CES/SEM.52/8/Rev.1*
26 November 2003

ENGLISH ONLY

**STATISTICAL COMMISSION and UNITED NATIONS ECONOMIC COMMISSION FOR EUROPE (UNECE)
CONFERENCE OF EUROPEAN STATISTICIANS**

UNITED NATIONS CONFERENCE ON TRADE AND DEVELOPMENT (UNCTAD)

INTERNATIONAL TELECOMMUNICATION UNION (ITU)

UNESCO INSTITUTE FOR STATISTICS (UIS)

ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT (OECD)

STATISTICAL OFFICE OF THE EUROPEAN COMMUNITIES (Eurostat)

**Joint UNECE/UNCTAD/UIS/ITU/OECD/EUROSTAT Statistical Workshop:
Monitoring the Information Society: Data, Measurement and Methods
(Geneva, 8-9 December 2003)**

Event related to the World Summit on the Information Society

UNDERSTANDING CHANGES IN THE INFORMATION SOCIETY: WORKING TOWARDS THE INTERNATIONALLY HARMONIZED VIEWS

Keynote paper

Mr. Thaweesak Koanantakool, Ministry of Science and Technology, Thailand

* Due to the late submission, this paper could neither be translated nor reproduced and has been posted on Internet as submitted by the country.

Understanding changes in the Information Society: working towards the internationally harmonized views

Thaweesak Koanantakool
National Electronics and Computer Technology Center (NECTEC)
National Science and Technology Development Agency
Ministry of Science and Technology, Thailand.
htk@nectec.or.th
http://www.nectec.or.th/uses/htk/

Presented at
"Monitoring the Information Society: Data, Measurement and Methods"
Session II: The Role of ICTs in Economic and Societal Transformations
Statistical workshop in conjunction with the World Summit on Information Society
organized by: UNECE, UNCTAD, ITU, UNESCO Inst. of Statistics, OECD, Eurostat
(Geneva, 8-9 December 2003)

Abstract

The statistical measurement for changes in the information society is not a trivial task among various nations. Critical indicators in one society can be substantially different from another, as each society may focus on different problems. The author will present the range of key indicators for different classes of "information societies": the economically advanced nations, the developing nations and the least developed nations. An initial list of indicators has been compiled from the latest available draft WSIS Plan of Action to facilitate the standardized method for globally conformed data. The indicators are grouped in such a way that each country may put emphasis to the issues closest to their interest. The case study of Thailand is presented with the official ICT Master Plan and the main ICT indicators, which are being actively monitored. The classification of issues, data priorities and suggestions for the minimum list of indicators are given for international comparison.

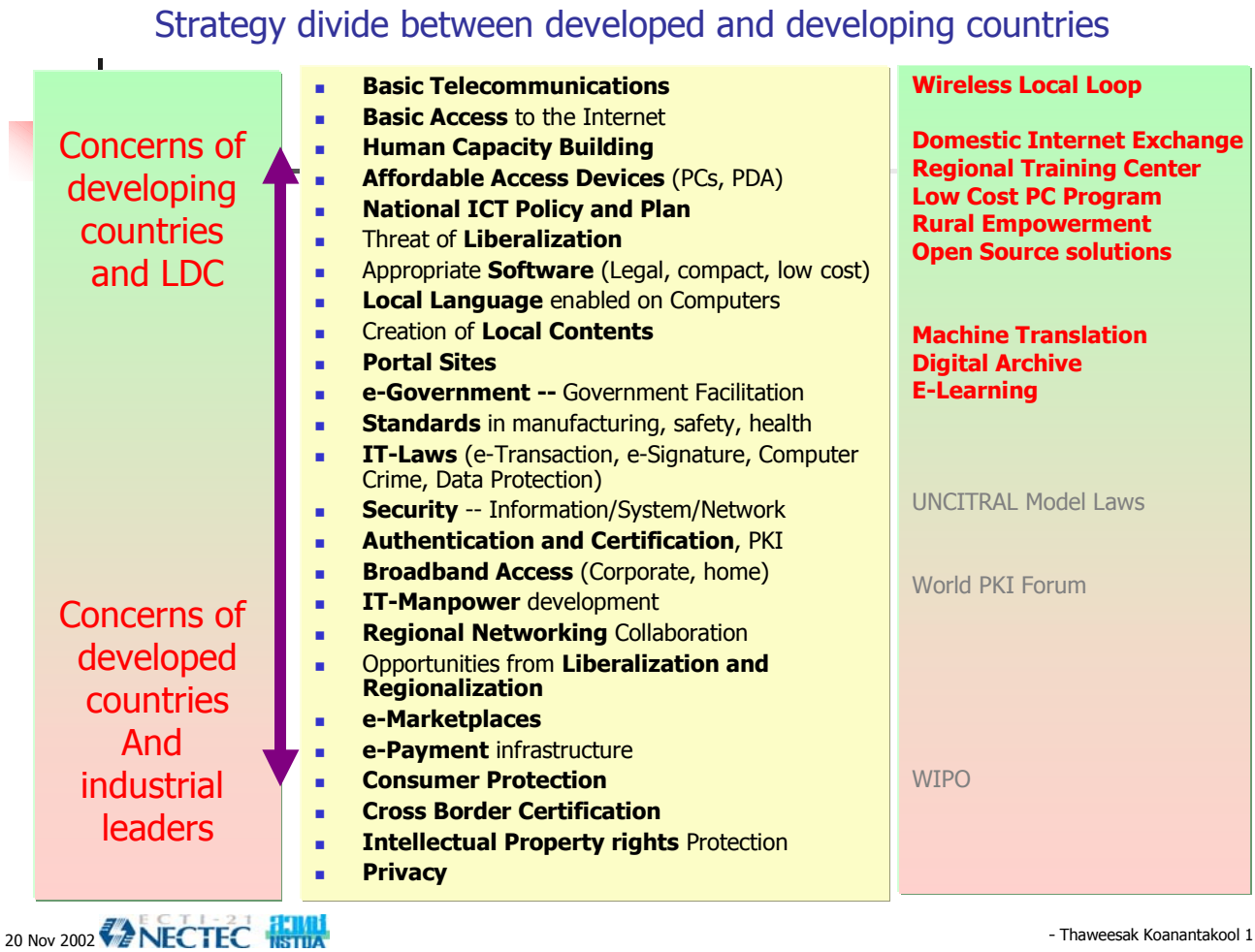
Introduction

The use of information and communication technologies (ICTs) in a country may be different from another country. Least developed countries are typically looking for the basic access to information, and basic telephone services; while developed countries are addressing the information security, privacy and broadband applications. Some developing countries are looking for ways of using electronic commerce, and developing related ICT laws to enhance the economy of the country. It is obvious that there are classes of information societies. This article is in search for an acceptable means of monitoring the "different" information societies, data, measurements and methods.

Diversified Focuses

There is a spectrum of policy issues related to the development of information society. The author presented the list of these issues in the UNCTAD-UNESCAP Regional Conference on Electronic Commerce Strategies in Development in Bangkok (20-22 November 2002) [UNCTAD 2003]. The list is shown in the chart below.

The chart highlights the fact that countries are in different phases of development. Their most interested statistical data therefore are diverse, depending on their concerned policy issues. The policy development in each country, therefore, focuses on a wide rage of overlapping issues.



According to the UNCTAD E-Commerce and Development Report 2003, "In many less advanced countries, there is still widespread lack of knowledge of using the Internet in business. For these countries, enhancing awareness and public understanding of the benefits of ICT is often an important starting point in policy planning. Other priority areas for developing countries are basic access to ICT, low-cost hard- and software and the use of local-language Internet portals." [UNCTAD-2003] In developed countries, according to the report, "business interests appear higher on the policy agenda. Businesses worry about issues such as competition, trust and security, interoperability, intellectual property and the open market environment."

Analyzing Indicators for WSIS Draft Plan of Action

When we consider these issues with the latest WSIS Draft Plan of Action (dated November 14, 2003) [WSIS-2003], there are many indicators, which can be developed and used as measurements of the society. However, the richness of issues and the length of the WSIS draft Plan of Action can complicate the issue of making a simple framework for global reference to the measurement of the Information Society. In order to simplify the process of defining indicators, we put down important indicators addressed by the WSIS Draft Plan of Action. The result of this is shown in Annex A.

By referencing to the chart above "*spectrum diagram*", it is interesting to learn from Annex A that the policies issues which received most attentions in terms of indicators are the followings:

- Basic Access to the Internet (21)
- Human Capacity Building (19)
- IT Manpower Development (19)
- Security (13)
- Opportunities from Liberalization and Regionalization (12)

Figures in parentheses indicate the number of indicators related to the associate policy issues. It is clear that the Draft Plan of Action is most concerned with the access-divide, and human capacity/IT manpower. Security and open market are also in the top of the list.

Opposing Policies

Interesting issues often raised in several international meetings are opposing policies towards liberalization. This is portrayed in the spectrum diagram as "threat of liberalization" for developing countries and "Opportunities from Liberalization and Regionalization" for developed countries.

By the terms "threat of liberalization", we mean that many undeveloped and developing countries are not quite ready for open competition in their home market. This is often because the local businesses and industries are much less competitive and productive than rivals from abroad. In some countries, these businesses are monopolized by the state-own enterprises, and are the sources of revenue for the government. Thus the government may be reluctant to open up the market and end the monopolistic status. At the other part of the spectrum, most developed countries are going for a global open markets as a way to promote free competition and make the consumer get the best offer.

The opposing policies do need a well-balanced world order, as the argument is not a simple one. It is often argued that in order to reduce the digital divide, the telecommunications market in every country should be "equally opened markets". On the other hand, many developing countries are crying for the agricultural and food sector should be "equally opened markets" in the developed countries because agricultural products are their main export income. The open market concepts should cater for fair international trade arrangement, in order to create a better income distribution.

We did not find any statements in the WSIS Draft Plan of Action which fall into the category of "threat of liberalization".

A Framework of Unified Measurement Spectrum

The author would like to propose a method of measuring the Information Society through an agreed set of policy issues, classification of the policy issues by interest groups, and then the individual indicators. In each indicator, an agreed convention on terminology and classifications of the measurement is needed in order to standardize the work. Thus, it is possible to measure the real values of each indicator in every society.

In practice, a country may have less attention on some policy issues, which are the main focus of other countries, as they may not be relevant to it. For example, for some LDCs, there is no need to perform any measurement in broadband access, or PKI because they are not in the urgent list. Often their values are close to zero. On the other hand, there is no need to talk about basic telephone line penetration for highly advanced countries which are already using broadband access and advanced mobile services. The values of these indicators in developed countries are a lot closer than 100% of investment.

Through the grouping of policy issues into spectrum, a country may implement the measurement system to obtain the indicators required. The choice of policy issues are left to each country to choose. The selection of choice itself is a kind of indicator in moving to the desired status of Information Society.

In the following sections, the author will take a look at the ASEAN e-measurement framework and the case study of Thailand.

ASEAN e-measurement framework

The framework was initially proposed in the First ASEAN Workshop on Measuring of Digital Economy in September 2002 and then endorsed by e-ASEAN Working group & e –ASEAN Task Force in October 2002. The framework focuses on measuring "readiness", "usage" and "impacts" of ICT. This framework is for measuring and monitoring e-Commerce as well as the development of ICT. The framework has been used as a base framework for the

member country in developing their national e-measurement framework. The framework aims for establishing the guidelines on definitions, data collection and measurement methodologies of ICT in each stage of development: readiness, usage, and impact. The initial e-ASEAN e-Readiness questionnaire contains 153 questions.

The second ASEAN e-Measurement Workshop in November 2003 was the region's next effort to implement the framework into realistic practice among ASEAN member countries. The main objective of the workshop is to agree on a common list of key ICT indicators, their definitions and methodologies. The exchange of information and experience sharing in this workshop will also contribute towards raising regional capabilities in developing comprehensive and reliable ICT indicators that are needed to support national decision-making and the second ASEAN e-Readiness Assessment scheduled to be in 2003.

The ASEAN e-Measurement workshop adopted the concept of OECD model [OECD-2003] which proposed 44 core list of indicators, with little modification. The ASEAN members were also aware of the e-Europe measurement framework based on 22 indicators.

A Case study for Thailand

Thailand is a middle-income nation, with 62.5 million populations. Her fixed-line telephone penetration is about 12% and mobile phone penetration of about 30%. The Internet user penetration is about 10%. The country enacted the Electronic Transactions Act since December 2001. More than 60% of secondary schools in the country are online with the Internet. Thai Government issued its first National ICT Master Plan (2002-2006) in September 2002. This plan calls for actions in seven strategies. These are:

1. To promote domestic ICT industry especially the software industry;
2. The use of ICT for better quality of life;
3. To reform and to build capacity in ICT research and development;
4. To raise potential social infrastructure for future competitiveness;
5. To develop potential entrepreneurships towards export expansion;
6. To facilitate small and medium enterprises (SME's) in utilizing ICT; and
7. To deploy ICT for e-government's administrative and services, and develop e-government procurement.

There are about 44 action items to be executed in the plan, with several benchmarks and targets to be achieved by the year 2006. In each strategy, a number of indicators are defined so that we can keep track of the progress of the plan, as well as to compare the progress against the stated targets.

At the time of the launch of master plan, we had only some data readily available. Some indicators could be derived or interpreted from existing statistics and surveys. Many indicators have never been collected or published. The ICT indicators, as stipulated in Thailand ICT Master Plan 2002-2006, are listed in Annex B.

At present, collection of ICT statistics in Thailand is performed by various agencies, both in governmental and private sectors. The National Statistical Office (NSO) collects the supply side and the demand side statistics as well as the impact of ICT. On the demand side, surveys of ICT usage by business, household and government sector have been conducted, while the impact of ICT is measured via the public opinion survey. The ICT market outlook data is annually estimated and reported by consortia of ICT industry: The Association of Thai Computer Industry (ATCI), The Association of Thai software Industry (ATSI), and the Information Networking Association (INA), while the values of ICT import and export have been collected by Thai Customs Department.

The National Electronics and Computer Technology Center (NECTEC) is the main sources of information related to the Internet, e-commerce and e-government development. The "Internet Information Research Center", which came into operation since 1999 [NECTEC-1999] provides a comprehensive set of information related to Internet growth: users, bandwidths, domains, IP numbers. The Government Information Technology Service Program (GITS) at NECTEC provides the automated web usage statistics for Thailand

[www.truehits.net]. In addition to these, NECTEC runs an annual "Internet User Profile Survey". and publishes the results annually [www.nitc.go.th].

The Electronic Commerce Resource Center (ECRC), a center established within NECTEC, collects the e-commerce statistical data. ECRC conducts many surveys for monitoring the development of e-commerce in Thailand. There is a survey for Thai Websites under the ".com", ".co.th", ".net" and ".org" in 1999 and 2001. The survey looks for number of active Website and the level of Website's sophistication. The results are reported and classified by industry. [www.ecommerce.or.th]

The B2B and B2C e-commerce surveys have been conducted to quantify the number of enterprises involving in the business as well as the value of total sales in the e-commerce sector. In 2003, an e-transaction survey has been conducted. The survey was performed on Thai commercial banks and all those foreign bank branches regulated by the Bank of Thailand. The survey focuses on payment method, size and type of business participated in B2B and B2C, as well as the value and volume of transaction via the gateway payment system. Website activities in the government sector are also monitored and keep tracking.

To measure e-government performance, NECTEC e-government project team develops the SEE ("Service E-readiness Explorer") system for exploring functions and services provided on all web pages of Thai government agencies. SEE consists of two parts: the e-government readiness survey and the government IT-project database system. The e-government web survey consisted of two phases: the initial manual survey of URLs and service pages to register the active locations, and the automatic tracking of service evolution of the registered URLs. The Government IT-project database system is a collaborative process of IT project registration and progress tracking. With automated process, the SEE system can now show the up-to-date status and statistics of e-Government services maturity, service directory, progress in IT project spending and milestones.

Some ICT statistics are surveyed by the industrial sector. The Association of Thai Computer Industry, the Computer Association of Thailand, etc. conduct an annual survey of the computer business: name of companies, address, market sizes, top products sold in these companies. The associations jointly estimate the sales of ICT in Thailand each year.

A unified ICT Indicator Project in Thailand

The "unified ICT Indicator Project" is a collaborative effort between National Electronic and Computer Technology Center (NECTEC) and the National Statistical Office (NSO) to develop ICT indicators that can keep track of the status of Information Society in Thailand. The project was approved and supported by the Ministry of Information and Communications Technology, and the Ministry of Science and Technology of Thailand.

In planning for Thailand's ICT indicators, the ICT Master Plan is not the only source of indicators that we aim to collect. For international comparability, we have taken basic indicators from OECD and ASEAN into our plan. Therefore, the total number of agreed indicators of the project becomes as many as 129 indicators.

Having identified several data collectors and processors within the country, NECTEC can conduct the country's ICT indicators in cooperation with other relevant agencies such as the National Statistical Office (NSO). The ICT indicator project aims at compiling data from several sources of information into a website and publish an annual report. The premiere issue of this report, "Thailand ICT Indicators", was released in October 2003 at the time of the APEC Leader's meeting in Bangkok [NECTEC-2003]. We started small, with the following steps in the plan:

- Stage 1: start with the existing data;
- Stage 2: add data which can be derived or calculated from existing data;
- Stage 3: conduct new surveys for the indicators which we have never collected before.

After having all concerned indicators, we classified them by using several criteria, such as maturity level (readiness, usage, and impact), data availability, and the urgency of data needed.

Conclusion

There exist some common ways in measuring the information society indicators. However, the varieties of policies issues may cause the measurement system too complicated to be useful for developing countries. Grouping of indicators by policy issues have been proposed in this paper. This concept simplifies the way that we may collect data and indicators, especially for the developing countries. The example of Thailand shows that it is possible to start small with usable set of initial indicators. The process can later be extended to cover other policy issues as required, while the global consistency for measurement is easily maintained.

Acknowledgement

The author wishes to thank all NECTEC staff members of the Thailand ICT Indicator project in their joint effort for establishing the general ICT indicators for Thailand. Special thanks are due to Dr.Chadamas Thuvasethakul, the team leader, and to Dr. Kasititorn Pooparadai and Mr. Phumisak Smutkupt for their assistance in the preparation of this report.

References

[UNCTAD-2003] "E-Commerce and Development Report 2003", United Nations Conference on Trade and Development, New York and Geneva, 2003, ISBN 92-1-112602-9 (p. 66).

[NECTEC-1999] The Internet Information Research Center (IIRC), an online collection of Internet history, charts, and statistics for Thailand, http://www.nectec.or.th/internet/.

[NECTEC-2003] "Thailand ICT Indicators", National Electronics and Computer Technology Center, Bangkok 2003, ISBN 974-229-527-1.

[OECD-2003] "A proposal for a core list of indicators for ICT measurement", Martin Schaaper (martin.schaaper@oecd.org), OECD. Presented at UNCTAD Expert Meeting on Measuring Electronic Commerce as an Instrument for the Development of the Digital Economy, Geneva, 8-9 September 2003.

[WSIS-2003] Draft Plan of Action (WSIS/PC-3/DT/5) - 14 November 2003 at 19 hours (rev. 1), http://www.itu.int/dms_pub/itu-s/md/03/wsispc3/td/030915/S03-WSISPC3-030915-TD-GEN-0005!R1!MSW-E.doc

---

Annex A
List of Indicators in WSIS Plan of Action by the Spectrum of Policy Issues

Basic Telecommunications (4)

- Teledensity
- Number of ICT backbone providers
- Full capacity of backbone system of data transmission
- Traffic level (Gbps) at peak times that each Internet Exchange Points can support

Basic Access to the Internet (21)

- Number of computer users by gender, age, education, income
- Number of Internet users by gender, age, education, income
- Number of households with a computer
- Number of households with Internet access
- Number of public Internet access
- Number of districts with telecenter
- Number of district with Websites
- Number of communities that can apply ICT to their local economy
- High-speed Internet access penetration
- Number of PCs in rural areas
- Number of local communities with Websites
- Expenditure on research and development in ICT infrastructure and applications
- Number of schools with computer and Internet access
- Number of schools with Websites
- Number of students per computer
- Average number of connected computers in each school
- Number of schools with ICT implementation plan

- Percentage of a national education budget is allocated for ICT
- Number of universities with high-speed Internet connection
- Number of household having teleworking
- Investment on ICT infrastructure by government and private sector

Human Capacity Building (19)

- Number of ICT based lessons in the curriculum relative to the overall curriculum time for the subject
- Percentage of educational content covered by ICT based instructional materials
- Number of ICT training courses for teachers
- Number of teachers with IT access and utilizing IT as educational tools
- Number of ICT related curriculums in universities
- Percentage of ICT management courses
- Number of schools with Websites produced by students
- Number of students who demonstrate only basic ICT skills
- Number of students who demonstrate advanced ICT skills
- Number of hours per week for ICT-aided instruction
- Number of people receiving ICT training courses from the Ministry of Labor
- Number of online courses
- Number of ICT related curriculum for distance learning
- Number of workers who graduated from ICT distance learning programmes
- Number of universities that have ICT programmes link with international educational institutions
- Number of ICT training course with international cooperation
- Number of volunteer programmes on ICT training
- Number of ICT related Train-the-trainer programmes
- Number of programmes to eradicate illiteracy by using ICTs

Affordable Access Devices (5)

- Number of locally assembled lower-cost PCs
- Ratio of locally assembled PCs usage
- Expenditure on research and development in affordable ICT equipment
- Presence of research on non-text based computer interfaces
- Expenditure on research and development in ICT accessibility for disadvantaged groups

National ICT Policy and Plan (9)

- Presence of national e-strategies/master plan
- Presence of information security policy
- Presence of a body responsible for implementing e-strategies/master plan
- Number of government IT projects in which private sector is involved
- Number of Public Private Partnership (PPP)
- Government funds allocated for SMEs loans
- ICT expenditure as percentage of GDP
- Number of ICT research projects receiving funds from international organizations
- Growth of ICT investment

Appropriate Software (4)

- Ratio of locally developed software usage
- Ratio of open source software usage
- Expenditure on research and development in open source software
- Number of software developed for disadvantaged and vulnerable groups

Local Language (4)

- Number of Websites with a majority content in local language
- Expenditure on research and development in machine translation tools
- Number of softwares distributed in local language
- Number of programmes to facilitate use of local language

Creation of Local Content (8)

- Number of cultural institutions with Websites
- Number of cultural institutions that post key information on the Website
- Number of cultural institutions that provide online services
- Number of digital archives
- Number of libraries with Internet access
- Number of libraries with Websites
- Number of libraries using ICT for providing services
- Number of libraries having digitization activities

Portal Sites (1)

- Number private sector's portal sites for local businesses

e-Government (6)

- Percentage of government agencies with Websites
- Percentage of government agencies with online services
- Percentage of government services that are linked to other agencies
- Intensity of government e-procurement

- Number of government e-commerce Websites
- Number of times that scientific information on the government Website is downloaded

Standards (5)

- Number of hospitals with Websites
- Number of hospitals with online services
- Number of hospitals with ICT based medical training
- Use of electronic health/medical records
- Use of electronic drug prescriptions

IT Laws (2)

- Presence of updated version of consumer protection laws
- Presence of IT related laws

Security (13)

- Number of incidents reported to CERT
- Expenditure on ICT security in government and private sector
- Information security technologies penetration
- Percentage of business ICT budget allocated for security
- Percentage of businesses suffering from security breaches
- Percentage of Internet users who limit their online transaction as a consequence of security concerns
- Number of secure Web server
- Percentage of PCs with security features
- Number of Internet users who are aware of CERT
- Use of anti-spam software
- Presence of anti-spam policy
- Number of security-related training courses
- Number of pornography Websites closed down

Authentication and Certification (3)

- Number of businesses involving in interoperability standard development
- Number of ebXML pilot projects
- Expenditure on new technologies research

Broadband Access (3)

- Percentage of business with broadband, ADSL, wireless
- Availability of satellite services
- Percentage of businesses with wireless

IT Manpower Development (19)

- Number of certified ICT professionals by gender
- Number of women in ICT workforce
- Number of businesses in ICT sector having women in high ranking management
- Number of employees using PCs for work
- Number of employees using Internet for work
- Number of employees with email address
- Number of government employees who can operate PCs
- Percentage of government employees using Internet for work
- Percentage of government employees using email for work
- Number of government employees per computer
- Number of local ICT training centers
- Number of ICT training courses for government employees
- Number of people attended professional training courses and being certified
- Number of ICT training programmes specifically designed for communities
- Number of volunteered ICT trainers from other countries
- Number of international cooperation ICT training for government employees
- Number of ICT training programmes specifically designed for a profession
- Number of businesses with in-house ICT training
- Number of programmes in science and technology targeting young girls

Opportunities from Liberalization and Regionalization (12)

- Number of SMEs with Websites
- Number of SMEs utilizing ICT in mainstream operation
- ICT investment by SMEs
- SMEs expenditure on ICT research and development
- Number of SMEs joining supply chain management
- Number of SMEs received ICT related assisting from government agencies
- Number of ICT related projects involving by SMEs
- ICT expenditure in agriculture sector
- ICT adoption rate in agriculture sector
- Foreign investment to ICT sector
- Number of software export activities
- Growth of venture capital investment

e-Payment (1)

- Expenditure in the development of online transaction application

Intellectual Property Right (3)

- Number of open source patents granted
- Number of ICT-related patents
- Number of measures supporting Intellectual Property Protection

Privacy (3)

- Presence of online privacy law
- Number of Internet users who are concerned over online privacy
- Number of commercial Website with privacy policy statement

Annex B

ICT indicators as required by the ICT Master Plan for Thailand

(2002-2006):

To measure the progress and the success of the plan, set of indicators for each strategic goals have been stated. These indicator set with a total of 59 indicators, is considered as the first tier indicators needed to be collected. These indicators categorized by ICT strategies are as follows:

1. **Promoting the domestic ICT industry especially the software industry;**
   - 1.1 Number of qualified researchers, software developers, and certified professional developers
   - 1.2 Total value of government IT projects in which Thai entrepreneurs are involved
   - 1.3 Government's IT budget (for both hardware and software)
   - 1.4 Expansion of software market in the country
   - 1.5 Total value of exported software
   - 1.6 Total value of exported ICT products
   - 1.7 Ratio of domestic software development and open-source software systems to total value of software market in each year
   - 1.8 Increase in number of software developers and market capitalization
   - 1.9 Decrease in imported software
   - 1.10 Increasing demand for IT recruitment in newspaper advertisements
   - 1.11 Increase in salaries of IT professionals
   - 1.12 Number of open-source training and service centers
2. **Promoting ICT usage to improve the quality of life and society.**
   - 2.1 Teledensity, urban and rural
   - 2.2 Mobile phone penetration
   - 2.3 Number of public phones and public Internet access points
   - 2.4 Number of fixed-line telephones, which can transmit data at the rate of 32Kbps, in a community
   - 2.5 Speed of backbone access
   - 2.6 Decline in Internet access cost
   - 2.7 Number of districts with telecenter
   - 2.8 Ratio of Tambon Administrative Organisations with Websites
   - 2.9 Number of community radio and television stations
   - 2.10 Number of schools connected to Internet and the average number of connected computers in each school
   - 2.11 Number of IT training courses for teachers
   - 2.12 Number of teachers with IT access and utilizing IT as educational tools
3. **Reforming and enhancing the ICT research and development capability.**
   - 3.1 Expenditure on ICT research and development in both the government and private sectors
   - 3.2 Ratio of locally assembled PCs usage
   - 3.3 Ratio of locally developed software usage
   - 3.4 Number of locally assembled lower-cost PCs
   - 3.5 Number of network computing courses taught in universities
   - 3.6 Number of graduate students in network computing
   - 3.7 Number of software developers with skills in network computing
4. **Raising social capacity for future competition.**
   - 4.1 Number of workforce that can access ICT
   - 4.2 Number of workforce that can access ICT and research information from Internet
   - 4.3 Number of graduates in any levels that can utilize ICT
   - 4.4 Ratio of computers to the number of students at all levels
   - 4.5 Computer course that is taught at every educational level
   - 4.6 Number of people attended professional training courses and being certified

4.7 Number of people receiving ICT training courses from the Ministry of Labor
4.8 Number of communities that can apply ICT to their local economy
4.9 Number of Thai Web pages

5. Development of entrepreneur capacity competing in the international markets expansion.

5.1 Market value of e-commerce
5.2 ICT employment in every industry
5.3 Increase in the ratio of IT occupation employment to the increase in overall employment
5.4 IT investment in every industry
5.5 Ratio of ICT expenditures to the total increase in economic value
5.6 Number of people with IT skills training from the Ministry of Labor

6. Promoting ICT utilization among SMEs

6.1 Number of SMEs utilizing ICT in their back-office systems
6.2 Number of SMEs utilizing ICT in mainstream operation
6.3 Number of SMEs joining supply chain management
6.4 Value of ICT investment by SMEs
6.5 Number of SMEs on the government's Web portal sites
6.6 Number of SME Websites

7. Promoting ICT utilization in government for administration and services.

7.1 Number of government agencies fully utilizing ICT in their administration
7.2 Internal administration system of government agencies which utilize ICT in organization
7.3 Use of secured transaction systems (encryption, PKI)
7.4 Number of basic e-government services
7.5 Number of e-government services
7.6 Number of Government services that are linked to other agencies
7.7 Intensity of Government e-procurement
7.8 Use of Government payment gateway