DETERMINANTS OF SMEs' E-COMMERCE ADOPTION IN THAILAND

By

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ABSTRACT

Title of Dissertation	:	Determinants of SMEs' E-commerce Adoption in Thailand
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This research aims to study the determinant factors for SMEs in Thailand in adoption of E-commerce. The objectives of the study are to examine the influential factors for SMEs' E-commerce adoption, and their satisfaction with the government and private agencies' activities supporting them in the adoption. It also aims to investigate the SMEs' strategies and activities in response to customer needs in the E-commerce arena.

The conceptual framework was developed based the study of the potential factors and conditions that impact E-commerce adoption, mainly from previous studies and major international trade issues. Theories of technology transfer and innovation in globalization are also major focuses. Seven determinant factors that affect E-commerce adoption were included in the model.

The methodology employed in this research is mainly quantitative, by gathering data with set questionnaires and from interviews with the unit of the study, that is, the owners or top executive management of the SMEs. The samples are those SMEs who registered their businesses with the Department of Export Promotion (DEP). Chi-square analysis and logistic regression were employed for data analysis.

The major findings from chi-square analysis reveal that the determinant factors of E-commerce adoption include the human development factors, which are the level of educational background, major subjects, and English proficiency. They are all significant to E-commerce adoption. English seems to be a very important competency for E-commerce since it is the international language of business and, hence, the language of international

E-commerce. Moreover, SMEs, which are larger, have higher sales volumes and have more employees will have a greater tendency to adopt E-commerce. The companies which employ strategic management, and have high IT investment, and better customer satisfaction management will have a higher percentage of E-commerce adoption. It is very interesting that customer satisfaction is confirmed by both chi-square and logistic regression analysis as a determinant factor for E-commerce adoption.

IT investment seems to be the strongest determinant factor, since it is also confirmed by logistic regression analysis. The variables include IT training hours, the number of employees per one PC, and the number of employees that can access Internet. Access to Internet is a compulsory condition for all E-commerce.

The findings also include SMEs' satisfaction of the support role from Government, private and international organizations that impact the E-commerce adoption. The risk management of SMEs shows significant statistical value, like all the determinant factors, from chi-square analysis but not confirmed by logistic regression analysis.

E-commerce is a new kind of international trade that occurs in the modern trade arena, using Internet as the channel of communication. This phenomenon appears to change very rapidly and is complex in the context of trade. It involves all large and small enterprises worldwide. Globalization, technology transfer and innovation are the three core essences of this newest trade. In order to assist small and medium enterprises to survive in this highly competitive and no-boundary trade, it is necessary for the government and international or even private organizations to support them. However the extent of intervention is a challenge and must be handled with care by all, especially government agencies.

Since E-commerce is very fast moving and requires high innovation for competitiveness, it is a never-ending study and the data change all the time. There are many more issues that need to be settled in the Internet world and a lot more opportunity for the SMEs.

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ABBREVIATIONS AND SYMBOLS

Abbreviations	Equivalence
FTP	File Transfer Protocol
WWW	World Wide Web
IP	Internet Protocol
ISP	Internet Service Provider
IT	Information Technology
WAN	Wide Area Network
LAN	Local Area Network
B to B (B2B)	Business to Business
B to C (B2C)	Business to Consumers
B to G (B2G)	Business to Government Agency
C to C (C2C)	Consumers to Consumers
ECTEC	National Electronics Communications
NITC	National Information technology Committee
GDP	Gross Domestic Products
ECRC	E-commerce Resource Center
MNC	Multi-national company
HRD	Human Resource Development
SMEs	Small & Medium Enterprises
VAT	Value Added Tax
WTO	World Trade Organization
AFTA	Asia Free Trade Agreement
APEC	Asia Pacific Economic Cooperation
WIPO	World Intellectual Property Organization
FX	Foreign Exchange
FERM	Foreign Exchange Rate Management
HDI	Human Development Index
DEP	Department of Export Promotion

CHAPTER 1

INTRODUCTION

1.1 Background & Significance of the Study

1.1.1 Electronic-Commerce or E-commerce

The latest innovation recognized as a global revolution is telecommunication, or to be more specific, Internet. The Internet has been defined as a large and open international computer network consisting of many thousand networks all around the world. Communication over the Internet takes place with the help of Internet protocols (IP). A number of services are offered through the Internet, among these the transfer of data files (FTP), electronic mail (email), world wide web (WWW), etc. World Wide Web (WWW) is a global network and the most known on Internet.

The Internet is used commercially for sending information from one computer to another. Digital products like text message, reports, contracts, digital books, newspapers or letters in the form of computer files or programs, can be transferred on the Internet. Pictures, in the form of photographs, live pictures in the form of film or video can also be transferred. In addition, musical recordings, spoken dialogue included in film or just normal telephone conversations can be transmitted over the Internet.

The advent of the Internet has created a revolution in communication and has spawned the Information Age. It started with the generation of applications in the 1960's, followed by on-line computing in the 1970's. The technology led to the concept of processing information. Information Technology emerged as a major industry and the speed of the revolution grew very fast due to such developments as personal computers which help to decrease the cost of application, word processing, the network systems of both Wide Area Network (WAN) and Local Area Network (LAN). These

developments also increased investment in computing power and spawned the international standards for information communication (Collins, ed., 1990: 1).

In this new era of Information Technology, data and information comes in many varieties; it is continually flowing and the speed of transmission is constantly increasing, requiring careful management. This makes information management become very important. Various topics such as planning for strategic decision support information systems for more effective strategic planning and how to maximize benefits from Information Technology are widely discussed and researched. In order to study the management of information, Sizer studied the keys issues in managing information. He proposed that there are three component parts – data, information, and the state of knowledge-that have a profound effect on information. (Collins, ed., 1990: 59).

Since Internet, the most innovative of the telecommunication systems emerged, it dramatically changed the way of doing business; it created a new economy and new way of life globally.

It is similar to the situation when the computer system first came and changed the industrial structure, particularly in the supply chain. It was employed for competitive advantage and competitive strategies in most organizations. Many studies confirmed that operational computer capacities helped organizations gain improvements in cost-effectiveness, increased business growth potential and assisted in the decision making process (Barnett, 1996: 16-17).

Internet provides a vast amount of information to virtually everyone, regardless of where they are. This brings tremendous benefits. For example, for students, academic personnel or any knowledge searchers, it is the world's greatest library. It also allows medical specialists to diagnose patients who are very far away. It enhances communication of personal or even political expression. In short, Internet helps to drive economies, increase speed, decrease complexity, and is an inexpensive way that information can be collected, compiled and delivered around the world.

With Internet access, E-commerce has emerged and expanded rapidly, taking advantage of increasing access to customers, products, and suppliers worldwide, since it provides more and better market information. E-commerce, through the Internet, has the widest scope of trade and it is dramatically increasing to create a global market for almost any product. For entrepreneurs, it covers more customers with no limitation on

time and geographic boundaries. As a result of the rapid increase of sales volume, E-commerce entices businesses and consumers to adopt E-commerce and has become the new trend for export, which calls attention to international trade. One example of how Internet helps increase the sales volume and expands international markets is advertising via web site.

The World Wide Web (WWW or the web) contains a huge number of web pages that are connected to each other using hypertext. A web page may include a wide range of multimedia elements such as text, graphics, music, video and pictures. These pages are built up using a markup language called Hypertext Markup Language or HTML which contains commands that tell the browser how to display the page on the screen and links to other pages. Advertising appears in these web pages. A web site could be compared to the whole magazine while a home page is the front page. The web site is normally located at the web server.

It is well known that technological advance drives the development of E-commerce, much as it did Internet. Studies show that there are big changes caused by E-commerce. They are retail and wholesale trade, and international trade.

E-commerce is on the mind of nearly every businessperson. A wide range of reports from media, business, talk shows, books, newspapers, magazines and experts in the field are now all addressing questions related to the possibility of employing E-commerce. Just as high technology affected personal lives, these same inventions have changed the way of business. E-commerce, like Electronic Data Interchange, has allowed companies and suppliers to share information, and computer software has improved sales force effectiveness, and customer tracking.

1.1.2 Types of E-commerce

In the beginning, E-commerce was divided into three different types: Business to Business (B to B or B2B), Business to Consumers (B to C or B2C) and Business to Government Agency (B to G or B2G). Later on, there was an additional type, defined as Consumer to Consumer (C to C or C2C).

B to B or Business to Business is the most challenging type. One Internet research firm predicts that by 2004, nearly 37 % of all industrial sales will occur via E-

commerce. Business to consumer sales will also be large but not show as significant an increase when compared to B to B.

Many businesses have employed E-commerce; however, there are some areas that need to be resolved. One of the key issues facing all stakeholders is privacy. Industry or market - self regulation and government intervention are the two balanced elements that are being raised in E-commerce. It has been suggested for government to minimize intervention, if any, in any business involved in E-commerce.

1.1.3 E-commerce Policy

The United States was among the first nations to develop a comprehensive electronic commerce policy. The "Framework for Global Electronic Commerce" released by President Clinton on July1, 1997, set the stage for global adoption to this new form of business transaction. The framework outlined the administration's strategy for fostering increased business and consumer confidence in E-commerce. The major forces of the recommendation were that international efforts were needed to preserve the Internet as a non- regulatory medium and let competition and consumer choice shape the market. This includes tariff-free trade, less intervention from the government and letting the private firms lead the business. The principles and recommendations of the "Framework for Global Electronic Commerce" became the model for other countries to follow. There are seven principles and recommendations that the Director of Commerce Department has focused on: intellectual property, patents, domain names, uniform commercial code and electronic authentication, privacy, content, and standards (William M.Daley – Secretary of Commerce).

As for Thailand, the fact that our market system, technical innovation or even current regulatory and legal structure are far behind the U.S., is causing us to face a critical situation. If we do not prepare and manage well, we will lose our traditional markets rather than gain the huge benefit of the free market of E-commerce. The free flow of information is the core of democracy and of the market - based economy. As such, it makes Thailand face even more difficulty in handling E-commerce since some of the problems are unique and different from others, especially the United States. There are several problems and issues that are significant to E-commerce transactions in Thailand. They are information infrastructure (including accessibility, availability, and

affordability; at the moment Thailand has leased line fees higher than our neighbors), consumer protection, payment system, tax, intellectual property protection, security, illegal IT activities, (e.g. illegal barriers, lack of security in trade action, tampering with the data, etc.), monopoly in telecommunication service provider, (resulting in higher service fees and higher Internet surcharges in Thailand than other countries in Asia), and law & legislation issues .

Aside from those many problems, Thailand also has had the problem of duplication on E-commerce related tasks among the concerned parties. It seems that there are many organizations in the government that try to cope with the problems in their own way, and there is no clear direction. It has taken quite sometime before the government could define each role and responsibility to respond to E-commerce related issues.

Despite the presence of all the above issues, Thailand has still been able to formulate an E-commerce policy .The E-commerce policy broadly stated that "Thai government's policy is to enhance the free market system on E-commerce. The Ministry of Commerce is assigned to facilitate the electronic transactions to be convenient, and effective. The government will set only the necessary rules to guarantee that trading over the internet is certain, consistent, just, convenient, secure, and meets the international standard."(NECTEC, 2000).

There is still a lot more to do to clarify the policy and make the policy effective. The working groups to ensure effective policy implementation includes Ministry of Commerce 's Committee for International Economic Policy, Advisory Board for E-commerce for Export Project and the Ministry of Sciences & Technology and Environment. NECTEC will study the master plan for E-commerce, and act as coordination center for E-commerce.

The problems of conflict of interest among local, national and international issues and constituencies occur in most areas. International developments, within the global information industry and the global economy, have direct impact on the usage that can be made of IT for social development. Inter-government cooperation also shapes the "enabling environment" for progressive use of IT. Unfortunately, much of the analysis of international trends is not written in a way that is understandable to local

and national citizen groups or activists. An immediate process of analysis and dissemination is required to fill this gap.

Some interesting statistical data for Thai economy in the year 2001 is shown in the table below:

Table 1.1 Thai Economy in 2001

GDP	4,900	Billion Baht
Private Consumption	2,752	56.1%
General Govt. Consumption	561	11.4%
Fixed Capital Consumption	1,083	22.1%
Change in Inventories	32	0.7%
Exports	3,290	67.1%
Imports	(2,862)	(58.3%)
Statistical Discrepancy	50	1.0%

Source: NESDB. 2002. Thai Economy in 2001 (Online). Available URL: http://nesdb.go.th/

The most interesting statistic above is the sum of exports and imports which indicate the international trade of 6,152 is a huge amount, bigger than the GDP. This indicates how international trade plays a very important role in the economy of the nation. Because international trade is increasingly conducted via E-commerce, it becomes increasingly important to establish policies which facilitate E-commerce and ensure that Thailand is competitive and maintains the international standards for such trade.

Another interesting bit of statistic data is from the Department of Export Promotion, Ministry of Commerce. (www.depthai.go.th) The highest volume of exports is from computers and their related parts; the second one is electrical circuits. Agricultural products such as rice and rubber fall to the third and second from the last place respectively.

1.1.4 Organizations for E-commerce Regulatory Policies and Legislation

There are a number of working groups, working together for efficient results in a timely manner to cope with the pace of the E-commerce growth.

In February 1996, the cabinet at that time issued the Information Technology policy by the Ministry of Sciences & Technology and Environment, with the objectives were to develop the economy and society, and strengthen the business and manufacturing sectors to be in step with the IT era, which is considered the new economic era. One of the key factors is law and legislation establishment. Information Law or IT Law initially consists of six kinds of law, all related to each other. They are electronic commerce law, privacy protection law, computer criminal law, electronic signature law, telecommunication law, intellectual property law and electronic funds transfer law.

On December 15, 1998, the cabinet assigned the National Information Technology Committee or NITC to be the center and to coordinate all working groups for establishing IT Laws. There were two working groups established: the Committee for E-commerce Law Drafting and the Legal Execution Department; NECTEC and National Science and Technology Development are to be responsible for drafting of these laws until they were completed, announced and enacted. Members of the committees were experts from international trade, and law firms. University professors were also included.

The laws will ensure that every one can have an equal opportunity in adoption of E-commerce; they will provide efficiency in trading and control so no one has a special advantage, or can use E-commerce for illegal purposes.

After a long time of hard work, these working groups were able to push two laws into an advanced stage. These laws are the E-commerce Law, and the Electronic Signature Law. Computer Crime law will, hopefully, follow very soon. However, it is not easy for the laws to be enacted, especially because these kinds of laws need not only those experts in law but also in IT technology. The list below shows all the related E-commerce laws and their status:

- Electronic Commerce Law -- Enacted effective as of April 3, 2002.
- Electronic Signature Law -- Enacted effective as of April 3, 2002

- Electronic Funds Transfer Law -- Expected to be ready and proposed to Cabinet by the end of March 2003.
- Privacy Protection Law--- Cabinet approval on Oct.3, 2001
- Computer Criminal Law --- Drafted and made ready by the Committee May 2, 2002
- Intellectual Property Law --- Draft process

Source: NECTEC . 2002. (Dec.3). The Progression of IT Laws (Online). Available URL:http://www.nitc.go.tj/itlaws4/head3-1html.

1.1.4.1 Bank of Thailand Electronic Commerce Committee

This group will study a plan for setting up infrastructure for E-commerce, an implementation guide for E-commerce to be trusted internationally, a technical standard for safety and security in E-commerce cycle, and an international trade law that will impact on E-commerce. Its responsibilities also include making suggestions to look after financial institutions and E-commerce financial business as well as protect businesses on exchange and laundered money issues.

1.1.4.2 NECTEC

Among the government agencies, NECTEC or National Electronics Communication and Technology Center seems to be very active in E-commerce. Being the secretariat of the office for Thailand National Information Technology Committee, NECTEC has a major role in stimulating economic and social impact through R&D programs and recently has established an E-commerce Resource Center (ECRC) that has proved to be a major factor for obtaining prompt results. The ECRC aims to achieve the following objectives :

- To establish awareness and understanding of E-commerce in the public, especially the consumers, starting from the policy making level through to the implementation level;
- To be the center of information and knowledge of E-commerce for internal activities and to establish readiness for international negotiation;
- To build up the readiness in human resources development (HRD) related to E-commerce including training and education; and

- To coordinate long term development in E-commerce in the private sector.

From the NECTEC web site, NECTEC is known as a dynamic organization whose main function is responsible for the national development of IT to ensure Thailand's competitiveness in electronics and computers. Also, there are many projects under NECTEC to develop the IT Infrastructure.

Source: NECTEC . 2002. (Dec.3). Information (Online). Available URL: http://www.nectec.or.th/home.

1.1.4.3 Ministry of Commerce

This ministry plays an important role in E-commerce. The introduction of the Pilot Project on E-commerce to increase exports, especially with the small and medium enterprises (SMEs) was successfully implemented. There are 3,077 enterprises that joined the project, and 90 small businesses in Internet were approved, while 41 were ready to do business with their own homepage.

The objectives of this pilot project are to test and study the problems occurring when operating E-commerce in order to build trust between buyers and sellers to increase the capability of SMEs, to increase foreign currency, to have solid data for negotiations in international business and to plan for improvement of the industrial and manufacturing sectors.

To fulfill these objectives, seven working teams were set up to handle different subject matters, namely: registration, promotion, communication and training, marketing, consumer protection, tax, transportation and assurance, payment and security, and signature, and legal affairs.

1.1.5 Registration, Promotion, Communication and Training Group

The Ministry of Commerce has registered the domain names for the web sites thaicommerce.net, thaicommerce.com and thaicommerce.org in the USA to be the main gate for other home pages in Thailand that provide E-commerce services. The website thaiecommerce.net will focus on the issue of reliability of the sellers, selecting the companies that are qualified and promote them. The Ministry of Commerce accepted 3077 companies to join the program, both in the manufacturing and service sectors. The E-commerce shops were targeted at 100; there were 90 selected and among them, 40

have home pages and are ready to do E-commerce. E-commerce started operating on Jan. 8,1999, having a sales volume of US$ 3,000.

1.1.6 Marketing Group

This group focuses on six market places; USA and Canada, Japan, EU, ASEAN, Australia and a group of Chinese in Taiwan, China Mainland and Hong Kong. This is the target market for manufacturing and service businesses. Manufacturing products will be physical products such as jewelry, food, garments, leather goods, toys, furniture, gifts, and plastic products. The intangible products are such things as songs, electronic books and software. Service businesses will target tourism: hotels, restaurants, car rentals, tour companies and airline bookings, etc. The main responsibilities also include strategies to support export and to get into new foreign markets, to train Thai exporters, to work in cooperation with the Foreign Affairs Ministry to promote Thai E-commerce and to provide service to foreign markets, and also to cooperate with ISP to have a cyber link and Commerce Ministry web site.

1.1.7 Tax Group

This group works on providing promotion and assistance on tax and tax related issues.

For instance, registered E-commerce merchants will be exempted from tax except Leather goods, and pay 0% for VAT. The formalities will be easier and not too complex for all parties. Income tax will be charged at the point, and the exchange rate will be based on the Thai National Bank rate on the following day. As for intangible goods for export, there is still no clear solution. The Tax Revenue Department views that this should be treated the same as service businesses.

1.1.8 Consumer Protection Group

Currently, there is no legal protection for consumers; however, Technology systems for E-commerce security in Internet like SSL, SET could help, as well as the market system to screen out bad merchants. In addition, the Thai Government's Embassy or Commercial Consulate will act as a center for taking care of the claims.

1.1.9 Legal and Signature Group

There is no signature law at the moment, however, there is a plan and the working group is still working on it.

1.1.10 Finance and Security Group

Payment currently is still not safe. NECTEC is now trying to set up Certification Authority or CA.

1.1.11 Transportation and Assurance Group

Forwarding companies proposed to reduce the service charge, for E-commerce, 30% for UPS, 40% for FedEx and 60% for DHL respectively.

1.1.12 E-commerce Coordinator : NESDP IX

There was an agenda for the major plan for E-commerce in the meeting of the committee for E-commerce policy. The role of this committee was changed to "coordinate policy and procedure between the public and private sector for development of National E-commerce". This group consists of the Deputy Prime Minister, chairman: the committee includes Mr. Boonmark Sirinaowkul, National University Ministry, and representatives of the Department of International Economy and Commerce, TDRI, Foundation of Thailand Computer Business, and Department of Industrial Support. Mr. Pichate Durongkaveroj and Mr. Krisda Piampongsarn are the Secretary and Asst. Secretary, respectively.

1.1.13 Consumer Protection Payment and Security

This group consists of NECTEC and Bank of Thailand to study the possibility of Certification Authority and establishing an organization to support or guarantee all Certification Authority.

Electronic marketplaces allow even small firms the opportunity to contact their suppliers and consumers globally. Through the corporate web site, or Internet, small and medium enterprises can have an additional sales force. These web sites provide a channel for retailers and manufacturers to get rid of overstocked merchandise. E-

commerce can also facilitate effective inventory management. In addition, merchants can search for the price that customers are willing to pay. E-commerce, therefore, is a significant opportunity for the SMEs to sell or export their products. Consequently, most SMEs are an important channel for countries to increase their exports.

In addition to the above issues that involve input from many organizations, there are areas that must be studied in order to gain quick readiness to cope with the free market–base of E-commerce. The subject matter or the issues include the following:

- Establishing an executing agency to assure the following areas of services: cryptographic service, certification management service, and anciliary service
- Coordination with Ministry of Finance. to study the impact to national income from the free market of E-commerce. Special attention must be given the affect of tax and duty, VAT, and income tax including efficient measurement.
- Coordination with the Ministry of Communication to establish a telecommunication policy to have high quality and a wide range of services at a fair price.
- Coordination with State education institutions such as the Ministry of University Affairs on human resources development to prepare personnel in IT, English and computer skills. The private sector also needs to be involved.
- Coordination with the Ministry of Industry to develop industry for export and job creation purposes, especially to assist the SMEs in human resources, marketing, etc.

1.1.14 International Organizations & E-commerce in Thailand

1.1.14.1 E-commerce & WTO

The meeting in Geneva in May 1998 had some significant solutions on E-commerce. The committee had set an agenda to consider the economic and financial issues and level of development in developing countries in detail. There was no solution made on tax-free status for E-commerce businesses. The sub-group discussions focussed on E-commerce in the service industry, intellectual property protection and business development.

1.1.14.2 E-commerce & APEC

The plan and taskforce for a regional E-commerce work plan were established on November 6th, 1997. On April 7, 1998, an APEC taskforce established the APEC Blueprint for Action on E-commerce. This blueprint outlined the creation of a data system to develop SMEs by proposing to set up an EC Multimedia Resource Center and building a network for SMEs. For SMEs, Thailand proposed to establish an Electronic Commerce Resource Center (ECRC), focusing on human resources development. As well, the role of government and ways to build up an atmosphere to support E-commerce were discussed widely.

An APEC steering group was set up, which consisted of Co - Chairs between the USA and Thailand, two administrators and one representative from private firms, to continue to set the plan, and align with the Blueprint to Promote E-commerce. The plans include building up confidence and reliability in the system for the users, expanding for more users including SMEs, reducing the barriers and eliminating the obstruction to E-commerce. Other plans included developing law and legislation for a borderless atmosphere in technology and other related matters, and supporting international interdependence. (Agenda of the Institute of Regional Economic cooperation, May 12,1999: 3).

1.1.14.3 E-commerce & ASEAN

In the first meeting of CCEC, the plan and activities for E-commerce were established. They considered the issues of reliability, rules and regulations, infrastructure, and human resources in ASEAN for E-commerce Development. The ASEAN Guiding Principles and Work Program for Hanoi Plan and Action was also set up at this meeting. The topic of E-commerce was widely discussed. At the CCEC second meeting, the ASEAN Guiding Principle & Work Program for Hanoi Plan of Action was done. This time, the development of an ASEAN web for E-commerce was promoted.

The Hanoi Plan was implemented after the third CCEC meeting. Malaysia was assigned to study the scope and policy. Support and assistance were requested from developed countries.

1.1.15 New Issues from E-commerce : Finance Policy, Payment

Since E-commerce causes faster money liquidity and will increase demand of money used in e-commerce payment, the Thai National Bank must be fast and efficient enough to cope with the change. It also has the tendency to cause inflation if the products get a higher price and when electronics become the medium for money exchanges. Thus, if there is no control in development of a payment system and accurate data, it will affect National Bank production of bank notes. It will also affect revenue and the budget plan. Therefore, it is necessary for Thailand to issue rules and policy for E-commerce payment and prepare for the impact on the national financial and banking system.

1.1.16 Small & Medium Enterprises (SMEs) in Thailand

E-commerce is emerging and expanding in the time that most ASEAN countries face the difficulty of recovering from an economic crisis. There is no doubt that in this competitive era, added to the economic downturn, every country, especially the developing countries, is affected. Thailand is no exception. The financial crisis in the capital and foreign exchange markets, which was caused by a sudden loss of confidence in the Thai economy make the problems even bigger. Everyone is suffering from the financial mistakes of the past. Unemployment seems to be the biggest problem that affects a large group of people. Governments, as well as individuals struggle to find a way out. However, "there is it is no easy obvious way out", as Max Cordon mentioned (Cordon, 1999). Yet, to increase exports is one way that could easily help. For exports, SMEs are clearly shown as having the most potential of any group to boost the economy. Therefore, to promote and assist SMEs to adapt quickly and start doing business through E-commerce seems to be a good choice. In most countries, SMEs are the biggest source of export even in normal circumstances. Consequently, the state has to focus and work hard on both making E-commerce real and supporting SMEs in adapting to E-commerce.

SMEs or small and medium enterprises are usually the most important base of the economy in most countries. The role of SMEs may vary, depending on the economic status of each country. For example, the U.K. and U.S.A. support SMEs as a mechanism to prevent monopoly and encourage market competition. Moreover, another

important role of SMEs is to generate new products to expand in the global market. In Japan, the SMEs are very far behind and cannot compete with big enterprises in terms of finances, efficiency in production, and management; therefore, the government has to provide more support and development.

In other developing countries, the economy is generally poor; the bigger enterprises can generate more employment for the workers, so the support from the state has focused on the bigger enterprises. Recently, SMEs have also been considered as the ones who are creating employment in various fields and, unlike large enterprises, which tend to be centered in major urban areas, SMEs cover the whole region. Support for SMEs could also reduce the gap between development in the big city and in rural areas. Some legislation has to be established and enforced to support SMEs. Some countries, such as U.S.A, relied on Adam Smith's free- market principles. However, the government established laws and regulations just in case the free-market mechanism did not work well or failed. However, government intervention was kept to a minimum. Normally, most countries will take the role of regulatory function and will allow market rationality and plan rationality to enhance efficiency and effectiveness in SMEs (Pempel, 1987).

In Thailand, as in other developing countries, more focus was on the large industry first, since governments assumed the large enterprises could generate more employment, not realizing that the SMEs are the biggest group in the country and are significantly important to the process of social and economic development. SMEs consist of manufacturing, merchandising (wholesale & retail) and service businesses. Unfortunately, most of these SMEs lack capacity in operational areas such as technology, management, marketing, and finance when compared to the large enterprises. In adaptation to E-commerce, SMEs, then, need full and proper support from the government.

1.1.17 Promotion of SMEs in Thailand

All concerned governmental organizations have formed their teams and work to promote and support the SMEs. The government policies for SMEs development are embodied and articulated in various forms. These include Acts of Parliament, and the National Economic and Social Development plan. From this major plan, many projects

that have cascaded down are the responsibility of the concerned ministries. Each working group has set their objectives, strategies, plans and targets to fulfill their objectives.

1.1.17.1 Industrialization Policy

From the Eighth National 5 –Year Economic and Social Development Plan, 1997 – 2001, there are some significant activities supporting SMEs:

- Introduction of a new paradigm, shifting from growth orientation to human development,
- Promotion of greater application of a production subcontracting system
- Development of a marketing system for small scale businesses
- Encouragement of public and private financial institutions to expand credit to SMEs, and
- Provision of training and information to SMEs, especially in the rural areas.

In addition, the Master Plan has been extended to a long-term vision. The vision 2012 for Thai industries is to maintain competitiveness with new competitive advantages. These include a strong flexible industrial exporting economy, sustained development of managerial skills and industrial research & development, and quality assurance of the product while preserving the environment. It will also be an information-based society. Many projects are the responsibility of the Department of Industrial Promotion.

Source: Ministry of Industry. Department of Industrial Promotion, 2001)

In relation to internationalisation of business facilities, under the Asean Free Trade Agreement (AFTA), Asia Pacific Economic Cooperation (APEC), the ASEAN Industrial Complementation Scheme (AICO), under the Indonesia-Thailand-Malaysia Growth Triangle (ITM-GT), Mekhong River Project, SMEs in Thailand, inevitably, have to enhance their competitiveness to reach out to international market niches through more efficient operations.

1.1.17.2 Definition of SMEs

Currently the Ministry of Industry and the related organization define the size of SMEs by their permanent assets and include the value of the land to be the criteria in classification of different types of business of SMEs.

Table 1.2 Classification of SMEs

Type of Business	**SMEs**
1. Manufacturing	Not more than Bht.200 millions
2. Merchandising-Wholesale	Not more than Bht.100 millions
Merchandising-Retail	Not more than Bht. 60 millions
3. Service Providers	Not more than Bht.200 millions

Source: Ministry of Industry. 2001. (June 7). SME in Thailand (Online). Available URL : http//www.smethai.net.hotnews/tnw3.htm.

The definition of SMEs may vary according to time and policy adjustment. Generally, SMEs means small and medium size enterprises, measured by the amount of permanent assets and employees. The small enterprises were clearly separated by the amount of the assets, i.e., 100 million Baht, and 200 employees for the medium enterprise and 20 million and 50 employees for the small one.

In Japan, the definition of SMEs has also been adjusted. According to the Basic Law of SMEs the definition has been standardized as follows (Higuchi, Kenji, 1999):

SME Classification in Japan

Type of Business	**SMEs**
1. Manufacturing & Transportation	Capital less than 100 million yen or less than 300 employees
2. Retail and Services	Capital less than 10 million yen or less than 50 employees
3. Wholesale	Capital less than 50 million yen or less than 100 employees

In order to cope with economics in the millennium, the SMEs in Japan were redefined as follows:

Type of Business	Employees	Registered capital (Yen)
1. Production and Mining	300	100-300 millions
2. Wholesale	100	10-100 millions
3. Retail	50	10-50 millions
4. Services	50–100	10-50 millions

In various countries, either classified as developed or developing ones, the definition and the importance of SMEs are similar. However, the intention in looking for new approaches in order to make SMEs a genuine source of national revenue might be different.

1.2 Statement of the Problem

During the economic recession, SMEs were the group that was severely impacted. With extreme limitations in preparation time, there has been the global innovation of E-commerce which SMEs have to confront. It could be either a threat or an opportunity. It is obvious that with sufficient support to SMEs, the growth of export from E-commerce could be a grand opportunity. However, entrepreneurs will have to perform smarter. If they do, then the nation could survive and become more self-reliant. The problems that urgently seek prompt answers and responses from government lie with the following items; they could be considered as the major tasks for the nation:

- What should be the right direction of E-commerce in Thailand to support SMEs, in term of laws, legislation and their enforcement?
- How could a supportive environment be promoted for the increase of exports via E-commerce by the SMEs?
- In order to compete in the global market, how could "speed competitiveness" be fostered to help SMEs?
- What would be the best practice for the SMEs in E-commerce adoption so they may be ready for other impacts from severe competitiveness and the rapid pace of high technology development in telecommunication?

All these above questions require delicate integration plans from all related parties; entrepreneurs of SMEs themselves, government agencies, and any international agencies. Even though there are some plans in the process of implementation, speed and readiness have to be strongly emphasized in this fast and dynamic information technology era.

1.3 Objectives of the Study

- To examine the critical success factors for E-commerce in Thailand for SMEs.
- To examine satisfaction with the government and private agencies' activities supporting E-commerce adoption.
- To study the SMEs' activities in response to customer needs in the E-commerce arena.

1.4 Scope of the Study

The Scope of the study will start from the start up of E-commerce in Thailand to the mid -year 2002, so that the focus and factors will not vary too much since this revolution of trade progresses very rapidly, and more various external factors influence different parties.

The SMEs will be the unit of the study, representing one part of E-commerce. The study will reflect the efficiency of those roles and responsibilities of government agencies relating to E-commerce.

1.5 Limitations of the Study

The study is focussed on SMEs; therefore some of the conclusions and recommendations are specific to the needs of that group. Therefore, they may not be applicable to larger businesses or to public sector organizations.

Furthermore, because of the fast pace of change in information technology, the study must be considered as "just in time", which means the findings may become outdated rapidly.

In Addition, the samples selected are those whose main businesses are export. So, it will not include the SMEs who start their business with local and might expand to export in a short time.

As well, some of the questions are perceptual in nature, thus, some of the responses may be subjective.

1.6 Expected Benefits of the Study

Even though time and financial constraints are the major two important barriers, this study expects extensive benefits. The findings of the study are expected to be accurate and updated data, relevant for the policy makers and related parties involved in the development of E-commerce so they can adjust the policy on E-commerce covering all necessary areas that will enhance maximum benefit to both entrepreneurs and consumers, creating a win-win situation for both parties and, overall, improve the life of the people in this nation both in terms of economic and social status.

Promoting export through E-commerce by the SMEs in Thailand will have a strong, positive impact on the overall national development, not only in the economy but also in social aspects. Thai people are faced with globalization, getting the latest information globally 24 hours a day, 7 days a week. Since E-commerce covers all aspects of life needs - education, medical, consumer products, entertainment and so on, we could expect a better quality of life through Internet and E-commerce.

As E-commerce is in an early and growing stage, this study will also benefit researchers to continue study in this areas for the newest and never ending developments.

Hence, this study aims to present findings, and recommendations to the E-commerce policy makers to shape policy and develop flexibility to cope with the extremely fast, dynamic nature of this kind of business in order to convert "threat" to "opportunity". The aim is to balance the extent of intervention to the level that does not

violate the free – market nature of E-commerce and yet look after the weak areas to promote the export through the participation of the SMEs.

Other Benefits of the Study

The findings of this study may also allow academics and researchers to continue to study the possibilities and opportunities of E-commerce business in other areas. As this is a very dynamic issue, it changes every minute and information reaches every one in the globe. Therefore, this study must be considered the first part of a continuous study.

1.7 Organization of the Study

There will be five chapters in this dissertation. Chapter One describes the significance of the study and states the objectives, scope, limitations, and benefits the study. Chapter Two reviews the literature, previous research studies and theories related to the topic of the dissertation. Research questions, conceptual frameworks, models of analysis and hypotheses are included in this chapter. The populations and samples, unit of the study, the operational definitions, data collection, construction of the questionnaire, and model are described in Chapter Three. In Chapter Four, all research findings and results will be demonstrated, while the summary, discussion and recommendations appears in Chapter Five, the last chapter of this dissertation.

CHAPTER 2

REVIEW OF THE LITERATURE

2.1 Adoption of E-commerce

There are a few areas that need to be clarified in order to better understand this study. One area is E-commerce background and its relationship to the free market, and the related issues in terms of the new ways of doing business that affect those who adopt E–commerce. These issues are related to the implementation of the E-commerce Policy. As well, attention must be paid to all who are directly impacted These include businesses in the trade business as well as consumers, who may be anyone who seeks products and services that are better in quality, cost less, are more convenient, and respond to their needs in a timely manner.

E-commerce refers to "... the carrying out of business activities through electronic means". It can be classified into three characteristics: business – to-business, business –to- consumers, and business –to- government. The major concern in this study is the second type, business to consumers.

Porters (1990), in his famous **"The Competitive Advantage of Nations"** explains why some nations succeed and others fail in international competition. He strongly advocates the need of a new paradigm in international trade. This means, to the researcher, to adopt the newest form of business transactions, E-commerce.

In adopting E-commerce, from the consumer's perspective, there are several steps involved in a transaction: searching & advertising, then conducting the transaction, which includes ordering, payment, and finally, the physical delivery of goods or electronic delivery if it is electronic data.

Since Internet has emerged, it has begun the information era; there is a 'free flow of information' and this information is essential to democracies and to market-based economies. As Internet is the channel that serves E-commerce, the quality of

the Internet system will be very important in the competitive global market. The Internet must allow interaction in a reliable manner; it must not be expensive, it must provide global coverage round the clock with no time, or geographic limitation. It can be used or transferred by multi-media.

It is clear that the nation not only must be well aware of the consequence of this high, fast and dynamic technology, but the specific direction must be clear and pass through the related parties. To promote a supportive environment, there must be an integration of all concerned groups, which may work separately but align to the same objectives. Speed competitiveness is also a major factor that forces every party to perform their roles and responsibilities in a timely manner. Moreover, at the same time, they must forecast the impacts that will occur and prepare to cope with them. Although, as Berman (1978) mentioned, in the state perspective, the micro implementation starts with local adoption decisions and ends when local systems have incorporated new practices or terminated them, adoption of E-commerce is something different. In globalization, there is no way out; one has to face it and incorporate it. Yet, it needs a smart and well-prepared approach. This may come from collaboration of all parties and the network.

As such, benefit will come to all parties and it is a win-win relationship. E-commerce will reduce business costs as companies are able to take advantage of increased access to customers, products, and suppliers worldwide as well as to more and better customer marketing information. As well, consumers will benefit from reduced prices and greater product choices that flow from accessibility to more and better consumer information and more vendors.

Enterprises apply the new channel or process of trade, selling their products or services via Internet. Purchasers select the products from the list or as shown in the web site and pay by electronic money such as a credit card or electronic bank transfer. The buyer may pay before or after receiving the products. In Thailand or elsewhere where there is an insufficient degree of confidence in the payment system; payment may not be done electronically. Transferring the money directly to the seller's bank account, or sending a money order, or cashier's check to the sellers are widely practiced. This is still counted as E-commerce. (Assumption University. E-commerce, Human Resources Development Center, 2002: 66-71).

According to the Commerce Ministry web site data, the World Trade Organization (WTO) has divided business transactions in E-commerce into three stages: searching stage, ordering and payment stage and delivery stage. The first stage, searching information, seems to be the major part of E-commerce; it comes in the form of electronic communication. Ordering and payment may be done by the conventional way or electronically. As for delivery, there is a limitation of products or services that can sent electronically, but in the future, there are indications that more products or services that come in the form of information or software such as in the entertainment services, movies or songs, etc. will be delivered electronically.

In E-commerce adoption, there are concerns about areas that the SMEs might not have enough confidence. One such area is the payment system. Consequently, SME's will be reluctant to employ full E-commerce or not employ E-commerce at all. The enterprises are very careful to communicate information via Internet or Intranet. For instance, they will put products online only for advertising and not for payment and delivery. This is usually more relaxed on business to business transactions, since most businesses have an ongoing relationship to some extent and share some processes such as supply chain management.

In Thailand the majority of E-business still emphasizes the tangible products market, and among this group, most of them locate in the big cities where it is easier to connect to Internet. There is high pressure on government to improve the infrastructure to expand the computer network. As for SMEs themselves, what they have to improve is their English, which is the international language of business.

2.1.1 Innovation Adoption Process & Speed Adoption of E-commerce is not only an innovation in the trade market , it is an integration of new technology transfer, a new process for doing business as well as opening a new global market. Even though E-commerce is understood as a very advanced process, it is not that easy and requires some supporting conditions. As Rogers states, even if the innovation has obvious advantages, it may be very difficult to adopt. Therefore, he said a common problem for many individuals and organizations is how to speed up the rate of diffusion of an innovation. (Rogers, 1983: 1).

Rogers defines diffusion as a process by which innovation is communicated through certain channels over time among the members of a social systems (Rogers, 1983: 10). Time plays an important role in the process of innovation decision-making. Rogers divides the innovation decision process into five steps: knowledge (one gains some understanding of how it functions), persuasion (one forms a favorable or unfavorable attitude toward innovation), decision (one engages in activities that lead to a choice of adopt or reject the innovation), implementation (puts an innovation into use), and confirmation (one seeks reinforcement of an innovation decision that has already been made) (Rogers, 1983: 20-21). This will be discussed later in more detail.

2.2 Issues Involved in the International Trade Market

International Trade plays an important role in E-commerce. There are a few terms that need to be discussed:

2.2.1 Liberalism Political economists suggest the term ' liberal', when applied to the present day, denotes something considerably different from the classical liberalism. Thomas Jefferson, the early American liberal, stated that liberalism hinged upon two postulates about the relationship between politics and economics. First a truly democratic order was to be best realized in a nation composed largely of small farms, augmented by the necessary number of small businesses. Second, the chief threat to the realization of such a system came from the advocates of big business, and these advocates were known to favor governmental intervention to help the "infant industries" of America get established. (Samuals quoted in Elliott and Cownie, 1979).

Therefore, it seemed apparent that the rights of individuals in the economic sphere could be protected only if the government would take firm steps to limit the influence of the large-scale economic power blocs that had arisen. This school of thought supported a variety of governmental economic activities, and is called 'modern social reform liberalism' or simply 'liberalism'. (The school of thought that maintains that the chief threat to democratic capitalism is unwarranted government intervention in the economy is called 'modern conservatism' or ' conservatism').

2.2.2 Free Market It is worth to quote Milton Friedman's concept of the power of the market (Friedman, 1981: 1-3) that if the exchange between two parties is voluntary, it will not take place unless both believe they will benefit from it. Most economic fallacies derive from the neglect of this simple insight. To Friedman, the government or what he called 'sovereign' has only three duties according to the system of liberty: the duty of protecting the society as a whole, duty of protecting every member of the society from injustice and the duty of erecting and maintaining certain public works.

Friedman believed that free trade at home and abroad is the best way that a poor country can promote the well-being of its citizens.

2.2.3 Protectionism & Tariffs Developed countries such as the United States of America try to emphasize the tariff free area for E-commerce, since the nature this business makes it easier to do so.

Since Adam Smith, most economists agreed that free trade is in the best interest of trading countries of the world. Yet, tariffs have been the rule and there is much support for tariffs, which are labeled as 'protection'. The arguments on free trade and protectionism are mostly related to the tariff issue. There are normally three reasons for tariffs. The first is for national security; the second is to protect 'infant industries' or shelter the potential industry in its infancy and enable it to grow to maturity. The last one is 'protect-thy-neighbor', that is a country who is a major producer of a product joins with a small number of other producers and, together, they can control a major share of production, taking a monopoly position by raising an export tax or export tariff.

To date, every trade negotiation has become a political matter. Tariffs and similar restrictions on trade have been sources of friction among nations.

2.2.4 Government Intervention & Legislation John Maynard Keynes argued that unemployment and depression are usually the problems of industrialized capitalist economies and required government intervention through control over spending, taxing, and the money supply. To Keynes, the government policies in this

regard were perceived as complementary to private enterprise and the market price system to allocate resources and distribute income efficiently.

Following the national-scale macroeconomics of Keynes, economists reviewed microeconomics, and a synthesis came out on the assumption that competition would prevail and concentrated economic power could not control markets for its own benefit. Then, to ensure competition and prevent monopolies, strong antitrust legislation is required.

As to the question of to what extent government intervention in this context that will enhance efficiency in E-commerce rather than be harmful to the business, Schultze has come with a sound view: "As society has become complex, government has been forced to intervene more and more in the activities and decisions of consumers and businessmen in order to achieve national objectives and has done so almost exclusively with detailed laws and regulations." (Schultze, 1977) However, Schultze raised the issue that the regulations, laws and agencies have attempted directly to force people and businesses to do certain things rather than to encourage them.

Schultze emphasized and favored the 'market-like arrangements' and suggested that they can reduce the need for compassion, patriotism, brotherly love, and cultural solidarity as motivating forces behind social improvement.

Public and private management are at least as different as they are similar, and the differences are more important than the similarities (Allison, 1983: 65) To effectively support E-commerce requires cooperation from both the public and private sectors, which makes this matter become very challenging.

Clive Hamilton (1989: 12-13), in his essay, **"The Irrelevance of Economic Liberalization in the Third World"**, concluded that "the case for liberalization in the West is valid, that government intervention mostly serves to shackle enterprise and leads to distortions in resource allocation which inhibit growth, and this will draw the distinction with the Third World more sharply". He proposed the idea that 'broad policy prescriptions based on abstraction will be ineffectual unless they are tailored to suit the institutional conditions of the country concerned"

2.2.5 Intellectual Property World Intellectual Property Organization (WIPO) has been established mainly to provide a forum for the development and implementation of intellectual property policies internationally. Major services that are provided to the private sector include administration of the systems that facilitate the attainment of the protection of patents, trademark, industrial designs and geographical indications in multiple countries through a single international policy and procedure. (WIPO, 1999).

Most conflicts arise from the domain names as they acquire a further significance as business identifiers. As such, there will be conflict with the system of business identifiers that existed before the arrival of the Internet and that are protected by intellectual property rights. These conflicts have led to many problems that raise challenges to the involved persons, and through the Internet medium, they became the global consequence of intersection of the whole world.

WIPO plays a role for an international process of consultations or WIPO Process. Through this process, the consultations have provided recommendations to the corporations on managing the interface between the domain system and intellectual property.

One of the best practices suggested by WIPO was the adoption of standard practices for registrars with authority to register domain names in the generic top-level domains. This will reduce the tension that exists between domain names and intellectual property.

Human resource development must be prepared for the new changing global market, which is a knowledge-and information based society of massive and rapid technological change. This will have a strong impact on the nature of work and education, training and professional development.

2.2.6 Promotion of a Favorable Business Environment Achieving widespread consumer adoption of E-commerce is a challenge to every trade organization. Related parties need to enhance the awareness and confidence, as well as support the development of relevant skills and network literacy. (E-commerce Commission Communication: Business Environment).

2.2.7 Trust - How to build Trust ? Consumers need to have confidence in the E-commerce process itself. All organizations such as trade and industry, need to work closely together. Support may come in the form of consumer reports, use of quality labels, issuing comparative reports or by endorsement of new services by trusted commercial brand names like banks, credit card companies or network operators. Trust, naturally, can be increased by the transparency of transactions, especially by making clear the legal status of any information provided. Industry or enterprises may also increase the level of trust by adopting codes of conduct, consistently improving the quality of products, and by being innovative by introducing new products that serve consumer needs, based on their professional research and development.

2.2.8 Quality Labels for E-commerce Payment Besides a simple process, the consumer also needs to have quality labels in payment . The financial industry, consumer representatives and public authorities would together define these criteria.

2.2.9 Education Education is an investment in human capital. On the average, it pays a good return. Studies show that the rate of return on higher education, for example, compares favorably with that on business investment.

2.2.10 Tax In private market transactions, there always are 'side effects and spillovers' (Schultze, 1977: 40) arising from tax and government spending and sometimes the benefits extend beyond the jurisdictions of the respective governments.

Since E-commerce does not have unique implications for intra-state taxation, income generated by transactions over the Internet is taxed within the jurisdiction of the business entity. E-commerce taxation is practiced in the same way as incomes from conventional trade. Most double taxation treaties are international ones, and thus have to comply with the Vienna Agreement on International Treaties of 23 May 1969.

In 1963, the Organization of Economic Co-operation and Development (OECD) set rules to establish a uniform basis for income taxation of international commerce and finance. It was the first draft of 'Double Taxation Convention on

Income and Capital', followed by a new Model Tax Convention and Commentaries in 1977. The current convention, which is a revised and updated version was published in 1992. The main purpose of this convention is to eliminate juridical double taxation.

Generally, tax payers will be taxed on their world-wide income in the state where they live. Most states also tax income earned within their territory by foreign taxpayers. In the international context, two ways of taxing income are referred to as ' residence-based' and ' source-based' taxation. If income is taxable in two states which have concluded a double tax treaty, the treaty provisions assign the right to taxation to one of the signatory parties: either to the state of residence or to the source state. However, it is obvious that most entrepreneurs are worried about this double taxation.

In the context of E-commerce another issue may rise in the case of the use of a web site as a virtual office. In cases of video-conference, since the provisions of the Model Convention suggest that only one place of residence exists, in this instance-providing this state is also a state where management functions are carried out. This interpretation, according to the Model Convention's provisions, might lead to the state of the enterprise's seat or state, under which law it is incorporated, being its state of residence.

However, the solutions provided by the Model Convention do not prevent revenue losses in the field of E-commerce that arise from 'jurisdiction shopping'. New businesses focusing on the sale of digitized products or the provision of E-services (such as information providing), can easily be moved. As such, businesses are not dependent to any particular location; a company can be set up in a low tax jurisdiction. Imagine a corporation, which is set up to exploit a software product via electronic means. In this context, attention must be paid to the controlled foreign corporation legislation and the appropriate determination of transfer prices. As for the benefits, according to the Model Convention, they are taxable in the state of residence of the enterprise unless they are attributed to a permanent establishment in the other signatory state.

2.2.11 Globalization Globalization represents the most significant aspect of current international relations. It is actually a process, which is essentially driven by economic forces. The spatial reorganization of production, international trade, and the integration of financial markets make globalization more intensive. It affects most capitalist economic and social relations. (Siederi, 1999:38).

Globalization & International Trade: The globalization, both by definition and reality, is a process creating a world economic system. The private sector is the main key player. This process has been empirically proved as fast-paced and is largely averse to government action, especially when perceived as interference. The existence of the world market renders the nation-state unable to deliver such valued benefits as job security and rising living standards to its citizens (Siederi, 1999: 69).

National sovereignty is no longer a valuable commodity. The search for protection from globalization becomes a major task. This explains why many deregulation efforts often stimulate increased protection of domestic markets. (Gilpin, 1987. Quoted in Siederi, 1999: 72).

2.2.12 Regionalism & Nationalism For developed countries, regionalism appears to be a means of protecting them from the risk of de-industrialization. Regional integration is seen as reducing the impact of political or cultural globalization; however, both are still less advanced than economic globalization yet no less challenging. The forces opposing the process of globalization, namely nationalism and powerful sectional interests, are the same forces which regionalism must overcome. The end of the Cold War has further contributed to the fragmentation of people's horizons (Bliss, 1994. Quoted in Siederi, 1999: 69).

Not only developed countries but also less developed countries, regard regional integration as a useful instrument for achieving those economies of scale required to increase their participation in international trade. (Krugman, 1988. Quoted in Siederi, 1999: 69).

In addition, multi-national companies particularly those competitive globally, are much more interested in intra regional rather than inter-regional trade liberalization. The multi-national companies become very important, and intra-firm trade appears to be a regional affair (Thomsen, 1994. quoted in Siederi, 1999: 72).

Furthermore, by multiplying international joint ventures, encouraging linkages among multinational companies of different nationalities, and strengthening crosscutting interests, sectoral protectionism may reduce the risk of establishing conflict inherent in a system of regional blocs (Gilpin, 1987. Quoted in Siederi, 1999: 72).

As regionalism mitigates the negative effects of unfettered globalization, the system of small and medium enterprises (SMEs) can likewise help to re-assert the value of co-operation without reducing efficiency. The success of SMEs and the growth of sub-regional economies is connected to the overall process of globalization as they can cope better with shifting and volatile patterns of international demand through their diversified and flexible production.

By clustering together, by sharing work, expertise, collective services, and risk, inter-firm small and medium enterprises (SMEs) have demonstrated their superior ability to resist market shocks and adapt to rapid changes over large firms hierarchically organized

By allowing sub-national areas enough autonomy, the system of SMEs may develop and prosper, reducing both separatist pressure and tensions between the national level and the global one. Grafted onto the economic, political and social system, likely through decentralization, federalism or even the recognition of sub-national entities' role and place, the system is 'embedded' in rules, norms and conventions established by trade unions, the state, political parties, religious affiliations and more informal community-based institutions. The result is a "social market' which rests as much as on economic forces as on solidarity.

In some views on globalization, it satisfies both the Right and the Left. For the Right, because of the anti-political liberalism, all trade, trans-national companies and capital markets are freed from politics and labor organizations. For the left, operations are made more secure also by the emergence of a de-militarized world, therefore denying 'both the need for strong international governance and possibility of national level action' It is fair to say that internationalization ultimately leads to globalization: however, this one world order of globalization is led by Western forces (Ling, 1996. Quoted in Siederi, 1999: 73).

The emergence of globalization has started and hence the process of all international trades follows, and consequently, all nations, including Thailand, have to prepare themselves to gain in this process and compete in the international market arena of E-commerce.

2.2.13 WIN-WIN Policy Win-Win policy can be defined " as handling policy problems by finding solutions that exceed the best initial expectations of conservatives, liberals , Republicans, Democrats or whoever are the major groups, sides, or viewpoints in the policy dispute." (Nagel, 2000).

Prof. Nagel pointed out in the Win-Win Development Cycle that one of the foundation parts consists of productivity causes which include training, technology, competition, and free –trade. All four can be stimulated by appropriate public policy such as 1. training vouchers, 2. technology vouchers, 3. prohibitions on restricting competition especially in electricity, communications, banking and 4. bilateral and multilateral reduction of tariffs and trade restrictions.

2.3 Small and Medium Enterprises -- SMEs

2.3.1 SMEs policies: Different countries establish SME policies in a way to support and reach some national economic goals. Most of these policies, then, relate to national economic development and provide assistance to make SMEs strong.

Assistance for SMEs may come in the form of training for knowledge intensification, enriching managerial resources, enhancing business managerial capabilities and technical skills, and other promotional support. Public agencies will work closely with the private organizations such as Federation of Retailers, Federation of Industry, Chamber of Commerce, etc.

Promoting a favorable business environment: Small business needs to understand the potential benefits of E-commerce in terms of cost savings, and opening up new markets and opportunities for new products and services. Awareness activities will build on the insights gained through. for example in the foreign countries, the

Commissions' Commerce 2000 pilot programs, the consultation process on the Green Paper on Commerce and in the G7 context.

Best practice pilot projects will play an important role in raising awareness. Pilot projects can be designed to test business innovations and examine their compatibility with existing legal and fiscal systems. They can also contribute to the analysis of structural changes in and across sectors and of the impact on employment. Since the SMEs normally lack the resources to try out new applications individually, this will become a great help to them.

2.3.2 SMEs in Selected Countries

Small and medium firms in various countries share similar characteristics. Gill studied major factors affecting the survival and growth of small companies in Vermont, United States. Insufficient finance support was pointed as the number one factor. Lack of marketing skills could also cause failure. Most entrepreneurs lack experience in management and fail to respond to customers with speedy and accurate services.(Gill, 1985: 5-8).

In South East Asia, a recent phenomenon in most countries is to promote the development of small and medium enterprises. The promotion plan has become the major policy to drive economic growth, and recover from the economic recession. One problem that has been solved by SMEs is unemployment. The pace of development is varied in each country because of the difference in culture, resources, geographic location, social values and most of all, politics.

2.3.2.1 SMEs in Indonesia

In Indonesia, the definition of SMEs according to the Central Bureau of Statistics, before 1973 was classified by employment size and power utilization. Small enterprises were defined as those who employed between 1-9 workers and utilized no power or 1-4 workers if power was utilized. The power consumption was no longer a criterion after 1973. Only the number of workers was taken into consideration; that is, between 5-19 workers is a small enterprise, fewer than 5 are classified as handicraft industries.

Those establishments with between $20-99$ workers are defined as medium and those with more than 99 workers are large industries respectively.

In Indonesia, like most countries in this region, the growth of SMEs between 1974-78 was only 5% which was very small when compared to total manufacturing growth which was 12 %. Yet, in terms of employment, small industries and handicraft industries engaged more than 82% of the total workforce in the manufacturing sector. The small and handicraft industries are the majority of the industry. According to the Industrial Census, in 1974-75, 99.55 % of manufacturing establishment were either small or handicraft industries (Storey, ed., 1983: 218–247).

Indonesia had set a policy to assist the economically weak group, for example in the Second Five-Year Development plan. Many government agencies provided financial support with credit facilities, softer and easier and simpler term loans. The Department of Industry set up a project called Industrial Extension Services for Small Industries. This special department provides various services such as training programs, (both managerial and technical), material procurement, marketing, mechanisation, quality control and standardization guidance, surveys, etc.

2.3.2.2 SMEs in Malaysia : In Malaysia, the Advisory Council for Consulting and Advisory Services for small scale Industries and business has given the definition of small industries as those enterprises with fixed assets of less than M$ 250,000. More criteria given later on by a researcher is the number of workers, that is, any manufacturing or commercial enterprise employing less than 50 full time paid workers.

The government of Malaysia incorporated SME development in their New Economic Policy Plan in the first and second " Malaysia Plan". The third plan (1976 - 80) had focused on eradicating poverty through promotion of employment and increasing the income of the lowest earning group, and at reducing economic imbalances between races and regions.

The small enterprises in Malaysia, from the survey of 239 enterprises, suffered from three major operational problems: capital problems, land and building issues, and labor problems.

There are a number of agencies involved in providing assistance to SMEs in Malaysia ,of one kind or another . For example, the Federal Industrial Development Authority (FIDA), the Majlis Amanah Rakyat (MARA), the national Productivity Centre, the Standard and Industrial Research Institute of Malaysia

(SIRIM), the Malaysian Industrial Development Finance Industrial Consultants (midfic), the Economic Planning Unit, and the Federal Treasury, all have programs to assist SME's These agencies normally provide financial support, accounting services, marketing, commercial design, and engineering/technical advice. The Prime Minister of Malaysia, Dr. Mahathir Bin Mohamed, showed his sincerity in supporting SMEs, in his speech at a seminar in 1978 when he was then the Deputy Prime Minister and Minister of Trade and Industry. He stated the role, prospect and future of small industries are that all industrial activities, big or small, are essential and complimentary; they are part of the whole, and they should receive equal attention (Storey, ed., 1983: 235).

In response to E-commerce, Malaysia has enacted six important IT and E-commerce Laws since 1997. Malaysian Cyberbills include the following:

Computer Crime Bill 1997
Copyright (Amendment) Bill 1997
Digital Signature Act 1997
Telemedicine Bill 1997
Communication and Multimedia Act 1998
Digital Signature Regulations 1998

2.3.2.3 SMEs in the Philippines

In the Philippines, the government strategy for small industries development is quite clear. The objectives are to promote and establish new small and medium-scale industrial enterprises throughout the entire country. The Commission on Small and Medium Industries (CSMI) was set up in 1974, with the purpose of coordinating the assistance activities of different government agencies to execute effective and comprehensive assistance programs for SMEs. The major tasks of the commission include encouraging and supporting potential SMEs, developing and implementing promotion and training programs, formulating and recommending regulations and incentives supplementing or complementary to SMEs.

2.3.2.4 SMEs In Singapore

In Singapore, the small enterprises werefirst defined as establishments that employed less than 50 workers and with fixed assets of less than S$250,000. The assets were increased to S$ 2 million in 1976. Small enterprises in most countries lack managerial skill. However, in Singapore, that problem is not as serious as the problem of high labor cost. The urban renewal activities in Singapore also strongly impacted the SMEs since they have to face the high rental costs.

Most of the assistance programs in Singapore are offered to all sizes of industries, with the exception of the Small Industries Finance Scheme. There are wide range of services offered to all kinds of industries from the Economic Development Board (EDB), which was set up in 1961 as a statutory body to centralize the supervision and implementation of the industrialization program in Singapore (Storey, ed., 1983: 220).

2.3.2.5 SMEs In Thailand

Unfortunately, Thailand, when compared to Indonesia, the Philippines, Malaysia and Singapore, has a much shorter history of small enterprise development and assistance provided to small industries. We have fewer agencies to provide the assistance and also the extent of assistance is not sufficient enough for the SMEs. The government has put the most focus on the large industries since the beginning of the 1960s. Even the first government agency, The Small Industries Services Institute, established in 1966 for the SMEs, was renamed later the Industrial Services Division, so that assistance could be provided to all industries, not only for the small industries. It is obvious that small enterprises in Thailand have not been given as much attention and assistance as in other countries.

2.4 Factors Affecting SME's E-commerce Adoption in Thailand From Related Previous Research Studies

Dye mentioned that in assessing causes and consequences, public policies themselves are the dependent variables when studying causes and when studying consequences, the policies will become independent variables (Dye, 1978: 5-6). In

this study, the focus is on the consequence of the policy, thus, E-commerce policy and other related policies become independent variables.

2.4.1 International Competitiveness: If we define E-commerce as getting to International Competitiveness, Porter's Diamond Theory seems to be very rational for explaining the phenomena of E-commerce adoption by the SMEs. Four major postulates on the competitive advantage of nations are as follows:

1. The nature of competition and the sources of competitive advantage differ from one industry to another;
2. Advantage can be drawn from abroad.
3. Sustainable competitiveness is gained from innovation; and
4. Competitive advantage requires firms to move early and aggressively to exploit new markets or technology.

Porter's determinants of national competitive advantage are elaborated in what has been called " Diamond Framework"(Porter, 1990). Four internal factors and two external factors that are proposed to be the determinants of E-commerce adoption are factors condition, demand condition, firm's structure and strategy, firm's domestic competitors and related and supporting industries, while the two external factors are the role of chance and the role of government. In the E-commerce case, the role of chance would be implied to be the risky situations that may occur, that are difficult to predict and control, while the E-commerce policy implementation, the E-commerce and related legislation are government influences.

2.4.2 Risk Management

Risk management, in a broad meaning, is the process of managing the company's exposure to fortuitous loss or the loss that happens by chance or coincidence. Normally the risk management process consists of four steps:

1. Risk assessment: identifying, defining, and evaluating the exposure.

2. Risk control: includes measures such as property loss control programs, loss prevention engineering. Normally these programs are coordinated with insurance providers.
3. Risk finance: includes insurance, self insurance, contractual transfers of risk, alternative funding arrangements, etc.
4. Risk administration: applying systems for making the risk management process, including the previous three steps,operate effectively.

Source: American Standard Company. 2002. (Jul.2) Risk Management (Online). Available URL: http://ascnet/riskmanagement/intro.htm.

Foreign Exchange Risk

Foreign Exchange Rates, by definition, are market rates for buying and selling quantities of one currency in exchange for another. The foreign exchange rates, or simply called FX markets, exist to meet the demand and supply for currencies arising from cross-border trading, investment and other financial transactions. For companies or organizations involved in international trade and finance, a currency risk arises; some of the risks are as follows (Coyle, Brian., 2000: 14).

- Exchange rates are volatile, in both the short and long term.
- Future movements in exchange rates cannot be predicted accurately.
- Companies have exposure to foreign currencies, and will suffer losses, or loss of business, as result of adverse exchange rate movements.

Exchange rates, however, are continually changing, according to the strength of supply and demand for each currency in the FX markets. This supply and demand for currency is created by trade flows, and long term speculative flows of capital. To some extent the exchange rates can be controlled by official intervention from central banks that can buy or sell a currency in the FX markets, in order to weaken or strengthen its value. Normally, the central bank will buy its local currency when it falls in value, using the government 's reserves of foreign currencies to pay for the purchases.

Exchange controls can also be imposed by governments restricting or prohibiting foreign exchange transactions involving their local currency. Both long-term and short-term factors influence the demand for buying and selling currency. The long-term trend in exchange rates is driven by economic fundamentals, while the short-term one is driven by market sentiment. However, the exchange rates can fluctuate widely over both the long and short term. Currently, exchange rates change continuously since the foreign exchange markets operate around the clock.

Exchange rate or currency risk arises in buying, selling, investing, and borrowing. Thus, it is very important to recognize the nature of currency risks and how they arise in the business. Any companies selling goods or services abroad face currency risk, regardless of whether its sales are priced in the local currency or foreign currency. Yet, the currency risk could be reduced if either:

- the volatility in exchange rate movement were lessened and the exchange rates were stable, or
- future exchange rate movement could be predicted with reasonable accuracy.

It is the company treasurer or financial controller who has to assess the market trend and evaluate the impact of rate exchange. Determining the impact of currency rate changes is a process of predicting currency markets and trends and calculating the probable effect on the specific positions of each firm. Sources of these market trends could be an economist, a financial professional, or a bank.

No one can ignore foreign exchange risk, as one author notes, "managers who continue to ignore foreign exchange risk are a rapidly disappearing species!". (Jacque, 1978: xix) Foreign exchange risk management refers to the pro-active management of currency exposures deemed to affect the firm cash flows and stock price. Most multinational corporations (MNC) implement Foreign Exchange Risk Management (FERM) and it becomes an essential part of the business strategies. Jacque (1978: 237-258) has recommended some practices for foreign exchange rate risk such as the mechanics of hedging transaction exposure, and eliminating foreign exchange risk in long-term contracts.

In risk management, foreign exchange, interest rate and commodity risk management are becoming integrated because the hedging instruments are similar and the same personnel have expertise in using them.

The terrorist attacks on the U.S on September 11, 2001 imply that anything at all could happen. Risk management has become one of the core policies for management; not only firms but also nations review their contingency plans or update disaster recovery plans to cope with unexpected situations.

In most cases, the Potter's Diamond Theory defines "Chance" in a positive meaning, however, the plans that most firms prepare are for rather negative, and unexpected events. The common plans include cutting staff, cutting spending, reversing financial forecasts, increasing expenditure on company and employee's security, imposing travel restrictions and so on. Risk management is implemented; approaches are based on the specific characteristics of firms and trade and have an impact over both traditional and E-commerce trade. The impact on E-commerce is more significant, because it operates primarily in a global context. It is even more significant in SME's because it is a complex area and most SME's lack the expertise to implement an effective risk management strategy. Thus risk management has a significant impact on decisions to adopt E-commerce.

2.4.3 Innovation

Besides from what we understand from the dictionary that innovation means new ideas, or techniques, many experts in both public and private firms provide definitions for innovation.

Rogers often uses "innovation" and "technology" as synonyms and almost of the new ideas analyzed in his book, **"The Diffusion of Innovations"** are what he calls "technological innovations" (Rogers, 1983: 12).

Porter states innovations include both improvements in technology and better methods or ways of doing things. This meaning of innovation, would be very close to E-commerce adoption, since E-commerce helps to find new markets and it is the new form of trade transaction that widely and highly satisfies customer needs (Porter, 1990).

Schumpeters (1934) was a first innovator who proposed five categories of innovations as: a new good, a new method of production, a new market, a new source of supply of raw material and a new organization of any industry.

E-commerce has emerged in the global market, carrying the new nature of the innovative process. Once, capitalism was a big change in economic thinking. Economics change, and new innovations will replace the existing ones in a process Schumpeter calls ' creative destruction'.

To Robert Stobaugh, there are two major components of this process, innovation and competition. Both are important to the nation as well as to the individual. As for the firm, innovation generates profit, while competition limits it (Stobaugh, 1988: 1).

Competition in globalization is severe. E-commerce, however can create a competitive advantage and can make huge profits. Competitors' strategies include product modification, different/better processes, product improvement, and lower prices. Sale of technology can be an additional source of profit (Stobaugh, 1988: 2).

Many researchers have examined the innovation process, technological change and transfer as major influences of economic and trade change. As for Stobaugh, he identifies and analyzes systematic patterns of innovation, market growth, competition, cost, price, technology transfer and international production, as key determinants of the new trade, and that includes E-commerce.

We can view E-commerce as an innovative trade process that combines the technology of the Internet and marketing strategy. However, the market of E-commerce is a global one, therefore, export trade becomes the central focus of the study.

The Innovation -Decision Process Rogers (1983: 163-209) presents a model of the Innovation-Decision Process that is most frequently quoted by researchers on innovation. The adoption of innovation is not an instant act; rather it is a process that occurs over time and consists of sets of activities. Rogers's model consists of five stages (Rogers, 1983: 64).

1. Knowledge Stage: This occurs when one has exposed himself to the innovation's existence and gains some extent of understanding of how it works.

2. Persuasion Stage: This happens when one forms his favorable or unfavorable attitude toward that innovation.

3. Decision Stage: This stage occurs when one engages himself in the activities that lead to a choice either to adopt or reject the innovation.

4. Implementation Stage: This stage occurs when one actively puts an innovation into use or practice.

5. Confirmation Stage: This final stage occurs when one seeks reinforcement of an innovation - decision that has already been made; he or she may reverse the previous decision depending on whether the message received confirms or conflicts with the innovation implementation decision.

In this model, Rogers has also presented the characteristics of the decision-making unit. These characteristics include socio-economic characteristics, personality variables, and communication behavior.

In sum, Rogers' innovation-decision process is the process through which one or other decision-making unit passes from knowledge of innovation, to forming an attitude toward the innovation, to a decision to adopt or reject, to implementation of the new idea, and to confirmation of this decision (Rogers, 1983: 165).

2.4.4 Entrepreneurship

Peter Drucker, one of the most profound experts in modern organizational management, points out a very outstanding observation on innovation and entrepreneurship. He emphasizes that both innovation and entrepreneurship are major requirements that firms must simply accept as 'rules', in order to achieve business growth, if not just to survive. Entrepreneurship converts changes to opportunity and cannot wait for inspiration or genious. To Drucker, entrepreneurial economy in America emerged as a result of changes in values of the new generation. The causes of these changes may result from the changes in demographics, education and the vehicle of technology to make the changes impact in wider areas and faster. To them, new enterprises, are not anymore for the "big boys" only; even other fields like healthcare, education could be the new way of business. It becomes the new application of management.(Drucker, 1985: 1-13).

Drucker defines entrepreneurship as economic situations, searching for change, responding to it and exploiting it as an opportunity. He refers to Karl Marx in establishing equilibrium as the result of changes in property and social relationships and Schumpeter in that dynamic disequillibrium, brought about by innovative entrepreneurs, is a norm of a healthy economy. In American business schools, "entrepreneur" often means one who starts his own small, new business. Entrepreneurship is risky since very few entrepreneurs know what they are doing. Drucker admits that entrepreneurs and new small businesses share some common characteristics but have some special characteristics over or above the new, small business. A successful entrepreneur has to create value and to make a contribution by systematic innovation, which Drucker says consists of purposeful and organized search for change. He proposes seven sources of new opportunity:

- The unexpected - either success or failure, or outside event.
- The incongruity - between the reality as it is and as it should be or ought to be.
- Innovation based on process
- Changes in industry structure or market structure
- Demographics or population change
- Changes in perception, mood, and meaning
- New knowledge - both scientific and non-scientific

The first four lie within the enterprises, which are clearly seen as symptoms and are highly reliable indicators of change while the last three are external to the enterprise (Drucker, 1985: 19-32). Entrepreneurship is a vital component in E-commerce. Because of rapid changes in technology, managers must be willing and able to adapt quickly to change. Therefore, they must adopt an entrepreneurial attitude. The new way of thinking, coupled with the increased risk can be a major factor for SME's in the decision to adopt E-commerce.

The keynote of the APEC/E-commerce Convention in Japan last May, 2000 on economic impact of E-commerce on the Asia-Pacific region outlined that the expansion of the global electronic marketplace opens up new perspectives on development of E-commerce and brings about huge benefits in productivity improvement, corporate restructuring and rationalization of the distribution system.

However, the readiness of this region to embrace E-commerce was taken into serious consideration. The issues, including self-readiness assessment, are the degree of commerce implementation in APEC, Infrastructure and technical facts, implementation of access services, the usage of Internet, measures of E-commerce promotion, and human resource development.

To achieve and gain the above- mentioned benefits, the discussion also included addressing policy challenges. It was clearly stated that governments have to adjust national regulatory frameworks and safeguards in the context of global networks to provide confidence in the digital marketplace. E-commerce promotion, then, has been widely reviewed in international forums, which included both public and private firm representatives. The issues that were raised include international discussion for the creation of a global framework for regulation, trade policy and market access.

In the study of Keiko Kubota (2000) of international trade policy formation, her model also includes the consumer, producer, and government as major stakeholders. As for the government, her focus is on revenue collecting.

2.5 The Influence of the Economic Approach through National Implementation of Policy on E-commerce & SMEs

One of the factors to be considered for an E-commerce policy maker is globalization.

As we all know, the globalization process is creating a world economic system which is, as Sideri mentioned, " mainly private, fast–paced and largely averse to government action, particularly when perceived as interference", (Sideri, 1977: 10). Therefore, government officers or policy makers must play key roles to gain competitive advantages for the benefit of the nations.

2.5.1 SMEs & Globalization

As regionalism mitigates the negative affects of globalization, the system of small and medium enterprises can likewise help the overall process of globalization as

they can cope better in the shifting international market through their more diversified and flexible production capacity.

2.5.2 SMEs and Their Role in the Recovery from the Economic Crisis

International trade and finance and type of production have changed rapidly in recent times. Consequently, there have been dramatic changes in industrial organization, world markets and production technology. These changes directly affected the growth rate and emergence of SMEs. (OzCarn, 1995: 9).

SMEs and their role in the economy have been discussed in many contexts. Many economic development policy approaches emphasize the bottom-up development and this would promote SMEs. Likewise, SMEs in Asia are considered as the backbone of the Asian economies, and true economic recovery will not be possible without a healthy SME sector. SMEs are also the sources of innovation and ideas that can generate employment, especially in the rural area. In the past two decades, the economy has focused on big business, and GDP figures; it is now time for a more people- oriented focus on development.

Eszter Hargittai (1999) in her **"Weaving the Western Web: Explaining Differences in Internet Connectivity Among OECD Countries"** found that there is very little social scientific work that address its diffusion. The impact of economic indicators, human capital, institutional legal environment, and existing technological infrastructure are all the variables that she includes in the analysis. The empirical analysis shows that economic wealth and telecommunication policy are the most salient of a nation's Internet connectivity.

She defined Internet as a world-wide network of computers, but sociology is also important to consider as a network of people, given two service systems: i.e., computer-mediated communication and information retrieval.

As for theoretical considerations, she included a summary of existing literature about important predictors of Internet connectivity: the economic situation of a country, the education level of its inhabitants, the institutional legal environment governing communication technology; and the technology infrastructure. All are related to Internet connectivity.

2.5.3 Human Development & Capital Factors

There are two factors: Education and English language proficiency

For Education, more educated people adopt new innovations quicker than people with less education (Rogers, 1983). Kelly and Petrazzini (1997. Quoted in Hargittai, 1999: 702) also suggest that the academic institutions often play an important role in spreading the Internet through training in computer literacy, and incorporating electronic technology in the classroom, and by mandating English as a required subject.

Individual knowledge may affect the spread of a communication technology, Laponce (1998. Quoted in Hargittai, 1999: 702) suggests that some languages, such as English, have greater status than others and they dominate certain areas of life. This assertion is supported by the fact that the United Nations has declared English as the official language of international business.

Barrnet and Choi (1995. Quoted in Hargittai, 1999: 702). state that in some areas where people do not speak English, it leads to a serious barrier in access to tele-technology.

Hargittai, (1996,1998. Quoted in Hargittai, 1999: 702) in her research, found the Human Development Index (HDI) which is measured from the UNDP's Human Development Report, is related to its level of Internet connectivity. HDI uses the information on adult literacy rate, education, GDP, and life expectancy to create an index of a countries' level of development .The International Telecommunications Union (ITU 1997) used the same measure and found a similar relationship between the two variables.

The conclusion is that the analysis cannot isolate explanatory factors among countries of similar development levels. General level of development influences on Internet connectivity is not helpful in understanding how and why countries that have similar levels of development have unequal levels of connectivity. However, the level of English competency may perhaps partially explain the difference. To fully utilize the Internet, particularly its global capabilities, one must be at least conversant in English.

Kelly and Petrazzini's (quoted in Hargittai, 1999) analysis does suggest that wealth, education, language and pricing are importantly correlated to Internet connectivity.

2.5.4 Technology Transfer

In our study on technology transfer, we found that economic wealth strongly predicts a population's adoption of new technology (Rogers, 1983). Capital requirements are more available in the richer countries. Another factor is that the level of inequality: the more egalitarian, the more people can afford the new technology.

2.5.5 Institutional Legal Environment

The institutional legal environment can enhance or hold back diffusion of a technology, depending on the approach to regulating mechanisms, privatization and free competition. People in free competition in the telecommunication sector will improve services and reduce the price to access and have higher Internet connectivity than those with monopolies.

2.5.6 Consumer Protection

Most of the research studies or surveys reveal that the major barriers for consumers to purchase the products or services from E-commerce are lack of confidence in the payment system and inability to physically see the products. Consumers protection seems to be a significant area that all concerns need to take into account.

One more barrier that is no less important is the cost to access the Internet system for E-commerce. It is considered high and therefore not many Thais enjoy this new channel of trading via the communication technology. The Thai government needs to put more effort in promoting SMEs to participate in E-commerce as evidenced from the UNCTAD.

According to the study from NECTEC, there are five areas in E-commerce that need to be improved.

First, infrastructure needs to be improved in five areas:

a. Telecommunication, which includes the distribution of the system, connection of the network and the high fee.

b. Internet, which includes the distribution of and accessibility to Internet, domain names, security system and the high service fee.

c. Human resources: top management is not fully aware of the opportunity; the understanding of both trader and consumers, the expansion of E-commerce training, electronics, IT provider training and the SMEs' participation are issues that need to be addressed.

d. Delivery system: The efficiency of the delivery system, international forwarding, the responsibility in delivery system, and the opportunity for Thai forwarding services must be improved.

e. Standards: international standards and the networking of all parties needs to be addressed.

Second, the security system, which includes payment system and tax issues need improvement and clarification.

The third issue is consumer protection, which covers a reliable payment system, product delivery, quality as agreed at time of purchasing, and International law on data protection.

Fourthly, marketing, which includes the effectiveness of advertising and cost reduction in advertising by sharing the resources, needs restructuring.

Finally, the E-commerce and E-commerce related laws, especially tax, electronic fund transfer need to be promulgated.

One difficulty for those who need to plan marketing in E-commerce is that there are different customer characteristics worldwide. In the free market of E-commerce, the competition on the price becomes very severe, but this is only a benefit to the consumers. The positive side for E-commerce for the entrepreneurs is the cost for managing a company, which is less than a physical company. Besides, it generates employment and promotes exports that will improve the economy of the country.

From the study of Nattakarn Nikornpongsin, from her 310 samples, the finding of ranking the barriers of E-commerce shows that the majority (23%) states

that E-commerce is too risky, 16% say unclear international trade laws are the main problem, while 15% felt there was a lack of security.

In sum, the review of related studies identifies several important factors and suggests the testable propositions. For example, greater economic wealth and higher level of economic equality will lead to higher connectivity; a country whose population has high levels of education is likely to have tendency to be more connected than those whose education level is lower.

Among the rich nations, economic factors alone do not explain the level of internet connectivity. If we add human capital in both the level of education and English language competency, then there appears to be a relationship. Also, the existence of a monopoly in the telecom sector has a considerable negative impact on that country's Internet connectivity, while price of access is not a significant predictor of Internet connectivity. It is an important issue only in that it adds to the possession of wealth and human capital measures. General economic strength does matter in predicting Internet connectivity even in the rich countries. The importance of telecommunication policy suggests that if government is interested in pursuing an increasing knowledge–intensive economy strategy with a large reliance on information, they may need to consider the implications of their telecommunication policies with respect to Internet connectivity in particular.

2.5.7 Measurement

Hargittai uses the following measurements: information on the number of users, their time spent online, the quality of connectivity , the amount and type of data transferred, and the technology's distribution among the population. She also included individual characteristics: information on age, gender, socio-economics status, and political affiliation. This information will tell us more about who within the nation is adopting the technology.

2.5.8 Bennameur's Study

Benameur' s dissertation on **"The Relationship between Information Technology and Small and Medium-Size Firm Performance in the Manufacturing Sector: Case of The Tunisian Textile"** (1999), found out many related factors that may compare to this study. Benameur found that restricted budgets, limited resources and budgets cuts are the important factors and act as barriers to the new environment. This includes SMEs. Therefore, he was confident that it is crucial to study the efficiency of inventing in Information Technology (IT). His study focuses on two phenomena that appear as contradictory. First, some SMEs continue to invest in IT in the hope that a positive impact will follow on their performance growth and increase the rate of return. Others, to the contrary, are cautious and restrain themselves to more 'traditional' approaches in order to study these phenomena and wait to be sure of the return.

His main research hypotheses stipulate that the investment in IT will have direct impact on the company's performance, and that certain organizational and personal factors will interact to affect the overall performance.

Benameur used two dependent variables, which are the company performance and the impacts of the Information Systems (IS). For the variables on performance, he assessed the users satisfaction with relation to the IS. Benameur used the Model of the Impact of IT in his study. He found that contextual variables could play a key role in the relationship between IT and the organization. The impact of IT measures should not only consider the structure of present IT, but also the conditions of use of IT. Also, the variables that relate to the satisfaction and extent of the use of IT are to be considered as mediating variables between IT characteristics and management and organizational performance.

In his research, he investigated seven areas. They are IT investment, users' satisfaction, ease of use, and its usefulness, IT training, utilization of IT, IS support: users' attitude: and users' performance (Benameur, 1999: 58-63).

2.6 Research Questions

The following are the research questions this study proposes to address:

- What are the major reasons influencing the SME's decision to adopt or not to adopt E-commerce in their business?
- How could the government's E-commerce Policy support SMEs to cover Thailand disadvantages while balancing the free-market nature of E-commerce and keeping intervention at the minimum?
- What are the factors influencing SME's participation in E-commerce that should be supported and promoted for the benefit of all, especially for the nation as a whole?
- How could the SMEs become fast learning organizations to cope with the rapid pace of innovative technology?
- How could SMEs increase export growth more quickly?

2.7 Model for Analysis and Conceptual Framework

Majors Factors Influencing the Decision of SMEs to Adopt E-commerce.

Adoption of E-commerce by the SMEs in Thailand involves many areas, for example, international competitiveness, innovation, new technology transfer, entrepreneurship of the SMEs, and the success of government 's E-commerce implementation. The model of analysis was formed from the major concepts of Rogers' model of innovation-decision process, Drucker's concept of entrepreneurship and Porter's Diamond model. Fortunately. These concepts are aligned.

From the above, Porter's Diamond model covers more areas and was taken to be a major part of this analysis. Porters' model consists of four determinant factors and these will lead to the findings that provide significant recommendations to the policy makers in order to adjust and review as appropriate.

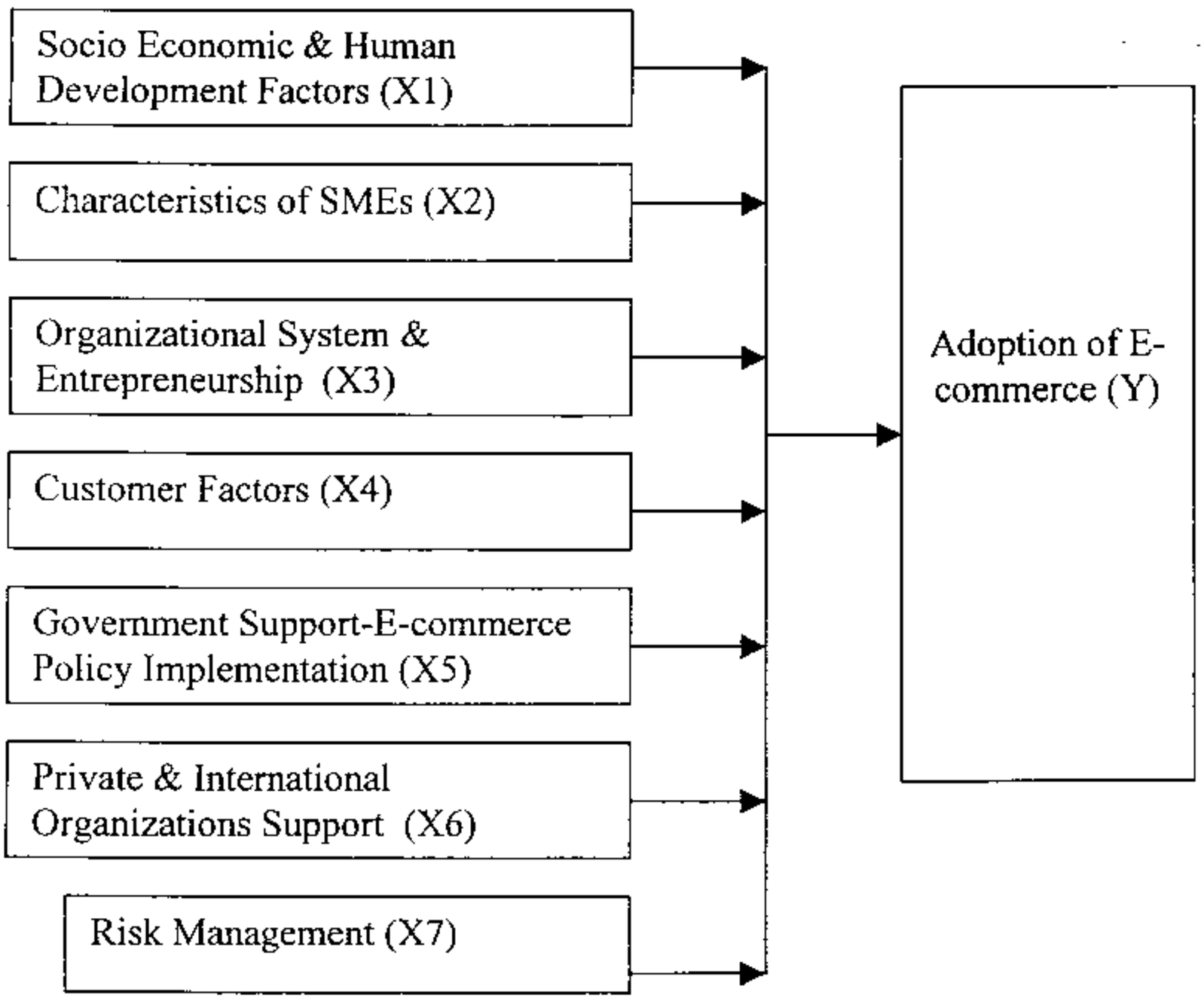
As mentioned earlier, Porter's four internal variables are defined as human factors, domestic market environment, SMEs' characteristics, organizational performance and customer factors. The two external variables; government, will be E-

commerce policy implementation, E-commerce law and the related legislation enforcement while chance will be defined as risk management.

Customer satisfaction is very important as a customer factor. Repeat customer business is one of the key measurements for customer satisfaction. The characteristics of satisfied customers, following Kotler's analysis (Kotler, 1988: 18) is the customer's behavior, in that they will buy the products or services of the company again, they will talk favorably to others about the company, they will pay less attention to competing services and advertising and they will buy other services or products from the company.

From the literature review, the conceptual framework of this study was designed based on the models as mentioned above as follows:

2.7.1 Conceptual Framework



In this section, more details will be described on the conceptual model as well as the justification for the variables.

2.7.2 Hypotheses

Socio Economic & Human Development Factors

Hypothesis 1: A higher rate of human resource development is more likely to have a positive relationship to E-commerce adoption.

Socio-economic status will basically be the demographic characteristic of the SMEs' owner or executive management. There are two human development factors include in this study: education and English language proficiency. Education consists of educational level and major subject.

Characteristics of the SMEs

Hypothesis 2: The larger SMEs, with more employees, whose businesses involve high technology are more likely to adopt of E-commerce.

For the characteristics, we will take type of business, size, and the number of employees.

Organizational System & Entrepreneurship, Strategy

Hypothesis 3: Innovative strategic management and higher levels of IT investment are positively related to E-commerce adoption.

Organizational System will be measured by classifying SME's into advanced firm and traditional firm; these categories are defined by the amount of training, and top management's support in IT.

Entrepreneurship: this factor includes company strategic management which was defined by the clarity of company goals and communication, marketing plan, innovation of products, and process, customer driven philosophy, English & computer training and management style.

Customer Factors

Hypothesis 4: The web site advertising investment and higher customer satisfaction are positively related to E-commerce adoption.

Satisfaction from customers comes from many integrated conditions. Major conditions included in this study are the right price, quality, and convenience. Other important factors include the channel through which the information reaches the customer, i.e., advertising, etc.

Government Support in E-commerce Policy Implementation

Hypothesis 5: A higher level of SMEs' satisfaction with the government's support in E-commerce Policy Implementation is positively related to their E-commerce adoption.

The measures of level of agreement on government policy and policy implementation include various areas. The major areas are the objectives and standards of policy, how policy was communicated to the people, the government support in the financial area, IT technology and infrastructure, the telecommunication system, E-commerce law and promulgation of related laws and enforcement, tax policy, security issues, intellectual property protection, international trade and network, export promotion and the government officers' effort to assist SMEs.

Private & International Organizations' Support

Hypothesis 6: A higher level of SMEs' satisfaction with the private and international organizations' support on E-commerce related issues is positively related to their E-commerce adoption.

Support includes financial support, delivery services, high quality of labor, and insurance institutes.

Risk Management

Hypothesis 7: A higher level of risk management in the SMEs is more likely to have a positive relationship to their adoption of E-commerce.

The ability of the management in risk management includes the operational process, based on a strategy that is fully aware of the uncertainty of the dynamic and fast moving market. Therefore, SMEs have to have a well- prepared contingency plan, property and employee insurance, as well as a wide support network in case something unplanned occurs.

In this chapter, the previous studies that related to E-commerce adoption were described. This includes the models, and theories of many reliable experts. Various aspects of E-commerce that may impact E-commerce adoption by the SMEs. We are discusses as well a thorough survey of thoughts and studies that form the conceptual framework of determinants of SMEs' E-commerce adoption in Thailand was presented.

Chapter three will describe the methodology employed in this study, including population & samples, data collection & analysis.

CHAPTER 3

RESEARCH METHODOLOGY

This chapter will cover the methodology employed in the study. It includes the unit of the study, type of sample, instrument, data collection and possible methods of variables measurement and the statistics to be used in testing the research hypotheses presented in Chapter Two.

3.1 Population & Sample

3.1.1 The Population

The population is SMEs who register their company names with the Department of Export Promotion (DEP) and have the characteristics as defined by the Ministry of Industry, and appeared in the Thailand's Exporters Directory 1999 - 2000. From the Thailand's Exporters Directory 1999-2000, there are 10,052 companies appearing on the list of exporters from 15 sections or categories of products as summarized in the table below:

Table 3.1 Exporters Count by Section

Section	Section Name/Product Code/Description	Number
1	Agricultural products/Mineral/Fuels	809
2	Food	1272
3	Automotive/Parts and Accessories/Machinery & Equipment	447
4	Chemicals, Cosmetics, Toiletries, Medical Supplies, Hygiene Products	489

Table 3.1 (Continued)

Section	Section Name/Product Code/Description	Number
5.	Building Material/Hardware Items	559
6.	Electronic, Electrical Products and parts	479
7.	Textile, Garment and Fashion Accessories	1542
8.	Furniture	435
9.	Toys and gems	160
10.	Household Products	662
11.	Gems and Jewelry	761
12.	Leather, PVC and Other products, Footwear, Travelling and Sporting Goods	724
13.	Gift, Decorative Items and Handicrafts	1067
14.	Printing Service/Packaging	332
15.	Trading Company/Pet Food/Stationary and Others	314
		10,052

Source: Department of Export Promotion. 2001 Thailand's Exporters Directory 1999-2000, 7th ed. Bangkok: Office of the Daily trade News : 81

Even though the Department of Export Promotion divides the companies into 15 characteristics of the products, this study still follows the four categories of enterprises by the nature of the business as manufacturing, and trading, which are further sub- divided into wholesale and retail and service businesses.(Defined by the Ministry of Industry).

3.1.2 The Samples & Sample Size:

The sample was selected on the criterion that they have to export and follow the definitions of SMEs from the Ministry of Commerce. Thus, all the enterprises that have their booths at Thailand Export Mart located next to the Exhibition Building of

the Department of Export, Ratchadapisek Rd., Bangkok were considered as representative of the total population. Thailand Export Mart is a convenient place for foreign customers to look around and select the product they need to order and make the trade deal. All formalities can be done on the spot with the support of DEP. These groups are from all categories of products and from all parts of the country, However, some of them may be categorized as large enterprises if their assets exceed 200 million Baht for manufacturing and service industries or exceed 50 million Baht for trading, both wholesale and retail. These large enterprises will not be taken into the calculation.

There is a total of 283 enterprises in the Thailand Export Mart. All 283 enterprises were contacted and requested to answer the questionnaires. The returned questionnaires were checked to see if they are large enterprises; if they were, they were not taken into the analysis.

From the list of 283 enterprises, 180 returned the questionnaire and most of these (103 cases) are categorized as large enterprises. Some had moved out. This means 36% of the total of the population in the Thailand Export Mart were not considered as SMEs. Therefore, the population of SMEs registered at the Thailand Export Directory 1999-2000 should be reduced by 36% from 10,052 , making the total population of SMEs 6,433.

The Sample Size Sample size was chosen based on the " Survey Samplings" provided in keywords@SPSS.com by Pamela Narins, the formula for the number of sample size is as follows:

Sample size = $\{(Py)(Pn)+(S.E.)^2/(Py)(Pn)/population\}$

Where the level of confidence in the sampling is set at 95%, therefore, the square of standard error $(S.E.)^2 =(0.05/1.96)^2 = 0.0006508$, Py= probability that the answer is 'yes',and Pn is probability that the answer is 'no'. By setting Py=Pn=0.5 the best sample size that can be applied to any Likert scales is obtained. Thus, the sample size selected in this analysis is 363 out of a population of 6,433.

Since the number of samples is more than the SMEs at the Thailand Export Mart, more samples were taken from various locations; in Jatujak Market, Jewelry Tower, and the popular areas for export in the north at Chiang Mai. The addresses

were taken from the Institute for Small And Medium Enterprises Development, located at Thammasart University, Rangsit campus.

This study employs the specific method of sampling due to the advantages of speed and economy (McGaw&Watson, 1976), but also the SMEs at this export promotion center, Thailand Export Mart, possess all characteristics of SMEs that are stated in the unit of analysis. The number of 363 of the enterprises could be considered representative of the whole population since these SMEs are located in various areas of the country as well as the types of business include almost every types of business.

However, the real figure of the samples of the study is 296 or 82 % from the calculation. This occurs because some of the enterprises from the population can be characterized as large size. Some identified themselves as medium, but the company asset was bigger than 200 million baht, which is categorized as large size. Some do not have an export business. Therefore, these samples were screened out and were not considered in the study. However, 82 % of the target samples is considered as appropriate.[1] (Suchart, 1997: 135)

3.1.3 The Unit of the Study

The study will focus on the major obstacles that may avoid or cause reluctance for SMEs to adopt E-commerce. The main objective that the study aims to find out is the factors that influence the SMEs in adoption of E-commerce to be one of the their channels for merchandising. Thus, the unit of the study will be the SMEs whose businesses are mainly export and who are registered at the Ministry of Commerce, Department of Export Promotion. The owner or the top executive management of that enterprise will be the one to answer the questionnaire.

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[1] Even though the number 363 is based on some formula, however, as mentioned by Dr. Suchart P, in consultation with his professor at Institute of Survey Research, Professor Leslie Kish, the appropriate amount of the samples is based on some conditions such as the variability of the samples, the objectives of the research, the analysis technique and the budget of the research.

3.2 Operational Definitions of Variables

In this section, the definitions of variables used in the model will be explained.

Socio Economic & Human Development Factors

Socio Economic factors include all demographic data such as gender, age, and marital status and position in the company, which are ascertained from Questions 1- 3 and 7.

Human Development - two human development variables are included in the model, education and English Proficiency:

Education means the level of education and major subjects, which appear in Questions 4 and 5.

English Proficiency means the level of English proficiency as determined by self-assessment. The levels are: very fluent, fluent, quite fluent/ moderate, poor or very poor. This is in Question 7.

Characteristics of the SMEs

Type of Business There are three questions, type of business and type of ownership and education level of the employees. Type of ownership consists of 2 kinds; Thai owned or an international joint venture (Question 12). Type of business means manufacturing, merchandising (which consists of 2 different types : retail and wholesale) and services. This is determined from Question 13. Employees' educational level is in Question 15.

Size of Business These include size of enterprise, small or medium, duration or years in export business, sales volume, export sales volume, number of employees, and value of company assets. These variables appear in Questions 8, 9,10,11, 14 and 16 respectively.

Organizational System Means strategic management , entrepreneurship or management style, and IT investment.

Strategic Management refers to the policy or how the company acts to cope with the highly competitive environment. It includes clear goal setting, which have been communicated to employees (Q.17-18), a marketing strategy that focuses on new markets and export (Q.19, 20), research & development, focusing on new product development (Q.21), management commitment for product and process

innovation (Q.22), recognition and reward to employees' innovative ideas (Q. 23), management drives for customer/market excellence (Q.24), management's support for English and computer training for employees (Q.25) and management's prompt response to market change (Q.26).

Entrepreneurship means management style which refers to the way a company approaches their business objectives, which become company norms. These categories include family style, result oriented, mixed management, innovative and high technology. This is in Question 27.

IT Investment means the investment for IT Infrastructure, the number of IT experts, the number of employees that can access Internet, the proportion of the number of employees and PCs, the usage of software, IT training hours and the expense spent for IT training for one year (Q. 28 - 34).

Customer Factors Refers to two topics: customer related activities and customer satisfaction.

Customer related activities means percentage of repeat customers, source of advertising , the cost of web site and other kinds of advertising. Repeat customer means the percentage of the customers who come back to purchase more products or services, This information is gathered from Question 35; Source of advertising in Question 36,Web site advertising in Question 37 and cost of other kinds of advertising in Question 38.

Customer satisfaction refers to the degree of how well each firm can recognize customers needs from the customers' point of view and provide prompt and efficient response to them. These responses include how well the company does in terms of convenience to buy the products and services, delivery system, price, awareness of customers having more choices from the web site, and executives' flexibility in customer handling. This information is determined from Questions 39-44.

Convenience means there is less complexity, it is easy to get the products, and the customers do not have to spend much time . This is in Question 39.

Delivery is the way that the products and services reach the customer, either by electronic transfer or using other kinds of transportation. This was asked in Question 40.

Right price refers to the amount of money in exchange for the products or services; normally customers will select products with a reasonable price, with required quality, size and convenience in use. This is in Question 41.

Government Support & E-commerce Policy Implementation - these variables include all assistance and support provided to SMEs by government and appears in Questions 45-65. This will be considered external support for the SMEs. This support appears in the forms of the followings resources.

Research & Development - All research done or sponsored by government (Q.45)

Funds - The monetary support from private and public agencies for SMEs, both short and long term loans; this includes amount available and ease of access. (Q.47, 48)

Promotion & Exhibition - Activities that are provided by the government to SMEs in the form of, exhibitions or conferences and any programs that are deployed in order to promote the SMEs' export sales (Q.49).

Training Support - Training programs or seminars arranged to educate the SMEs for better understanding in E-commerce.(Q.50).

E-commerce and related Law and enforcement - All laws and legislation that government establishes and the enforcement of that law.(Q.54-55)

Tax : Formalities & Exemption - Tax and export tax policy to support SMEs , including international or global tax policies that are fair and encouraging to SMEs.(Q.56, 57)

Security - The confidence that there will be protection in the form of laws or legislation to the extent that it is sufficient to protect the product, property or intellectual property. (Question 58, 59)

E-commerce Policy Implementation - Government support roles in international trade and network context (Q.60), sincere promotion for the development of SMEs (Q.61) and government seeking co-operation for E-commerce Policy Implementation (Q.62).

Private and International Organizations Support - All support given by other private firms plus international organizations to help make E-commerce adoption easier for the SMEs. This includes private sector finance, IT and delivery

services, prompt and efficient financial services, to SMEs at a reasonably cost (Q.66, 67, 68), International organizations such as WTO, APEC, and ASEAN promotion and support of SMEs (Q.69), sufficient material at a reasonable cost (Q.70), high quality of labor at a reasonable cost (Q.71), financial institutes, insurance institutes support of SMEs' business (Q. 72,73) the size, growth rate and competitiveness of the domestic market (Question 74,75,76), foreign consumers' demand in relation to domestic(Q.77) and profit from export sales compared to domestic sales (Q.78) are other factors in this area.

Risk Management means the strategic management to cover risk that may occur in E-commerce business. These include the existence of a contingency plan, a human resource succession plan, insurance of company property, products and employees as well as network management.

Contingency Plan - A contingency plan or other approaches have been set to overcome any crisis. (Q.79)

Risk Management Plan for Human Resources - There is a succession plan or human resources management plan to build up successors for key positions in the company. The plan includes identifying the persons and providing them necessary training and orientation at certain levels. (Q.80)

Insurance covers the property, products, and employees' medical and life to ensure that if any thing go wrong, there will be some certain amount of compensation. (Questions 81,82,83)

Network Management means the company has member-ships in organizations, or has alliances and agreements with other companies that will provide support when needed.

Adoption of E-commerce The Level of adoption measures activities involved in E-commerce transactions. They are fully adopted (including electronic payment), partly (includes only receiving orders via electronic, advertising in web site) or not at all. (Q.85)

3.3 Construction of the Questionnaires

A total of 85 questions formatted into a six page questionnaire was constructed and produced both in Thai and English. There are three kinds of questions to be answered: tick to choose the answer, fill in the blank and tick in the column of 1-5 to indicate degree of agreement. The questionnaire had eight parts; each part consists of groups of questions as follows: (See Appendix I, pp.138-143).

Part 1 Demographic Data This section consists of seven questions asking about sex, age, marital status, Educational background and subjects of study, English competency and position in the company.

Part 2 Characteristic of SMEs There are nine questions in this part, to identify the size of the company, how long in the export business, sales, and export sales volume, type of partnership, category, number of employees, employees' educational background and the value of assets.

Part 3 Strategy, Management Style and IT Investment This part is divided into three sub-sections: Company strategic management and management style or entrepreneurship and IT Investment . For the first section, strategic management consists of questions on goal setting, goal communication, marketing plan for export, R&D innovation of product and process, recognition of innovation from staff, customer excellence, English and computer training for staff, customer focus, and prompt response to market changes. Entrepreneurship refers to company management style. For IT Investment, questions cover cost of IT Investment, the competency of English and computer literacy, the amount of IT infrastructure, number of IT experts, number of employees who can access Internet, the ratio of the PC ands employees, the usage of specialized software, IT training hours and cost of IT training.

Part 4 Customer Factors There are 10 questions relating to customer factors, divided in to two sections: Customer related activities and customer satisfaction. The questions ask for a variety of indicators of customer satisfaction, for instance, the number of customers who are repeat purchasers, sources and cost of advertising, web site and other media. There is also on the convenience of buying,

delivery system, price, understanding of customer needs, efficiency of customer handling and response of the executive management to customer needs .

Part 5 Attitudes towards E-commerce Policy Implementation There are twenty-one questions to survey the attitudes of the SMEs towards the government's E-commerce Policy Implementation. The questions cover whether the government supports R&D of E-commerce, communication of the policy objectives and standards, funding, efficiency of funding institute, arranging of international trade fairs and exhibitions, IT training, IT infrastructure, and the cost and convenience of telecommunication systems. The questions also include the E-commerce law and related laws, tax, international tax, security issues, intellectual property protection, international trade and networks, and the effort the government agencies put for promoting E-commerce to develop SMEs, including export promotion and whether economic and social environment support E-commerce adoption by the SMEs.

Part 6 Private and International Organizations' Support There are thirteen questions in this section. The questions cover the efficiency of private agencies in support of SMEs in term of finance, cost of IT Services, delivery services, quality, quantity and cost for material, labor, insurance service, competitiveness in domestic markets, and consumer demand.

Part 7 Risk Management This section consists of six questions, exploring how well the SMEs do in the area of risk management. The questions include whether there are contingency plans, and a succession plan in place. Also, the section includes questions about asset and product insurance, life and health insurance for employees and network management.

Part 8 Adoption of E-commerce This part is for the dependent variable, asking whether or not the SMEs have adopted E-commerce in their business. There is also a survey of the degree of adoption for those who adopt either fully, (meaning including electronic payment) or partly (which includes receiving orders or only advertising in the web site).

3.3.1 Pre-test of the Questionnaire

The questionnaire was built in a way to support the research questions, which were derived from documentary data and from interviews with entrepreneurs whom

the researcher met during attending seminars, or exhibitions arranged for the SMEs. The questionnaires were pre-tested on a sample of 20 entrepreneurs at the institute of SMEs. These entrepreneurs came to the Institute of Small and Medium Enterprises for several reasons such as attending the training provided by the institute or seeking information on financial support or channels for customers. After the pre-test, the questions were revised and adjusted on wording, sequence and clarity to ensure the respondents understand the questions the way the researcher intended. Therefore, both content and format were adjusted after the pre-test. To ensure the reliability of the questionnaire, a reliability test for this Pre-Test Group was done, using Cronbach's Alpha coefficient. From the reliability analysis, the alpha ranged between 0.81- 0.97, which considered as very high reliability. Details are demonstrated in Appendix II.

3.4 Data Collection

The questionnaires were sent to the owners or chief executives of the enterprises by hand and appointments were made to collect them. The data was collected in the month of July, 2002.

3.5 Data Analysis

Statistics software, SPSS version 10 was used to analyze the received data. Chi - Square was employed at the first step to see the relationship of the determined factors and the dependent variable, E-commerce Adoption.

Finally, Logistic Regression analysis[2] was employed to confirm the relationship of all independent variables and the dependent variable (Suchart, 2001: 4; Hosmer and Lemeshow, 1989: 6-11) . The findings will tell the real determinants of the decision to adopt or not to adopt E-commerce for the SMEs.

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[2] Since the dependant variable is dichotomous. (The SMEs adopt or not adopt of E-commerce), Logistic Regression Analysis was employed to determine the factors proposed as determinants of adoption of E-commerce by SMEs.

3.6 Measurement Model

The proposed framework of the determinants of SMEs' adoption of E-commerce in Thailand consisted of seven factors, namely Socio Economic & Human Development Factors, Characteristics of SMEs, Organizational System & Entrepreneurship, Customer Factors, Government Support & E-commerce Policy Implementation, Private & International Organizations Support and Risk Management. Each factor's combination will be soon explained. However, for the Chi- Square Analysis, each variable will be analyzed and explained separately.

Adoption of E-commerce (Y)

Respondents were asked to indicate to what extent they have adopted E-commerce, fully (including electronic payment or delivery), partly (which may include some activities of the transactions, for example, only order processing or receiving or only web site advertising) and not at all. Thus, there is a degree of adoption, from fully to not at all.

Socio Economic & Human Development Factors (X1)

For Socio Economic, we include the demographic of the respondents. They are gender, age, marital status and. the position in the company.

Characteristics of the SMEs (X2)

There are two sets of variables in this factor, Types of SMEs and Size of SMEs.

Organizational System: Strategic Management, Entrepreneurship and IT Investment (X3)

This factor was divided into three sections : company strategic management , management style and IT investment.

Customer Factors (X4)

This factor will be measured by the percentage of repeat customers (Q35), sources of advertising (Q36), cost of web site advertising (Q37) and other advertising costs (Q38). The measurement also involves attitude survey of agreement or disagreement on convenience of customers to purchase the products or services (Q39), customer satisfaction on delivery system (Q40), price of the products (Q41),

understanding of market (Q42), customer handling (Q43) and efficiency in response to customer needs (Q44).

Government Support and E-commerce Policy Implementation (X5)

This factor will be measured by the attitude survey questions of four levels of degree of agreement and disagreement on R&D in E-commerce (Q45), the communication of policy objectives and standard (Q46), the sufficiency of fund support to SMEs from the governmental institutes (Q47), Support from Small Industry Finance Corporation (Q48), arrangement of international trade fair and exhibition (Q49), sufficient support in IT technology training (Q50), support in improving IT infrastructure (Q51), support of Telecommunication in term of convenience(Q52) and cost (Q53) . The measurement also includes the enactment of E-commerce law and related laws in terms of timeliness (Q54), and the appropriateness of enforcement (Q55), the fairness of policies on tax (Q56), the international tax policy (Q57), confidence on security issues (Q58), support on Intellectual Property protection (Q59), government role in international trade (Q60), development of SMEs (Q61), cooperation of E-commerce Policy Implementation (Q62), extra effort to assist SMEs (Q63), export promotion (Q64) and economic and social environment to support E-commerce adoption by the SMEs (Q65).

Private And International Organizations Support (X6)

This factor will be measured by the support of the private and international organizations on finance(Q66), IT services(Q67), delivery service(Q68), International organization roles in support SME (Q69), material support (Q70), and labor support in terms of quality and cost (Q71), support from Financial Institutes (Q72), from insurance service (Q73). The measurement also includes the influence of other private firms on the market size, the growth of domestic market (Q74), the high competitiveness of the domestic market (Q75), stronger domestic demand (Q77) and higher profit gained from export sales (Q78).

Risk Management (X7)

This factor will be measured by the existence of contingency plan(s) (Q79), human resources succession plan (Q80), the insurance of company property (Q81), insurance of the company products (Q82), health and life insurance for employees (Q83), and the existence of network management (Q84).

From all seven factors the researcher came up with a model as in the following:

$Y = f(X1, X2, X3, X4, X5, X6, X7,) + e_0$.....(1), where Y= dependent variable, etc, etc.

All variables that were constructed with Likert scales had gone through reliability analysis. All scales exceeded the reliability guideline of alpha = 0.7 or above. (See Appendix III for statistical details.)

General characteristics of the variables and statistical analysis with the research findings will be presented in chapter four.

CHAPTER 4

RESEARCH FINDINGS

In this chapter, research findings will be presented, hypotheses will be described in terms of whether they are supported or not supported in accordance with the assumptions set in the earlier chapter. To begin with, the descriptive analysis of the samples will be presented, followed by the result of the study from Chi-Square analysis and Logistic Regression analysis of all variables.

4.1 Description of the Samples

To describe the characteristics of the samples, frequency analysis was employed to analyze each sample of the total of 296, which were collected for this study.

4.1.1 Socio- Economic and Human Development Factors

The Socio-Economic and Human Development Factors that were asked in this study include gender, age, marital status, educational background, major subjects, English proficiency and position in the organization or company. Details are separately described as in the following :

Gender Among the 296 samples, 42.6 percent are male and 55.7 are female. One point seven percent did not respond to this question.

Age The average age is 36.6 years and the youngest is 21 while 76 is the oldest. The majority, 40.5 percent of the respondents, are between 36 and 45 years old.

Marital Status The majority of the group are married (55.1%)

Educational Background The majority, 59.6 percent, have bachelor degrees, 17.2 percent have higher than a B.A., and 15.2 percent have lower than BA level.

Major Subjects The responses were divided into two groups: not related to business and IT (Liberal Arts, Social Sciences, Law, Math & Statistics, Sciences and Development Administration) and related to business and IT (Marketing, Business Administration, Accounting, Computers and Economics). The majority of the respondents' (58.8 percent) majors related to business and IT, while the rest (41.2 percent) had major subjects not related to business and IT.

English Proficiency The English proficiency of the majority of this group ranked at the moderate level (63.2 percent), 21.6 percent rated themselves as poor,11.5 percent fluent , the rest were very poor.

Position in the company Among these respondents, 29.7 percent were single owners, 24.0 percent were the major holders and 19.6 percent were the senior executives.

Details of each variable is shown in table 4.1 :

Table 4.1 General Demographic Characteristics of the Samples

Characteristics	Percent	Number
Gender		
Male	42.6	126
Female	55.7	165
No answer	1.7	5
Total	100.0	296
Age		
Less than 25	10.5	31
25-35	32.4	96
36-45	40.5	120
46+	16.6	49
Total	100.0	296

$\bar{X}$ = 36.66, SD = 9.34, Min = 26, Max = 76

Table 4.1 (Continued)

Characteristics	Percent	Number
Marital Status		
Single	44.9	133
Married	55.1	163
Total	100.0	296
Education		
Below B.A	15.2	45
BA	59.6	176
Higher than BA	17.6	52
No answer	7.8	23
Total	100.0	296
Major Subjects		
Not Related to Bus. & IT	41.2	122
Related to Business & IT	58.8	174
Total	100.0	296
English Proficiency		
Fluent	11.5	34
Moderate	63.2	187
Poor	21.6	64
Very Poor	2.4	7
No answer	1.4	4
Total	100.0	296
Position in the Company		
CEO / MD	5.4	16
Board Member	8.4	25
Senior Executives	19.6	58

Table 4.1 (Continued)

Characteristics	Percent	Number
Position in the Company		
Others	11.8	35
No answer	1.0	3
Total	100.0	296

4.1.2 Characteristics of the SMEs

The characteristics of SMEs are described in terms of size and types of SMEs.

Size of SMEs: there are 5 items included for these variables. There are size of enterprise, years in export sales business, sales volume, export sales volume, number of employees and company assets.

Size of Enterprise The respondents categorized their business as small business (71.3 percent) and medium (23.0 percent).

Years in Export Sales Business The average number of years in the export business is 5.5 years; the minimum is 6 months and maximum is 60 years. However, the majority of the respondents have experience in the export business of between one and five years (57.1 percent), followed by 5-10 years, less than one year and longer than 10 years at 28.7%, 12.2% and 2.0% respectively.

Sales Volume There were 2.7 percent of the respondents that did not answer this question, since many of the respondents kept this as confidential data. The majority of the group have a sales volume of 1-3 million Baht, followed very closely by the 3-6 million Baht with more than 10 million baht as the next group; the percentages were 25.7 percent , 25.3 percent and 17.2 percent respectively. The average sales volume is 12.3 million Baht; the maximum is 300 million Baht and minimum is 100,000 Baht.

Export Sales Volume Similar to sales volume, export sales volumes, there are quite a number of respondents that did not answer this question. The majority of the export sales volume is between 1-3 million Baht, followed by less than one million and more than 6 million; the percentage were 30.4%, 27.4% and 23.0% respectively. The average export sales volume is 6.3 million Baht; the minimum is 100,000 Baht and maximum is 150 million Baht.

Number of Employee The average of number of employees is 35.2, the minimum is 1 and maximum is 200. (Over 200 would be considered as a large enterprise, and would be excluded). The majority group are those between 1-10, which is 38.5 percent and 11-20, which is 27.7 percent and the group that has more than 30 employees, which is 25.3 percent.

Company Assets The majority, 33.4 percent of the SMEs have assets less than 3 million Baht, 31.8 percent have assets of more than 10 million Baht, and 20.3 percent have assets between 3 and 7 million Baht. The average of company assets is 16.3 million Baht, the minimum is 0, and maximum is 300 million Baht.

Table 4.2 shows details of size of enterprises, which include size of company, years in the export business, sales volume, export sales volume, number of employees and company assets.

Table 4.2 Sizes of SMEs

Characteristics	Percent	Number
Size of Company		
Small	71.3	211
Medium	23.0	68
No Answer	5.7	17
Total	100.0	296

Table 4.2 (Continued)

Characteristics	Percent	Number
Years in Export Business		
0-1	12.2	36
1-5	57.1	169
5-10	28.7	85
10 Years up	2.0	6
Total	100.0	296
	$\bar{X}$ = 5.5, SD= 6.4, Min = .5, Max = 60.0	
Sales Volume		
Lt 1million	8.1	24
1-3 million	25.3	75
3-6 million	25.7	76
6-10 million	17.2	51
Higher than 10 million	20.9	62
No answer	2.7	8
Total	100.0	296
	$\bar{X}$ = 12.3, SD = 27.9, Min = 0.1, Max = 300.0	
Export Sales Volume		
Less than 1 million	27.4	81
1-3 million	30.4	90
3-6 million	16.6	49
Higher than 6 million	23.0	68
No answer	2.7	8
Total	100.0	296
	$\bar{X}$ = 6.3, SD = 14.3, Min = 0.1, Max = 150.0	

Table 4.2 (Continued)

Characteristics	Percent	Number
No. Of Employees		
Less than 10 persons	38.5	114
11-20 persons	27.7	82
21-30 persons	6.8	20
More than 30 persons	25.3	75
No answer	1.7	5
Total	100.0	296
$\bar{X}$ = 35.2, SD= 50.11, Min = 1.0, Max = 200.0		
Company Assets		
Less than 3 million	33.4	99
3-7 million	20.3	60
7-10 million	12.2	36
Higher than 10 million	31.8	94
No answer	2.4	7
Total	100.00	296
$\bar{X}$ = 16.3, SD = 32.6, Min = 0.0, Max = 300.0		

Types of Enterprise This category includes types of company ownership, types of business and employees' educational level.

Type of company ownership The majority of 83.8 percent are Thai owned and only 10.5 percent are international joint ventures.

Types of business A total of 70.3 percent of the respondents are in the wholesale-retail business, 26.4 percent are in manufacturing and only 3.4 percent are in the service business.

Employees' Educational Level There are two levels describing employees' education; High School and lower, and Bachelor and higher. Both groups have similar

size of 47.9 percent for Bachelor and higher and 45.1 percent for the level of High School and lower. The rest, (3-4 percent) did not answer the question.

Detail of types of SMEs are shown in Table 4.3.

Table 4.3 Types of SMEs

Types	Percent	Number
Ownership		
Thai Owned	83.8	248
International Joint Venture	10.5	31
No answer	5.7	17
Total	100.0	296
Business		
Manufacturing	26.4	78
Wholesale-Retail	70.3	208
Service Business	3.4	10
Total	100.0	296
Employee's Education		
High School And Lower	45.1	129
BA and Higher	47.9	137
No answer	3.4	10
Total	100.0	296

4.1.3 Strategy, Management Style and IT Investment

These factors are divided into three groups: company strategic management, management style and IT investment.

4.1.3.1 Company Strategic Management Attitude questions have been employed, with a total of 10 items. The responses from these questions are divided into four levels of degree of agreement or disagreement; 1 means strongly disagree, 2 means disagree, 3 - agree and 4 - strongly agree.

The measurement includes the clarity of company goals and how well they are communicated to employees, marketing plan emphasizing new markets and export, new product development, encouragement of innovation of products and services, customer driven approach, English and computer training for employees, and management style. These will be individually described in the following:

Clear Goal Setting Almost all of the respondents believe that their companies had clear goal setting (97.6 percent).

Goal Communication Most of the respondents, (94.9 percent), accept that goal communication is good in their company.

Marketing Plan for New Markets Ninety-six point nine percent of the respondents believe that there is a marketing plan in their company that focuses on new markets.

Marketing Plan for Export Most respondents (96 percent) believe there is a marketing plan for export in their company.

Research & Development for New Products Almost all of respondents (98.3 percent) believe that there is research & development for new products in their company as one of the strategies.

Executives' Commitment to Innovation Similarly, the same percentage of respondents (98.3 percent), confirm that their executives are committed to innovation of both products and processes of operation.

Recognition of Employees' Innovative Ideas Almost all of respondents, (95.3 percent of them), believe their company recognizes employees' innovative ideas as a strategy for management.

Executives Drive for Customer/Market Excellence A total of 95.2 percent of the respondents agreed that executives strive for customer and market excellence.

English & Computer Training for Employees Most of the respondents (92.6 percent) agreed that in their company, English and computer training is a strategy for management.

Timely and Efficient Response to the Changing Market Most of respondents, (97.3 percent) believe that they respond to market change efficiently and in a timely manner.

Overall, it can be said that the executives of the SMEs believe that their companies are strategically well-managed.

Details of Company Strategic Management are shown in Table 4.4.

Table 4.4 Company Strategic Management

Strategic Management	Strongly Disagree	Disagree	Agree	Strongly Agree	Total
Clear Goal Setting	0.3	2.0	82.7	14.9	100.0 (296)
Goal Communication	0.3	4.7	71.3	23.6	100.0 (296)
New Market Plan	0	3.0	66.2	30.7	100.0 (296)
Export Plan	0.3	3.7	60.5	35.5	100.0 (296)
R&D for New Products	0	1.7	67.9	30.4	100.0 (296)
Innovation	0	1.7	69.9	28.4	100.0 (296)
Recognition & Reward	0	4.7	68.3	27.0	100.0 (296)
Customer Excellence	1.0	3.7	63.8	31.4	100.0 (296)
Eng & Com. Training	1.4	6.1	68.6	24.0	100.0 (296)
Response to Market Change	0.7	2.0	72.0	25.3	100.0 (296)

4.1.3.2 Company Management Style Thirty-eight point five percent of the respondents rated their company management style as family style, and 35.1 percent of them result- oriented, while only 7.8 percent and 13.5 percent stated that their company management styles are mixed style and innovative and high technological orientation respectively. Details of company management style are shown in Table 4.5.

Table 4.5 Company Management Style

Management Style	Percent	Number
Family Style	38.5	114
Result Oriented	35.1	104
Mixed Management	7.8	23
Innovative/High Tech.	13.5	40
No answer	5.1	15
Total	100.0	296

4.1.3.3 IT Investment The category includes the cost of investment in IT infrastructure, the number of IT experts, the number of employees that can access Internet, the proportion of PC and employees, the usage of software, IT training hours, and IT Training cost for IT investment.

The Cost of IT Infrastructure Most respondents do not have any investment in IT infrastructure (53.7 percent) while 20.3 percent of them have invested less than 100,000 Baht. The average investment is 225,500 Baht, and maximum is 5 million Baht.

Number of IT Experts The average number of IT experts is 0.92, maximum is 20 and minimum is none, which is also the majority of all respondents at 59.1 percent. There are 22.0 percent of the SMEs that have one IT expert in their companies, and 18.9 percent have more than one.

Number of Employees that Have Access to Internet There are 38.2 percent of the SMEs that have 1-3 of their employees who can access Internet; 28.0 percent of them have 4-6 of the employees who can access Internet. The number of employees that can access Internet varies from 0-100 and the average is 4.43.

Proportion of Number of Employees to one PC The majority of the SMEs have one PC for more than 1-2 employees (24.1 percent), 22.7 percent have one PC for 3-5 employees and 19.3 percent have one PC for one employee and more than 6 employees for one PC. The average of number of employees to one PC is 4.38 and the maximum is 40 employees for one PC.

Software Usage Only 28.7 percent of the SMEs use specialized software, while the majority of 70.3 percent do not use any specialized software.

IT Training Hours Most of SMEs do not provide any IT training to their employees (57.8 percent); the group that has IT Training hours higher than 60 hours ranked second at 20.9 percent. The average of IT training hours is 30.5 hours and the maximum is 300 hours.

IT Training Cost The majority of SMEs do not have any IT training cost which is aligned with no IT Training. This makes up 59.8 percent of them. The second group (23.0 percent) is the group that has IT Training costs from 1-5000 Baht percent. The average of IT training cost is 34,266 Baht while the maximum is 600,000 Baht.

Details are shown in Table 4.6.

Table 4.6 IT Investment on IT Infrastructure, IT Expert, Internet Access, Ratio of Employee / PC, IT Training Hour and IT Training Cost

IT Investment	Percent	Number
IT Infrastructure Cost		
No Investment	53.7	159
Less than 100,000	20.3	60
100,001-999,999	13.2	39
More than 1 million	12.5	37
No answer	0.3	1
Total	100.0	296
	$\bar{X}$ = 0.22, SD = 0.54, Min = 0.0, Max = 5.0*	
No. of IT Experts		
None	59.1	175
1	22.0	65
2 or more	18.9	56
Total	100.0	296

Table 4.6 (Continued)

IT Investment	Percent	Number
	$\bar{X}$ = .92, SD = 2.06, Min = 0.0, Max =20.0	
Access to Internet		
0	16.2	48
1-3	38.2	113
4-6	28.0	83
More than 6	17.6	52
Total	100.0	296
	$\bar{X}$ = 4.43, SD = 7.81, Min = 0.0, Max = 100.0	
No. of Employee/PC		
0	14.5	43
1	19.3	57
2	24.0	71
3-5	22.6	67
More than 6	19.3	57
No answer	0.3	1
Total	100.0	296
	$\bar{X}$ = 4.38, SD = 5.89, Min = 0.0, Max = 40.0	
Software Usage		
Use	28.7	85
Do not use	70.3	208
No answer	1.0	3
Total	100.0	296
IT Training Hours		
0	57.8	171
1-30	10.5	31

Table 4.6 (Continued)

IT Investment	Percent	Number
IT Training Hours		
31-60	10.8	32
61 and higher	20.9	62
Total	100.0	296
	$\bar{X}$ = 30.5, SD = 48.12, Min = 0.0, Max = 300.0	
IT Training Cost		
No cost	59.8	177
1-5000 Baht	23.8	68
More than 5000 Baht	17.2	51
Total	100.0	269
	$\bar{X}$ = 34266.5, SD = 72893.2, Min = 0, Max = 600,000*	

*Calculated by using variable ratio answer.

4.1.4 Customer Factors

This factor is divided in to 2 parts: customer related activities and customer satisfaction. The customer related activities includes the rate of repeat customers, sources of advertising, cost of web site advertising and other advertising costs. As for customer satisfaction, the measurement involves attitude questions of agreement or disagreement on convenience of customers to purchase the products or services, customer satisfaction on delivery system, the right price of the products and services, understanding of market, customer handling and efficiency in response to customer needs.

4.1.4.1 Customer Related Activities

The Percentage of Repeat Customers Most SMEs (49.0 percent) have a very high percentage of repeat customers (70-89 percent), while 19.9 percent

had repeat business of 50-69 percent. Fifteen point nine percent of the SMEs had repeat business of 90 percent and more. The average of the percentage of repeat customers is 66.83 percent and the maximum is 100 percent.

Source of Advertising Among all, the largest group of SMEs select the web site as their source of advertising (41.9 percent), followed by word of mouth (customer to another customer) with 28.7% None of the respondents uses broadcasting as a source of advertising.

Cost of Web Site Advertising The majority of web site advertising ranged between 1-100,000 Baht at 77.6 percent and more than 100,001 at 22.4 percent. The average cost is 195,500 Baht and the maximum is 2 million Baht.

Cost of Other Advertising Most SMEs have no other advertising investment (64.7 percent of them) and more or less the same amount between 1-100,000 Baht and more than 100,001 Baht at 17.2 percent and 17.9 percent respectively. The average of this kind of advertising investment cost is 183,000 Baht and the maximum is 10 million baht.

Details of these customer factors are presented in Table 4.7

Table 4.7 Repeat Customers, Source of Advertising, Cost of Web Site Advertising, and Other Kinds of Advertising

Characteristics	Percent	Number
Percentage of Repeat Customers		
0 - 49 %	14.9	44
50 - 69%	19.9	59
70 - 89	49.0	145
90 % and More	15.9	47
No answer	0.3	1
Total	100.0	296

$\bar{X}$ = 66.83, SD= 25.02, Min = 0.0, Max = 100.0

Table 4.7 (Continued)

Characteristics	Percent	Number
Source of Advertising		
Broadcast	0	0
TV	3.4	10
Magazine	6.4	19
Web Site	40.9	121
Trade Exhibition	18.9	56
Customer to Customer	28.0	83
No answer	2.4	7
Total	100.0	296
Cost of Web Site Advertising		
None	0	0
1-100,000 Baht	77.6	229
More than 100,000	22.4	66
No answer	0.3	1
Total	100.0	296
$\bar{X} = 0.1955$, SD = 1.18, Min = 0.0, Max = 2.0*		
Cost of Other Advertising		
None	64.5	191
1-100,000 Baht	17.2	51
More than 100,000	17.9	53
No Answer	0.3	1
Total	100.0	296
$\bar{X} = 0.1803$, SD = .71, Min = 0.0, Max = 10.0*		

* Calculated by using interval variable.

4.1.4.2 Customer Satisfaction

Customer Convenience to Buy Products and Services Almost all of SMEs -98.8 percent of them believe that their customers can conveniently buy their products and services.

Delivery System Most SMEs (96.6 percent) believe that their customers are satisfied with their delivery system.

Right Price of Products and Services Almost all SMEs, or 98.9 percent, believe that their price of products and services are right.

Awareness that there are Choices for Customer via the Internet Most SMEs or 90.2 percent of them are aware that their customers have choices via Internet.

Customer Handling Most SMEs, or 97.3 percent, believe that their companies are efficient in customer handling.

Network and Team Alignment to Respond to Customers Needs Almost all SMEs or 97.4 percent of them believe that there are network and team alignment in their companies in response to customer needs.

Overall, it could be said that the SMEs are confident that their customers are satisfied with their products and services.

Details of this customer satisfaction survey show in the Table 4.8.

Table 4.8 Customer Satisfaction

Customer Satisfaction	Strongly Disagree	Disagree	Agree	Strongly Agree	Total
Convenience	0.3	1.4	5.1	13.2	100.0 (296)
Delivery	0	3.4	1.7	14.9	100.0 (296)
Price	0	1.0	8.0	20.9	100.0 (296)
Choices (web site)	1.7	8.1	6.2	24.0	100.0 (296)
Customer Handling	0	0.3	5.7	21.6	100.0 (296)
Response to Customers needs	0.4	2.0	7.4	20.3	100.0 (296)

4.1.5 Government Support and E-commerce Policy Implementation

For this factor, all will be measured by the attitude questions, employing the same pattern of satisfaction degree. A set of 21 questions was employed. With regard to government support on E-commerce Policy Implementation, respondents' answers are considered more positive than one could expect. They are individually described in the following:

Research & Development Support A majority of 70.9 percent of the SMEs are confident that the government supports them on research and development. On the other hand, there are 29 percent of them that do not believe that the government supports them on research and development.

Communication of E-commerce Policy The majority (67.8 percent) of SMEs consider that the government can communicate the objectives, and standards of E-commerce Policy to them. However, 33.8 percent are not convinced that the government can communicate the E-commerce policy to them.

Sufficient Financial Support Sixty-nine percent of SMEs consider that the financial support from government is sufficient. On the other hand, 31.1 percent of them consider there is not sufficient financial support from the government.

Small Industry Finance Corporation Support Almost 70 percent of the SMEs believe that the Small Industry Finance Corporation, which is a government financial institute, supports their business, while there are 30 percent that do not believe so.

Exhibitions & Trade Fairs Most of the SMEs (72.4 percent) have a positive attitude that the government helps them to promote their business by organizing international exhibitions and trade fairs. Another 37.7 percent of them do not believe so.

IT Training Support Sixty-seven point two percent of SMEs consider that there is sufficient government support for them in IT training. There are, on the other hand, 37.8% of them that do not think so.

IT Infrastructure Support On improvement of IT Infrastructure issues, 64.9 percent of the SMEs consider government has provided sufficient support in improving IT infrastructure, while 39.7 percent of them consider that it is not sufficient.

Convenience of Telecommunication System The majority (64.5%) of SMEs considers telecommunication system provided by the government is convenient, and 35.5 percent of them have a contrary idea..

Cost of Telecommunication System A majority of SMEs , (62.5 percent), consider that the government supports the telecommunication system in terms of cost. On the other hand, there are 37.5 percent of them that do not believe so.

Appropriate ness and Timeliness of E-commerce Law and Related Laws There are 62.5 percent of the SMEs who consider that the E-commerce law and related law are appropriate and on time. On the other hand, 35.5 percent of them consider that they are not appropriate and not on time.

Enforcement of E-commerce Law and Related Laws The SMEs (63.5 percent) believe that the enforcement of E-commerce laws and related laws by the government are appropriate. However, another 36.5 percent of them believe that they are not appropriate yet.

Tax and Export Tax Policy The majority of SMEs (63.8 percent) consider that the Tax Policy is fair and encourages them, while 36.2 percent have the opposite idea. They consider that the tax policy is not fair and not encouraging.

Fairness of Global Tax Policy A majority of SMEs (63.5 percent) consider that the global tax policy, supported by the government, is fair to them . There are 36.5 percent of them that do not believe that the global tax is fair.

Confidence in Security Issues Sixty-five point one percent of the SMEs consider that government instills confidence and provides sufficient support for security issues, while there are another 34.8 percent that do not believe so.

Protecting Intellectual Property A total of 69.6 percent of the SMEs consider that the government has put forth an effort on protecting intellectual property. Yet, there are another 31.4 percent that consider it is not sufficient .

International Trade and Network The SMEs (62.8 percent) appreciate the government's role in supporting international trade and network contexts. There are 29.2 percent who are still not satisfied with this government role yet.

Promoting Development of SMEs Sixty-seven point two percent of SMEs consider that the government sincerely promotes the development of SMEs and 32.8 percent do not believe so.

Co-operation in E-commerce Policy The majority (69.5 percent) of the SMEs consider that government really seeks cooperation for E-commerce Policy implementation while 30.5 percent have a contrary idea.

Extra Effort to Assist SMEs Most SMEs (62.8 percent) consider that the government agencies and their officers put extra effort to assist them in E-commerce activities while 37.2 percent disagree.

Successful Export Promotion The majority of SMEs (64.32 percent) consider that government 's export promotion is successful while 35.8 percent do not think so.

Economic & Social Environment The majority (65.9 percent) of respondents believe that the economic and social environment support E-commerce adoption, while 34.1 percent do not believe so. Table 4.9 below presents the details of Government Support and E-commerce Policy Implementation.

Table 4.9 Government Support and E-commerce Policy Implementation
(296 Respondents)

Support and Implementation	Strongly Disagree	Disagree	Agree	Strongly Agree	Total
Research & Development Support	2.0	27.0	59.1	11.8	100.0(296)
Communication of E-com. Policy	11.5	22.3	55.0	11.1	100.0(296)
Financial Support	6.8	24.3	57.5	12.3	100.0(296)
Small Industry Fin. Corp. Support	12.8	17.2	59.4	10.5	100.0(296)
Trade Fair Exhibition	5.7	22.0	56.5	15.9	100.0(296)
IT Training Support	12.5	20.3	54.0	13.2	100.0(296)
IT Infrastructure Support	13.9	20.3	51.7	14.2	100.0(296)
Convenience of Telecom. System	16.2	19.3	48.3	16.2	100.0(296)
Cost of Telecom. System	16.9	20.6	49.7	12.8	100.0(296)
On -Time E-commerce laws	8.4	29.1	52.4	10.1	100.0(296)
Appropriate E-commerce laws	10.5	26.0	54.7	8.8	100.0(296)
Fair Tax Policy	8.8	27.4	55.4	8.4	100.0(296)

Table 4.9 (Continued)

Support and Implementation	Strongly Disagree	Disagree	Agree	Strongly Agree	Total
Fair Global Tax Policy	11.5	25.0	55.1	8.4	100.0(296)
Confidence in Security Issues	7.1	27.7	57.7	7.4	100.0(296)
Protecting Intellectual Property	5.1	25.3	54.7	14.9	100.0(296)
International Trade/Network	4.1	25.0	62.8	8.1	100.0(296)
Promoting Development of SMEs	4.7	28.0	61.8	5.4	100.0(296)
Co-Operation in E-com. Policy	4.7	25.7	62.1	7.4	100.0(296)
Extra Effort to assist SMEs	6.8	30.4	55.4	7.4	100.0(296)
Successful Export Promotion	3.7	32.1	53.1	11.1	100.0(296)
Economic-Social Environment	3.0	31.1	54.4	11.5	100.0(296)

4.1.6 Private and International Organizations Support

This group of variables was measured by 13 questions of attitude measurement. The responses to this group of questions are more or less the same as the government support and E-commerce Policy.

Support From Private Sector in Finance Most SMEs (86.5 percent) consider that the private sector in finance provides prompt and efficient services to them at a reasonable cost, while 13.5 percent do not believe so.

Support from Private Sector in IT For the private sector support in IT, 80.4 percent of SMEs consider that the services are prompt and efficient with a reasonable cost. There are 19.6 percent that have a contrary idea.

Support from Private Sector in Delivery Service Most SMEs (82.5 percent) consider that the delivery services provided by private sector is prompt and efficient and at a reasonable cost, while 17.5 percent of them do not believe so.

Support From International Organizations The majority of SMEs (85.4 percent) consider that international organizations such as WTO, ASEAN, APEC promote and support SMEs, while 17.6 percent of them do not believe so.

Sufficient and Reasonable Price of Material Eighty-five point four percent of SMEs consider that the private sector provides sufficient material to them at reasonable quality and price . The rest of 14.6 percent have a contrary opinion.

High Quality Labor at Reasonable Cost There are 85.2 percent of SMEs who agree that the private sector can support them with high quality labor at a reasonable cost, while 14.8 percent of them do not agree.

Support From Financial Institutes Most of the SMEs (85.4 percent) consider that the private financial institutes support SMEs business, but 14.5 percent of them do not believe so.

Support from Insurance Institutes Similar to the private financial Institutes support, most SMEs also consider that insurance institutes support them; the total was 80.1 percent, while 19.9 percent of them do not believe so.

Large Domestic Market The majority of the SMEs (80.1 percent) consider that their domestic market is large, while 19.9 percent of them do not believe so.

High Growth Rate of Domestic Market The majority of the SMEs (81.7 percent) consider that their domestic market has a high growth rate while 18.3 percent of them do not believe so.

High Domestic Competitiveness Most SMEs (83.8 percent) believe that the domestic market has a very high competitiveness and forces them to export, while another 16.3 percent do not believe so.

Stronger Domestic Demand Similarly, 84.5 percent of the SMEs consider that domestic market demand has become stronger and the other 15.5 percent do not believe so.

High Profit From Export Sales Most of the SMEs (85.2 percent) consider that they can get higher profits from the export sales , while 14.8 percent do not believe so. For complete details, see table 4.10

Table 4.10 Private And International Organizations Support

Private and International Organizations' Support	Strongly Disagree	Disagree	Agree	Strongly Agree	Total
Finance support from private sector	1.0	12.5	77.0	9.5	100.0(296)
IT Service support from private sector	0.7	18.9	69.2	11.2	100.0(296)
Delivery support from private sector	1.0	16.6	70.0	12.5	100.0(296)
Support from Int'l organizations	0.7	16.9	71.9	10.5	100.0(296)
Reasonable price of material	1.4	13.2	69.9	15.5	100.0(296)
Quality labor at reasonable cost	0.3	14.5	71.6	13.5	100.0(296)
Support from financial institute	0.0	14.5	68.2	17.2	100.0(296)
Large domestic market	1.0	18.9	67.6	12.5	100.0(296)
High growth rate of domestic market	0.7	17.6	66.5	15.2	100.0(296)
High domestic Market competitiveness	1.4	14.9	69.6	14.2	100.0(296)
Stronger domestic demand	2.7	12.8	71.3	13.2	100.0(296)
Higher profit from export sales	2.4	12.5	69.0	16.2	100.0(296)
Finance support from private sector	1.0	12.5	77.0	9.5	100.0(296)
IT Service support from private sector	0.7	18.9	69.2	11.2	100.0(296)
Delivery support from private sector	1.0	16.6	70.0	12.5	100.0(296)
Support from Int'l organizations	0.7	16.9	71.9	10.5	100.0(296)
Reasonable price of material	1.4	13.2	69.9	15.5	100.0(296)
Quality labor at reasonable cost	0.3	14.5	71.6	13.5	100.0(296)
Support from financial institute	0.0	14.5	68.2	17.2	100.0(296)
Support from insurance institute	0.7	18.9	65.2	15.2	100.0(296)
Large domestic market	1.0	18.9	67.6	12.5	100.0(296)
High growth rate of domestic market	0.7	17.6	66.5	15.2	100.0(296)
High domestic competitiveness	1.4	14.9	69.6	14.2	100.0(296)
Stronger domestic demand	2.7	12.8	71.3	13.2	100.0(296)
Higher profit from export sale	2.4	12.5	69.0	16.2	100.0(296)

4.1.7 Risk Management

This group of variables indicates how well the SMEs prepare for change in the dynamic global market. These variables were measured by the existence of contingency plan(s), human resources succession plan, the insurance of company assets, and products, health and life insurance for employees, and the existence of network management. They will be described individually below:

Existence of Contingency Plan Most of the respondents (90.2 percent of them) have a contingency plan or plans. Only 9.8 percent of them do not have a contingency plan.

Existence of Succession Plan Similar to the contingency plan, 83.8 percent of the 296 respondents indicated that a succession plan was in place. Only 16.2 percent of them that do not have one yet.

Insurance for Company Assets Insurance strategy seems to be common practice for most SMEs. A total of 88.1 percent have insurance for their company assets.

Insurance of Company Products Most respondents (84.5 percent) have insurance for their products, while only 15.5 percent of them do not have.

Insurance of Employee Similarly, a total of 84.4 percent of the SMEs have life and medical insurance for their employees. Only 15.5 percent of them do not have this kind of insurance yet.

Existence of Network management Again, 90.2 percent of the respondents have a network management system and are members of some foundation. Only 9.8 percent of them stated that network management does not exist yet and they haven't joined any foundation.

Details are shown in Table 4.11.

Table 4.11 Risk Management

Risk Management	Strongly Disagree	Disagree	Agree	Strongly Agree	Total
Contingency Plan	1.7	8.1	69.3	20.9	100.0
Succession Plan	0.3	15.9	66.2	17.6	100.0
Insurance for Company Assets	0.7	11.1	64.5	23.6	100.0
Insurance for Company Products	0	15.5	64.6	19.9	100.0
Health &Life Insurance for Employees	1.0	14.5	60.8	23.6	100.0
Network Management	1.0	8.8	69.9	20.3	100.0

4.1.8 Adoption of E-commerce

The final variable is the dependent variable. There are three different choices of answer; full adoption, partial adoption and no adoption. Full adoption includes the whole process via Internet starting from web site advertising and order processing, all the way to final payment; also, some kinds of products or services include delivery.

From 296 respondents, there were 38 cases of full adoption of E-commerce, and 181 partial adoptions which were added together to make a group of 219 as adopters of E-commerce and 77 cases of non- adoption of E-commerce. This makes adoption of E-commerce become dichotomous, i.e., adopted or not adopted.

Table 4.12 Adoption of E-commerce

Adoption of E-commerce	Percent	Number
Not Adopted	26.0	77
Fully Adopted	12.8	38
Partly Adopted	61.2	181
Total	100.0	296

4.2 The Variables Affecting E-commerce Adoption

In order to find out whether the findings of the research will support any set of hypotheses, or to see the relationship between factors identified and the adoption of E-commerce, the researcher employed Chi - Square Analysis. Logistic Regression was applied to find out which variables strongly influenced SMEs with regards to E-commerce adoption.

The research findings will be presented, starting with individual independent variables' relationship to E-commerce adoption.

4.2.1 Adoption of E-commerce and Socio - Economic & Human Development Factors

The purpose of this analysis is to determine which variable is related to E-commerce adoption. The statistics used are percentage difference and χ^2- test.

4.2.1.1. Socio - Economic Factor This factor includes gender, age, marital status and position in the company.

Adoption of E-commerce and Gender

The statistics show that the male owners of SMEs (or CEO,MD, Board member or executives) adopted E-commerce for their business at a rate of 76.2 percent. This was higher than female owners who adopted at a 72.1 percent rate. Also, the test statistics χ^2 which is equivalent to .613, does not fall in the critical region which, for alpha = .05, df = 1, begins at χ^2 critical value of 12.706. Therefore, we fail to reject the null hypothesis. It means that gender apparently has no effect on E-commerce adoption. See Table 4.13.

Table 4.13 Adoption of E-commerce by Gender

Adoption	Male	Female
Not adopted	23.8 (30)	27.9 (46)
Adopted	76.2 (96)	72.1 (119)
Total	43.3 (126)	56.7 (165)
	χ^2= .613 df =1 p.=.434	

Adoption of E-commerce and Age

All ranges of age show very little difference in the level of E-commerce adoption, except at the range of 46 and older. This age group had an adoption rate of about 5-6% lower than other ranges of age. The rate of E-commerce adoption is 74.2 percent, 74.0 percent, 75.8 percent and 69.4 percent for the group of age below 25, 25-30, 35-45 and 46 and older respectively. χ^2 obtained = .752 and the alpha is set at .05 level, the critical region, with df = 3, would begin at 3.182. Thus, we fail to reject the null hypothesis. Age, then, has no effect on E-commerce adoption. See Table 4.14

Table 4.14 Adoption of E-commerce by Age

Adoption	Below 25	25-35	35 - 45	46 and older
Not adopted	25.8 (8)	26.0 (25)	24.2 (29)	30.6 (15)
Adopted	74.2 (23)	74.0 (71)	75.8 (91)	69.4 (34)
Total	10.5 (31)	32.4 (96)	40.5 (120)	16.6 (49)
	χ^2	=.752 df = 3	p. =.861	

Adoption of E-commerce and Marital Status

The grouping of married respondents compared to unmarried was almost even. the total number of married respondents was 163 and the single respondents number is 133. The difference of E-commerce adoption between these two groups is about 8 percent. The married status adopted E-commerce more than single status, that is, 78.2 percent compared to 70.6 percent. However, from Chi-square test, the tabular χ^2 value at a.05 level of significance and one degree of freedom is 12.706. Because the calculated χ^2 = 2.23 is less than the tabular value, we fail to reject the null hypothesis and conclude that there is no significant difference between single and married respondents in E-commerce adoption. See table 4.15.

Table 4.15 Adoption of E-commerce By Marital Status

Adoption	Single	Married*
Not adopted	55.1 (29)	55.1 (48)
Adopted	78.2 (104)	55.1 (115)
Total	44.9 (133)	55.1 (163)

$\chi^2 = 2.23$ df = 1 p. = .136

***includes divorced or separated**

Adoption of E-commerce and Position in the Company

From the position in the company or organizational variable, the senior executives is the group that has the highest percentage E-commerce adoption. From the analysis, Senior Executives adopted of E-commerce at an 89.6 percent rate, CEO or MD at 81.3 percent, Board members at 76.0 percent, major shareholders at 74.6 percent, others at 74.3 percent and single owners (SO) at 61.4 percent respectively. The calculated value is greater than the critical value, so the null hypothesis is rejected. Therefore, position of the SMEs in the organization has an effect on E-commerce adoption. Please see Table 4.16.

Table 4.16 Adoption of E-commerce by Position in the Company.

Adoption	S. Owner	M.Share	CEO	B. Member	S. Executives	Others
Not adopted	38.6(34)	25.4 (18)	18.8 (3)	24.0 (6)	10.3 (6)	25.7 (9)
Adopted	61.4 (54)	74.6 (53)	81.3 (13)	76.0 (19)	89.7 (52)	74.3 (26)
Total	30.0 (88)	24.2 (71)	5.5 (16)	8.5 (25)	19.8 (58)	11.9 (35)

$\chi^2 = 15.220$ df = 5 p. = .009

4.2.1.2 Human Development Factors There are three variables included in the human development model: educational background, major subjects and English proficiency. The units of study are the owners, CEOs, executives, board members, or major shareholders of their respective organizations.

Adoption of E-commerce and Educational Background

From table 4.17 below, it is shown that SMEs who have higher education adopt of E-commerce much more than those whose education is lower. Ninety-two percent of the group that have education qualifications higher than BA adopt E-commerce, compared to 72.2 percent of BA level and 64.4 percent of below BA. These differences are statistically significant at the level of .003 which is less than .05 level of significance. Therefore, education has a strong effect on E-Commerce Adoption. See Table 4.17.

Table 4.17 Adoption of E-commerce by Educational Background.

Adoption	**Lower than B.A**	**BA.**	**Higher than BA.**
Not adopted	35.6 (16)	27.8 (49)	7.7 (4)
Adopted	64.4 (29)	72.2 (127)	92.3 (48)
Total	16.5 (45)	64.5 (176)	19.0 (52)
	χ^2 =11.644	df =2 p. =.003	

Adoption of E-commerce and Major Subjects

The members of the group who have a business and IT background have a higher percentage in E-commerce adoption than those whose backgrounds are not related to business and IT; the rates were 79.3 percent and 66.4 percent respectively. There is statistical support for the hypothesis that there is a relationship between major subjects and E-commerce adoption. We reject the null hypotheses because the value of 0.15 is less than our .05 level of significance. Thus, we can conclude that subjects that are relevant to E-commerce have an effect on adoption. See Table 4.18.

Table 4.18 Adoption of E-commerce by Major Subjects

Adoption	Relevant	Not Relevant
Not adopted	33.6 (41)	20.7 (36)
Adopted	66.4 (81)	79.3 (138)
Total	41.2 (122)	58.8 (174)
	χ^2 = 6.217 df = 1	p.=.015

Adoption of E-commerce and English Proficiency

The percentage of E-commerce adoption for the four English proficiency groups of very poor, poor, moderate and fluent are 28.6, 72.7, 71.9 and 94.1 percent respectively. Since the calculated $\chi^2 = 14.598$ is greater than the critical value, with df = 3, which is 3.182, we can conclude that there is statistical support for the hypotheses that there is a relationship between English proficiency and E-commerce adoption. We can reject the null hypotheses because the value of .002. is less than our .05 level of significance. It means that English proficiency has an effect on E-commerce adoption. Results as shown in Table 4.19 indicated that the more fluent respondents in regards to English proficiency adopted E-commerce at a higher rate than the ones who were more proficient.[3] See table 4.19.

Table 4.19 Adoption of E-commerce by English Proficiency.

Adoption	Very Poor	Poor	Moderate	Fluent
Not adopted	71.4 (5)	27.3 (51)	28.1 (18)	05.9 (2)
Adopted	28.6 (2)	72.7 (136)	71.9 (46)	94.1 (32)
Total	2.4 (7)	64.0 (187)	21.9 (64)	11.6 (34)
	χ^2 = 14.958 df = 3 sig. = .002			

[3] However, it should be noted that self assessment of English proficiency is highly subjective; people with less proficiency tend to exaggerate their ability, while those with more competence underestimate. As a consequence, the categories, in relation to actual proficiency are somewhat unreliable. Notwithstanding the subjectivity, the statistical evidence still supports the hypothesis.

4.2.1.3 Finding for Hypothesis 1 A higher rate of Human development is more likely to have a positive relation to E-commerce adoption

From the three variables, which are educational level, major subjects and English Proficiency, all three of them have a positive statistically significant relationship with E-commerce adoption. Thus we may conclude that the hypothesis I is confirmed.

4.2.2 Adoption of E-commerce and Characteristics of SMEs Factor

As the characteristics of the SMEs were divided into two groups: types and sizes pf the SMEs., each of them will be presented separately as follows:

4.2.2.1 Types of SMEs There are three variables included in this model: company ownership, types of business and employees' educational level :

Adoption of E-commerce and Type of SMEs ' s Ownership

For the types of SMEs ownership, there are two types: Thai Owned and International Joint Venture. The Thai Owned group of SMEs has an E-commerce adoption rate at 71.0 percent while the International Joint Venture group has a 96.8 percent. rate of adoption From the calculation, the value of .002 is much less than the .05 value of significance. Then, we can reject the null hypothesis. It means that types of SMEs have an effect on E-commerce adoption. See table 4.20.

Table 4.20 Adoption of E-commerce by Types of Ownership

Adoption	100 percent Thai Owned	Int'l Joint Venture
Not adopted	29.0 (72)	3.2 (1)
Adopted	71.0 (176)	96.8 (30)
Total	88.9 (248)	11.1 (31)

χ^2 = 9.499 df = 1 p. = .002

Adoption of E-commerce and Types of Business

From the three categories defined in types of business in this study, namely manufacturing, wholesale-retail and service business, the study shows that manufacturing, wholesale-retail and service groups have E-commerce adoption rates of 85.9%, 69.0% and 70.0% respectively. From the statistical analysis, there is a statistically significant positive relationship between E-commerce adoption and the types of business of the SMEs at the level of .020. It means the type of business has affected E-commerce adoption. See Table 4.21.

Table 4.21 Adoption of E-commerce by the Types of SMEs

Adoption	Manufacturing	Wholesale-Retail	Service Business
Not adopted	14.1 (11)	30.3 (63)	30.0 (3)
Adopted	85.9 (67)	69.0 (145)	70.0 (7)
Total	26.4 (78)	70.3 (208)	3.4 (10)

$\chi^2 = 7.807$ df = 2 p. = .020

Adoption of E-commerce and Educational Level of the SMEs' Employees

The SMEs whose employees have education at high school and lower adopt E-commerce at a rate of 68.3 percent and those whose employees have BA and higher education adopt E-commerce at a 79.9 percent rate. From the study, it also shows statistic significance at a level of .026, which means that educational level of employees has an effect on E-commerce adoption. See Table 4.22

Table 4.22 Adoption of E-commerce by Educational level of Employees

Adoption	High School and Lower	B.A and Higher
Not adopted	31.7 (45)	20.1 (29)
Adopted	68.3 (97)	79.9 (115)
Total	49.7 (142)	50.3 (144)
	χ^2 = 4.97 df = 1	p. = .026

4.2.2.2 Size of SMEs For the size of SMEs, there are seven variables included in the model, namely size of company, size of enterprise, years in export business, sales volume, export sales volume, number of employees and company assets.

Adoption of E-commerce and size of SMEs

The medium sized SMEs have E-commerce adoption at a higher rate than the small ones (92.6 percent and 66.4 percent, respectively). There is statistical support for the hypothesis that there is a relationship between the size of the business and E-commerce adoption. We reject the null hypotheses because the value of 0.000 is much less than our .05 level of significance. Thus, we can conclude that the size of SMEs has an effect on E-commerce adoption. as shown in Table 4.23.

Table 4.23 Adoption of E-commerce by Size of SMEs

Adoption	Small	Medium
Not adopted	33.6 (71)	7.4 (5)
Adopted	66.4 (140)	92.6 (63)
Total	75.6 (211)	23.0 (68)
	χ^2 = 17.942 df = 1	p. = .000

Adoption of E-commerce and Years in Export Business

Years in business will show how SMEs experience in the export business affects E-commerce adoption. The higher of years in export sales business shows a higher percentage of E-commerce adoption except for the last group who are in business for more than 10 years. The percentage of E-commerce adoption starts from 52.8,72.8,85.9 and 66.7 for the four groups of 0-1 year, 1-5,5-10 and longer than 10 years in the export business. From the statistical analysis, it shows a significant relationship of years in export business and E-commerce adoption since the value of .002 is much less than our set of .05 level of significance. This means the years in export business has a high effect on E-commerce adoption, with the exception of the longer than ten years group.. See Table 4.24.

Table 4.24 Adoption of E-commerce by Years in Export Business

Adoption	0-1 Year	1-5 Years	5-10 Years	Lt10 Years
Not adopted	47.2 (17)	27.2 (46)	14.1 (12)	33.3 (2)
Adopted	52.8 (19)	72.8 (123)	85.9 (73)	66.7 (4)
Total	12.2 (36)	57.1 (169)	28.7 (85)	2.0 (6)
	χ^2 = 14.958	df = 3	p. = .002	

Adoption of E-commerce and Sales Volume

From the study, it obviously shows that the higher the sales volume of SMEs', the higher percentage of E-commerce adoption: i.e., 50.0, 64.0, 69.7, 84.3, and 91.9 for those SMEs who have sales volume at less than 1 million Baht, 1-3 million, 3-6, and more than 6 million Baht respectively. There is statistical support for the hypothesis that there is a strong relationship between E-commerce adoption and the sales volume. We can reject the null hypothesis since the value of .000 is much less than .05 level of significance. This means that the sales volume has strongly affected E-commerce Adoption. See Table 4.25.

Table 4.25 Adoption of E-commerce by Sales Volume

Adoption	Lt 1M Baht	1-3M Baht	3-6M Baht	6-10 M Baht	Ht10M Baht
Not adopted	50.0 (12)	36.0 (27)	30.3 (23)	15.7 (8)	8.1 (5)
Adopted	50.0 (12)	64.0 (48)	69.7 (53)	84.3 (43)	91.9 (57)
Total	8.3 (24)	26.0 (75)	26.4 (76)	17.7 (51)	21.5 (62)
$\chi^2 = 24.961$ df = 4 p. = .000					

Adoption of E-commerce and Export Sales Volume

The SMEs who have an export sales volume less than 1 million baht have E-commerce adoption at 60.5 percent, 1-3 million 72.2 percent, 3-6 million 77.6 percent, and more than 6 million at 89.7 percent respectively. It is clearly shown that the higher of the export sales volume, the higher percentage of E-commerce adoption. Besides, there is a statistically significant relationship of the export sales volume and E-commerce adoption at the level of .001. It means, then, the export sales volume has a strong effect on E-commerce adoption. See Table 4.26.

Table 4.26 Adoption of E-commerce By Export Sales Volume

Adoption	Less than 1 M Baht	1-3 M Baht	3-6 M Baht	Higher than 6 M Baht
Not adopted	39.5 (32)	27.8 (25)	22.4 (11)	10.3 (7)
Adopted	60.5 (49)	72.2 (65)	77.6 (38)	89.7 (61)
Total	28.1 (81)	31.3 (90)	17.0 (49)	23.6 (68)
χ^2 = 16.849 df = 3 p. .001				

Adoption of E-commerce and the number of Employees in the SMEs

The SMEs who have less than 10 employees have E-commerce adoption at 61.4 percent, 11-20 employees at 76.8 percent, 21-30 employees at 75.0 percent, and more than 30 employees at 73.5 percent respectively. From Chi-square test, there is statistical evidence that there is a relationship between the number of employees of the SMEs and the E-commerce adoption. We reject the null hypothesis because the value of .001 is less than .05 level of significance, which means the number of employees has an effect on E-commerce adoption. Please see Table 4.27.

Table 4.27 Adoption of E-commerce by the Number of Employees in the SMEs

Adoption	**Lt10**	**11-20**	**21 - 30**	**Ht 30**
Not adopted	38.6 (44)	23.2 (19)	25.0 (5)	12.0 (9)
Adopted	61.4 (70)	76.8 (63)	75.0 (15)	88.0 (66)
Total	39.2 (114)	28.2 (82)	6.9 (20)	25.8 (75)
	χ^2 = 17.166 df = 3		p. = .001	

Adoption of E-commerce and the SMEs' Assets

The asset level was divided into four groups: less than 3 million, 3-7 million, 7-10 million and more than 10 million. The percentages of E-commerce adoption were at 68.7,63.3,66.7,and 89.4respectively. From the statistical analysis, there is a significant relationship between Adoption of E-commerce and the amount of the assets. The significance is at the level of .001. The higher amounts of assets show a higher percentage of E-commerce adoption as we can see in the last group that almost 90 percent adopted E-commerce. This means that the SMEs' asset has a strong effect on E-commerce adoption. Please see Table 4.28.

Table 4.28 Adoption of E-commerce by Company Assets

Adoption	Lt 3 m	3-7 m	7-10 m	Ht 10 m
Not adopted	31.3 (31)	36.7 (22)	33.3 (12)	10.6 (10)
Adopted	68.7 (68)	63.3 (38)	66.7 (24)	89.4 (84)
Total	34.3 (99)	20.8 (60)	12.5 (36)	32.5 (94)
	χ^2 = 17.557 df = 3		p. = .001	

4.2.2.3 Finding for Hypothesis 2 The larger sized SMEs, with more employees, higher sales and export sales volume will be more likely to adopt E-commerce.

The characteristics of SMEs have been analyzed to cover types, and sizes of SMEs. All variables included in the model, namely size of enterprises, the years in export business, sales volume, export sales volume, number of employees and company assets have statistically significant relationships with E-commerce adoption. Thus, we could confirm hypothesis 2.

4.2.3 Adoption of E-commerce and Strategy, Management Style and IT Investment Factors.

(These factors include strategic management, management style and IT Investment)

4.2.3.1 Adoption of E-commerce and Company Management Strategy

The company management strategies include a clear set of company goals, the communication of those goals, a market plan focusing on new markets, the marketing plan focusing on exports, an R&D team seeking new product development, and an executive management committed to the innovation of new products and processes. Furthermore, the innovative ideas of employees are recognized and rewarded, management executives strive for customer and market excellence, English and computer training are encouraged to practice and continuously improve, and management can respond to the changing market efficiently in a timely manner.

It is shown that the SMEs who have applied more of above mentioned management strategies adopted E-commerce at a higher rate than those SMEs who applied fewer management strategies. The assumption made here is that SMEs who agreed applied fewer strategies than SMEs who strongly agreed. Those who merely agree adopted E-commerce at a rate of 73.6 percent. Those who strongly agreed adopted at a rate of 83.3 percent, while the SMEs that did not apply the management strategies adopted E-commerce at a rate of only 44.4 percent. The statistical significance is at level .004, indicating that strategic management affected E-commerce adoption. Please see Table 4.29.

Table 4.29 E-commerce Adoption By Company Strategic Management

Adoption	**Non Strategic Mgt.**	**Strategic Mgt.**	**High Strategic Mgt.**
Not adopted	55.6 (10)	26.4 (56)	16.7 (11)
Adopted	44.4 (8)	73.6 (156)	83.3 (55)
Total	6.1 (18)	71.6 (212)	22.3 (66)
	$\chi^2 = 11.176$ df = 2	p. = .004	

4.2.3.2 E-commerce Adoption and SME Management Style

From the four kinds of management styles namely family style, result oriented, mixed management and innovative & high technology; the three highest rates of E-commerce adoption are those of innovation & high technology, result oriented and mixed management style with the percentage of E-commerce adoption at 97.5,88.5, and 82.6 respectively. Family style came last at 50.9 percent. From the analysis, the calculated value of χ^2 is much greater than the critical value, so the null hypothesis is rejected. This means that there is a relationship of E-commerce adoption and management style or we can conclude that management style has strongly affected E-commerce adoption. See Table 4.30.

Table 4.30 Adoption of E-commerce by SME Management Style.

Adoption	Family	Result-oriented Mgt	Mixed Mgt.	Inno.& H. Tec.
Not adopted	49.1 (56)	11.5 (12)	17.4 (4)	02.5 (1)
Adopted	50.9 (58)	88.5 (92)	82.6 (19)	97.5 (39)
Total	40.6 (114)	37.0 (104)	8.2 (23)	14.2 (40)
	χ^2 = 55.381 df = 3 p. = .000			

4.2.3.3 Adoption of E-commerce and IT Investment Factor

This factor consists of seven variables. They are Cost of IT infrastructure, Number of IT experts, Employees that can access Internet, Employment of software, IT Training hours and IT training costs.

E- commerce Adoption and Investment in IT Infrastructure

From the four levels of IT infrastructure investment groups; no investment, less than 100,000 Baht, 100,001-999,999 and more than 1 million Baht, the percentages of E-commerce adoption are: 57.9, 85.0, 100.0, and 97.3 respectively. As for the statistical analysis, the relationship of E-commerce adoption and the IT infrastructure investment have a strong relationship. The value of .000 is much less than .05 which is the set value of significance. It means that the IT Infrastructure investment has an effect on E-commerce adoption. See Table 4.31.

Table 4.31 Adoption of E-commerce by the IT Infrastructure Investment

Adoption	None	Lt 100,000	100,001-999,999	Ht 1 m
Not adopted	42.1 (67)	15.0 (9)	–	2.7 (1)
Adopted	57.9 (92)	85.0 (51)	100.0 (39)	97.3 (36)
Total	53.9 (159)	20.3 (60)	13.2 (39)	12.5 (37)
	χ^2 = 49.311 df = 3 p. = .000			

E-commerce Adoption and the Number of IT Experts in the Company

As IT literacy is one of the factors that helps E-commerce adoption, the number of IT experts was one of the key indicators of IT literacy. From the three groups of no IT expert, 1 IT expert and more than 1 IT experts, these three groups have E-commerce adoption at 59.4 percent, 93.8 percent, and 96.4 percent respectively. This indicates that the higher number of IT experts, the higher the E-commerce adoption rate. The result also shows that the number of IT experts has a statistical significance of .000. It means that the number of IT experts in SMEs strongly affects E-commerce adoption. Please see Table 4.32.

Table 4.32 Adoption of E-commerce by The Number of IT Experts

Adoption	**None**	**1**	**Higher than 1**
Not adopted	40.6 (71)	06.2 (4)	3.6 (2)
Adopted	59.4 (104)	93.8 (61)	96.4 (54)
Total	59.1 (175)	22.0 (65)	18.9 (56)
	χ^2 = 47.244 df =2 p. = .000		

Adoption of E-commerce and the Number of Employees who have Access Internet

From the study, it is shown that there is a consistent relationship; that is, the higher the number of employees who have access, the higher the rate of E-commerce adoption, starting from 20.8 percent, 69.0 percent, 95.2 percent and 100 percent for groups 1-4 respectively. Therefore, the number of employees who have access to Internet is related to the E-commerce adoption with a statistical significance level of .000. It means that the number of employees that can access internet has a strong effect on E-commerce adoption. Please see in Table 4.33.

Table 4.33 E-commerce Adoption By the Number of Employees Who Can Access Internet.

Adoption	None	1-3	4-6	ht 6
Not adopted	79.2 (38)	31.0 (35)	04.8 (4)	–
Adopted	20.8 (10)	69.0 (78)	95.2 (79)	100.0 (52)
Total	16.2 (48)	38.2 (113)	28.0 (83)	17.6 (52)
	$\chi^2 = 109.560$ df = 3 p. = .000			

Adoption of E-commerce and the Proportion of Employees and PCs

From the study, it is shown that there is a positive relationship of the proportion of number of employees and PCs and percentage of E-commerce adoption. It is a slight inconsistency, though, as from the 5 groups of results starting from 0, 1, 2, 3-5, and higher than 6, the percentage of adoption begins from 20.9 percent, 87.7percent, 80.3 percent, 83.6 percent and 80.7 percent respectively. there is statistical support for the hypothesis that the relationship between the proportion of the number of employees and the PCs, because the value of .000 is much smaller than the value of set value of significance which is .05. This means the proportion of the number of employees and the PCs has a strong effect on E-commerce adoption. Please see Table 4.34.

Table 4.34 Adoption of E-commerce by the Proportion of Number of Employees and PCs.

Adoption	None	1	2	3-5	ht 6
Not adopted	79.1 (34)	12.3 (7)	19.7 (14)	16.4 (11)	19.3 (11)
Adopted	20.9 (9)	87.7 (50)	80.3 (57)	83.6 (56)	80.7 (46)
Total	100 (43)	100 (57)	100 (71)	100 (67)	100 (57)
		$\chi^2 = 74.315$ df=4 p.= .000			

Adoption of E-commerce and the Usage of Software

The usage of software in the company is also one of the indicators of IT support.

The result from the study shows that those SMEs who use specialized software, which is the majority of the group, have a greater rate of E-commerce adoption than those who do not employ any kind of software, other than the standard applications. From the statistical analysis, the software usage group has an E-commerce adoption rate of 95.3 percent. The rate is 65.4 percent for the group that has no software usage. There is statistical support for the relationship of the usage of the software and E-commerce adoption due to the fact the value of .000 is much smaller than .05, which is our set level of significance. Therefore, we reject the null hypothesis, which means the usage of software affected E-commerce adoption strongly. Details are shown in Table 4.35.

Table 4.35 E-commerce Adoption by the Usage of Software

Adoption	Use Software	Do Not Use Software
Not adopted	4.7 (4)	34.6 (72)
Adopted	95.3 (81)	65.4 (136)
Total	29.0 (85)	71.0 (208)
	$\chi^2 = 28.099$ df = 1 p. = .000	

Adoption of E-commerce and IT Training Hours

From the four groups: 0 hours, 1-30 hours, 31-60 hours and more than 61 hours, it appears that the higher the number of IT training hours, the higher the percentage of E-commerce adoption. The percentages of E-Commerce adoption start from 58.5 percent, 90.3 percent, 90.6 percent, and 100.0 percent for groups 1-4 respectively. In addition, from the statistical analysis, there is a statistically significant relationship between E-commerce adoption and the IT training hours at the level of .000 in a consistent manner. This means that IT training hours has a strong effect on E-commerce adoption. Details are shown in Table 4.36.

Table 4.36 Adoption of E-commerce by IT Training Hours

Adoption	None	1-30	31-60	61 & more
No	41.5 (71)	9.7 (3)	9.4 (3)	–
Yes	58.5 (100)	90.3 (28)	90.6 (29)	100 (62)
Total	57.8 (171)	10.5 (31)	10.8 (32)	20.9 (62)
	χ^2 = 52.065 df = 3		p. = .000	

E-commerce Adoption and IT Training Cost

IT Training cost was divided in to 3 groups: none or no cost, 1- 5000 Baht, and more than 5,000 Baht, and the result shows, same as IT training hours, that it has a statistically significant relationship with E-commerce adoption at the level of .000. There is also a consistency between higher IT training costs and higher E-commerce adoption. This is shown from the percentages, starting from 59.8 percent, 92.6 percent, and 98.0 percent of adoption level of groups 1-3 respectively. This means that the IT training costs have strongly affected E-commerce adoption. Please see Table 4.37.

Table 4.37 Adoption of E-commerce by IT Training Cost

Adoption	None	1- 5000	5001 and more	Total
No	40.1 (71)	7.4 (5)	2.0 (1)	26.0 (77)
Yes	59.9 (106)	92.6 (63)	98.0 (50)	74.0 (219)
Total	59.8 (177)	23.0 (68)	17.2 (51)	100.0 (296)
	χ^2 = 45.915 df = 2 p. = .000			

4.2.3.4 Finding for Hypothesis 3 From the company strategic management, management style, and the IT investment perspective, all variables have statistic significant relationships to E-commerce adoption. **Therefore, Hypothesis 3**

is confirmed; that is, better, innovative strategic management and higher levels of IT investment have a positive effect on E-commerce adoption.

4.2.4 Adoption of E-commerce and Customer Factors

This factor was measured by the percentage of repeat customers, sources of advertising, cost of web site advertising, cost of other kinds of advertising and a set of six attitude- type questions to determine customer satisfaction with regard to company activities, services, and response to customers needs.

Adoption of E-commerce and the Percentage of Repeat Customers

Percentage of repeat customers was divided into of four groups: 0- 49, 50 - 69, 70- 89, and 90 & more. The percentage rates of E-commerce adoption are 63.6, 69.5, 77.2, and 78.7 respectively. Even though there is a consistency in percentage of E-Commerce adoption, there is no statistical significance. From the chi-square test, we cannot reject the null hypothesis because the value of .221 is greater than the set .05 level of significance. It means that, statistically, the percentage of repeat customers does not affect E-commerce adoption. See Table 4.38.

Table 4.38 Adoption of E-commerce by the Percentage of Repeat Customers

Adoption	**0-49**	**50-69**	**70 - 89**	**Less than 90**
Not adopted	36.4 (16)	30.5 (18)	22.8 (33)	21.0 (10)
Adopted	63.6 (28)	69.5 (41)	77.2 (112)	78.7 (37)
Total	14.9 (44)	19.9 (59)	49.2 (145)	15.9 (47)
	χ^2 = 4.404 df = 3 p. =.221			

E-commerce Adoption and the Sources of Advertising

The percentages of E-commerce adoption of the different groups of sources of advertising of T.V., Magazines, Web Site, Trade Exhibition, and from customer to are 70.0, 73.7, 99.2, 80.4,and 36.1 respectively. Since the value of .000 is less than the value of .05 level of significance, we reject the null hypothesis. This

indicates that the sources of advertising affect E-commerce adoption. Please see Table 4.39.

Table 4.39 E-commerce Adoption by the Sources of Advertising

Adoption	T.V.	Magazine	Web Site	Exhibition	Customer
Not adopted	30.3 (3)	26.3 (5)	0.8 (1)	19.6 (11)	63.9 (53)
Adopted	70.0 (7)	73.7 (14)	99.2 (120)	8.4 (45)	36.1 (30)
Total	3.5 (10)	6.6 (19)	41.9 (121)	19.4 (56)	28.7 (83)
		$\chi^2 = 104.81$ df = 4 p. = .000			

Adoption of E-commerce and Web Site Advertising Investment

The two groups of SMEs that have web site advertising investment of 1-100,000 Baht and more than 100,001 Baht, adopted E-commerce at a rate of 67.7 percent and 97.0 percent respectively. There is statistical support for the hypothesis that there is a relationship between web site advertising and E-commerce. We reject the null hypothesis due to the fact the value of .000 is much less than .05. This means the web site advertising investment strongly affects E-commerce adoption. The statistic also shows the consistency of the higher investment in web site advertising and the higher rate of E-commerce adoption. See Table 4.40.

Table 4.40 E-commerce Adoption by Web site Advertising Investment

Adoption	1-100,000	Ht 100,00
Not adopted	32.3 (74)	3.0 (2)
Adopted	67.7 (155)	97.0 (64)
Total	77.6 (229)	22.4 (66)
	$\chi^2 = 22.972$ df = 1 p. = .000	

Adoption of E-commerce and Other Kinds of Advertisement Investment

From the study, the three groups of SMEs who have investment in other kinds of advertising (no investment, less than Bht.100,000, and more than Bht.100,000), the results show a consistency in the relationship of E-commerce Adoption and the higher volume of advertisement investment . The percentage of adoption increases when the investment is higher. The percentage of adoption was 67.0 percent, 82.4 percent, and 92.5 percent respectively. There is also statistical support, in that the value of .000 is less than alpha value of .05. This means that investment in other kinds of advertising has a very strong effect on E-commerce adoption. Please see Table 4.41.

Table 4.41 E-commerce Adoption By Other Kind of Advertisement Investment

Adoption	**0**	**1-100,000**	**Ht 100,000**
Not adopted	3.0 (63)	17.6 (9)	7.5 (4)
Adopted	7.0 (128)	82.4 (42)	92.5 (49)
Total	64.7 (191)	17.3 (51)	18.0 (53)
	χ^2 = 16.159 df = 2 p. = .000		

4.2.4.1 Adoption of E-commerce and Customer Satisfaction

The six activities that are included in the customer satisfaction model are the convenience of customer to buy the products or services, the satisfaction on the delivery system, the right price, awareness of competitor products, customer handling, and team alignment to respond to customers need. From the study, the results indicate that there are 3 groups of SMEs: those that do not have the concept and do not apply the activities to satisfy customer needs (disagreement group), those that have applied the mentioned activities to satisfy the customer (agreement group) and the last group that really practice the above- mentioned activities for their customer satisfaction need. (strong agreement group) The adoption rate of E-commerce in these three groups was 45.5 percent, 72.0 percent, and 86.8 percent

respectively. From the Chi-Square test, the value of .000 is less than our .05 level of significance, so that we can reject the null hypothesis. This means that customer satisfaction has a strong effect on E-commerce adoption and in a consistent manner in that the higher the level of applying customer satisfaction activities, the higher the rate of E-commerce adoption. Please see details in Table 4.42.

Table 4.42 E-commerce Adoption by Customer Satisfaction

Adoption	Dissatisfied	Satisfied	S. Satisfied
Not adopted	54.5 (6)	27.6 (64)	13.2 (7)
Adopted	45.5 (5)	72.4 (168)	86.8 (46)
Total	3.7 (11)	78.4 (23)	17.9 (53)
	χ^2 = 9.46 df = 2 p. = .009		

4.2.4.2 Finding for Hypothesis 4 From the chi-square analysis of Customer Factors, four variables in the equations have a statistically significant relationship to E-commerce Adoption; only the percentage of repeated customers has no statistically significant value. **Then, it could be concluded that the Hypothesis 4, web site advertising investment and higher customer satisfaction are positively related to E-commerce adoption, is confirmed.**

4.2.5 Adoption of E-commerce and Government Support of E-commerce Policy Implementation Factors

This factor is measured by a set of attitude survey questions for the satisfaction of SMEs on Government Support of E-commerce policy implementation in various areas.

There are twenty - one questions altogether in this set. It includes research development support, communication of E-commerce policy, financial support, small industry financial corporation support, trade fair exhibition, IT training support, IT infrastructure support, convenience of telecommunication system, cost of telecommunication system, on-time E-commerce laws, appropriate E-commerce laws,

Fair tax policy, fair global tax policy, confidence in security issues, protecting intellectual property, international trade/network, promoting development of SMEs, successful export promotion and economic -social environment. The four responses were: Strongly Disagree, Disagree, Agree and Strongly Agree which means the SMEs were very dissatisfied, dissatisfied, satisfied and very satisfied with the Government performance of E-commerce policy implementation and activities that support SMEs.

From the study, the percentages of E-commerce adoption of these four groups are 88.6, 60.0, 76.6, and 88.0 respectively. From the calculation, there is statistical support, in that the value of .000 is less than alpha value of .05. Therefore, it means that the Government's role in E-commerce policy implementation and activities to support SMEs affect E-commerce adoption. It appears that with higher satisfaction, there will be a higher percentage of E-commerce adoption. However, this is not consistent. It is very interesting to note that those SMEs who are very dissatisfied with the government's roles in supporting E-commerce and SMEs adopted E-commerce at a very high rate. However, from the interview and documentary study, E-commerce is a new way of business that SMEs have adopted for their own benefit even though, they are still not satisfied with the government supporting role. Please see Table 4.43.

Table 4.43 E-commerce Adoption by Government Support on E-commerce Policy Implementation.

Adoption	Strongly Dissatisfied	Dissatisfied	Satisfied	Strongly Satisfied
No	11.4 (5)	40.0 (40)	23.4 (29)	12.0 (3)
Yes	88.6 (39)	60.0 (60)	76.6 (95)	88.0 (22)
Total	15.0 (44)	34.1 (100)	42.0 (124)	8.5 (25)

$\chi^2 = 17.937$ df = 3 p.= .000

4.2.5.1 Finding of Hypothesis 5 From the statistic analysis of chi-square, there is a statistic significant value of the relationship between the Government support on E-commerce policy Implementation at the level of .000. **Therefore, Hypothesis 5, that a higher level of SMEs satisfaction with the**

government support on E-commerce Policy Implementation is positively related to their E-Commerce adoption, is confirmed.

4.2.6 Adoption of E-commerce and Private & International Organizations' Support Factor:

From this factor, a set of 13 attitude survey questions had been used to find out the satisfaction of the SMEs toward the support from private and international organizations. They consist of financial services from the private organizations, IT service support, delivery service support, support from international organizations such as WTO, ASEAN, APEC, material support, labor support, support from financial institutes, insurance institutes, large size of domestic market, high domestic competitiveness, high demand of domestic consumers, and higher profit from export sales than domestic sales.

The response are treated the same way as other attitude questions in this study, that is, there are four categories: Strongly Disagree, Disagree, Agree and Strongly Agree. The result of analysis shows a statistically significant relationship of E-commerce adoption and the private and International organization support at the level of .015. There is also a consistency of a higher adoption rate with a higher satisfaction level, starting from zero percent to 62.1 percent, 76.6 percent, and 85.7 percent respectively. This means the satisfaction of private and international organizations support affects E-commerce adoption. See Table 4.44.

Table 4.44 E-commerce Adoption by Private and International Organizations' Support to SMEs

Adoption	**S. Dissatisfy**	**Dissatisfy**	**Satisfy**	**S. Satisfy**
Not adopted	100.0 (1)	37.9 (25)	23.4 (47)	14.3 (4)
Adopted	–	62.1 (41)	76.6 (154)	85.7 (24)
Total	0.3 (1)	22.3 (66)	67.9 (201)	9.5 (28)

$\chi^2 = 10.396$ df = 3 p. = .015

4.2.6.1 Finding for Hypothesis 6 From the statistic analysis, there is a statistically significant relationship at the level of .015, This supports the positive relationship of satisfaction on private and international organizations' support and E-commerce adoption. **Thus, Hypothesis 6, that a higher level of SMEs satisfaction with the private and international organizations' support on E-commerce related issues is positively related to their E-commerce adoption, is confirmed.**

4.2.7. Adoption of E-commerce and Risk Management Factors

For this factor, a set of six attitude survey questions on the readiness and preparation for risk management was asked of SMEs. The questions included the existence of a contingency plan, succession plan, insurance for their assets, insurance for their products, life and health insurance for staff and network management. The responses were categorized into four groups that is, those SMEs who do not have risk management at all, those that have a somewhat low degree, those that have a somewhat high degree and those that have a very high degree. (for strongly disagree, disagree, agree and strongly agree).

The result from the analysis indicated that SMEs who have better risk management adopted E-commerce more than those who do not have or have a low or small degree of risk management. The percentages of E-commerce adoption of these 4 groups are 100.0, 48.1,77.5, and 88.0 respectively. Except for the one respondent of low risk management, the figures show a relationship between the higher degree of risk management and the higher percentage of E-commerce adoption. From the calculation of Chi-Square test, there is statistical support, in that the value of .000 is less than .05 which means risk management affects E-commerce adoption. See Table 4.45.

Table 4.45 E-commerce Adoption by Risk Management of the SMEs

Adoption	No Risk Mgt.	Low Risk Mgt.	High Risk Mgt.	Very High Risk Mgt.
Not adopted	–	51.9 (28)	22.5 (43)	12.0 (6)
Adopted	100.0 (1)	48.1 (26)	77.5 (148)	88.0 (44)
Total	0.3 (1)	18.2 (54)	64.5 (191)	16.9 (50)

$\chi^2 = 25.401$ df = 3 p. = .000

4.2.7.1 Finding of Hypothesis 7 From the analysis, the results indicate very clearly statistically significant value that there is a strong relationship between risk management and E-Commerce adoption of the SMEs at the level of .000.

Therefore, it can be concluded that SMEs who employ risk management are more likely to adopt E-commerce. Thus, Hypothesis 7 is confirmed.

4.3 Logistic Regression Analysis

Logistic regression analysis was employed to predict the probability that SMEs would adopt of E-commerce for their export sales. A binominal logistic regression analysis was performed between the dependant variable, which is E-commerce adoption and the nine selected independent variables. These variables, were not only referred from review literature, they were empirically justified that they could be the determinant factors of the SMEs to E-commerce adoption.

The selected independent variables to this logistic regression analysis are all those having ratio or interval value. For the Socio Economic and human development factor, the age of SMEs' owner or the top management personnel of the companies is selected since it is the only variable the has an interval value. The sales volume is selected for the characteristic of the SMEs factor. For the third factor in the model, strategy, management style and IT investment, the number of employees that can access internet, the number of employees per one PC, and IT training hours are

selected since they show strong impact on E-commerce adoption while customer satisfaction management of the SMEs is selected for the customer factor. For the other three factors, which are government support and E-commerce policy implementation, private & international organizations support and risk management, all three sets of attitude variables are taken to the analysis. These nine independent variables are included in the equation as listed in table 4.46.

To report the results of the analysis, the researcher follows the style of reporting from **"From Numbers to Words"** (Morgan et al., 2002: 73- 76). The table (4.46) shows the logistics regression coefficient, Wald test, and odds ratio for each of the predictors. Employing a .05 criterion of statistical significance, number of employees of the SMEs that can access Internet, the number of employees per one PC, the IT training hours, and customer satisfaction management had significant partial effects. The odds ratio for the number of employees that can access Internet indicates that when holding other variables constant, the number of SME's employees who can access Internet is 1.848 times more likely to adopt E-commerce than those SMEs whose employees cannot access Internet. The odds ratio for the number of employees per one PCs indicates that when holding other variables constant, the SMEs whose employees use PCs is 1.369 times more likely to adopt E-commerce than those SMEs whose employees do not use PCs. The odds ratio for the training hours indicates that when holding other variables constant, SMEs whose employees who have IT training are 1.030 times more likely to adopt E-commerce than those SMEs whose employees do not have IT training. In addition, the odds ratio for the customer satisfaction indicates that when holding other variables constant, the SMEs who got better customer satisfaction are 3.217 times more likely to adopt E-commerce than those who do not have customer satisfaction.

The results of this analysis when analyzed for goodness of fit of the model, it was found that the equation had –2 Log Likelihood (- 2LL) = 190.696 and Model Chi-Square = 136.337. This is a null hypothesis test where every logistic regression coefficient is equal to 0. Using difference of –2LL between the equation that had only constant and the equation with nine independent variables, the null hypothesis that none of the independent variables are related to the log adds of the dependent or E-commerce adoption was rejected. This model is significant, which means that

combining variables in this equation is able to predict with statistical significance when p-value = 0 with 84.3 percent accuracy. See Table 4.46.

Table 4.46 Logistic Regression Coefficient and Statistical Values from Analysis of E-commerce Adoption

Variable	β	Wald χ^2	p	Odds Ratio
Age	-.032	2.526	.112	.969
Sales Volume	.035	2.416	.120	1.035
Internet Access	.614	13.828	.000	1.848
Number of employee per PC	.314	4.506	.034	1.369
IT Training Hours	.029	5.020	.025	1.030
Customer Satisfaction Mgt.	1.168	4.424	.035	3.217
Government Support	.613	1.611	.204	1.846
Private and International Support	-.377	.710	.595	.686
Risk Management	.110	.3548	.758	1.117

Cox & Snell R Square = .379 Nagelkerke R Square = .557

- 2 LL = 190.696 Percentage correct = 84.3

Since the internet is the only channel to get to E-commerce, the analysis confirms that the number of employees that can access the internet is a determinant factor for E-commerce adoption. It is also an empirical fact that access to the internet is a very primary condition of E-commerce. Not many companies can provide computers to every employee, the number of employee per one PCs comes second in terms of statistically significant value. This shows the relationship or the alignment of having PCs and access to internet. IT Training is also very vital for any companies who decide to adopt E-commerce and IT Training hours comes third for its statistically significant value. The competition in the E-commerce market is very high, the only way to win customers and stay in the market is to have better customer satisfaction management. Therefore, customer management is the key strategy for

most companies. From the logistic regression analysis, the assumption that those SMEs who have their customer satisfaction management established in their organizations are positively disposed to E-commerce adoption, is confirmed.

4.4 Conclusion

In sum, from the statistic analysis of Chi - Square, most of the independent variables have a relationship with E-commerce adoption. From Logistic Regression Analysis, influencing variables were identified. Among the four variables that have statistically significant influence on E-commerce adoption, the number of employee that can access Internet is the most influential variable, with the significant value at level of .000, followed by the number of employee using one computer, at the level of .025, and IT training hours of the employees, at the level of .034 and finally, the customer satisfaction management, at the level of .035 respectively. There will be more discussion on this result in the following chapter.

CHAPTER 5

SUMMARY, DISCUSSION AND RECOMMENDATIONS

This chapter will explain the responses to the research questions set earlier in chapter one.

5.1 Response to Research Questions

From the study it is confirmed that from seven factors in the conceptual model, all of them have a statistically significant relationship to E-commerce adoption.

- The human development factor is the major factor for any kind of technology transfer and innovation. The SMEs' level of educational background, the major subjects that relate to business and IT, and English proficiency support E-commerce adoption. In addition, E-commerce requires new and high technology knowledge, especially in IT; therefore the higher educational level of employees will definitely support E-commerce adoption. The findings of the analysis show that all human development factors have a positive relationship to E-commerce adoption, which means that human development is key.
- Characteristics of the SMEs the manufacturing type of SMEs are more likely to adopt E-commerce. Adoption to E-commerce does not require higher amounts of the budget; therefore, it allows small enterprises to join in this new innovative channel of business. Yet, a manufacturing business has better and more chances and resources to apply to E-commerce. This is similar to the reason bigger enterprises adopt E-commerce. International joint venture owned enterprises, because of their international context, are more likely to adopt E-commerce which also has an international nature.
- With regard to strategy, customer management, and IT investment, company strategic management refers to management that has clear goals, which are well

communicated to the employees. The company also has a marketing plan for the new market and a plan for export. It also includes the company that emphasizes new product development and has innovation of both products and the process of operations. Innovation must be encouraged and promoted by having reward and recognition for innovation in the workplace. In addition, the company must have a strategy to strive for customer service excellence, meaning that the focus must be on the customer; all activities are done to serve customers' needs. The strategy to respond to customer needs is vital to this modern trade. The findings from Logistic regression confirm this assumption.

To satisfy and pursue this strategy, the employee who is considered a valued resource must be trained in English and computers so that they can communicate in the international arena. To cope with this fast and dynamic globalization, the management must efficiently respond to change. As for the company style, it is also confirmed that the innovative and technology oriented style is positively related to E-commerce adoption. As for the IT investment factor, from the logistic regression analysis, the findings show that IT training, Internet access and the number of employees per one PC confirmed that enterprises that have a higher number of employee who can access Internet, and the enterprises where employees have more IT training or higher IT training will have a positive relationship to E-commerce adoption. This may also confirm the development factor and IT literacy that empirically associates with E-commerce adoption.

- All customer factors variables put in the equation are statistically significantly related to E-commerce adoption except the percentage of repeat customers. It supports the idea that in E-commerce, advertising is a very critical factor and among all sources of media, starting from customer to customer, exhibition, broadcast, T.V., magazine and web site, the latest one, web site advertising, which is through Internet is the most preferable choice in relation to E-commerce adoption.
- Even though this factor was not reconfirmed by Logistic Regression Analysis, confirms by Chi-Square Analysis that there is a significant relationship for SMEs and E-commerce adoption. The issue of most concern is E-commerce and related laws and legislation is the matter of security in doing E-commerce business.

- It is confirmed that the more support from private & International organizations and firms is strongly related to E-commerce adoption. The support included in the analysis covered financial support, IT support, delivery service both in terms of efficient services and reasonable cost, prompt support to SMEs by the international organizations, and support in materials of good quality, sufficient quantity and reasonable price. It also includes the support in high quality and reasonable costs in labor, and the services from finance and insurance institutes. Also, when the private firm's desire to become larger and more competitive are high, when there is a weakened demand from domestic consumers, and the profit from export sales is higher than the domestics sales, this will force SMEs to look to the export market as an alternative. Consequently, they need full support from the private firms and International Organizations.
- Risk Management may be considered as an important issue in strategic management of modern enterprises. To cope with the dynamic and moving, changing market as in E-commerce, the company has to have better preparation to deal with unforeseen circumstances. Strategies include contingency plans to cope with any operations, a succession plan, and a risk management plan for human resources that will develop their skills in preparation for assuming critical positions. The normal practice to avoid unexpected loss, is to buy insurance for all company products, assets, and to insure employees' health and life. In addition, a management network that will assist their operations is considered risk management. Most well prepared enterprises will be a member of one or more foundations, whether in the same business or a different one. It is confirmed that those enterprises with better risk management have a positive relationship with E-commerce adoption.

There is a question as to how the government could provide E-commerce Policy in order to support SMEs balancing the free-market nature of E-commerce and government intervention to cover Thailand's disadvantages, which was forced by international trade, or more directly, the U.S. Also, they must keep intervention at the minimum since from the SMEs perspective, their attitudes towards government support on E-commerce policy and policy implementation is positive. From the study, E-commerce is really based on the international context, so the government has to align with the international standards and practices. Some E-commerce laws and related laws

will follow the guideline from the UNCITRAL. These legal issues will be discussed later.

From the study, it could be concluded that the enterprises have to focus their strategic management on innovation, high technology and market or customer focus. In order to be innovative enterprises, employees must be well trained, especially in English and computers. These two subjects will help the company to fit in the unlimited and boundary-less world of the Internet.

To the last research question, how SMEs could help economic growth from e-commerce, it is confirmed that if the SMEs were supported in a way that they can adopt E-commerce, it means that the export market will grow, resulting in an improved economy. The E-commerce market is a global market, knows no boundary, and is on line 24 hours a day. Therefore, the opportunity is very clear for economic growth.

Not all research questions get their answers; there are always many issues that need further study. There are several issues that are worth raising for discussion. They are confirmed from the study of the determinants of the E-commerce adoption by the SMEs in Thailand. These issues include the internal or local support to SME's, especially on E-commerce and IT related laws, technology transfer, human development, markets and customers in the international context.

5.2 E-commerce as a Risky Business

The findings of the study confirm what Jay M. Tannebuam, founder and Chairman of Commerce net in U.S. A. (cited by Wen, The Executive Journal, 2001:20) said. He stated that there were two issues that have the highest potential "brake" on the Internet commerce revolution. The first issue is the growing concerns about security, privacy, liability and other perceived risks of doing business on the Net. These concerns are very dangerous, and if not addressed adequately and promptly, it will bring E-commerce to an end since the consumers will go elsewhere to do their shopping. The second issue is perhaps the even greater risk of governments who may slow down or stop the technology and the evolution of innovative business practices. He compared the Internet commerce with international trade because in both cases, people will not know

whom they are dealing with. In international trade, basically two things emerged in order to provide some assurance; one is a legal and regulatory framework that people can understand and that set the ground rules. Second is a set of commercial trust services to manage the risk, which is inherent in doing business. However, that risk is not going to be eliminated. The law simply sets the framework and the trust services can provide the guarantees or a greater extent of confidence. The same thing happens in E-commerce. It is also a global context, right at the beginning. When a transaction takes place, it involves players on multiple continents. There are serious issues about whose laws will be applied, what contracts mean and how you get resources when something does not work the way it should. Most people who work on these issues have come to the same conclusion that there is no alternative but to have the global Internet equivalent of the Uniform Commercial Code.

5.3 E-commerce Law

A Uniform Commercial Code will lead each individual country to have her own laws, but to align with the code. The effort of the international organizations continue to work on some extent of agreement and solutions. One of the international organizations to undertake work on E-commerce at an early stage was United Nations Commission on International Trade and Law (UNCITRAL), which is the core or essence of the legal body of this United Nations system in the field of international trade law. UNCITRAL started realizing in the mid 1980s that there was a need for a set of legal principles that would provide a basic framework for communication through E-commerce. It is obvious that E-commerce raised the issues right at the heart of the regulations of traditional practice and procedures, especially those resulting from legal requirements and evidence of legal acts in the context of domestic and international trade commerce transactions. UNCITRAL is working on model law on E-commerce. The purpose of this Model Law is to offer national legislators a set of acceptable rules internationally. This encourages every nation to consider establishing E-commerce law and other related laws. Yet, the pace of the revolution and change are extremely fast, complex and dynamic, and conflicts of interest between nationalism and globalization or international

trade constantly emerge. It seems that this task is a never-ending one. (UNCITRAL. 2002. E-commerce Law (online). Available URL: http://ecommerce.wipo.int/meetings/1999/papers/hermann.html.)

The E-commerce laws and related laws in the international trade context are crucial for E-commerce; however, the same local laws are no less important. These issues were taken care of by various working teams; the major teams are from NECTEC and the Justice Ministry. These laws include E-commerce law, EDI or Electronic Data Interchange law, Privacy Data Protection Law, Computer Crime Law, Electronics Digital Signature Law, Electronics Fund Transfer Law, and Universal Access Law. Among these, only the E-commerce and Electronic Signature Laws have come to the stage of enactment. The rest are in the process of drafting and some have received cabinet approval. The difficulties of drafting and getting them enacted, is not only because this is not a normal practice of the developing countries, but these laws need expertise both in legal, and IT technology. That's why the NECTEC has to work closely with the Law Execution Team.

There is more than one working team working on this issue. All try to help make E-commerce easy and convenient. The opportunity of E-commerce is so enormous for economic growth that none can neglect it.

5.4 Government Support for SMEs

The significant increase in popularity of the Internet in recent years has been fueled largely by the prospect of performing business online. More and more companies have set up their corporate Intranets, and use Intranet and the Internet to work collaboratively with their customers, suppliers, and partners. Internet brings down the physical barriers to trade, almost immediately giving even the smallest business access to the global market. However, the lack of security is the leading barrier to widespread E-commerce. The power of the Internet to facilitate business is severely offset by the risk inherent in the openness of the Internet. During the past few years, we have seen much evidence of this reality in the form of Internet – based attacks on commercial

systems-for example, the takedowns of some major E-commerce providers such as Yahoo, eBay, E*Trade, and Amazon.com recently. Several potential hindrances to the security of electronic transactions include unauthorized access to the network, packet sniffing, unauthorized activities, data alteration, and unregistered transactions. These are the 'threat ' of E-commerce and could sweep off all the new-born small enterprises. Therefore, government must pay great attention to support these enterprises for their basic survival elements.

IT infrastructure is one of the major elements that government has to take care of so that the efficiency and the cost are competitive with the rest of the world. E-commerce relies very heavily on electronic telecommunication. Therefore, the telecommunication system must strongly support the market. Financial support is another area that the government has to sincerely assist both in terms of services and sources of funds. There are, actually, many organizations established mainly for the purpose of helping SMEs, especially during the economic downturn, since during this situation, large firms may not be able to recover in a short period, while small and medium firms have a better chance.

5.5 SMEs As Key Success Indicators for Economic Growth

It is empirically shown in most nations that small and mediums enterprises have become a very effective source of mass employment, incomes, and growth with equity. (Foundation of International Human Resources, 1999). The on-going modernization of SMEs helps to sustain and enhance the private sector to be dynamic and competitive. Hence, their overall roles support both economic and social development. It is proved that support for SMEs growth and competitiveness is really financially sustainable and cost-effective on efficiency grounds. The support also helps raise the levels of knowledge intensity in production and marketing. These are partly from the domestic policy on liberalization that enlarges the competitive market through regionalization and globalization.

The issue of competition seems to be vital for SMEs development. It is confirmed from the study that successful enterprises have to sharpen their competencies in innovation to respond to constant change and heightened competition. They must be embedded in multiple networks of diversified and interactive linkages with all parties such as their suppliers, clients, financial institutions, science & technology infrastructure and training centers.

SMEs in many ASEAN countries are faced with similar difficulties in various areas such as inadequate skill and managerial human resources, high cost in training and accessing, and absorbing and adapting new technologies. The main reasons are from lack of research and development and training infrastructure and facilities. It is also because of inadequate linkages and mutual interactions within firms and organizations. There are also problems in the areas of marketing and external trade opportunities. There are limitations on supply sources especially in an on-line basis, in accessing venture capital, trade finance and other types of credit. If there is more development in inter-firm relationships, we could expect more cooperation, collaborative networks and diversified business relationships. In addition, among the ASEAN members, a more enabling and transparent business environment for SMEs is needed.

It is fair to state that as a whole, government has achieved much progress, especially in the promotion of SMEs development. However, it is also clear that support programs that are largely based on considerations of welfare have proved financially unsustainable. Also, the assistance from donor countries that provide support based on efficiency was, again not a long sustained history. Some criteria set, sometimes, unfortunately, are biased against SMEs, for example, requirement of minimum size or volume of investment, number of employees or export value, etc. In addition, there are issues in designs and delivery, consistency and transparency in policy implementation across sectors, inadequate prior preparations, or consultations with target groups, and lack of cross-sectoral coordination. Most of all, the effective and timely implementation of SME assistance activities from public sectors is very important.

5.6 New Technology Transfers & Human Development

The industrial revolution took place 200 years ago. Until now there has been a big gap between the developed and developing countries. Only two decades ago, there was a technological revolution. This only caused an increase in the gap between the developing and developed countries.

The expansion of the worldwide communication network and its pervasiveness has denied the possibility and protection of isolation. One optimistic approach available to the new era is that the high technology of computer applications can offer the possibility of contributing to an accelerated development process. Yet, new technology transfer is not an easy task. There are some studies and research exploring how one country could bring about and maximize this new technology. It involves many parties in various fields. There are at least three important parties: the government policy makers, education and development specialists, and industry, to harness those scientific and technological resources for economic development. To concentrate on economic development, one has to focus on establishing a new public policy. The policy that all policy makers in all nations have to concentrate on is technology transfer. Thailand is no exception, and has actually put forth an effort to some extent. There are many projects that have as their main objectives, technology transfer.

With regard to technology transfers in Thailand, obviously we are more receiver from those of advanced or developed nations rather than building up our own. One clear example could be the BOI project that tries to be flexible for multi-national companies to have their production source in Thailand by motivating them with some compensation in tax and other conveniences. One sure thing we gain is job creation or employment from the foreign investment, but we may not, in some cases, receive technology transfer. The transfer or the intervention or flow from one sector to another of technology or innovation needs more conditions as mentioned in Chapter Two. Other important factors include the human development factor, and that is related to other factors like the marketing approach for the new and dynamic market.

Science and technology policy is mostly accepted by leading countries for the reasons that they are major contributors to economic and social progress for growth and the betterment of life. It is fortunate for Thailand that in the Eighth National Economic

and Social Development Plan there is an emphasis on human resources development through a systematic education policy. Science and technology are expected to be the major focus of human development in order to cope with this highly competitive global environment. Two major parties that play very important roles for this science and technology transfer are universities and industries. We need more researchers from universities and firms for the transfer process. However, the interaction between these two parties is limited and they still do not participate in a collaborative manner.

In Thailand, Science and technology transfer are only in the awareness stage, not to mention the policy formation and implementation stage. The Ministry of Sciences, Technology, and Environment must be fully in charge of all the science and technology transfer with high cooperation from the Ministry of Education and University affairs. However, an improvement is required for systematic research. There should be more studies in a wider scope and depth in technology in both universities and industries. One thing that could be the better if not best approach is to have an expert exchange program with the advanced countries or more consultants for technology transfer. There might be the above-mentioned program in existence, but the productivity or outcome is still far from expectations. The compensation package could be revisited to motivate more participation.

As mentioned earlier, for E-commerce, two competencies that are required are the English language and computer literacy. For the latter competency, NECTEC could get more involved. For English language proficiency, there is a need for more native speakers in the schools, particularly at an early level.

Normally, when there is a requirement for sciences and technology transfer, two areas have been widely discussed; funds and intellectual property. The funding gap seems to be a big barrier for the countries like Thailand or even in other developed countries, because we have to prioritize and maximize our limited resources. The intellectual property needs dedicated management, some legislation and enforcement. Thailand has suffered a poor reputation in this area, and some foreign companies are reluctant to get involved in technology transfer in Thailand because of frequent copyright infringements and intellectual property right violations. One has only to stroll through Pantip Plaza to see evidence of the extent of this problem. As for IP (Intellectual Property), in Thailand, there is some progress both in terms of policy and

laws, and law enforcement, but it has not yet reached the level expected. Here again, IP is an area that researchers could do some studies or research.

Best practices for policies to accelerate innovation or scientific and technology transfers could be in the U.S.A. In the Clinton government, there was an effort to address some issues such as upgrading scientific and technological infrastructure, dealing with the funding gap, converting dual use of military technologies, bureaucratic rules and procedures, creating and empowering partnerships, and dealing with global trade. Some of these are already being practiced here in Thailand such as the upgrading of scientific and technological infrastructure, distribution of funds as per priority and necessity. In addition, there are reforms in many areas, specifically, laws, education, bureaucratic rules, etc. However, the pace could be enhanced and accuracy improved.

IT technology may be different from other technologies in that it so very fast and dynamic. Developing countries like Thailand have never experienced this before. Consequently, there may be some issues, both economic and social, that result from this lack of experience.

Issues that relate directly to E-commerce are the problem of standards and procedures for international trade, especially electronic transactions. Very few of us have had the chance to get into the boundary-less world of information. This calls for telecommunication and IT infrastructure improvement, since it is the foundation of the convenience and low cost to get into the Internet.

The greatest concern for all is what would happen if the rate of adoption of E-commerce in Thailand were less than the rest of the world? It is obvious that those whose IT infrastructure, technology, high education and better economic and social environment will have a better chance and will become the leaders, while the less developed countries will naturally be the laggards. However, the gap and the rate should be much different. With this in mind, it is, again, the competitive advantage that becomes a major concern. It is, indeed, a long, and it may be a never-ending struggle to overcome the gap in this highly competitive world. However, it is better late than never.

5.7 Recommendations for Further Study

It is very interesting and it will be benefit to SMEs to study E-commerce laws, both local and international ones, since it could reduce the risks in E-commerce. Traders, including SMEs, will be more confident to do business via Internet if there are some reliable standards and rules for all parties to comply.

Improvement of IT infrastructure is another area that will significantly help E-commerce. The lower cost, better services of the IT will definitely bring more SMEs to E-commerce. Governmental agencies will have major roles in establishing policies and regulations to support E-commerce. Time series analysis may tell us how the current changes in policy regulations are influencing Internet connectivity.

As for the technology transfer, it is worth it to study whether there is an equal distribution of technology in a country. This may significantly affect its final impacts for that society.

Globalization and Internet brings opportunity to everyone. However, it could be a threat if there is less human development in the society. Competitiveness advantages will benefit those who are well prepared. The study of human development, then, is vital for all.

BIBLIOGRAPHY

American Standard Company. 2002. **Risk Management** (Online). Available URL: http://ascnet/riskmanagement/intro.htm.

Assumption University. Human Resources Development Center. 2000. **E-Commerce Management Strategies**. Bangkok: Assumption University.

Barnett, Christopher. 1996. **Management Strategy and Information Technology**. Boston, MA: International Thomson Business Press.

Benameur, Kameleddine. 1999. The Relationship Between Information Technology and Small and Medium Size Firm: Case Study of The Tunesian Textile. Ph.D. Dissertation, Drexel University.

Berman, Peter I. 1978. **Inflation and the Money Supply in the United States, 1956 – 1977**. Lexington, Massasuchetts: Lexington Books.

Buning, Matthias and Kaestner, Jan. 2001. **ESPRIT Project 27028 - Electronic Commerce Legal Issues Platform**. Norway: Norwegian Research Center for Computer and Law. University of Oslo.

Cameron, Debra. 1998. **E–Commerce Security Strategies, Protecting the Enterprise** (On Line). Available URL : http://www.ctrcorp.com

Cashmore, Carol and Lyall, Richard.1991. **Business Information: Systems and Strategies.** United Kingdom: Prentice Hall.

Chittum, J.Marc. 1999. **Electronic Authentication Technologies** (On Line). Available URL: http://www.ecommerce.gov/9.htm

Collins, Alfred, ed. 1998. **Planning For Information As A Corporate Resource.** London: Pergamon Press.

Cordon, Max. 1999. **The ASEAN Crisis: Is There A Way Out?**. Singapore: Seng Lee Press.

Coyle, Brian. 2000. **Introduction To Currency Risk.** New York: Glenlake Publishing Company.

Craig, James and Jutla, Dawn. 2001. **e-Business Readiness, A Customer-Focused Framework.** MA: Addison –Wesley.

Department of Industrial Promotion, Ministry of Industry. 2001. **SME Policy** (Online) Available URL: http//www.smethai net/policy/epolicy 4 htm.

Drucker, Peter F. 1985. **Innovation and Entrepreneurship**. Oxford: Butterworth Heinenam.

Dye, Thomas R. 1978. **Understanding Public Policy.** 3d ed. Englewood Cliffs,N.J. : Prentice-Hall.

E-Commerce beyond 2000 (On Line). Available URL: http://www.uoie.gov.au/nformation_economy/research&analysis/index.htm

Friedman, Milton and Friedman, Rose. 1990. **Free To Choose**. San Diego: Harcourt Brace Jovanovich.

Gill, John. 1985. **Factors Affecting the Survival and Growth of the Smaller Company.** Vermont: Gower Publishing Company Limited.

Glass,Gene V., McGaw Barry, Smith Mary Lee. 1982. **Meta- Analysis in Social Research**. Beverly Hills, London : Sage Publications.

Hamilton, Clive.1989. The Irrelevance of Economic Liberalization in the Third World. **World Development** 17(10): 1523 – 1530.

Harding, Craig W. and Varney, Christine, A. 2000. **eCommerce Strategies for Success in the Digital Economy** .New York: Practicing Law Institute.

Hargittai, Eszter, 1999. Weaving the Western Web: Explaining Differences in Internet Connectivity among OECD Countries. **Telecommunications Policy**. 23: 701-718.

Hill, Eileen. 1997. **Intellectual Property Protection And Electronic Commerce: Privacy in The Information Age. n.p.**

Hosmer, David Wand Lemeshow, Stanley. 1989. **Applied Logistic Regression.** U.S.A.: John Wiley & Sons.

Institute of Regional Economic Cooperation. 1999. **Agenda of the Institute of Regional Cooperation Meeting**. U.S.A.: Institute of Regional Cooperation.

International Trade Centre, 2000. **Secrets of Electronic Commerce**. n.p.

Jacque, Laurent L. 1996. **Management and Control of Foreign Exchange Risk.** Maassachusetts : Kluwer Academic Publishers.

Janet Maneerak. 2000. Impact Evaluation of EDI Policy: A Stakeholder Approach. Ph.D. Dissertation, National Institute of Development Administration.

Kalakota, Ravi. 2001. **e-Business 2.0, Roadmap for Success.** NJ: Addison-Wesley.

Kessler, Sheila.1996. **Measuring and Managing Customer Satisfaction**, Milwaukee. Wisconsin. : ASQC Quality Press.

Kleinbaum, David G. 1994. **Logistics Regression**. New York: Springer - Verlag.

Kotler, Philip.1991. **Marketing Management, Analysis, Planning, Implementation, and Control.** 7 th ed. London: Prentice-Hall International.

Kotler, Philip and Cox, Keith K.,eds.1988. **Marketing Management And Strategy**. 4 th ed. Englewood Cliffs, N.J.: Prentice-Hall.

Korper, Steffano and Ellis, Juanita. 2000. **The E-Commerce Book, Building the E-Empire.** California: Academic Press.

Korsiur, David R. 1997. **Understanding Electronic Commerce.** Washington: Microsoft.

Kubota, Keiko. 2000. Essays on International Trade Policy Formation.Ph D. Dissertation, Columbia University.

Kuroda, Akira and Kasajima, Suji. 1987. **The Development Strategies For Small and Medium Scale Industries in Thailand.** Bangkok: The Department of Industrial Promotion, The Ministry of Industry.

Lall, Sanjaya. 1996. **Learning From the Asian Tigers, Study in Technology and Industrial Policy.** London: Macmillan Press.

Levin, Richard L. 1987. **Statistics for Management**. 4 th ed N.J.: Prentice - Hall.

Malhotra, Yogesh.2000. Information Strategy, Tax Risks Every E-Commerce Executive Should Know. **The Executive's Journal** 16 (4): 8 – 29.

Mazamanian, Daniel A. and Sabatier, Paul A. 1983. **Implementation and Public Policy**. U.S.A.: Foresman and Company

Ministry of Industry. 2001. **SME in Thailand** (Online). Available URL: http://ww.smethai.net hotnews/tnw 3. htm.

Morgan, Susan E. et al. 2002. **From Numbers to Words.** New Jersey: Pearson Education.

Nagel, Stuart. ed. 2000. **Handbook of Global Technology Policy**. New York: Marcel Dekker.

Nantakarn Nikornpongsin. 2000. The study of entrepreneurs' opinions, satisfaction, and the Future Trends of Electronic-Commerce in Thailand, Master's thesis, KMIT.

Neck, Philip A. and Nelson, Robert E., eds.1987. **Small Enterprise Development:**

Policies And Programmes. Management Development Series No.14.2d ed. Geneva: International Labor Office.

NECTEC. 2002 .The Progression of IT Laws (Online). Available URL: http://www.nitc.go .tj/thaws4/head 3-1 html.

_____. 2002. NECTEC Information (Online) Available URL: http://www.nectec.or.th/home.

_____. 2000. **E-Commerce in Thailand.** (Online) Available URL : http://www.thaiecommerce.net/eplan.htm.

Neuman, W.Lawrence.1991. **Social Research Methods: Qualitative and Quantitative Approaches**. Massachusetts: Allyn and Bacon.

Organization for Economic Co-Operation And Development. 1998 . **OECD Proceedings: Gateways to the Global Market, Consumers And Electronic Commerce.**

OzCarn, Gul Berna. 1995. **Small Firms and Local Economic Development Entrepreneurship in Southern Europe and Turkey.** Ankara: Middile East Technical University.

Pempel, T.J. 1987. The Unbounding of Japan, Inc: The Changing Dynamics of Japanese Policy Formation:. **Journal of Japanese Studies** 13 (2) : 24-36.

Porter, Michael E. 1989. **The Competitive Advantage of Nations**. New York: The Free Press.

Princeton University . Sociology Department.1999. **Telecommunications policy**. N.J.: Princeton University Press.

Prindl, Andreas R.1976. **Foreign Exchange Risk.** New York: Wiley

Rogers, Evertt M. 1983. **Diffusion of Innovations,** 3 rd ed.New York: The Free Press.

_____. 1971. **Communication of Innovations.** 2 ed ed.New York: The Free Press.

Sanders, M. 1972. **Computer Utilization in Public Administration in the Undeveloped Countries**. Michigan: UMI.

Schultze, Charles L.1977. **The Public Use of Private Interest.** Washington D.C.: Brookings Institution.

Shim, Jae K. et al. 2000. **The International Handbook of Electronic Commerce**. New York: Glenlake Publishing Company.

Sideri, Sandro. 1977. **Globalisation and Regional Integration**. Hague, the Netherlands : Institute of Social Studies.
Princeton University.

Spence, W R. 1994. **Innovation : The Communication of Changes in Ideas, Practices, and Products**. United Kingdom: Chapman & Hall.

Standing, Craig. 2000. **Internet Commerce Development.** Massachusetts: Artech House Inc.

Stobaugh, Robert. 1988. Innovation and Competition. **The Global Management of Petrochemical Products.** Boston, Maschusetts: Harvard Business School Press.

Storey, David, ed. 1983. **Understanding the Small Business Sector**. London: Routudge.

Suchart Prasith-rathasint. 1997. **Regression Analysis for Social Science Researchers**. Bangkok: National Institute of Development Administration.

_____. 1994. Multi – Variates Technique For Social Researches. Bangkok: National Institute of Development Administration.

Sussman, Gerald. 1997. **Communication, Technology, and Politics in the Information Age**. California: Sage Publications.

UNCITRAL. 2002. **E-Commerce Law** (Online). Available URL: http://ecommerce.wipo.int/meetings/1999/papers/hermann.html.

Walters, Stephen J K. 1993. **Enterprise, Government and The Public.** New York : McGraw-Hill Book Co.

Wen, Joseph and Tarn, Michael J. 2001. The Impact of the Next Generation Protocol on E-Commerce Security, **The Executive's Journal**. 17(3): 34-46.

Whiteley, David. 2000. **e-Commerce, Strategy, Technologies And Applications.** London: McGraw -Hill International.

WIPO. 1999. **Final Report of the WIPO Internet Domain Name Process**. n.p.

Wright, Sonia R.1979. **Quantitative Methods and Statistics.** Beverly Hills, California: Sage Publications.

APPENDIX I

Questionnaire In Partial Fulfillment of the Dissertation

Title : Determinants of SMEs' E-Commerce Adoption in Thailand

Kindly answer every question.

Instruction: There are three kinds of questions :

1. Put / in the box in front of your answer.
2. Fill your answer in the blank given.
3. Put / in the box to rate your degree of agreement: 1 is strongly disagree, 2 - disagree, 3 - agree, 4 - strongly agree and 5- unsure or do not know.

Part 1: Demographic Data

1. Sex

   ☐ Male ☐ Female

2. Age _____years

3. Marital Status

   ☐ Single ☐ Married ☐ Divorced ☐ Separated ☐ Widowed

4. Educational background

   ☐ Less than High school ☐High School ☐ Bachelor's degree ☐ Master's Degree

   ☐ Doctorate ☐ Others, please specify .....

5. Major subject (Able to select more than one)

   ☐ Liberal Arts☐ Social Sciences ☐ Law ☐ Political Science ☐ Marketing

   ☐ Business Administration ☐ Accounting ☐ Math & Statistics ☐ Computers

   ☐ Science ☐ Economics ☐ Public Administrations☐ Others , please specify.....

6. Your English language is ……..

   ☐ Very Fluent ☐ Fluent ☐ not quite fluent/moderate ☐ poor ☐ very poor

7. Your position in this company:

   ☐ single owner ☐ Major share holder☐ CEO or MD ☐ Board member

   ☐ Senior executives ☐ Other please specify……

Part 2: Characteristics of SMEs

8. Your company is classified as a ☐ small ☐ medium ☐ or large company.
9. How long has the company exported ? ……years
10. How much was your last year Sales?……..million Baht

11. What was company 's total last year export value? .....million baht.

12. Type of company ownership
    ☐ 100% Thai owned ☐ International Joint Venture

13. Which category best describes your business? (Choose one)
    ☐ Manufacturer ☐ Wholesale - Retail ☐ Service Provider

14. Number of employees.....

15. The majority of your Employee's education levels:
    ☐ Primary school or lower ☐ Secondary school or lower
    ☐ Bachelor or equivalence ☐ Master Degree or higher

16. What is the value of assets the company hold?..... million Baht.

Part 3 : Strategy, Management Style and IT Investment

3.1 Company Strategic Management.

How much do you agree with the following statement pertaining your entrepreneurship style and your company strategy?

Put / in the column 1,2,3,4 0r 5 to rate your degree of agreement:

1. Strongly Disagree 2. Disagree 3. Agree 4. Strongly Agree 5. I don't know / I am not sure

	1	2	3	4	5
17. Your company goals were clearly set					
18. Your set goal have been communicated to employees					
19. Your marketing plan focuses on new markets					
20. Your marketing plan emphasizes export					
21. Your R&D seeks new product development					
22. Your executive management team is committed to innovation of both products and processes					
23. Employee's innovative ideas are recognized and reward.					
24. Management executives strive for customer/market excellence.					
25. English and computer training are encouraged to be practiced and continuously improved.					
26. Management can response to the changing market efficiently in a timely manner.					

3.2 Company Management Style

27.How would you categorize your company's management style ?

□ Family Style □ Moderate Conservative □ Goal Oriented□Customer Driven

□ Compromising □ Innovation/High Tech Driven

3.3 IT Investment

28.How much have you invested in IT Infrastructure ? .....Baht.

29. How many IT experts /personnel in your company?.....Persons

30. How many employees have access to Internet? .....Persons

31. What is the proportion of PCs to employee ?.....PC: .....Employee

32. Does company employ any kinds of specialized software? □Yes □No

33. How many IT Training hours in your company / year?.....Hours.

34. How much did your company spend for IT Training last year?.....Baht.

Part 4 : Customer Factors

4.1 Customer Related Activities :

35. The number of repeat customers is about_____%

36. What is the most effective sources of your advertising?

□ Customer to customer □ Export Exhibition □ broadcast media □ TV media

□ magazine media□ web site media

37. How much have you invested in advertising in the web site? ..... Bht.

38. How much you have invested in advertising in other media last year?..... Bht.

4.2 Customer Satisfaction :

How much do you agree with the following statement pertaining to customer satisfaction? Put / in the column 1,2,3,4 0r 5 to rate your degree of agreement:

1. Strongly Disagree 2. Disagree 3. Agree 4. Strongly Agree 5. I don't know / I am not sure

	1	2	3	4	5
39. It is convenient for your customers to buy your products/services.					
40. The customers are satisfied with the delivery system.					
41. You are very confident that the price is right for your customer.					
42. You are fully aware that your customers have unlimited choices to buy from the web sites.					
43. The flexibility of the management executives in Customer Handling is good.					
44. The management executives have their connections that gain team alignment in response to customer needs.					

Part 5 : Attitude towards Government Support & E-Commerce Policy Implementation :

How much do you agree with the following statement pertaining E-Commerce Policy and the policy implementation ? Put / in the column 1,2,3,4 0r 5 to rate your degree of agreement:
1. Strongly Disagree 2. Disagree 3. Agree 4. Strongly Agree 5. I don't know / I am not sure

	1	2	3	4	5
45. Government provides support in R &D in E-Commerce.					
46. Government communicates objectives and standards of E-Commerce Policy					
47. Government provides sufficient fund to support SMEs in adoption E-Commerce.					
48. Small Industry Finance Corporation helps SMEs .					
49. Government supports SMES for promoting activities,e.g. exhibitions, tradefair					
50. Government provides sufficient support in E-Commerce training for SMEs.					
51. Government provides sufficient support in improving IT Infrastructure.					
52. Current Telecommunication System supports SMEs in terms of convenience					
53. Current Telecommunication System supports SMEs in terms of cost.					
54. E-Commerce Law and related laws were appropriate and on time					
55. The enforcement of E-Commerce Law related laws is appropriate.					
56. Tax and Export Tax policy support SMEs.					
57. International or global tax policy is fair and encouraging for SMEs.					
58. Government provides sufficient confidence to SMEs for security issues					
59. Government supports and put effort in protecting Intellectual Property					
60. Government roles in International trade and networks context positively support SMEs .					
61. Government sincerely promotes the development of SMEs					
62. Government seeks co-operation on E-commerce Policy Implementation					

	1	2	3	4	5
63. Government agencies and their officers put extra effort to assist SMEs in all cases .					
64. Government Export promotion is successfully implemented.					
65. The economic and social environment support in E-commerce adoption.					

Part 6: Private and International Organizations Support

How much do you agree with the following statement pertaining to private and International organizations support?
Put / in the column 1,2,3,4 0r 5 to rate your degree of agreement:
1. Strongly Disagree 2. Disagree 3. Agree 4. Strongly Agree 5. I don't know / I am not sure

	1	2	3	4	5
66.Private sector in finance provides prompt and efficient services to the SMEs with a reasonably cost.					
67.Private sector in IT provides prompt and efficient services to the SMEs with a reasonable cost.					
68.Private sector in delivery service provides prompt and efficient services with a reasonable cost.					
69.International Organizations such as WTO , ASEAN, APEC, promotes and support SMEs					
70.You can find sufficient materials at reasonable good quality and price.					
71.You can find high quality of labor with a reasonable cost.					
72.You find financial Institutes support your business.					
73.You find insurance institutes services are sufficient and support your business.					
74.You find domestic market size in your industry is large .					
75.Your domestic market has a high growth rate.					
76.Your Domestic competitiveness is high and forces you to export.					
77.Your domestic consumers' demand is stronger than foreign consumers.					
78.You gain higher profit from export sales than domestic sales.					

Part 7: Risk Management

If external uncontrolled events such as currency devaluation, political changes, war, oil crises, flood, drought, earth quake , epidemic, rejection from overseas market, emerging of new standards and technology, new product innovation, etc, occur , how could you cope with them?

How much do you agree with the following statements pertaining your risk management ?
Put / in the column 1,2,3,4 0r 5 to rate your degree of agreement:
1. Strongly Disagree 2. Disagree 3. Agree 4. Strongly Agree 5. I don't know / I am not sure

	1	2	3	4	5
79. Your company has a contingency plan to overcome the crisis					
80. Your company has a Risk Management plan for HR such as a succession plan.					
81. Your company has insurance for the asset.					
82. Your company has insurance for the products.					
83. Your company has life and medical insurance for your employees.					
84. Your have net work management or you are a member of one or more foundations.					

Part 8 : Adoption of E - commerce

85. To what extent does your company adopt E-Commerce?
☐ Fully , including electronic payment
☐ Partly only receiving orders
☐ Partly only advertising in the public web sites
☐ Not at all .

Thank you for your kind co-operation -- Please return this questionnaire in the enclosed envelope.

APPENDIX II

Reliability Test for the Pre-Test Group

The reliability Analysis shown below starts at questions number 17 - 26, the attitude test asking about entrepreneurs and company strategic management style.

Table 4.6 Reliability of the Company Strategic Management
****** Method 1 (space saver) will be used for this analysis ******

R E L I A B I L I T Y A N A L Y S I S - S C A L E (V3)

Statistics for	Mean	N of Variance	Std Dev	Variables
SCALE	33.1250	14.8125	3.8487	10

Item-total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Alpha if Item Deleted
Q17	29.8750	12.0493	.6814	.7769
Q18	29.9250	13.1388	.2358	.8236
Q19	29.7500	13.3026	.3136	.8105
Q20	29.6250	13.5757	.2576	.8150
Q21	29.6250	12.7336	.4960	.7944
Q22	29.7500	12.9342	.4138	.8016
Q23	30.0000	11.9474	.7393	.7724
Q24	29.7000	10.6421	.6968	.7664
Q25	30.0000	11.6316	.4442	.8035
Q26	29.8750	10.5493	.7344	.7611

Reliability Coefficients

N of Cases = 20.0 N of Items = 10
Alpha = .8107

RELIABILITY ANALYSIS - SCALE (V4)

Statistics for	Mean	Variance	Std Dev	N of Variables
SCALE	18.0500	13.4974	3.6739	6

Item-total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Alpha if Item Deleted
Q39	15.0750	10.0599	.6673	.8817
Q40	14.9750	9.1289	.8241	.8564
Q41	15.0500	9.1289	.7371	.8713
Q42	15.1250	9.5230	.6574	.8845
Q43	14.9500	9.3658	.8505	.8549
Q44	15.0750	10.3493	.5722	.8952

Reliability Coefficients

N of Cases = 20.0 N of Items = 6
Alpha = .8933

RELIABILITY ANALYSIS - SCALE (V5)

Statistics for	Mean	Variance	Std Dev	N of Variables
SCALE	60.9750	136.3020	11.6748	21

Item-total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Alpha if Item Deleted
Q45	58.0000	124.7895	.7078	.9686
Q46	57.9000	122.3316	.7716	.9680
Q47	57.9750	123.4336	.6629	.9693
Q48	58.0500	124.7605	.5970	.9701
Q49	57.8750	123.5493	.7885	.9678
Q50	58.0000	123.3947	.7793	.9679
Q51	58.0500	125.8395	.6834	.9688
Q52	57.9750	122.9599	.7564	.9681
Q53	58.0250	122.6441	.7417	.9683
Q54	58.2250	123.2757	.7656	.9680
Q55	58.3000	123.5105	.7172	.9686
Q56	58.1500	123.8711	.8523	.9672
Q57	58.1250	123.1283	.8053	.9676
Q58	58.1250	122.8125	.8507	.9671
Q59	57.9750	122.6704	.8631	.9670
Q60	58.0750	124.4020	.8649	.9672
Q61	58.2250	123.3809	.8530	.9672
Q62	58.0000	124.4474	.8040	.9677
Q63	58.2500	125.2500	.8026	.9678
Q64	58.1500	124.5553	.8016	.9677
Q65	58.0500	125.1816	.7301	.9684

Reliability Coefficients

N of Cases = 20.0 N of Items = 21
Alpha = .9695

RELIABILITY ANALYSIS - SCALE (V6)

	Mean	Variance	Std Dev	N of Variables
Statistics for SCALE	36.3500	33.6342	5.7995	12

Item-total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Alpha if Item Deleted
Q67	33.6000	29.1737	.6668	.8993
Q68	33.3000	30.1158	.6438	.8998
Q69	33.3250	28.0862	.6438	.8998
Q70	33.2000	30.6421	.4280	.9086
Q71	33.2000	30.8526	.5008	.9061
Q72	33.2750	30.0914	.5432	.9043
Q73	33.4500	28.7079	.7126	.8972
Q74	33.3250	26.5862	.7553	.8939
Q75	33.3000	26.7474	.8261	.8902
Q76	33.1250	27.1020	.7227	.8957
Q77	33.3750	28.3388	.5051	.9087
Q78	33.3750	25.5493	.7887	.8923

Reliability Coefficients

N of Cases = 20.0 N of Items = 12
Alpha = .9076

RELIABILITY ANALYSIS - SCALE (V7)

Statistics for	Mean	Variance	Std Dev	N of Variables
SCALE	18.6500	10.7132	3.2731	6

Item-total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Alpha if Item Deleted
Q79	15.7000	7.4053	.7069	.8418
Q80	15.5250	7.8546	.6464	.8525
Q81	15.5250	6.5388	.8506	.8127
Q82	15.5250	7.8546	.6464	.8525
Q83	15.4500	8.4184	.5938	.8616
Q84	15.5250	7.7230	.5925	.8627

Reliability Coefficients

N of Cases = 20.0 N of Items = 6
Alpha = .8704

RELIABILITY ANALYSIS - SCALE (ALPHA)

Statistics for	Mean	N of Variance	Std Dev	Variables
SCALE1	69.9250	648.1914	25.4596	56

RELIABILITY ANALYSIS - SCALE (ALPHA)

Item-total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Alpha if Item Deleted
Q17	166.6750	636.4283	.4331	.9760
Q18	166.7250	638.5388	.2607	.9765
Q19	166.5500	640.5237	.2726	.9763
Q20	166.4250	643.7441	.1607	.9765
Q21	166.4250	638.3757	.3685	.9761
Q22	166.5500	639.6816	.3039	.9763
Q23	166.8000	637.3789	.4100	.9761
Q24	166.5000	630.2105	.4420	.9762
Q25	166.8000	628.8526	.4508	.9762
Q26	166.6750	626.1388	.5573	.9758
Q39	166.9500	622.8921	.7129	.9754
Q40	166.8500	618.3184	.7518	.9753
Q41	166.9250	621.5336	.6298	.9757
Q42	167.0000	622.8684	.6057	.9757
Q43	166.8250	619.0862	.8219	.9752
Q44	166.9500	618.8921	.8082	.9752
Q45	166.9500	622.8921	.7129	.9754
Q46	166.8500	618.3184	.7518	.9753

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Alpha if Item Deleted
Q47	166.9250	621.5336	.6298	.9757
Q48	167.0000	622.8684	.6057	.9757
Q49	166.8250	619.0862	.8219	.9752
Q50	166.9500	618.8921	.8082	.9752
Q51	167.0000	625.9474	.6662	.9756
Q52	166.9250	620.4020	.7179	.9754
Q53	166.9750	620.3546	.6887	.9755
Q54	167.1750	621.8493	.7044	.9755
Q55	167.2500	622.7237	.6512	.9756
Q56	167.1000	622.4632	.8005	.9753
Q57	167.0750	619.0862	.8107	.9752
Q58	167.0750	618.7178	.8446	.9751
Q59	166.9250	617.9020	.8714	.9751
Q60	167.0250	621.2230	.8923	.9751
Q61	167.1750	619.8230	.8514	.9751
Q62	166.9500	621.1026	.8388	.9752
Q63	167.2000	625.4053	.7531	.9754
Q64	167.1000	624.2526	.7429	.9754
Q65	167.0000	624.6053	.7079	.9755
Q66	167.1500	626.8447	.7326	.9755
Q67	167.1750	626.4283	.7466	.9754
Q68	166.8750	635.0493	.5628	.9758
Q69	166.9000	618.4368	.8008	.9752

RELIABILITY ANALYSIS - SCALE (ALPHA)

Item-total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Alpha if Item Deleted
Q70	166.7750	636.3809	.4037	.9761
Q71	166.7750	637.0914	.4671	.9760
Q72	166.8500	634.7132	.4803	.9759

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Alpha if Item Deleted
Q73	167.0250	623.2230	.8239	.9753
Q74	166.9000	617.8579	.7287	.9754
Q75	166.8750	619.7336	.7558	.9753
Q76	166.7000	621.0368	.6774	.9755
Q77	166.9500	626.5500	.4914	.9761
Q78	166.9500	617.4447	.6615	.9756
Q79	166.9750	621.6704	.7204	.9754
Q80	166.8000	632.0632	.4681	.9760
Q81	166.8000	613.0632	.8604	.9750
Q82	166.8000	632.6947	.4490	.9760
Q83	166.7250	634.9072	.4501	.9760
Q84	166.8000	621.0632	.7195	.9754

Reliability Coefficients

N of Cases= 20.0 N of Items = 56
Alpha = .9760

APPENDIX III

Reliability of the variables

Method 2 (covariance matrix) will be used for this analysis

RELIABILITY ANALYSIS - SCALE (ALPHA)

1. Correlation Matrix for Company Strategic Management -CSM

	CCG	GCO	MNM	EMP	NPD
CCG	1.0000				
GCO	.5179	1.0000			
MNM	.3735	.4624	1.0000		
EMP	.2235	.4675	.5585	1.0000	
NPD	.1589	.1035	.2246	.2977	1.0000
IPP	.1060	.2033	.3393	.3347	.4904
RRI	.1837	.1676	.2906	.1786	.3481
DCE	.2523	.2882	.3047	.4024	.3510
ECT	.1909	.1200	.2128	.2732	.3270
ERC	.3704	.2395	.3079	.3202	.2955

	IPP	RRI	DCE	ECT	ERC
IPP	1.0000				
RRI	.3181	1.0000			
DCE	.4232	.4612	1.0000		
ECT	.1788	.4017	.4686	1.0000	
ERC	.3902	.3293	.6057	.5945	1.0000

N of Cases = 218.0

Item Means	Mean	Minimum	Maximum	Range	Max/Min	Variance
	3.2592	3.1422	3.3349	.1927	1.0613	.0043

Inter-item Correlations	Mean	Minimum	Maximum	Range	Max/Min	Variance
	.3213	.1035	.6057	.5023	5.8551	0.162

Reliability Coefficients 10 items

Alpha = .8265 Standardized item alpha = .8256

2. Correlation Matrix Customer Factor

	CMC	CSD	PIR	UOC	CMH	RCN
CMC	1.0000					
CSD	.5407	1.0000				
PIR	.3975	.5313	1.0000			
UOC	.3485	.4066	.4284	1.0000		
CMH	.4156	.3445	.4156	.4319	1.0000	
RCN	.3100	.4179	.3753	.5364	.6564	1.0000

N of Cases = 241.0

Item Means	Mean	Minimum	Maximum	Range	Max/Min	Variance
	3.1563	3.0996	3.2116	.1120	1.0361	.0029

Inter-item Correlations	Mean	Minimum	Maximum	Range	Max/Min	Variance
	.4371	.3100	.6564	.3464	2.1172	.0081

Reliability Coefficients 6 items

Alpha = .8159 Standardized item alpha = .8233

3. Correlation Matrix for Government Support and E-Commerce Policy Implementation - GSE

	RDS	CEP	FSC	SCS	TFE
RDS	1.0000				
CEP	.8202	1.0000			
FSC	.7299	.7693	1.0000		
SCS	.6610	.7858	.7587	1.0000	
TFE	.6522	.7197	.7058	.7757	1.0000

	RDS	CEP	FSC	SCS	TFE
ITT	.6672	.7499	.7136	.7834	.7602
ITI	.6841	.7288	.6674	.7069	.7208
CON	.6536	.7919	.7059	.7615	.7599
COS	.6382	.7339	.6823	.7143	.7292
ELT	.5950	.7007	.6104	.6673	.6323
AEL	.5795	.7034	.5927	.6299	.5804
FTC	.5686	.6500	.5910	.6202	.6014
FGT	.5799	.6914	.6623	.6849	.6596
CSI	.6110	.6578	.6864	.6333	.5692
PIP	.6206	.6617	.6565	.6434	.6423
ITN	.5971	.7157	.6441	.6037	.6540
PDS	.6529	.7155	.6805	.6309	.6264
CEP	.6702	.7118	.6920	.6095	.6058
EEA	.6021	.6306	.6668	.5919	.5350
SEP	.3242	.2621	.2544	.2487	.2217
ESE	.6250	.7049	.6775	.6293	.6014

	ITT	ITI	CON	COS	ELT
ITT	1.0000				
ITI	.7671	1.0000			
CON	.8039	.8537	1.0000		
COS	.7791	.8513	.8922	1.0000	
ELT	.6709	.7024	.7556	.7772	1.0000
AEL	.6521	.6804	.7182	.7371	.7829
FTC	.6229	.7051	.7112	.7042	.7674
FGT	.6824	.7148	.7544	.7262	.7491
CSI	.6932	.7196	.6848	.7078	.7247
PIP	.6899	.7005	.7131	.7066	.7006
ITN	.6698	.6499	.6977	.6695	.6466
PDS	.6777	.6115	.6643	.6547	.6854
CEP	.6577	.6601	.6854	.6853	.7178
EEA	.6049	.6235	.5662	.6099	.6347
SEP	.2483	.2591	.2570	.3270	.2514
ESE	.6833	.6392	.7063	.7290	.6585

	AEL	FTC	FGT	CSI	PIP
AEL	1.0000				
FTC	.7315	1.0000			
FGT	.7263	.8076	1.0000		
CSI	.7084	.7659	.8089	1.0000	
PIP	.6240	.7105	.6850	.7842	1.0000
ITN	.7224	.6846	.6546	.7171	.7228
PDS	.7043	.7128	.7026	.7807	.8022

	AEL	FTC	FGT	CSI	PIP
CEP	.7097	.7369	.6743	.7942	.8090
EEA	.5363	.6035	.6060	.6298	.5928
SEP	.3243	.2534	.1753	.2517	.2498
ESE	.6180	.6231	.6281	.6344	.6923

	ITN	PDS	CEP	EEA	SEP	ESE
ITN	1.0000					
PDS	.8517	1.0000				
CEP	.8257	.8883	1.0000			
EEA	.5709	.6277	.6346	1.0000		
SEP	.3376	.2542	.2478	.3107	1.0000	
ESE	.6963	.6924	.6611	.7752	.3984	1.0000

N of Cases = 165.0

Item Means	Mean	Minimum	Maximum	Range	Max/Min	Variance
	2.4375	2.2485	2.6667	.4182	1.1860	0.139

Inter-item Correlations	Mean	Minimum	Maximum	Range	Max/Min	Variance
	.6477	.1753	.8922	.7169	5.0897	.0192

Reliability Coefficients 21 items

Alpha = .9583 Standardized item alpha = .9747

4. Correlation Matrix OF Private and International Organizations Support--PIO

	SPF	SPI	SPD	SIO	SRM
SPF	1.0000				
SPI	.6460	1.0000			
SPD	.5781	.5719	1.0000		
SIO	.6038	.6687	.5665	1.0000	
SRM	.5118	.5535	.4900	.4363	1.0000
QLC	.3771	.5556	.4414	.4442	.7784
SFI.	4162	.5307	.4599	.5136	.7015
SII	.4243	.5393	.5146	.5719	.3863

	SPF	SPI	SPD	SIO	SRM
LDM	.4523	.4084	.4688	.4485	.3254
HGD	.3382	.3571	.4228	.4021	.2896
HDC	.5159	.4714	.3341	.4482	.3552
SDD	.4633	.3328	.3957	.3778	.2817
SPE	.4722	.4008	.2775	.5147	.1660

	OLC	SFI	SII	LDM	HGD	HDC	SDD	HPE
QLC	1.0000							
SFI.	6761	1.0000						
SII	.4616	.4751	1.0000					
LDM	.3302	.4391	.6023	1.0000				
HGD	.3655	.3913	.5460	.7318	1.0000			
HDC	.2718	.3445	.5489	.6336	.5939	1.0000		
SDD	.1587	.3367	.3939	.4497	.4165	.5406	1.0000	
HPE	.1185	.3450	.5108	.5423	.5522	.6568	.5241	1.0000

N of Cases = 147.0

Item Means	Mean	Minimum	Maximum	Range	Max/Min	Variance
	2.9320	2.7891	3.0204	.2313	1.0829	.0045

Inter-item Correlations	Mean	Minimum	Maximum	Range	Max/Min	Variance
	.4610	.1185	.7784	.698	6.5670	.0162

Reliability Coefficients 13 items

Alpha = .9175 Standardized item alpha = .9175

5. Correlation Matrix OF THE Risk Management Factor – RSM

	ECP	ESP	ICA	ICP	IFM	ENM
ECP	1.0000					
ESP	.5453	1.0000				
ICA	.3219	.5529	1.0000			
ICP	.2438	.5178	.7304	1.0000		
IFM	.2368	.4134	.6327	.7445	1.0000	
ENM	.3929	.5044	.5017	.5520	.5000	1.0000

N of Cases = 187.0

Item Means	Mean	Minimum	Maximum	Range	Max/Min	Variance
	3.0633	3.0160	3.1176	.1016	1.0337	.0019

Inter-item Correlations	Mean	Minimum	Maximum	Range	Max/Min	Variance
	.4927	.2368	.7445	.5077	3.1444	.0223

Reliability Coefficients 6 items

Alpha = .8541 Standardized item alpha = .8535

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