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交通部電信總局

我國電信統計規劃與電信競爭力分析（三）

電信競爭力分析

（英文精簡版）

委託單位：交通部電信總局

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Abstract

The project, corresponding to the policy demand of “Telecommunications Statistics Plan and Telecommunications Competitiveness Analysis in Taiwan” third annualized practice of six-year project, is lasting to investigate and analyze the trend of international telecommunications statistical indicators on the basis of previous studies. Then making an appreciation in the light of the ranking of telecommunications competitiveness in Taiwan offers the authorities of the government to draft a scheme to promote telecommunications competitiveness in Taiwan.

The content of this study comprise two aspects, one is in consideration of international and domestic indicators and on the basis of previous annualized studies to update telecommunications statistics indicators yielded 7 categories, (1) telecommunications basic indicators, (2) telecommunications staff and revenue indicators, (3) telecommunications indicators on capacity offering and quality of network, (4) telecommunications investment and growth indicators, (5) information related indicators, (6) telecommunications indicators on popularization of telecommunications services and the gap of digitized life and (7) telecommunications competitiveness related indicators. It will be compiled into a specific volume of international telecommunications statistics through this study.

On the other side, in according with national development and global trend, this study will review and amend the items of currently national telecommunications statistics. Besides, in the course of assessing national competitiveness, it is inevitable to introduce and assess the usage of some calculation concerning competitiveness. This study will be beneficial for the policies of telecommunication and Internet, and promote the advantage of national competition ability.

研究主題：我國電信統計規劃與電信競爭力分析（三）

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Telecommunications Competitiveness Analysis in Taiwan(III) (Condense Version)

Ⅰ、Introduction

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.In the principle of Basic Telecommunications Agreement, the telecommunications market in Taiwan has been opened to a brand-new situation. This research is based on telecommunications competitive environment in Taiwan in 2003, and compares with thirty-four countries , such as OECD、China、Hong Kong、Singapore etc. to going comparative analysis , then computing the comprehensive rankings of telecommunication competitiveness in each country.

Ⅱ、Overview: Implementation of Telecommunications Liberalization in Taiwan

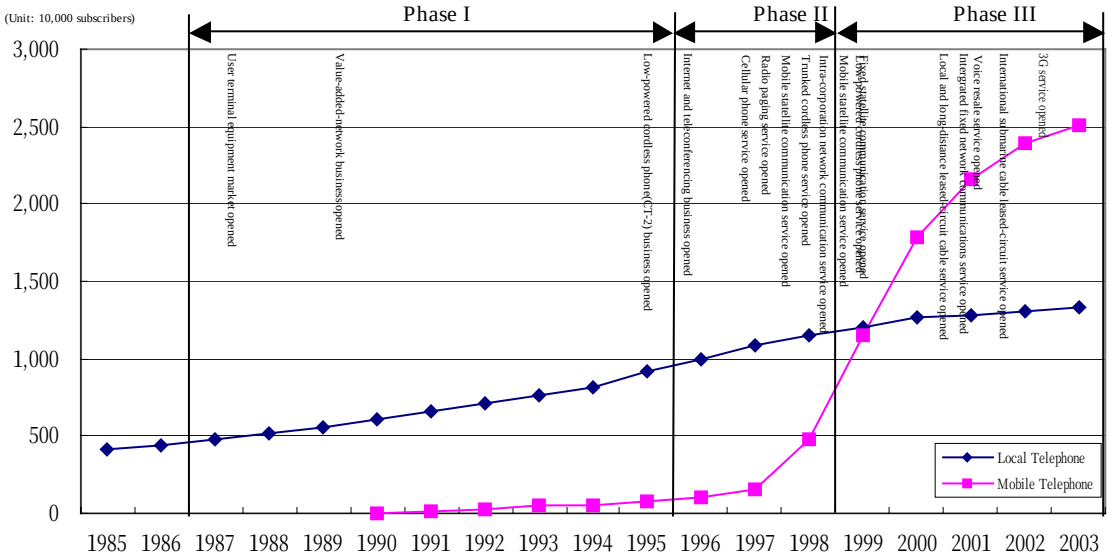
The liberalization of telecommunications in Taiwan follows the trend, and is opening up the island's telecommunications market through a staged progression.

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(referring to Figure 1).

Figure 1. Process of Telecommunications Liberalization in Taiwan



Source：Summaries of this study

III、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 implement the “Guidelines and Action Plans for Service Industry Development ” by the 2884th Cabinet Meeting of the Executive Yuan in March of 2004, Council for Economic Planning and Development (CEPD), Executive Yuan made followed six basic rationales and principles based on the “Telecommunication & media services”:

（1） Eliminate obstacles to network development and speed up broadband network construction.

（2） Continue reviewing market-opening measures, and open up business opportunities for

service-providers.

(3) Strengthen market standards and assure fairness of market competition.

(4) Integrate the administrative mechanisms for communications and media, and accelerate the development of newly emerging services.

(5) Establish proper encouraging incentives to make telecommunications & media services transform high value-added services.

(6) Make the broadband services to be the priority items for development of telecommunications & media services.

Responding to trends of digital convergence and complement with basic rationales and principles of telecommunications & media services, The Directorate General of Telecommunications (DGT) had the proposal of "Advanced Broadband Integrated e-Service Network (ABIEN)" in September of 2004. It builds a fair, competitive environment and good communications network, integrate administrative mechanisms for communications and broadcasting, and promote the development of new services, so as to make telecommunications & media services high value-added services and enhance overall national competitiveness. The summaries of targets and measures are referring to figure 2 and figure 3.

Figure 2. The goal of ""Advanced Broadband Integrated e-Service Network"

	2003		2008
◆ Internet Protocol	IPv4		IPv4/IPv6
◆ Digitization of terrestial TV network	55%		95%
◆ Digitization of cable TV headend	0%		60%
◆ Digitization of digital broadcast	0%		55%
◆ Primary Bandwidth(end-to-end)	512K~1.5M ADSL		~100M FTTH
◆ Penetration of broadband to the home	38%		79%
◆ Broadband subscribers, of which	3,043,300		6,300,000
⇨ FTTH 100Mbps	0		2,800,000
⇨ 4~20Mbps 3G+WLAN	16,000		2,700,000
◆ Total output value of communication industry (service+content)	NT$ 540 Billion		NT$ 900 Billion

Source：the Directorate General of Telecommunications (DGT)

Figure 3. The calendar of "Advanced Broadband Integrated e-Service Network"

	2004	2005	2006	2007	2008
◆ Digitization of terrestial TV network (%)	55%	70%	80%	90%	95%
◆ Digitization of cable TV headend (%)	0%	10%	30%	55%	60%
◆ Digitization of digital broadcast (%)	0%	10%	30%	55%	55%
◆ Penetration of broadband to the home (%)	45%	55%	65%	75%	79%
◆ Broadband subscribers (thousand), of which	3800	4600	5300	6000	6300
FTTH 100Mbps (thousand)	150	300	600	2060	2800
4~20Mbps 3G+WLAN (thousand)	150	250	1000	1700	2700
◆ Total output value of communication industry (service+content)(Billion NT$)	640	720	810	860	900

Source：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 Telecommunications authorities have emphasized the trends of digital convergence and implements of ABIEN by promoting legal reformation, reinforcing internet infrastructure, encouraging the development of digital internet services, promoting innovation of applied services and reinforcing promotion of applied services.

IV、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.

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 and NRI 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.

To integrating the preceding research conclusion, making a summary of Table 3 , the analysis is represented below.

Figure 4. Summaries of major telecommunications indicators rankings of Taiwan

	Iindicators	the Rank of R.O.C.(Taiwan)		
		2003	2002	2001
ITU indicators	5 principle components of ITU indicators	9	10	12
	1. Density of local line	12	12	15
	2. Density of cellular mobile telephone	1	1	2
	3. Density of internet host	7	8	10
	4. Density of internet user	17	18	17
	5. Density of PC	—	19	22
	Broadband subscribers density	5	4	—
	Broadband household density	3	3	—
	Public pay phones per 1,000 inhabitants	—	—	4
	Export - telecommunication equipment	—	6	7
	TV and CATV indicators	—	18	11
	CATV household density	—	6	6
	Cost of a local 3 minute call (peak rate)	—	4	3
	Cellular-cost of 3 minute local call (peak rate)	—	12	13
	Broadband prices per month as a % of incoming	23	—	—
	Broadband prices per 100K	5	—	—
WEF indicators	WEF's National Competitiveness Current Index	16	16	20
	WEF's National Competitiveness Growth Index	5	3	7
	WEF ICT Indicators	12	7	16
	1. Availability of mobile or cellular telephone	31	28	—
	2. Internet access in schools	11	10	10
	3. Quality of competition in the ISP sector	16	15	26
	4. Government prioritization of ICT	5	2	4
	5. Government success in ICT promotion	4	3	4
	6. Laws relating to ICT	15	12	26
	WEF's networked readiness	16	9	15
Integrated indicators on telecommunication competitiveness（5 ITU indicators +WEF ICT indicators＋NRI）		12(8)	6	14

Note:

1. The objects in this study are 34 economies including those of OECD, China, Hong Kong, Singapore, and Taiwan.

2. Numerals in the row of the "WEF enterprise competitiveness indicator" are the rankings of "WEF country competitiveness indicator".

3. The average score of "Availability of mobile or cellular telephone" is 5.9, which shows many economies were satisfied with it. Many economies are tied for the same score. Taiwan is 6.9.

4. WEF NRIs are likely to be miscalculated, and the citation is merely for reference.

5. "Integrated indicator" is an overall index calculated from indicators of ITU, WEF ICT and WEF NRI. The numeral in the bracket of the "Integrated indicators" shows the ranking excluding NRI.

Source: Compiled by this study

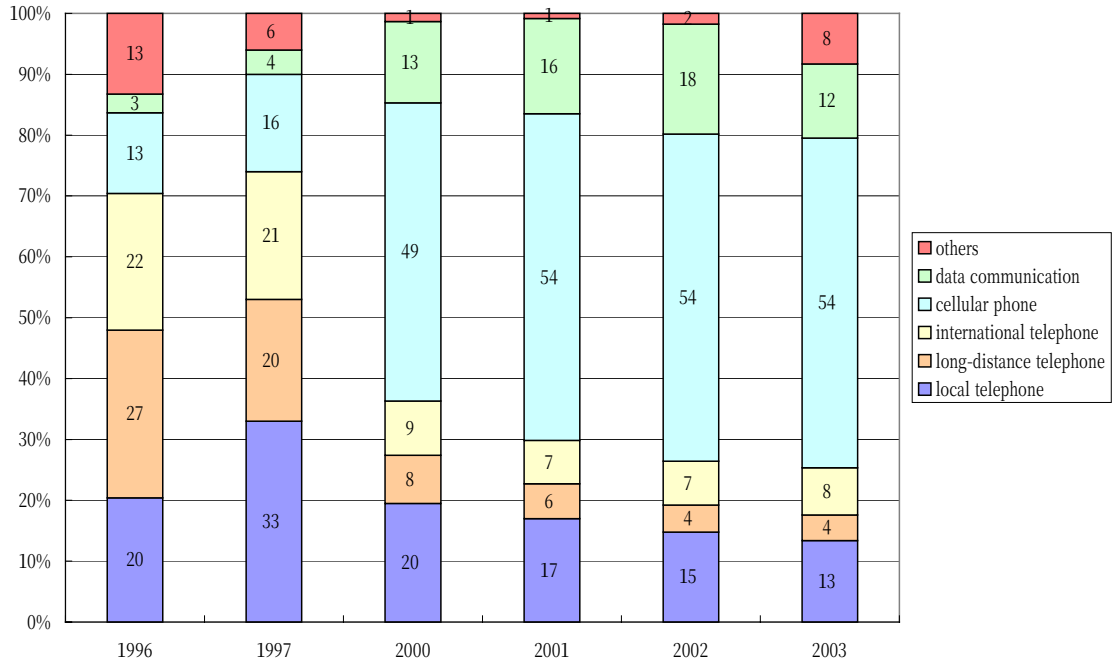
(1) Telecommunications market competition policy

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

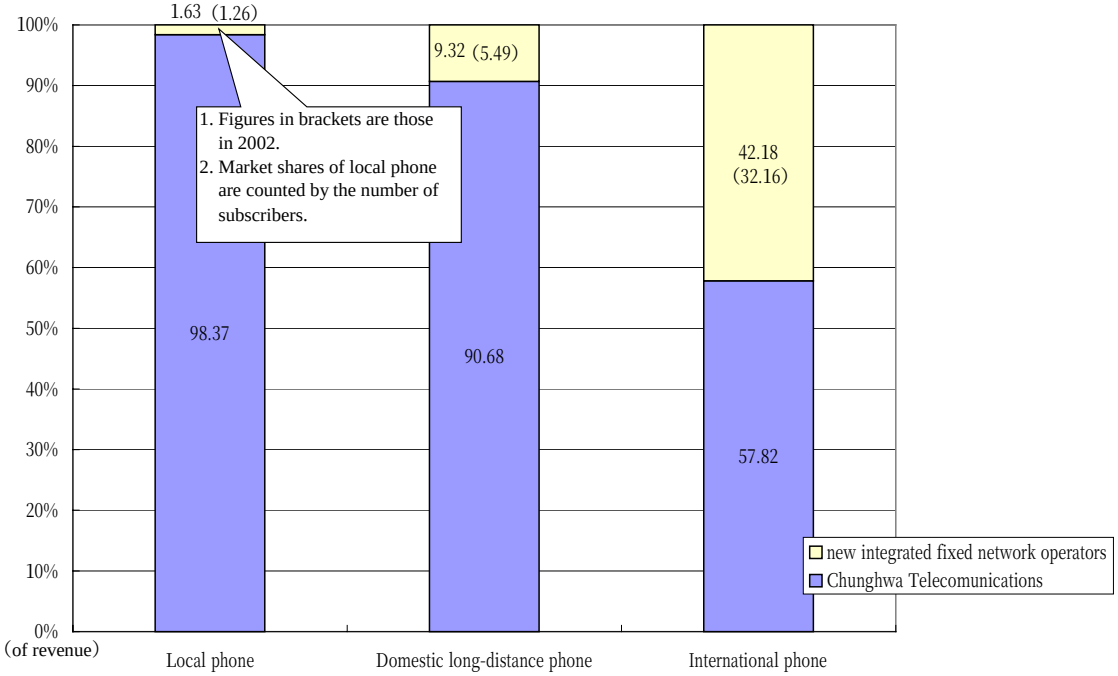
For the three new fixed network operators who just entered the market since July of 2001, their performances in terms of market shares in local phone service and domestic long-distance phone service are not yet apparent in 2003. But the international phone service is made remarkable progress. In September of 2004, there are sixty domestic leased data circuit operators, increasing twenty-eight operators than September of 2003. They compete violently and the tariff of leased data circuit has been dropped a wide range ,too(referring to Figure 4~7).

Figure 5. Comparison of major telecommunications revenue in Taiwan



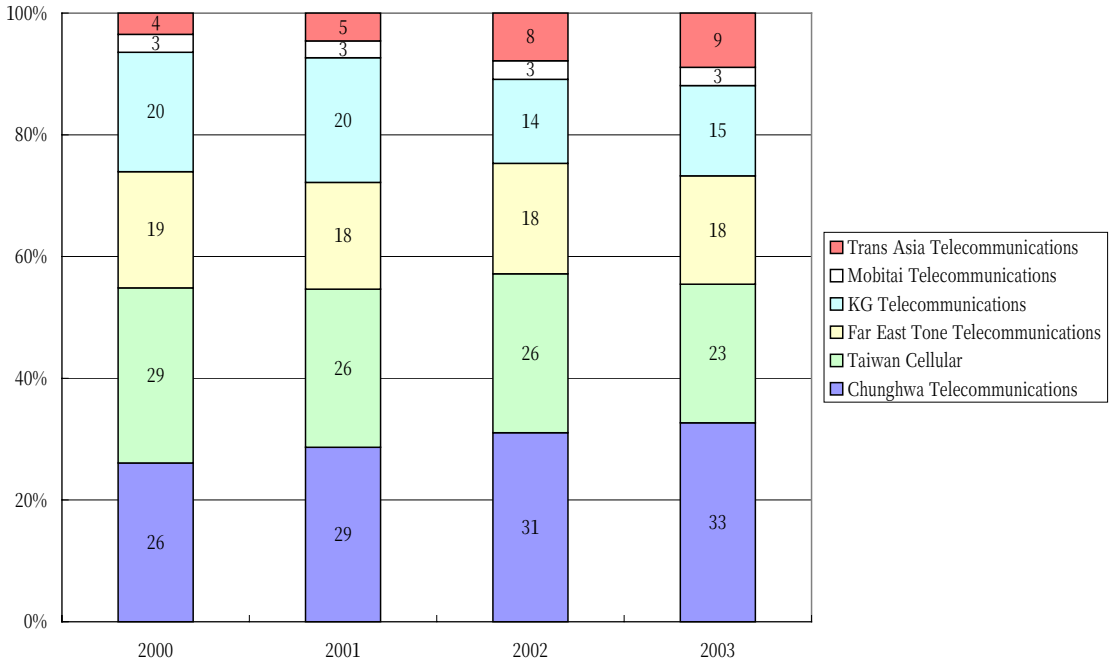
Source ∴ Summaries of various DGT data

Figure 6. Analysis of market shares in integrated fixed telecommunications network (2003)



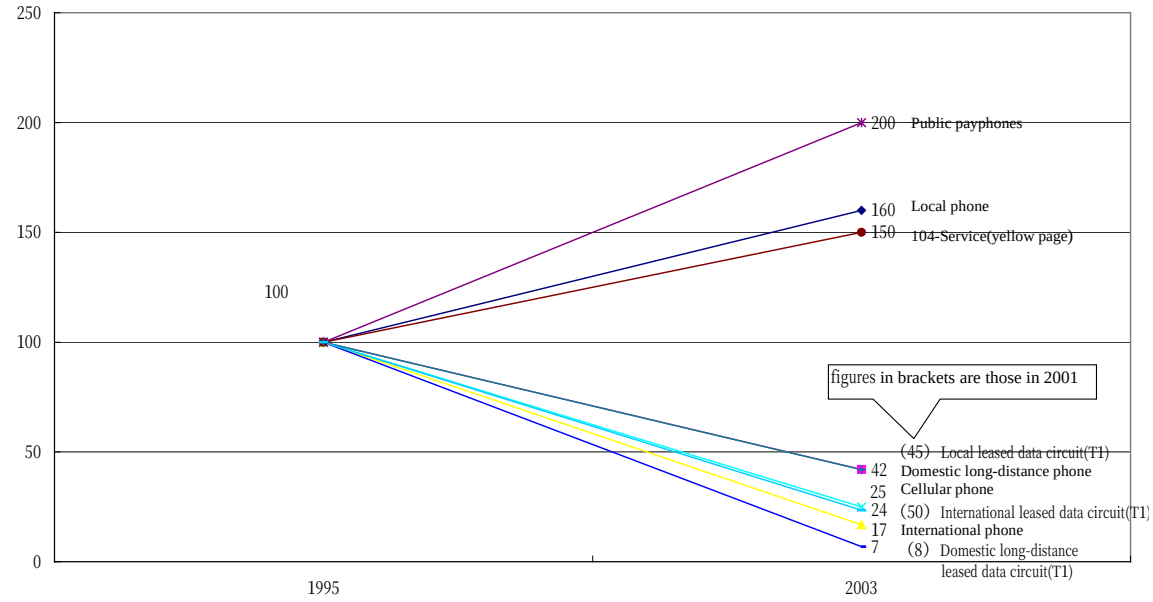
Source：Summaries of various DGT data

Figure 7. Analysis of market shares in mobile phone operators in Taiwan



Source：Summaries of various DGT data

Figure 8. Comparison of telecommunications tariffs index in Taiwan



Note：Each tariff level of telecommunication services in 1995 is set as 100.
Source：Summaries of various DGT data

(3) Status of third generation(3G) development

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.

Among the 3G companies, 「Asia Mobile Broadband」 have entered the market since twenty-eight in July of 2003. In order to figure out the tendency, the 「Far EasTone」 had started the operation of 3G services in March of 2004. 「Chunghwa」、「VIBO telecom」 and 「Taiwan cellular」 are also setting up the operation aggressively.

(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 universal average. 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 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

The average operating revenues per employee is USD 252,000 in 2002, lower than the average of USD 272,000. 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 stands on the higher level. The operation of Chunghwa Telecom Co. is soundly constituted with competitive capacities.

(7) Comparison of international telecommunications tariffs

The local-call tariffs in Taiwan are low and thus lead to price advantages. However, the mobile tariff is still higher than that in Singapore, Korea, Hong Kong and china. The ADSL broadband tariff level is relatively high.

(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) Analysis of telecommunications technologies competitive environment

Taiwan's export competitiveness index of the telecommunication machine equipment turns to negative. From 1996, 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.

The telecommunications machine equipment index of export competitiveness in our country has dropped to the bottom in 1999, and then risen again from year to year. It is because that the telecommunications equipment in domestic firms have invested completely day by day, and the factor to enlarge the ability of output capacity progressively, to decrease the dependence from importing. "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

Telecommunications Competitiveness Rankings by ITU Indicators in Taiwan is No. 9 , and has raised 1 rankings than the year of 2002. 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.

WEF ICT Index Tables Rankings in Taiwan is No. 12, and has slipped 5 rankings than the year of 2002. The ranking is calculated by 6 survey evaluation indexes, aiming to supplement the acquisition of indexes, which are difficult to quantify. These 6 survey evaluation indexes include the environment in using mobile phones, internet access in schools, quality of competition in ISP sector, government prioritization of ICT, government success in ICT promotion and laws relating to ICT use.

The telecommunications competitiveness Ranking by WEF NRI in Taiwan is No. 16,

and has slipped 9 rankings than the year of 2002. The ranking is calculated with 46 items for 3 categories survey evaluation indexes, aiming to supplement the acquisition of indexes, which are difficult to quantify. These 3 categories survey evaluation indexes include internet access indicators, readiness indicators and use indicators. The NRI indicators maybe had some errors in data processing this year and had reduced its values.

At last, the Integrated telecommunications competitiveness rankings in Taiwan is No. 12 , and has slipped 6 rankings than the year of 2002. This ranking is calculated equally by former three rankings. If excluding NRI indicators, the ranking of Taiwan is No. 8, and has slipped 2 rankings than that of 2002 (referring to Figure 9).

The indexes of the comparison between countries will depend on quantification data instead of the material data, which is easier influenced by the degree of subjective comprehension. Nonetheless, we can't deny its reference values, we must care its limits in the usage and explanation. We also have indicated the faults of statistic indicators by WEF survey. Actually, the measurement and evaluation in the world for telecommunications competitiveness also have examination and new development. We also adopted the DAI index of ITU in this report. Ranking by ITU DAI index, we are the No. 9(referring to Figure 10) and it can be compared with ITU principle component indicators (referring to Figure 9).

Figure 9. Integrated telecommunications competitiveness rankings of major countries (2003)

	Total Score	Overall Rankings				WEF ICT indicators		WEF NRI		5 ITU indicators	
		2003		2002	2001	Ranking	Score	Ranking	Score	Ranking	Score
Finland	95	1	3	1	2	2	33	3	32	5	30
Denmark	94	2	2	7	7	4	31	5	30	2	33
Singapore	92	3	5	5	7	1	34	2	33	10	25
Sweden	91	4	4	2	2	7	28	4	31	3	32
Iceland	89	5	1	4	2	5	30	10	25	1	34
United States	85	6	6	3	1	6	29	1	34	13	22
Switzerland	76	7	11	9	11	15	20	7	28	7	28
Canada	75	8	13	7	11	8	27	6	29	16	19
Australia	75	9	9	15	13	10	25	9	26	11	24
Luxembourg	70	10	7	..	..	17	18	14	21	4	31
Norway	70	11	16	16	5	19	16	8	27	8	27
Taiwan	68	12	8	6	14	12	23	16	19	9	26
Hong Kong	67	13	10	14	9	9	26	17	18	12	23
United Kingdo	65	14	14	10	10	11	24	15	20	14	21
Germany	65	15	17	13	15	14	21	11	24	15	20
Netherlands	65	16	15	11	5	21	14	13	22	6	29
Korea. South	63	17	12	12	20	3	32	19	16	20	15
Japan	63	18	18	18	24	13	22	12	23	17	18
Austria	49	19	19	17	15	18	17	20	15	18	17
France	48	20	21	20	20	16	19	18	17	23	12
New Zealand	44	21	20	22	17	20	15	22	13	19	16
Ireland	36	22	24	19	17	27	8	21	14	21	14
Belgium	35	23	23	20	19	23	12	23	12	24	11
Italy	34	24	22	25	22	25	10	24	11	22	13
Portugal	30	25	25	25	22	22	13	26	9	27	8
Spain	30	26	26	27	24	24	11	25	10	26	9
Czech	27	27	27	23	26	26	9	27	8	25	10
Greece	20	28	28	28	28	29	6	28	7	28	7
Hungary	19	29	29	24	27	28	7	29	6	29	6
Slovak Repub	15	30	30	28	29	30	5	30	5	30	5
Mexico	10	31	32	33	32	31	4	31	4	33	2
Poland	10	32	31	30	31	32	3	32	3	31	4
China	5	33	34	31	32	33	2	33	2	34	1
Turkey	5	34	33	32	30	34	1	34	1	32	3

Note：The left column of "overall competitiveness rankings" is calculated from indicators of ITU, WEF ICT and WEF NRI, and the right column excludes NRI.

Source：Taiwan Institute of Economic Research (TIER)

Figure 10. The rankings of major countries by ITU DAI (2002)

	DAI	Ranking	infrastructure	affordability	knowledge	ICT quality	usage
Sweden	0.85	1	0.94	0.99	0.99	0.64	0.67
Denmark	0.83	2	0.89	0.99	0.99	0.66	0.60
Iceland	0.82	3	0.89	0.99	0.96	0.50	0.76
Korea. South	0.82	4	0.74	0.99	0.96	0.74	0.65
Finland	0.79	5	0.81	0.99	0.99	0.55	0.60
Netherlands	0.79	6	0.78	0.99	0.99	0.61	0.60
Norway	0.79	7	0.84	0.99	0.99	0.55	0.59
Hong Kong	0.79	8	0.93	1.00	0.83	0.68	0.51
Taiwan	0.79	9	0.98	0.99	0.95	0.56	0.45
Canada	0.78	10	0.69	0.99	0.97	0.64	0.60
United States	0.78	11	0.74	0.99	0.97	0.54	0.65
United Kingd	0.77	12	0.86	0.99	0.99	0.53	0.50
Switzerland	0.76	13	0.86	0.99	0.95	0.60	0.41
Austria	0.75	14	0.74	0.98	0.97	0.56	0.48
Japan	0.75	15	0.72	0.99	0.94	0.47	0.64
Luxembourg	0.75	16	0.94	0.99	0.90	0.48	0.43
Singapore	0.75	17	0.78	0.99	0.87	0.54	0.59
Australia	0.74	18	0.75	0.99	0.99	0.42	0.57
Belgium	0.74	19	0.75	0.99	0.99	0.63	0.36
Germany	0.74	20	0.76	0.99	0.96	0.52	0.48
France	0.72	21	0.76	0.99	0.96	0.51	0.37
Italy	0.72	22	0.81	0.99	0.93	0.45	0.41
New Zealand	0.72	23	0.69	0.99	0.99	0.42	0.54
Ireland	0.69	24	0.72	0.99	0.96	0.47	0.32
Spain	0.67	25	0.77	0.98	0.96	0.47	0.18
Czech	0.66	26	0.70	0.96	0.91	0.45	0.30
Greece	0.66	27	0.86	0.98	0.92	0.36	0.18
Portugal	0.65	28	0.71	0.98	0.93	0.42	0.23
Hungary	0.63	29	0.61	0.96	0.94	0.44	0.19
Poland	0.59	30	0.43	0.96	0.96	0.35	0.27
Slovak Repu	0.59	31	0.50	0.94	0.91	0.43	0.19
Mexico	0.50	32	0.25	0.95	0.86	0.32	0.12
Turkey	0.48	33	0.39	0.90	0.77	0.25	0.08
China	0.43	34	0.22	0.87	0.79	0.24	0.05

Source: Compiled by this study

（11） Comprehensive evaluation

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. 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.

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. This is important reason that the broadband tariff still belongs to the middle and high level.

（12）Challenge and topic

The 3G companies have entered the market continuously in July of 2003. According to the development experience for national 3G market , it is full of challenge that the marketing strategy in market segment and price positioning between 3G and 2G.The ranking by broadband subscribers density in Taiwan is No. 3, but the internet tariff is still high and it is not yet improvable. The ranking by the competitive quality of ISP department in Taiwan in 2003 is No. 16. Although compared with the year of 2002 has slipped 1 ranking, it also hasn’t yet improvable. The current preparedness of ICT related regulation is also the same. The services of portable mobile telephone number will promote competition and make the phone tariff decline.

Although we have introduced competition mechanism successfully in Taiwan. 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.

Ⅴ、Conclusion

Current goals of telecommunications policy in Taiwan correspond to the implementation of e-Taiwan Project in Executive Yuan's "Telecommunication & media services –Advanced Broadband Integrated e-Service Network (ABIEN)" of "Guidelines and Action Plans for Service Industry Development". 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.

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 and abundant digital contents can attract consumers to use and market strong demands as the most fundamental driving forces for broadband penetration. Regarding the functions of telecommunications authorities, low communications tariffs may be realized by introducing competition policy, however, the effectiveness of the policies is limited in terms of enhancement of digital contents and expansion of market demands. To make the development of digital contents synchronously and well, therefore, the government must make the plan about how to promote global development in advance to lead market change.

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圖表目錄

我國電信競爭力分析　精簡版

一、前言

世界貿易組織（WTO）基本電信自由化協議自 1998 年 2 月生效後，佔全球電信市場 90%以上之 69 個簽約國，已在其國內積極推動電信自由化政策，放寬或廢除外資管制，促使海內外電信業者開始迎向激烈競爭之局面。我國在 2002 年 1 月已正式成為 WTO 會員，在基本電信協議的原則下，我國電信市場已邁入全面開放的嶄新局面。本研究針對我國 2003 年電信競爭環境，與 OECD、中國、香港、新加坡等 34 個國家，進行比較分析，並計算各國電信競爭力之綜合排名。

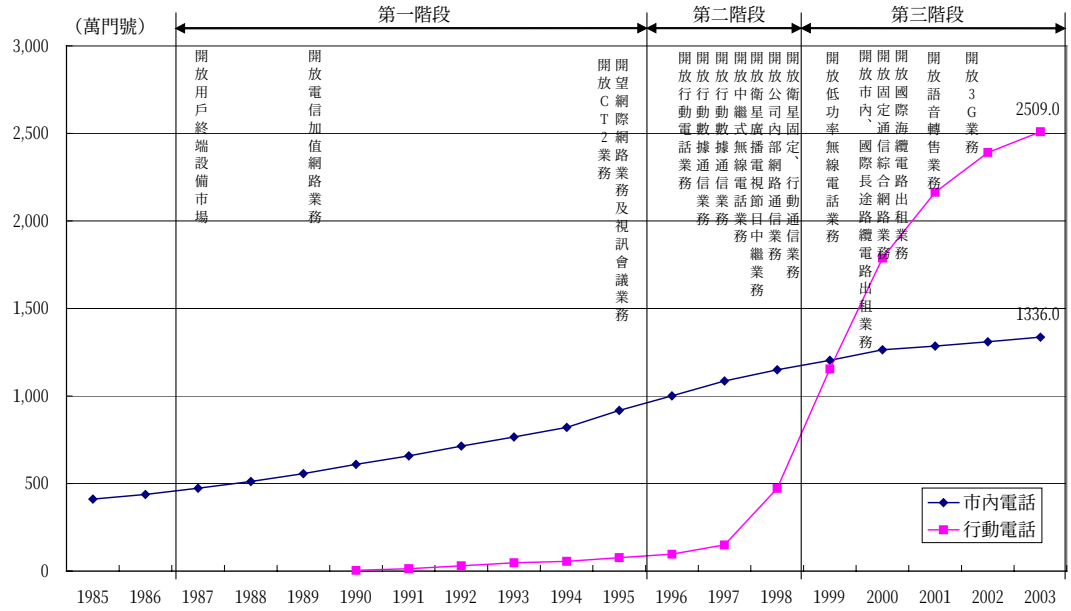
二、我國電信自由化實施概要

我國電信自由化之推動，係順應世界潮流，以階段性、漸進式逐步開放電信市場。首先在 1987 年開放用戶自備終端設備，開啟電信終端設備市場的競爭，其後在 1989 年開放電信加值服務業務，提供消費者多樣的電信服務。

1996 年電信三法通過後，負責電信監理的電信總局及經營電信服務的中華電信公司正式分離，更加確立電信業務開放之政策方向，並陸續開放行動通信業務及衛星通信業務。

至 1999 年以後，則繼續開放固定通信綜合網路業務、國際海纜電路出租業務、市內國內長途陸纜電路出租業務、開放轉售業務、以及第三代行動通信業務（3G），完成電信自由化之近程目標（參見圖表 1）。

圖表 1 我國電信自由化之發展歷程



資料來源：本研究彙整。

三、當前電信政策之主要內容與展望

我國現行電信政策發展目標，係依據交通部在 2001 年 6 月召開之全國交通會議「電信自由化政策之檢討及前瞻」議題之決議事項，擬定如次四大電信政策發展主軸：

一、建構國際級經營環境，使台灣成為亞太地區電信樞紐
二、普及電信服務，降低數位落差
三、促進電信市場的全面競爭，提供更創新、高品質的電信服務
四、帶動產業發展，增進全民利益

為能有效達成前述四大電信政策發展主軸，交通部在參酌當前科技發展方向與盱衡國際、國內電信環境趨勢，乃策定如次四大電信政策：

一、因應國際自由化趨勢，解除市場管制，達成全面電信自由化
二、因應數位經濟發展推動寬頻網路建設，達成資訊化社會理想
三、因應科技匯流發展，檢討監理組織及管理內容，達成服務品質優質化
四、因應傳播新趨勢推動數位廣播與電視開播，達成廣電數位化

此外，為配合行政院第 2884 會議決議「服務業發展綱領及行動方案」（2004 年 3 月）之落實，行政院經濟建設委員會乃針對「通訊媒體服務業」之發展提示如次六項基本原則及理念：

一、排除網路建設障礙，加速寬頻網路建設
二、持續檢討市場開放相關措施，創造服務契機
三、加強市場規範，建立公平競爭環境
四、整合通訊媒體管理機制，加速新興服務發展
五、訂定適當之獎勵誘因，輔導我國之通訊媒體服務業轉型成為高附加價值之服務業

六、以最具發展潛力的寬頻服務為優先發展項目

交通部電信總局則於 2004 年 9 月規劃「先進寬頻 e 化服務網路計畫」，其內容除配合「通訊媒體服務業」之基本原則及理念外，更基於數位匯流發展趨勢之前瞻性考量，從建構公平競爭環境及良好通信網路，到整合通訊及傳播管理機制，進而推動無線電視數位平台的建置，展現多元文化主體性的數位內容產業，促進新興服務發展，期使通訊媒體服務業成為高附加價值的服務業，提升國家整體競爭力。其具體計畫目標及措施，參見圖表 2 與圖表 3。

圖表 2　「先進寬頻 e 化服務網路計畫」目標

	2003年	2008年
◆ 網際網路通訊協定	IPv4	IPv4/IPv6
◆ 無線電視數位化服務涵蓋率	50%	95%
◆ 有線電視頭端數位化比率	0%	60%
◆ 無線廣播數位化服務涵蓋率	0%	55%
◆ 主流應用頻寬(end-to-end)	512K~1.5M ADSL	~100M FTTH
◆ 寬頻到府普及率	38%	79%
◆ 寬頻用戶數，其中	304.33萬戶	630萬戶
⇨ 光纖到府(共享式100Mbps)	0萬戶	280萬戶
⇨ 無線(4-20Mbps 3G+WLAN)	1.6萬戶	270萬戶
◆ 通訊媒體(服務+內容)業總產值	5400億元	9000億元

資料來源：交通部電信總局。

圖表 3　「先進寬頻 e 化服務網路計畫」年度目標

政策指標 \ 年度	2004	2005	2006	2007	2008
%)	55%	70%	80%	90%	95%
%)	0%	10%	30%	55%	60%
無線廣播數位化服務涵蓋率（%)	0%	10%	30%	55%	55%
%)	45%	55%	65%	75%	79%
	380	460	530	600	630
光纖到府(共享式100Mbps)用戶（萬）	15	30	60	206	280
無線(4-20Mbps 3G+WLAN)訂戶（萬）	15	25	100	170	270
（服務+內容）總產值（億元）	6400	7200	8100	8600	9000

資料來源：交通部電信總局。

我國實施電信自由化最根本的目的，在於引進競爭，加速電信基礎建設。展望今後我國電信政策發展，可以確認：電信主管機關已開始重視數位匯流之發展趨勢，從推動法制再造、加強網路建設、鼓勵數位內容網路服務開發、促進應用服務創新、加強應用服務推廣等五個側面，展現出推動「先進寬頻 e 化服務網路計畫」之積極作為。

四、我國電信競爭力分析

在過去電信事業獨佔經營時代，國家電信事業機構之實力，即是該國電信實力之表徵，藉由各國電信事業機構之比較，即可反映各國電信競爭力之相對優勢。隨著電信自由化之進展，電信競爭力的概念，出現變化，主要是反映一國電信市場之競爭環境，作為檢驗電信自由化政策之推動成效，與過去獨佔體制時代之國家電信競爭力概念有所差異。

基於前述電信競爭力概念之基礎，本研究所進行之電信競爭力分析，原則上，定位為可展現國內電信競爭環境之相關指標，以及運用跨國可比較指標進行競爭力分析。

首先，在國內電信市場競爭環境分析方面，主要從電信事業產業結構、電信總營收額佔 GDP 比率、電信營收結構、電信資費、電信市場佔有率、服務品質、以及電信投資對總體經濟貢獻等關鍵性指標，進行分析，俾利於國內電信競爭環境發展現況之掌握。

其次在跨國可比較指標分析方面，基本上，大分為單項指標分析與綜合指標分析兩大項。前者包含政策面、營運面、以及費率、品質、技術等項目之分析比較；後者則利用 ITU 主要電信指標以及世界經濟論壇（WEF）之 ICT 與 NRI 評比指標為基礎，進行綜合分析，並加權計算國際電信競爭力排名，俾利於我國國際電信競爭優勢之掌握。

綜合前述研究結果，彙整如圖表 4 所示，分述如下。

圖表 4　我國主要電信指標排名彙整

指標項目		我國排名		
		2003年	2002年	2001年
ITU統計指標	ITU 5項主成份指數	9	10	12
	1.市內電話普及率	12	12	15
	2.行動電話普及率	1	1	2
	3.聯網主機普及率	7	8	10
	4.網路使用人數普及率	17	18	17
	5.PC普及率	—	19	22
	寬頻用戶普及率	5	4	—
	寬頻家庭普及率	3	3	—
	公用電話每千人普及率	—	—	4
	電信機器設備出口競爭力	—	6	7
	電視家庭普及率	—	18	11
	CATV家庭普及率	—	6	6
	市內電話3分鐘（尖峰）費率水準（29國比較）	—	4	3
	行動電話3分鐘（尖峰）費率水準（26國比較）	—	12	13
	每月寬頻價格佔平均每人每月所得（26國比較）	23	—	—
	寬頻上網每100kbps平均價格（26國比較）	5	—	—
WEF統計指標	WEF企業競爭力指標	16	16	20
	WEF國家競爭力成長指標	5	3	7
	WEF ICT指數	12	7	16
	1.行動電話利用環境	31	28	—
	2.學校網路環境	11	10	10
	3.ISP部門競爭品質	16	15	26
	4.政府重視ICT政策程度	5	2	4
	5.政府成功推動ICT政策程度	4	3	4
	6.利用ICT相關法規	15	12	26
	WEF 網路整備度指數	16	9	15
電信競爭力綜合指數（ITU 5指數＋WEF ICT指數＋NRI指數）		12(8)	6	14

註：1.本研究對象國家包含 OECD、中國、香港、新加坡和我國共 34 國。

2.WEF 企業競爭力指標項在 2001 年和 2002 年為 WEF 國家競爭力當前指標。

3.「行動電話利用環境」評比成績平均值為 5.9，顯示多數國家滿意行動電話之利用環境，同分國家甚多，我國評比成績為 6.1。

4.WEF 網路整備度指標可能失真，僅供參考。

5.2003 年電信競爭力綜合指數括弧內排名不包含 NRI 指數。

資料來源：彙整自本研究統計指標。

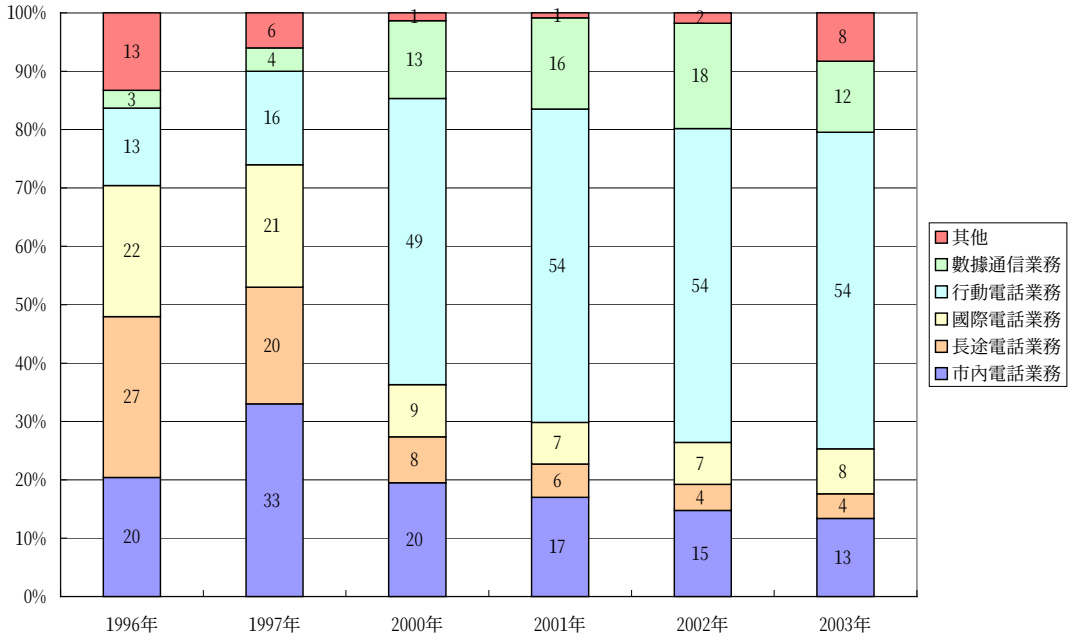
（一）電信市場競爭政策

我國已在 WTO 基本電信自由化協議原則下，大幅開放國內電信市場，與國際電信政策發展趨勢，同步接軌。

（二）電信市場競爭現況

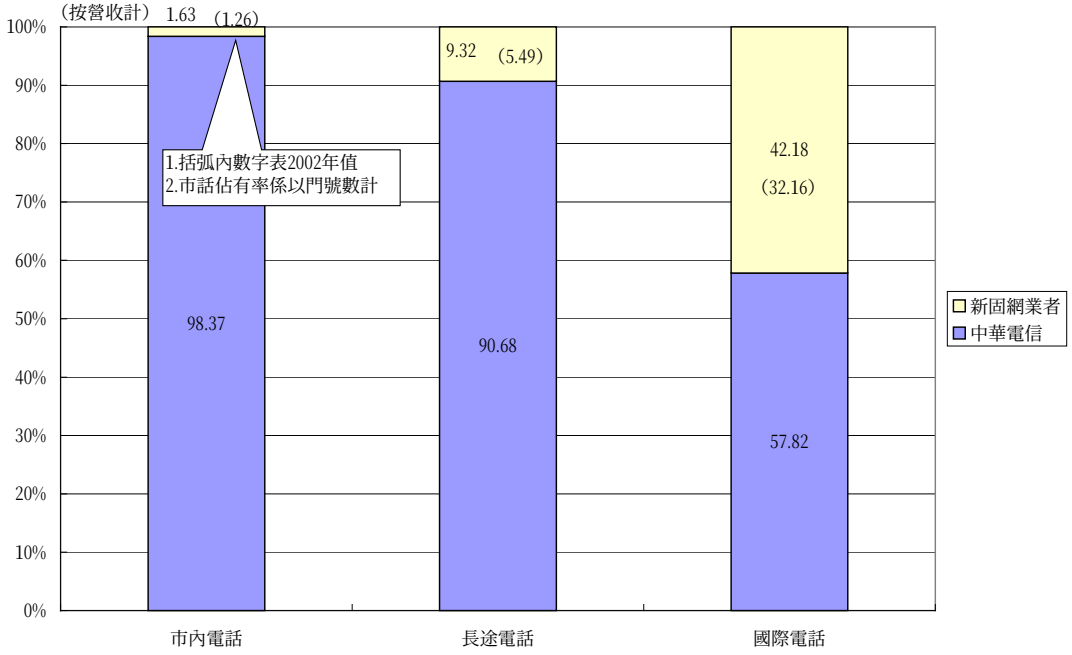
我國三家新固網業者自 2001 年 7 月開始營運，因此 2003 年之市內電話、長途電話市場佔有率實績尚弱，國際電話則有明顯進展。我國行動電話市場集中度表現相對均衡，成果顯著，但近兩年中華電信的市場佔率出現擴大的發展趨勢。2004 年 9 月我國電路出租業者數共 60 家，較 2003 年 9 月增加 28 家，競爭激烈，電路出租費率調降幅度亦大（參見圖表 5　8）。

圖表 5　我國主要電信營收結構比較



資料來源：電信總局。

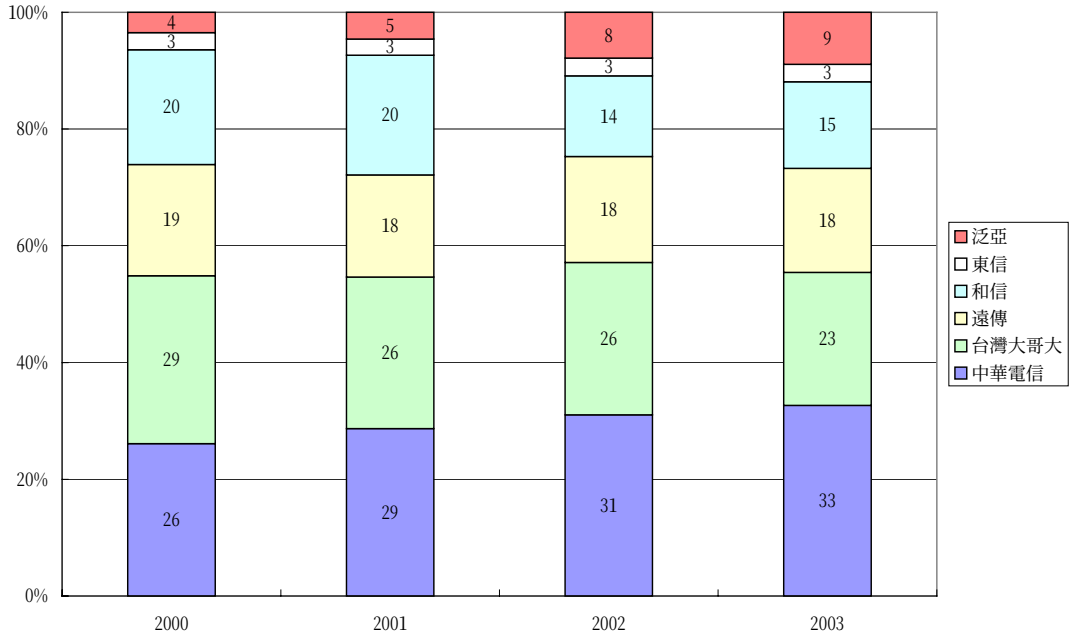
圖表 6　我國固定通信綜合網路市場佔有率分析（2003 年）



資料來源：本研究彙整自電信總局資料。

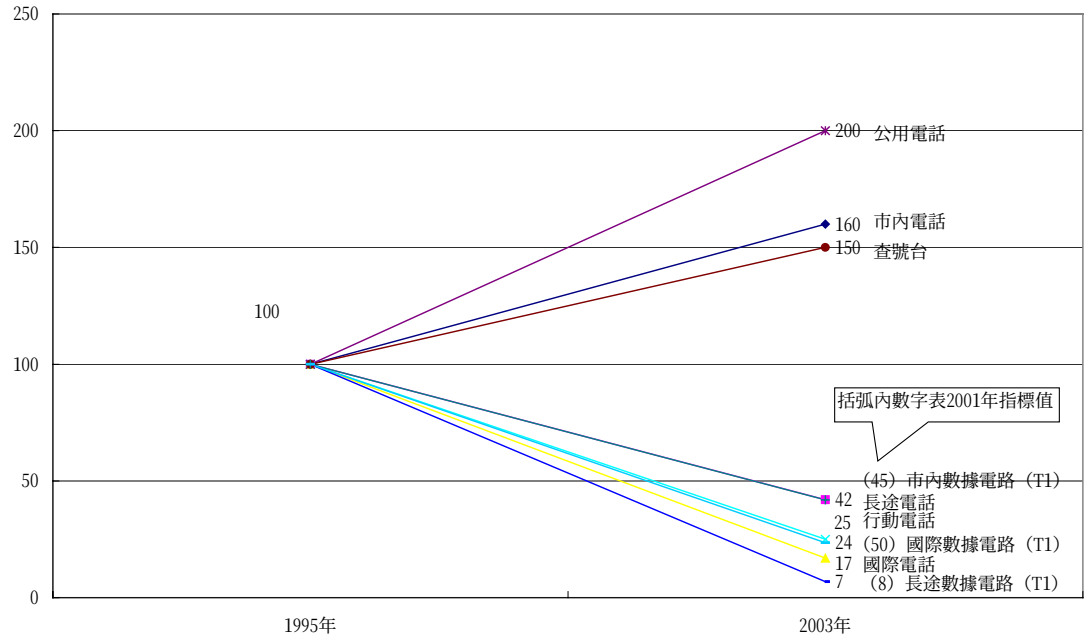
Source：Summaries of various DGT data

圖表 7　我國行動電話業者市場佔有率分析



資料來源：本研究彙整自電信總局資料。

圖表 8　　我國電信費率指數比較



註：以 1995 年各項電信服務之費率水準為 100。

資料來源：本研究依據中華電信資料計算。

Note：Each tariff level of telecommunication services in 1995 is set as 100.

Source：Summaries of various DGT data

（三）3G 發展現況

3G 執照之核發、我國係採用競標制，平均每一人口每張執照競標金額為 12.49 美元，低於國際平均值 22.38 美元(若不包含金額偏高之英德兩國之平均值則為 13.13 美元)，決標金額應屬合理。

我國 3G 業者中，「亞太行動寬頻」已經在 2003 年 7 月 28 日開台。遠傳電信則聲稱於 2004 年 3 月開始 3G 小型營運，藉以試探市場動向。「中華電信」、「威寶電信」、「台灣大哥大」亦積極佈建中。

（四）電信業產出比重

我國實施電信自由化政策以後，電信總營收額佔 GDP 比重雖呈現逐年增加的趨勢，但該比重仍低於國際平均值，顯示國內電信市場規模尚未充分擴大，在國內整體產業所佔有之地位份量，就亞洲地區而言，相對低於韓國、中國、新加坡、香港。此一課題，待國內三家新固網業者完成網路佈建，競爭條件成熟後，或可適度擴大市場規模，提升電信事業在國內整體產業所佔有之地位份量。

（五）電信事業生產力

2002 年度我國電信事業平均每一員工營收額為 25.2 萬美元，低於

國際平均值 27.2 萬美元，屬生產力相對中等之國家。

（六）主要國家代表電信業者營運現況

2001 年度我國中華電信之純益率為 20.45%，相對較高，顯示我國代表業者中華電信營運體質堪稱良好，具有競爭實力。

（七）電信費率國際比較

我國市話費率水準低廉，具有相對價格優勢。行動電話費率水準，高於新加坡、韓國、香港、中國。ADSL 寬頻上網費率水準，相對較高。

（八）固網品質

我國電信網路自動化比率與數位化比率皆已達到 100%水準。電信網路故障率低，網路品質相對良好。

（九）電信技術力競爭環境分析

我國電信機器設備出口競爭力指數，從 1996 年之具競爭優勢地位，轉變為負數，競爭優勢相對減弱。主要原因是我國實施電信自由化以後，國內電信市場急速擴大，國內生產不敷所需，電信機器設備仰賴進口供應增大，致使出口競爭力指數轉呈負數，其中尤以無線通訊器材類

為最。

我國電信機器設備出口競爭力指數在 1999 年降至谷底，而後逐年回升，主要原因是國內電信業者設備投資漸趨完備及擴大國內供給。若單以「數位無線電話機」為例，由於近年政府將之列為我國產業發展重點項目後，出口競爭力指數明顯呈現逐年改善趨勢，顯示國內是項技術發展，逐年進步。

（十）綜合評比結果

ITU 主成份指標競爭力排名第 9 名，較 2002 年進步 1 名。本排名係依據市話普及率、行動電話普及率、聯網主機普及率、網路用戶數普及率、PC 普及率等 5 項可量化之主要電信指標，計算而得，可反映評比對象國家之相對電信競爭力。

我國在 WEF ICT 評比成績排名第 12 名，較 2002 年退步 5 名。本排名係依據行動電話使用環境、學校網路環境、ISP 部門競爭品質、政府重視 ICT 政策程度、政府成功推動 ICT 政策程度、利用 ICT 相關法規等 6 項問卷評比指標計算而得，可補強難量化指標之掌握，反映評比對象國家之相對電信競爭力。

我國在 WEF NRI 評比成績排名第 16 名，較 2002 年退步 9 名。本排名係依據網路之環境指標、整備指標、利用指標等三大類 64 項問卷評

比指標計算而得，可補強難量化指標之掌握，反映評比對象國家之相對電信競爭力。不過本年之 NRI 指數可能資料處理過程有誤，降低參考價值。

最後，電信競爭力綜合排名方面，我國名列第 12 名，較 2002 年退步 6 名。本排名係依據前述三項排名加權計算；若不含 NRI 指數，則我國名列第 8 名，較 2002 年退步 2 名（參見圖表 9)。

本研究認為跨國指標之比較，原則上宜以量化資料為依據，質化資料等容易受到主觀理解程度影響，固然不可全然否定其參考價值，但在使用及解釋上應特別留意其限制。本研究已揭示 WEF 以自我填卷方式得出之統計指標之缺點，其實，國際上對於電信競爭力的衡量或計算亦有檢討與新發展。本研究亦採 ITU 的 DAI 指數，得出我國 2002 年在 DAI 指數下排名為第 9 名（參見圖表 10)，可與本研究另一 ITU 五項主成份指數綜合排名結果（即圖表 9）驗證比較。

圖表 9　主要國家電信競爭力綜合排名（2003 年）

	總分	綜合排名				WEF ICT 指標		WEF NRI 指標		ITU 主成份指標	
		2003年		2002年	2001年	排名	分數	排名	分數	排名	分數
芬蘭	95	1	3	1	2	2	33	3	32	5	30
丹麥	94	2	2	7	7	4	31	5	30	2	33
新加坡	92	3	5	5	7	1	34	2	33	10	25
瑞典	91	4	4	2	2	7	28	4	31	3	32
冰島	89	5	1	4	2	5	30	10	25	1	34
美國	85	6	6	3	1	6	29	1	34	13	22
瑞士	76	7	11	9	11	15	20	7	28	7	28
加拿大	75	8	13	7	11	8	27	6	29	16	19
澳大利亞	75	9	9	15	13	10	25	9	26	11	24
盧森堡	70	10	7	..	..	17	18	14	21	4	31
挪威	70	11	16	16	5	19	16	8	27	8	27
台灣	68	12	8	6	14	12	23	16	19	9	26
香港	67	13	10	14	9	9	26	17	18	12	23
英國	65	14	14	10	10	11	24	15	20	14	21
德國	65	15	17	13	15	14	21	11	24	15	20
荷蘭	65	16	15	11	5	21	14	13	22	6	29
韓國	63	17	12	12	20	3	32	19	16	20	15
日本	63	18	18	18	24	13	22	12	23	17	18
奧地利	49	19	19	17	15	18	17	20	15	18	17
法國	48	20	21	20	20	16	19	18	17	23	12
紐西蘭	44	21	20	22	17	20	15	22	13	19	16
愛爾蘭	36	22	24	19	17	27	8	21	14	21	14
比利時	35	23	23	20	19	23	12	23	12	24	11
義大利	34	24	22	25	22	25	10	24	11	22	13
葡萄牙	30	25	25	25	22	22	13	26	9	27	8
西班牙	30	26	26	27	24	24	11	25	10	26	9
捷克	27	27	27	23	26	26	9	27	8	25	10
希臘	20	28	28	28	28	29	6	28	7	28	7
匈牙利	19	29	29	24	27	28	7	29	6	29	6
斯洛伐克	15	30	30	28	29	30	5	30	5	30	5
墨西哥	10	31	32	33	32	31	4	31	4	33	2
波蘭	10	32	31	30	31	32	3	32	3	31	4
中國	5	33	34	31	32	33	2	33	2	34	1
土耳其	5	34	33	32	30	34	1	34	1	32	3

註：2003 年綜合排名之左列排名為包含 NRI 指數；右列排名為不包含 NRI 指數。
資料來源：本研究。

圖表 10　ITU DAI 指數 34 國評比成績（2002 年）

	DAT指數	排名	基礎建設	上網負擔力	知識水準	ICT服務品質	網路使用
瑞典	0.85	1	0.94	0.99	0.99	0.64	0.67
丹麥	0.83	2	0.89	0.99	0.99	0.66	0.60
冰島	0.82	3	0.89	0.99	0.96	0.50	0.76
韓國	0.82	4	0.74	0.99	0.96	0.74	0.65
芬蘭	0.79	5	0.81	0.99	0.99	0.55	0.60
荷蘭	0.79	6	0.78	0.99	0.99	0.61	0.60
挪威	0.79	7	0.84	0.99	0.99	0.55	0.59
香港	0.79	8	0.93	1.00	0.83	0.68	0.51
台灣	0.79	9	0.98	0.99	0.95	0.56	0.45
加拿大	0.78	10	0.69	0.99	0.97	0.64	0.60
美國	0.78	11	0.74	0.99	0.97	0.54	0.65
英國	0.77	12	0.86	0.99	0.99	0.53	0.50
瑞士	0.76	13	0.86	0.99	0.95	0.60	0.41
奧地利	0.75	14	0.74	0.98	0.97	0.56	0.48
日本	0.75	15	0.72	0.99	0.94	0.47	0.64
盧森堡	0.75	16	0.94	0.99	0.90	0.48	0.43
新加坡	0.75	17	0.78	0.99	0.87	0.54	0.59
澳大利亞	0.74	18	0.75	0.99	0.99	0.42	0.57
比利時	0.74	19	0.75	0.99	0.99	0.63	0.36
德國	0.74	20	0.76	0.99	0.96	0.52	0.48
法國	0.72	21	0.76	0.99	0.96	0.51	0.37
義大利	0.72	22	0.81	0.99	0.93	0.45	0.41
紐西蘭	0.72	23	0.69	0.99	0.99	0.42	0.54
愛爾蘭	0.69	24	0.72	0.99	0.96	0.47	0.32
西班牙	0.67	25	0.77	0.98	0.96	0.47	0.18
捷克	0.66	26	0.70	0.96	0.91	0.45	0.30
希臘	0.66	27	0.86	0.98	0.92	0.36	0.18
葡萄牙	0.65	28	0.71	0.98	0.93	0.42	0.23
匈牙利	0.63	29	0.61	0.96	0.94	0.44	0.19
波蘭	0.59	30	0.43	0.96	0.96	0.35	0.27
斯洛伐克	0.59	31	0.50	0.94	0.91	0.43	0.19
墨西哥	0.50	32	0.25	0.95	0.86	0.32	0.12
土耳其	0.48	33	0.39	0.90	0.77	0.25	0.08
中國	0.43	34	0.22	0.87	0.79	0.24	0.05

資料來源：本研究彙整。

（十一）綜合評價

整體而言，我國實施電信自由化政策，已成功引進競爭機制，活化電信產業結構，有效帶動電信事業成長。在良性市場競爭環境下，已明顯出現合理調降電信服務費率的發展趨勢。不僅電信用戶享有低價格、高品質之電信服務，電信業者亦能有效拓展業務績效，並對總體經濟發展做出貢獻，展現消費用戶、電信業者以及總體經濟三贏之具體成效。

惟在市話與長途電話業務方面，一則由於新進業者參加市場競爭時間較晚；再則佈建電信網路進度難按預定計畫施展，導致各該市場表現，尚未呈現令人滿意之成果，此亦係我國寬頻上網費率仍屬中高水準的重要原因之一。

（十二）挑戰與課題

國內 3G 業者已於 2003 年 7 月開始陸續開台，鑒於國際 3G 市場發展經驗，3G 與 2G 之市場區隔以及價位設定等市場策略，充滿挑戰。我國寬頻家庭普及率雖排名全球第 3 名，但上網費率仍偏高，尚待改善。2003 年我國 ISP 部門競爭品質排名第 16 名，較 2002 年退步 1 名，尚有改善空間；ICT 相關法規之整備現況亦同。行動電話號碼可攜服務之引進，將可刺激競爭，帶動費率調降。

我國內電信市場雖已成功引進競爭機制，主管機關仍有必要繼續觀

察、掌握市話與長途電話市場之發展情況，裨益整體電信事業之健全發展。

五、結論

我國現階段之電信政策目標，係配合推動行政院「服務業發展綱領及行動方案」中「通訊媒體服務業－先進寬頻 e 化服務網路計畫」之落實。基本上，仍以「政府帶動、民間主導」的原則，持續推動寬頻網路建設。就此意義而言，健全電信市場競爭機制，增進電信業者競爭活力，擴大消費用戶市場需求，實為達成前述政策目標之關鍵所在。

此外，從韓國寬頻普及之經驗可知，除政府政策獎勵、業者網路建設等因素外，低廉的通訊費率與充實的數位內容才能吸引消費者加入使用，帶動出旺盛之市場需求，這才是促進寬頻普及最根本的原動力。然而就電信主管機關之職能而論，低廉之通訊費率，或可繼續藉由競爭政策之引進而實現；但是在數位內容之充實以及擴大市場需求方面，則目前電信主管機關之政策有效性是有其界限的。為使數位內容同步且良性地發展。因此，政府在數位內容上應及早規劃如何有助於整體發展，以領先於市場變化。

題名：我國電信統計規劃與電信競爭力分析（三）（電信競爭力分析英文精簡版）

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