MARKET STUDY ON TELECOMMUNICATIONS IN KOREA

This market guide booklet has been prepared with the problems inherent to the initiating exporter in mind. However, it is not exhaustive; individual circumstances, interests and needs will dictate how companies should tailor their approach and strategy to the Korean market. While every attempt has been made to ensure accuracy in this study, no responsibility can be accepted for errors or omissions.

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EXECUTIVE SUMMARY

The following are key findings and comments from this study:

* The 1990 domestic market for telecommunications attained an estimated value of US$ 2.02 billion in Korea, growing just over 10% from the previous year. By the year 2001, this market is forecast to exceed US$ 4.9 billion in value.

* Korea has sourced the majority of its telecommunications equipment imports from the United States and Japan. Although developed countries have been the key buyers of Korea's exports, developing countries in regions such as South East Asia, South and Central America; and the countries in Eastern Europe, the Soviet Union, China and Mongolia are expected to be fertile ground for Korean exporters, particularly for telephone switching systems.

* Among major equipment and service areas which show promise for active participation by Canadian firms, those relating to the communication satellite business, mobile communications and network management are particularly interesting.

* The value of Korea's service market is roughly three times that of the equipment market. Basic voice services, which constituted over three-quarters of total service revenues in 1990, have been provided solely by Korea Telecom (KT), a state-owned enterprise. Legislation has been passed to pave the way for Korea Telcom's privatization.

* Important new services that Korea's Ministry of Communications and five existing basic telecommunication service providers plan to make available in the nineties, include the launching of a domestic communications satellite, introduction of CATV, and a host of local and international data communications services.

* Deregulation of Korea's service market is gaining some headway, although the U.S. and the E.C., among others, are pressing for earlier access. Korea has agreed to open the VAN service market to foreign firms through joint ventures in the first part of this year. However, the government is determined to hold off complete foreign access to the market until 1994.

BACKGROUND

Koreans marked the beginning of telecommunications in their country in 1885 when telegraph service first began between what are today the cities of Seoul and Incheon. Telephone service became available to the public in these same cities seventeen years later in 1902.

In 1905, Korea relinquished control over telecommunications to the Japanese under a forced agreement. It was not until the conclusion of World War II that they regained authority. During the Japanese Occupation, Kyungsung Broadcasting Station, the precursor of the Korea Broadcasting System, became the first radio station to air in 1927.

Three years after Japan's surrender, the Ministry of Communications (MOC) was created in conjunction with the inauguration of the Republic of Korea (ROK) government. Although the MOC granted permission for the first commercial radio station to be established in 1949, the Korean war delayed the first commercial broadcast until 1954.

Postwar restoration commenced in 1954, and in 1957 the first shortwave broadcast was sent to Hawaii and North America in English and Korean. The first five-year plan for telecommunications was unveiled in 1962. In the same year, KBS began television broadcasts. The following year, telex service between Seoul and Tokyo commenced.

Microwave installations went into operation between Seoul and Taejon, Taegu, Pusan, and Kwangju in 1967. That was also the year that the age of satellite communications dawned in Korea as it became the 56th member country of INTELSAT. Three years later, the first earth station was constructed at Keumsan and opened for traffic. As demand continually increased, an additional three stations were put into operation between 1977 and 1986.

The MOC now has an ambitious program to put Korea's own communication satellite, bearing the English name "KOREASAT" into orbit by 1995.

As late as 1981, telephone subscribers numbered only 3.3 million, and another half million were waiting in line. From that year on, though, Korea has been experiencing remarkable growth. The Fifth Five-year Economic and Social Plan (1982-1986) called for large-scale investment in equipment and support for the development of up-to-date technology with the goal of satisfactorily meeting the demand for basic telecommunication service.

As a result, switching capacity increased from 3.5 million lines in 1981 to almost 15.3 million at the end of 1990, raising the number of subscribers per 100 population from 8.4 to over 31. The automation rate increased from 87.1% in 1981 to 100% in 1989 while the ratio of electronic switching facilities rose from 8% to 87.6% in 1990.

During the same period the number of television broadcasting stations increased from less than 170 to 922, 873 of which are relay stations, and the number of radio stations increased more than sevenfold. Leased lines for data transmission grew from little more than 2,400 in 1981 to over 57,000 in 1989.

The Korean government plans to invest heavily in upgrading the telecommunications infrastructure and in research and development in order to realize their goal of becoming an advanced country by the turn of the century. Also, existing telecommunications firms in Korea will face strong challenges in the near future as Korea begins market liberalization which will open key sectors of the market to a wider number of both domestic and foreign enterprises.

ECONOMIC ENVIRONMENT

Although the Korean economy has slowed considerably in the past two years from its double digit growth in 1987 and 1988, the pace is still well above that of major industrial nations. Growth in GNP reached 6.7% in 1989 and 9% in 1990, despite the reoccurrence of a trade deficit which surpassed US$ 2 billion. That deficit is expected to widen to US$ 3 billion according to a Korea Development Institute forecast which anticipates more than 10% growth in imports in 1991 while exports increase at slightly over 9%.

Korean manufacturers and exporters have seen price competitiveness erode as wage hikes, ever rising real estate prices, falling productivity and close to double digit inflation take their toll. Still, prospects for 1991 have greatly improved in part due to the stabilization of oil prices and resumption of trade to countries in the Middle East.

Much will depend on major corporations' success in keeping labor disputes and wage hikes contained this spring. Economic policy makers, who have been largely ineffective in keeping a tight rein on consumer and real estate prices, will need to work out an effective strategy for monetary control.

The government is putting major effort into bolstering industries where Korea can maintain a competitive edge based on technological advances and is strongly promoting automation in small and medium industries, particularly manufacturing companies, to counter the increasing cost of production.

TELECOMMUNICATIONS IN KOREA

Prior to 1982, the government, through the Ministry of Communications, was the sole provider of telecommunications services in Korea. In 1981, a wholly government-owned corporation, the Korea Telecommunications Authority (KTA), was established in accordance with the Korea Telecommunications Authority Law, and this entity commenced operations in January of 1982.

Korea Telecom (KT), as KTA is now named, has seven subsidiaries, three of which, along with KT, comprise four of the five companies providing public telecommunications services at present. A fifth company, the Korea Travel Information Service Co., Ltd., was established by joint investment from DACOM and the Hanjin Group in 1987 and provides airline reservation network service and a travel information system.

MINISTRY OF COMMUNICATIONS (MOC)

The MOC's jurisdiction covers the postal service, radio signal management, telecommunications, and communications finance. In the realm of telecommunications, the MOC has four major roles: (1) establishing policy, (2) providing guidance and supervision to public telecommunications service providers, (3) supporting R&D institutions, and (4) nurturing domestic telecommunications equipment manufacturers and construction companies.

One of the key elements of the Basic Telecommunications Law delineates two methods for authorizing public telecommunications operators (PTOs). One is by legal mandate and the other by appointment. In the latter case, the Minister of Communications is empowered to designate PTOs provided that they meet one of three criteria: they are a government organization, at least a third of their paid-in capital is invested by the government or Korea Telecom, or they are limited to providing specific services or operating in specified regions or technical fields.

The MOC's objectives a decade ago focused on providing a core of basic services and were characterized by the phrases "one house, one phone" and "countrywide automated telephone switching service".

In the 1990s, the MOC is aiming towards building both infrastructure and technology so as to achieve world recognition as an advanced nation. Thus, telecommunications and the larger field of information technology to which it belongs have been designated as national priority strategic industries.

In the MOC's report to the President at the beginning of 1991, five primary objectives were presented which are outlined below:

1. Strengthening of the Telecom. Business Foundation

A) Expansion of the information distribution network

B) Provision of new services including CATV trial broadcasts, opening of an INMARSAT earth station, and automated telephone switching service for coastal vessels

C) Establish a competitive system for telecom. business

* Form a fair competitive environment in accordance with the regulatory framework for telecom. business
* Accelerate the growth of telecom. business through reorganization of the telecom. business structure
* Bring about improvements to the system
* Designate new service operators to include appointing a new operator for aeronautical communication services in the first half of 1991 and DACOM's entry into the international telephone service market in competition with KT from December, 1991
* Put an appropriate regulatory system in order for telecommunications business competition between 1991 and 1992

2. Promote Radio Utilization

A) Improve the radio regulatory system

* Improve the permit system for radio stations
* Introduce a prenotification system for available radio frequency bands

B) Improve the radio usage environment

* Establish countermeasures for preventing EMI
* Raise the domestic production rate by supporting small & medium industries

* Expand the available radio resources through control of frequency and power (a recent law revision will permit wireless communication on a wider frequency range from 139-174MHz effective in April or May of 1991)

3. Domestic Telecommunication Broadcasting Satellite Project

4. International Telecommunication Cooperation

A) UR and Korea-US talks on telecommunications

* Actively participate in the liberalization of service trade
* Promote the domestic telecommunications industry

B) Strengthen participation in international associations

C) Prepare for overseas marketing of telecom. services

* Expand telecom. exchanges with Socialist countries
* Provide telecom. support to developing countries
* Export high-tech telecom. equipment such as TDX switches

KOREA TELECOM (KT)

Korea Telecom was established primarily to install, manage the operation of, and maintain public telecommunications equipment; undertake business related to public telecommunications; engage in research and development for technology relating to telecommunications and train manpower; provide testing, inspection and quality control for telecommunications; and support research and development of new technology and commercialization concerning telecommunications.

Korea Telecom is the sole provider of basic telephone services in Korea. KT's subsidiaries handle carrier services for data communications, mobile communications, and port communications.

Changes to two key laws will have important affects on Korea Telecom in the near future. As a result of these changes made at the end of 1989, KT will become a public telecommunications operator (PTO) and will be privatized by doubling KT's paid-in capital.

At the same time, the government's share will be reduced from 100% ownership to holdings of over 51% of stock issued. Foreigners will be prohibited from possessing any of the stock offered.

Under this system, KT may accumulate a portion of the profits due to the government which the Minister of Communications then controls for expenditure on data communications research and development.

Additionally, the MOC has the power to order changes in telecommunication service rates in order to maintain them at an optimum level.

In keeping with the priorities set by the MOC, Korea Telecom has identified quite a large number of goals for 1991 and beyond which fall into two broad categories - (1) innovations in international business telecommunications for confronting competition and (2) building up the competitive strength of the national telecommunications infrastructure. Major goals within these categories are outlined below:

1. Innovations in the Int'l. Telecom. Business

A) Modernization of the Int'l. Telecom. Network

Modernizations are to include increasing the number of digital switching systems by related stations by opening 14,000 new lines by September of 1991 and another 2,600 lines by the end of the year. Secondly, KT aims to install an exclusive switching network for international facsimile service by the end of the same year. They also expect to have an international packet-switched network available by September of 1991.

B) Development and Provision of New Int'l. Services

* International speed dialing service by March, 1991
* Phone credit card service in cooperation with AT&T by March, 1991
* International video conferencing service by Dec., 1991
* International E-mail service installed by the end of 1991 and service available from September of the next year
* International data base service installed between 1991 and 1992 and available from the end of that year

C) Ensuring Stable International Telecommunications

KT plans to have an international network management system in operation by the end of 1991 and also to install satellite antennas for disaster recovery when submarine optical cables are not operating. Their schedule calls for completion of the work at existing earth stations at Keumsan by September, 1991, and Boheun by December of 1992.

D) Participation in Construction of Worldwide Submarine Cable Projects

1st Stage: installation of four sections including NPC completed between 1991 & 1992
2nd Stage: installation of five sections including APC completed between 1993 & 1995

KT will also participate in construction of the Trans-Soviet Line (TSL) fiber optic cable from 1991 to 1995. South Korea intends to invest US$ 50 million and to share the cost of construction, maintenance and repair with Japan for the section which will connect Ulung Island in Korea with Hamada, Japan and Nakhodka in the Soviet Union. KT anticipates that joint construction will commence from 1993.

At this point in time, it is determined that an undersea branching unit will be employed for the 1,147 km. fourth section which can accommodate 7,680 circuits simultaneously through a 565 Mbps grade optical fiber line. There is a possibility that the project may have to be rethought depending on the outcome of COCOM deliberations this Spring on exporting telecommunications equipment to the USSR.

E) Improvement of Telcom. Service to Ocean Going Vessels

An INMARSAT (Pacific) ground station was put into operation on March 6th of 1991 to reduce subscriber rates by direct rebroadcast, formerly received indirectly from Japan and Singapore. Services to be provided include automated telephone switching, TELEX , and distress communications. A total of over US$ 9 million was invested in the project begun in 1989.

KT plans to construct an INMARSAT (Indian) ground station from this year with completion coming by March of 1993.

2. Ensuring the Competitive Strength of the National Telecommunications Infrastructure

A) Improving the Quality of the Telephone Switching N/W

In 1991, KT plans to open an additional 2.68 million digital lines, more than 60% of which will be domestically developed and produced, primarily the TDX-1B type. This will bring the total number of existing lines to almost 17.5 million by the end of the year. The new generation TDX-10 versions will be introduced for the first time in the country by October of 1991 as 62,000 local and 50,000 long distance lines are installed. By the end of this year, KT hopes to have 90% of station-to-station lines digitalized and 100% by 1996.

B) Long Distance Telecommunications N/W Extension

* 87,000 new lines to various cities
* Merger of 23 local stations into four radii covering the peninsula
* 1,007 km. of fiber optic cable added to the equipment base
* Construction of a 158 km. submarine fiber optic cable between Ulung island and the coastal station at Samchuk completed by 1993 and links to the TSL

C) Construction of a Main Data Communications Network

KT is diving head first into this market with a very aggressive plan to install the following networks and services within a two year time frame:

* Exclusive facsimile N/W installed on the existing telephone network with service available to five large cities including Seoul from June of 1991 and countrywide after 1992
* PSDN equipment installation in Seoul and three other cities in 1991; commercial use from March, 1992
* Private HDDN construction
* Construction of a CSDN to provide services including high-speed facsimile, video conferencing, high-speed data transmission and other large volume transmissions at high speed with service in Seoul and four other large cities from October, 1991 and expansion in stages countrywide from 1992

D) Public Corporate Communications Network (CO-LAN)

A trial network for R&D purposes will be operated in 1991 at two telephone offices each in Seoul and Pusan. KT is planning to offer commercial service sometime in 1992.

E) ISDN Construction

The MOC, ETRI and KT all see the realization of a comprehensive nationwide ISDN as Korea's stepping stone into the family of advanced nations and the new era of telecommunications. Enormous resources are being spent to speed its development, installation and operation.

KT has announced that a trial network will operate from early 1991 utilizing Korea's TDX-1B switching systems between Seoul and Taejon. 200 subscribers using ISDN-telephones, telewriting and ISDN-PCs will participate in the trial operation. Long range plans call for development of an intelligent network system between 1988 and 1993 which will be commercialized sometime in 1994.

A countrywide network management system will be introduced between 1991 and 1992 and will cover the entire country after 1996.

KT has invested some US$ 25 million dollars on the project since 1985 and will invest an additional $75 million over the next four years.

F) Domestic Satellite Program (KOREASAT)

With the establishment by presidential decree of the Communication Broadcasting Satellite Promotion Committee in August of 1989, chaired by the Minister of Communications, another ambitious telecommunications projects began.

A new Satellite Business Center within KT was appointed to begin drawing up a detailed statement for satellite equipment, satellite purchase, launch contracting and other affairs relating to the system design.

KT has already held a pre-bidders conference this year to which 20 companies from nine different countries were invited. Attenders included Spar Aerospace from Canada; Hughes Aircraft, Space Systems/Loral, GE-ASTRA, General Dynamics, McDonnell Douglas and others from the U.S., Arianespace, British Aerospace, Marconi and others from Europe; and Mitsubishi from Japan. China and the Soviet Union, although invited, did not attend the conference.

KT's schedule entails receiving proposals by June of 1991 for spacecraft manufacturing with a contract award to follow by December of this year. The award is expected to hinge on such factors as what level of technology transfer is offered and price/performance comparisons. Of the total US$ 420 million earmarked for the project originally, the bulk is allotted to procuring the spacecraft itself.

Launching service is expected to be bought from overseas owing to the lack of funds and the slim possibility of reaching agreement on transfer of technology with foreign firms.

The satellite is to provide both direct broadcasting and fixed station telecommunications covering the entire country and enable services such as direct broadcast of standard NTSC TV, inter-city trunk, wide band digital data services, narrow band digital service and communication service for rural areas.

Two Ku-band satellites, primary and secondary, each will handle 5,300 voice circuits, three television broadcasting channels and four video channels.

KT has agreed to handle the financing of the venture in light of the earnings they anticipate from offering satellite communications services.

Domestic firms are tying up with foreign partners in the hope that they can acquire enough technical skill to produce Korea's second satellite within five years of the launching of this first one in 1995. Major partners include Goldstar Information & Communications and GE-Astra, Samsung Co. and Hughes, and Daewoo Corporation and British Aerospace.

In the interim before services are available, the MOC and KT plan to lease an INTELSAT V-A from 1992 to cover domestic demand and accumulate technology. This year, ground stations will be constructed in Seoul and other large cities. The leased satellite will handle one TV rebroadcast channel, 310 private data lines, 10 emergency/disaster lines and 450 VSAT units.

G) CATV Trial Service

KT will launch trial CATV broadcasts to 10,000 homes in two major apartment complexes in Seoul in the first half of 1991.

DACOM

Since DACOM's establishment in accordance with the Basic Telecommunications Law in 1982, they enjoyed a monopoly in the data communications service market up until 1990 when the MOC changed key regulations to allow for KT to compete in this area.

DACOM's primary business areas include the organization and operation of data communications networks, the collection and management of computer-related information, leasing of communication terminals and operation of and interconnection with domestic and international data banks. Additionally, DACOM was designated to be responsible for the entire development of the National Administration Information System (NAIS), one of a number of similar systems including financial information, education & research information, and trade information, which when constructed will comprise a National Information System (NIS).

The objectives of the NIS are to connect and conform the computer systems which are being organized and operated at the administrative agency levels, and to develop them into a communication network which will make up the backbone national network.

Originally DACOM was established through joint investment by KT and private corporations. As of 1990, KT still held roughly 34% of DACOM's stock and three of Korea's largest conglomerates, Samsung, Lucky Goldstar and Hyundai, held about 12% each. KBS, another state-run institution, held almost 6%.

Authorized as a common carrier for data communications in 1982, DACOM provides a wide range of services including packet-switching network service for data transmission, leased data circuit service on local, long-distance and international circuit lines, domestic and international digital leased line service and value-added services such as domestic and overseas E-mail, bulletin board, EDI and domestic and international data base service.

Recent changes in existing regulations will permit DACOM to offer international telephone service from December of 1991. DACOM plans to conclude an agreement for interconnection with KT in the first part of this year, conclude service agreements with overseas operators by June, install switching equipment by August and commence service in December. By April of next year DACOM expects to have completed construction of a satellite earth station and will begin commercial use.

DACOM also intends to install a core transmission path between Seoul and Pusan, and Taejon and Kwangju cities in 1991 for long-distance communications using KT's fiber optic network. Other equipment installation projects are planned for adding fiber optic cable lines to the Korea-Japan-Hong Kong route and between Japan and the U.S.

KOREA MOBILE TELECOM. CO. (KMTC)

The Mobile Telecommunication Service Co. of Korea was established as a KTA subsidiary in accordance with the Basic Telecommunications Law and the KTA Law in 1984. It was appointed as an independent PTO and assumed its present name in 1988, subsequently opening for business in 1989. This company is primarily responsible for providing service for carphones, portable phones and wireless pagers and for mobile telecommunication-related research and technology development.

Korea Telecom still holds 68% of KMTC, another 22% is held by private investors and the remaining 10% by eight corporations. The company employs roughly 500 people in its headquarters and eight regional offices. KMTC's revenues, tripling in 1989, climbed another 170% in 1990 to a level of US$ 87 million.

The MOC has decided to permit a new carrier for mobile telecommunications in 1991 to help alleviate a growing shortage of lines for cellular phones. Joint ventures with foreign partners holding a minority equity share will be considered provided that there is some provision for transferring needed technology. Several foreign firms including Northern Telecom are actively pursuing the award with their Korean counterparts. The selection process is on hold until a necessary amendment passes through the National Assembly.

KMTC's facilities investment plan unveiled for 1991 aims at (1) providing complete mobile telephone service coverage of all cities countrywide while improving and centralizing quality control and (2) extending wireless paging service coverage to villages nationwide and forming an exclusive wireless paging switching network.

Under the plan 217,000 additional lines for mobile telephone and 815,000 additional wireless paging lines are to be added by the end of 1991, extending mobile service to three new cities and paging service to 44 new villages. This is expected to bring about an increase of 90,000 mobile service subscribers and 400,000 paging service subscribers. The number of carphones in use will be increased from 135,000 units to 352,000 units in 1991.

ELECTRONICS & TELECOM. RESEARCH INSTITUTE (ETRI)

ETRI is one of four research concerns organized under the MOC. It was formed in 1985 by the union of two separate research institutes and, after its establishment, was responsible for the development of the TDX (Time Division Exchange) electronic switching system now seeing increasingly greater use in Korea's telephone networks. With 1,600 employees in 1990, the institute's 1990 budget exceeded US$ 100 million dollars. ETRI is financially supported by the government directly and through KT, its subsidiaries and private enterprise. ETRI in turn transfers developed technology to state and private enterprises for their use in manufacturing, operating and servicing high-technology equipment in the major fields of telecommunications, computers and semiconductors.

Among ETRI's recent important developments are data exchange equipment and terminals, the new generation high capacity digital switching system TDX-10 test model, and a 565 Mbps long-wave fiber optic transmission system along with the increase of its practicality.

ETRI is also deeply involved with the MOC, KT, DACOM and private enterprise in the research, development and practical application of ISDN-related technology.

Other research bodies organized under the MOC are the Radio Research Laboratories (RRL), the Korea Information Society Development Institute (KISDI) and the National Computerization Agency (NCA).

KOREA'S TELECOMMUNICATIONS INFRASTRUCTURE

Switching systems: The electronic switching capacity will be increased by 2.68 million in 1991 of which over 62% will be locally produced, raising the total capacity to 17.47 million by the end of 1991. Installations planned by type:

Import	S-1240	347,000	Local	TDX-1B	1,531,000
	5 ESS	331,000		TDX-10	72,000
	Other	234,000		TDX-1A	63,000
				AXE-10	102,000

Public payphones: Payphones numbered 237,074 in 1990. Over 64% of these are DDD type and 14% card type. The remaining 21% are for local use only. KT plans to install an additional 39,960 DDD units and 14,840 card units in 1991. Card-ordering service will be available to customers in July.

Microwave: At the end of 1990, a total of 18,720 analog and 33,744 digital lines for long distance telephone and telegraph were installed in Korea. In 1985, KT stopped installation of the analog type. A total of 6,660 analog lines have been replaced since 1988. Digital versions were first installed in 1982 and digital sections now number 72.

Microwave is also incorporated in four nationwide television channel networks. A total of 57 relay stations, 70 terminal stations and 60 passive reflectors are also employed.

Mobile Phone: KMTC is using Motorola's DYNA T.A.C., installed in 1984, and AT&T's Autoplex1000, installed in 1989, for its network. Although total capacity is now at 135,000, only 80,000 are in operation due to a lack of expertise in utilizing the software. The density rate for mobile phones per 1,000 population fell just short of 2 at the end of 1990.

The ratio of portable phone users to car phone users stood at 1:2 at the end of 1990, as portable phone subscribers increased from 5,665 to 26,206. About half of all portable phone subscribers are in or around Seoul versus 75% of car phone users. Subscribers are expected to increase to 175,000 in 1991 and reach 1.4 million in 1995. Subscribers have doubled yearly since 1987.

Wireless Pager: By the end of 1990, 535,000 lines were installed for wireless pagers and there were 417,650 subscribers. Here as well, the number of subscribers has doubled on the average every year since 1985. All but 5% of these subscribers are using display-type units. About half of the users are in Seoul or the surrounding area.

International circuits: Of 3,593 voice circuits, 45% are carried by Pacific satellite, 27% submarine coaxial cable, 18% Indian satellite and 9.4% submarine fiber optic cable.

There were 966 telegraph circuits at the end of 1990, of which 88% are for TELEX. 52% of these are carried by Pacific satellite, 42% by Indian satellite and the remainder between Korea and Japan on submarine coaxial cable.

Long Distance Lines: In addition to the 52,464 microwave lines, 194,880 fiber optic broadcast lines, 118,632 PCM, 69,048 coaxial and 84 UHF were installed as of the end of 1990. Of the total 435,108, 80% are in use and the other 20% are reserved. The number of fiber optic lines has tripled since 1988.

Radio Stations: A total of 224,867 radio stations were operating in 1990. Mobile stations represent the largest share with 59%, followed by 6.4% vessel. Stations for broadcasting numbered 1,179 and fixed stations 3,407. The remaining 33% were of other types.

Mobile radios were assigned 97% of the 19.5 million frequencies in use, vessels used 374,000, fixed stations 16,000 and 1,272 were set aside for broadcasting.

Telegram: Although overall statistics show that use of this service dropped by 21% in 1990 to 28.6 million messages, the actual decrease came primarily as a result of a 52% drop in resends. Even so, outgoing messages decreased in number by 9.5% in 1989 and 4% in 1990.

Television: The Korean Broadcasting System (KBS), which uses three television broadcasting channels, and the Munhwa Broadcasting Corporation, which uses only one, had 752 and 171 broadcasting stations operating in 1989 respectively.

In the same year, a total of 1,298 TV transmissions were beamed via satellite, down sharply from 3,392 in 1988. The high number in 1988 can be attributed to Korea's hosting of the 1988 Summer Olympic Games.

The MOC intends to double the number of television channels available in Korea to 10 by the end of 1999. In order to accomplish this, the negotiations will take place with the U.S. military to take over the Armed Forces Korean Network (AFKN) sometime in 1993. Further, three additional channels will be added with the launching of Korea's domestic broadcasting satellite in 1995, and another in the late nineties.

INTELSAT has allotted six channels to Korea; the sixth will see use later in 1991 as the newly designated broadcasting company begins operations.

CATV: As mentioned in the outline of KT's plans, a trial service project will be launched this year involving 10,000 households in apartment complexes and will also include hotels and businesses. Samsung Company, Goldstar Electric, Goldstar Telecom and two other local companies are participating.

From 1994, full service utilizing a twin-directional traffic system. The frequency range, initially 5-30 MHz, will be raised in stages into the giga range.

Satellite: KT presently operates six satellite INTELSAT antennas in Korea. Two of these are for the Pacific region and two for the Indian Ocean region. The other two are Standard C and F for mobile communications systems.

In 1989, of 5,386 lines for international transmissions, 3,680 were allotted to the four earth stations at Keumsan and Boheun.

Data Communications: DACOM originally began operating Korea's first network in 1984 with a DPS packet-switching system. At the end of 1990, 7 switches were installed. Also last year, DACOM installed additional TP4 packet-switching equipment from Sprint which included 25 switches placed around the country. Close to 700 multiplexers are incorporated as well as an earth station for IBS, one VSAT and two digital microwave units.

Korea Telecom has also purchased small packet-switching systems from Hughes and Ericsson for use in model experiments prior to launching VAN services and for research. The Hughes system is comprised of 2 NPX 9000s, one in Seoul and one in Taejon, and 25 PADs.

A small number of private companies have also purchased packet-switching systems from Sprint and AT&T to operate Group VANs or in preparation for launching commercial services.

MARKET ASSESSMENT

The Electronic Industries Association of Korea (EIAK) estimates that the market for telecommunications equipment in Korea reached a total value of more than US$ 2 billion in 1990. This amounts to growth of 10.4% over 1989, continuing a sharp slowing trend from 65% in 1988 to 38.6% in 1989 (see Table 1).

For the six year period from 1991 to 1996, ETRI predicts that the compound annual growth rate (CAGR) will register slightly lower than 1990's level at 10.1%, reaching a value of US$3.6 billion. According to ETRI, the market will grow at a CAGR of only 6.4% during the following five years, falling about one hundred million dollars short of achieving US$5 billion in revenues by the end of 2001. For the eleven year forecast period, then, the CAGR is calculated at 8.4%.

Although production had increased steadily during the period from 1987 to 1989, it increased only 5% in value in 1990. In the same year, imports surged to increase 55% from 1989. Exports, although recording a more modest increase of 16.7% over the 1989 value, still outperformed many other export sectors.

TABLE 1
The Korean Market for Telecommunications Equipment
(US$ Billion)

	1987	1988	1989	1990	1996[1]	2001[1]
Production	1.40	1.83	2.33	2.45	-	-
+ Imports	.25	.38	.40	.62	-	-
- Exports	.85	.90	.90	1.05	-	-
= TOTAL	.80	1.32	1.83	2.02	3.60	4.91

(Source: EIAK, [1]ETRI)

IMPORTS

As a percentage of total apparent consumption, imports were at their highest level in the first year of the four-year period from 1987 to 1990. After falling for two straight years from 39% to 22%, in 1990 the import share rose back up to 30%.

This rise came as a result of a 96% growth in imports of wireless communication equipment. Although wireless equipment segments rose across the board, wireless communications parts imports, up almost 80% from 1989, accounted for 41% of the total value.

On the other hand, wire communications equipment imports had lackluster growth of only 4.5% in 1990 since the state of technology and manufacturing domestically is much higher for many segments that make up this category. Switching system imports showed a 71% increase in value over 1989, although they make up only a 5.5% share of the total for this category. The major item, wireless equipment parts, experienced negative growth for the first year since 1987. Declining 11.7%, these parts still constitute 57% of the total value of wire communications equipment imports.

One strong gainer in this category was broadcasting communications equipment, which has grown over 57% yearly since 1988 and in 1990 represented a 20.5% share of this category's total value.

By region, the United States is the largest telecommunications equipment importing country to Korea, followed by Japan. Collectively they account for two-thirds of the total import value. While the U.S. exports more than half of its total value in wire communications, however, Japan's imports are more those of wireless equipment.

Canada's trade with Korea in 1990 accounted for less than 2% of Korea's telecommunications imports but increased a robust 30% from 1989. In the same year, Canada's imports from Korea made up less than 4% of Korea's total telecommunications exports and continued to taper off slowly from the previous year (see Table 2).

Key exports to Korea from Canada in 1990 included CDN$ 1.9 million in telegraphic apparatus and CDN$ .7 million worth of telephone sets. Notably, Korea exported CDN$ 15 million in telephone sets and CDN$ 10.7 in mobile and cordless phones to Canada in the same year.

TABLE 2
Canadian Trade with Korea of
Telecommunications Equipment
(CDN$ Million)

	1987	1988	1989	1990[1]
CANADIAN EXPORTS				
Wire communications	.7	2.7	3.1	6.8
Wireless	1.4	2.5	5.5	4.4
TOTAL	2.1	5.2	8.6	11.2
CANADIAN IMPORTS				
Wire communications	16.8	17.2	17.5	24.7
Wireless	31.0	31.1	28.4	19.4
TOTAL	47.8	48.3	45.9	44.1

(Source: EIAK, [1]ETRI)
(CDN$ 1 = US$ 1.156)

Major exporters from the United States, Japan and Europe are likely to maintain their dominance of Korea's import market. It should be noted, however, that considerable revenues going to Canadian firms in licensing fees, royalties, consulting fees and other such forms are not reflected in these statistics. Thus they tend to understate the value of Canada's trade with Korea.

Some major international telecommunications companies which are active in Korea directly or through local partners are:

AT&T (USA)
BTM (Belgium)
Casio (Japan)
Canadian Marconi
Ericcson (Sweden)
Fujitsu (Japan)
Hughes (USA)
IBM (USA)
ITT
Motorola (USA)
NCR (USA)
NEC (Japan)
Northern Telecom (Canada)
Siemens (FGR)
Tymnet (USA)
U.S. Sprint

Equipment and services that are related to areas such as those below where there is very little local expertise or technical knowledge will be in high demand in Korea over the next several years:

* satellite communications equipment, antenna, cables, and consulting services , VSAT equipment
* packet-switching and other data communications equipment
* LAN and network connectivity devices
* network management systems and consulting services
* mobile communications equipment (including aeronautical)
* CATV equipment, software and consulting services

* fiber optic equipment and cables
* TV and broadcasting equipment
* international value-added services (limited until 1994)
* software

DOMESTIC PRODUCTION

The fact that Korea's domestic production exceeded apparent consumption in every year shown in Table 1 illustrates the export-oriented nature of the country. However, the picture is steadily changing as Korea's domestic market begins to grow and calls from other countries for market opening to foreign participation grow along with it. In 1990, domestic production remains larger than apparent consumption by a 20% margin.

Most of Korea's largest conglomerates have one or more subsidiaries involved in the manufacture, domestic supply and export of a wide range of telecommunications and related equipment.

Of US$ 238 million in wire communications equipment imported to Korea in 1990, 57% were parts. Conversely, of US$ 372 million in wireless communications, 41% were parts. One reason for this difference is the relatively newer technology and standards associated with manufacturing of many types of wireless communications equipment. These figures also suggest that the localization ratios for components of many manufactured products in the wireless equipment category have not yet been maximized.

Telephone

Korea's own switching system developed by ETRI and now manufactured by four local companies, is supporting a large portion of KT's requirements. As seen earlier, however, there are still a significant portion of switching systems sales going to foreign firms including AT&T, ITT and Northern Telecom.

Once TDX-10 lines have been fine-tuned, KT will build its ISDN with as little foreign-derived equipment as is practical.

TDX versions are being strongly pushed for exports to many developing countries which are overlooking a technology lag in favor of the bargain prices. Samsung reportedly signed a contract to provide Nicaragua with 120,000 lines at a price tag of US$20 million earlier this year. Samsung has also made an agreement to provide 20,000 TDX-1B circuits, valued at US$6 million, to the Philippines and is pursuing a US$15

million sale to the Soviet Union. In a related area, Samsung has also announced the development of a multi-functional digital transmission system, SDNS 16, which can transmit video as well as voice and text.

Goldstar is expected to earn US$3 million from TDX-1B exports to Vietnam and is working at a production agreement with Rumania for PBX and TDX equipment. Goldstar has also reportedly won a US$5 million contract to expand and upgrade the telephone system in use in one province on Mindanao Island in the Philippines.

Although TDX systems are produced and supplied by Daewoo Telecom and Oriental Telecom as well, Samsung Electronics and Goldstar Information & Telecommunications are likely to be the two main exporters. The MOC and KT recently agreed to allow these companies to export TDX switching systems under their own brand names.

Domestic demand for standard telephone units is predominantly met by local manufacturers.

Mobile Phones Three major Korean manufacturers have developed and are supplying the domestic market with carphones and/or portable phones. Samsung Electronics, after completing a technical tie-up with Toshiba, announced their own model carphone in 1988 and portable model in 1989. Goldstar Telecom, having benefited from a cooperative relationship with NEC, now sells their own carphone and portable phone as well. Hyundai exports their own model portable phone to Europe.

Other domestic firms are handling products from Philips and Japanese makers. Motorola, the established market leader, will be facing stiff competition from these firms.

Data Communications

Korea locally produces competitive low-end equipment such as time division and statistical multiplexers, PADs, and low-end packet-switches, but foreign vendors including Sprint, AT&T, Hughes, BT Tymnet, Netrix and Ericsson are very active in the higher-end of these products' spectrums.

DOMESTIC SERVICE

Of the three service types shown in Table 3 below, basic services have accounted for approximately 80% of total service revenues in every year since 1987. According to ETRI's classification, basic services consist of telephone, mobile, and public telephone services. ETRI's forecast for 1996 and 2001 shows an expectation that enhanced services, although still small in comparison to basic ones, will grow at a strong pace to surpass "other" services in value by the end of the century.

Enhanced services include data communications, telex, facsimile, data base and data processing services. ETRI places services such as private network, data communications installation, maintenance and consulting in the "other" services category.

TABLE 3
The Korean Market for Telecommunications Services
(US$ Billion)

	1987	1988	1989	1990	1996	2001
Basic	2.55	3.45	4.23	4.82	9.00	13.32
Enhanced	.03	.05	.07	.10	.71	3.66
Other	.52	.75	1.03	1.19	2.33	3.40
TOTAL	**3.10**	**4.25**	**5.34**	**6.10**	**12.05**	**20.38**

(Source: ETRI)

KT recorded operating revenues of US$ 4.76 billion in 1990, roughly equaling the estimated size of the basic services market, and anticipates growth in 1991 will top 20%. DACOM's revenues are on a smaller scale at US$ 250 million and KMTC's fall short of US$ 90 million.

These figures graphically illustrate the absence of commercial enterprises from the market. Market restrictions have insured KT and DACOM continued growth at the expense of the small and medium businesses which need new areas of business to expand into that are not heavily dominated by Korea's major corporations.

Foreign enterprises also balk at the one-sided picture presented by these statistics. In order to appease both these groups and at the same time instill a competitive

atmosphere that will spark both innovation in services and reduced costs to subscribers, the MOC has opened up the VAN/VAS and line subleasing markets to domestic firms who were formerly only permitted to offer limited services within their own organizations.

Trade negotiations with the U.S. and other major trading partners have also progressed somewhat better than in recent years. At telecommunications talks with the U.S. in Hawaii in February, Korea promised to allow foreign telecommunications companies to offer international VAN services, including data base and data processing services, from July of 1991 under the provision that they launch joint ventures with local companies and hold no more than 50% control.

The Korean government still intends to delay full service market opening until 1994 as a means of allowing domestic companies a period for building up their competitive strength. Another round of talks is expected in April of this year.

END USERS

Korea Telecom, since its inception, has been and will continue to be overwhelmingly the largest user of telecommunications equipment in Korea. Their expenditures for principal equipment averaged roughly US$ 1.5 billion in 1989 and 1990 and their 1991 budget plan involves some US$ 1.2 billion in additional purchases. Although this is a marked decrease from the prior two years, the purchase of a satellite body and other major items in 1992 will likely push expenditures up once again.

Purchases of both imported and locally produced switching systems equipment accounted for about half of these amounts in 1989 and 1990. Although they are still planned to be the major item in 1991's purchase plan as well, they will decline 36% from 1990 and account for an estimated 36% of the value of major purchases.

The share of equipment from foreign firms, including Ericsson, AT&T and ITT, comprised over 60% of the total value of all switching equipment purchases in 1989 and 1990. Of 2,680,000 lines to be installed in 1991, 38% will be imported.

Cable purchases range from 27% to 32% of the value of major equipment purchases in these three years. However, the portion allotted to F/S cable purchases has increased sharply

from less than a third in 1989 to 80%, or US$ 287 million, in 1991. Fiber optic cable purchases increased 20% in value in 1990 and will in 1991 as well to reach US$ 43 million.

Although only a small portion of total purchase value, expenditure for antenna equipment will multiply by well over four times in 1991 to almost US$ 5 million. Optic fiber communications equipment purchases are expected to triple and exceed US$90 million this year.

As Table 1 shows, the value of the domestic telecommunications market in Korea in 1989 and 1990 was US$ 1.83 billion and US$2.02 billion respectively in 1989 and 1990.

Although a direct comparison between Korea Telecom's telecommunications equipment purchases and these figures for overall market size overlooks possible differences in time periods and definitions for the recording of sales transactions, it is still enlightening to note that Korea Telecom's major purchases in 1989 and 1990 equal more than 70% of the domestic market's value in both years.

Korea Telecom's entry into the field of data communications will mean an increasingly larger market for vendors of related equipment, particularly packet-switching and network management systems. This is the area where DACOM has been the major buyer in the past two years and they will continue to expand their service areas and network coverage. Deregulation of the VAN/VAS market to domestic companies and joint venture firms with foreign partners will lead a number of Korea's large corporations and conglomerates to invest in data communications equipment as well.

Additionally, DACOM's entry into the international and long-distance telephone service market from the end of this year will create new sales opportunities. The pending appointment of a new mobile communications carrier to meet burgeoning demand and the authorization recently for the establishment of another commercial television broadcasting company will also increase the demand for related equipment and consulting services in these sectors.

The Korean government's massive program for the development of a National Information System composed of five nationwide networks will call for large-scale investment in communications and data processing facilities. One of these networks, the National Administrative Information System, or NAIS, is already under development and limited operation through DACOM.

In the commercial sector, financial institutions including banks and securities firms and insurance companies continue to purchase equipment for private networks. LAN, packet-switching and integrated systems vendors are working feverishly to develop this market.

Canadian Embassy
Seoul
April 1991

APPENDIX A

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- Mr. Jung, Hong Shik,
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APPENDIX B

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APPENDIX C

LOCAL AGENTS

NOTE: Where area codes are not listed, the area code is (02) for the city of Seoul

APPENDIX B

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APPENDIX C

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