

行政院所屬各機關因公出國人員出國報告書

(出國類別：考察)

奉派赴韓考察 MPLS Based 網路之發展趨勢及其維運技術

行政院研考會/省(市)研考會 編號欄

服務機關：交通部中華電信股份有限公司

出國人員職稱：處長

姓名：江振村

出國期間：中華民國90年5月7日至90年5月15日

出國地點：韓國(南韓)

報告日期：中華民國90年10月18日

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壹.摘要

職奉派參加第七屆亞洲電信產業交流會議(Asian Telecommunication Industry Exchange ATIE)，並於會後考察韓國電信公司推展 ADSL 之具體措施及其骨幹網路 SDH、DWDM 等之建設及系統運作情形，於本(九十)年五月七日啟程前往，五月十五日返國。

亞洲電信產業交流會議每年舉辦一次，本次會議輪由韓國主辦，該項活動係藉由各國電信業者參與研討會、參觀展覽會及工廠觀摩等方式進行。本次電信產業交流訪韓團由工研院電通所周勝鄰博士擔任代表團團長，邀請本公司派員代表我國於會議中第一階段研討會發表「台灣電信產業現況與未來發展」論文。

韓國主辦單位 KAIT(Korea Association of Information & Telecommunication)安排本屆 ATIE 於漢城國際會議中心 Convention and Exhibition Center (COEX)舉行，包括研討會、展覽會及工廠參訪三部分，研討會分四個階段四個 Session 如下：

Session1. Present status &future development plan of telecommunications

Industry

Session2. Status of information infrastructure

Session3. Market trends of wireless communications

Session4. New technology and new application

展覽會 Expo Comm Korea 2001，由電信、電腦產業廠商及業者參與展出，與國內之電信展相似且規模略大。工廠參訪部分則安排參訪 SamSung 及 LG 兩家韓國最具特色及規模之通信電子公司。

另外於會後透過安排參訪韓國電信公司(KT)及 Alcatel、Lucent 及

Nortel 等世界通信設備大廠商在韓國之分公司或代表，以了解韓國對通信設備之應用情形。最重要的是考察韓國電信 KT 對寬頻通信市場之發展情形及其骨幹網路之建設概況。本次參訪韓國電信公司，由該公司 Global 事業團海外投資管理部部長崔德晚、課長韓永洙及相關人員接見，並簡報韓國之各項電信發展現況。

貳.行程

- | | | | |
|-----------|-------|---------|---|
| 90.05.07 | | 台北—韓國漢城 | 1. 去程(台北—韓國漢城),1 天 |
| 90.05.08 | 05.09 | 韓國漢城 | 2. 參加第七屆亞洲電信產業交流會議，並於會中發表論文 |
| 90.05.10. | | 韓國漢城 | 3. 考察 Alcatel 於韓國各大樓裝設 ADSL、DSLAM 等設備使用情形 |
| 90.05.11. | | 韓國漢城 | 4. 參觀韓國電信公司(KT)，並了解其 ADSL、ATM、MPLS 系統運作及裝機之具體措施 |
| 90.05.12 | 13 | 韓國漢城 | 5. 休假日 |
| 90.05.14. | | 韓國漢城 | 6. 考察 Nortel 於韓國裝設之 SDH、ATM、BB-RAS 系統建置及維運情形 |
| | | 韓國漢城—台北 | |
| 90.05.15. | | | 7. 返國 |

參.參加 KAIT 主辦之 ATIE

本次參加 ATIE 研討會主要任務是報告台灣電信產業發展現況，英文講稿如附件一，簡報資料如附件二。因適逢本公司釋股期間所規定之沉默期，對於台灣電信之發展及預測等均迴避敏感議題。

肆.參訪心得簡報

本次參訪之重心在韓國之寬頻通信之發展現況及韓國電信公司經營管理方式，為使參訪心得能快速提供本公司參考，已將報告製成簡報如附件三。

伍.感言與建議

1. 亞洲電信產業交流會 ATIE 係由日本(CIAJ)、新加坡(ATIS)、韓國(KAIT)、香港(TAHK)及台灣(TEEMA)等公會所組成，其設立之宗旨希利用每年舉辦之交流會將 IT 領域上之經驗及理想進行交換，在功能上扮演著亞太地區電信發展之良好橋樑，透過 ATIE 每年舉辦之研討會可以即時取得各國之發展現況及相關資料。
2. 韓國政府推動寬頻通信發展之具體措施，包括教育政策、國防役、金融政策等，均具有鼓勵及催化之效果，值得我們學習。
3. 韓國電信公司 KT 不論是用戶數或公司規模均比中華電信大一倍，KT 在營運管理、執行力及提升員工生產力等之作為均值得本公司學習。

附件一 「台灣電信產業現況與未來發展」論文講稿

Page0:

Ladies and gentlemen, It's my great pleasure and honor to attend this meeting, and have chance to give this presentation. The topic of my presentation is "The present status and future development plan of telecom market in Taiwan."

Page1.:

There are seven sessions in my presentation including preface, current status of major telecom services, major telecom service providers, mobile market, IDC market, the liberalization of telecom industry in Taiwan and last but not least, a glance at Chunghwa telecom.

Page2:

First of all, as we look at last two years, we could find that telecommunication industry has played an important role in the economic activities. The high growth rate of mobile and data communication services have made significant contribution to the country's economic development. Also the new technology evolution together with its related products and the services change the behavior of human's activities. As a matter of fact, when we look around, we could find that almost everybody is accompanied with a small and smart handset. The mobile phone has become the necessities of daily life for everyone living in Taiwan. People are willing to accept the innovative creation, not only because of the convenience to carry it, but also the cheaper usage fee. The liberalization of telecom service in Taiwan has brought to telecom market enormous business opportunities. The keep competition among the telecommunication service providers has resulted in the sharp dropping of usage fee, for instance, not only the monthly payment is about one third of that of the payment in 1997, but also the usage charge is segmented to various suite case which is up to user's chioce.

Page3:

The population of Taiwan currently is about 22M in Taiwan now. As I have learned that Korea has a population of 47M. Current status of major telecom service in Taiwan includes fixed line service, mobile service and Internet service.

Page4:

The relatively high GDP and even distribution of wealth in Taiwan has contributed to the formation a developed and highly attractive telecom market.

Taiwan's cellular penetration in particular, is among the highest, not only in Asia, but also in the world.

We are now experiencing rapid growth in the Internet market, particularly in broadband. We expect Internet penetration to reach 50% by 2004, with broadband standing up to half of the market.

Page5:

In this viewgraph fixed line service in the past few years was stepping up steadily in a

small pace. We have 12.6M subscribers now. Penetration is about 55%. We will see that fixed line service with the same growth pace in next few years.

Page6:

As regards mobile service the number of subscribers has been soaring at its height since the beginning of competition from 1998. The various market promotion programs resulted in very low monthly fee and usage charge, and teenager affordable price for handset is bundling with a period of subscription. We have 18.2M subscribers now, and expect mobile penetration to reach 90% by 2003.

Page7:

Internet service grew very fast in the last few years. There are 6.2M Internet subscribers in Taiwan now. I have read some Korean magazines that there are 19M Internet users at year-end 2000, the penetration is about 26%, some of them are broadband users. We knew that Korea has created one of the most successful Internet market in the world.

Page8:

Major telecom service providers

Chunghwa Telecom is the only fixed network operator in Taiwan now. Another 3 licenses for fixed network service have been granted and scheduled to launch the service in the 2Q this year. After then, a fully competition environment for Taiwan's telecom market is implemented. As you will see that 4 fixed network operators, 7 mobile voice operators, 6 mobile data operators, 6 pager operators, 12 trunk radio operators, 3 satellite operators and 157 Internet service providers will be aggressively playing in this competition arena to their utmost. Hinet, Seednet and TANet are three Major ISPs.

Page9:

Mobile telecom is a high growth rate and high revenue market. Many research and consultant companies forecast the trend and market size in Taiwan.

Page10:

It is the trend that most analysts have the same prediction that mobile service will shift from simple voice to data and voice, and then the third generation mobile. We could find that 3G will occupy a large proportion of mobile market.

Page11:

Prospects of 3G Industry

Merrill Lynch forecast that 45% of all mobile traffic would be data by 2003.

Arthur D. Little expected 3G penetration to reach 60% by 2010.

Durlacher forecast mobile commerce revenues could reach \$15/sub by 2010.

Goldman Sachs believes the mobile phone will become the e-commerce platform of the future.

Page12:

3G Mobile Market in Taiwan

High penetration in mobile market is expected to reach 90% by 2003.

CEPD estimated that more than 10 million mobile subscribers would shift to 3G by 2010

3G revenues will reach 138 billion NT\$ by 2008

Page13:

IDC Market in Taiwan

Forecaster Research expected IDC revenues to reach 1.32 billion US\$ by 2003

Up to 80,000 m² of floor space required by 2005

Including maintenance services and application services

Ovum forecast that IDC market would reach 483 million US\$ by 2005

Page14:

The liberalization of Telecom industry leads to competition and progress in Taiwan. As we look at time frame for telecom liberalization. At first, CPE released to be owned by user themselves in 1987, then VAN deregulated in 1989, CT-2 in 1994, mobile voice and data in 1997, trunk radio and radio paging also in 1997, satellite service in 1999, fixed network service in 2000. 3G licenses are expected to be granted in this year.

Page15:

Chunghwa Telecom Co., Ltd. is a state run company. which is facing competition now. We have scheduled to privatize this year. Finally let's take a look of our annual report and our strategy.

Chunghwa Telecom's annual report

Page16:

As I mentioned in the beginning of the presentation, technology and competition are the driving forces in our market. We have defined our strategy to address these two issues.

The four key elements of our strategy are:

Focus our resources on high growth markets

Leverage our established and extensive customer relationships to sell new services

Aggressively maintain our market share in traditional voice services, and

Execute our restructuring initiatives

Last page


Thank you for paying your attentions, thanks.

附件二「台灣電信產業現況與未來發展」論文簡報



Contents

- Preface
- Current Status of Major Telecom Services
- Major Telecom Service Providers
- Mobile Market
- IDC Market
- The Liberalization of Telecom Industry in Taiwan
- Chunghwa Telecom Co., Ltd.

 Chunghwa Telecom Co., Ltd.

April 11, 2001

1

Preface

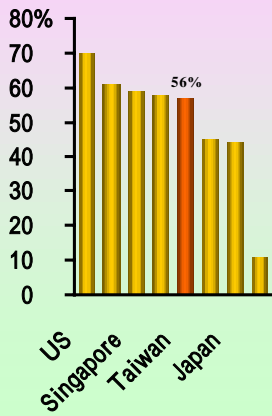
- **The high growth rate of telecom industry with its related services have made significant contribution to the country's economic development**
- **New technology evolution together with its products also change the behavior of human's activities**
- **The liberalization of telecom in Taiwan has brought to telecom market enormous business opportunities**

Current Status of Major Telecom Services

- **A highly attractive telecom market**
- **Fixed network service**
- **Mobile service**
- **Internet service**

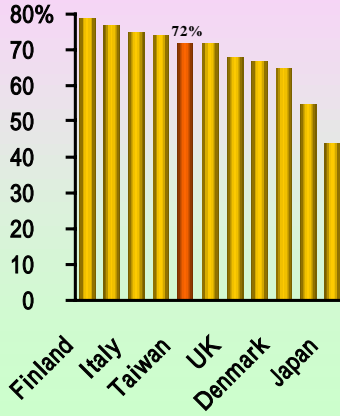
A Highly Attractive Telecom Market

Fixed Line Penetration in 2000



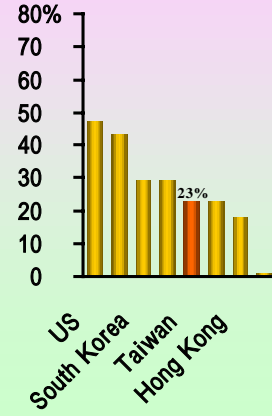
Source: Broker research

Cellular Penetration in 2000



Source: Baskerville

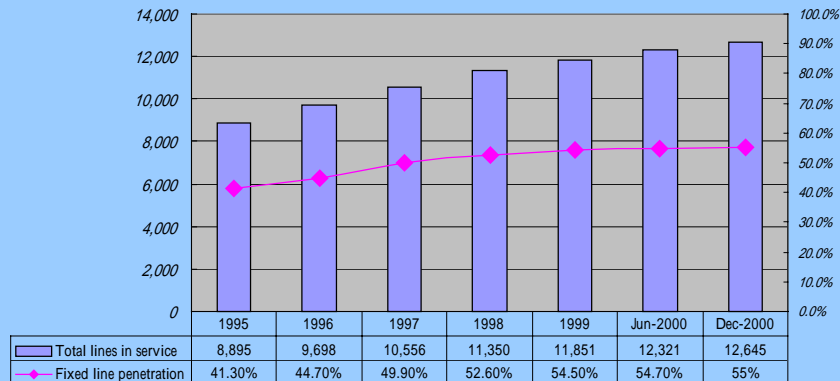
Internet Penetration in 2000



Source: Broker research

Fixed Network Service

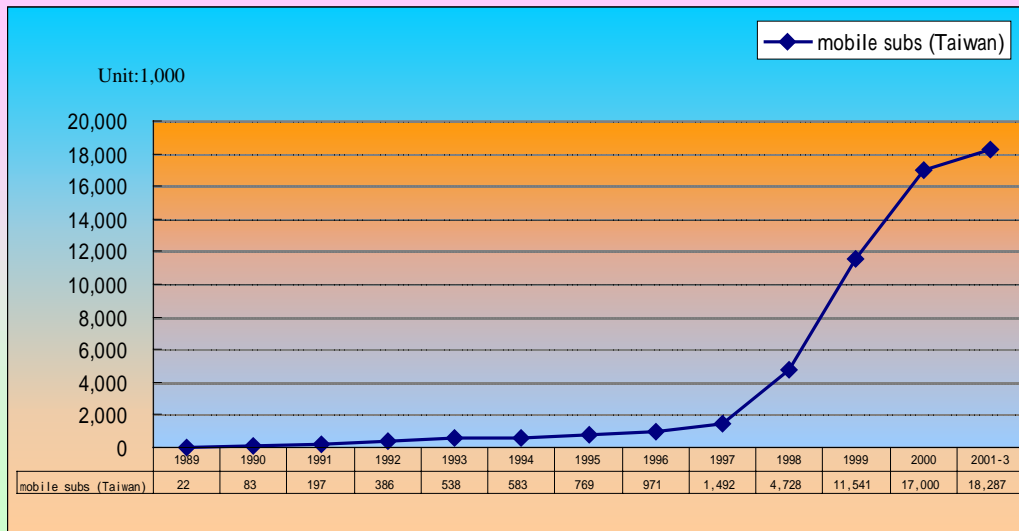
Fixed line market



Unit:1,000

Source: CHT

Mobile Service

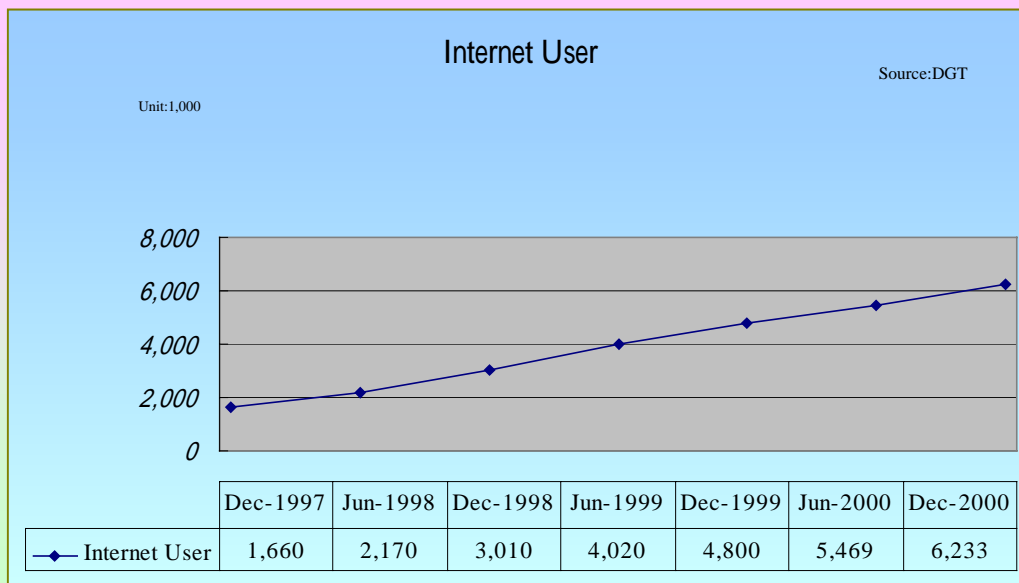


Chungwa Telecom Co., Ltd.
April 11, 2001

Source:DGT

6

Internet Service



Chungwa Telecom Co., Ltd.
April 11, 2001

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Major Telecom Service Providers

	Fixed Network	Mobile Voice	Mobile Data	Pager	Trunk Radio	Satellite com.	ISP
Number of operator	1	7	6	6	12	3	157

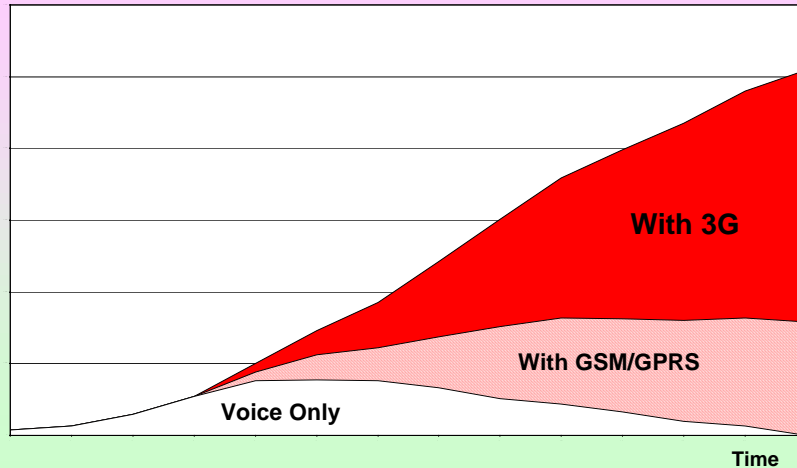
- 3 licenses for fixed network have been granted in the 1Q of 2000, scheduled to launch the service in the 2Q of 2001
- source: DGT

Mobile Market in Taiwan

- **Worldwide Mobile Trend**
- **Prospects of 3G Industry**
- **3G Mobile Market in Taiwan**

Worldwide Mobile Trend

Subscribers



Source: Ericsson, October 2000.

Prospects of 3G Industry

- **Merrill Lynch forecast that 45% of all mobile traffic would be data by 2003**
- **Arthur D. Little expected 3G penetration to reach 60%+ by 2010.**
- **Durlacher forecast mobile commerce revenues could reach \$15/sub by 2010.**
- **Goldman Sachs believes the mobile phone will become the e-commerce platform of the future.**

3G Mobile Market in Taiwan

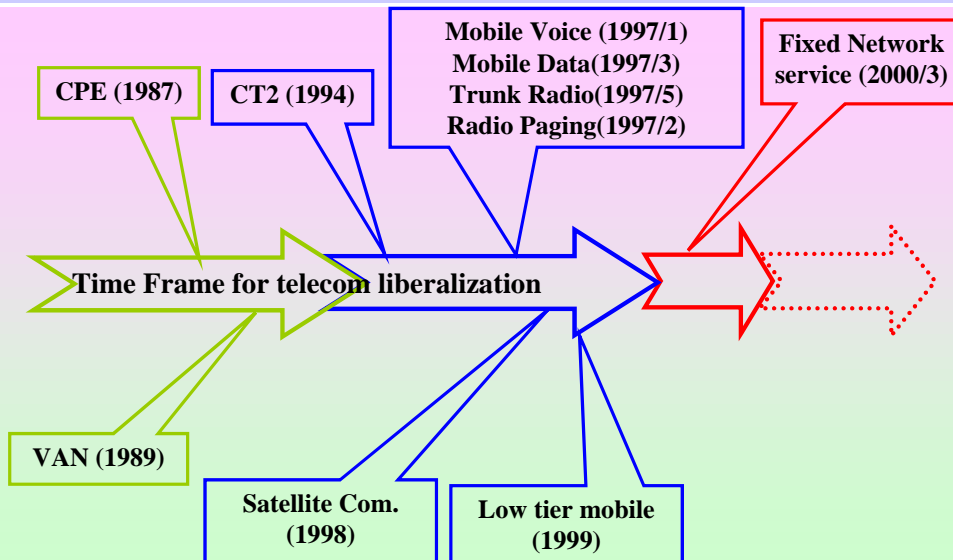
- **High penetration in mobile market is expected to reach 90% by 2003**
- **CEPD estimated that more than 10 million mobile subscribers would shift to 3G by 2010**
- **3G revenues will reach 138 billion NT\$ by 2008**

Source:estimated by CEPD

IDC Market in Taiwan

- **Ovum forecast that IDC market would reach 483 million US dollars by 2005**
- **Forecaster Research expected IDC revenues to reach 1.32 billion US dollars by 2003**
- **Up to 80,000 m² of floor space required by 2005**
- **Including maintenance services and application services**

The Liberalization of Telecom Industry in Taiwan



Chunghwa Telecom Co., Ltd.

Annual Report

- **Total Assets: NT\$ 465B** (2000E)(=14.53B US\$)
- **Revenue: NT\$ 280B** (18 months, 2000E)(=8.75B US\$)
- **Employees: 34,752** (2000E)
- **Fixed line subscribers: 12,700,000** (Mar 2001)
- **Mobile phone subscribers: 5,000,000** (Mar 2001)
- **Radio pager subscribers: 2,281,000** (2000E)
- **HiNet user: 2,230,000** (Mar 2001)

Strategy

- **Focus resources on high growth areas**
- **Drive growth of new services on extensive customer base**
- **Aggressively maintain dominance in traditional voice services**
- **Execute restructuring initiatives**



Thanks

附件三 韓國電信現況簡報資料



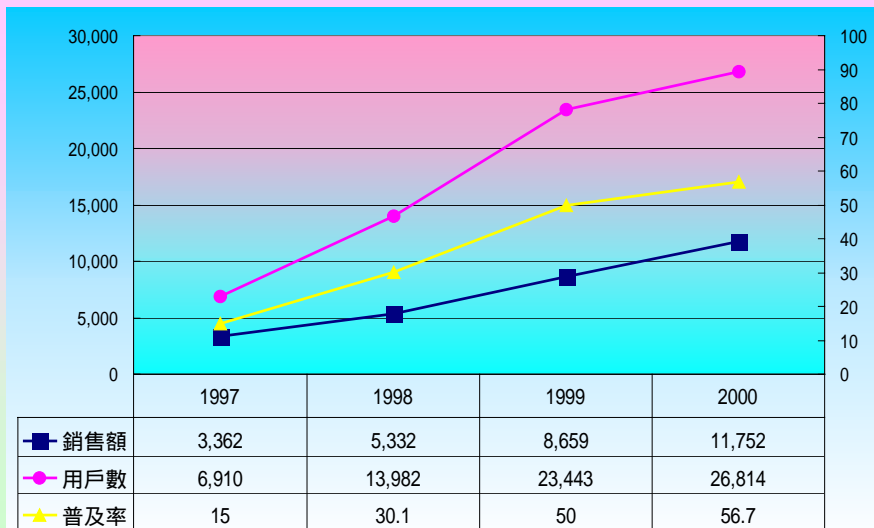
韓國電信現況--市場結構

業務別	業者數	業者名稱
市話 (Local)	2	KT, Hanaro
長途 (Long Distance)	3	KT, Dacom, ONSE
國際 (International)	3	KT, Dacom, ONSE
專線	13	KT, Hanaro, Dacom, ONSE, G&G, Dreamline, Hyundai Electrics, Powercomm, SKT, Hansol, KTI, Seoul Intl Phone,
行動電話 (Mobile telephony)	2	SKT, Shinsegi Telecom
低階行動電話 (PCS)	3	KT Freetel, KT M.COM, LG Telcom
TRS(trunk radio)	7	全國:2 區域:5
Paging	9	全國:SKT 區域:8
無線數據	3	Aimedia, Intec Telecom, Hansae Telecom
GMPCS	2	Dacom, Korea Obcom
特殊服務	58	
加值服務	5433	

韓國電信現況--市場分類

分類	基礎設備服務提供者	特殊服務提供者	加值服務提供者
設備	自有設備	租用設備	租用設備
客戶服務	固網電話、專線、行動電話及其他通信部所指定項目	第一類： 語音轉售、IP 電話、國際回撥 第二類： 頻寬集縮者、帳務重作者 第三類：建築物內通信	所有電信加值服務
進入市場之方式	授予證照(Licensing)	註冊(Registration)	通知(Notification)

韓國電信現況--快速成長的行動電話市場



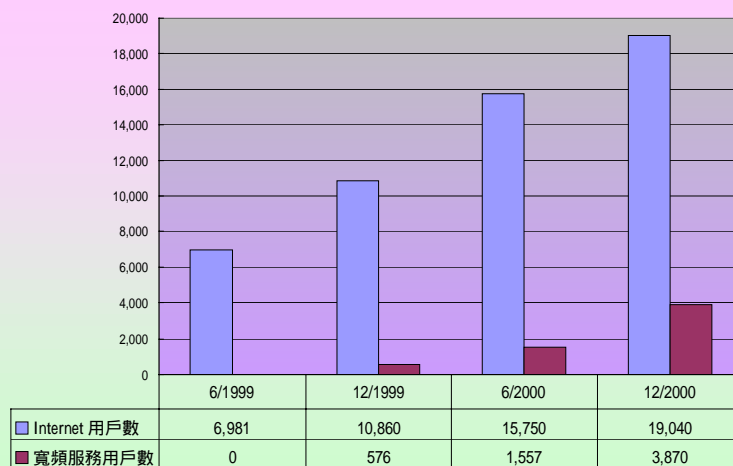
註：1.總人口數47M. 2.銷售額單位Billion Won. 3.用戶數單位:千戶. 4.一美元=\$1300Won

Chunghwa Telecom Co., Ltd.

April 11, 2001

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韓國電信現況--快速成長的Internet市場



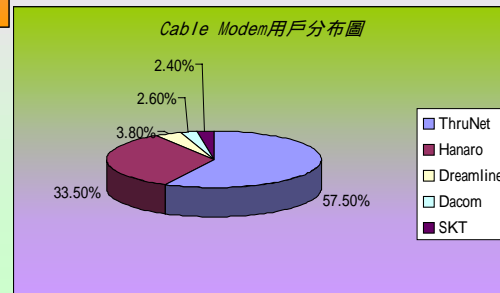
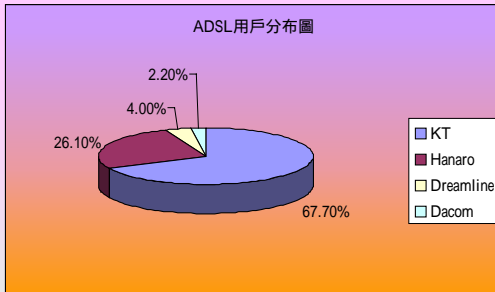
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Chunghwa Telecom Co., Ltd.

April 11, 2001

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韓國電信現況--ADSL/Cable Modem市場分布



韓國電信現況--寬頻服務

- 韓國的寬頻服務 (unit:,000)

韓國寬頻Internet市場推估

	1999	2000	2001	2002
住戶數(household)	14,355	14,695	15,036	15,377
Internet用戶數	10,864	19,002	24,954	28,436
寬頻用戶數	299	4,017	8,018	10,014

韓國電信現況--寬頻服務

- 寬頻市場特性
 - 服務提供者:超過20家
 - KT, Hanaro, ThruNet, Dacom, Dreamline, ONSE...
 - 市場:專注在住家用戶
 - 使用之媒體
 - ADSL, Cable Modem, Lan, Satellite, BWLL

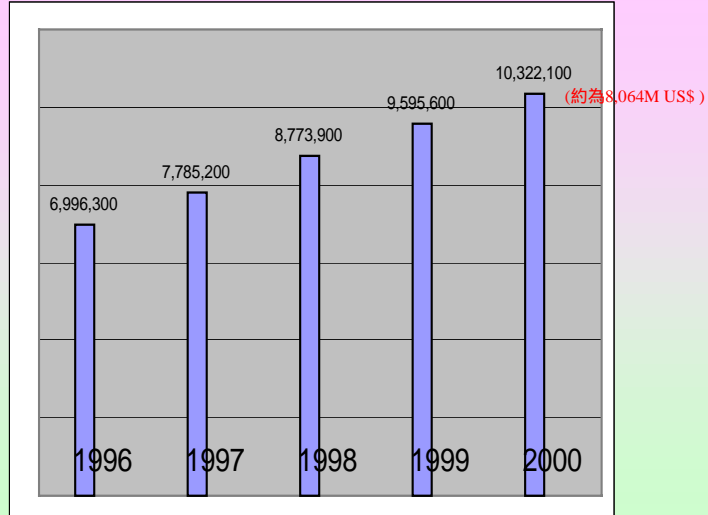
韓國電信公司(KT)簡介

YEAR	1996	1997	1998	1999	2000
營收	6,996,300	7,785,200	8,773,900	9,595,600	10,322,100 (約為8,064M US\$)
淨利	181,900	79,700	258,300	383,300	1,010,100 (約為789M US\$)
每員工銷售額	116	130	155	202	224 (約為0.175M US\$)

單位: million won
 1US\$=1280 won

韓國電信公司--營收

- KT每年營收仍有增長



單位: million won
1US\$=1280 won

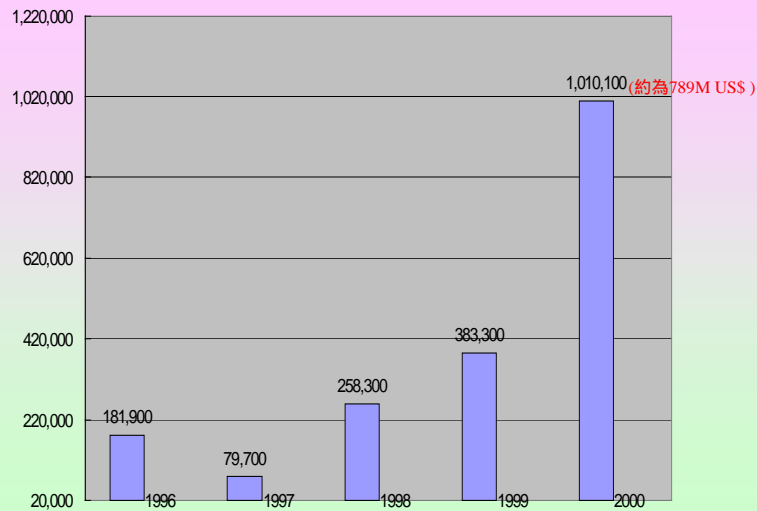
ChungHwa Telecom Co., Ltd.

April 11, 2001

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韓國電信公司--Net Income

- KT每年淨利大幅度成長



單位: million won
1US\$=1280 won

ChungHwa Telecom Co., Ltd.

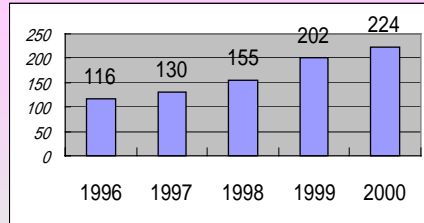
April 11, 2001

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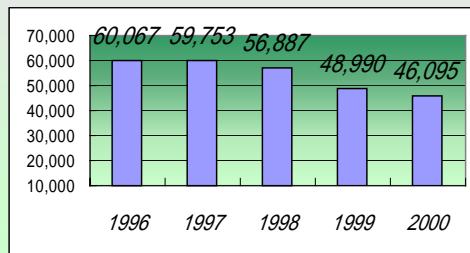
韓國電信公司--員工生產額

單位: million won
1US\$=1280 won

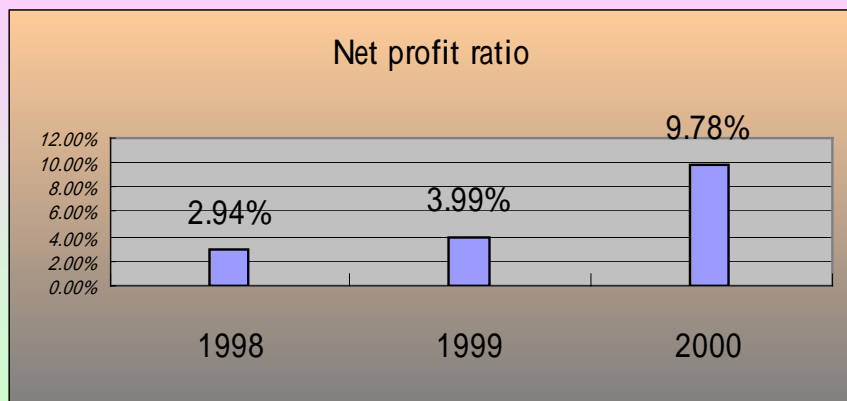
- 員工生產毛額每年成長



- 員工總數逐年降低



韓國電信公司--淨獲益比



韓國電信公司 High Speed Internet Subs

ADSL	1,322,531
Satellite internet	9,036
寬頻無線用戶迴路BWLL	492
其他	397,261
total subs	1,729,320

韓國電信公司--統計數字

2000年報摘要

	2000	1999	1998	1997	1996
市話用戶線數	24,384,821	24,464,163	24,454,984	23,795,000	22,789,807
市話用戶數	20,984,909	20,518,092	20,088,543	20,421,913	19,600,950
高數網際網路	1,729,320	13,617			
KT每百人用戶數	44.1	43.6	43.2	44.4	43
國內專線	569,401	518,915	460,563	522,042	568,849
國際專線	45,280	12,647	5,384	4,204	291
KT Internet埠數	48,819	19,493	14,679	9,731	5,129
員工數	46,095	48,990	56,887	59,753	60,067

韓國電信公司--2000年重要事紀

- 5/16 亞洲最大IDC啟用
- 6/15 購入Hansol M.COM
- 7/2 將全國144個話價區簡化為16個
- 12/15 獲得IMT-2000商業證照
- 12/19 獲得衛星廣播證照

韓國電信公司--面對改變之策略1/3

- **專注於有利潤業務** (Focusing on a profitable portfolio)
 - 1.獲利導向的管理 (profit-oriented management)
 - 2.細心籌劃E-Business (Smart E-Business Incubation)
 - 3.配置人力於成長型業務 (Deploying workforce in growth businesses, 從telephony移轉4000人到Internet及wireless, 並計畫於2001及2002再訓練8000人.)
 - 4.壓低投資營收比到25% (集中資金投入Internet backbone及用戶迴路光纜)
 - 5.擴大網路基礎建設 (Expanding network infrastructure, 含ADSL 2,200,000 line及相關ATM設備)

韓國電信公司--面對改變之策略2/3

- **向前邁進 (Going forward)**
 - 1.培養3P能力(prevision(預知), preconsideration(先考慮到), and precedence(領先))
 - 2.速度管理(Speed management),運用IT技術及KM知識管理並構建整合式客戶資訊系統ICIS達到快速反應的效果
 - 3.改良企業文化(Advancing Corporate Culture)--減會減文減報告及減少公司管理規則
 - 4.加強子公司財務成長
 - 5.加速民營化(目前政府持有59%股權)

韓國電信公司--面對改變之策略3/3

- **客戶滿意的承諾 (Customer commitment--Satisfaction)**
 - 1.H-2-H管理(Heart to Heart management)--心到心的管理是未來競爭力的保證
 - 2.客戶至上的心理建設(Customer-first mindset)
 - 3.用戶評估服務滿意度(Customer-evaluated service and satisfaction)--客戶自行評估,多管道客戶服務窗口,網路品質
 - 4.提升勞工與管理層之關係
 - 5.世界杯足球賽提供高品質無間隙的廣播及通信服務
 - 6.積極促進南北韓通信合作

Korea Telecom's 寬頻服務

市場佔有率

ISP	開始服務日期	1999.12	2001.3
KT	1999/6 (ADSL)	13,260 (4.4%)	2,424,000 (47.6%)
Hanaro	1999/4 (ADSL)	82,450 (27.6%)	1,281,000 (25.1%)
ThruNet	1998/7 (Cable)	130,130 (43.5%)	900,000 (17.6%)
Etc		73,160 (24.5%)	481,000 (9.7%)
Total		299,000	5,086,000

Korea Telecom's 寬頻服務

- KT之ADSL服務類型及費率
 - 品牌: Megapass ADSL

單位: won
1NT\$=38.7 won
10000won=258NT\$

服務類型及名稱	價格(月租費)	速率	IP	備註
ADSL-Lite	30,000Won(=NT 775元)	Max 1.5M/256K	動態	住家簡易型
ADSL-Premium	40,000Won(=NT 1033元)	Max 8M/600K	動態	住家豪華型
ADSL-HomeNet	50,000Won(=NT 1291元)	Max 8M/600K	動態	家庭網路型
ADSL-MyIP	80,000Won(=NT 2067元)	Max 1.5M/384K	靜態	商用簡易型
ADSL-MultiIP	180,000Won(=NT 4651元)	Max 2M/512K	靜態	商用豪華型

- 裝置費(all type): 30,000Won(=NT\$ 775)
- Modem 租費(all type): 5,000Won/Mon(=NT\$ 129)

韓國寬頻上網成功之分析^{1/2}

- KT高層主管認為
 - 政府之政策--新希望
 - 多家競爭
 - 費率--相當便宜
 - Content發展速度快且內容豐富
- 訪談產品業者認為
 - 除上述原因外尚有：
 - 小學生(3年級以上)必須上網作功課(Homework)
 - 政府無息貸款購置新電腦
 - 遊戲軟體內容新且多

韓國寬頻上網成功之分析^{2/2}

- 訪問一般用戶認為
 - 除上述原因外尚有：
 - 裝機速度快, 從申請到完成裝機約2-3天
 - 家庭用戶上網Download娛樂節目或成人節目
 - 服務系統穩定
 - 特定技術人員可選擇為國防役
 - 與電腦廠商結合提供套裝式服務

KT寬頻服務快速供裝之分析

- 投入大量人力--從傳統電話領域移轉4000人到Internet及Wireless領域
- 完整的人力培訓計畫--約兩個月的訓練課程
- 部分外包--約30%外包
- 結合電腦公司--新購電腦一併安裝
- 簡易安裝--客戶可DIY,聘請大專電腦系工讀生電話指導,提供100個諮詢服務中心.
- 有利的環境--密集且固定式樣的公寓住宅

參訪感言

- 本次參訪獲韓國電信海外投資管理團Director Mr. Choi, Deug Man及Manager Mr. Han, Young-Soo接見, 並提供寶貴資料,可供本公司參考.
- 本次參訪適逢KT公司擬將其虧本之141(相當於本公司之104)部門賣出, 該部門員工正在總部抗爭, 本公司宜及早借鏡.
- 本公司體質及相關規範皆屬國營事業, 各項做法採溫和漸進方式, 雖然方向與KT相似, 但效果顯現就不如KT亮麗.