

**Information and Communication
Technology (ICT) for development of
small and medium-sized exporters
in East Asia:
Thailand**

Chanin Mephokee

Kaipichit Ruengsrichaiya



IDE-JETRO

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Abstract

It is generally recognized that SMEs are presently the most important and fundamental organizations for accelerating national economic development. They play crucial roles and functions in helping large enterprises increase production efficiency by supplying primary spare parts and components. Even though IT is the key element for international and domestic trading, only a small number of Thai SMEs use IT for increasing their productivity and efficiency and for trading. Since the world economy is becoming a digital economy, the uses of electronic networks or electronic media should not be ignored. Consequently, Thai SMEs in general are unable to compete on the world market.

The Thai government has recognized the benefits of IT use for SMEs. However, the cost of using IT may be too high for small organizations. The Thai government is planning to create a positive environment for SMEs by using IT for SME capacity building, financial assistance and human resource development. E-government is one of the projects designed to ease all barriers of IT use by SMEs.

I. Introduction

The term “enterprises” covers a wide range of economic activities involved in the process of production, marketing and trade (both wholesale and retail), and services. Under the SME Promotion Act 2000, enterprises that can be categorized as SMEs are those, which possess either a certain amount of properties, a certain size work force, or a certain amount of registered capital (see table 1).

TABLE 1
DEFINITIONS OF SMES

| Types | Small (not more than) | | Medium | |
|---------------|-----------------------|----------------------------------|----------------------|----------------------------------|
| | Work force (persons) | Registered capital (THB million) | Work force (persons) | Registered capital (THB million) |
| Manufacturing | 50 | 50 | 51-200 | 50-200 |
| Services | 50 | 50 | 51-200 | 50-200 |
| Wholesale | 25 | 50 | 26-50 | 50-100 |
| Retail | 15 | 30 | 10-30 | 30-60 |

Source: Department of Small and Medium Enterprises (SMEs) Promotion.

In the year 2000, there were 1.6 million enterprises in Thailand. Amongst these, 99.63% were SMEs. SMEs are adaptable in that they are small-scale, easy to set up and close down, adjustable to practical production processes and new machines, and able to switch to other new products and services in an ever-changing industrial environment of present-day business. These characteristics place them in an advantageous position as the most flexible and adaptable industrial firms in the present economic situation. However, most of Thailand SMEs apply labour-intensive production processes. Under globalization, relatively low labour costs no longer give Thailand a comparative advantage. SMEs in Thailand are forced to participate in the world market facing intense competition. They cannot compete on the world market with products from other countries. What needs to be dealt with promptly is the replacement of obsolete engines, slow production processes and ineffective management. SMEs need to improve the quality of

their products and management processes, as well as lower costs, so as to be able to compete with products of other countries that are more adaptable.

In order to do so, information technology (IT) is a prerequisite for SMEs. SMEs could employ IT in both the production process (design and production) and the management process (marketing and administration). However, IT use by SMEs in Thailand is still very low.

This paper attempts to describe the present situation of IT use by SMEs in Thailand and the development of SMEs in the IT revolution. Government efforts to promote IT use and international trade by SMEs are also discussed.

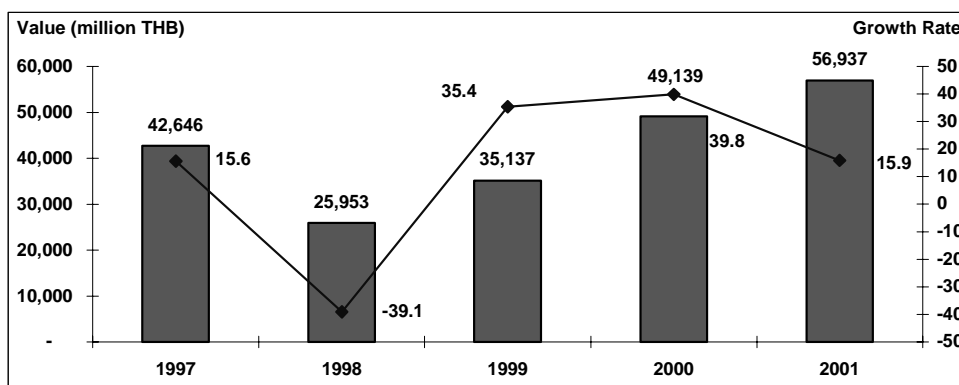
II. Present situation of IT market and IT use by SMEs

A. Use of IT in Thailand

1. IT market

The overall IT market of Thailand has been significant and expanding. Before the economic crisis of 1997, its value was over 1.2 million US\$ per annum. Though it was hit by the crisis, which decreased its value and growth rate in 1998, the market bounced back at an impressive rate. As shown in figure 1, the growth rate in 1999 and 2000, the years following the crisis, was considerable: 35.4 and 39.8% a year. The market value had also recovered within two years, to over 1.2 million US\$ since 2000.

FIGURE 1
VALUE AND GROWTH RATE OF IT MARKET IN THAILAND



Source: The Association of Thai Computer Industry, 2002 <www.atci.or.th>

The major categories of products on the IT market are the hardware segment, consisting of systems, PCs and workstations; data communication; packaged software; and IT services. Statistics on their value, share and growth rate for the years 1999 to 2001 are shown in table 2. During the period 1999 to 2001, PCs and workstations accounted for the largest share – one half – of total market values. In second place was the IT service segment. Packaged software was third.

Another important aspect of the market is growth rate. The outstanding category was data communication. Its average growth rate was 89.5% per annum between 1999 and 2001, reflecting an increased interest in and use of data communication among users. The Internet was another important factor of growth during this period. The second highest growth-rate category was packaged software, which reflected the use of IT knowledge in different activities. The impressive growth rate of both categories indicates increased interest in ICT within the Thai market and among the Thai people in this new era.

It should be noted that the statistics on packaged software values in table 2 might significantly underestimate the actual use of software. This is because most private use and small-business use of software is not registered. These users may be making extensive use of various kinds of unlicensed software. As regards business uses, though there is no formal estimate of unlicensed software use, a high percentage of SMEs do not use authorized software. This is due to the market for pirated software and the weak Intellectual Property Rights (IPRs) law. Hence, ICT penetration in business use may be deeper and broader than what the statistics show.

TABLE 2
VALUE OF IT MARKET, CLASSIFIED BY PRODUCTS AND SERVICES
(In millions of THB and Percentages)

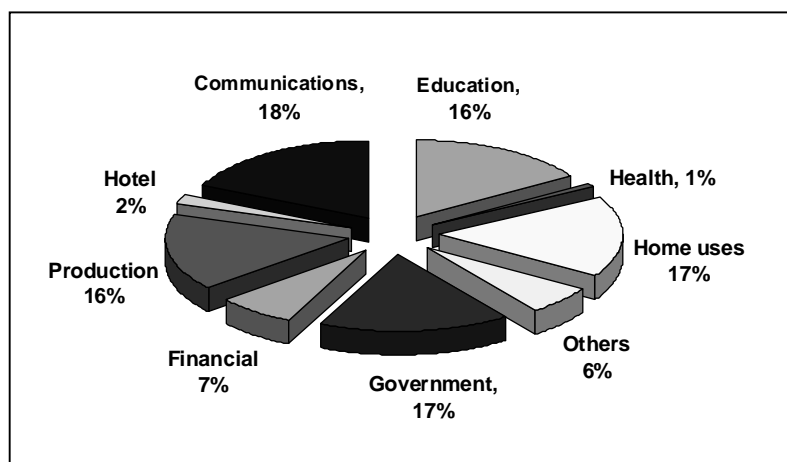
| Items | 1999 | | 2000 | | 2001 | | Growth /year |
|--------------------|---------------|------------|---------------|------------|---------------|------------|--------------|
| | Value | Share | Value | Share | Value | Share | |
| Systems | 2 704 | 8 | 2 894 | 6 | 3 406 | 6 | 11.9 |
| PCs & workstations | 16 456 | 47 | 24 623 | 50 | 26 933 | 47 | 20.7 |
| Data communication | 950 | 3 | 3 758 | 8 | 5 480 | 10 | 89.5 |
| Packaged software | 6 289 | 18 | 8 378 | 17 | 10 125 | 18 | 26.7 |
| IT services | 8 738 | 25 | 9 486 | 19 | 10 993 | 19 | 14.2 |
| Total | 35 137 | 100 | 49 139 | 100 | 56 937 | 100 | 22.7 |

Source: The Association of Thai Computer Industry, 2002 <www.atci.or.th>

In terms of classification by activities, the shares of major activities in 2001 are illustrated in figure 2. The largest shares were distributed among the telecommunications sector, education, home uses, government use and the production sector, which accounted for approximately 17% each:

Penetration of IT in business enterprises has been limited. According to the National Statistical Office Survey on Trading and Service Enterprises in 2002, as shown in table 3, computer-equipped firms accounted for only 10.6%, and the concentration was in Bangkok and outlying areas. In the aggregate view, only half of the companies that used computers also made use of the Internet, but less than 10% of them had their own websites. The highest use of computers and related systems has been clustered in Bangkok and outlying areas. The other regions of the country account for approximately equal shares.

FIGURE 2
VALUE OF IT MARKET, CLASSIFIED BY ACTIVITIES
(In percentages)



Source: The Association of Thai Computer Industry, 2002 <www.atci.or.th>

TABLE 3
PROPORTION OF ICT USE, BY TRADING AND SERVICE ENTERPRISES
CLASSIFIED BY REGION IN 2002
(In percentages)

| | Total | Bangkok | Outlying areas | Central | North | NE | South |
|---------------|------------|------------|----------------|------------|------------|------------|------------|
| Total | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| No computers | 89.4 | 82.6 | 87.2 | 93.4 | 91.8 | 93.5 | 93.6 |
| Computers | 10.6 | 17.4 | 12.8 | 6.6 | 8.2 | 6.5 | 6.4 |
| - No Internet | 5.3 | 7.8 | 7.5 | 3.5 | 4.8 | 4 | 2.8 |
| - Internet | | | | | | | |
| o Business | 4.3 | 8.2 | 3.8 | 2.6 | 2.5 | 2.1 | 2.6 |
| o Other | 1 | 1.4 | 1.6 | 0.5 | 1 | 0.4 | 1 |
| - Website | | | | | | | |
| o No website | 9.8 | 15.7 | 11.9 | 6.2 | 7.8 | 6.3 | 5.9 |
| o Website | 0.8 | 1.7 | 0.9 | 0.4 | 0.4 | 0.2 | 0.4 |

Source: National Statistical Office, 2002 <www.nso.go.th>

As shown by the general IT-use statistics in this section, the main characteristic of the overall IT market in Thailand is the increased importance of and interest in IT use in general but its limited use for business purposes. The considerable growth of the market, including in education, government and personal use is a good indication that in the near future, ICT literacy and demand are likely to rise at a fast pace. Along with the demand for policies aimed at encouraging the use of ICT, mentioned in chapter 4, and considering that Thailand is a major world exporter of computers and components, IT penetration should become broader and deeper in the country over the next few years.

2. E-commerce

According to the National Electronics and Computer Technology Centre, a survey of 6,460 examples from websites using www.com and www.co.th addresses showed that in 2001, most of the websites were accounted for by the tourism, computer and Internet, and entertainment industries. Most of them (88.58%) were at a beginning stage, being used for advertising purposes only. These beginning-stage websites belonged mainly to the tourism industry, computer and Internet industry, and entertainment industry.

Approximately 11.42% of websites were in the advanced stage and were used for a variety of purposes, such as purchasing, clearing or logistics. Most of the websites (89.77%) used a www.com address. These advanced-stage websites were mainly in the tourism, computer and Internet, garments and cosmetics, florist and handicraft industries.

TABLE 4
E-COMMERCE USERS IN SELECTED INDUSTRIES IN 2001
(In number of websites)

| Industry | Total | Early-stage | Advanced-stage |
|------------------------|-------|-------------|----------------|
| Tourism | 607 | 494 | 113 |
| Computers and Internet | 393 | 328 | 65 |
| Entertainment | 330 | 316 | 14 |
| Services | 147 | 147 | 0 |
| Agriculture | 141 | 129 | 12 |
| Food and drugs | 124 | 115 | 9 |
| Publishing | 122 | 109 | 13 |
| Real estate | 120 | 110 | 14 |
| Finance and banking | 114 | 106 | 8 |
| Retail and wholesale | 114 | 89 | 25 |

Source: National Electronics and Computer Technology Center (NECTEC) <www.nectec.or.th>

Most of the websites (55.3%) were written in English; 26.5% were written in Thai, and 18.1% were in both English and Thai. The main reason for using English as a medium is to serve the purpose of expanding to overseas markets. Among the advanced-stage websites, the contents include sufficient information to satisfy customer needs such as details on prices and how to make orders. These websites also provide purchasing-order forms, information on payment systems both online and offline, and information on how to receive products. Order forms are provided on 69.5% of advanced-stage websites, 79.5% provide payment systems, 47.7% provide information on how to receive products, and 61.2% offer services to both domestic and overseas customers. Details on website contents may be seen in table 5.

The success of using websites for e-commerce in Thailand depends on four factors, namely:

- Quality of information and service,
- System use,
- User-friendliness, and
- Quality of system design.

TABLE 5
SERVICE PROVIDED BY ADVANCED-STAGE WEBSITES
(In percentages)

| Level of service | Description | % of total |
|------------------|--|------------|
| 1 | Purchasing orders only | 20.5 |
| 2 | Purchasing orders and offline payment | 14.7 |
| 3 | Purchasing orders, offline payment and delivery system | 18.4 |
| 4 | Purchasing orders and online payment (by credit card) | 17.4 |
| 5 | Purchasing orders and online payment (by credit card), and delivery system | 29.1 |

Source: National Electronics and Computer Technology Center (NECTEC) <www.nectec.or.th>

According to the survey, Thai websites for e-commerce have satisfactory quality, providing information and services in terms of security and privacy, website contents, and after-sale services. The system-user features (personal profile, shopping cart and payment system, data-collecting system, and catalogue system) are also high quality. User-friendliness, including account setup, order-status checking, order tracking, and password protection, are satisfactory to customers. System design (navigation, graphics, and international service) is quite good as well. So far, in technical terms, Thai websites for e-commerce can be used effectively.

The main problems of Thai e-commerce can be divided into two parts. The first has to do with the customers' lack of confidence regarding security. The second is the technical issue of implementation and enforcement of the e-commerce law.

B. Participation of SMEs in IT

To have a vivid picture of the involvement of SMEs in IT, it is useful to divide SMEs into three groups, namely, manufacturing, trading and service. Each group has different IT needs for its business activities, and this implies different types of involvement and use.

1. Manufacturing SMEs

According to the Office of Industrial Economics, medium-sized enterprises have participated in IT at higher levels than small enterprises. Thus, the level of IT participation depends on the size of the enterprise. It was found that 58.3% of medium-sized enterprises are using IT, while only 24.4% of small enterprises are.

TABLE 6
INTERNET AND EDI USE BY ENTERPRISES
(In percentages)

| | Enterprises | | |
|-----------------------|-------------|------------|------------|
| | Large | Medium | Small |
| Use IT | 61.9 | 58.3 | 24.4 |
| Planning to use IT | 21.8 | 18.4 | 25.2 |
| Do not plan to use IT | 16.3 | 23.3 | 50.4 |
| Total | 100 | 100 | 100 |

Source: Office of Industrial Economics.

However, the share of SMEs participating in IT has been increasing in both the production process and in marketing. The number of SMEs using computers for product design (Computer-Aided Design, CAP), for improving the production process (Computer-Aided Manufacturing, CAM), and for system analysis (Computer-Aided Engineering, CAE) has been increasing.

Another indicator of IT participation is the proportion of IT-related products in fixed assets. Assigning a percentage of software in fixed assets as a rough indicator, the relative importance of the firm's aspect in IT does not differ according to size (see table 7). Larger enterprises would have a greater investment in IT.

TABLE 7
PERCENTAGE OF FIXED ASSETS IN MANUFACTURING ENTERPRISES,
BY ASSET CATEGORY AND SIZE
(In number of employees)

| Type of Permanent Asset | Firm size | | | |
|---------------------------|------------|------------|------------|------------|
| | Total | Small | Medium | Large |
| Total | 100 | 100 | 100 | 100 |
| Land and developed land | 12.4 | 33.4 | 11.8 | 10.9 |
| Building and construction | 20.4 | 23.4 | 18.8 | 20.7 |
| Machinery and equipment | 60.2 | 33.6 | 62.2 | 61.7 |
| Office equipment | 1.9 | 1.5 | 2.0 | 1.9 |
| Vehicles | 1.8 | 7.2 | 2.6 | 1.1 |
| Software | 0.1 | 0.1 | 0.1 | 0.1 |
| Other permanent assets | 3.2 | 0.8 | 2.5 | 3.6 |

Source: National Statistics Office <www.nso.go.th>

As far as the influence of foreign ownership on IT involvement of SMEs is concerned, as shown in table 8, the proportion of software in fixed assets is not different between those having and not having foreign ownership. However, it could make a difference in the case of hardware and IT services, such as computers and data communication devices, which are included in the office equipment category. Because IT products account for a significant percentage of the office equipment assets of general SMEs and SMEs with foreign ownership, and this asset is 40% higher than in the case of local companies, it can be expected that SMEs with foreign ownership will be inclined to have higher IT participation than local ones.

TABLE 8
PERCENTAGE OF FIXED ASSETS OF SMES, BY ASSET CATEGORY AND OWNERSHIP
(In percentages)

| Category | Total | Type of Permanent Asset | | | | | | |
|--|-------|-------------------------|-----------|-----------|-------------------|----------|----------|-------|
| | | Land | Buildings | Machinery | Office Equip-ment | Vehicles | Software | Other |
| Percentage of permanent assets | 100 | 12.4 | 20.4 | 60.2 | 1.9 | 1.8 | 0.1 | 3.2 |
| Not in joint venture with foreign investor | 100 | 17.3 | 19.8 | 56.5 | 1.5 | 3.3 | 0.1 | 1.5 |
| Joint venture with foreign investor | 100 | 9.5 | 20.8 | 62.4 | 2.1 | 0.9 | 0.1 | 4.2 |

Source: National Statistics Office <www.nso.go.th>

2. Trading SMEs

Currently, most trading SMEs do not use IT to improve managerial and marketing functions. According to the e-commerce ranking of businesses conducted by the National Electronics and Computer Technology Centre, the retail-wholesale industry ranks sixth, after the service industry and the manufacturing industry.

The use of IT in trading SMEs has been clustered in newly established firms. The main objective is to lower operating costs and increase competitiveness. The main ITs used in this sector are cross-docking and efficient consumer response (ECR), which focus mainly on the wholesaling process. As regards retailing, rudimentary IT is used, such as the bar code. However, due to the overall transformation of the Thai economy into an IT-based one, the number of retailers using bar codes and elementary IT functions has increased. With this broad IT-user base in the trading sector, it is expected to progress quickly to a more advanced stage in the near future.

3. Service SMEs

IT has been introduced in some sectors such as real estate, tourism, private hospitals and transportation. Most (55%) of the tourism agencies and hotels that are SMEs have their own websites.

In some cases, there is a digital divide between large enterprises and SMEs. Among SMEs themselves, the problem of the digital divide exists as well, especially between the new-economy SMEs (such as software industry) and the traditional SMEs (such as handicraft and One Tambon One Product (OTOP) industries).

In services, IT and e-commerce have played an important role in marketing, advertising, sale processing and service management. The sector that has been most successful in applying IT and e-commerce is tourism (see table 9). More than half the firms (55%) in this business have websites. Most of them (85%) understand the importance of the Internet and e-commerce for their business. In addition to tourism, other types of SMEs in the service sector also appreciate the value of IT, such as private hospitals, insurance, transportation and real estate companies.

The types of IT used in service SMEs range from advanced to basic levels. Tourism has the highest number of full-fledged e-commerce applications for providing information, ordering products or services and making online payments. This is an example of a business that successfully applies IT and e-commerce in Thailand. Use of IT by private hospitals and insurance and transportation businesses is focused chiefly on data storage and processing. The most elementary use of IT in service SMEs is in real estate, where it is limited to providing information online to customers; there is no clear policy for introducing IT into these businesses.

TABLE 9
SUCCESSFUL E-COMMERCE USE, BY BUSINESS CATEGORY
(Number of websites)

| Industry | Websites using e-commerce |
|------------------------|---------------------------|
| Tourism | 113 |
| Computers and Internet | 65 |
| Garments and cosmetics | 36 |
| Flower suppliers | 28 |
| Handicrafts | 26 |

Source: Thailand Electronic Commerce Resource Centre (ECRC)
<www.ecommerce.or.th>

To sum up, there is a digital divide between large enterprises and SMEs. A higher percentage of large enterprises, over 60%, use IT, while half of the small businesses still have no plans to use IT. Among SMEs, the digital divide also exists. Trading SMEs seem to have the shallowest level of IT use, while service SMEs have the deepest IT penetration. The former use IT only for part of their business purposes, while the latter already have fully developed e-commerce and data processing procedures in place. As regards manufacturing SMEs, though they widely apply IT in production, they are likely to use digital IT in the Thai market; use of IT among businesses in general is uneven.

III. SME development in the IT revolution

A. Importance of SMEs in the Thai economy

It is generally recognized by the public and private sectors that SMEs are presently the most important and fundamental organizations for accelerating national economic recovery and a growth engine for Thailand's economic and social development. SMEs are industrial enterprises that produce goods and products for domestic consumption, as well as for export to the international market, thus generating income for the country. Finally, SMEs also provide jobs and job training programmes for people in rural and urban areas.

Additionally, SMEs in Thailand play a crucial role in supporting large industrial enterprises and increasing production efficiency by supplying the large industrial enterprises with primary spare parts and components, e.g. electronic and automobile parts and supplies. Their connections with large industrial enterprises also offer SMEs opportunities to learn about and gain experience with technical know-how, paving the way for them to enter into the higher echelon of industries in the future. SMEs are also related to other business and economic sectors, such as trade, services and agriculture.

In the year 2002, there were 1,645,530 enterprises in Thailand. Amongst these, the number of SMEs was 1,639,427, or 99.63% of all companies. This number has grown by 840,394 since 1997, when there were only 799,033.

In 2002, most SMEs were in the retail sector, i.e., 732,593, or 44.69% of the total number of SMEs. In second place were SMEs in the service sector: 500,970, or 30.56% of the total. The manufacturing and the wholesale sectors have 356,806 and 49,058, or 21.79 and 2.99% respectively.

In terms of regional distribution of SMEs in the year 2002, the northeastern region has the highest number of SMEs, i.e. 511,245 or 31.07% of all SMEs. Next is the Bangkok metropolitan region, with 347,827 or 21.14%. There are 278,101 SMEs in the north, 224,120 in the south, 201,481 in the central region and 76,653 in the east.

In terms of Gross Domestic Product (GDP), in the year 2002, SMEs in all sectors in the country delivered products and services to the economy worth THB 2,112,934 million (US\$ 52,823.35 million) out of a total of THB 5,430,455 million (US\$ 135,761.37 million), or

38.91%. The sector in which SMEs account for the highest share of GDP is the service sector. This covers all types of services provided by the private sector, but not educational or health and other services that are provided by the State. In 2002, the GDP from service-sector SMEs was worth THB 724,934 million (US\$ 18,123.35 million), or 13.35% of overall GDP. Next is the wholesale and retail trade sector (12.23%) and the manufacturing sector (9.89%)

TABLE 10
GROSS DOMESTIC PRODUCT, 1998-2002
(THB million)

| | 1998 | 2000 | 2002 |
|--------------|-----------|-----------|-----------|
| GDP | 4 639 847 | 4 916 505 | 5 430 455 |
| GDP for SMEs | 1 750 706 | 1 956 673 | 2 112 934 |
| As % of GDP | 37.73 | 39.80 | 38.91 |

Source: Department of Small and Medium Enterprises (SMEs) Promotion.

In the year 2002, a total of 7,234,022 persons were employed by all types of enterprises in the country. Of these, 4,990,217, or 68.98% of the total labour force are employed by SMEs. Compared with the figures for 1997, the total labour force – 5,313,370 overall and 4,057,595 in SMEs – has grown by 1,920,652 overall and by 932,622 in SMEs.

Table 11 shows the statistics on investments for the year 2002, when SMEs were granted 573 projects promoted by the Board of Investment Office (BOI). This includes 167 projects that are 100% owned by Thais, 211 fully foreign-owned projects and 195 projects that are joint ventures between foreigners and Thais. Investments totalled THB 91,582 million (US\$ 2,289.55 million) and accounted for 35,492 jobs.

TABLE 11
TOTAL NUMBER OF SMES ACHIEVING INVESTMENT PROMOTION, 2002
(Number of projects)

| | Enterprises | |
|------------------------------|-------------|------------|
| | Small | Medium |
| Total Number | 264 | 309 |
| Projects 100% owned by Thais | 79 | 88 |
| Projects 100% foreign owned | 119 | 92 |
| Joint ventures | 111 | 84 |
| Investment (THB million) | 66 640 | 24 940 |
| Jobs (persons) | 27 565 | 7 927 |

Source: Board of Investment Office.

In 2002, Thai SMEs exported industrial products worth THB 1,209,303 million (US\$ 30,232.575 million), or 38.22% of all industrial products exported from Thailand. Even though the percentage has fallen from 39.47% in the year 2001, the value of exports from SMEs has grown steadily.

The five most important exports from SMEs account for 53.85% of all industrial exports, or approximately THB 651,288 million (US\$ 16,282.2 million). This includes electronic and electrical appliances, which have the highest export value, i.e., THB 209,091 million

(US\$ 5,227.75 million), or 17.29% of the total value of SME exports. In second place are exports from the textile industry, amounting to THB 166,596 million (US\$ 4,164.9 million) or 13.78%. Ranking third is the plastics industry, with exports worth THB 95,504 million (US\$ 2,387.6 million), or 7.9%.

TABLE 12
EXPORTS FROM SMES
(THB million)

| | 2000 | 2001 | 2002 |
|--------------|---------|---------|-----------|
| Export value | 754 784 | 793 760 | 1 209 303 |
| As % | 38.45 | 39.47 | 38.22 |

Source: Customs Department.

TABLE 13
VALUE OF EXPORTS GENERATED BY SMES, BY INDUSTRIAL SECTOR
(THB million)

| Industry | 2000 | 2001 | 2002 | Proportion |
|--|-------------------|-------------------|---------------------|------------|
| Canned and processed foods | 44 878.59 | 53 374.58 | 82 705.03 | 6.84 |
| Beverages | 2 222.83 | 2 964.81 | 4 463.62 | 0.37 |
| Weaving | 108 412.28 | 117 946.37 | 166 596.16 | 13.78 |
| Jewellery and stones | 44 874.22 | 56 369.44 | 92 419.35 | 7.64 |
| Electronics and electronic appliances | 149 914.55 | 131 254.71 | 209 091.94 | 17.29 |
| Furniture and parts | 22 183.56 | 23 799.18 | 39 273.82 | 3.25 |
| Wood and wooden products | 14 889.56 | 16 767.94 | 27 633.40 | 2.29 |
| Steel, refined steel and steel products | 29 907.81 | 27 826.27 | 41 042.42 | 3.39 |
| Plastic products | 56 838.48 | 59 746.55 | 95 504.84 | 7.90 |
| Chemical products | 33 929.84 | 30 817.92 | 47 181.31 | 3.90 |
| Shoes and parts | 10 847.69 | 12 674.94 | 15 918.47 | 1.32 |
| Leather, leather products and travelling equipment | 8 085.79 | 7 489.69 | 11 858.71 | 0.98 |
| Rubber products | 53 118.47 | 50 969.54 | 87 676.63 | 7.25 |
| Tableware and kitchen appliances | 3 651.75 | 41 606.63 | 5 035.07 | 0.42 |
| Motor vehicles, spares and parts | 18 955.84 | 10 068.03 | 49 513.97 | 4.09 |
| Paper and paper products | 10 162.56 | 2 363.95 | 14 251.50 | 1.18 |
| Machinery, spares and steel moulds | 2 099.84 | 2 164.44 | 3 847.77 | 0.32 |
| Flowers, leaves and nursery flowers | 2 120.28 | 5 598.89 | 2 875.70 | 0.24 |
| Ceramic products | 5 342.21 | 5 598.89 | 7 586.01 | 0.63 |
| Other industrial products | 135 350.17 | 136 111.55 | 204 827.98 | 16.94 |
| Total | 754 787.56 | 793 760.96 | 1 209 303.71 | 100 |

Source: Department of Small and Medium Enterprises (SMEs) Promotion.

B. Case studies

1. Chatchawal Orchid Co., Ltd.

Chatchawal Orchid Co., Ltd. was set up in 1998 as a manufacturer and exporter of orchids. The company started its business by exporting orchids to the United States through its connection with Thai-owned orchid importers located in the United States. After a few years, the company started

to ship products to United States customers (supermarkets) directly. Since the owner had the experience of training at a Japanese co-operative for nine months, he was able to establish connections with Japanese importers and started to export products to Japan. In 2000, the company expanded its products from fresh orchid cut flowers to fruits and vegetables, according to customer requirements. Japan gradually replaced the United States as the company's main market. Currently, the range of products includes a variety of fresh orchids, such as dendrobium, makara, aranda and aranthere; ornamental plants, such as dracaena, bamboo, snow bush and hoyo; vegetables such as asparagus, mushrooms and okra; and fruits, such as Japanese melons, pineapples, durian, and guava. The company started with small quantities and only one shipment a week; today it makes more than five shipments per week. In the case of okra, the company supplies fresh okra to Japan at a volume of seven tons a week.

Chatchawal Orchid Co., Ltd. is a private limited company with registered capital of US\$ 100,000. However, the company presently generates total annual revenues of US\$ 800,000. One hundred per cent of the company's products are exported to Japan.

As a typical Thai SME, the company started exporting through personal contacts (human networks). However, to expand its market globally, human networks were not sufficient. The company realized that IT was essential to compete on the world market. Therefore, it started to invest in IT for exports. First, the company got technical support from the National Science and Technology Development Agency (NSTDA), a government agency. However, several problems arose in dealing with the government agency, and the company hired a private firm to create a company website (www.qualitygreen.com) and a management system. After the company set up its own e-mail address (orchid@ji-net.com) and website, it was able to contact new customers (mainly supermarkets in Japan) and get their orders. Since customers have some concerns regarding product safety, as in the case of pesticides, the company set up digital cameras at its working site. Customers are able to view the company's production process live on the Internet 24 hours a day, every day. This is how the company is using IT to guarantee the quality of its products to its customers.

2. Victor Packaging Co., Ltd.

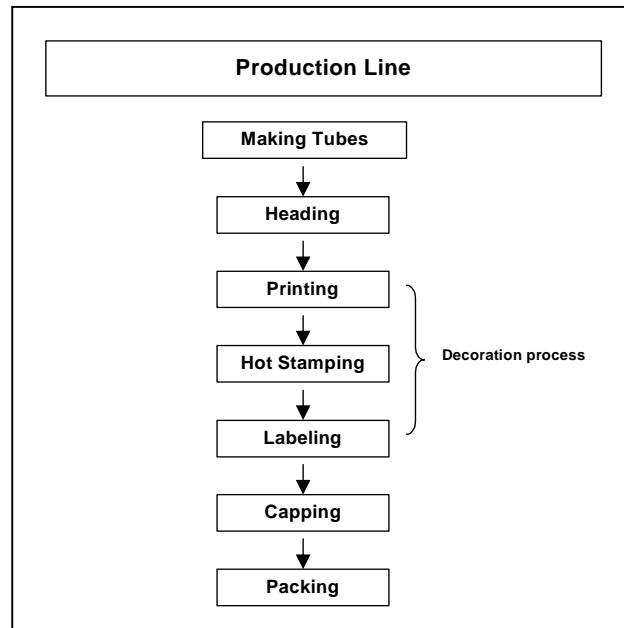
a) Company profile

Victor Packaging has been established since 1975 as the first manufacturer of tube packaging. The company supplies customers both domestically and abroad. About 40% of the tubes made are exported to destinations such as the United States, Indonesia, Malaysia, Japan, the United Kingdom and many more. The products are used in the cosmetics and cleansing industry, and key customers include P&G, L'Oreal Kao, Avon, Shiseido, Pola, Natri-Metrics and Marks & Spencer. The products include two-layer and three-layer low-rigidity standard soft tubes used for toiletries products and industrial uses, medium-hardness tubes used for sunscreen products and products requiring some degree of hardness, and high-hardness tubes to increase the strength of high-moisture barriers used for sunscreen products and oily lubricant additives. The company also produces five-layer standard soft tube and five-layer hard tubes for special applications. Today the company has a production capacity of over 150 million units per year and a product range of 3-ml to 400-ml tubes. The company is located in Nonthaburi province, just a 20-minute drive from Bangkok International Airport. The company employs a total of 150 persons.

Making tubes is the basic process for tube body making. The process requires precise calibration of diameter and wall thickness. Wall thickness may range from two to five layers. Structure requirements depend on the nature of tube contents.

Heading involves two main processes: compression moulding and injection moulding. Head styles and thread designs are available in both standard range and custom made.

**FIGURE 3
PRODUCTION LINE**



Source: Interview by author.

Printing is the process of decoration and may be done by offset silk-screen processes. Tube coating may be either glossy or matte. Hot stamping is a hot-foil blocking process whereby silver or gold blocking are added, increasing the value of the packages. Labelling is also a decorative process and consists of either all wrap-around or partial labelling.

To complete the packaging, cap assembly is required. Basically, there are screw-on closures and snap-on closures. The company also has an in-house cap-making facility. Customized closures can be produced to meet the customer's specific requirements.

Each individual product is checked for defects. The company also sets a quality-control system whereby random checks are conducted on every batch of products throughout the production process.

b) IT use

Since the company is an SME, investing in IT was considered unimportant and expensive. Therefore, in the beginning, the company ignored IT investment. It was not until 1984 that the company owner visited an IT exhibition in Bangkok, Thailand, and became interested in IT use for administration purposes. He decided to buy one computer (Epson) with basic software programmes, such as spreadsheet and word processor, in order to handle basic tasks like letter writing and accounting. One reason the owner decided to buy was that the software programmes came with a training program. The software company managed the three-day training programme for Victor Packaging staff and assumed responsibility for potential problems with the programmes. The company used this IT package for two or three years and realized the importance of IT. Then the company invested more in IT by upgrading to new technologies. The company purchased personal computers, along with the Microsoft Office programme, accounting

programme, production planning programme, Illustrator, and Photoshop. All programmes include training courses, which contribute to the development of company human resources. Today the company is able to produce in-house moulds and dies with computer technology.

Internet is the other IT used by the company. The company started using Internet in 1999. With Internet, it is able to communicate with customers faster and at lower cost. Customers can send the specific design of products with the right colours in three-dimensional blueprints through the Internet. This enables the company to minimize difficulties in designing the structure of products and product decoration to meet customer needs. Since the company focuses on long-term key customers, there is no need to seek new customers. E-commerce is not important for the company at the moment. However, it has put the company profile in PowerPoint and distributes this information by e-mail to new customers. The company website is under construction and will be available soon. According to the owner, the company website is not designed for reaching new customers (because the company is already producing at full capacity for existing customers), but the company wants to have its own website to send the signal to the market that it is equipped with new IT technologies. Thus, having or not having a website can be a sign of a “good” or a “bad” company.

The website is also useful for recruiting new staff. Announcing vacancies through the company website allows it to screen the IT-literate applicants from IT-illiterate ones.

In the production process, the company has recently started using IT. To produce moulds, the company purchased two computerized numerical controller (CNC) machines with CAD and CAM software for designing moulds. With these new technologies, the company is able to increase its productivity and its competitiveness.

However, the shortage of IT officers is the most crucial problem of IT use. Even though the degree of IT use by the company is relatively low compared to larger firms, IT officers who can manage the IT system are needed. The average cost of IT labour in SMEs is higher than in the large firms. In terms of salaries, the SMEs cannot compete with the large firms. High-quality IT personnel have a tendency to move to large firms that pay higher salaries. Therefore, the SMEs are facing a shortage of IT officers and are unable to use IT fully. In the case of Victor Packaging Co., there is only one IT officer, who is in charge of the research and development (R&D) department.

In brief, Victor Packaging Co. represents a successful case of IT use for exports. IT use not only reduces production and marketing costs but it also sends a signal to the market that Victor Packaging Co. is a quality company. IT use also helps the company screen IT-literate applicants from IT-illiterate applicants. However, since on average, the cost of IT use in SMEs is relatively high, and there is a shortage of IT personnel, the company is reluctant to invest more in IT.

3. Nuntiya Care Stone Co., Ltd. (NCS Group)

Nuntiya Care Stone Company began its business in 1997 as a traditional gemstone wholesaler based in Chanthaburi province, located about two and a half hours east of Bangkok. All company products were exported to the United States. At first, the company staff had to take some samples to the customer in the United States directly, which was very costly to the company. Since then, the company has been able to establish its reputation among United States customers as a quality exporter of coloured gemstones from Thailand.

As its business grew, NCS developed its marketing strategies by sending its catalogue directly to its customers. Instead of sending sales staff to the United States, NCS communicated with its customers by fax or long-distance telephone.

In 1998, NCS Group Co., Ltd., began to experiment with online sales and the instantaneous profit that brought resulted in extremely rapid growth. Initially listing five items on

eBay, it added more and more items as sales escalated. By the end of that year, NCS Group Co., Ltd. had thousands of gemstones listed online, and Thaigem.com, the website, was started with only five items of gemstones listed and three persons in charge of e-commerce.

After 18 months of sales through Thaigem.com, the site had had more than one million visitors and total sales of nearly 4 million US\$ a month. The company has also listed products on several well-known auction websites such as eBay.com, Yahoo! Auction, Amazon.com and Gemkey.com.

Today, the company lists over 1.6 million individual items online. Starting with only six gem types, Thaigem.com used to purchase most of its gems in Chanthaburi. Today, Thaigem.com sources gems from 60 countries, stocking over 400 gem types. Thaigem.com's success and large online market share has allowed it to rapidly diversify into related areas such as jewellery, carvings, beads, tools and more.

In 2001, the company opened its new Gem Centre. The 28,000-square-foot centre is located inside a three-story, air-conditioned building. It is completely wired for Gem TV, a cable station developed by Thaigem.com to bring news, edutainment and gem-related interviews and real-time online trading information. Buyers' requirements are entered into the in-house Internet terminals and are then transmitted directly onto Gem TV, which is also piped into 9,000 gem factories across Chanthaburi via CTV, a local cable TV network.

The main barrier to trading online is losing money. Therefore, the company decided to implement a connection with Escow.com so that customers can approve their purchases before Escow releases their money to Thaigem.com.

Fast delivery is one of the company's successes. After a transaction has been completed, products are delivered to customers within 24-72 hours. All products are refundable with no questions asked.

Price competitiveness is one success factor for online trading. Thaigem.com is able to cut prices to as low as four dollars per carat for certain stones. The company can cut prices because it buys everything in bulk straight from the cutters in full quality range.

As mentioned earlier, the company started its online sales with only three IT staff. The company developed its own applications using JAVA, JAVA Script C, and ASP, working with an Oracle database.

IV. Government policies

A. IT policies

In 1992, the first information technology policy-making body, the National Information Technology Committee (NITC), was established. The main objective of this committee is to promote the development and use of IT in Thailand for the economic and social well being of the country as a whole. The committee is chaired by the Prime Minister and is made up of high-ranking officials from various government organizations, industry representatives and individual experts. Over the years, NITC has set up many subcommittees, each to take a particular area of responsibility, such as the subcommittee on drafting electronic transaction legislation, the subcommittee on drafting computer crime legislation, the subcommittee on IT for the disabled and disadvantaged, the subcommittee on IT use in the public sector, the subcommittee on IT human resource development, the subcommittee on IT policy planning and Thailand's Internet policy task force, just to name a few.

In October 2002, the Ministry of Information and Communications Technology was instituted. This ministry is by no means intended to be a replacement of NITC. Rather, these two bodies are complementary to each other and will work closely together. That is, NITC will maintain its role in IT policy making, while the ministry will be responsible for converting policies into actions and practices. The Ministry of IT is indeed the "champion" for IT matters that Thailand has been longing for. By having this ministry in place, Thailand can effectively expedite the policy-to-action conversion process, orchestrate IT-related activities of various agencies so as to eliminate unnecessary redundancy, maximize efficiency and effectiveness and ensure adequate allocation of resources.

However, the establishment of the Ministry of IT has led to changes in the structure of NITC. The changes, which are aimed at creating a link between the ministry and NITC, were approved by the Cabinet in January 2003. The Minister of IT was appointed as Vice-Chair and the Permanent Secretary for IT was appointed as Secretary. Furthermore, there were some changes in the member bodies. Also, the name of the committee itself was changed from the National Information Technology Committee to the National Committee on Information Technology and Communications.

During the past decade, NITC (as it was previously called) has worked on several policy matters. Its work includes drafting IT-2000, Thailand’s first national IT policy, and subsequently IT-2010 and the five-year master plan. The content of these policies is discussed in the following sections.

1. IT-2000: the first national IT policy

In February 1996, Thailand’s first national IT policy, IT-2000, which was proposed by NITC, was approved by the Cabinet. IT-2000 was a five-year policy framework spanning from 1996 to 2000. In essence, the policy addressed three foundations or fundamental prerequisites that must be in place to enable Thailand to fully take advantage of IT in order to become a key sustainable economic power in Southeast Asia and, at the same time, to provide social equity and prosperity for all. These three fundamental prerequisites are:

- National information infrastructure (NII);
- A well-educated population and adequate IT human resources;
- A “dare to dream and resolve to act” commitment.

These critical prerequisites are translated into three national agendas, as follows:

- **Agenda 1: Invest in an equitable information infrastructure to empower human ability and enhance quality of life.**

Without a doubt, an equitable information infrastructure is a critical prerequisite that Thailand should have before the potential of IT can be fully and even-handedly realized. IT-2000 emphasized the importance of an information infrastructure that is universally available and accessible to all citizens at an affordable cost regardless of location. The term “information infrastructure” used in IT-2000 refers not only to nationwide telecommunications facilities but also to related equipment and technologies including, among other things, telephones, fax machines, computers and peripherals, and software. IT-2000 described telephone services and nationwide high-speed telecommunications backbone as the most basic building block that must first be put in place. This infrastructure-building agenda resulted in two strategic directions, which were, in turn, converted into four policy recommendations, each directed by a specific set of goals:

a) Strategic directions

- Wire rural Thailand as necessary to support the government’s main policies aimed at creating jobs and distributing wealth to rural regions of the country, opening up new opportunities and ensuring equality in education and personal development and creating more open and equal access to basic public services.
- Reform the Telecommunications Act to make it more relevant to modern technological and global business environments.

To accomplish the above two strategic directions, IT-2000 proposed the following:

b) Policy recommendations

- (i) Embark on a five-year Rural Thailand Communications Expansion and Modernization Programme.
 - Install telephone lines for at least 12,000 remote tambons and villages by investing approximately 6 billion THB a year for five consecutive years, in order to expand service coverage to the whole country by the year 2000.

- Provide one public telephone booth to every village with more than 20 households and increase the public telephone penetration rate in the rural area to more than 2:1000 population.
- Provide data transmission services to business entities of all sizes in both urban and rural areas throughout the country with a minimum speed of 64 kbps.
- (ii) In all future large-scale communications projects, the government must ensure that a reasonable share of the benefits are extended to the rural regions.
 - For the six-million-telephone-line expansion project described in the Eighth National Economic and Social Development plan and other projects, the government must ensure that an adequate share is allocated to satisfy the needs of residents of remote rural areas.
 - All projects intended for the rural regions must reflect the actual needs of all citizens by giving them an opportunity to participate and have their voices heard.
- (iii) Establish an independent telecommunications regulatory body.
 - Through legislative reform, establish an independent telecommunications regulatory committee to take charge of facility and pricing regulations.
 - Encourage participation from the private sector in information infrastructure building and service expansion and promote open competition.
- (iv) Review and reform existing telecommunications acts and other related legislation.
 - Establish a flexible telecommunications regime that is suitable for the current environment where technologies are changing at a rapid rate and global competition is intensified.
 - Set up the legal infrastructure necessary to promote IT utilization among people at large.
- **Agenda 2: Invest in people to build a literate populace and an adequate information technology human resource base**

Without a doubt, having a national information infrastructure put in place is necessary but not sufficient for a country to fully realize the potential benefits of information technology. Infrastructure must, by all means, be coupled with useful and relevant content and applications that all people can use. Thailand cannot, and should not, rely largely on imports for content and applications if it wants to have a sustainable economy and society. In other words, local IT manpower must be developed and nurtured to promote local creation of both content and applications.

In addition, Thailand also needs educated, IT-literate citizens who have the capability to take full advantage of technologies, content and applications brought to them by the National Information Infrastructure (NII). Education and knowledge will bring more consumption, which in turn will stimulate infrastructure expansion. Infrastructure expansion will then provide more educational opportunities, for example through distance learning, to the people. Apparently, human resource development is one critical factor for success. This human resource investment agenda is translated into two strategic directions and three policy recommendations, as discussed below.

a) **Strategic directions**

- Accelerate the supply of IT manpower at all levels to eliminate the current critical shortage and to meet the expected huge growth of demand in the future.

- Make IT an integral tool in education and training at all levels. The use of IT in education must not be restricted to science and technology but must include the humanities and the arts as well.

The following three policy recommendations, each with its specific set of goals, are derived from the directions mentioned above.

b) Policy recommendations

- (i) Implement a National School Information Action Programme:
 - Provide microcomputers to every public school throughout the country. Ensure a minimum computer-to-student ratio of 1:80 for primary students and 1:40 for secondary students.
 - Continuously invest at least 1 billion THB annually on hardware, software and IT training for schools to effectively develop, operate and maintain their IT capability. A portion of this investment must be used to provide at least 30,000 microcomputers to schools, some with network accessibility.
 - Connect all universities, colleges and then schools to ThaiSarn or other Internet networks to enable students, teachers and faculties of various educational institutions to communicate and share information resources among themselves as well as with other sources inside and outside of Thailand.
- (ii) Establish a National Interactive Multimedia Institute to facilitate the development of education courseware and application software:
 - This National Interactive Multimedia Institute will take responsibility for the design, development, outsourcing, dissemination and distribution of interactive multimedia technologies, courseware and interactive Computer-Aided Instruction (CAI)/Computer-Aided Learning (CAL) packages to schools. The responsibility will also include necessary licensing and commercial package adaptation.
 - Provide an annual budget of at least 400 million THB for technology and courseware package development. The content presented should reflect diverse local wisdom and knowledge and emphasis should also be placed on promoting a localized information service industry.
 - Disseminate these courseware packages throughout social sectors, within and outside schools, for both traditional education and professional and specialized training. Disadvantaged/underprivileged schools should receive special technological and managerial assistance to enable them to make the most effective and efficient use of their limited resources.
 - Make full use of large, resourceful and centrally located schools, colleges and universities by establishing long-distance learning facilities based at these institutions.
- (iii) Intensify IT manpower production at all levels:
 - Increase the number of IT engineers and technicians. The number of telecommunications and computer professionals must be doubled within five years.
 - Improve IT curricula and materials used in IT courses at colleges and universities.
 - Establish effective measures to retain and recruit IT professors, including through recruitment from overseas. Immigration laws and regulations will need to be modified to support this goal.
 - Encourage private-sector participation in the provision of secondary school and college education, particularly for IT education and training.

- **Agenda 3: Invest for good governance**

The “dare to dream and resolve to act” mission can never be accomplished without good governance in action. Although the determination to move the country forward by means of IT requires strong participation from all parties, the government still has a key role to play in making that happen. The government should be a prime moving force in both the NII-building and the human-resource-development agendas to attract involvement from the private sector. Furthermore, the government should anticipate any potentially negative side effects that might result from the changes brought about by IT, and it should set up all necessary preventive and defensive mechanisms. IT should be an equitable social and economic tool for enabling not only a particular group but also all people. In other words, the government should ensure that IT results in a decrease, as opposed to an increase, in social and economic differences.

Equally important is that the government should also fulfil its responsibility of being a role model to society by making effective use of IT across all governmental agencies for the purpose of improving operations and services. Perceivable improvement of government services enabled by IT will surely be an effective agent that will create a positive attitude toward IT and IT use. IT-2000 indicated two strategic directions, coupled by four policy recommendations, for this “invest-in-good-governance agenda”. The directions and policy recommendations, as well as a set of goals for each policy, are described below.

a) Strategic directions

- Seize and make fuller use of new IT opportunities offered by all public agencies in order to deliver efficient, high-quality services to all citizens, thereby setting a good example as an active IT user to society, while at the same time substantially improving the effectiveness of governance.
- Provide top priority support, particularly to SMEs everywhere, in order to build a strong thriving local information industry from hardware, software and content to a whole range of information and other necessary support industries.

To achieve the above two strategic directions, IT-2000 proposed the following four policy recommendations:

b) Policy recommendations

- (i) Launch a nationwide Government Information Programme:
 - Allocate an annual budget for government IT investments, at a minimum level equivalent to 3% of the annual budget spent on total personnel expenditure. Two thirds of this budget should be spent on the provision of computers, network devices, software and databases, while one third should be spent on government human resource development and training in the utilization of IT and maintenance of databases.
 - Allocate the above budget to various public agencies as evenly as possible, meaning that the amount received should be in proportion to the agency’s annual personnel expenditure. This budget should be considered separate from any large IT investments the Cabinet may grant to any particular agencies on a case-by-case basis.
 - Allocate an annual budget of at least 200 million THB for the development of common software applications, such as applications for accounting, human resource management, e-mail, public information search, online tax services, registration services or any other public services.

- Provide as many electronic public service kiosks, for example by using ATMs, as possible to ensure equal access to public services for all people.
- (ii) Make IT planning an integral part of the annual government budgeting exercise and IT policy research an ongoing effort. Promote continuous policy research by NITC with the following objectives:
- Identify needed directions and policy decisions to assist public agencies in their IT planning;
 - Gain in-depth understanding of the social consequences of IT, particularly negative ones, in order to promptly take preventive and/or defensive actions;
 - NITC, along with the Budget Bureau, will set up comprehensive guidelines to direct all government agencies in preparing an IT budget plan and proposal;
 - Consolidate all public departments' plans into the overall National IT Plan, which will describe in detail each department's goals and objectives, budget allocation, activities to be carried out, previous year's results, problems and obstacles and recommendations. Every department should submit a rolling, three-year-forward procurement plan indicating its estimated IT expenditure, planned activities and expected outcomes.
- (iii) Support the development of a strong local information industry:
- Ensure continuous and adequate investment in R&D and technology diffusion in the area of hardware, software, information networks, multimedia, manufacturing technology, provision of services and applications.
 - Encourage strong participation from the private sector in all aspects of IT development, including development of multimedia technologies, IT R&D, technology diffusion and development of human resources by providing tax/financial incentives, financial resources and outsourcing of government IT projects to the private sector. The government may also promote IT utilization within the private sector.
 - Involve local information service industries in major software development and IT training projects of the government. To ensure transparency, fairness, quality and compatibility, every government agency should adopt a standard system for their development practices.
 - NITC should closely monitor local and global technological trends in order to propose appropriate strategies and measures for promoting a domestic information industry.
 - Strengthen public organizations, such as NECTEC, in order that they may become information resources and forums for exchange of knowledge and experiences within and across IT manufacturers and user groups in both the public and the private sectors.
- (iv) Promote and support electronic means for citizens and businesses to interact or trade with the government, among themselves or with the world community:
- To enable Thailand to become a regional trading and manufacturing centre, the government should speed up the adoption and utilization of Electronics Data Interchange in international trade by facilitating development of EDI standards and promoting the use of EDI in major areas, such as public administration, manufacturing, finance, trade and transportation.
 - The government should consider setting up a Government Information Network (GINet) with an emphasis on enhancing the effectiveness and efficiency of government and improving public services through electronic means.

2. The impact of IT-2000

After IT-2000 ended, NITC requested an independent group of researchers to conduct an evaluation study. The purpose of this study was to compare the actual performance of the country within the IT domain against the proposed goals expressed in IT-2000. In sum, the research results indicated that Thailand made significant progress within a few years with respect to information infrastructure. As a result, the country's telephone penetration was increased tremendously. The telephone line service coverage expanded to all tambons around the country, so that public telephones are now available in all villages. Through optic fibre cable and microwave technology, the Telephone Organization of Thailand (TOT) now provides communication services with a minimum speed of 64 kbps.

In addition, there has been a significant change in the regulatory and legal infrastructure. In February 2000, the Organization to Allocate Radio Frequency and Regulate Television Broadcasting Act was enacted. This Act mandates the establishment of an independent telecommunications regulatory body called the National Telecommunications Commission (and also a broadcasting regulatory body called the National Broadcasting Commission). The actual set-up of this committee is still an ongoing process, but it will soon be completed. Other laws in addition to the Organization to Allocate Radio Frequency and Regulate Radio and Television Broadcasting Act have also been developed. The Electronic Transaction Act was enacted in April 2001, while the other four IT-related laws —on universal access, computer crime, data protection and data privacy— are in process.

With respect to investment in people, progress has also been made. Research conducted by the Ministry of Education indicates that by the end of 1998, the computer-to-student ratio was 1:84 at the primary school level and 1:53 at the secondary school level (compared to IT 2000 targets of 1:80 and 1:50). Also, by the end of 2000, almost all universities were connected to ThaiSarn, while more than 3,000 schools were connected to SchoolNet. On the other hand, the plan to establish the National Interactive Multimedia Institute has not been implemented, largely because of budget constraints. Though the Institute has not been founded, many multimedia educational and CAI development projects have been carried out by several entities. In addition, in August 1999, the Education Reform Act was passed. This reform clearly expresses the importance of IT in education. At present, however, the demand for IT manpower in Thailand is still greater than the supply. Clearly, this disparity between demand and supply needs to be resolved.

Regarding the third agenda, investing in good governance, there has also been perceivable progress. In 1999, for example, based on an NITC proposal, the Cabinet requested every public ministry and department to appoint a high-ranking official (i.e., deputy permanent secretary for a ministry or deputy director-general for a department) as the Chief Information Officer (CIO) of the organization. The responsibility of a CIO includes drafting the organization's IT master plan and translating relevant national IT policies into organizational actions. In recent years, there has been a visible improvement in IT utilization in the public sector for both internal operations and public services. Many of the public services are now available online. GINet was also established to provide secure network services for government organizations. Also, an agency called Software Park was set up to promote and support the Thai software industry.

In sum, after the release of IT-2000, Thailand made great strides in developing information infrastructure, human resources and good governance. It appears, however, that progress in the areas of human resources and good governance has been slower than in the building of infrastructure. In the case of the human resources and good-governance agendas, although obvious progress has been made, a number of goals have not yet been achieved.

3. From IT-2000 to IT-2010

After IT-2000 successfully provided a framework for subsequent policies and projects, IT-2010, a national IT policy framework covering a ten-year period, was drafted and approved by the Cabinet in March 2002. As discussed in the previous sections, IT-2000 focused on three fundamental prerequisites that must be put in place; IT-2010, however, extends the focus to include not only the required foundations but also the application domain in which IT is to be utilized. More importantly, the long-term vision of IT-2010 is not on the technology itself but the idea that use of IT can lead to the sustainable social and economic development of the country.

The long-term vision of IT-2010 is to bring Thailand into a knowledge-based economy and society, an economy and society in which creation, collection, dissemination and utilization of knowledge are considered major tools of economic development. To make this vision a reality, IT-2010 identifies three guiding principles that must be followed:

- Invest in knowledge-based human capital
- Promote innovation
- Invest in information infrastructure and information industry promotion

In addition, three measurable goals are targeted:

- To increase national technological capability, expressed in the United Nations Development Programme (UNDP) Technological Achievement Index, from being in the “dynamic adopters” class to the “potential leader” category.
- Using the International Labour Organization (ILO) classification standard, to increase the proportion of “knowledge workers” from 12% (as of 2001) to 30% (to match the average knowledge-worker proportion of OECD member countries for the year 2001).
- To increase the proportion of knowledge-based/knowledge-intensive industries, adopting OECD classification standards, to 50% of the overall economy (to match the average knowledge-based industry proportion of OECD member countries in 2001).

As mentioned previously, in addition to the fundamental principles, IT-2010 also identifies specific application domains in which IT should be utilized. These application domains are called “flagships”, and they are described in the following paragraphs.

- **Flagship 1: E-government**

The e-government flagship focuses on the utilization of IT in the public sector, which includes central, provincial and local government organizations. The long-term objective is to develop good governance that will help strengthen the overall competitiveness of the country and improve quality of life for all citizens. Two specific goals are associated with this flagship:

- By 2004, government internal administration (back office) must be fully computerized.
- By 2005, at least 70% of public services (front office) will be offered online and 100% will be online by 2010.

- **Flagship 2: E-commerce**

The overall objective of this flagship is to strengthen the competitiveness of Thai industries by means of electronic commerce. According to IT-2010, primary attention should be placed on e-commerce for exports, e-commerce for trade and services and e-commerce for domestic consumption. IT has an extremely critical role to play in ensuring the equal distribution of benefits to the people at large.

- **Flagship 3: E-industry**

This flagship attempts to promote the utilization and development of IT in the private sector so as to enable it to become a knowledge-based industry by 2010. In doing so, IT should not be utilized exclusively for any particular function, but rather all functions should be interconnected, including office administration, production, logistics and marketing.

- **Flagship 4: E-education**

The objective is to develop and strengthen human capital at all levels to enable the country to become a knowledge-based society. Five specific goals are associated with this flagship:

- By 2010, all schools should have access to a computer-based network and be able to effectively make full use of the network for educational purposes.
- By 2006, at least 10% of instruction conducted in educational institutions should be assisted by computers and/or other information technologies.
- Educational institutions should supply the industry with adequate human capital, including computer, software, telecommunications and IT scientists, engineers and industrial innovations.
- Innovation for education itself should be promoted to ensure quality and compatibility between education and industry requirements. In addition, IT curricula should be developed in a way that will stimulate application development and technology transfer to industry.
- By 2010, 50% of the workforce should receive some type of professional skills training through an IT network.

- **Flagship 5: E-society**

E-society refers to the effort to use IT for improving quality of life, developing a knowledge-based society and, most importantly, narrowing the digital divide. Three specific goals are indicated:

- By 2010, each and every Thai citizen will have equal access to quality IT services at affordable cost. This IT accessibility will, in turn, lead to improvements in job opportunities, quality of life and environment. In addition, content development should be promoted, with emphasis on the information requirements of the local people. At least 10% of the content created should be done locally.
- Local and older-generation knowledge and wisdom should be accumulated, articulated, treasured and augmented through modern knowledge and technology as a basis for national and international knowledge.
- By 2010, at least 50% of all villages in Thailand should be knowledge-based societies where knowledge is continuously developed, the economy is strong, the society's members are debt-free, quality education is provided to all, good public services are available, crime does not exist, and proper care is provided for senior citizens.

IT-2010 clearly indicates the need to ensure synergy in the development of the five flagships. For example, resources should be shared to reduce investment redundancy, demand-supply relations among the flagships should be created to keep exports to a minimum, physical and information networks should be built to urge close collaboration, and cooperation within and across public and private sectors should be encouraged.

The three guiding principles described above and the five flagships are intertwined and should all be viewed in the context of the big picture. For example, the development of e-education will have a positive effect on human capital development. Likewise, investment in infrastructure will have a positive effect on all flagships. More importantly, the principle of

promoting and supporting the local IT industry must be given high priority. Otherwise, the development of the five flagships might possibly lead to a higher negative export balance.

In addition to the three guiding principles and the five flagships, IT-2010 also outlines certain so-called “key success factors” that must be included in all IT policy development and implementation. These key success factors are follows:

- a) Content and knowledge creation must receive more or at least equal attention in comparison to infrastructure and hardware.
- b) Continuous human resource development is a must. This should be carried out through both traditional (in-school) and non-traditional education, including short-term training to improve the skills of the workforce so that they can become knowledge workers.
- c) Digital-divide problems must be tackled by creating digital opportunities for all. It is important that all dimensions of the divide, i.e. infrastructure divide, literacy divide, cultural divide and management divide, are recognized.
- d) IT leadership must be emphasized and included in IT policy development and implementation at all levels, starting with the Prime Minister in his role as the chair of the national IT policy-making body.
- e) The linkage between universal access policy and telecommunications and broadcasting policy must be ensured. Technological convergence should also be considered to optimize the utilization of resources.

4. IT master plan (2002-2006)

As previously mentioned, IT-2010 provided a policy framework to guide Thailand during the first decade of the twenty-first century. In addition to IT-2010, NITC also drafted a five-year plan called National IT Master Plan 2001-2006, which identifies visions, missions, objectives, strategies and plans and establishes a time frame for the first five years of IT-2010. This IT Master Plan was approved by the Cabinet in March 2002. It is intended to provide guidelines to be followed by government agencies and other related organizations in drafting their five-year IT strategies. Thus, the IT development of all related parties will be well coordinated.

SWOT (Strengths, Weaknesses, Opportunities, Threat) analysis was adopted to identify strengths, weaknesses, opportunities and threat in Thailand in relation to IT development and utilization. Based on these findings and other related information, national IT strategic agendas for the next five years were drawn up, as follows:

- **Strategy 1: Elevate Thai IT industry to become a regional leader**

Goals:

- By 2006, expand the software industry value to 90 billion THB per year, with 75% contributing to exports.
- By 2006, have at least 60,000 software developers; 30% of this workforce should be certified developers.
- By 2003, establish a Software Industry Promotion Agency.
- By 2006, a government budget with a minimum cumulative amount of 65 billion THB should be spent on software development projects with a view to creating a market and opportunities for the local software industry.
- Provide open-source software with a value of at least 50% of the total software market.

- **Strategy 2: Utilize IT to enhance the quality of life and Thai society**

Goals:

- By 2005, at least seven telephone lines with a minimum speed of 32 kbps should be provided to every community throughout Thailand.
- By 2006, broadband services should be provided to every province at a reasonable price.
- Reduce domestic leased-line prices to reflect advances in technology.
- By 2006, at least 70% of the disadvantaged and underprivileged population should have access to IT services.
- By 2006, an IT service centre should be established in every sub-district.
- By 2006, Thailand should have at least 300,000 IT-literate teachers; 70% of them should be in the provinces.
- By 2006, a radio broadcast station should be set up in every province, and community radio programmes should also be provided.
- By 2004, each sub-district should be able to publicize locally produced content.
- An organization responsible for IT security should be set up.

- **Strategy 3: Reform and enhance R&D for IT development**

Goals:

- The government should ensure that the public and private sectors together invest in IT research, with the aggregate amount being equal to or greater than 3% of the total IT industry value.
- The government should provide a large software development project requiring at least 100 man-years of work, and this project should include research and development activities amounting to no less than 5 billion THB by 2006.
- By 2004, at least 80% of PC value and at least 50% of software value consumed within the country should be locally developed.
- By 2004, at least 70% of Thai software developers should be working in network computing and/or Web services.

- **Strategy 4: Human resource development**

Goals:

- By 2006, at least 70% of the workforce should have access to IT and 40% should have access to the Internet.
- By 2006, at least 90% of all students should be IT literate.
- By 2006, the number of knowledge workers should have increased by at least 150,000 persons.

- **Strategy 5: Enhance entrepreneurial spirit and leadership to strengthen national competitiveness**

Goals:

- By 2006, at least 600,000 persons (or 1% of total national workforce) should be employed in IT-based industries.
- The market value contributed by e-commerce should be increasing at a minimum rate of 20% annually.
- By 2006, the economic contribution of IT-based industries should represent at least 10% of the overall national economy.

- **Strategy 6: Promote the utilization of IT in SMEs**

Goals”:

- By 2006, at least 100,000 SMEs should make use of IT for back-office activities.
- By 2006, 40% of SMEs should make use of IT for their core business activities.
- The number of entrepreneurs in the supply chain should be increasing at the rate of 10% annually.

- **Strategy 7: Encourage the use of IT in public administration and services**

Goals:

- By 2006, all government agencies within a ministry should be able to exchange information and communicate electronically regardless of their location in the country.
- By 2006, every ministry should be able to use electronic means to integrate all relevant data from various locations throughout the country.
- By 2006, at least 60% of government agencies should be using full IT management.
- By 2006, at least 90% of public service transactions should be offered online.
- By 2006, at least 50% of government agencies should be able to provide electronic services for State fee payments in all provinces.
- By 2006, ministries should exchange information to provide at least 100 public services online (e-citizen).
- By 2006, at least 100 billion THB worth of government procurement transactions should be conducted online (e-procurement)
- IT security policies and regulations must be put in place.
- By 2006, basic software applications should be available for government agencies.

Of these seven strategies, three have been included in national top-priority agendas, namely, IT industry development (software industry in particular), human capital development and IT utilization in the public sector. It is obvious that these three strategies are closely related. For example, to strengthen industry, quality human capital is needed. Likewise, IT utilization in the public sector will result in a significant expansion of the local IT market, which in turn will encourage further industry development and so on and so forth. At present, much has been done to implement these three strategies. For example, the plan to set up the Software Industry Promotion Agency has been executed, and this agency should be operational very soon. Furthermore, the services provided by the Visa Service Centre operated by the Board of Investment (BOI) have been expanded to accommodate all visa/work permit requests for IT knowledge workers (whether or not they are employed by BOI member organizations). After this new regulation is fully implemented and all documents have been filed, IT knowledge workers’ visas/work permits should be granted within a few hours.

Over the past decade, Thailand has made significant progress in regard to IT. With very strong leadership and enthusiasm at the top, together with the establishment of the IT Ministry – appointed as the IT champion – there is no doubt that Thailand will make further progress, technologically, socially and economically, in this digital era.

B. Policies in support of SMEs

1. Ministry of Industry and the promotion of SMEs

The most important state agency directly involved with SMEs is the Ministry of Industry. A law on the promotion of SMEs was proposed by this Ministry in 2000 and was promulgated during that same year. The three major components of this law are as follows:

- The establishment of the Office of SMEs Promotion, which reports directly to the Executive Board of the Office of SMEs Promotion. This Office acts as a liaison, or coordinating unit, in drawing up a major plan of operations for the promotion of SMEs at all levels of government agencies, state independent promotion units and relevant private organizations. It also manages and administers SMEs promotion funds.
- Granting of SMEs Promotion Funds. These include loans made to newly set-up SMEs, as well as loans for the improvement and expansion of existing private SMEs, R&D projects, technical and financial consultations, and seminars and workshops.
- Formulation of a major promotion strategy plan and policy. This five-year (2000-2005) plan was formulated by the Ministry of Industry in the year 2000. Seven strategies to increase the strength and efficiency of SMEs have been laid down as follows:

Strategy 1: To increase the operational efficiency of SMEs in terms of technological and managerial capacity;

Strategy 2: To improve the human-resources development and entrepreneurial skills of SME operators;

Strategy 3: To create and expand marketing opportunities for SMEs;

Strategy 4: To increase the capacity of both public and private financial institutions and increase the availability of funds granted to SMEs;

Strategy 5: To improve the existing business environment;

Strategy 6: To support the development of small-scale enterprises and community enterprises in both rural and urban areas;

Strategy 7: To set up networks and clusters of SMEs.

In order to implement all these strategies, the government has already provided several fundamental bases for the accomplishment and materialization of each strategy, as follows:

a) Financial support base for SMEs

(i) In the year 2000, loan totalling 35 billion THB loan was raised for the promotion of SMEs, with the cooperation of the Ministry of Finance working through various state financial agencies, such as the Bank for Agriculture and Agriculture Cooperatives (BAAC) and the Industrial Finance Cooperation of Thailand (IFCT). In 2001, the government approved a total amount of 45.3 billion THB for loans to SMEs and another 4 billion THB as down payment for loans provided to SMEs.

(ii) A joint loan programme with the Siam City Bank has been established. A similar effort has also been made with the Bangkok Bank.

(iii) Similar financial contacts have also been made with domestic financial institutions and international finance corporations, such as the Asian Development Bank, the Overseas Economic Cooperation Fund and others.

b) Increase the capacity of SMEs

(i) The Institute of Small and Medium Enterprises Development (ISMED) was set up in 1999 as an independent institution responsible for enhancing and increasing the capacity of both existing entrepreneurs and potential new entrepreneurs. This Institute provides support to those two groups through a process of learning by experience, as well as consultation and support with research information. The Institute is operated as a collaborative effort of the Department of Industrial Promotion of the Ministry of Industry and eight state universities scattered throughout the country, notably Chulalongkorn University, Thammasat University, Khon Kaen University and Chiang Mai University.

(ii) An Industrial Restructuring 5-Year Plan (1998-2002) was also drawn up. This entailed collaboration between the public and private sectors to improve and increase industrial capacity in the production and distribution process, as well as in manpower utilization and industrial equipment and technology.

(iii) Industrial Settlement Zones were set up in order to provide the public infrastructure needed for the promotion of SMEs and other basic facilities. Standardization of land use, factories and industrial assemblies will be implemented to meet demand from various types of SMEs, such as food production, textiles, wood crafts, furniture factories, and certain public services.

2. Institute for Small and Medium Enterprises Development (ISMED)

The Institute for Small and Medium Enterprises Development (ISMED) was established with financial support from the government on April 5, 1999, under the supervision of the Ministry of Industry. Its main purpose is to develop and strengthen the skills and capacity of SMEs to become viable and sustainable. In particular, its purposes are:

- To act as a primary centre for supervising and supplying information on where and what kind of assistance entrepreneurs seeking help can gain access to. This is known as the SMEs Service Centre Programme;
- To provide further services in connection with:
 - Training courses in administration, management and technology;
 - Supervision and consultation;
 - Business information services;
 - Setting up SMEs networks and clusters to overcome technical and human resources problems and to enhance business performance.

To date, ISMED has provided a wide range of services to those who have just recently started up businesses, as well as to those who have already set up SMEs. Services offered include:

a) SMEs service centre programme

This is a service and information centre aimed at helping SME entrepreneurs obtain closed-circuit information, as well as to gain access to information and services of various public and private service agencies (both in connection with promotion and development of enterprises and with supervision and administration to solve specific problems). The programme is intended to be the first primary centre to assist those entrepreneurs who seek help. Other services, such as business transactions, business correspondence and business partnership, both within and between countries, are also included.

b) Training programmes

Specific training programmes are provided directly to target groups so that trainees can gain skills and knowledge pertaining to their specific businesses in a short period of time. There are short, medium and long-term training courses under a wide range of topics, as follows:

- General management: marketing, personnel management, finance, accounting and business tax;
- Business operation: a variety of professional training courses, e.g. hotel management, restaurants and food shops, and others;
(closed-circuit training courses)
- Specific business management: production, marketing and services, and agribusiness;
- Specific business operations: shipping and export, commercial electronics, etc.;
- Business facilities: business plan, negotiating and bargaining;
- Promotion of new entrepreneurs: training of young-generation entrepreneurs, venturing in new business, business adjustment in periods of economic downturn, and community business enterprises.

c) Advisory and supervision programme

Services include solving business problems and enhancing the business enterprises, including:

- Introductory supervision by full-time Institute specialists with a view to making an in-depth analysis so as to improve the enterprises or refer them to affiliated agencies (more than 40 agencies) for further guidance and assistance;
- Supervision in connection with business planning, as in connection with obtaining alternative financing from private and public financing agencies, or to improve the existing business system;
- Supervision in connection with business decisions and improvements to facilitate market competition;
- Supervision on special matters, such as packaging, market promotion and cost reduction;
- Business clinic for small enterprises conducted by a group of specialists and covering a variety of issues.

d) Information services

The Institute provides a wide range of information through the Internet, fax, and telephone numbers for public inquiries. Information provided covers the following:

- Information is provided on buying and selling and/or helping enterprises advertise their products and contact potential customers seeking information on specific products and services. The Institute acts as an intermediary, providing data on more than 100,000 products and lists of interested entrepreneurs.
- General information on technical matters concerning SMEs is covered, including rules and regulations, tax information and advice on how to get started in business. Recommendations on how to run a successful business are offered, as well as ample information on successful case studies.

- Information on all agencies concerned with SMEs is provided. The Institute supplies all necessary contacts with agencies involved with SMEs. Letters of introduction can be provided to those who need further information and assistance from relevant agencies.

e) Business upgrading services

Development and achievement of business firms are crucial to SMEs, and this service is provided under the responsibility of ISMED. The Institute is ready to help upgrade a business from a shop operating at home to a mini-mart, for example. This includes supervision on management of the store and purchasing of products, as well as training of employees. Introducing other relevant agencies, such as financing agencies, to help with further development, is not disregarded. Additionally, with regard to SME networks and clusters, the Institute also provides assistance in searching for new prospects on the international market, finding partner companies abroad as well as marketing channels to export products to foreign countries. In order to improve the level of specialization and creation of demand, the Institute cooperates with local SMEs in setting up networks and clusters to strengthen their cooperative arrangements.

f) Other services

The Institute for Small and Medium Enterprises Development (ISMED) promotes activities of SMEs by organizing SMEs Day at least once a year, at which time entrepreneurs can get together and exhibit their products. More than 100,000 items of goods and products are on display in this exhibition. In addition, radio and TV programmes on SMEs are also widely broadcast and televised. This service also includes newsletters and other published materials relating to SMEs.

As mentioned above, ISMED has also established connections with universities in Bangkok and in four other regions of the country to represent them in the activities and services described above. The Institute therefore is easily accessible to all entrepreneurs in every part of the country.

3. Office of SMEs promotion (OSMEP)

As mentioned above, the Office of SMEs Promotion (OSMEP) is a coordinating body chaired by the Executive Board of the Office of SMEs Promotion. Given its coordinating and facilitating functions, it is a corporation, not a governmental agency or public enterprise; this enables it to carry out a broader range of tasks and perform its work more expeditiously. It has the benefit of access to governmental information and cooperation, and can also work in partnership with other corporations. This subsection describes its present crucial roles.

At present, the important tasks of OSMEP include promoting international marketing and operating a venture capital fund. Both tasks are bound to foster and increase competitiveness of SMEs. The ongoing responsibilities include developing a national information infrastructure of SMEs and coordinating international cooperation on aspects relating to SMEs. These are supportive of and complementary to the first two, but they provide payoff in the long-run and keep SMEs development sustainable.

a) Promotion of international marketing

In general, Thai SMEs export relatively less than they sell on the domestic market. This is because exporting requires more competency owing to the fierce competition in prices and quality of products and tariff and non-tariff barriers from importing countries. Forty-three per

cent of medium-sized manufacturing enterprises export while only 10% of small businesses do. The enterprises exporting the highest volume are service companies, and the ones with the lowest volume are trading companies.

Support and promotion policies for exporting SMEs address a number of difficulties and problems. International marketing problems may be classified in three categories. Firstly, most SMEs lack marketing knowledge, especially concerning the international scene. They are not competent in finding and creating export channels or researching international markets. Secondly, international transportation may be a heavy burden for exporting and hence, for competitiveness. Most SMEs must depend on many stages of transportation, and this increases the cost of the product. Thirdly, the lack of financial capital, qualified human resources and managerial skill when dealing with strong international competition is also a problem.

To address the difficulties with exports, OSMEP has initiated policies on international marketing as follows.

- (i) Promotion of SMEs and information on the international market
 - tracking the market situation, such as trading rules and prohibitions related to Thai SMEs;
 - collecting important marketing information, for instance on technology, product networking and SMEs information networks from many countries;
 - exhibiting and presenting exhibitions for Thai SMEs and their products in foreign countries;
 - coordinating with official bodies of major trading partners in order to build an international network of SMEs;
 - studying opportunities for SMEs' trade and investment expansion.
- (ii) Development of international cooperation at the governmental level on policy guidelines for upgrading Thai SMEs
 - negotiating and requesting academic and economic assistance in connection with the main responsibility of OSMEP, such as creation of franchise networks and administration of national SMEs information infrastructure;
 - initiating and endorsing pilot projects on ASEAN SMEs cooperation;
 - evaluating SME support projects from foreign countries.
- (iii) Support for the role of Thai SMEs in regional networks
 - advocacy for Thai SMEs in regional networks such as Asia-Pacific Economic Cooperation (APEC) and the Association of Southeast Asian Nations (ASEAN);
 - leading the Thai government in regional cooperation efforts or a number of SMEs in regional collaboration efforts, such as the Centre for Supply Chain Management under APEC;
 - organizing international conferences and brainstorming sessions for launching the SMEs network between Thailand and foreign countries.

In addition to promoting policies, OSMEP has founded another corporate-type instrument called SMEs Trader Partner (STP). It focuses mainly on facilitation pertaining to the international marketing process for SMEs engaged in exporting. From finding markets to shipping procedures, STP assists enterprises in finding information, contacting related foreign offices and advising on potential problems. Thanks to its corporate form of operation, it is able to perform functions with flexibility, unlike governmental institutions.

b) Venture Capital Fund

The Venture Capital Fund, designed to promote SMEs, is managed by OSMEP. It was created by agreement with the Competitiveness Development Board chaired by the Prime Minister. In order to increase the competitiveness of SMEs, the Venture Capital Fund serves major objectives, such as:

- Being a financial resource for SMEs in accordance with the Promotion Strategic Plan and Policy.
- Providing financial support for SMEs so as to adjust the debt-equity ratio at an appropriate level.
- Contributing to steady growth of SMEs' administrative, marketing, accounting and other systems until the enterprises are able to raise funds via the capital market on their own.
- Encouraging SMEs to get into professional management.
- Contributing to the growth of the domestic capital market.
- Providing support for plans and projects related to SMEs and their efficiency.

The benefit to SMEs includes both source of capital and assistance in operational and information aspects, e.g., through advisory services, training in accounting and market knowledge. To be a source of capital as a partner of SMEs, the enterprises are exempted from paying interest and do not need collateral for fundraising. These advantages of venture capital over loans allow for a screening process in picking the winners or those companies included in the groups targeted by the government.

In order to have access to the Joint Venture Fund, SMEs should have the following characteristics:

- innovative: preferably, SMEs should be innovative, either in their products or production process, or be able to make new use of existing inputs;
- creative;
- skills-based;
- high economic potential: firms should have a high growth rate for the industry in question.

An alternative way to gain access to the fund is to be in an industry in the target groups chosen by the government, namely:

- fashion-and-design-based business,
- software or IT business,
- food and herbs business,
- automotive industry,
- tourism industry,
- export-oriented business,
- business or industry that supports those mentioned above,
- firms in plans or projects selected by the government.

Assistance from OSMEP as mentioned above is based on improvement in competitiveness. The institution provides technical and administrative knowledge for management, especially with regard to exporting, together with financial help for improving the feasibility of SMEs in general. Although knowledge assistance benefits all kinds of businesses, financial assistance is limited to certain selected industries and businesses. Under the joint

venture approach, it becomes an owner, in the range of 10% to 50% of total registered capital, sharing the risks and profits of SMEs. This is the main reason why it is directed only at officially selected businesses. These industries and businesses had been picked up before the Promotion of SMEs Act was implemented.

After a two-year operational period under a private fund management company, the performance of the Joint Venture Fund is much lower than targeted. As shown in table 14, the Fund achieves about 16% of its goal in terms of both the number of enterprises and the amount of joint venture capital. The major obstacles are threefold. The first and most important one is a lack of business potential. According to the Fund manager's evaluation, 38.3% of total applications fail to meet that requirement and are not considered feasible for operation and investment. The second obstacle is the high debt-equity ratio. The ratio of unsuccessful applicants is above the limit assigned by the Fund manager. This problem accounts for 12.1% of total applicants. Thirdly, the non-achievers are not willing or not ready to improve their accounting systems. Normally, SMEs tend to have informal accounting systems, which makes them unwilling or unable to open their books to the government. It would be very costly to the firms to change their accounting system in order to apply for venture capital. This obstacle accounts for 7.1% of the total number of applicants. Although the Venture Capital Fund is an instrument of the government and beneficial to SMEs, there are many problems that delay its expected success.

TABLE 14
TARGETS AND PERFORMANCE OF SMEs VENTURE CAPITAL FUND IN 2001-2002
(In millions of THB)

| Period | Target | | Performance | | |
|---------------------|-----------|------------|-------------|---------------|--------------|
| | Number | Funds | Number | Funds | % of success |
| Jul-2000 — Jun-2001 | 25 | 375 | 4 | 57 | 15.20 |
| Jul-2001 — Jun-2002 | 32 | 460 | 9 | 76.52 | 16.63 |
| Total | 57 | 835 | 13 | 133.52 | 15.99 |

Source: Department of Small and Medium Enterprises (SMEs) Promotion.

4. SMEs Development Bank (SMEs Bank)

For SMEs that are not in a targeted business or industry, financial support is available in other forms from other institutions. One of those designed to support SMEs is the SMEs Bank. It provides financial help in the form of loans to SMEs which might not be able to obtain financing from commercial banks. Given its aim, the SMEs Bank, being a governmental institution, will bear risks higher than the market level. This is definitely another form of SMEs promotion.

The SMEs Bank was founded by law in 2002. It is a governmental financial institution under the supervision of the Ministry of Finance and the Ministry of Industry. Its main objective is to undertake business operations, expansion and improvement of SMEs through loans, guarantees, joint ventures, advisory services and other necessary services. In line with this objective, its functional goals are:

- a) To provide financial services to SMEs targeted by the government so as to strengthen them and equip them for sustainable development, as well as to give them liquidation support with regard to economic and social benefits rather than financial profits;

- b) To support existing SME entrepreneurs and new SME start-ups so as to improve their competitiveness and increase their potential to become the economic foundation of the country;
- c) To increase the capacity of the organization, in line with the country's mission of supporting SMEs.

Services are provided to a very broad range of SMEs, including manufacturing, trading and service SMEs. Eligibility is based simply on their being of Thai nationality and of an investment size classified as SMEs. Specific services are:

- loans for long-term investment;
- loans for short-term current cash flow;
- factoring loans for liquidation support via cashing and invoices;
- bill discount, acceptance and letter of guarantee;
- leasing loans for buying or investing in machinery or vehicles for business;
- joint-venturing in which SMEs Bank participates at no more than 50% of the registered capital and no more than 50 million THB in each case;
- foreign loans;
- services including advisory services, training and other support for the development of business capacity.

5. Board of Investment Office (BOI)

The Board of Investment Office (BOI) has played an important role as an investment promotion agency for more than 40 years. It was authorized and empowered by the Investment Promotion Act and is chaired by the Prime Minister and the Minister of Industry. It focuses on large-scale production and investment promotion covering a wide range of industries and businesses, such as agriculture, mining-ceramics and iron production, machinery and transport equipment, electrical and electronics, chemicals-paper-plastic products and public services and utilities. Decisions on granting of promotion and provision of benefits are made by the Board on a case-by-case basis. In a recent year, 2003, BOI turned its attention to SMEs, in keeping with the Ministry of Industry's policies.

The scope of BOI promotion of SMEs is smaller than that provided for large investments. There are only two groups of businesses, i.e., agricultural products and creative products or production such as furniture and components, toys, clothing and stationery products. Eligibility requirements for SMEs are:

- to be an SME with an investment of over 500,000 THB (about 12,000 US\$) but less than 5 million THB (approximately 120,000 US\$), excluding working capital and land value;
- to have Thai ownership of more than 51%;
- to be a producer in the One Tambon One Product (OTOP) programme or a producer authorized by the Office of SMEs Promotion.

The privileges and benefits given to eligible companies include import-duty exemptions for machinery and corporate income tax exemptions for eight consecutive years. This is equivalent to the highest benefit provided for large investments.

Promotion of SMEs by BOI is new, and many enterprises are not aware of it. The performance and success of the policy are presently not clear. Nevertheless, it is worth noting that the kinds of businesses that are eligible are few, and that it is not expected to affect firms in a broad area. This could be because the first tier of policy is as a pilot project. The Board of

Investment will soon start more projects and expand the range of SME businesses or industries. As regards support for SME use of technology, its promotion is applied to another group.

C. Special measures to correct the digital divide

1. Human resources

Guidelines for human resources development in connection with IT are as follows:

a) Initiate policies aimed at enhancing the role of the government in supporting technology development:

- Reduce the role of government from supplying technological development to supporting private firms wishing to create their own technological development projects;
- Reduce duplication of the roles and responsibilities of different government departments in supporting technological development (institutional specialization);
- Extend the scope of research and development activities that are eligible for tax privileges;
- Improve regulations and procedures for requesting tax privileges or tax exemptions so as to make such measures more effective in supporting research and development activities; for example, there could be a progressive rate of tax exemption or establishment of a minimum percentage of R&D investment to be granted certain privileges, thus encouraging private firms to invest more.

b) Initiate policies to support technology development among private enterprises:

- (i) Encourage private enterprises to improve their knowledge and to increase their demands for technology development. Private entrepreneurs are classified into two groups – those who are not aware that their firms lack certain skills or do not know what kind of skills they lack, and those that know what skills they need to learn. The government will then provide different policies for each group (see table 15):
- (ii) Support private firms in starting technology development:
 - Set up a skills-development fund to support worker skills development projects of private enterprises;
 - Improve tax incentives for firms that invest in research and development;
 - Offer subsidies for private enterprises to develop their own technology;
 - Offer funds at low interest rates for firms investing in modern machinery or in certain technology development activities;
 - Extend cooperation between private entrepreneurs and universities in order to produce researchers who can truly respond to the needs of these firms in technology development;
 - Create links or cooperation between educational institutions and private firms, especially in the improvement of worker skills.

TABLE 15
TECHNOLOGY DEVELOPMENT POLICY FOR SMEs

| Private entrepreneurs | Policies |
|--|---|
| <p>Group 1: Those who are not aware that their firms lack certain skills or do not know what kind of skills they lack</p> | <ul style="list-style-type: none"> · Make the entrepreneurs recognize the effects of changing internal and external environments, such as the impact of membership of the World Trade Organization on the competitive situation of business · Help private firms in comparing different types of production processes in order to select the type of technology development that best suits them individually; · Support technology research projects in cases where firms do not know exactly what their problems are; · Provide information about sources of investment funds. · Demonstrate uses of new technology; · Set up industrial forums to share knowledge and experiences among private firms. |
| <p>Group 2: Those who know what skills they need to learn</p> | <ul style="list-style-type: none"> · Help entrepreneurs in technology research; · Facilitate contacts for entrepreneurs in approaching new sources of technology; · Provide a financial facility for private firms. Provide consultants for short-term technology transfer; · Establish a centre for inexpensive quality testing of products; · Provide assistance to small and medium-sized enterprises in drafting plans for productivity improvement. |

Source: National Electronics and Computer Technology Center (NECTEC) <www.nectec.or.th>

(iii) Encourage technology transfer between private firms:

The Board of Investment may offer tax privileges to attract foreign software companies on the condition that there must be technology transfer to Thai partners.

(iv) Enhance the technological potential of small and medium-sized enterprises. Since small and medium-sized enterprises usually have less technological potential than larger ones, the government may encourage these firms to apply information technology in their businesses by:

- Creating right attitudes about and understanding of the benefits of using information technology;
- Creating incentives to set up alliances among these firms in each industry to help one another in the application of new information and telecommunications technology;
- Encouraging large firms to help small and medium-sized enterprises in adopting or utilizing information technology.

c) Initiate policies designed to increase the potential of research and development:

(i) Increase the number of researchers, especially in the software industry:

- Set up professional training centres to produce highly skilled researchers and software developers;
- Import workers with software knowledge to work with local employees to facilitate technology and knowledge transfers.

- (ii) Promote the quality and skills of software researchers:
 - Provide support for foreign and Thai experts to cooperate in carrying out research and development activities.
- (iii) Encourage cooperation between the public and private sectors in improving the attitude of the public toward occupations that are relevant to research and development activities.
- (iv) Set up a systematic mechanism for gathering and analyzing information about IT progress, in order to draw up plans and strategies for supporting research and development activities.

d) Initiate policies related to promoting the level of education and skills of the workforce:

- (i) Increase the number of highly educated workers:

Increase the level of education of workers already in the marketplace by setting up courses in private factories. Also, increase the proportion of science and technology students in universities. The government aims to produce 2,000 more science and technology students per year, so as to increase the proportion of such students from 20% to 21.4% by 2008 by offering subsidies to universities to launch science-and-technology-related courses.

- (ii) Reform all levels of education:

Some relevant departments, such as the Ministry of Education, Religion and Culture, as well as governmental and non-governmental educational institutions, will be encouraged to cooperate more with each other to improve and develop up-to-date curricula designed to enable development of the thought process and fundamental skills among students. In addition, courses related to information technology will be included in the curricula at all levels of education.

- (iii) Offer access to and opportunities for using information technology:

The government will provide subsidies for several educational institutions to set up IT libraries and to develop IT-related educational media to familiarize students with information technology and increase the opportunities for applying their knowledge and creativity.

- (iv) Increase the availability of human resources in areas in which they are truly needed by industrial firms:
 - Send more science and technology teachers to private firms as consultants to provide theoretical support and to then gain experience in theoretical applications;
 - Establish apprentice-type situations whereby students gain direct experience through practice in private factories, which allows them to apply their knowledge in the actual production process;
 - Offer incentives to experts in the industrial sector to become teachers in educational institutions;
 - Encourage private entrepreneurs to help unskilled workers with low levels of education to further their studies.

- (v) Increase the number and quality of teachers:

Increase both the quantity and the quality of teachers of courses such as science, mathematics and foreign language, by offering incentives to retired employees of private enterprises to become university teachers.

- (vi) Increase the knowledge and skills of human resources in the industrial sector:
 - Set up a skills-development fund and provide incentives to support on-the-job training projects of private firms;
 - Encourage cooperation between the public and private sectors to survey the situation with regard to skills and knowledge of workers who are needed in the industrial sector and develop suitable training curricula to respond to this demand;
 - Develop product-design skills of workers by improving relevant training courses in educational institutions;
 - Encourage product designers to protect their innovations through copyright and property rights laws.

e) Initiate policies to create the atmosphere of a knowledge-based society. To help people adjust to a knowledge-based society, the government will pursue the following strategies:

- (i) Extend a network of IT infrastructure to mitigate the digital-divide problem:
 - The government will extend its telephone network to reach every village, and it aims to establish at least seven telephone numbers in each village by 2006;
 - The government will set up institutions needed for the IT infrastructure around the country.
- (ii) Increase the capacity of IT networks and reduce the price of IT services:

The telecommunications and other IT-related industries will be liberalized in order to increase the intensity of competition, leading to a higher quality of services at lower cost. Moreover, to support or facilitate such activities, the government issued a Frequency Allocation Law in 1997; currently, it is establishing a National Telecommunications Commission.

- (iii) Encourage greater utilization of existing infrastructure networks by the private sector:
 - Support local government organizations to enable them to provide their services through the Internet;
 - Support small and medium-sized private firms or cooperatives so as to enable them to operate their businesses through the Internet.

f) Initiate policies

- (i) Develop the software industry:
 - Increase the value of the software industry to make it competitive on both the external and the domestic markets. Government-led projects can be used to create opportunities for domestic firms to gain more experiences in software development;
 - Initiate institutional restructuring to promote development in the software industry. The government will set up two agencies: One will be the Software Industry Promotion Board (SIPB), which will be responsible for drawing up the master plan for developing and approving relevant policies. The second will be the Software Industry Promotion Agency, which will be responsible for bringing the SIPB-approved plans into action and providing funds in the form of seed money, venture capital or soft loans to support the research and development activities of the private entrepreneurs;

- Develop quality software products and related services. International standards of quality testing will be employed and a quality-testing centre will be established;
 - Support research and development in IT-related industries by setting up an Intelligence Centre to gather data and to encourage the application of innovations resulting from research and development.
- (ii) Develop the hardware industry:
- The government will support private firms to invest more in the hardware industry, such as electronics and computer hardware used in the telecommunications and automotive industries, in terms of both quantity and variety with a view to creating industrial clusters;
 - The government will try to enact laws or decisions to facilitate business operations in the information technology economy, such as a law relating to electronic financial transfer or an information protection law.

2. Technical and financial aspects

Given the existing statistics and reports about the digital divide between SMEs and large enterprises, as well as among SMEs themselves, this problem is a matter of concern to the government. Many types of technical and financial assistance are offered but they may not be successful in every case. They are effective for certain groups of SMEs. This is because SME promotion is relatively new and has been a matter of public interest for just a few years. Although policies are designed to support such enterprises, the use of public sponsorship is still rare compared with the number of SMEs. Recently, there has been a general governmental promotion that advocates the use of public benefits. For example, in 2004, the BOI-SMEs-OTOP and SMEs Forum 2004 were initiated to inform general SMEs in the country about the availability of government benefits and assistance and offices that are involved in the SMEs promotion process. The policies for tackling the problems and the difficulties arising in implementation are described in this subsection.

The technical deficiency of enterprises, particularly indigenous firms, has long been a matter of concern. This problem is not so clear in large enterprises or large-scale production, partly because such undertakings have adopted new technologies and obtained technical help from foreign firms through foreign direct investment and joint ventures. This has usually not been the case with SMEs, and is the main reason for the digital divide between firms of different sizes. However, the SMEs that have successfully applied technology are those that have a strong background in financial resources. It appears that overall, there are not many successful cases. This is one of the major causes of the digital divide among SMEs.

The difficulties and problems in regard to technical applications and adoption of technology by SMEs, including in information and communication, may be summarized as follows:

- Slow pace of technology absorption in the firm due to lack of familiarity with technical and technology know-how;
- Less access to technology know-how; most SMEs chiefly gather knowledge and information from their customers and suppliers, preventing them from using new techniques and technology, and lack of information on the technology level of competitors;
- Lack of knowledge and understanding of information and communications technology such as e-commerce, which distorts incentives to employ e-commerce and leads to inability to manage information for online transactions;

- Lack of confidence in online transactions owing to Internet fraud and theft of sensitive information, which causes a decline on the demand side and hence makes the supply side unprofitable;
- Inadequate infrastructure of information and communication technology. The available equipment and infrastructure for business purposes has a relatively high cost compared to the market demand.

These problems with the use of technology of SMEs arise from technical difficulties, insufficient know-how and also low rates of return. To remedy the problems, many policies and institutions have been created to tackle both technical and financial issues. To promote use, many governmental bodies have been set up to address specific problems ranging from promoting use, to troubleshooting to providing resources. The main institutions and their technical and financial assistance roles are described below.

a) Office of Science and Technology Development

The Office of Science and Technology Development is a special administrative body working directly under the Ministry of Science, Technology and Environment. Its main objective is to advocate research and technology development. Its SME-related activities for upgrading technology levels concentrate mainly on manufacturing SMEs. These activities involve technical and technological assistance and financial support, as follows:

(i) Financial support

The Office provides soft loans at a 3% interest rate. The funding condition for SMEs is to service up to 50% of project value of 20 million THB (approximately 500,000 US\$). The support is channelled to the firm for improvement of quality and production technology in order to boost its competitiveness.

(ii) Technological support

There is a programme called Industry Technology Assistance Programme (ITAP) for providing one-stop technological development service in order to improve product standards and quality and to encourage innovation and creation of new products. It is intended to boost the potential and opportunities of enterprises that place most attention on SMEs. An example of the services provided by ITAP are the programmes on searching for international technology, matching business and technology, organizing training and seminars, and organizing testing and analysis.

In addition to ITAP, the Office of Science and Technology Development also has cooperation arrangements with private enterprises to advance products and processes. It also creates pilot projects to match specific need of industries and offers consulting service, which include elementary analysis and searching for technical specialists at the firms' request.

Under the administration of the Office of Science and Technology Development, three major centres have been created to respond to specific technical needs, namely: BIOTECH, for biological technology; MTEC, for materials technology; and NECTEC, for information and communication technology. These bodies make up a knowledge infrastructure that is available to SMEs as required.

b) Institute of Science and Technology Research

The Institute of Science and Technology Research is a public enterprise under the Ministry of Science, Technology and Environment. Its main objective as a research and development body is to solve technical problems and to facilitate technology transfer for SMEs. Its services also include improvement of science and technology potential to increase productivity and to stimulate exports. The services cover different branches of industry, for instance food technology, engineering-pharmaceutical aspects of natural products, environment-energy branch, microbiology centre, biotechnology and agricultural technology.

To bring technology to SMEs, the Institute of Science and Technology Research creates networks of SMEs, local institutions and foreign offices to facilitate support for technology transfer. Moreover, the Institute also acts as a technical advisor to the private and public sectors and the industrial sector concerned. Most of the services supplied in the past have concentrated on agriculture-related activities, such as application of organic fertilizer in the industrial sector, processing of waste for use in planting, and promoting non-toxic agricultural products.

c) Software Park

The Software Park is an organization operating under the Office of Science and Technology Development. It was founded to support and develop the software industry in the country. It facilitates clustering of software producers and supports business cooperation, acting as a centre for research and development, technology transfer, improvement of human resources and upgrading of software in Thailand.

The main responsibilities in terms of technical and financial assistance are as follows:

- Provision of rental space and appropriate technical services at a reasonable cost. This is to reduce operating costs through matching and management, not subsidies;
- Performing as a medium for technology transfer from the foreign software industry to domestic producers;
- Coordination of fund-raising activities or seeking funds for domestic producers, especially in investment activities and joint ventures between foreign and domestic investors.

To meet the responsibilities described above, there are four departments which work cooperatively within the Software Park: software development, transfer of technology, technical support and marketing support. The software development department provides assistance to new and experienced enterprises. It develops the production potential of firms and creates enterprise-investor networks for the software industry. The transfer of technology department promotes the upgrading of international software standards through training and providing technical knowledge at the professional level. The technical support department provides back-up by offering suggestions and recommendations on technical problem from experts in the field concerned. The marketing support department performs at the first stage of software development, acting as an intermediary for technology transfer from abroad. It also provides basic utilities needed by reducing risk and production costs. Major achievements of the Software Park are shown in table 16.

TABLE 16
GOALS AND ACCOMPLISHMENTS OF SOFTWARE PARK

| Goal | Main Accomplishments |
|---|---|
| Software industry promotion in Thailand | <ul style="list-style-type: none"> · More than 30 firms in Software Park can export or have plans to export; · Establish a Software Consortium to endorse firms for development of high-value software in the country and abroad |
| Economic activity expansion | <ul style="list-style-type: none"> · In 2001, there were 48 enterprises operating in Software Park employing more than 500 workers; this contributes an economic value of about 400-600 million THB (10-15 million US\$) per annum |
| Increase competitiveness of software industry | <ul style="list-style-type: none"> · Cooperation with the Centre for Information Systems Engineering (CISE) of Carnegie Mellon University for CMM training in order to upgrade quality of software organization in the process of catching up to international standards |
| Foreign investment promotion | <ul style="list-style-type: none"> · 14 enterprises in Software Park have foreign ownership or are joint ventures; · Founding of a centre for software technology as a source of technology transfer from major foreign enterprises to Thai firms, mostly SMEs; · Establishment of Mobile E-services Bazaar (MEB) as an information centre for wireless software development and e-commerce in Thailand; · Setting up of an E-Infrastructure Centre to support and promote software development personnel in order to create new technological skills and bring knowledge from IBM; · Founding of the Centre of Excellence for Computer Security (CECoS) to support the security technology software development personnel and to back up the security system for e-commerce; · Creation of mLAB to stimulate and promote wireless technology and to be a centre for testing and exhibiting the work of Thai software development personnel |
| Software and multimedia personnel development | <ul style="list-style-type: none"> · Cooperation with academic institutions and technology-related businesses for the establishment of personnel development programmes such as Oracle Academic Initiative (OAI) and JAVA Training under the JAVA Competency Centre |

Source: Software Park.

d) Office of Research Support Fund and Office of Innovation Development Administration

The Office of Research Support Fund is intended to support a knowledge-formation process among researchers and research systems in the country. It covers traditional and new-economy businesses in order to increase competitiveness. This Fund benefits from its advantage in research management. Its functions are to foster strength of community, including community businesses classified as OTOPs and SMEs, and covering SMEs engaged in manufacturing, trading and services.

For promotion of innovative activities and creation, the Office of Innovation Development Fund was established to serve this target. It facilitates contacts between the research programme and selected industries, including the food, automotive, rubber, software and product design industries. It accumulates 100 million THB (about 2.5 million US\$) per annum for product development research in the form of soft loans and full subsidies for entire projects.

e) Board of Investment Office (BOI)

The role of BOI in financial assistance for technological advancement is to offer tax exemptions, similarly to SMEs promotion. Incentives for eligible enterprises consist of exemptions of import tariffs on machinery and waivers of corporate income tax for eight years. In order to be eligible, firms must meet the following conditions:

- (i) they must have R&D and design expenditure of no less than 1% to 2% of sales value for the first three consecutive years;
- (ii) they must employ graduates in science and technology or in research-design at a level of no less than 1% to 5% of total jobs during the first three consecutive years;
- (iii) they must have training expenditure for Thai workers of no less than 1% of the payroll for the first three consecutive years;
- (iv) they must spend on capacity and competitive development for Thai subcontractors or on support for an academic institution no less than 1% of sales value for the first three consecutive years.

If a firm does not satisfy the above conditions, it has the option of requesting BOI benefits when it is classified in one of the following industries or businesses:

- Pharmaceutical products or medical equipment.
- Science equipment,
- Aircraft and components production,
- Electronic design,
- R&D activities,
- Scientific testing and experimental services,
- Calibration activities,
- Human resources development activities.

Eligible firms may apply for the decision procedure, and support is granted on a case-by-case basis, subject to consideration by the Board.

D. E-government

1. E-government

In 2000, ASEAN countries endorsed the e-ASEAN initiative to promote the potential of information technology in order to strengthen their competitiveness in the world economy. E-government is one of the five key areas that ASEAN countries have committed to implement. On July 3, 2000, the Thai Economic Cabinet considered the issue raised in the e-ASEAN initiative and envisioned that Thailand must first work on developing e-Thailand as a priority in order to prepare readiness for the country and minimize drawbacks in the development process of IT infrastructure.

a) Five areas of the e-ASEAN initiative are:

- (i) Establishment of the ASEAN information infrastructure;
- (ii) Growth of e-commerce;
- (iii) Establishment of a free trade area in products, services, and investment;

- (iv) Development of e-society;
- (v) Establishment of e-government.

E-government in Thailand has been driven since 1994 by the Sub-Committee on Promotion of Utilization of Information Technology in Public Organization, which is under the National Information Technology Committee (NITC). Several measures have been taken to promote this initiative, such as computer training for mid-level officers, specifying minimum requirements of IT equipment for government agencies, appoint of CIOs in the public sector, leading the IT master plans of ministries, departments and provinces, and so forth. The project's main mandate is to coordinate and facilitate public organizations in delivering quality services through electronic media, such as red-tape reduction aimed at one-stop service, rapid response, rural coverage, and round-the-clock service.

b) Project objectives

- (i) To establish a framework for building up e-government in order to be in line with e-ASEAN in the following areas:
 - Public services:
 - High-quality and high-standard services to citizens, businesses and the public sector;
 - Good services through electronic media.
 - Public administration:
 - Financial management between government and business sectors;
 - Electronic procurement aimed at achieving speed, transparency, and fairness;
 - Government data and resources management.
 - Communications and coordination between government sectors:
 - Intra- and inter-ministries;
 - Between central, regional and local administrations.
- (ii) To set up guidelines for reprocessing of public organizations, in terms of administration and services to comply with the framework of building up e-government.
- (iii) To implement and evaluate e-government pilot projects.
- (iv) To follow a well-defined strategic framework and action plan.

c) The scope of the project is to build up e-government in the following four tracks of electronic services in public agencies:

- (i) Online information service: G2G, G2C, and G2B;
- (ii) Simple transaction service: G2C, and G2B;
- (iii) Payment gateway (electronic funds transfer): B2B and C2G;
- (iv) Electronic procurement: G2B.

d) Previous efforts in this project include:

- (i) Organization and human resources development
 - Appointment of CIOs and IT policy planning;
 - Computer training for mid-level officers;
 - Government administration reform plan.

- (ii) Technologies
 - Minimum requirements of IT equipment;
 - Government Data Infrastructure (GDI) research project;
 - IT Model Office pilot project.
- (iii) Services
 - Government information network services by Government Information Technology Services (GITS).
- (iv) Laws and regulations
 - Legislative and regulatory reforms such as Office Information Act (BE. 2540), Statistics Act (BE. 2508).

2. Bank of Thailand (BOT)

The Bank of Thailand (BOT) is working on the e-payments project, called Payment 2004. Payment 2004 consists of five agendas, which cover three major areas. The five agendas are:

- Agenda 1: Industry Payment Body
- Agenda 2: National Payment Body
- Agenda 3: Payment Legislation
- Agenda 4: Infrastructure and Standards
- Agenda 5: Cross-border Connection

The first agenda focuses on the need to establish an industry payment body to create a channel for co-operation between banks and non-bank payment participants in the market. The Bank of Thailand plans to establish the Thailand Payment Association, which will include committees overseeing regulation, standards and security, card payment, global payments and e-commerce.

For the second agenda, BOT proposes to conduct an annual survey of national payment data led by the central bank in close co-operation with industry. Data from banks, credit card companies, non-banks, and processing centre companies (PCC) will be submitted to BOT electronically.

The third agenda concentrates on the need for explicit legislation on payment systems to safeguard financial stability. The Bank of Thailand and NECTEC are studying this project and the launching of a new Payment System Act.

The fourth agenda focuses on the need to develop a common payment platform based on interoperable standards to reduce duplication of payment infrastructure investments and to support the growth of e-commerce.

For the fifth agenda, BOT is considering connecting BAHTNET and Media Clearing to large-value cross-border and small-value cross-border payment systems respectively.

3. E-procurement

The Thai government has established e-procurement, which includes:

- E-catalogue
- E-RFP (request for proposal) and E-RFQ (request for quotation)
- E-data exchange

E-catalogue is the standard information system that collects all detailed data on qualified suppliers. Suppliers are able to access the catalogue to update their own information on specifications and price lists. Public agencies are able to search this information.

E-RFP and E-RFQ are the electronic systems that enable public agencies to find the “right” sellers from the e-catalogue. Communications on proposals and quotations are conducted through electronic mail.

E-data exchange is used to verify the qualifications of suppliers with the Ministry of Commerce and the Department of Government Revenue and to check on cash management and directed payments with the Office of the Comptroller General.

E-procurement tools include the e-procurement website (www.gprocurement.go.th) and e-marketplace service provider. The website is the information centre for both sellers and buyers. The e-marketplace acts as an electronic market; it operates the e-auction and plays the role of intermediary.

E. IT use for international trade

1. IT-related customs services

In a world of aggressive global trade competition, the use of modern technology to facilitate international trade and industry becomes crucial for planning improvements in customs procedures on a more comprehensive scale. The aim of the Thai Customs Department is to apply modern IT-related services to promote international trade.

Apart from the existing EDI system via the value-added network (VAN), the Thai Customs Department also offers another option for SMEs to process their customs declarations online. At present, SMEs are able to process import and export declarations via the Internet.

Entrepreneurs are allowed to pay taxes and duties electronically to a bank 24 hours a day under an e-payment scheme. Greater convenience in the import and export processes has been achieved through this service.

An e-manifest system allows for the electronic transfer of general data and consignment details pertaining to each vessel or aircraft arriving at the port or airport, from the responsible carrier to customs. When the message is accepted and replied to by the computer system of Customs, the responsible carrier may unload cargo from the vessel or aircraft, thus reducing paper flow and business transaction costs.

The Thai Customs Department is introducing container inspection facilities in major ports which feature container X-ray technology. This type of technology has increased the efficiency of customs officials in the inspection of container cargo.

2. Electronic Commerce Resource Centre (ECRC)

The Electronic Commerce Resource Centre (ECRC) was set up under the National Electronics and Computer Technology Centre (NECTEC), the National Science and Technology Development Agency (NSTDA), and the Ministry of Science, Technology and Environment (MOSTE), by a decision of the Cabinet on December 1998. Its purpose is to advance electronic commerce development in Thailand so that it will be internationally competitive, to continuously lay the groundwork for developing readiness and strength in electronic commerce.

Initially, the ECRC’s objectives were as follows:

- To create public awareness and understanding of electronic commerce. In addition, to create cooperation between public and private organizations; to initiate new forms of business for the public from the policy level for entrepreneurs and consumers as well as to work with the public and private sectors;
- To be a centre for collecting and publicizing information resources and monitoring the development of electronic commerce development in both the government and the private sectors;
- To create capacity building in terms of human resources ranging from training to educational programmes, so as to enhance the availability of human resources in various fields pertaining to electronic commerce activities.

In addition, ECRC also coordinated the work of the APEC Electronic Commerce Training Centre. The Electronic Commerce Resource Centre has since been dissolved, and the project is under the supervision of the Ministry of Information and Communications Technology (Ministry of ICT).

3. Public key infrastructures

A public key infrastructure (PKI) enables users of a basically unsecured public network such as the Internet to securely and privately exchange data and money through the use of a public and a private cryptographic key pair that is obtained and shared through a trusted authority. The public key infrastructure provides for a digital certificate that can identify an individual or an organization and directory services that can store and, when necessary, revoke the certificates. Although the components of a PKI are generally understood, a number of different vendor approaches are emerging. Meanwhile, an Internet standard for PKI is being worked on.

The public key infrastructure entails the use of public key cryptography, which is the most common method on the Internet for authenticating a message sender or encrypting a message. Traditional cryptography has usually involved the creation and sharing of a secret key for the encryption and decryption of messages. This secret or private key system has the significant flaw that if the key is discovered or intercepted by someone else, messages can easily be decrypted. For this reason, public key cryptography and the public key infrastructure is the preferred approach on the Internet. The private key system is sometimes known as symmetric cryptography and the public key system as asymmetric cryptography.

- A PKI consists of:
 - A certificate authority (CA) that issues and verifies digital certificates. A certificate includes the public key or information about the public key;
 - A registration authority (RA) that acts as the verifier for the certificate authority before a digital certificate is issued to a requestor;
 - One or more directories where the certificates (with the public keys) are held;
 - A certificate management system.

In public key cryptography, a public and a private key are created simultaneously using the same algorithm (a popular one is known as RSA) by a CA. The private key is given only to the requesting party and the public key is made publicly available (as part of a digital certificate) in a directory that all parties can access. The private key is never shared with anyone or sent across the Internet. The receivers use the private key to decrypt text that has been encrypted with receiver's public key by someone else, who can find out what your public key is from a public directory. Thus, if the sender sends a message, the sender can find out the receiver's public key (but not private key) from a central administrator and encrypt a message to a receiver using receiver's public key. When a receiver receives this message, he decrypts it with his private key.

In addition to encrypting messages, the sender can authenticate himself to the receiver by using sender's private key to encrypt a digital certificate, so the receiver knows that it really is the sender who sent the message.

The Thai Parliament passed the Electronic Transaction Act BE 2001, and the Act came into force in April 2002. It establishes the basic principle that a contracting party cannot deny the existence or enforceability of electronically transmitted information merely because it is in electronic form. Pursuant to the Act, an offer or acceptance of offer made electronically is valid and a party to a contract cannot deny the contract's validity merely because the offer or its acceptance was made via electronic means. General guidelines on ensuring the authenticity of electronic signatures are given in the Act. In addition, the Act provides that electronic information may be admitted in Thai courts.

The Act also regulates the provision of services relating to electronic transactions, particularly those concerned with safeguarding the security of transactions, e.g. the service of certifying electronic signature.

An Electronic Transaction Committee will be established under the Act to deal with practical and procedural issues arising from its implementation.

The Office of Government Information Technology Services (GITS) is a Thai Government body. This Office has been assigned to develop and service the digital certificate for the Thai government. At present it is the only official government certification authority (G-CA) of Thailand.

One of the leading telecommunications companies in Thailand is TOT Corporation Public Company Limited. At present, TOT focuses on e-business, providing several services to support e-business, such as e-payment via the TOT website, an e-business centre, e-procurement, and certificate authority or TOT CA.

4. Consumer protection

There are many consumer protection laws in Thailand, for example, the Consumer Protection Act B.E. 2522, the Unfair Contract Terms Act B.E. 2140, the Direct Sale and Direct Marketing Act B.E. 2145, the Drug Act B.E. 2130, the Food Act B.E. 2122, the Cosmetic Act B.E. 2535, the Narcotics Act B.E.2530, the Psychotropic Substances Act B.E. 2535, and the Volatile Substances Act B.E. 2533.

a) The consumer protection act follows principles of consumer protection rights in five areas, namely:

- (i) Adequate and correct information,
- (ii) Freedom of choice,
- (iii) Safety,
- (iv) Fair contracts,
- (v) Compensation.

b) Thai law also protects privacy, which can be divided into four categories, as follows:

- (i) Information privacy
Involves the establishment of rules governing the collection and handling of personal data, such as credit information and medical and government records. Its is also known as "data protection".

- (ii) **Bodily privacy**
Concerns the protection of people’s physical selves against invasive procedures, such as genetic tests, drug testing and cavity searches.
- (iii) **Privacy of communication**
Covers the security and privacy of mail, telephones, e-mail, and other forms of communications.
- (iv) **Territorial privacy**
Concerns the setting of limits on intrusion into the domestic and other environments such as the workplace or public space. This includes searches, video surveillance and ID checks.

The Thai Data Protection Act is based on the principles of data protection, so as to protect the right to privacy in the information society. Thus, it lays down general rules to protect personal data of individuals. The Thai Credit Bureau Act provides guarantees privacy of financial information.

c) Privacy protection tools and procedures include the following:

- (i) **Online privacy protection tools**
 - Encryption;
 - Use of an anonymous server to send e-mail or access Internet sites anonymously.
- (ii) **Information industry procedures**
 - Code of conduct;
 - Best practices which online service providers need to safeguard subscribers’ privacy or else lose subscribers, e.g., Trust E, Privacy BBB Online, Better Web.

However, according to the 2001 survey conducted by Ms. Kaewjumngong (NECTEC), only 13% of the respondents understood the extent of privacy rights in Thailand.

5. Department of Export Promotion (DEP)

The Department of Export Promotion’s e-strategies cover many major aspects of export business, revolving around the core activities of marketing, product development and services, and training courses for exporters. The major strategies are classified as follows:

a) Seminars and training

The Thai government provides a variety of seminars and training courses on e-commerce, e-government and e-marketing to serve SMEs both in the central business area of Bangkok and in other regions.

The Department of Export Promotion offers two types of e-commerce seminars. The first type includes basic knowledge, concepts and how to begin using e-commerce systems. The second type involves a discussion of selected successful e-commerce enterprises and covers many useful topics, such as direct experience, advantages, disadvantages, benefits and key success factors, to inspire other SMEs to start using e-commerce. The total number of participants in the seminars over two years has been more than 10,000.

b) Information technology system

In keeping with the government policies mentioned above, the Department fully incorporates information technology into its own management, and it also develops Intranet and Internet systems to connect the Bangkok office with the regions and the Foreign Trade Promotion Offices. With this high-end technology, information is smoothly exchanged between offices, enhancing the flow of information among Thai exporters, foreign importers and other interested parties.

(i) Trade inquiry system

For faster service, the Department of Export Promotion posts its trade inquiry system on its website, so anyone can access the list of Thai exporters/manufacturers and foreign importers/buyers at any time.

(ii) Online electronic catalogue

More than 8,500 companies appear on the DEP Exporters List (EL) on the Web, which covers 17 groups of products and services. Listed firms are allowed to update their information online at anytime. At least 90% of the exporters on the list have their own e-mail address, and about 5,000 already have their own websites. Following is an example of a catalogue entry:

We Thai Dot Co., Ltd. (www.WeThai.com) produces Textiles and Garments, Electronic Products and Parts, Chemicals, Plastic Resins and Sheets

Further details on specific products may be found at www.depthai.go.th in the e-commerce section.

V. Regional networks

A. E-ASEAN

The ASEAN Telecommunications Ministers (TELMIN) met on 27-28 August 2002 and signed the Manila Declaration whereby they decided to exploit ASEAN's competitive edge in the information and communications technology (ICT) sector.

Terms of reference and work programmes have been developed for the five TELSOM working groups on information infrastructure, capacity building, universal access and the digital divide in ASEAN, intra-ASEAN trade and investment in telecommunications and IT Ministers (TELMIN), except for elements relating to trade and investment liberalization and e-commerce promotion.

The e-ASEAN Working Group (EAWG) continued to contribute to the implementation of the e-ASEAN Framework Agreement, covering intra-ASEAN activities, cooperation with Dialogue Partners, and streamlining the current and future direction of EAWG functions. The Working Group has developed a funding mechanism to build sufficient financial resources with a fast-track approval process. The e-ASEAN operational mechanism has been restructured to reposition and enable the EAWG to respond to the need for convergence of information infrastructure and IT applications.

1. ASEAN information infrastructure

In order to develop a technical architecture framework to provide linkages of infrastructure and application systems among members, a study is being conducted to determine the common requirements for high-capacity information processing and high-speed communications for the next two to ten years. Discussions have also been held on establishing an ASEAN broadband network. In addition, there is an initiative to conduct a study on each country's technical architecture for e-government systems to enhance interconnectivity of design and standards of the national information infrastructure.

2. E-commerce

A common reference framework for e-commerce legal infrastructure has been published to assist the countries with or without adequate e-commerce legislations. An e-commerce white paper to share available information on each country's initiatives and development is under preparation. A cyber-law seminar was held in order to share best practices and learn from the experiences of the more developed countries in ASEAN. The e-ASEAN Public Key Infrastructure (PKI) Forum has also been established. Studies on cross-border harmonization of e-transactions and e-signatures legal frameworks are underway.

E-commerce incubator activities have been implemented to create a business environment that supports e-commerce development in the region and to support ASEAN small and medium-sized enterprises (SMEs) and entrepreneurs in international trade. To speed up the development and acceptance of e-commerce in CLMV countries (Cambodia, Laos, Myanmar and Viet Nam), appropriate business models are being developed through the ASEAN e-commerce programme. Experts from more developed countries in ASEAN are sharing best practices for consideration and adoption where applicable.

The TELSOM Working Group on information infrastructure has begun setting up computer emergency response teams (CERT) in all ASEAN Member Countries.

3. Trade liberalization and facilitation

The ASEAN Sectoral Mutual Recognition Arrangement (MRA) for electronic equipment has been signed. Preparations for an online database of key policies and regulations of ASEAN member countries on ICT trade and investment are underway. ASEAN is also working on a common standard system for evaluating IT professional skills, with a view to including an ASEAN MRA on IT professional skills. ASEAN is planning to develop a certification standard for ICT skills competency in the region in order to establish a common framework for developing professionalism in ICT and a standard certification for ICT professionals. A series of Capacity Maturity Model (CMM) training courses for ASEAN members is in preparation. Member countries have agreed to eliminate tariffs on a wide-ranging number of products by 2005.

4. Capacity building and e-society

A number of ICT training programmes, workshops and seminars have been conducted in order to share and learn from the experiences of ASEAN members; these include the SchoolNet seminar and forum to encourage and enable schools and universities to implement distance learning via the Internet and the Asia Incubator workshop to assist SMEs and entrepreneur groups. Preparations for workshops on multilingual machine translation and on digital economy measurement are underway.

The e-ASEAN Open Source Software (OSS) Working Group has been established to collate, exchange information and share best practices with a view to providing cost-effective alternative computer software development. Open Source Software seminars have been organized. The ASEAN e-Measurement Forum has been established to develop a comprehensive set of ASEAN ICT indicators to help monitor progress in the ICT sector in the region.

Several public awareness programmes have been conducted, including ICT road shows/technical forums, the e-ASEAN Business Forum and the e-ASEAN Industry Dialogue, as well as promotion of e-commerce and e-government. A number of ICT training programmes have also been conducted for the CLMV countries under the Initiative for ASEAN Integration (IAI).

This includes a primer on cyberlaw for senior public officials held in Singapore in November 2002 with participation from all ASEAN countries.

A series of e-government training courses and seminars have been conducted in various member countries to raise awareness and build capacity in this area. Inter-country government online applications are being explored, such as the use of a common e-passport smart card system to facilitate the movement of citizens in certain member countries. Cooperation to build capacity in customs administration to facilitate trade has also been undertaken.

5. Private-sector pilot projects

Under the leadership of the former e-ASEAN Task Force (EATF), about 40 private sector pilot projects have been endorsed to raise the profile of the ASEAN ICT companies and encourage their participation in ICT development. Such projects include (a) ASEAN Trade Electronic Data Interchange (TEDI), which aims to create an ASEAN ecosystem for e-trade utilizing Internet technology and standards such as UNEDIFACT and ebXML; (b) Cybermatrix, which aims to establish zoned Internet in ASEAN enabled by intelligence overlaid on regional and national telecommunication networks; (c) ASEAN SchoolNet, aimed at enabling ASEAN students and teachers to tap into the wealth of information and learning resources on the Internet; (d) ASEAN Incubator Network, which aims to help ASEAN SMEs and entrepreneurs to network with venture capitalists regarding the creation of a pan-ASEAN infrastructure for member countries to very rapidly launch services that other countries can leverage on to build even more complex services; and (f) ASEAN Regional Electronic Payment Gateway Solution, which aims to develop and implement solutions to facilitate cross-border e-clearing of retail payments in ASEAN, using agreed currencies by clearing through existing efficient national clearinghouses and/or payment processing centres in ASEAN.

6. Cooperation with other countries

ASEAN cooperation with other countries in the field of ICT has continued. The following activities were held over the last year: ASEAN-Japan Workshop on ICT Applications for Trade Promotion; ASEAN-China Seminar on ICT; Symposium on Bridging the Digital Divide with Korea; and a project on the establishment of harmonized legal, regulatory and institutional environments for e-commerce with Australia.

An ASEAN-China memorandum of understanding (MoU) on mid and long-term ICT cooperation has been finalized for signature, by ASEAN Ministers and the Minister of Information Industry of China. Areas of cooperation include human resources development (HRD), technology development, information infrastructure, ICT applications and others. China has organized a series of ICT training workshops, such as in telecom network management, wireless Internet and third-generation (3G) mobile communications for ASEAN members.

A Road Map on ASEAN-Korea Cooperation has been finalized which outlines the following areas of cooperation: sharing best practices; promotion of private sector investment; building of trust and confidence, particularly in the area of content development; lowering the cost of IT accessibility; and infrastructure and applications development, including policy implementation.

B. APEC

One of the most important interregional SME networks is Asia-Pacific Economic Cooperation (APEC). In practical terms, APEC is a discussion forum made up of countries of different geographic environments and economic cultures. The members are: Australia; Brunei Darussalam; Canada; Chile; People's Republic of China; Hong Kong (China); Indonesia; Japan; Republic of Korea; Malaysia; Mexico; New Zealand; Papua New Guinea; Peru; Philippines; Russian Federation; Singapore; Taipei; Thailand; the United States, and Viet Nam. The participation of SMEs in APEC has been gradually growing in importance, particularly since the economic crisis of 1997. The significance of SMEs is also worth noting. According to the Kuala Lumpur Declaration of 1998, a year after the crisis, SMEs accounted for 95% of the total number of enterprises, employed approximately 80% of the work force and contributed from 30 to 60% of GNP in the APEC economies. Small and medium-sized enterprises are expected to be one of the mechanisms driving economic prosperity, especially in Thailand and other post-crisis economies.

Asia-Pacific Economic Cooperation first paid attention to SMEs in 1989; however, it was only in 1993 that the early initiatives for SMEs were established. These were the Small and Medium Business Enterprise Ministers Meeting and the Pacific Business Forum. At the former, discussions centred on improving the business environment for SMEs. The latter was a forum to identify issues in which APEC members might facilitate and coordinate trade and investment in the region. The Forum consisted of two private-sector representatives, one of them from the SME sector, from each member country.

After the early initiatives, the attention and importance of SMEs in APEC have been fortified and included in the meeting known as APEC Small and Medium Business Enterprise Ministers Meetings, first held in Japan (1994). The content of the meetings is summarized as follows (table 17).

At the first ministerial meeting in 1994, the efforts of APEC in support of SMEs focused on five areas of most difficulties, as follows:

- Human resource development,
- Access to information,
- Technology and technology sharing,
- Availability of finance,
- Market access.

Several policy agendas have been proposed since 1994 to address difficulties. Progress has continued in subsequent APEC ministerial meetings on SMEs. This has facilitated a growing recognition of the importance of SMEs, including that of information technology and trade within the group. The major successes in enhancement of information technology and international trade of the APEC network can be summarized as follows:

TABLE 17
APEC SMALL AND MEDIUM BUSINESS ENTERPRISE (SMEs) MINISTERS MEETINGS

| | | |
|-------------|------|---|
| Japan | 1994 | · Addressed areas where SMEs face handicaps. |
| Australia | 1995 | · Endorsed wide range of initiatives under each of five priority areas and adopted a vision and set guiding principles. |
| Philippines | 1996 | · Encouraged close partnership with private sector and other support groups. |
| Canada | 1997 | · Emphasized the importance of policies and programmes to support SMEs at both the domestic and international levels and the importance to SMEs of trade liberalization and facilitation. |
| Malaysia | 1998 | · Discussed the impact of the region's financial instability on SMEs, the Integrated Plan of Action for SME Development (SPAN) and the importance of e-commerce for SMEs. |
| New Zealand | 1999 | · Discussed five topics: the regional financial crisis and its impact, enhancing management performance through education, reducing barriers to trade and compliance cost, improving capital markets and access to them, strengthening linkages to assist business within the region. |
| Brunei | 2000 | · Discussed four main issues: capacity building of APEC SMEs to capitalize on e-commerce, making financial and capital markets more accessible to SMEs, harnessing diversity for shared economic prosperity. |
| China | 2001 | “New Century, New Challenges: Innovation and Environment for SME Development” · Focused on advancing technological innovation, facilitating financing, improving the environment for SME development. |
| Mexico | 2002 | “Expanding the Benefits of Cooperation for SMEs” · Discussed the issues of policy environment, sustainable development and regionalism Policy environment - Microfinancing and capital markets - Human capacity building - Access to information - Technology and technology sharing - Access to markets - Access to transparent and regulatory environment Sustainable development - Microfinance as a sustainable development tool - Seed and venture capital business and guarantee funds - Incubation policy towards start-up SMEs - Knowledge platform for business start-up - Access to information and communication technology · Addressed issue of microenterprises |

Source: Asia Pacific Economic Cooperation (APEC) Small and Medium Enterprises Working Group <www.Apecsec.org>

1. Technology: adoption and promotion

Many studies and projects have been created to enhance the technological capacity of SMEs. Under the expectation that knowledge of ICT can enhance efficiency and coordination among SMEs in trade, a series of institutions and programmes has been created to meet the target.

The APEC Centre for Technology Exchange and Training for SMEs was established in 1996 as a centre with its own website for accumulating an electronic database of APEC members' economics. This was followed by the Policy Level Group, coordinated work on the project on Training and Certification for Small Business Counsellors and the Electronic Commerce Impact Study for SMEs, set up in 1998-1999. The website to support business and SMEs online was created in 2000 under the name bizaper.com. It is intended to provide information and advice for businesses. It helps those doing business in the region to save cost and time.

Under the United States proposal on the Business Partnership Initiative in 2000, the private sector led efforts on an agenda for creating strategic alliances between companies. Together with the ongoing APEC Business Matching and Advice Programme, which provides support to SMEs in business matching among APEC members, SMEs were encouraged to employ technology such as electronic data interchange and e-commerce for increasing efficiency. Given the importance of SMEs as an element in the global value chain, using technology for efficiency enhancement should bring benefits to all parties, including SMEs.

To promote the use of Internet and e-commerce, a meeting on enabling APEC SMEs to capitalize on electronic commerce was held to acknowledge the benefits of this new information and communication technology. The meeting focused on the idea that the involvement of the public and private sectors, e-commerce and Internet could "turn the world of Digital Divide to Digital Opportunity". Furthermore, the Electronic Commerce Steering Group was formed to promote consumer confidence and acceptance of new technology. The regulatory and security issues were the most important. The importance of SMEs' gaining access to information technology and regulatory and administrative requirements on trade and investment in the APEC region through the new medium was recognized.

As mentioned above, the importance of SMEs and their use of ICT has been noted and promoted in APEC. Not only the studies, but policy actions on the corresponding agenda have been implemented to hasten ICT use by SMEs in the region. Hence, APEC has played an important role in promoting trade among SMEs through information and communication technology.

2. International trade: harmonization and market access

One of the most important policies for enhancing the role of SMEs in trade is to promote free-market mechanisms. Studies and plans have been developed to implement that policy. In 1997, the APEC report entitled "Helping Your Business Grow: Guide for Small and Medium Enterprises in the Asia-Pacific Region" discussed policy measures for addressing SME priorities. It mentioned the supportive role of APEC in the growth of SMEs' and the creation of open and efficient trading schemes. Furthermore, in order to harmonize trading in the region, the Sub-Committee on Customs Procedures Collective Action Plan, supported by ministers of member countries, was engaged in organizing customs procedures to facilitate the running of businesses and to reduce transaction costs in customs procedures for SMEs.

To address the market access issue, the Policy Level Group on Small and Medium Enterprises has agreed on guidelines for APEC to follow for correcting and granting assistance at the request of the SMEs group. This assistance has benefited SMEs in many areas, including market access.

Although the activities of APEC have focused chiefly on studies and policy recommendations, these have influenced the implementation of related policies by governments. With regard to broader agreements such as those of the World Trade Organization, APEC can play a supportive role in policy execution under the agreements. This is important for SMEs that have relatively less power to advocate beneficial policies from their standpoint. Endorsement of

technology adoption and free trade is one of these policies. Hence, as a regional network, APEC has played an influential role in promoting SMEs and economic prosperity.

C. ASEAN+3

ASEAN+3 is a cooperative arrangement between the Association of South East Asian Nations (ASEAN) and three major countries in the East Asian region. The members of ASEAN are Brunei Darussalam, Cambodia, Indonesia, Laos, Malaysia, Myanmar, Philippines, Singapore, Thailand, Viet Nam; the other countries are People's Republic of China, Japan and Republic of Korea. Cooperation covers economic, social and political issues, but the main emphasis is on economic issues. In the area of economic cooperation, the members agree to enhance trade and investment, information technology, e-commerce, SMEs, industrial and agricultural cooperation and tourism. The main objective is to promote economic prosperity and sustainability for member countries of different backgrounds.

As concerns SMEs, an official SMEs network was established by heads of government of member countries in November 2001. The main objective of the network is to improve business relations of member countries with others. Through its official website, www.asean3.net, as well as www.etradeshows.org, ASEAN+3 SMEs network provides reliable and accurate information, free of charge, about trading and registered companies and creates an online meeting place to match suppliers and buyers in B2B fashion within member countries and with other countries. The official website is aimed to be the largest online meeting place of suppliers and buyers of ASEAN+3 regions and the number one destination for buyers from the rest of the world to purchase products made in ASIA.

The ASEAN+3 SMEs network offers its resources through the website www.etradeshows.org. As mentioned earlier, it is one of the leading e-trade hubs providing an electronic marketplace. The services supplied by the website include:

- **Company information:** The site contains a list of companies and their profiles. A company can register to be a member and provide its pertinent information, such as an overview of products or services, factories, certificates, clients.
- **Product catalogue:** Members of the website can upload and search product catalogues with detailed information and pictures of their products and services. The browsing page of products/services catalogues shown in table 18 groups merchandises and number of companies registered.
- **Trade leads:** Members are able to post, view and reply to buy and sell offers, and be coupled with business partners on a real-time basis.
- **Business matchmaking:** Members can create a targeted profile in order to complete transactions and save searching time.
- **Resources:** This service provides up-to-date trade news and useful information. A discussion board is also included as a tool for exchange of opinions, materials and information among members.

TABLE 18
ASEAN+3 WEBSITE CATALOGUES

| Browse by products | | Browse by services | |
|-----------------------------------|-----------|-------------------------------------|---------|
| Live Plant and Animal Materials | (19,648) | Agriculture Services | (2,411) |
| Mineral, Textile, Inedible Plants | (142,304) | Mining, Oil, Gas Services | (193) |
| Chemicals and Gas Materials | (62,918) | Building Maintenance Services | (554) |
| Plastic and Rubber Materials | (24,676) | Industrial Manufacturing Services | (2,392) |
| Paper Materials and Products | (13,272) | Industrial Cleaning Services | (99) |
| Fuel and Lubricant Materials | (14,142) | Environmental Services | (66) |
| Mining, Oil, Gas Equipment | (38,402) | Transportation, Storage Services | (742) |
| Agricultural Equipment | (4,718) | Management Professional Services | (1,954) |
| Building, Construction Machinery | (46,447) | Engineering, Research Services | (902) |
| Manufacturing Machinery | (60,038) | Editorial, Design, Graphic Services | (721) |
| Handling, Storage Equipment | (62,237) | Public Utilities, Public Services | (379) |
| Transport Vehicles | (72,908) | Financial, Insurance Services | (619) |
| Power Generation Machinery | (46,447) | Healthcare Services | (306) |
| Tools, General Machinery | (25,310) | Educational, Training Services | (888) |
| Building, Construction Components | (117,724) | Travel, Food, Entertainment | (707) |
| Manufacturing Components | (141,868) | Personal, Domestic Services | (1,501) |
| Electronic Components | (32,824) | Security, Safety Services | (1,302) |
| Electrical, Lighting Components | (29,533) | Political, Civic Affairs Services | (1,370) |
| Distribution Systems | (64,970) | Organizations, Clubs | (949) |
| Laboratory Equipment | (86,989) | | |
| Medical Equipment | (72,273) | | |
| IT, Telecommunications | (41,423) | | |
| Office Equipment | (27,540) | | |
| Printing, Audio, Visual Equipment | (42,575) | | |
| Security, Safety Equipment | (86,177) | | |
| Cleaning Equipment | (43,115) | | |
| Service Industry Machinery | (15,197) | | |
| Sports, Recreational Equipment | (49,766) | | |
| Food, Beverages, Tobacco | (117,597) | | |
| Drugs, Pharmaceuticals | (24,883) | | |
| Domestic Appliances | (37,237) | | |
| Apparel, Luggage, Personal Care | (144,529) | | |
| Jewellery, Gemstones | (18,243) | | |
| Publications, Signage Products | (29,839) | | |
| Furniture, Furnishings | (8,479) | | |
| Entertainment, Education | (90,913) | | |

Source: ASEAN + 3 e-TradeShow.org. <<http://www.etradeshows.org/index.jsp>>

The SMEs network under ASEAN+3 cooperation is relatively new and is still rather rudimentary. It functions as a trade-related information hub which benefits enterprises within member countries and in the rest of the world. There is no government agenda, agreement or issue to strengthen the role of SMEs in this cooperation arrangement. Cooperation with SMEs might seem weak, on the one hand. On the other hand, however, this information-hub function serves in a supportive role for broader cooperation and for the SMEs network of APEC, which includes most of the countries that belong to ASEAN+3. From this perspective, since there are governmental agreements in a broader cooperation framework, the ASEAN+3 SMEs network is an element of the overall SMEs development scheme that uses new information and communications technology in the region.

VI. Conclusions and recommendations

A. Conclusions

After the 1997 economic crisis, the growth rate of the IT market was considerable, namely, 35.4% in 1999 and 39.8% in 2000. The market value has been over 1.2 billion US\$ since 2000. Telecommunications is the sector that uses IT the most. However, the IT penetration ratio in Thailand is relatively low. Computer-equipped firms accounted for only 10.6% of the total, and these companies were concentrated in Bangkok and the surrounding area. Only half of all firms using computers have access to Internet and less than 10% have their own websites. Most of the websites are used in the tourist industry and are at the beginning stages, using them for advertising only. Only 11.42% of all websites are at an advanced stage and are used for a number of purposes, such as purchasing, clearing or logistics.

It is generally recognized that SMEs are presently the most important and fundamental organizations for accelerating national economic development. They play crucial roles and functions in helping large enterprises increase production efficiency by supplying primary spare parts and components. In the year 2002, there were 1,645,530 enterprises in Thailand. Among these, 99.63% were SMEs.

Even though IT is the key element for international and domestic trading, only a small number of Thai SMEs use IT for increasing their productivity and efficiency and for trading. Since the world economy is becoming a digital economy, the uses of electronic networks or electronic media should not be ignored. Consequently, Thai SMEs in general are unable to compete on the world market.

Chatchawal Orchid Co., Victor Packing Co., and Nuntiya Care Stone Co. are the case studies discussed in this paper. Nuntiya Care Stone Co. represents a successful case of using IT for international trading. The company website, www.ThaiGem.com, has reached the full scale of e-commerce. There were more than one million visitors with total sales of 4 million US\$ a month. The website also provides real-time online trading information.

Chatchawal Orchid Co. is a case of an SME using e-commerce at the beginning stage. The company website, www.qualitygreen.com, is used for advertising purposes only.

Victor Packing Co. is a successful SME that does not use e-commerce. However, the company is using IT for increasing the productivity and efficiency of its organization.

The Thai government has recognized the benefits of IT use for SMEs. However, the cost of using IT may be too high for small organizations. The Thai government is planning to create a positive environment for SMEs by using IT for SME capacity building, financial assistance and human resource development. E-government is one of the projects designed to ease all barriers of IT use by SMEs. This programme includes e-procurement, e-revenue, e-license, e-payment and e-auctions, for example. The Thai government has also established several institutions to create this positive environment, such as the Electronic Commerce Resource Centre (ECRC, www.ecommerce.or.th). There are several websites used that serve SMEs as trading places, such as www.Thaitambon.com and www.Siamvillage.net

Regional networks have also been established to assist SMEs. The ASEAN+3 SMEs Network has been set as the largest online meeting place for suppliers and buyers in the ASEAN+3 region and the number one destination for buyers from the rest of the world to purchase products made in Asia.

B. Recommendations

The factors that affect the slow pace of IT use by Thai SMEs are as follows:

1. Thailand has some of the most competitive pricing in terms of individual users, i.e., dial-up services. However, Thailand has some of the most expensive lease-line prices, making it less competitive. Thailand is five times more expensive than Hong Kong (China), four times more expensive than Japan and three times more expensive than Singapore. The core of the problem is the monopoly in the telecommunications sector, which is largely controlled by the Communications Authority of Thailand. In order to lower IT costs, market liberalization must be given priority.

2. With a population of more than 60 million, Thailand only has 1.4 million computers. The electronic market is too small for e-commerce to be profitable on the domestic market. The low level of computerization in Thai society can be explained by the lack of information technology infrastructure and the low IT literacy rate. The transformation of the whole society to an IT society has to be accomplished through implementation on the part of the Thai Government.

3. The inadequate IT law structure is an IT burden as well. The Thai government is introducing six bills relating to e-commerce, namely, an e-commerce law, a digital signature law, a law on computer-related crime, an electronic funds transfer law, and the national information infrastructure law. The real problem may not be the laws themselves, but rather how the law is implemented, such as through the establishment of a neutral body to be the certification authority and the gateway for monitoring the inflow-outflow of e-commerce trade.

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