# Thailand ICT Indicators 2005

February, 2005

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# Content

List of Figures ..... 4

List of Tables ..... 5

Introduction ..... 6

Thailand at a Glance ..... 8

I Broadcasting ..... 9

II Computer Usage ..... 15

III Telecommunications ..... 17

IV Internet ..... 26

V e-Commerce ..... 39

VI ICT Market and Industry ..... 49

VII ICT in Government ..... 58

VIII ICT Human Resource ..... 68

IX Research and Development ..... 72

List of Contributors ..... 78

List of Abbreviations ..... 79

# List of Figures


Figure 1.1 Percentage of Households with Television/Radio ..... 10
Figure 1.2 Percentage of Population Listening to Radio and Watching Television by Level of Educational Attainment (2003) ..... 12
Figure 2.1 Percentage of Business Establishments with Computers (2003) ..... 14
Figure 3.1 Number of Telephone Lines (1999-2004) ..... 18
Figure 3.2 Number of Fixed Lines per 100 Inhabitants (1999-2004) ..... 19
Figure 3.3 Number of Fixed Lines per 100 Inhabitants by Location (1999-2004) ..... 20
Figure 3.4 Number of Mobile Users (2000-2004) ..... 21
Figure 3.5 Number of Mobile Users per 100 Inhabitants by Location (2003) ..... 21
Figure 3.6 Market Share of Mobile Phones by System and Service Provider (2004) ..... 22
Figure 3.7 International Telephone Calls (1999-2003) ..... 23
Figure 3.8 Number of Telex Services (Outgoing) (1999-2003) ..... 24
Figure 3.9 Number of Domestic Mails Received (1999-2003) ..... 25
Figure 4.1 Number of Internet Users (1998-2004) ..... 27
Figure 4.2 Internet Users: Bangkok vs Others (2001-2004) ..... 27
Figure 4.3 Internet Users by Gender (2001-2004) ..... 28
Figure 4.4 Internet Users by Age (2004) ..... 29
Figure 4.5 Mode of Access to the Internet (2003) ..... 30
Figure 4.6 Average Online Time per User (1999-2003) ..... 31
Figure 4.7 Top Ten Internet Activities (2003) ..... 32
Figure 4.8 Thailand Domestic Internet Traffic Volume (1998-2004) ..... 34
Figure 4.9 Total Domestic Exchange Bandwidth (End of Period) (1998-2004) ..... 34
Figure 4.10 International Internet Bandwidth (1998-2004) ..... 35
Figure 4.11 Distribution of .th Domain Names (2004) ..... 36
Figure 4.12 Virus Distribution during December 2003 to November 2004 ..... 38
Figure 5.1 Percentage of Establishments with ICT by Region (2003) ..... 40
Figure 5.2 Percentage of Establishments with ICT by Size (2003) ..... 40
Figure 5.3 Percentage of Establishments with Computers by Economic Activities (2003) ..... 41
Figure 5.4 Percentage of Establishments with Internet Access by Economic Activities (2003) ..... 42
Figure 5.5 Percentage of Establishments with Web Site by Economic Activities (2003) ..... 42
Figure 5.6 Registered e-Commerce Entrepreneurs by Registration Type (2004) ..... 44
Figure 5.7 Registered e-Commerce Entrepreneurs by Location (2004) ..... 44
Figure 5.8 Registered e-Commerce Web Sites by Domain Name (2004) ..... 45
Figure 5.9 Internet Purchase Experience (1999-2003) ..... 46
Figure 5.10 Reasons Against Internet Purchase (2003) ..... 46
Figure 5.11 Online Spending (2003) ..... 47
Figure 5.12 Value of Online Trading (2003-2004) ..... 47
Figure 5.13 Number of Online Trading Customers (2000-2004) ..... 48
Figure 5.14 Value and Volume of Internet Banking Transaction (2000-2004) ..... 48
Figure 6.1 Thailand IT Market by Category (1997-2004) ..... 52

Figure 6.2 Software Industry Spending by Sector (2002-2003) ..... 54
Figure 6.3 Software Piracy Rate in Thailand (1994-2002) ..... 55
Figure 6.4 Trade in ICT Goods (1999-2004) ..... 57
Figure 7.1 Government Budget on Computer Equipment (1998-2004) ..... 59
Figure 7.2 Number of Government Web Sites by Type of Online Services (2004) ..... 61
Figure 7.3 Basic Information on Government Web Sites (2004) ..... 62
Figure 7.4 Type of Interaction Feature on the Government Web Sites (2004) ..... 63
Figure 7.5 Type of Transaction Feature on the Government Web Sites (2004) ..... 64
Figure 7.6 Security System on the Government Web Sites (2004) ..... 65
Figure 7.7 Main Assessment of the Government Web Sites (2004) ..... 66
Figure 7.8 Value of Government e-Auction (2002-2004) ..... 67
Figure 8.1 Number of Science and Technology Graduates VS Social Science Graduates (1999-2001) ..... 69
Figure 8.2 Number of Workforce Attended and Completed IT Training of the Ministry of Labour (1998-2003) ..... 71
Figure 9.1 The Ratio of ICT R&D Expenditures by Sector (1996-2001) ..... 74
Figure 9.2 R&D Personnel in ICT Field (1996-2001) ..... 76
Figure 9.3 ICT R&D Researchers by Sector (2001) ..... 77

# List of Table

Table 1.1 Percentage of Households with Television/Radio by Region (2003) ..... 11
Table 2.1 Percentage of Households with Computers (2001-2004) ..... 14
Table 2.2 The Ratio of Business Establishments with Computers by Size of Firms (2003) ... 15
Table 2.3 Students to Computer Ratio (2004) ..... 16
Table 4.1 Internet Penetration by Location (2001-2004) ..... 28
Table 4.2 12 Top Ten Most Visited Web Sites ..... 33
Table 4.3 Distribution of .th Domain Names (1997-2004) ..... 35
Table 4.4 Report of Virus Infected e-mails during December 2003 to November 2004
Table 5.1 e-Commerce Transaction Value (2003) ..... 45
Table 6.1 Thailand IT Market by Category (1997-2004) ..... 51
Table 6.2 Thailand IT Market by Industry Sector (1997-2004) ..... 53
Table 6.3 Source of Software Industry Revenue by Sector (2002-2003) ..... 55
Table 7.1 Budget Approved for Computer in Fiscal Year 2005 ..... 59
Table 8.1 Gross Enrollment Ratio ..... 68
Table 8.2 ICT Workforce (2001-2003) ..... 70
Table 9.1 National R&D Expenditures (1991-2001) ..... 72
Table 9.2 Budget Allocation for Research and Development by Field of Research (2001-2002) ..... 73
Table 9.3 ICT R&D Expenditures by Sector (1996-2001) ..... 74
Table 9.4 R&D Personnel Classified by Occupation and Field of Research (2001) ..... 75

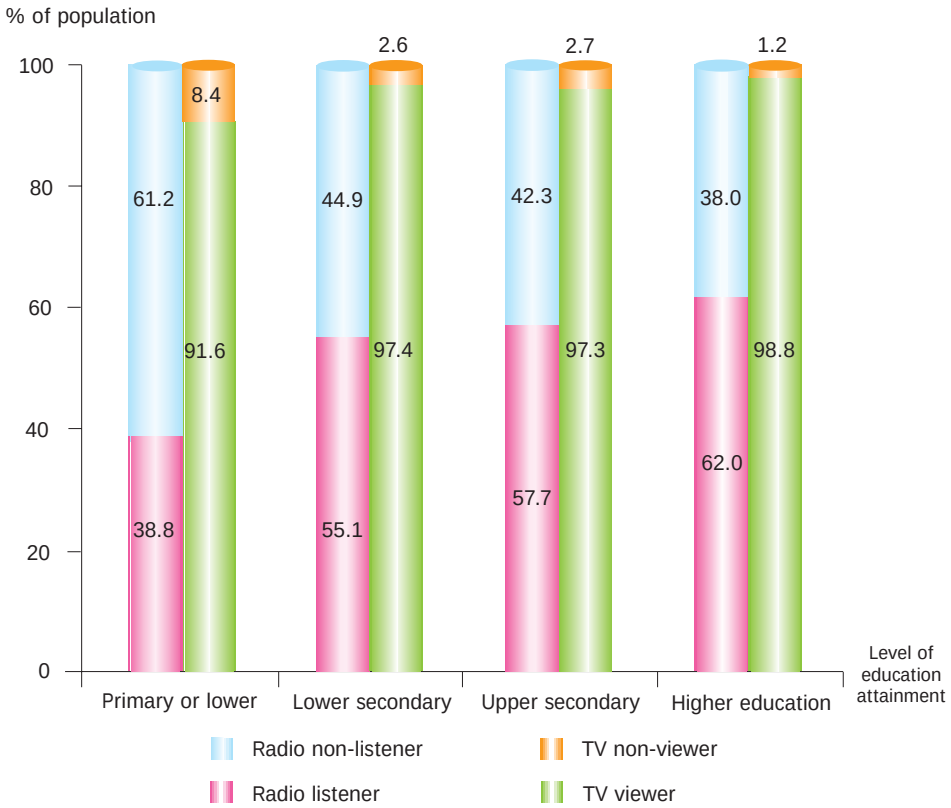
## Table 1.1 Percentage of Households with Television/Radio by Region (2003)

| | 2003 |
|---|---|
| Households with television sets | |
| Bangkok | 94.2 |
| Central | 93.3 |
| North | 91.0 |
| Northeast | 93.1 |
| South | 90.0 |
| Households with radio sets | |
| Bangkok | 63.7 |
| Central | 48.4 |
| North | 57.1 |
| Northeast | 44.3 |
| South | 51.3 |

Source: National Statistical Office (NSO)

The survey further reveals the usage pattern. Nearly all population with the age of 6 years and over (94.5%) watch televisions, while less than half (42.8%) listens to the radio. Factors such as educational level, gender and occupation, were also examined whether they are influential to the usage pattern. For instance, Figure 1.2 shows that, for population who are 15 years old and over, educational level has little effect on television viewing, but greatly impinge on radio use. In the latter case, there was a reverse pattern between those who are least educated and most educated.

## Figure 1.2 Percentage of Population Listening to Radio and Watching Television by Level of Educational Attainment (2003)




Source: National Statistical Office (NSO)

For television, the most popular program is entertainment (51.6%), followed by news (47.2%), general knowledge or documentary (0.9%), and others (0.3%). At present, there are six free TV channels (with commercial advertisement broadcasted) in Thailand. For cable TV, subscribers for United Broadcasting Corporation (UBC), the main operator in the market, reached 439,928 in the second quarter of 2004[1].

[1](ubctv.com/Aboutubc/thaiSubScriberNo_List_front_th.aspx)

# II

# Computer Usage

In 2003, the Ministry of Information and Communication Technology (MICT) launched a major initiative to make widely available "low-cost" PCs to the general public as well as civil servants. The PCs distributed through this project was bundled with the open-source software, i.e., Office TLE, which has equivalent functions to the Microsoft Office packages. Shortly after the launch of the project, Microsoft had announced a drastic price reduction, to approximately US$ 35, for an individual user who purchased a PC under this project. Moreover, a "low-interest" fund was also made available for those in need. This fairly "well-designed" package has generated much interest from those who were considering buying a home-use PC for the first time. It was reported that more than 200,000 units were purchased under this program, causing a big jump in the PC penetration rate in Thailand, as seen in Table 2.1.

The rise in the penetration, however, does not only result from the purchase of PCs under this project alone. What has been observed was that this project has also induced competition in the local PC market. In other words, manufacturers who did not participate in the project has cut down their price significantly in order to compete and get some marker share.

As a result, the PC penetration in Thailand has risen significantly over the past two years, with the percentage of households with computers arising from 5.1% in 2001 to nearly 11% in mid 2004. Nevertheless, the problem of digital divide still prevails, with household and business establishments in Bangkok having greater access to computers than those residing outside Bangkok (Table 2.1).

## Table 2.1 Percentage of Households with Computers (2001-2004)

| Year | 2001 | 2003 | 2004 |
|---|---|---|---|
| Overall | 5.1 | 8.2 | 11.1 |
| Bangkok | 19.8 | 24 | 28.1 |
| Central* | 5.1 | 7.5 | 11.6 |
| North | 2.8 | 6.1 | 9.0 |
| Northeast | 2.0 | 4.5 | 6.3 |
| South | 2.3 | 6.1 | 8.6 |

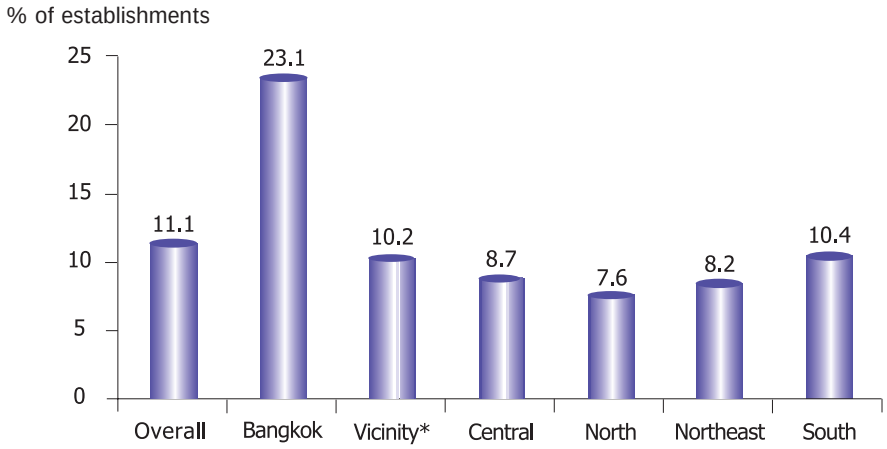
Remark: *Exclude Bangkok

Source: Report on the 2001 Survey on Information Technology, NSO

Report on the 2003 Survey on Information Technology, NSO

Report on the Information and Communication Technology Survey (Household) 1st quarter 2004, NSO

## Figure 2.1 Percentage of Business Establishments with Computers (2003)




Source: Report on the 2004 Information and Communication Technology Survey on Business Establishment

Remarks: *Vicinity includes Pathumthani, Nonthaburi, Samut Prakarn, Samut Sakorn and Nakorn Pathom

The size of firms, classified by the number of employees, is related to the extent to which firms absorb new technology. By and large, the larger the firm is, the more likely it will own and use computer in its business (Table 2.2). In this respect, small and medium enterprises (SMEs), which are fundamental to Thai economy, have not widely adopted the new technologies. The National ICT Master Plan (2002-2006), therefore, has devised a strategy which aims to increase the use of ICT among SMEs.

## Table 2.2 The Ratio of Business Establishments with Computers by Size of Firms (2003)

| Firm Size | % |
|---|---|
| 1-15 employees | 10.1 |
| 16-25 employees | 72.4 |
| 26-30 employees | 68.7 |
| 31-50 employees | 78.2 |
| 51-200 employees | 90.1 |
| more than 200 employees | 97.4 |

Source: National Statistical Office (NSO)

Regarding the use of computers for education, the ratio of students per computer is rather high. That means computer resources have to be shared by among large number of students (Table 2.3). According to the National ICT for Education Master Plan (2004-2006) from Ministry of Education, the number of students sharing one computer in primary schools, secondary schools, and vocational institutions targeted at 120, 54, and 23 respectively. However, the figures in Table 2.3 show that such targets have already been achieved, especially in primary and secondary schools.

## Table 2.3 Students to Computer Ratio (2004)

| Educational Level | Number of Students | Number of PCs | Number of Students per 1 PC |
|---|---|---|---|
| Primary | 6,595,828 | 73,292 | 90 |
| Secondary | 2,539,657 | 105,674 | 24 |
| Vocational | 686,737 | 25,699 | 27 |
| Higher Education* | 645,089 | 78,290 | 8 |
| Non-Formal Education | 2,342,751 | 3,311 | 708 |

Source: Office of the Permanent Secretary, Ministry of Education (MOE)

Remarks: *Exclude private universities

In early 2004, the MICT initiated an "ICT for Children" project. The main objective was to increase ICT diffusion in schools, especially those that serve the deprived areas. Other objectives were to introduce social-engineering measures to increase ICT awareness and adoption in the community and to establish a scalable and sustainable framework for helping schools nationwide. Under this project, used computers were provided to rural schools. In addition, the ICT skills training were provided for both users in schools at all levels and for unskilled or unemployed people in the community.

# III

# Telecommunications

The Thai telecommunication sector has just crossed the threshold. After long awaiting, the National Telecommunications Commission (NTC) was set up in August 2004. The market structure of the telecom sector in the absence of NTC remains unchanged from the year 2003, with the number of operators in both fixed-line and mobile sector the same as in 2003.

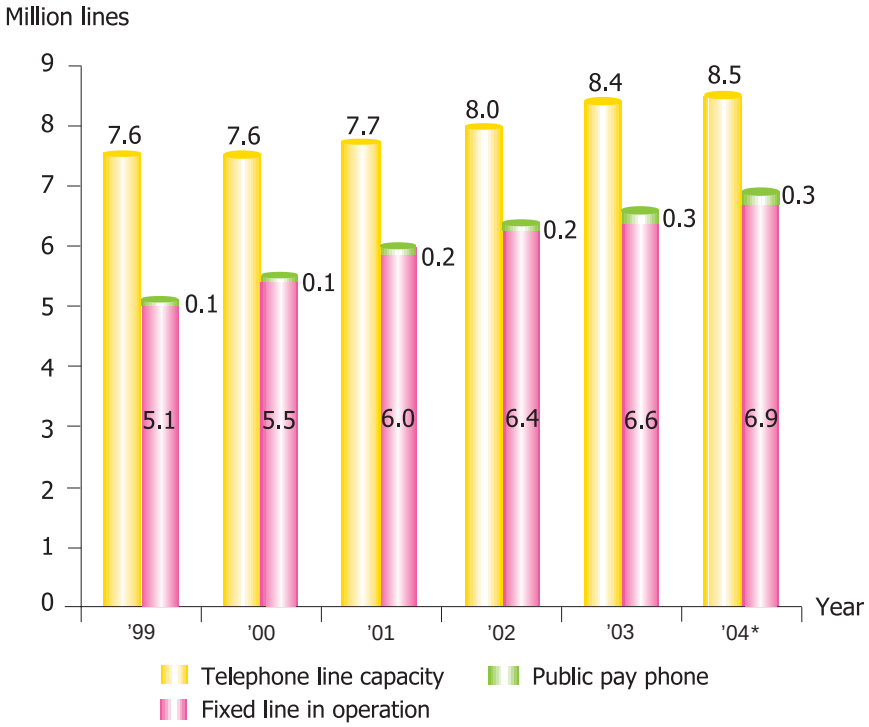
Fixed-line service providers include TOT Corporation Public Company Limited, True (previously TelecomAsia Corporation) and TT&T Public Company Limited. Solely international service provider is CAT Telecom Public Company Limited.

Mobile phone service operators are

- Advance Info Service Plc. (AIS): GSM 900-MHz and GSM 1800-MHz mobile phone
- Total Access Communication Plc. (DTAC): Cellular and digital 1800-MHz mobile phone
- Thai Mobile Company Limited: 1900-MHz CDMA mobile phone
- Hutchison CAT Wireless Multimedia Ltd.: CDMA mobile phone
- TOT Corporation Plc.: 470-MHz or cellular 470 mobile phone
- CAT Telecom Plc.: cellular AMPS 800 A-Band mobile phone

The growth in telephone penetration has been sluggish over the past couple of years, with number of fixed line subscribers increase only slightly. Although the fixed-line penetration in upcountry has been increasing at a greater rate than in Bangkok, the digital divide still prevails.

## Figure 3.1 Number of Telephone Lines (1999-2004)

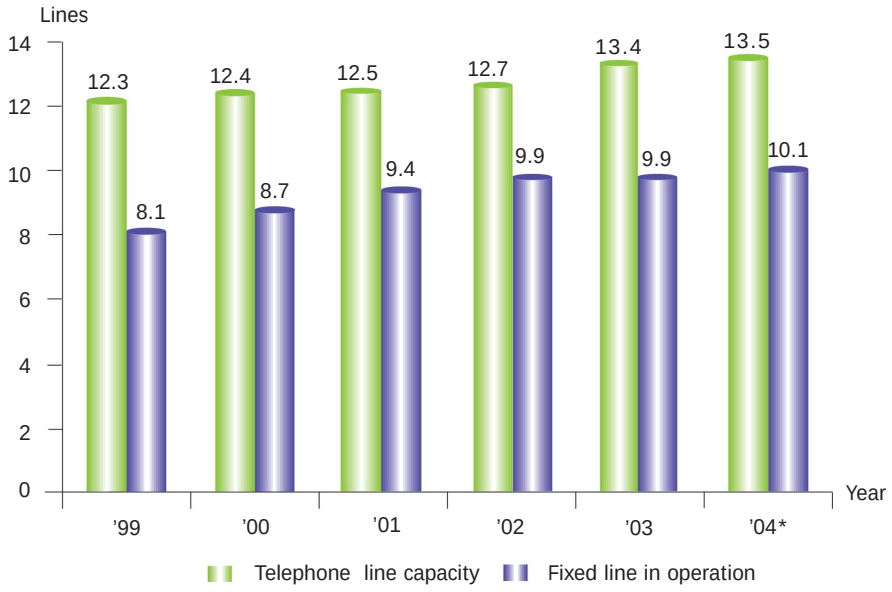



Source: TOT Corporation Plc. (formerly the Telephone Organization of Thailand)

Remarks: *as of March 2004

**Note:** All data presented in telecom section from 2002 onwards are collected in the calendar year. Previous data are in the fiscal year, which is the 12 months beginning October 1 of the year stated.

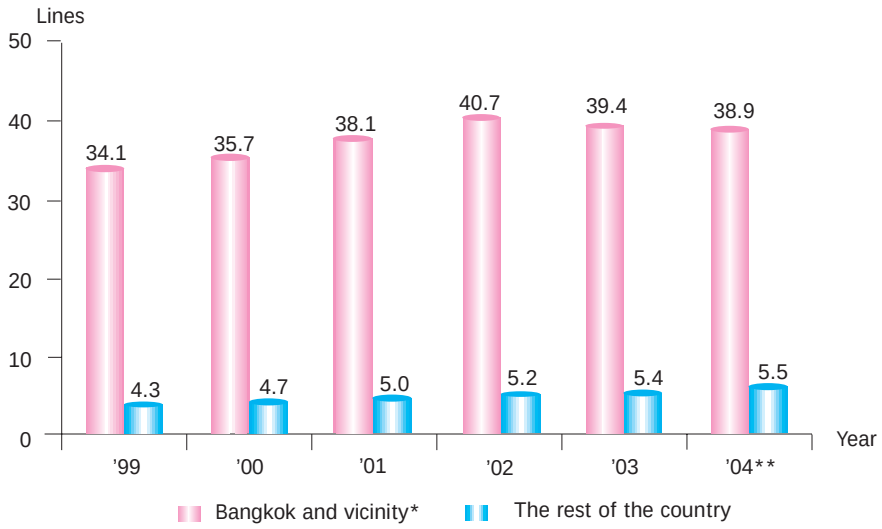
## Figure 3.2 Number of Fixed Lines per 100 Inhabitants (1999-2004)




Source: TOT Corporation Plc. (formerly the Telephone Organization of Thailand)

Remarks: *as of March 2004

## Figure 3.3 Number of Fixed Lines per 100 Inhabitants by Location (1999-2004)




Source: TOT Corporation Plc. (formerly the Telephone Organization of Thailand)

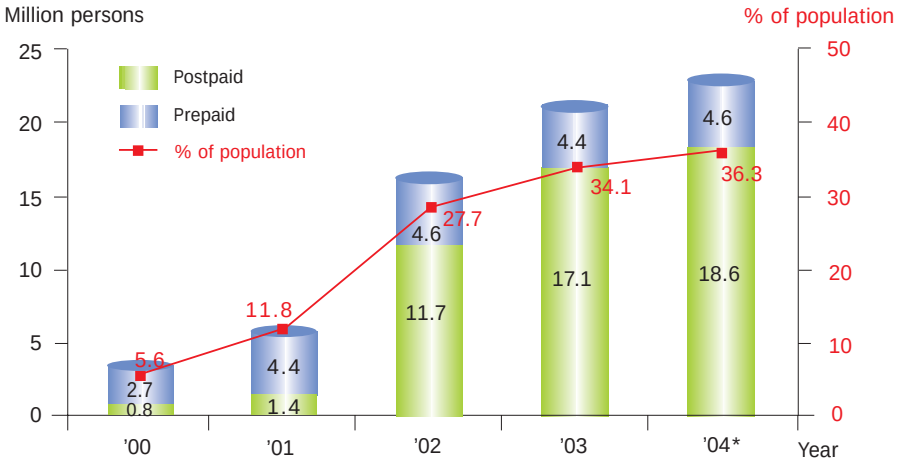
Remarks: *Vicinity includes Pathumthani, Nonthaburi and Samut Prakarn
**as of March 2004

The mobile market experienced an exponential growth in number of users from 5.8 million in 2001 to 16.3 million in 2002. The increase from 2002 to 2003, however, was merely half of that. The growth of mobile users in 2004 is expected to remain sluggish as the penetration has reached as high as 36.3%.

A rapid growth of mobile market in the past few years, nonetheless, has not yet solved the digital divide problem. As Figure 3.5 shows, only 13.3% of population in the Northeast region have access to a mobile phone, compared to 42.4% of population in Bangkok and vicinity.

The market is dominated by Advance Info Service Plc. (AIS) with 58.3% share, followed by DTAC 30.3%, Orange 8% and Hutch 2.5%. With regard to the system, 900 Mhz gains the highest 58.3%, followed by PCN 1800 (37.9%), CDMA (2.5%), AMPS 800 (0.7%), and 1900 MHz (0.6%) as presented in Figure 3.6.

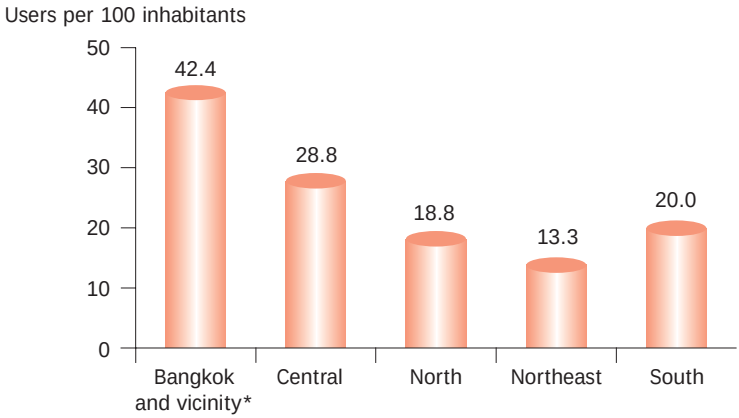
## Figure 3.4 Number of Mobile Users (2000-2004)




Source: CAT-Telecom Plc. (formerly the Communications Authority of Thailand)
TOT Corporation Plc. (formerly the Telephone Organization of Thailand)

Remarks: *as of March 2004

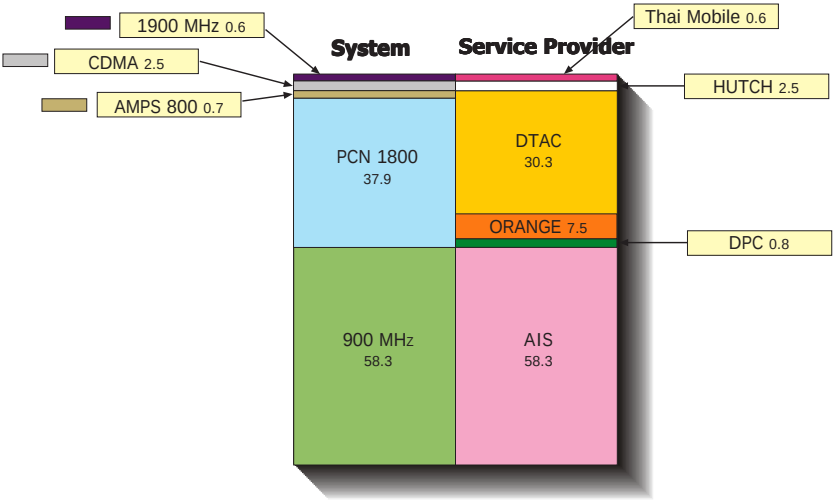
## Figure 3.5 Number of Mobile Users per 100 Inhabitants by Location (2003)




Source: National Statistical Office (NSO)

Remarks: *Vicinity includes Pathumthani, Nonthaburi, Samut Prakarn, Samut Sakhon and Nakhon Pathom

## Figure 3.6 Market Share of Mobile Phones by System and Service Provider (2004)




### Mobile Users by System (2004*)

| System | Number of Users | % |
|---|---|---|
| 900 MHz | 13,539,148 | 58.3 |
| PCN 1800 | 8,815,356 | 37.9 |
| CDMA | 590,198 | 2.5 |
| AMPS 800 | 150,220 | 0.7 |
| 1900 MHz | 142,610 | 0.6 |
| 470 MHz | 6,176 | 0 |
| total | 23,243,708 | 100 |

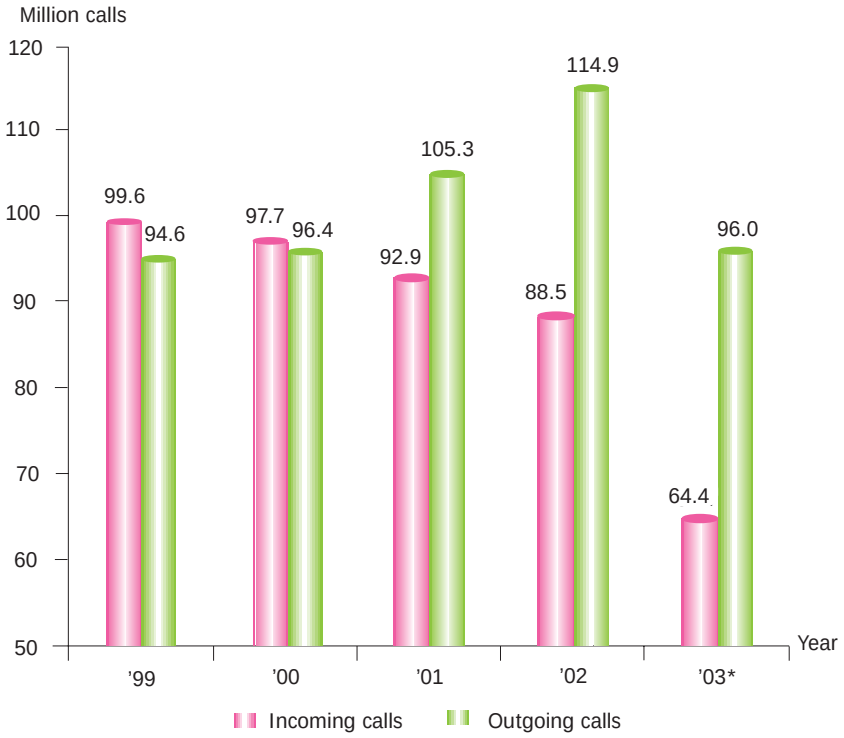
### Mobile Users by Service Provider (2004*)

| Service Provider | Number of Users | % |
|---|---|---|
| AIS | 13,539,148 | 58.3 |
| DTAC | 7,029,979 | 30.3 |
| Orange | 1,743,384 | 7.5 |
| Hutch | 588,398 | 2.5 |
| DPC | 192,213 | 0.8 |
| CAT | 1800 | 0.0 |
| TOT | 6176 | 0.0 |
| Thaimobile | 142610 | 0.6 |
| Total | 23,243,708 | 100.0 |

Source: CAT Telecom Plc. (formerly the Communications Authority of Thailand)
TOT Corporation Plc. (formerly the Telephone Organization of Thailand)

Remarks: *as of March 2004

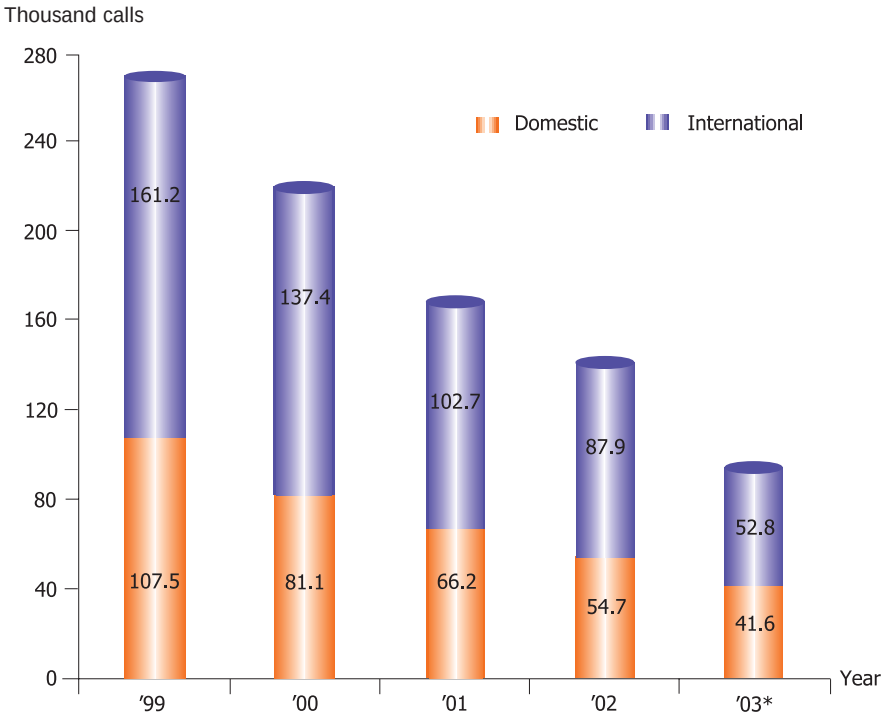
## Figure 3.7 International Telephone Calls (1999-2003)




Source: CAT Telecom Plc., (formerly the Communications Authority of Thailand)
Remarks: *as of August 13, 2003

Previously, the competition in the telecom sector (fixed-line and mobile) tends to be on non-price area. Major operators, particularly mobile operators, compete using product differentiation through service quality, advertising and value-added services. However, price competition is now heating up. Fixed-line operators drastically cut down the price for long distance and international calls, reflecting in an increase in the ratio of outgoing calls to incoming calls as seen in Figure 3.7. For mobile, the price, particularly for pre-paid option, went down to as cheap as as one baht per minute.

## Figure 3.8 Number of Telex Services (Outgoing) (1999-2003)

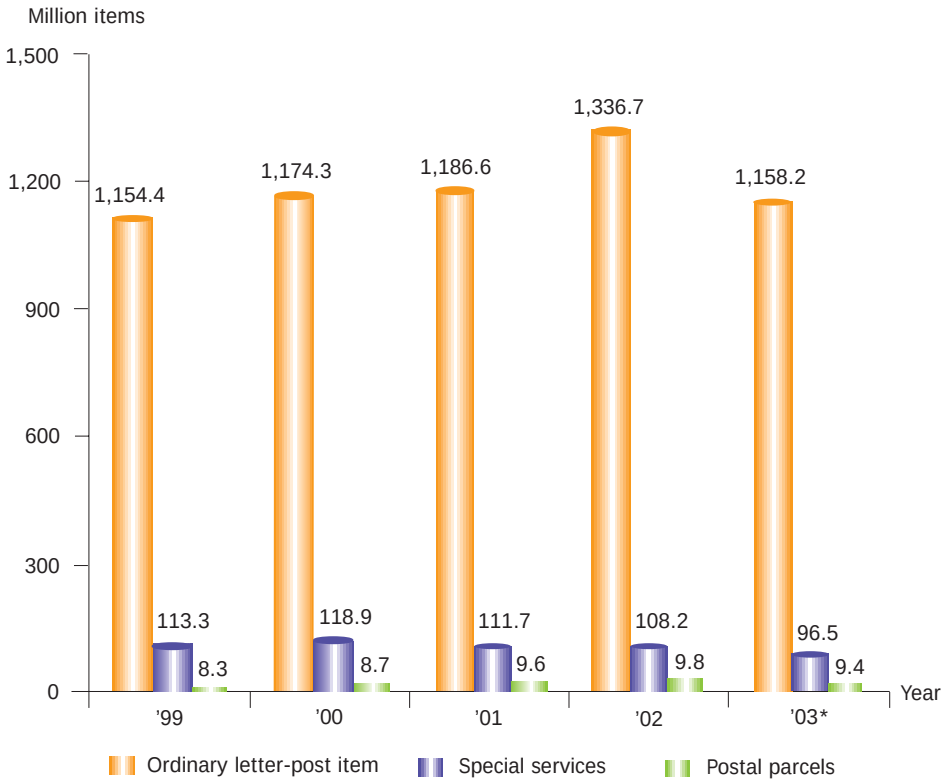



Source: CAT Telecom Plc. (formerly the Telephone Organization of Thailand)

Remarks: *as of August 13, 2003

Telex service becomes the latest victim of ICT revolution as the number of outgoing calls went down sharply from 268.7 thousands in 1999 to 142.6 thousands in 2002. With just one quarter left in 2003, there is no sign of recovery since throughout the year only 94.4 thousand calls were made.

## Figure 3.9 Number of Domestic Mails Received (1999-2003)




Source: CAT Telecom Plc., (formerly the Communications Authority of Thailand)

Remarks: *as of August 13, 2003

Although the emergence of ICT and the Internet as new mainstream communication tools has contained the use of telex service, postal service remains intact with the number of domestic mails received in the past five years constantly rising. Through three quarters of 2003, 1,158.2 million ordinary letter-post items and 9.4 million postal parcels have been delivered to the customers. These figures are well on course to break a 2002 record which both categories reached a high of 1,336.7 and 9.8 million items, respectively.

# IV

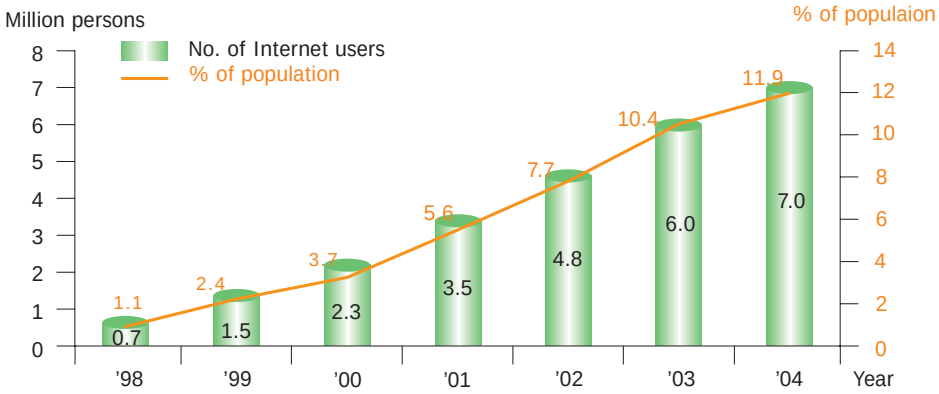
# Internet

Internet is increasingly instrumental to information and knowledge access in the Thai society. It is also a vital infrastructure for business communication and transaction. The growth of Internet users is steadily increasing and reaches approximately 7 million users in 2004, equal to 11.9 users for every 100 population (Figure 4.1).

Internet users are concentrated in Bangkok and other big cities. Nevertheless, the proliferation of Internet users has recently emerged in all regions outside Bangkok (Table 4.1). There is no apparent gender divide in Thailand. Both men and women have nearly equal access to the Internet (Figure 4.3).

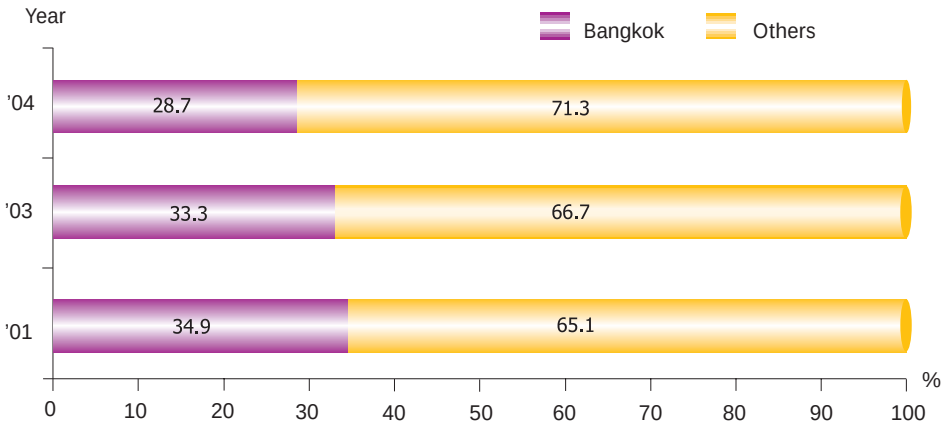
Another area where digital divide clearly presents is the distribution of users among different age group. Population at the age of 15-24 represents more than half of the Internet users. Elderly population (50 years old and over), on the other hand, represents only 3.2% of Internet users (Figure 4.4).

## Figure 4.1 Number of Internet Users (1998-2004)




Sources: National Electronics and Computer Technology Center (NECTEC)
National Statistical Office (NSO)

## Figure 4.2 Internet Users: Bangkok VS Others (2001-2004)




Sources: National Electronics and Computer Technology Center (NECTEC)

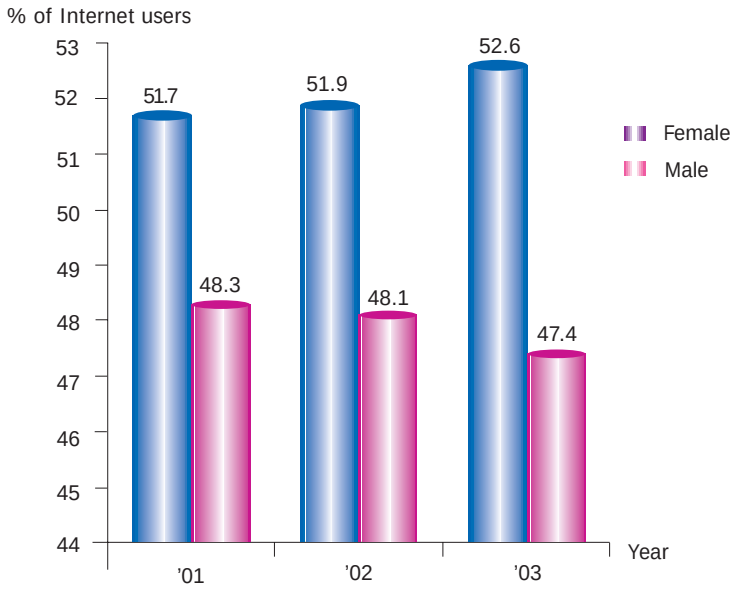
## Table 4.1 Internet Penetration by Location (2001-2004)

| Region | Number of users (million persons) | | | Users per 100 Inhabitants | | |
|---|---|---|---|---|---|---|
| | 2001 | 2003 | 2004 | 2001 | 2003 | 2004 |
| Whole kingdom | 3.53 | 6.03 | 6.97 | 5.6 | 10.4 | 11.9 |
| - Bangkok and vicinity* | 1.23 | 2.01 | 2.00 | 16.0 | 26.9 | 26.6 |
| - North | 0.52 | 1.34 | 1.52 | 4.6 | 10.1 | 11.2 |
| - Central | 0.83 | 1.00 | 1.21 | 5.9 | 9.7 | 11.4 |
| - Northeast | 0.56 | 1.07 | 1.49 | 2.6 | 5.6 | 7.7 |
| - South | 0.39 | 0.62 | 0.76 | 4.7 | 8.2 | 9.9 |

Source: National Statistical Office (NSO)

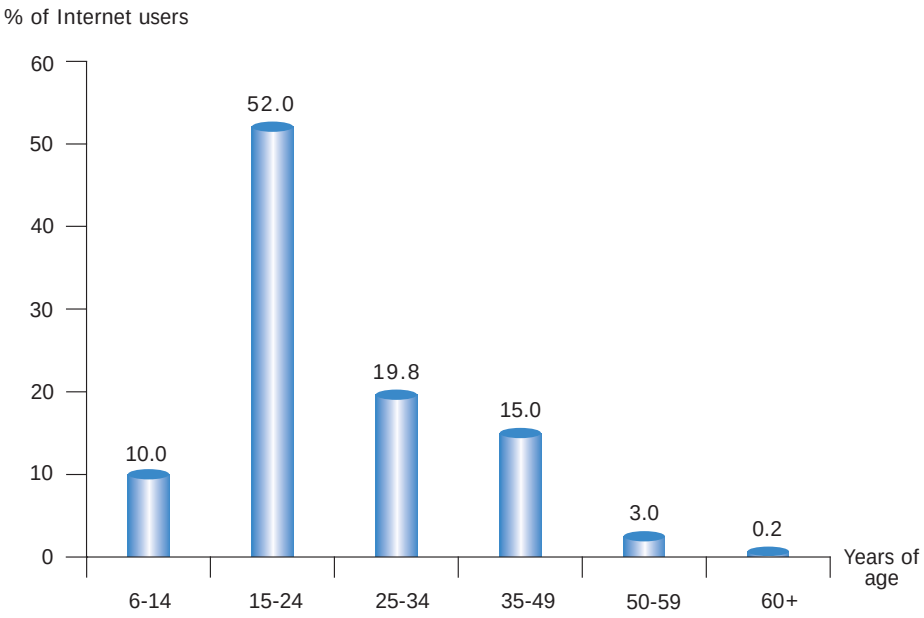
Remarks: *Vicinity includes Pathumthani, Nonthaburi, Samut Prakarn, Samut Sakhon and Nakhon Pathom

## Figure 4.3 Internet Users by Gender (2001-2003)



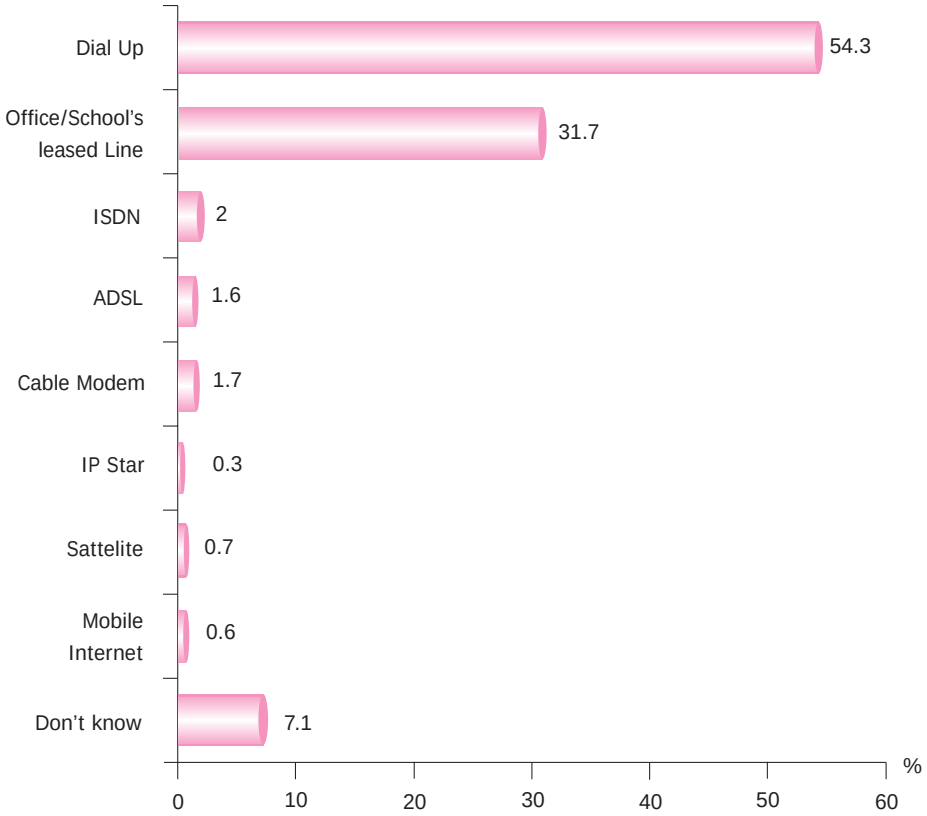

Source: National Statistical Office (NSO)

## Figure 4.4 Internet Users by Age (2004)




Source: National Statistical Office (NSO)

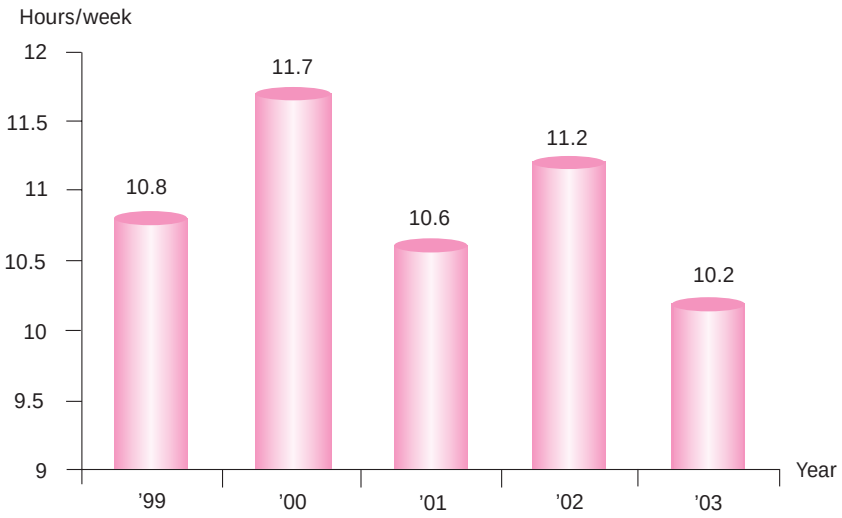
## Figure 4.5 Mode of Access to the Internet (2003)




Sources: National Electronics and Computer Technology Center (NECTEC)

The government is actively promoting broadband development, with the aim to increase the number of broadband subscribers to 1 million by the end of 2004. Although there is no exact information on the number of broadband users, it is estimated that there are currently around 200,000.

## Figure 4.6 Average Online Time per User (1999-2003)




Source: National Statistical Office (NSO)

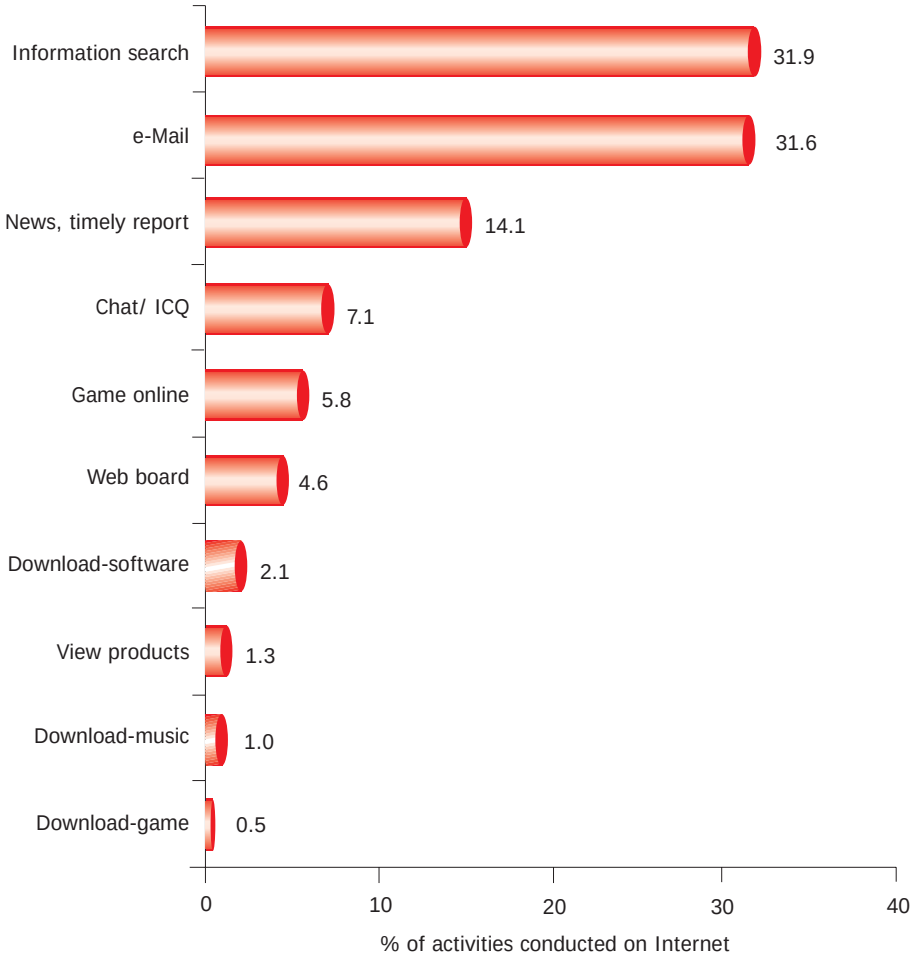
On average, users spend around 10-11 hours per week online. According to the latest Internet users survey (2003), most popular activities users conduct on the Internet are searching for information, using e-mail, and reading news and current issues (Figure 4.7). This pattern differs slightly from the previous years where e-mail was the most popular activity on the Internet. Nowadays the Internet is not just a communication channel but has become a common platform for information acquisition in the "Information Society".

In terms of entertainment, there was a rising popularity of "Online Games", which accounted for 2.3% and 5.8% of the activities on the Internet in 2002 and 2003 survey, respectively. Most players are younger than 20 years of age. The popularity of entertainment and games are confirmed by another statistics on the most frequently visited web sites in Table 4.2.

The popularity of online games has created a concern within the society for two main reasons: the excess amount of time being spent and the violent nature of some games. With the growing concerns that young people are becoming addicted to the online computer games, the Ministry of Information and Communication Technology (MICT) proposed the online gaming regulations, which was endorsed by the cabinet in November 2003. The new regulation would limit gaming among gamers under 18 years old to no more than three hours a day; ban online gambling; establish a new

registration process for places offering online gaming services; and run the awareness campaign on the negative impacts of game addiction. It will be sometimes before we can evaluate whether MICT approach is fruitful.

**Figure 4.7 Top Ten Internet Activities (2003)**




Source: National Electronics and Computer Technology Center (NECTEC)

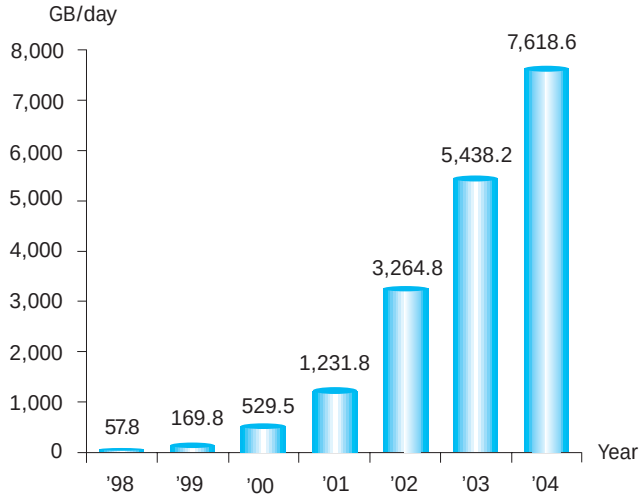
## Table 4.2 Top Ten Most Visited Web Sites

| Categories | % of Total Visited | |
|---|---|---|
| | Year 2002 | Year 2003 |
| 1. Entertainment | 33.1 | 29.6 |
| 2. Internet | 24.9 | 26.0 |
| 3. Business | 11.8 | 9.5 |
| 4. News | 8.6 | 7.0 |
| 5. Person | 6.0 | 6.0 |
| 6. Game | - | 5.0 |
| 7. Shopping | - | 3.3 |
| 8. Government | 2.2 | 2.4 |
| 9. Computer | 6.5 | 2.4 |
| 10. Education | 2.2 | 2.1 |

Source: http://truehits.net, Jan-Dec average

The growth of Internet bandwidth is also impressive. However, since 2002, most ISPs have opted for high quality fiber links and symmetric satellite services. Hence, the figures presented are inbound and outbound capacities, reflecting the "infrastructure" more than actual use. The domestic Internet traffic has also increased considerably from a mere 57.8 GB per day in 1998 to 7,618.6 GB per day in 2004.

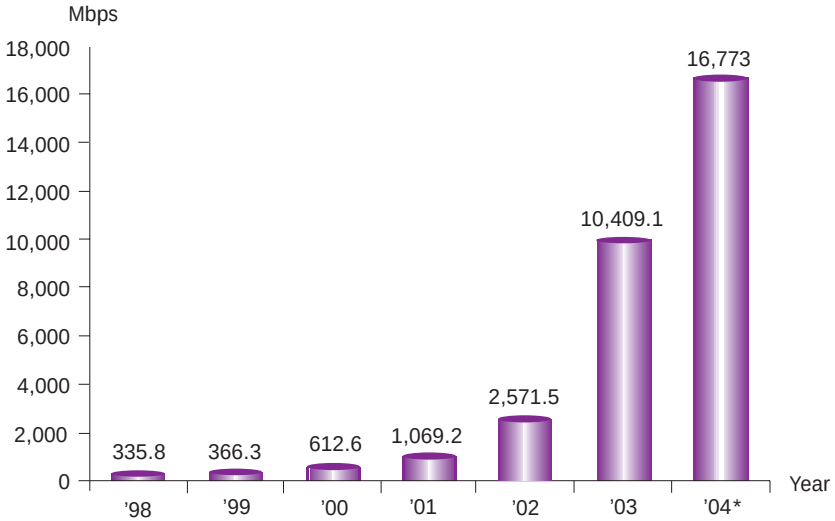
## Figure 4.8 Thailand Domestic Internet Traffic Volume (1998-2004)




Source: National Electronics and Computer Technology Center (NECTEC)

Remarks: *as of March 2004

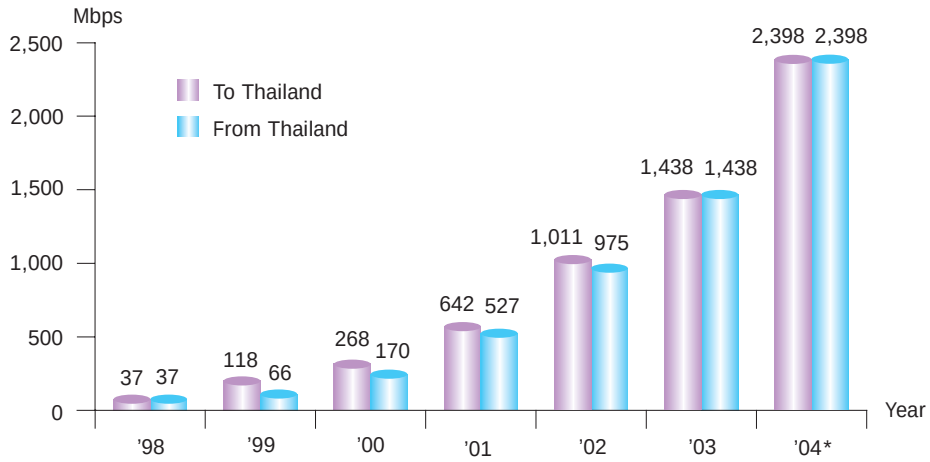
## Figure 4.9 Total Domestic Exchange Bandwidth (End of Period) (1998-2004)




Source: National Electronics and Computer Technology Center (NECTEC)

Remarks: *as of June 2004

## Figure 4.10 International Internet Bandwidth (1998-2004)




Source: National Electronics and Computer Technology Center (NECTEC)

Remarks: The international Internet bandwidth represents the capacity of the communication lines of the ISPs. During 1999-2002, many ISPs expanded their lines "simplex" satellite service in order to cope with their congestions in the inbound traffic. In late 2002, most ISPs opt for high-quality fiber links and symmetric satellite services. This resulted in equality between the inbound and outbound capacities.

*as of June 2004

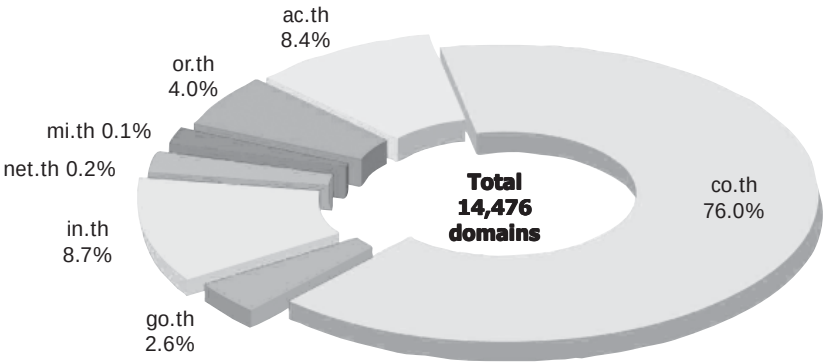
## Table 4.3 Distribution of .th Domain Names (1997-2004)

| Year | ac.th | co.th | go.th | in.th | mi.th | net.th | or.th | Total |
|---|---|---|---|---|---|---|---|---|
| 1997 | 156 | 767 | 70 | - | 2 | 17 | 89 | 1,101 |
| 1998 | 230 | 1,730 | 88 | - | 4 | 18 | 160 | 2,230 |
| 1999 | 313 | 2,927 | 108 | 242 | 6 | 21 | 217 | 3,834 |
| 2000 | 423 | 4,774 | 210 | 804 | 7 | 23 | 312 | 6,553 |
| 2001 | 624 | 6,573 | 229 | 1,084 | 10 | 24 | 416 | 8,924 |
| 2002 | 839 | 8,354 | 265 | 1,181 | 14 | 27 | 484 | 11,164 |
| 2003 | 1,087 | 10,367 | 343 | 1,271 | 14 | 27 | 567 | 13,676 |
| 2004* | 1,210 | 10,999 | 387 | 1,264 | 14 | 26 | 576 | 14,476 |

Source: T.H. NIC Company Limited

Remarks: *as of May 2004

## Figure 4.11 Distribution of .th Domain Names (2004*)




Source: T.H. NIC Company Limited.

Remarks: *as of May 2004

In May 2004, there are 14,476 domain names under .th, representing an increase of 7.82% from 1997. The majority (76%) of .th domain names are business registration, i.e. under ".co.th" (Figure 4.0).

Over the past few years, many computer systems have been burdened by an increasing incidence of viruses and spam mails which represent a major threat to computer security. A Thailand Computer Emergency Response Team or ThaiCERT, for short, was established under NECTEC in 2000, to perform consultancy services and to quick respond queries as well as to take quick action on issues concerning computer security.

Table 4.4 shows the incidence of virus infected e-mails detected on 94 domains which were registered with the Government Information Technology Services (GITS) during September 2003 to August 2004.

It was found that the percentage of infected e-mails has been continuously increasing. This signifies the need to establish policies and/or measures to appropriately address the computer security issue. The task is now under the responsibility of the electronic transactions commission, through the sub-committee on e-security.

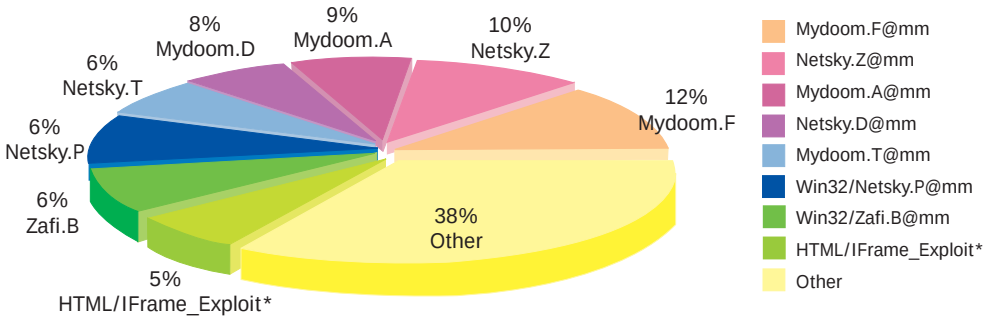
## Table 4.4 Report of Virus Infected e-mails during December 2003 to November 2004

| | Message | Infected | % of infected e-Mails | Top Virus |
|---|---|---|---|---|
| Dec-03 | 1,336k | 6k | 0 | HTML/IFrame_Exploit |
| Jan-04 | 1,946k | 390k | 20 | Win32/Mydoom.A@mm |
| Feb-04 | 2,753k | 961k | 35 | Win32/Mydoom.A@mm |
| Mar-04 | 5,337k | 1,458k | 27 | Win32/Mydoom.F@mm |
| Apr-04 | 3,789k | 1,359k | 36 | Win32/Mydoom.F@mm |
| May-04 | 4,309k | 1,917k | 44 | Win32/Netsky.Z@mm |
| Jun-04 | 3,008k | 2,084k | 69 | Win32/Netsky.Z@mm |
| Jul-04 | 5,613k | 2,809k | 50 | Win32/Netsky.Z@mm |
| Aug-04 | 4,887k | 2,657k | 54 | Win32/Netsky.Z@mm |
| Sep-04 | 2491k | 1,750K | 70 | Win32/Netsky.Z@mm |
| Oct-04 | 2449k | 1,697k | 69 | Win32/Mydoom.T@mm |
| Nov-04 | 5646k | 3349K | 55 | Win32/Bagle.AS@mm |

Source: http://mailcleaner.gits.net.th/mcstat/index, Government Information Technology Infrastructure (GITS)

Remarks: Statistics from 94 registered domains

## Figure 4.12 Virus Distribution during December 2003 to November 2004




Source: Government Information Technology Service http://mailcleaner.gits.net.th/mcstat/index.php

The virus incident reported collection via Mailcleaner, virus and spam mail screening and cleaning service offered by the Government IT Services (GITS), during year 2003 to 2004 (as of November 2004) indicated that Mydoom.F was the majority type of infected virus in year 2004 with a share of 12%, whereas Netsky.Z and Mydoom.A came as the second and third major type of infected virus with a share of 10% and 9%, respectively. In addition, the report revealed that the highest infected rate has occured in September 2004.

# V

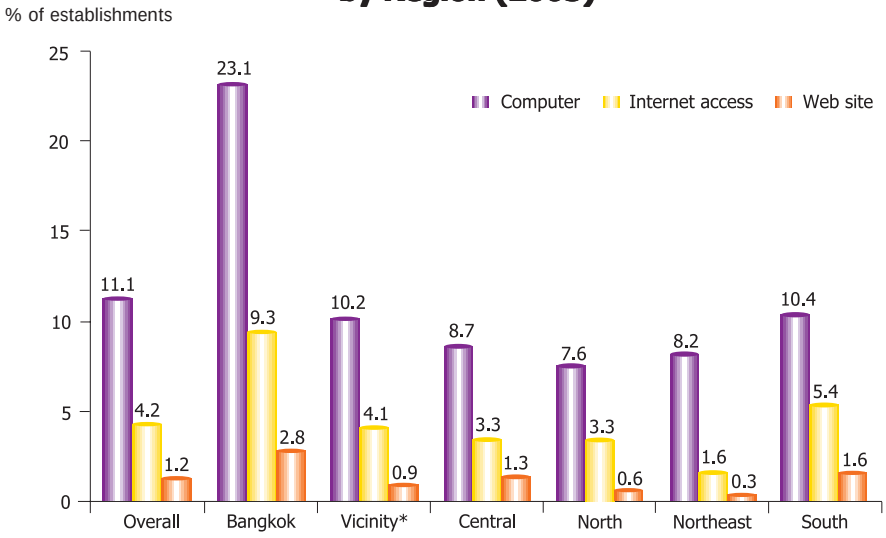
# e-Commerce

The National ICT Masterplan (2002-2006) encourages business sectors, particularly small and medium enterprises which are the driving force behind the national development, to deploy ICT in order to boost up their competitiveness. ICT is to be applied in both manufacturing and marketing functions.

However, the diffusion of ICT among business establishments was limited and uneven. On average, 11% of business establishments have computers, whereas only 4.2% and 1.2% have access to the Internet and own web sites, respectively (Figure 5.1). The size of firms is related to the extent to which firms absorb new technology. By and large, the larger the firm is, the more likely it will own and use ICT in its business (Figure 5.2). Overall, computer is more widespread and commonly used than the Internet and web site.

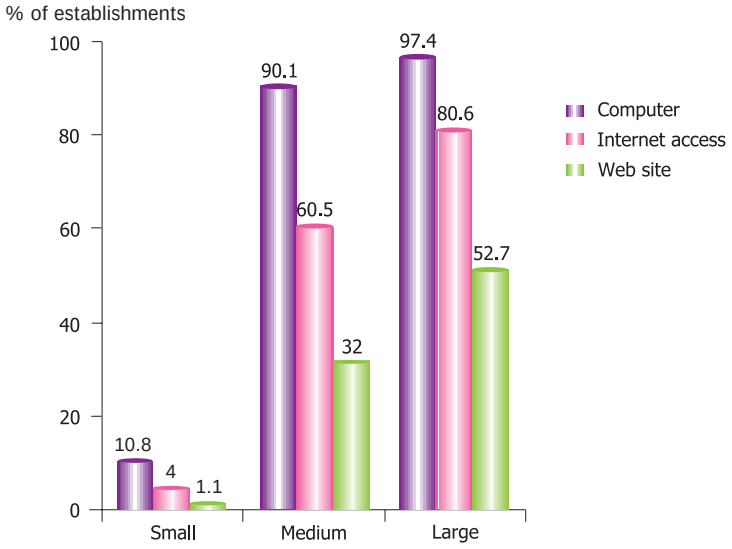
The disparity of ICT uptakes also exists among economic activities. Computer and related services is undoubtedly the most advanced sector, with 89.9% of its establishments having computers, 81.9% and 11.2% having Internet access and web sites, respectively. Research and development surprisingly comes in second with close records, 100% for computer usage and 79.2% for Internet access. However, none of the establishments in this sector has its own web site. For the rest, they are not much different, especially in the area of web site where the usage rate is minimal.

## Figure 5.1 Percentage of Establishments with ICT by Region (2003)



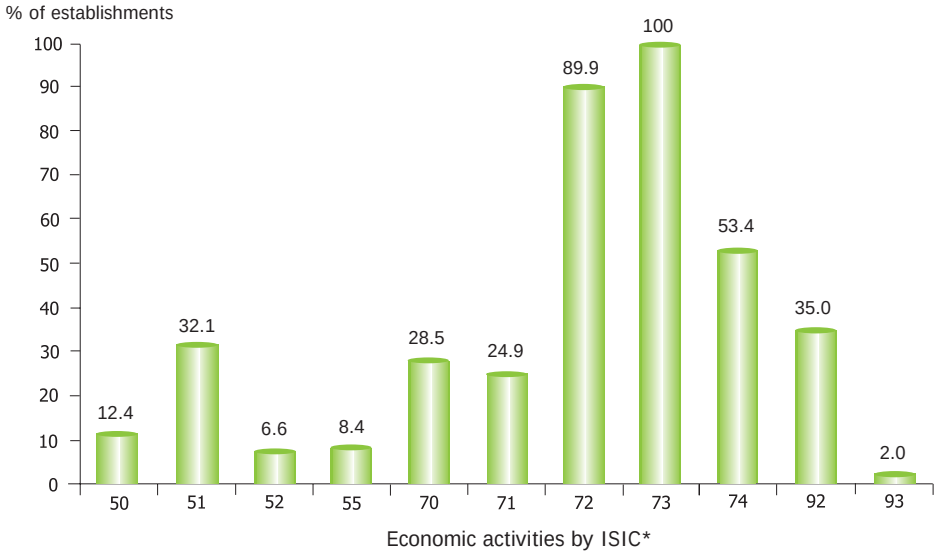

Source: National Statistical Office (NSO)
Remarks: *Vicinity includes Pathumthani, Nonthaburi, Samut Prakarn, Samut Sakhon and Nakhon Pathom

## Figure 5.2 Percentage of Establishments with ICT by Size (2003)




Source: National Statistical Office (NSO)

## Figure 5.3 Percentage of Establishments with Computers by Economic Activities (2003)




Source: The Report of the 2004 Information and Communication Technology Survey (Establishment), National Statistical Office (NSO)

Remarks: *List of Economic Activities by ISIC (International Standard Industrial Classification System)

**List of Economic Activities**

50 - Sale, maintenance and repair of motor vehicles and motorcycles; retail sale of automotive fuel

51 - Wholesale trade and commission trade, except of motor vehicles and motorcycles

52 - Retail trade, except of motor vehicles and motorcycles; repair of personal and household goods

55 - Hotels and restaurants

70 - Real estate activities

71 - Renting of machinery and equipment without operator and of personal and household goods

72 - Computer and related activities

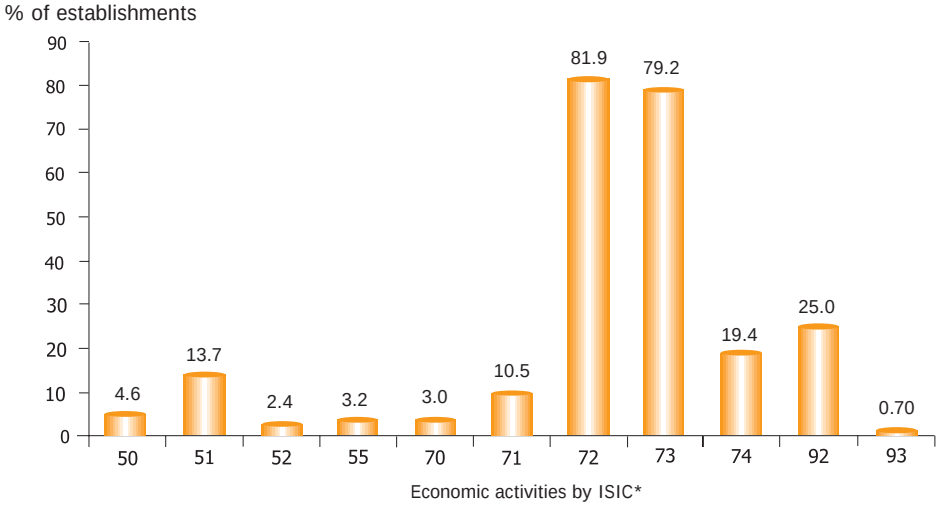
73 - Research and development

74 - Other business activities

92 - Recreational, cultural and sporting activities

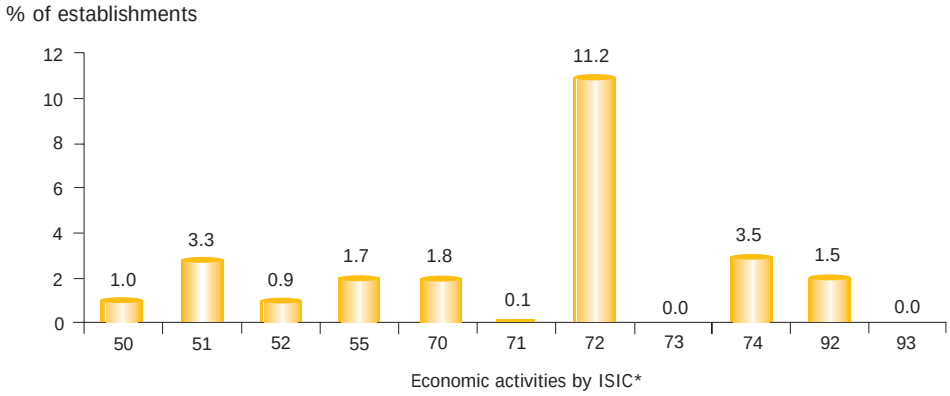
93 - Other service activities

## Figure 5.4 Percentage of Establishments with Internet Access by Economic Activities (2003)




Source: The Report of the 2004 Information and Communication Technology Survey (Establishment), Natonal Statistical Office (NSO)

## Figure 5.5 Percentage of Establishments with Web site by Economic Activities (2003)




Source: The Report of the 2004 Information and Communication Technology Survey (Establishment), Natonal Statistical Office (NSO)

The first ICT Indicator series discussed the difficulty in gathering information on e-Commerce. Since then, various government agencies have put further efforts in systematic data collection and analyzing statistics. The Department of Business Development, Ministry of Commerce, launched a program in May 2003 on Registration of E-commerce Entrepreneur which requires e-commerce entrepreneurs to register with the department in accordance with the Commercial Registration Act, 1956. Approximately 900 have registered 1,200 web sites so far. Three quarters of those businesses are located in the central region, and 77% are ".com" followed by ".co.th" and ".net" at 11% and 6%, respectively.

This registration program is not only a tool for data and statistics collection, but also a vehicle for e-Commerce promotion. The department will issue a Trustmark to qualified entrepreneurs by 2005. For consumers, this Trustmark provides them confidence in the credibility of the provider, thus, encourages them to purchase via e-Commerce.

According to a survey of 880 e-Commerce enterpreneurs, e-Commerce transaction value for B2B and B2C was estimated at 58,529.16 million baht. Meanwhile, as the government is driving towards e-Procurement, B2G transaction value has been rising from 182 million baht in 2002 to nearly 5,000 million baht in 2003.

Business-to-Consumer or B2C, on the other hand, is not well established in Thailand. According to the survey on Internet Users Profile of Thailand conduct annually by NECTEC, it is found that during 1999-2003, only 20% of Internet users have ever purchased goods/services via the Internet. When asked for the reasons to which users did not buy via e-Commerce, a number of issues came up. For instance, some users need to touch and feel the feelings to be confident in the quality of the products in question. Others were concerned with online security and fraud, particularly when they have to give out their credit card number on the Internet.

The year 2003 also witnessed the breakthrough of online trading, of which the value has reached 417,916 million baht, more than 600% increase from 2002. One of the main reasons behind the leapfrog was an enormous boost in the number of registered customers and active customers. The customers who registered to open an Internet trading account increased 140%, from 16,381 in 2002 to 39,882 in 2003. Out of this, approximately 25% was active customers who at least once ever traded online.

## Figure 5.6 Registered e-Commerce Entrepreneurs (2004*)

Source: Department of Business Development (DBD), Ministry of Commerce

Remarks: *as of July 16, 2004

## Figure 5.7 Registered e-Commerce Entrepreneurs by Location (2004*)

Source: Department of Business Development (DBD), Ministry of Commerce

Remarks: *as of July 16, 2004

## Figure 5.8 Registered e-Commerce Web Sites by Domain Name (2004*)

Source: Department of Business Development (DBD), Ministry of Commerce

Remarks: *as of July 16, 2004

## Figure 5.9 e-Commerce Transaction Value (2003*)

| | Value (Mil. baht) | % |
|---|---|---|
| e-Commerce transaction value in total | 63,436.42 | 100 |
| B2B transaction value | 57,812.23 | 91 |
| B2C transaction value | 716.93 | 1 |
| B2G transaction value** | 4,907.26 | 8 |

Question: What is your estimated value of transaction processed via e-Commerce or e-Marketplace?

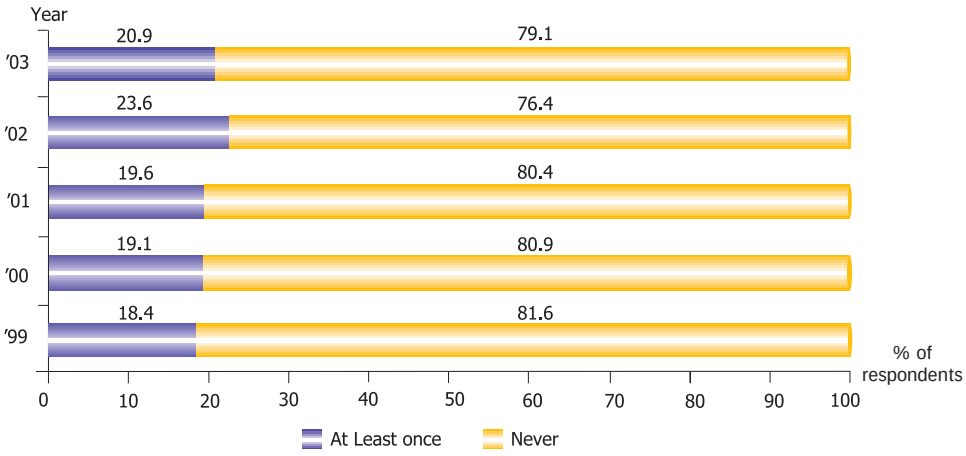
Sources: NECTEC, The Comptroller General's Department; Ministry of Finance

Based: A sample size of 60 e-Commerce key players in Thailand

Remarks: *Exclude transaction value of online trading. The value is compiled from two sources: NECTEC and the Comptroller General's Department

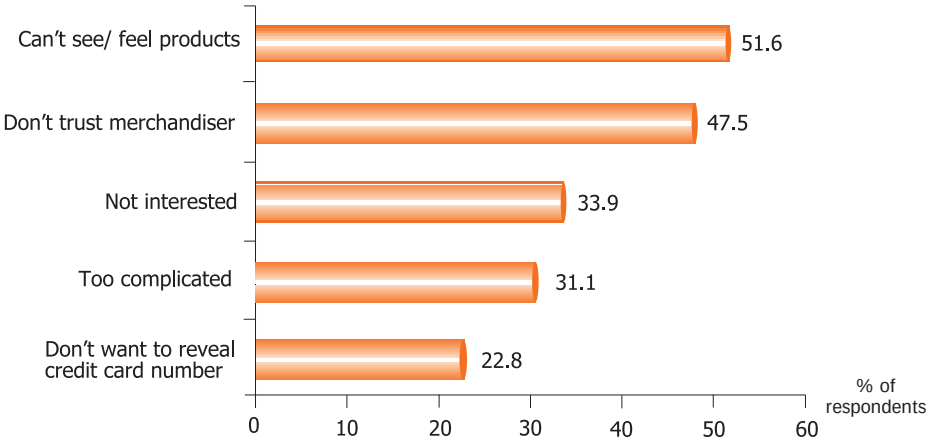
**The figure of B2G transactions is reported by the Comptroller General's Department

## Figure 5.10 Internet Purchase Experience (1999-2003)



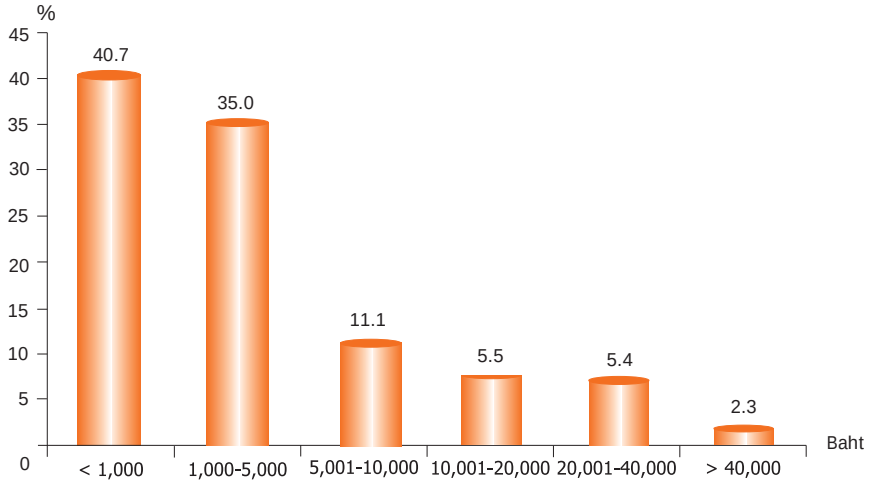

Source: National Electronics and Computer Technology Center (NECTEC)

## Figure 5.11 Reasons Against Internet Purchase (2003)




Source: National Electronics and Computer Technology Center (NECTEC)

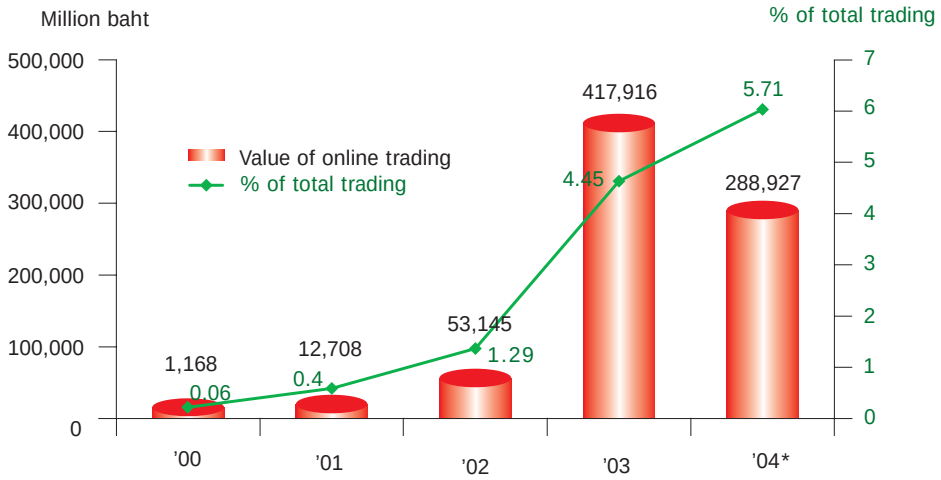
## Figure 5.12 Online Spending (2003)




Question: What is your approximate online spending in the past year including online reservation? The payment can be either offline or online.

Source: National Electronics and Computer Technology Center (NECTEC)

## Figure 5.13 Value of Online Trading (2000-2004)

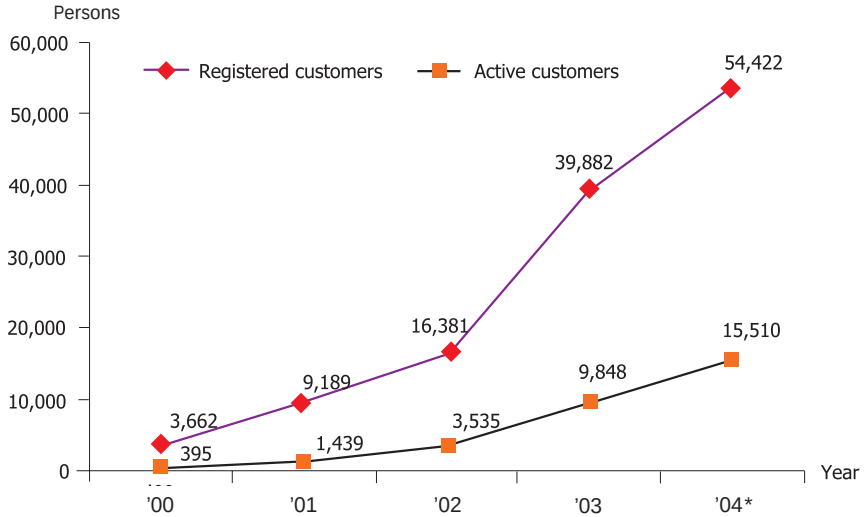



Source: Stock Exchange of Thailand (SET)

Remarks: *as of May 2004

(Exchange rate as of July 21, 2004, 1 USD = 40.89 Baht)

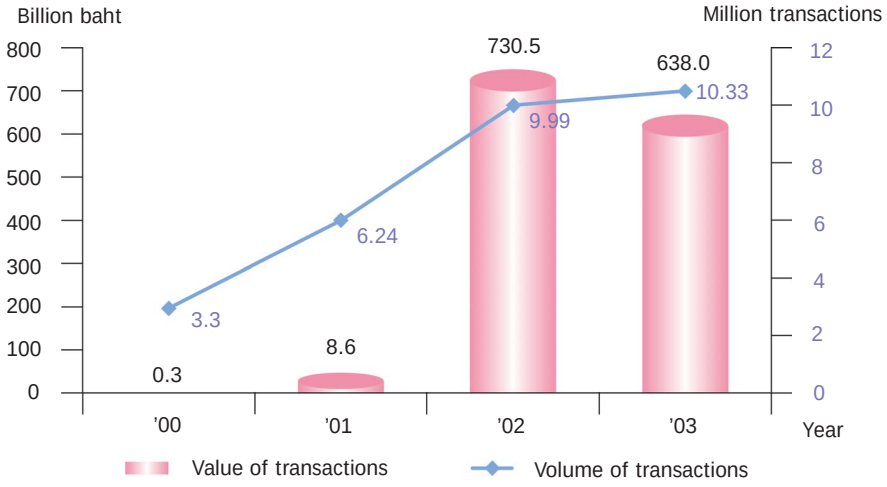
## Figure 5.14 Number of Online Trading Customers (2000-2004)




Source: Stock Exchange of Thailand (SET)

Remarks: *as of May 2004

## Figure 5.15 Value and Volume of Internet Banking Transaction (2000-2003)




Source: Bank of Thailand (BOT)

# VI

# IT Market and Industry

From year 1997 onwards, the Thai IT market is expanding continuously with an average growth rate of 17% annually. The total market for 2004 is estimated to be 103,191 million baht, with the share of hardware, software and IT services at 66% (69,193 million baht), 17% (17,934 million baht) and 17% (18,064 million baht), respectively. Over the past seven years, hardware market hold the biggest share at the average of 62%, followed by IT services at 20% and software market at 18%. In terms of growth, hardware market grows the fastest at 21%, while software and IT services grow at 17% and 12%, respectively.

From the demand side, during 1997-2004, the government, manufacturing, and telecommunications were among the major IT spenders. Their spending individually ranges from 14-16% of the market. From the household side, the home use accounted for 16% of the market, whereas health care and hotel appeared to be the least spenders, with the spendings together accounted only approximately 2% of total market.

The total value of software market in 2003 was reported at 14,129 million baht. The major source of spending came from a manufacturing sector and a government sector, each accounted for approximately 18% of the market, followed by an education sector (14%). Those sectors, with spending less than 5% were agriculture (3%), entertainment (2%), health care (1%) and transportation (1%).

However, this market value did not account for the pirated software. The study conducted by the Business Software Alliance (BSA) reported that, in 1994, the piracy rate was at 87%, which was equivalent to 17.06 million baht in revenue lost. From 1995 onward, the country has made a good progress and success in reducing the piracy rate to a level of 77% in the year 2001 and 2002, the lowest since 1994.

In the area of trade, Thailand has always been a net importer of ICT goods (Figure 6.4), with the value of imports approximately twice of the exports. In 2003, the import values accounted for about 5.73% of GDP, while the export values accounted for only 2.97%. Computer parts and computer accessories are among the top ICT imported items. Oftentimes, these parts and accessories were used in the local assembly plant and re-exported as finished ICT goods.

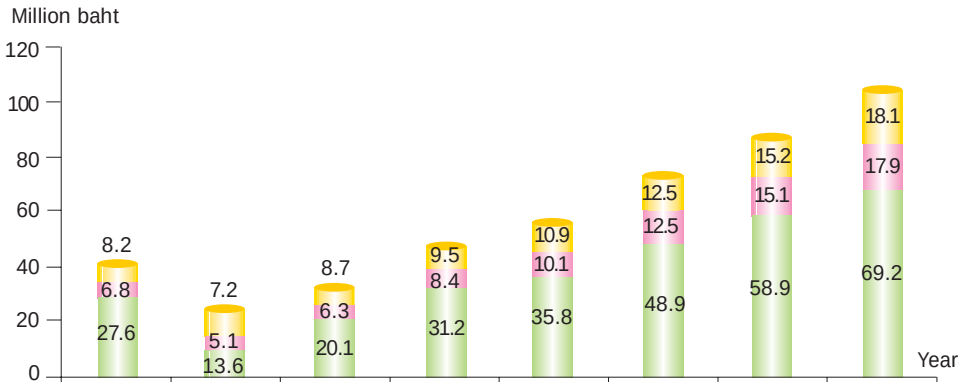
# Table 6.1 Thailand IT Market by Category (1997-2004)

Million baht

| Category | Year | | | | | | | | | | | | | | | | Average Growth Rate | Average of Share |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1997 | | 1998 | | 1999 | | 2000 | | 2001 | | 2002 | | 2003 | | 2004 | | | |
| | Value | % change | Value | % change | Value | % change | Value | % change | Value | % change | Value | % change | Value | % change | Value | % change | (Y'97-'04) | (Y'97-'04) |
| Hardware | 27,596 | | 13,597 | -51% | 20,110 | 48% | 31,275 | 56% | 35,819 | 15% | 48,879 | 36% | 50,331% | 3% | 69,193 | 37% | 21% | 62% |
| (Mkt Share) | 65% | | 52% | | 57% | | 64% | | 63% | | 66% | | 63% | | 66% | | | |
| Software | 6,851 | | 5,126 | -25% | 6,289 | 23% | 8,378 | 33% | 10,125 | 21% | 12,530 | 24% | 14,129 | 13% | 17,934 | 27% | 17% | 18% |
| (Mkt Share) | 16% | | 20% | | 18% | | 17% | | 18% | | 17% | | 18% | | 17% | | | |
| IT Services | 8,200 | | 7,229 | -12% | 8,738 | 21% | 9,486 | 9% | 10,993 | 16% | 12501 | 14% | 15,260 | 18% | 18,064 | 18% | 12% | 20% |
| ( Mkt Share) | 19% | | 28% | | 25% | | 19% | | 19% | | 17% | | 19% | | 17% | | | |
| Total | 42,647 | | 25,952 | -39% | 35,137 | 35% | 49,139 | 40% | 56,937 | 16% | 73,910 | 30% | 79,720 | 8% | 103,191 | 16% | 15% | |

Source : The Association of Thai Computer Industry (ATCI)

## Figure 6.1 Thailand IT Market by Category (1997-2004)




| | '97 | '98 | '99 | '00 | '01 | '02 | '03 | '04 |
|---|---|---|---|---|---|---|---|---|
| Hardware | 8,200 | 7,229 | 8,738 | 9,486 | 10,993 | 12,501 | 15,160 | 18,064 |
| Software | 6,865 | 5,126 | 6,289 | 8,378 | 10,125 | 12,530 | 15,086 | 17,934 |
| IT Services | 27,596 | 13,597 | 20,110 | 31,275 | 35,819 | 48,879 | 58,792 | 69,193 |

Hardware Software IT Services

Source: The Association of Thai Computer Industry (ATCI)

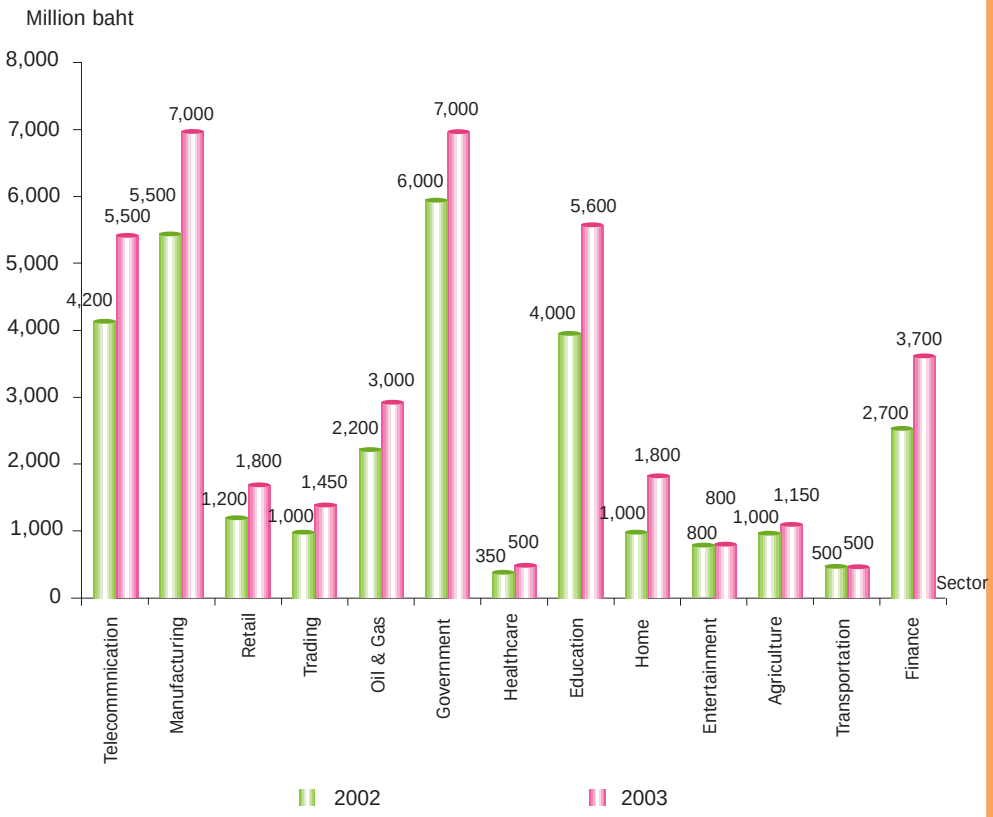
# Table 6.2 Thailand IT Market by Industry Sector (1997-2004)

Value in million baht

| Sector | 1997 | | 1998 | | 1999 | | 2000 | | 2001 | | 2002 | | 2003 | | 2004 | | Average |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Value | Ratio | Value | Ratio | Value | Ratio | Value | Ratio | Value | Ratio | Value | Ratio | Value | Ratio | Value | Ratio | Ratio |
| Government/State Enterprise | 7,250 | 17% | 3,374 | 13% | 7,379 | 21% | 15,300 | 18% | 9,682 | 17% | 11,384 | 16% | 12,755 | 16% | 15,300 | 15% | 17% |
| Financial | 5,118 | 12% | 2,076 | 8% | 3,162 | 9% | 17,600 | 7% | 3,987 | 7% | 5,692 | 8% | 7,175 | 9% | 17,600 | 17% | 10% |
| Manufacturing | 6,823 | 16% | 4,931 | 19% | 6,325 | 18% | 14,800 | 15% | 9,112 | 16% | 10,673 | 15% | 11,161 | 14% | 14,800 | 14% | 16% |
| Health Care | 1,279 | 3% | 519 | 2% | 703 | 2% | - | 1% | 570 | 1% | 1,423 | 2% | 2,392 | 3% | - | - | 2% |
| Hotel | 1,279 | 3% | 519 | 2% | 351 | 1% | - | 1% | 1,139 | 2% | 2,135 | 3% | 1,594 | 2% | - | - | 2% |
| Telecommunications | 5,544 | 13% | 4,152 | 16% | 4,216 | 12% | 18,500 | 17% | 10,252 | 18% | 12,808 | 18% | 14,350 | 18% | 18,500 | 18% | 16% |
| Education | 5,544 | 13% | 3,374 | 13% | 3,865 | 11% | - | 16% | 9,112 | 16% | 10,673 | 15% | 11,958 | 15% | - | - | 14% |
| Home Use | 5,118 | 12% | 3,633 | 14% | 4,216 | 12% | 22,000 | 17% | 9,682 | 17% | 11,384 | 16% | 13,552 | 17% | 22,000 | 21% | 16% |
| Others | 4,691 | 11% | 3,374 | 13% | 4,919 | 14% | 14,992 | 8% | 3,417 | 6% | 4,981 | 7% | 4,782 | 6% | 14,992 | 15% | 10% |
| Total | 42,646 | 100% | 25,953 | 100% | 35,137 | 100% | 103,191 | 100% | 56,953 | 100% | 71,153 | 100% | 79,720 | 100% | 103,191 | 100% | 100% |

Source: The Association of Thai Computer Industry (ATCI )

## Figure 6.2 Software Industry Spending by Sector (2002-2003)



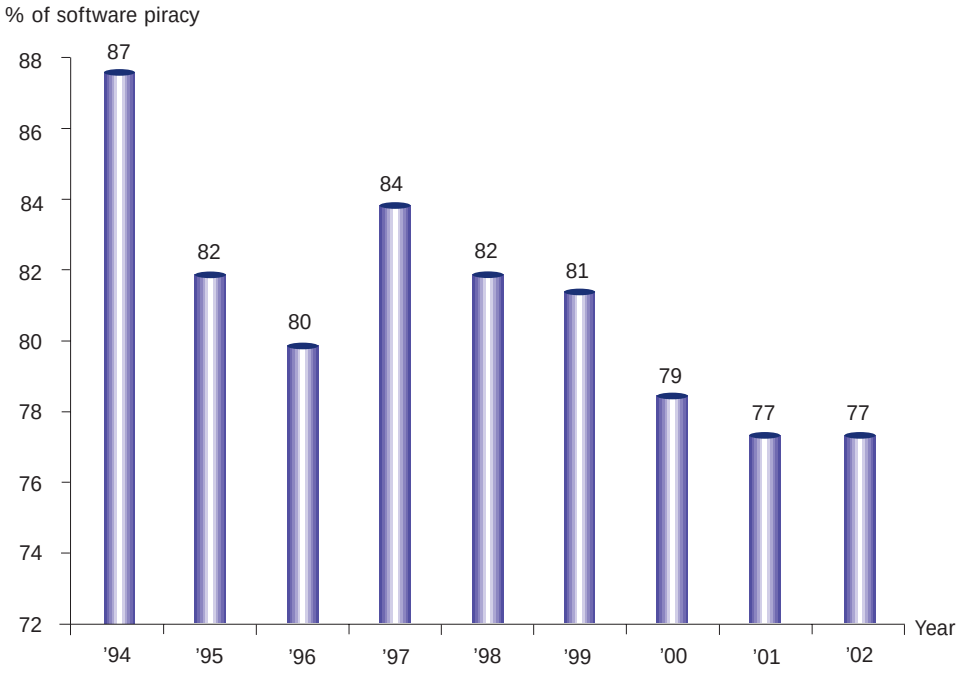

Source: The Association of Thai Software Industry (ATSI)

## Table 6.3 Source of Software Industry Revenue by Sector (2002-2003)

| Sector | Share (%) | |
|---|---|---|
| | 2002 | 2003 |
| Government | 20 | 18 |
| Manufacturing | 17 | 18 |
| Telecom | 14 | 14 |
| Education | 13 | 14 |
| Financial | 9 | 9 |
| Oil & Gas | 7 | 8 |
| Retail | 4 | 5 |
| Home | 3 | 5 |
| Trading | 3 | 4 |
| Agriculture | 3 | 3 |
| Entertainment | 3 | 2 |
| Transport | 2 | 1 |
| Healthcare | 1 | 1 |
| Total | 100 | 100 |

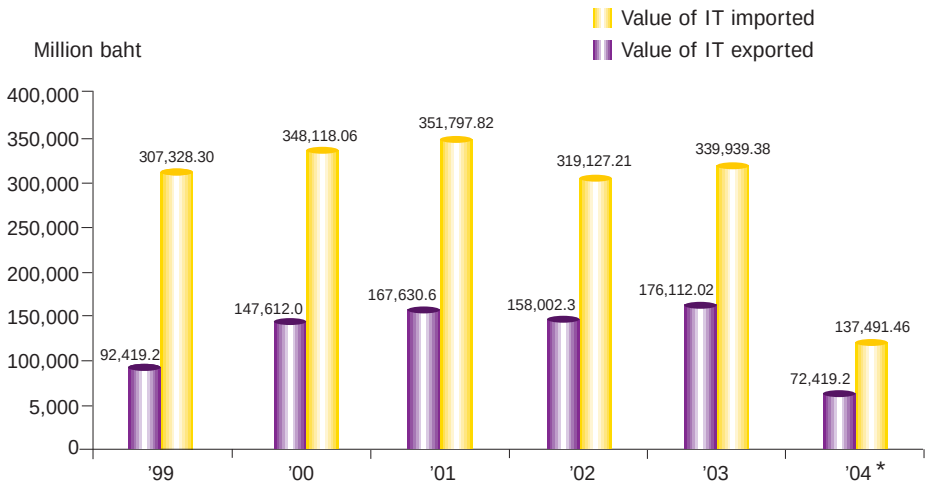
Source : The Associaton of Thai Software Industry (ATSI)

## Figure 6.3 Software Piracy Rate in Thailand (1994-2002)




Source: Business Software Alliance (BSA)

## Figure 6.4 Trade in ICT Goods (1999-2004)




Source: Customs Department, Ministry of Finance

Remarks: *as of May 2004

# VII

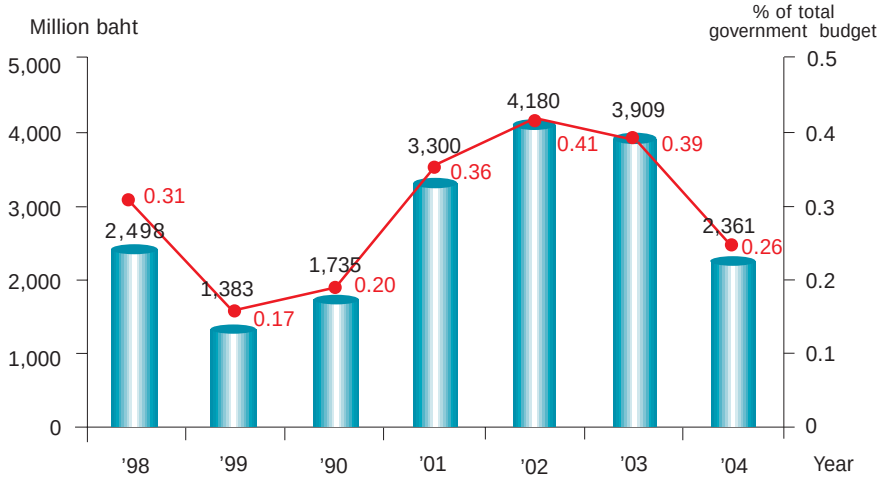
# ICT in Government

The current Thailand ICT Policy Framework (IT 2010) and ICT Master Plan (2002-2006) calls for a promotion of ICT usage in the government or "e-government". Consequently, many initiatives/programs/projects have been implemented by various ministries, with the aim to achieve the "e-government" objectives and targets put forth by the MICT. According to research done by NECTEC, using the information provided by each ministry, the government has approved 1,095 IT projects with the total budget of 28,436.25 million baht in 2003. In 2004, the number of projects have dropped down to 1,078, while the total budget has significantly increased to 60,408.62 million baht.

Among those projects that were approved, it is worth to mention one large project that has received much interest from the media--the Smart Card Project. Proposed by the MICT, the project received the cabinet's approval in March 2004 with the total budget of over 7.9 billion baht. Such earmarked budget was to be used for producing and managing the distribution of 64 million smart cards to every Thai citizen. The first 12 million cards are expected to be ready for distribution in the fiscal year 2004.

One indicator that can be used to reflect government commitment on IT was the budget allocation. Figure 7.1 shows the government budget on computer equipment during 1998-2004, both in absolute term and as a percentage of the total budget, which indicates an increasing trend.

## Figure 7.1 Government Budget on Computer Equipment (1998-2004)




Source: The Bureau of the Budget, Ministry of Finance

## Table 7.1 Budget Approved for Computer in Fiscal Year 2005

| No. | Ministry | Budget (Mil. baht) | % |
|---|---|---|---|
| 1 | Office of The Prime Minister | 161.98 | 3.78 |
| 2 | Ministry of Defense | 133.17 | 3.09 |
| 3 | Ministry of Finance | 552.78 | 12.82 |
| 4 | The Ministry of Foreign Affairs | 51.38 | 1.19 |
| 5 | Ministry of Tourism and Sports | 26.68 | 0.62 |
| 6 | Ministry of Social Development and Human Security | 152.13 | 3.53 |
| 7 | Ministry of Agriculture and Cooperatives | 163.16 | 3.78 |
| 8 | Ministry of Transport | 182.06 | 4.22 |
| 9 | Ministry of Natural Resource and Environment | 8.46 | 0.20 |
| 10 | Ministry of Information and Communication Technology | 330.00 | 7.65 |
| 11 | Ministry of Energy | 35.28 | 0.82 |

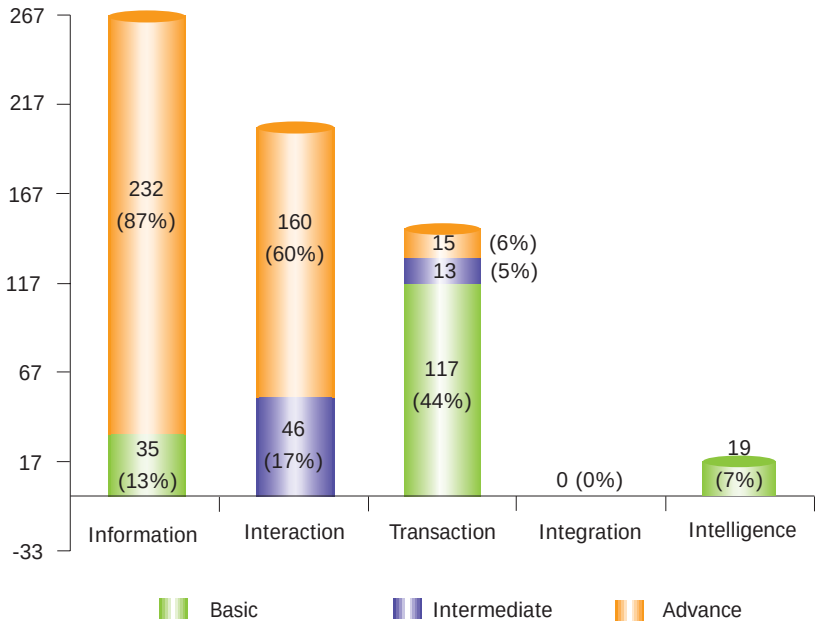
| No. | Ministry | Budget (Mil. baht) | % |
|---|---|---|---|
| 12 | Ministry of Commerce | 178.84 | 4.15 |
| 13 | Ministry of Interior | 282.59 | 6.55 |
| 14 | Ministry of Justice | 170.96 | 3.97 |
| 15 | Ministry of Education | 1,097.54 | 25.45 |
| 16 | Ministry of Labour | 41.62 | 0.97 |
| 17 | Ministry of Culture | 0.42 | 0.01 |
| 18 | Ministry of Science and Technology | 60.14 | 1.39 |
| 19 | Ministry of Public Health | 188.30 | 4.37 |
| 20 | Ministry of Industry | 35.37 | 0.82 |
| 21 | Independent Public Agencies | 172.13 | 3.99 |
| 22 | Others | 286.79 | 6.65 |
| | **Total** | **4,311,786,500** | **100%** |
| | | **% of total government budget** | **0.26** |

Source: Report of the ad hoc subcommittee on the Budget Allocation on the Computer Procurement of the Government Agencies, fiscal year 2005, The secretariat of the House of Representatives

In early 2004, NECTEC has initiated the first on-line survey on government e-services called “Service e-Readiness Explorer” or SEE evaluation program (http://see.thaigov.net/actionPlan). The purpose was to evaluate the readiness of government web services, based on five-level of e-Government maturity, i.e., Information, Interaction, Transaction, Integration, and Intelligence, and to provide recommendations for future web service development to achieve high level of integration among various government agencies.

The survey revealed that all 267 government agencies have web sites (Figure 7.2) to provide information to the public. However, 13% of these sites were still at the basic level. A much lower percentage was found in the other four categories, i.e., Interaction, Transaction, Intelligence, and Integration, respectively. Especially in the integration, no web site with such features was reported. This may imply the lack of collaborarion among agencies or lack of systematic mechanism that encourages collaboration. Figure 7.3-7.5 shows the detail of service features under each category and the percentage of government e-services that have those features.

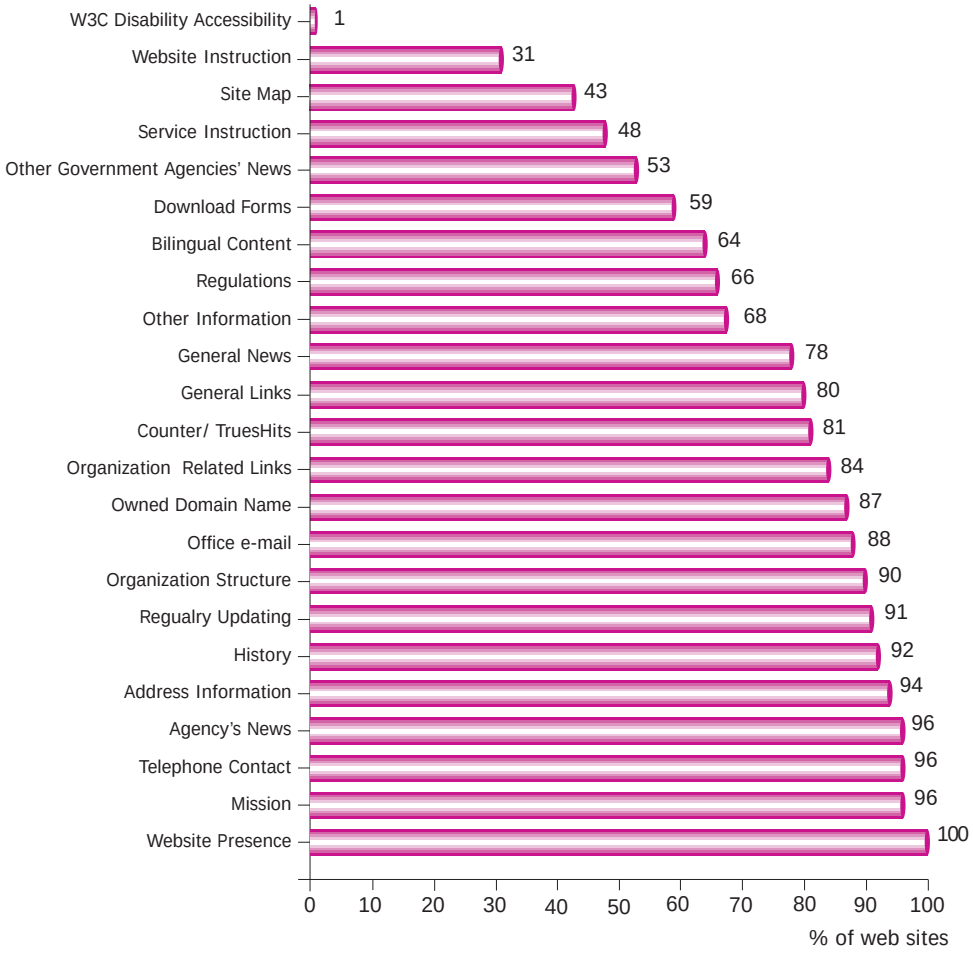
## Figure 7.2 Number of Government Web Sites by Type of Online Services (2004)




Remarks: Total number of web sites surveyed is 267.

Source: National Electronics and Computer Technology Center (NECTEC)

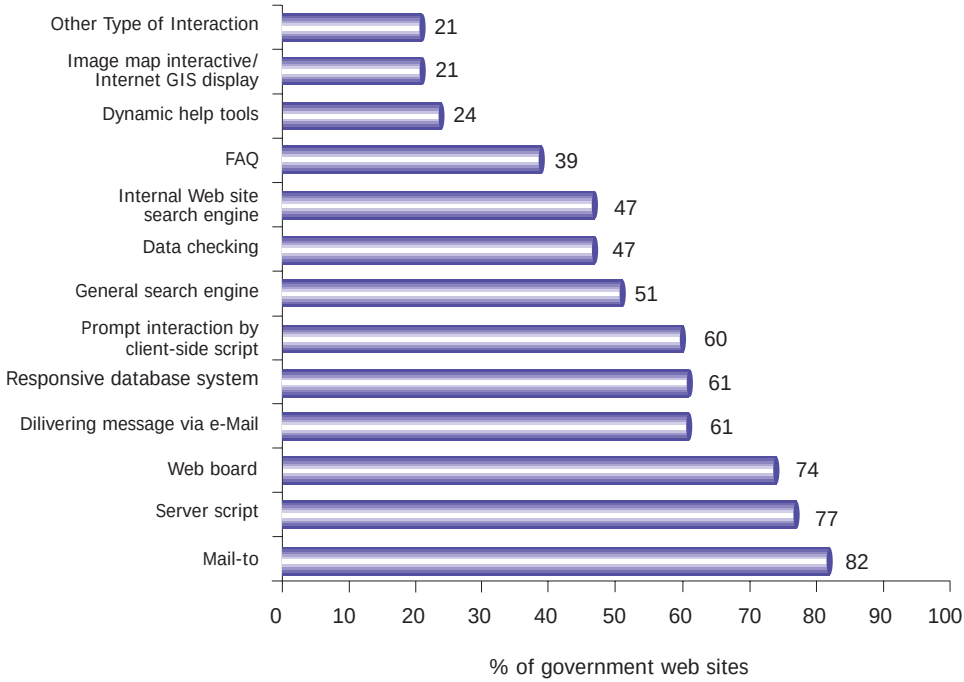
## Figure 7.3 Basic Information on Government Web Sites (2004*)




Source : National Electronics and Computer Technology Center (NECTEC)

Remarks: *Survey of 267 government web sites during 16 January - 31 March 2004

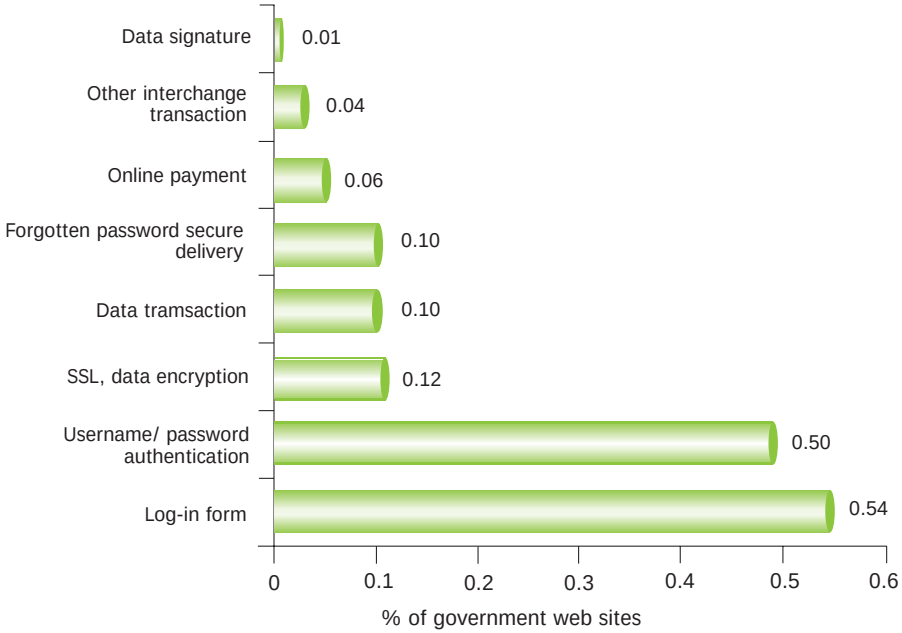
## Figure 7.4 Type of Interaction Feature on the Government Web Sites (2004*)




Source : National Electronics and Computer Technology Center (NECTEC)

Remarks: *Survey of 267 government web sites during 16 January - 31 March 2004

## Figure 7.5 Type of Transaction Feature on Government Web Sites (2004*)

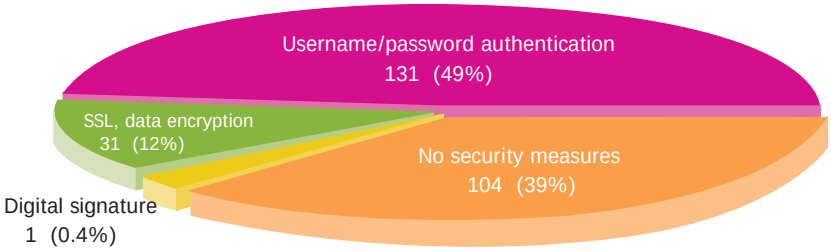



Source : National Electronics and Computer Technology Center (NECTEC)

Remarks: *Survey of 267 government Web sites during 16 January - 31 March 2004

Since security is among the most significant issue in the implementation of e-Government, we performed an assessment of the security system as currently found in the government web sites. The result was quite alarming. Out of 267 web sites surveyed, 104 web sites (39%) did not have any security system implemented, 131 (49%) used a simple security system, i.e., user name/password authentication, 31 (12%) used a more advanced system, i.e., Secured Socket Layer (SSL), and data encryption, and only 1 (0.4%) had imposed the strongest security measures, i.e., digital signature for encryption and authentication (Figure 7.6).

**Figure 7.6 Security System on the Government Web Sites (2004)**

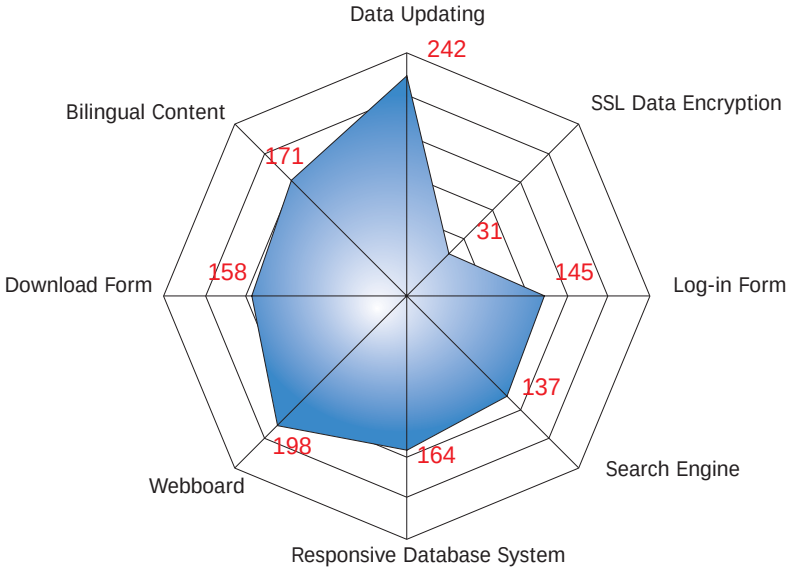



Source : Government Information Technology Infrastructure (GITI), National Electronics and Computer Technology Center (NECTEC)

Remarks: *Survey of 267 government web sites during 16 January - 31 March 2004

Apart from the security measures, we also performed an assessment of those 267 government web sites on seven other criteria, for example, having responsive database system, having webboard, having forms for downloaded, etc. The results were presented in Figure 7.7. The results confirmed the earlier findings that most web sites were fairly weak in the security aspect. This suggested that more efforts need to be put in implementing appropriate security measures to government e-services in order to provide more confidence to both service providers and users.

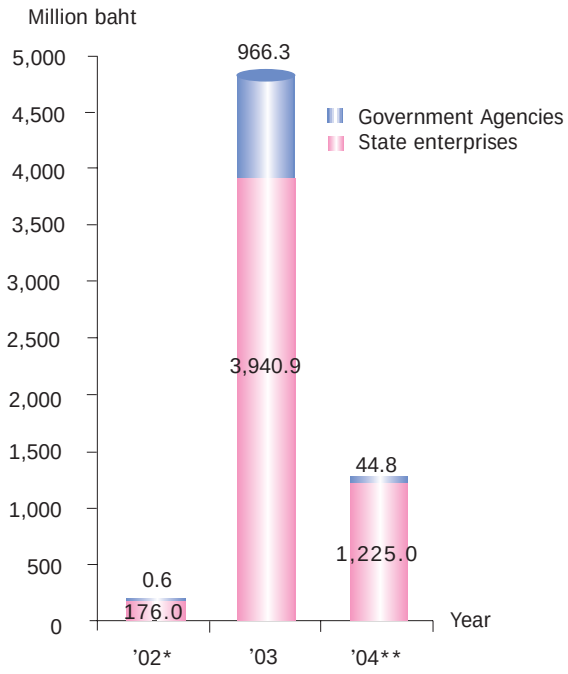
## Figure 7.7 Main Assessment of Government Web Sites (2004)




Unit: No. of government web sites

Source: Government Information Technology Infrastructure (GITI), National Electronics and Computer Technology Center (NECTEC)

## Figure 7.8 Value of Government e-Auction (2002-2004)




Source: The Comptroller General's Department

Remarks: *Project started October 2002
**as of March 2004

The 9th National Economic and Social Development Plan called for an increased provision of government services through ICT. To this end, the cabinet issued a measure on October 1, 2002 emphasizing that online procurement must be implemented in all government agencies. The target is to acheive the e-Procurement transaction value of 100,000 million baht by 2006. According to Figure 7.8, the transacation value in 2003 was approximately 5,000 million baht, or around 50% of the target set for the year 2006.

# VIII

# ICT Human Resources

Education plays a large part in building up the human capital. At present, the framework of education system in Thailand is based on the 1997 Constitution and the 1999 National Education Act, which provide principles and guidelines for the provision and development of the Thai education to prepare all Thais for the learning society.

In 2003, there was around 18.6 million school-age population, of which 14.2 million were actually enrolled in formal education. The gross enrollment rate for the year 1999 to 2003, at each level is presented in Table 8.1. In general, there was a slight decline in enrollment from the year 2002 to 2003.

**Table 8.1 Gross Enrollment Ratio**

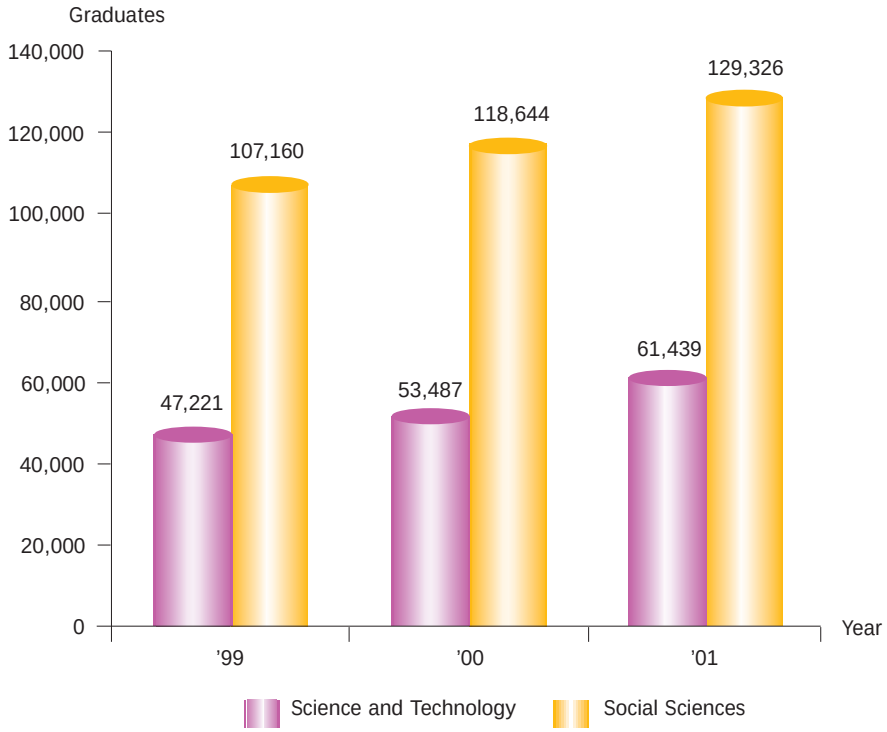
| | 1999 | 2000 | 2001 | 2002 | 2003 |
|---|---|---|---|---|---|
| Pre-primary | 96.2 | 95.7 | 93.1 | 90.6 | 87.7 |
| Primary | 102.3 | 103.2 | 103.8 | 104.8 | 104.4 |
| Secondary | 68.7 | 69.7 | 70.6 | 71.2 | 71.7 |
| Lower secondary | 83.4 | 82.8 | 82.2 | 82.2 | 84.6 |
| Upper secondary | 55.3 | 57.4 | 59.3 | 60.1 | 58.5 |
| - General | 33.2 | 36.7 | 38.9 | 38.8 | 37.5 |
| - Vocational | 22.1 | 20.7 | 20.4 | 21.3 | 21 |
| Higher education* | 22.5 | 23.7 | 26.1 | 42.9 | 29.5 |

Source: Office of the Educational Council (OEC), Ministry of Education

Remarks: Exclude students in open universities

There was an increase in the number of graduates from 154,381 in 1999 to 190,765 in 2001. However, the majority of graduates were from the field of social sciences, with the ratio of science and technology graduates to social sciences graduates at 31:69 (Figure 8.1). Currently, there are no data on the number of graduates in ICT field. The problem centered around the "obscure" boundary of what might be considered as "ICT courses/curriculum" due to the rapid evolution of the technology itself. In addition to traditional field of computer science, computer engineering and telecommunications engineering, there is a proliferation of applied courses such as business computing and e-Commerce which may have been classified by some school as "ICT-related" programs.

**Figure 8.1 Number of Science and Technology Graduates vs Social Sciences Graduates (1999-2001)**




Source: Thailand Science and Technology Profile 2004,
National Science and Technology Development Agency

## Table 8.2 ICT Workforce (2001-2003)

| ICT Workforce | 2001 | | 2002 | | 2003 | |
|---|---|---|---|---|---|---|
| | No. of Persons | % | No. of Persons | % | No. of Persons | % |
| **Highly-skilled Job** | **76,514** | **27.1** | **68,567** | **22.6** | **77,529** | **24.2** |
| Computer professional | 21,099 | 7.5 | 19,888 | 6.6 | 20,241 | 6.3 |
| Computer-related personnel | 17,736 | 6.3 | 16,247 | 5.4 | 21,795 | 6.8 |
| Optometry and electronics personnel | 37,679 | 13.3 | 32,432 | 10.7 | 35,493 | 11.1 |
| **Low-skilled Job** | **206,084** | **72.9** | **234,501** | **77.4** | **242,519** | **75.8** |
| Electrical and electronics technicians | 206,084 | 72.9 | 234,501 | 77.4 | 242,519 | 75.8 |
| **Total** | **282,598** | **100.0** | **303,068** | **100.0** | **320,048** | **100.0** |

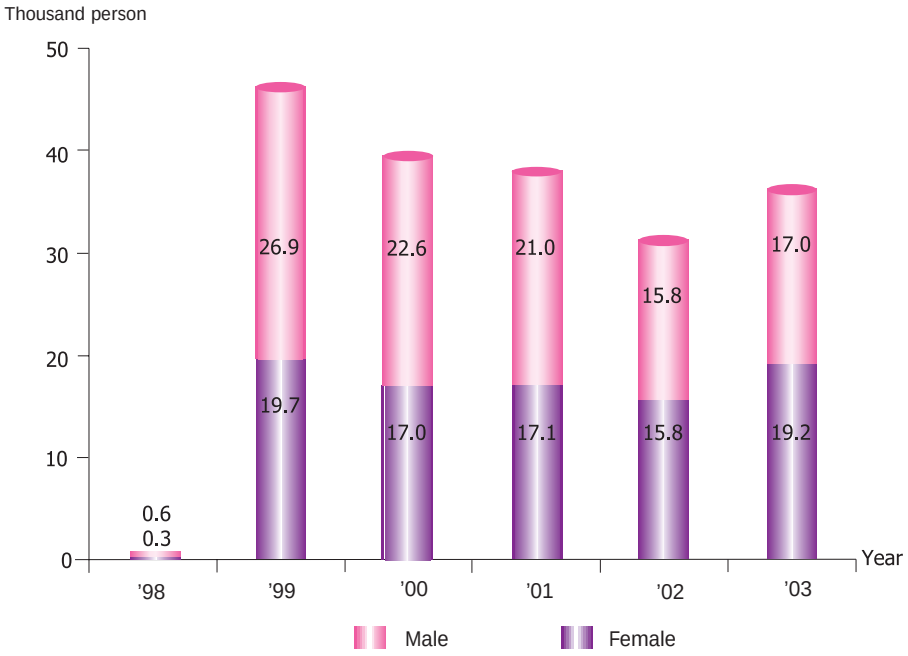
Source: National Statistical Office (NSO)

From the labour force survey conducted by the NSO in 2003, there were approximately 320,048 ICT personnel in Thailand or 9.5 ICT personnel per every 1,000 workforce. However, around three quarters of those (75.8%) worked in relatively low-skilled jobs (Table 8.2).

Among ICT personnel, the Thai government has paid considerable attention to software personnel. The Software Industry Promotion Agency (SIPA) speculates that there are currently around 30,000 software personnel in the market. The demand projected for the year 2008 is 100,000 persons, of which educational institutions are expected to be able to deliver approximately 40,000. Anticipating the personnel shortage, SIPA is working on the program to provide short courses and non-degree programs to convert non-ICT personnel into the field.

Other agencies also contribute to the development of ICT workforce and ICT literacy in the country. For example, NECTEC offers short courses for advanced users, while Software Park Thailand organizes a number of specialized courses aiming at high-end software developers. The Ministry of Labour has also embarked the program to train general IT knowledge for the workforce at large.

## Figure 8.2 Number of Workforce Attended and Completed IT Training from the Ministry of Labour (1998-2003)




Source: Ministry of Labour

# IX

# Research & Development

Research and development is a foundation for knowledge generation and innovation, particularly in science and technology. Knowledge, in turn, is a vital production factor in the development of the knowledge-based society/economy. Indicators related to research and development can be categorized into two main types: R&D expenditures and R&D personnel. R&D expenditures are often classified by (a) sector of performance or (b) source of funding. R&D personnel include reseachers, assistant researchers (or technicians) and supporting/administrative staffs.

According to the National Research Council of Thailand, Thailand spent a total of 11,065 million baht on research and development, an equivalent to 0.22% of GDP, in 2001. Despite representing a small percentage in GDP, it was a large increase, approximately 100% from 1999 (Table 9.1).

## Table 9.1 National R&D Expenditures (1991-2001)

| Year | R&D expenditures (Million baht) | R&D expenditures/GDP (%) |
|---|---|---|
| 1991 | 3,928.05 | 0.16 |
| 1993 | 4,473.41 | 0.14 |
| 1995 | 5,174.24 | 0.13 |
| 1996 | 5,528.13 | 0.12 |
| 1997 | 4,811.23 | 0.10 |
| 1999 | 5,021.76 | 0.11 |
| 2001 | 11,065.00 | 0.22 |

Source: National Research Council of Thailand (NRCT), 2001 National Survey on R&D Expenditures and Personnel of Thailand

Remarks: Public and Private expenditures are included

The figures from 2001 indicate that there was a high concentration of R&D activities in government, whether as a sector of performance or a source of funding. Notwithstanding different data collection approach, the government budget allocation for research and development activities for the year 2001 and 2002 also confirmed science and technology at the top of R&D spenders.

## Table 9.2 Budget Allocation for Research and Development, by Field of Research (2001-2002)

(Million baht)

| Field of Research | 2001 | 2002 |
|---|---|---|
| Science and Technology | 3,761.4 | 3,251.8 |
| Agriculture | 3,026.0 | 2,919.7 |
| Education | 1,302.6 | 1,378.9 |
| Health | 418.7 | 485.1 |
| Environment | 127.6 | 296.5 |
| Industry | 70.3 | 25.5 |
| National Security | 35.1 | 34.8 |

Source: National Science and Technology Development Agency (NSTDA), Thailand Science and Technology Profile 2004

Remarks: The Figure from the Budget Bureau which devises the R&D budget into 7 areas.

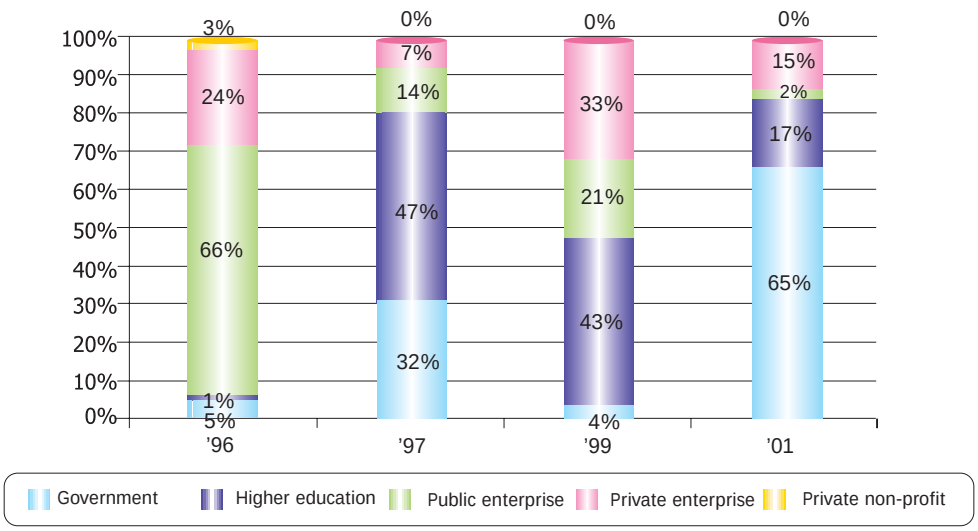
ICT R&D expenditures also experienced an impressive growth from approximately 108 million baht in 1997 to 406 million baht in 2001 (Table 9.3). However, it contributed only 3.68% of the total R&D expenditures in Thailand, with the majority (65%) being spent from the government sector. When looking at the distribution of expenditures across sector during 1996-2001, some fluctuations in ratio were observed. This might partly be a reflection in the change of methodology involved. A number of semi-autonomous organizations, including the National Science and Technology Development Agency, which had previously been classified as public enterprise has now been re-classified and grouped as “government” sector starting in the year 2001. The breakdown figure, therefore, should be treated with caution.

## Table 9.3 ICT R & D Expenditures by Sector (1996-2001)

| Sector | Year | | | |
|---|---|---|---|---|
| | 1996 | 1997 | 1999 | 2001 |
| Government | 13,971,817 | 34,475,062 | 5,983,915 | 266,145,661 |
| Higher education | 4,141,566 | 51,459,362 | 66,263,798 | 70,725,274 |
| Public enterprise | 185,415,611 | 15,440,991 | 32,567,776 | 9,461,79 |
| Private enterprise | 67,954,862 | 7,118,000 | 51,076,815 | 60,617,914 |
| Private non-profit | 8,934,088 | - | - | - |
| Total | 280,417,944 | 108,493,415 | 155,892,304 | 406,950,647 |

Source: National Research Council of Thailand (NRCT)

## Figure 9.1 The Ratio of ICT R&D Expenditures by Sector (1996-2001)




Source: National Research Council of Thailand (NRCT)

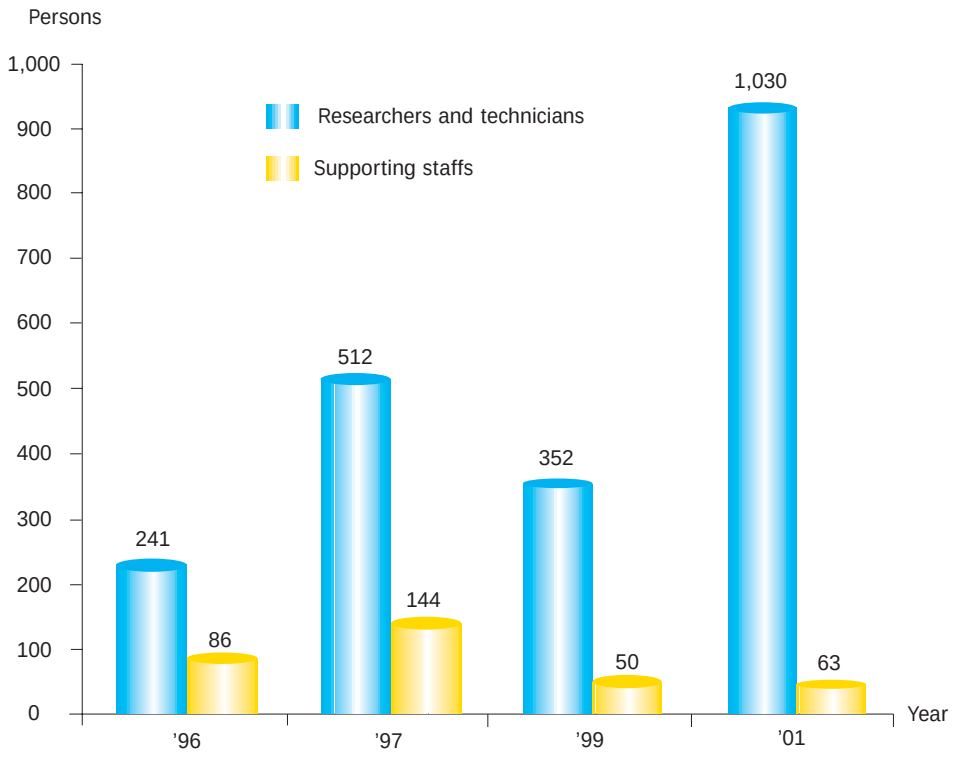
Regarding R&D personnel, the National Research Council of Thailand survey indicated that there were around 55,748 R&D personnel in 2001, of which 45% were researchers, 35.1% were technicians and the remaining 19.8% were supporting staffs (Table 9.4). However, the number of ICT R&D personnel was surprisingly low, accounted for only 1.96% of all R&D personnel. According to the survey, there were only 750 researchers and 280 technicians working in ICT field in 2001. The majority (42%) were working in educational institutions (Figure 9.3).

## Table 9.4 R&D Personnel Classified by Occupation and Field of Research (2001)

| Field of research | Occupation | | | |
|---|---|---|---|---|
| | Researchers | Technicians/ Research Assistants | Supporting Staffs | Total |
| Natural sciences | 2,763 | 1,469 | 413 | 4,645 |
| Computer and communication technologies | 750 | 280 | 63 | 1,093 |
| Engineering and technologies | 5,673 | 4,257 | 2,172 | 12,102 |
| Medical sciences | 4,353 | 3,931 | 640 | 8,924 |
| Agricultural sciences | 5,222 | 3,836 | 6,852 | 15,910 |
| Social sciences | 5,296 | 5,004 | 797 | 11,097 |
| Humanities | 1,043 | 810 | 124 | 1,977 |
| Total | 25,100 | 19,587 | 11,061 | 55,748 |

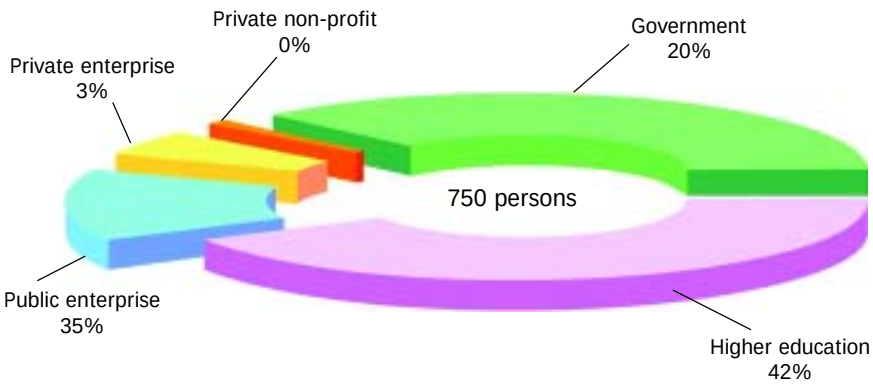
Source: National Research Council of Thailand (NRCT)

## Figure 9.2 R&D Personnel in ICT Field (1996-2001)




Source: National Research Council of Thailand (NRCT)

## Figure 9.3 ICT R&D Researchers by Sector (2001)




Source: National Research Council of Thailand (NRCT)

# List of Contributors

## Advisors

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2. Chadamas Thuvasethakul

## Contributors

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5. Jiraporn Tangpoolcharoen
6. Kardsiri Kantikittikun
7. Weerawan Charoensub
8. Kunakorn Charoenwong

# List Of Abbreviations

| | |
|---|---|
| ATCI | The Association of Thai Computer Industry |
| ATSI | The Association of Thai Software Industry |
| B.E. | Buddhist Era |
| BOT | Bank of Thailand |
| BSA | Business Software Alliance |
| CAT Telecom Plc. | CAT Telecom Public Company Limited |
| CGD | The Comptroller General's Department, Ministry of Finance |
| DBD | Department of Business Development, Miinistry of Commmerce |
| ECRC | The Electronic Commerce Resource Center, NECTEC |
| INA | The Information Networking Association |
| ISP Club | Internet Service Provider Club |
| MOC | Ministry of Commerce |
| NECTEC | National Electronics and Computer Technology Center |
| NESDB | National Economic and Social Development Board |
| NRCT | National Research Council of Thailand |
| NSO | National Statistical Office, Ministry of Information and Communication Technology |
| NSTDA | National Science and Technology Development Agency |
| OEC | The Office of the Education Council, Ministry of Education |
| SET | The Stock Exchange of Thailand |
| T.H. NIC | Thailand Network Information Center (T.H. NIC Co.,Ltd.) |

| | |
|---|---|
| TOT Corporation Plc. | TOT Corporation Public Company Limited |
| GITS | Government Information Technology Services |
| UBC | United Broadcasting Corporation |
| UNDP | United Nations Development Programme |