

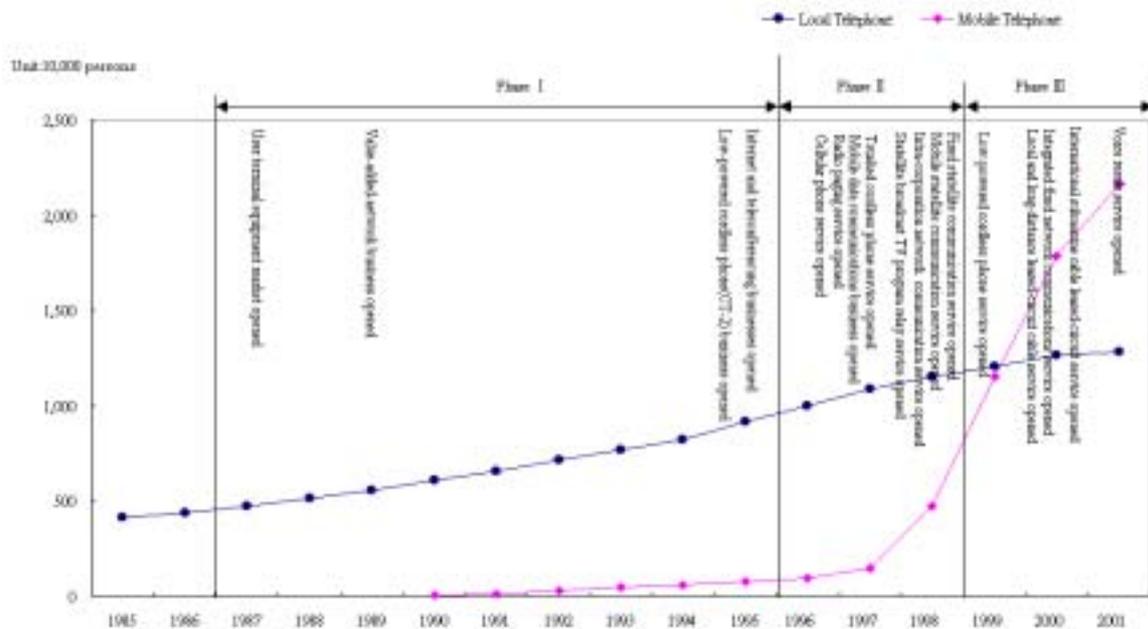
# Telecommunications Competitiveness Analysis in Taiwan (Condense Version)

Since The World Trade Organization (WTO) Basic Telecommunications Agreement became valid in February of 1998, 69 contracting countries, which compose of more than 90% of the world telecommunications market, have been furthering telecommunications liberalization policies aggressively in their domestic markets. These moves also led to increasing competition between telecommunications enterprises around the world. Taiwan, just officially becoming a WTO member on January 1, 2002, will implement the accession commitments and continue forwarding the telecommunications liberalization policies.

## Overview: Implementation of Telecommunications Liberalization in Taiwan

The liberalization of telecommunications in Taiwan is an outgrowth of two policies, those regarding the Asia-Pacific Regional Operations Center and the National Information Infrastructure, and is opening up the island's telecommunications market through a staged progression (referring to Figure 1).

*Figure 1: Process of Telecommunications Liberalization in Taiwan*



Source : Taiwan Institute of Economic Research (TIER).

In the first step toward liberalization, the ownership of terminal equipment by subscribers was opened up in 1987, thus initiating competition in the terminal equipment market. Later in 1989, the step was the opening of the market to value-added services so as to provide consumers with a diversity of such telecommunications services. The passage of three telecoms-related laws in 1996 led to the formal separation of the Directorate General of Telecommunications, which is in charge of telecommunications industry regulation, and the Chunghwa Telecom Co., which is responsible for operating the telecoms business. This separation more firmly established the policy directions for liberalization, and later further liberalization steps were taken particularly in services of mobile telecommunications and satellite telecommunications.

After 1999, liberalization continues in various fields of services, such as integrated fixed network telecommunications, international submarine cable leased-circuit, local and long-distance leased-circuit cable, resale business, and the third generation mobile telecommunications (3G). The short-term objective of telecom liberalization is thus completed.

#### **、 Major Contents and Outlook of Current Telecommunications Policy**

A report presented to the national transportation conference “Telecommunications Liberalization Policy, Past and Future” held in June of 2001 by Ministry of Transportation and Communications gives the resolutions that were reached regarding the planning of policy goals for the next stage of telecommunications liberalization and proposes four major policy goals for the telecommunications development in Taiwan:

- ( 1 ) Establishment of a world-class operating environment to build Taiwan into a telecommunications hub for the Asia-Pacific region;
- ( 2 ) Popularization of telecommunications services and shortening of the digital divide;
- ( 3 ) Promotion of full competition in the telecom market and provision of more innovative, higher quality telecommunications services;
- ( 4 ) Boosting of industrial development to advance the interests of all the people.

In order to achieve the above-mentioned four policy development axes effectively, Ministry of Transportation and Communications evaluated and assessed trends in current technological developments, international and domestic telecommunications environments. With such efforts, Ministry of Transportation and Communications made four major telecom policies as follows:

- ( 1 ) Responding to trends of global liberalization trend and lifting market control to accomplish full telecommunications liberalization.
- ( 2 ) Responding to the development of digital economy and promoting the building of broadband network to realize the ideal of information society.
- ( 3 ) Responding to the development of technological convergence and examining governing organizations and managerial contents to achieve high quality services.
- ( 4 ) Responding to new trends of communications and promoting digital radio and television to achieve digitalization of broadcastings.

In addition, in order to cooperate with the implementation of “e-Taiwan Project” in Executive Yuan’s “Challenge 2008 – National Development Plan”, the Directorate General of Telecommunications of Ministry of Transportation and Communications also plans broadband networks construction indexes (referring to Table 1). The cooperation between the government and enterprises in private sectors is expected to promote related policies and measures with the principle of combining government’s leadership and initiatives taken by private sectors, in order to accelerate the completion of e-Taiwan broadband network construction and thus enable Taiwan to become the country with the most popularized broadband networks in Asia-Pacific region.

*Table 1 Broadband Networks Construction Evaluation Index*

Item \ Year	2002	2003	2004	2005	2006	2007
Domestic north-south backbone network bandwidth (Gbps)	850	950	1,050	1,150	1,200	1,250
International backbone network bandwidth (Gbps)	150	200	200	200	250	250
Fiber-To-The-Cabinet (FTTC) covering rate(%)	82.0	85.5	88.5	91.0	93.0	95.0
Ratio of broadband population (%)	25	40	50	60	65	70
Broadband population (10,000persons)	200	300	380	460	530	600

*Source : Directorate General of Telecommunications ( DGT ) .*

The most fundamental objective for Taiwan to implement telecommunications liberalization is to introduce competition, in order to accelerate the construction of telecommunications infrastructure. Forward looking at the development of telecommunications policy in Taiwan, it is confirmed that promotion of the construction of broadband networks has become the main direction of Taiwan's telecommunications policy. Telecommunications authorities also demonstrate constructive actions through emphasizing the target value planning and employing the Benchmark policy-evaluating method.

#### **、 Analysis of Taiwan's Telecommunications Competitiveness**

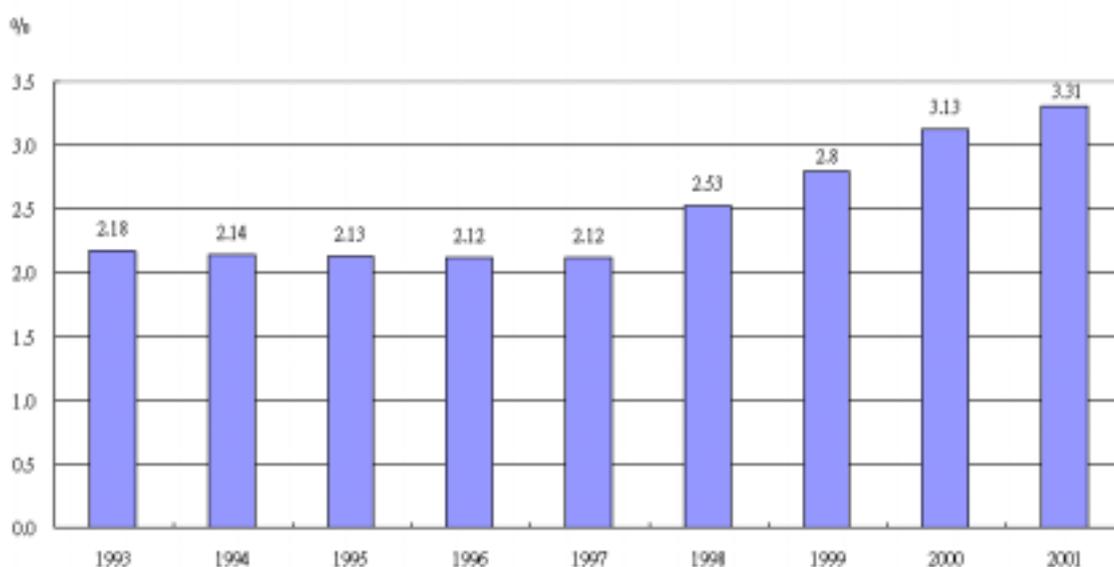
In the past era when telecommunications was a monopoly industry, the capacity of national telecommunications institutions demonstrated one country's telecommunications capacity. Therefore, relative competitive advantages among different countries could be reflected by comparisons of country's telecommunications institutions. With progresses of telecommunications liberalization, the concept of telecommunications competitiveness has become different from that in the previous era of national monopoly. Now the new concept of telecommunications competitiveness is considered as a signal, which reflects the competition environment of one country's telecommunications market and is used to evaluate the results of the promotion of telecommunications liberalization policy.

Based on the concept of telecommunications competitiveness mentioned above, the analyses of telecommunications competitiveness involved in this project are basically positioned as relevant indexes, which can demonstrate the domestic telecommunications competition environment and applications of international comparable indexes.

First of all, regarding analyses of the competition environment of the domestic telecommunications market, analyses focus on indicators such as telecommunications industrial structure, percentage of telecommunications revenues to Gross Domestic Product (GDP), telecommunications revenues structure, telecommunications tariffs, telecommunications market share, quality of services and contribution of telecommunications investment to the overall economy. Results of the analyses are summarized below.

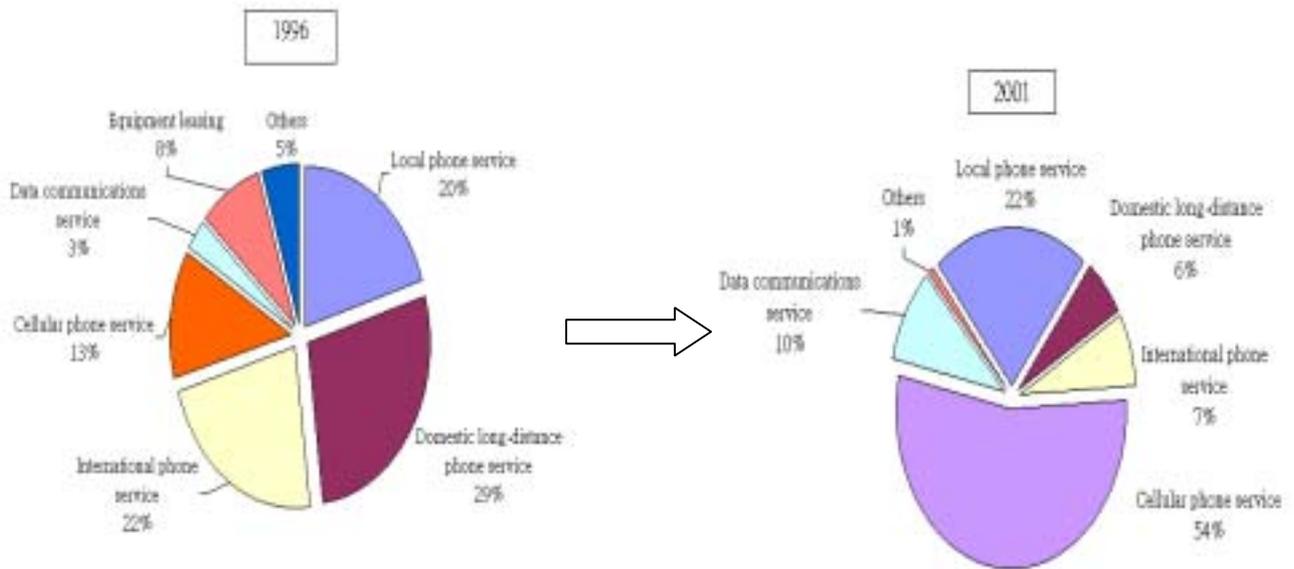
( 1 ) In general, telecommunications liberalization policy in Taiwan has introduced competition mechanism successfully, vitalized the telecommunications industry structure and led to the growth of telecommunications business effectively (referring to Figure 2 and Figure 3).

*Figure 2 Percentage of Telecommunications Revenues to Gross Domestic Product(GDP) in Taiwan*



Source : Directorate General of Telecommunications ( DGT ) .

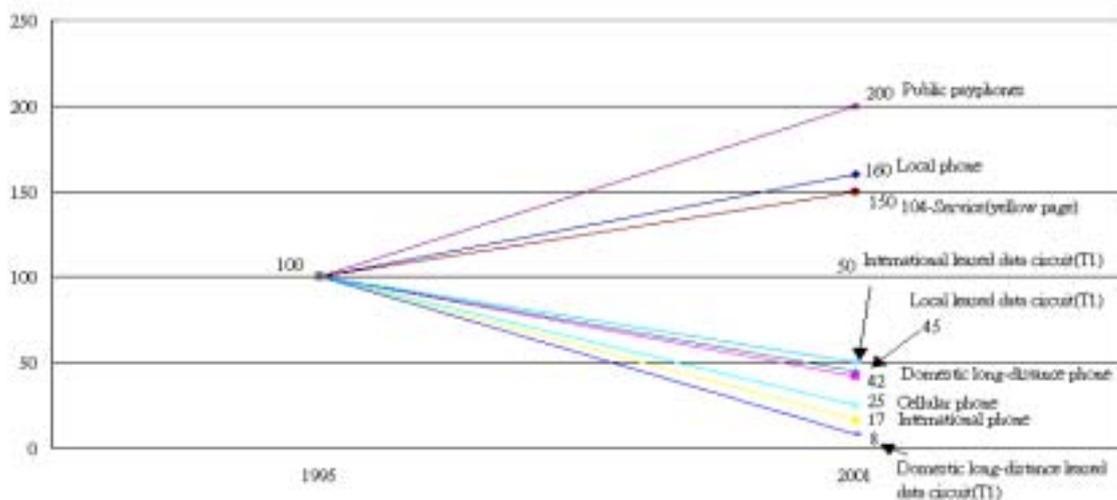
Figure 3 Comparison of major telecommunications revenues in Taiwan



Source : Directorate General of Telecommunications ( DGT ) .

( 2 ) In a healthy market competition environment, the trend of reasonable reduction of telecommunications services tariffs has emerged. This tariff reduction not only provides subscribers with low-priced and high quality telecommunications services but also enables telecommunications operators to expand sales and increase efficiencies and ultimately to contribute to the development of overall economy. Concrete outcomes that benefit all consumers, telecommunications operators and the overall economy have been shown (referring to Figure 4 and Figure 5).

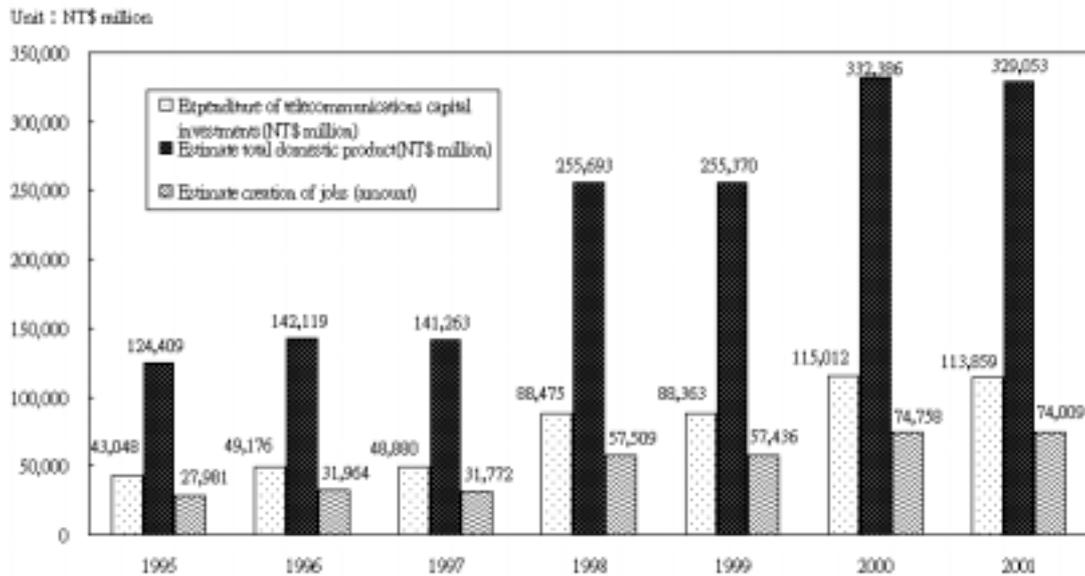
Figure 4 Comparison of telecommunications tariffs index in Taiwan



Note : Assuming tariff level of every telecommunication service in 1995 as 100.

Source : Summaries of various DGT data.

Figure 5 Trends of Changes in Telecommunications Investment in Taiwan



Note : Estimated total domestic product and estimated creation of jobs are only referential values ,which are calculated by applying the figure of expenditure of telecommunications capital investments shown in the report 「 Analysis of the Results of Telecommunications Liberalization in Taiwan 」 commissioned by DGT.

Formula : Estimated total domestic product= expenditure of telecommunications capital investments $\times$ 2.89

Estimated creation of jobs= expenditure of telecommunications capital investments $\times$ 0.65

Source : Summaries of various DGT data.

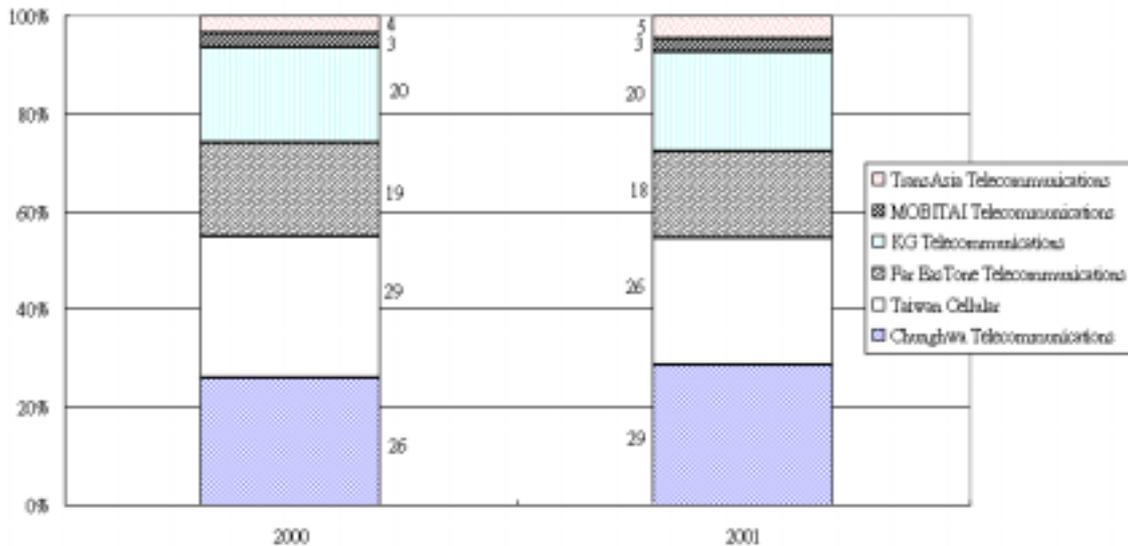
( 3 )Regarding main telephone lines and long-distance call services, performances in these two markets have not yet presented satisfactory results, partly due to the late entrance of new-coming operators into the market competition and partly due to the delay in establishments of telecommunications networks (referring to Table 2 and Figure 6).

Table 2 Analysis of Market Shares in Integrated Fixed Telecommunications Network (2001)

	Local phone(subscribers)	Domestic long-distance phone(call minutes)	International phone (call minutes)
Chunghwa Telecom	99.76%	98.36%	87.39%
Three new integrated fixed network operators	0.24%	1.64%	12.61%

Source : Summaries of various DGT data.

Figure 6 Analysis of Market Shares of Mobile Phone Operators in Taiwan



Source : Summaries of various DGT data.

It is necessary for authorities to continue observing and controlling the development in main telephone lines and long-distance call services markets, in order to contribute to the sound development of entire telecommunications business.

Secondly, regarding analyses of international comparable indexes, analyses are basically divided into two areas – single index analysis and integrated index analysis. The former includes analyses and comparison in policy, operation, tariff, quality and technology aspects. The latter analyses are conducted on the basis of the ICT Competitiveness Indicator in World Economic Forum (WEF)’s National Competitiveness Index and telecommunications competitiveness indicators rankings by ITU with weighted calculation of international telecommunications competitiveness rankings.

Results of international comparable indexes analyses are summarized below.

( 1 ) Telecommunications market competition policy in Taiwan

The domestic telecommunications market in Taiwan has been widely opened up, matching the trend of international telecommunications policy development with principles of WTO Basic Telecommunications Liberalization Agreement.

## ( 2 ) Status of telecommunications market competition

For the three new fixed network operators who just entered the market since July of 2001, their performances in terms of market shares in 2001 are not yet apparent. However, the relative balance of the concentration in the mobile phone market highlights the effects of competition.

## ( 3 ) Licensing for third generation mobile communications services

In Taiwan, bidding system is adapted for 3G licensing. The bidding price for one license per person is USD 12.49, which is below the international average of USD 22.38 (if UK and Germany where the bidding is overpriced are excluded, the average would be USD 13.13). Bidding price is considered reasonable in Taiwan.

## ( 4 ) Percentage of telecommunications revenues to GDP

After the implementation of telecommunications liberalization in Taiwan, the percentage of telecommunications revenues to GDP, though gradually increasing year by year, is still below the average of 3.4%. This indicates that the domestic telecommunications market is not yet fully expanded. In terms of the share of telecommunications among all domestic industries, Taiwan is relatively lower than Korea, Hong Kong and China in Asia region. After the three new domestic fixed network operators gradually complete the network layout and mature their competitive advantages, the market scale could grow in an appropriate pace and telecommunications sector could increase its importance among all other domestic industries.

## ( 5 ) Productivity of telecommunications operations

- a. In the telecommunications sector, the average number of subscribers of main line telephone services per employee in Taiwan is 291, higher than the average of 225 subscriptions. This indicates Taiwan as a country with a relatively higher productivity.
- b. The average operating revenues per employee is USD 223,000, slightly lower than the average of USD 239,000. Productivity in Taiwan in this sense, however, stands only on the middle level.

( 6 ) Status of the operation by the major telecommunications operator in Taiwan

In 2001 Chunghwa Telecom Co., as a representative of telecommunications operators in Taiwan, has net income ratio of 20.45% and average net income of USD 38,000 per employee. The operation of Chunghwa Telecom Co. is soundly constituted with competitive capacities.

( 7 ) Comparison of international telecommunications tariffs

The local call tariff and the Internet tariff in Taiwan are low and thus lead to price advantages. However, the mobile tariff is still higher than that in Hong Kong, Korea and Singapore.

( 8 ) Quality of fixed network

The automatic and digital ratios of the telecommunications network in Taiwan have reached 100%. In addition, low faults ratio also demonstrates good quality of the network.

( 9 ) Telecommunications technologies

- a. Taiwan's export competitiveness index turns to negative. The weakening of competitive advantage might result from the imbalance between supply and demand in the domestic market. With the implementation of telecommunications liberalization, domestic telecommunications market has been expanding rapidly, in which domestic supplies can no longer satisfy the demand. Therefore, the supply of telecommunications machines and equipments, wireless communications equipments in particular, increasingly relies on imports. The scenario, however, appears different if the evaluation only takes one sort of equipment into account.
- b. "Digital wireless telephone set", listed as a major item for industrial developments by the government, is a good example to demonstrate a positive correlation between exports and the technological development. The evident improvement of its export competitiveness index every year indicates the progress on developments of this technology.

( 10 ) Integrated evaluation index

a. Telecommunications Competitiveness Rankings by ITU Indicators: No. 12

Definition: The ranking, reflecting relative telecommunications competitiveness of assessed countries, is calculated based on five quantifiable major telecommunications indicators, which include main lines penetration rate, mobile phone penetration rate, Internet hosts penetration rate, network subscribers penetration rate and PC penetration rate.

b. WEF infrastructure ICT Index Tables Rankings: No. 16

Definition: The ranking is calculated by 12 survey evaluation indexes, aiming to supplement the acquisition of indexes, which are difficult to quantify. These 12 survey evaluation indexes include government prioritization of ICT, government success in ICT promotion, public access to internet, internet access in schools, IT training and education, government online services, quality of competition in telecommunication sector, quality of competition in ISP sector, speed and cost of Internet access, laws relating to ICT use, legal framework for ICT development and high skilled IT job market.

c. Integrated telecommunications competitiveness rankings: No. 14 (referring to Table 3)

Definition: This index is derived from influential resources. Its calculation method is reasonable with clear format in content. With such characteristics, this index is less controversial and more persuasive, providing objective references with regard to international telecommunications competitiveness.

*Table 3 Integrated telecommunications competitiveness rankings of major countries*

Country OECD+4	WEF-ICT Competitiveness Indicators		ITU Principle Component Indicators		Total Score	Overall Competitiveness Rankings
	Ranking	Score	Ranking	Score		
United States	5	29	1	33	62	1
Iceland	4	30	3	31	61	2
Finland	1	33	6	28	61	2
Sweden	3	31	4	30	61	2
Norway	11	23	3	31	54	5
Netherlands	6	28	8	26	54	5
Denmark	10	24	5	29	53	7
Singapore	2	32	13	21	53	7
Hong Kong	8	26	9	25	51	9
United Kingdom	9	25	12	22	47	10
Canada	7	27	15	19	46	11
Switzerland	15	19	7	27	46	11
Australia	13	21	10	24	45	13
Taiwan	16	18	11	23	41	14
Germany	14	20	15	19	39	15
Austria	12	22	17	17	39	15
Ireland	17	17	20	14	31	17
New Zealand	21	13	16	18	31	17
Belgium	20	14	18	16	30	19
Korea, South	19	15	19	15	30	20
France	18	16	22	12	28	20
Italy	24	10	23	11	21	22
Portugal	23	11	24	10	21	22
Spain	22	12	26	8	20	24
Japan	27	7	21	13	20	24
Czech	25	9	27	7	16	26
Hungary	26	8	28	6	14	27
Greece	30	4	25	9	13	28
Slovak Republic	28	6	29	5	11	29
Turkey	29	5	31	3	8	30
Poland	33	1	30	4	5	31
China	31	3	33	1	4	32
Mexico	32	2	32	2	4	32

*Note : This table does not include Luxembourg , so the ranking of ITU principle component in Taiwan is upgraded one place.*

*Source : Taiwan Institute of Economic Research ( TIER ) .*

Current goals of telecommunications policy in Taiwan correspond to the implementation of e-Taiwan Project in Executive Yuan's "Challenge 2008 – National Development Plan". The basic principle for promoting the construction of broadband networks is the cooperation between government's leadership and private sectors' initiatives. In this sense, building the sound competition mechanism in the

telecommunications market, enhancing the competitive vitality of telecommunications operators and increasing market demands of consumer subscribers are crucial to achieve the above mentioned policy goals.

The last stage of telecommunications liberalization – fully opening of the telecommunications market - is about to be complete in the current telecommunications environment in Taiwan. In particular, the relative balance of the concentration in the mobile phone market highlights the effects of competition. With respect to services in local and long-distance telephone, however, the market performances have not yet presented satisfactory results due to the late entrance of new comers into market competition and delayed progresses on the building of telecommunications network.

In addition, the experiences of popularizing broadband in Korea point out significant factors in promoting broadband penetration. Other than encouraging government policies and the construction of operators' networks, low communications tariffs, abundant digital contents and strong market demands function as the most fundamental driving forces for broadband penetration.

Regarding the functions of telecommunications authorities, the effectiveness of the policies, however, is limited in reality. Although low communications tariffs may be realized by introducing competition policy, administrative resources appear relatively limited in terms of enhancement of digital contents and expansion of market demands.

The results derived from analyses in this project show Taiwan's ranking in telecommunications competitiveness. In terms of policy and integrated telecommunications competitiveness ranking, Taiwan stands on middle to upper level, while in the fields of application and development of ICT related regulations, Taiwan belongs to only middle to lower level.

These results have certain implications. Without doubt the implementation of telecommunications liberalization in Taiwan is worthy praising. However, relatively weak performances in application and development of ICT related regulations ranking raise certain issues for future research. Has the government made enough efforts? Or is policy efficiency limited? Or is intensive examination necessary? These questions will remain for further research.