

A Study on the Promotion of Information & Telecommunication Industry in Korea

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I. Introduction

Today, the world market environment for information & telecommunication industry is rapidly changing. The market in Korea is also facing changes including the opening of the market to foreign competitors, establishment of competition system and changing demand structures and the introduction of multi-media.

The new wave of information which results from the combination of computer and telecommunication has brought enormous changes throughout the society.

As the changes of social system in the history have ranged from hunting to agricultural, and to finally industrial society, the society in the upcoming 21st century will be defined as the society of information based on communication technology.

The changes in question in the environment of the communication industry offer both the difficulties and new opportunities for those working in the industry who have performed the activities in a traditionally closed and dependent environment under the protection, direct and indirect, of the government.

Under this circumstances, this study is to bring our attention to the importance of the industry and presents the guidance for the development of the industry. It is also to explore the ways of development that the industry should pursue and to present systematic methods to improve and cultivate the industry in Korea.

II. Present Telecommunication Industry in Korea

1. Environment of Telecommunication Industry

Since information communication is mostly realized over a communication network, the telecommunication is defined in the Article 2 of the Electric Communication Business Act as the "electric communication where words, symbols, images, sounds and other data are sent, received or processed by connecting data-storing and/or -processing devices, additional input/output devices and other equipment to electric communication lines". Recently, however, with the technical development and environmental changes, the discrimination between processing and transmitting has become vague, and the advent of new concepts such as value added network (VAN) and of various new media, single definition is not sufficient enough to fully contain the meaning of the telecommunication and the scope of the word 'telecommunication' encompasses wide range of meanings depending on the context of the its usage.

In the high information society to come in the 21st century, value addition, once generated by the materials, labor and energy, will occur mostly as a result of the information activities, accelerated information communications will change the underlying social structure including conventional systems and practices, and human freedom and creativeness will be greatly enhanced with the new-found liberty from time and spatial restraints. The substructures composing the information society estimate that the countries taking the lead in the telecommunication will dominate the world economy in the 21st century.

2. Present Status of Communication Industry and Its Trend of Internationalization

(1) Present Status of Communication Industry

The information & communication industry in Korea has shown a remarkable growth with the boosting effect of the basic communication industry. In 1987, the demand for phone lines has been fully met, providing at least 1 phone line to every family, and the phone line automation system has been established. In December 1993, 20 million phone lines were established, which made Korea the 8th largest communication network holder all over the world. In the course of realizing 20 million lines, epoch-making technical development and independency were accomplished including the development of TDX exchangers. Recently, large scale investment project is under way to build the information super-highway, which is expected to bring tremendous progress.

In addition to the quantitative growth, the structure of the information and communication industry has been diversified in a qualitative viewpoint, which diversification may be summed up in the following 4 points.

One, the contents and forms of information transmissions have made great changes along with the development of computer technology and digitalization of networks. Also, the trend in the market is that software, data processing, and communication industries are being incorporated.

Two, the implantation of intelligence into the networks thanks to the development of communication nodes lets information communication discard its conventional role as a social infrastructure and, with its show of new technologies, take on a new strategic importance for the data processing industry and the public lifestyles.

Three, in the course of technical development, the terminals have become intelligent, adopt multi media functions and get smaller and lighter. The networks have become faster, larger and more personal.

Four, free competition and opening are going on in the market. Companies are getting bigger and offering high-tech and multi-functional products.

Despite the quantitative and qualitative development in the communication sector, basic technology for the industry and other high-tech services are considerably behind those in the advanced countries. Moreover, at this time near the turn of the century, the environment for the industry is geared for open and diverse market, and the changes in the market are hard to predict. Domestic information & communication industry is expected to undergo a good many trials to upgrade the international competitiveness through competition, privatization, liberalization and provision of new services.

(2) Trend of Globalization in the Industry

One of the reasons which hamper domestic information & communication businesses from entering foreign markets is the lack of competition in the domestic market due to governmental restrictions and protection. This has caused inefficient management and complacency in the domestic market, resulting in weak international competitiveness despite their huge turnovers. Foreign operations by present information & communication businesses may be classified into 3 types.

First, businesses participate in the local investment for the installation of communication facilities and equipment and sales of communication equipment in the Southeast Asia, Eastern Europe and South American countries which are the underdeveloped in the communication services. Their participation is realized through state-level treaties, loans or interest participation.

The second type is the establishment of foreign branches or small participation in

the projects undertaken by the companies from developed countries in order to obtain advanced technologies and management strategies applicable to communication network businesses.

The third type is the participation in a multi-national projects or relationship as a Korean party. It is a method of partial participation in a worldwide projects.

Foreign operations performed by the Korea Telecommunication (KT) are mainly focused on their technically superior areas such as the consulting and network building and on the export of telephone line exchangers including TDX.

III. Governmental Measures Required for Promotion of Information & Communication Industry

1. Position of Domestic Information & Communication Industry

(1) Production Capacity and Competitiveness of Information & Communication Devices

1) Production of Information and Communication

As of the end of 1992, the production of information and communication industry all over the world was USD 506.3 billion. For the countries having large shares, USA took up 30.54% of the total production and Japan shared 27.18% thereof. For emerging industrial countries, Korea shared 3.73%, Singapore 2.80%, Taiwan 2.65%, Hong Kong 1.0%, which means the production by Korea was the highest.

Until 1987, the production capacity of Korea was similar to that of Taiwan and Singapore. But, it has expanded quickly since 1988.

2) Competitiveness of Information & Communication Equipment

As of the end of 1991, the largest exporter of communication equipment was Japan which exported USD 52.3 billion in the year. Japan has outrun USA since 1986 in the communication equipment export, becoming the top exporter of the world.

Advanced countries also held highest standings in the list of communication equipment exporters. Noticeable among the emerging industrial countries was Singapore which outstripped France in 1991 exporting the equipment valuing USD 17.5 billion.

For the growth of exportation, developed nations and new industrial countries all recorded the growth rate of 10% or higher, showing vigorous growth and economic significance of the industry.

Newly emerging industrial nations recorded remarkable growth rate of 20% or higher concentrating their effort for the exportation of information and communication equipment. Especially, Korea and Singapore showed a surprising growth rate of 27.05%

and 25.54% respectively. Also, the significance of the industry in each country may be seen by checking the share of the industry to the total export of the country. It is possible to assume that the larger the share of the industry to the total export of the country, the more important the industry will be in the national economy.

(2) Supply of Information & Communication Facilities

1) Telephone Lines

Considering the no. of telephone lines per 100 persons, Korea had 43.45 lines for every 100 persons as of the end of 1992, getting closer to those in the advanced and new industrialized nations. With the number being at 8.59 lines as of 1981, a much lower figure than those in Hong Kong and Singapore in the same year, the expansion of telephone lines has been incredible during the 1980s as a result of the telephone line expansion project during the period.

2) Digitized Lines

The rate of telephone line digitalization in Korea was 53.6% as of the end of 1992, which was one of the lowest among new industrialized countries. Although the rate in Japan was 48.6% as of the end of 1991, the actual rate had gone much higher if we would have taken into account the high rate of digitalization for new telephone lines.

3) Distribution of Terminals

(a) Distribution of Personal Computers

For the distribution of personal computers, US as of the end of 1991 had the highest rate of 249 units per 1,000 people.

UK (169 units), Japan (104), and France (91) were the countries that ran behind USA, and the rate in Korea was 43 units, lower than 67 units in Taiwan. Personal computers have been rapidly introduced to our home environment, mostly for child education, in late 1980s. Nevertheless, the rate of distribution in Korea was only 60% of the rate in Taiwan.

(3) Information & Communication Services

The research on the ISDN service showed that Singapore and Hong Kong were some of the leading countries among the newly emerging industrialized countries, and Korean and Taiwan were at the same level.

Based on the ISDN service comparison, Korea is seen to rank at the medium-low standing among the new industrialized countries with regard to information and communication services.

For mobile communication services, Singapore and Hong Kong are providing the

world-class mobile communication services. Various services in Singapore include cellular mobile phone service, CT-2 wireless telephone service and mobile data communication service since late 1993. In addition, the global aeronautical communications systems which enabled the mobile telephoning in the aircraft was introduced in 1991 for the first time in the world, providing best quality mobile communication services.

In Korea, on the other hand, cellular mobile phone services and wireless paging services by KT, and paging services by local businesses are in use, and CT mobile phones are being tested for commercial service. There is no wireless data communication service in Korea. The above comparison on mobile communication services shows that the services in Korea are inferior to those in Singapore and Hong Kong.

As discussed above, major new services such as ISDN service and mobile communication service must be greatly improved to keep up with the services in other new industrialized countries.

(4) Analysis on the Domestic Business Conditions for the Industry

1) Changes of International Business Conditions

With the establishment of the WTO and the integration of the world economy, competitions among nations are getting tough and at the same time provides both new opportunities and jeopardies. This requires our positive response and our strengthening national competitiveness through globalization.

First, we must admit that the WTO is there to establish a free and just international order for multi-lateral tradings, and any laws, systems and practices of any countries which obstruct just international trading must be modified to match a internationally accepted regulations.

Second, with the world becoming a single economic market by the WTO system, more regional economic blocs such as EU, NAFTA, APEC, etc. will be organized for the benefit of neighboring countries which share the same economic interests. Although there are worries that the regionalism would deteriorate the conditions for international trading, chances are that it will supplement the WTO system, contributing to the settling of an order for international trading. Therefore, the future of the world economic order is largely dependent upon the interactions between regional economic blocs including EU, NAFTA, and APEC. With the market opening, and the revolutionary progress in the information, communication and traffic environment, giant businesses are now focusing more on the technical expertise than on the natural resources and the superiority in the production cost, and expected to technically

cooperate with other big businesses to survive under harsher competition.

2) Changes of Internal Conditions

In order to turn this ever-changing conditions into a foundation upon which we may jump to the status of a developed country, national economy and all respects of the society must be qualitatively improved. Since mid 1980s, high wage, high interest rates, and the degradation of social infrastructure has occurred, the consumption pattern has become rapidly diversified and gone for more luxuries, the demand for diversified cultural and leisure activities and for social welfare has increased, and the appreciation for the value of information has risen. Development of information communication services and service systems and the qualitative updating and upgrading of information networks are urgently required to support the demand for various information.

2. Governmental Measures Required for Development of Information & Communication Industry

(1) Expansion of National Information & Communication Infrastructure

National infrastructure for information & communication, which are relatively outdated compared to that in other new industrialized countries, must be quickly updated and expanded. The expansion of the infrastructure must be performed taking into account that the information and communication industry will determine national competitiveness in the future and that the expansion requires a long-term plan.

As suggested earlier, Taiwan, Hong Kong, and Singapore, which have achieved a better developed foundation for the information and communication industry, has put a long-term effort for the building of infrastructure, in order to maximize national competitiveness and economic effectiveness utilizing the information available from the industry. Investment into and hard work for the industry have been the fundamentals in making those nations the hub of the Southeast Asia with regard to industry, trading and economic activities. It is very much likely that the effort to secure national competitiveness and the level of national infrastructure, including that for the information and communication industry, have acted as a major factor resulting in the differences in economic development between those countries and Korea.

(2) Promotion of Industrial Information Sector

Each industrial sector should acquire, process and use more industrial information by introducing information communication technologies and using information

networks and services.

The use of information and communication is under way in all commercial sectors including manufacturing industry, banking industry, transport/traffic sector, logistics, and service industry, and the use of information results in improved competitiveness by saving cost and increasing effectiveness.

Therefore, the government should establish and push for measures to promote the use of industrial information and provide various benefits to the enterprises introducing a system for the use of such information.

(3) Development of Latest Information and Communication Technologies

The information and communication industry is by nature closely related to high-tech systems and advanced technologies, that is, the communication requires systems which are the combination of advanced technologies including computers, semiconductors, softwares, etc. Therefore, development of the state-of-the-art technologies related to the information communication is required to provide services which satisfy the desires of the users. The development of technologies should be undertaken to provide various types of communication services, to give birth to multi-functional terminals and to protect privacy.

(4) Globalization with the Use of Information and Communication Systems

With the settling of UR in the GATT and organizing of NAFTA and EC, the world is becoming one market. But the globalization taking place at the moment is based on the organization of regional blocs and the establishment of regional communities is the result of their considering their own economic interests. As a party of the world economy and for constant development of national economy, globalization and participation in the global scene are a must under the present sweeping changes in the world economic structure such as UR treaty.

However, in this regard, we have a geo-political limitation that is different from the other countries. We have to our south Japan, which formerly colonized us, and are in confrontation with the North Korea to our north. Although we have recently entered into a state diplomatic relationship with China and Russia, China still maintains a relationship with the North Korea and Russia is politically unstable for us to maintain a stable economic relationship. Also, geographically, we are quite distant from the USA or Europe. These geo-political factors acts against our advance to the rest of the world.

In order to work on the globalization under these obstacles, telecommunication would be the most promising means to overcome the restrictions of time and space.

IV. Method To Foster Information & Telecommunication Industry

1. Fostering System for Information & Telecommunication Industry

(1) Governmental Role for Raising the Industry

With Korean economy facing the problems including price hike, deficit in foreign trade, and the increase of actual wages, vigorous discussions are going on on the governmental policies to resolve the problems and to strengthen competitiveness of the industry. New policies of the government are mostly focused on reducing governmental restrictions and interventions on the industry to fortify the functions of the market.

However, the experiences in Japan and Germany do not necessarily tell us that the more complex the industrial structures of a country, the less governmental interventions should be.

Although free functioning of market mechanism may have positive effect on the it is not clear at the moment that less control will work in Korea. Especially, active governmental intervention is required for the development of essential technologies and for the performance of long-term R & D projects since the appreciation, technical expertise and the capacity of technical development are not enough to conduct such projects. If governmental role for the progress of an industry depends upon the stage of progress of the industry, international competitiveness, and the stage of technical developments, it should not be shrunk. The government is not supposed to lift all support and restrictions for an industry once and for all. It should take place gradually, changing the degree of intervention to match present situations in the market.

(2) Industry Fostering System

1) Present Industry Fostering System

Information & communication industry in Korea has weak ability to develop technologies for themselves, and its competitiveness is also weak due to immature parts industry. The scale of investment into the R & D in order to overcome these weaknesses are far less than that in the advanced nations or that in other industries. Also, the industry is not fully equipped with the system and the ability to respond to the market changes and to deal with the market opening and tougher competition. Therefore, the industry fostering system stresses the formation of the base structure for the industry, not a concentrative support for a industry or a sector.

Various supports from the government may be divided into the support for the competitiveness of the industry, support for technical development in order to set a

foundation for technical independency, and the support for improve the quality of the services.

Fortification of
Industrial Competitiveness

Quality Improvement for
Information & Communication Services

Information & Communication
Promotion Fund

Progress of
the Industry

Manpower
Training and Education

Strong Technical Base

Building of Information Super Highway

2) Direction for Improving the Industry Fostering System

Since the conclusion of UR, all supports for the strengthening of competitiveness are subject to restrictions. According the UR treaty, many of the tax exemptions and governmental subsidies for exporting industries are enlisted in the list of prohibited supports, and only the investments for general technical development are allowed.

Therefore, under the new international economic system, the government should use the Information & Communication Promotion Fund to build the foundation for the information society and to secure competitiveness of the industry, and set out a consistent policy system thereafter.

At the same time, the base for technical progress should be fortified, the infrastructure should be better conditioned, and the required training should be given to the work force.

2. Use of Information & Communication Promotion Fund

(1) Ways to Effectively Use Information & Communication Promotion Fund

The Information & Communication Promotion Fund was established in 1993 as a governmental investment and loan for the fostering of the industry, which will be the root of the future society.

As the need for and the importance of financial support for the industry has increased, the government plans to finance the Fund with the profit as a result of the privatization of telecommunication businesses in order to activate the industry.

The interest in and the significance of the Fund are increasing as the Fund grows larger. The effective operation of the Fund emerges as a key issue for the promotion of the industry.

Therefore, we would like to briefly suggest ways to effectively use the Fund in order for the Fund to raise desires of the industry for technical development and to

actually take effect in fostering the industry :

- First, joint operation with the governmental policies for the support of the industry ;
- Second, systematic operation of the Fund ;
- Third, Modification of Fund operation ; and
- Fourth, expansion of monetary resources.

1) Strengthened Joint Operation of the Fund

As shown in the discussion on the industry fostering system, strengthening of industrial competitiveness, quality improvement of information and communication services, strengthening of technical base, building of information super highway and the training of manpower are the main projects that the government is working on.

The strengthening of industrial competitiveness is to provide support to strengthen the foundation for parts industry and to widen the capacity for technical development and includes strengthening the competitiveness of manufacturers, support for the designation of the Promising Medium Telecommunication Company and technical guidance for medium industries. Building up technical capacity requires voluntary investment and hard work for commercialization of technologies. However, medium telecommunication companies are not in the position to actively engage in such investment due to the burden of risk and the lack of fund and interest. Therefore, political support for technical developments will greatly contribute to the improvement of technologies on the part of small and medium companies.

Especially in the field of information and telecommunication where technical life cycles are very short and new products are constantly released, the ability of small and medium companies to cope with changing technologies and to commercialize new technologies is weak and therefore financial support from the government is strongly wanted.

Moreover, as the nation's industry has grown on the basis of conducting the designing and manufacturing of final product, it lacks and requires the technology for essential parts. The policy and support for the promotion of the technical development should be pushed for side by side to maximize the effect.

2) Systematization of Fund Operation

• Support for the Basic Requirements for Information Society

For the realization of information society, the building of high-speed, large-capacity information networks is insufficient. Users should be given an easy access to various information services like LAN, POS facilities, and terminals at anywhere in the society : homes, schools, and works.

• Support for Strengthening Technological Foundation

It is to support and fund the R & D by the telecommunication companies in order to promote the technical development. It should support new telecommunication devices for the use of information and waves and the priority must be given to the small and medium companies.

- Development of network equipment and terminals for new telecommunication services

- Development of equipment with new functions

• Support for Commercializing New Technologies

It is to support the commercialization and utilization of new technologies developed from the R & D projects including the followings.

- Support for the purchase of commercialized new technologies : Direct purchase or support through lease companies

- Support for commercialization : Transfer of the technologies to other companies and funding for commercialization

(2) Improvement of Fund Operations

1) Simplification of Fund Loaning

As an obstacle against the efficiency of funding, loan procedures are complex and time-consuming. While the general banking institutes provide loan on the basis of mortgages, the fitness of the loan to the purpose of the Fund and the feasibility of the project in question are deliberated before the loan grant and it takes considerable amount of time. Therefore, efforts should be made to simplify the procedures of the loan.

2) Granting More Funding for Industry

In 1993, ₩6.7 billion was granted to 30 applicants for the purchase and expansion of facilities, which means the average funding for each applicant was only ₩220 million. For technical development projects, ₩23.2 million was granted to 106 projects, an average of ₩210 million for every project. This funding is insufficient given the scale of the development projects in the industry and may provide little help to the applicants in need. The average funding amount should be increased, especially the amount of funding for joint projects between enterprises and between enterprises and schools must be increased to activate larger joint projects.

3) Introduction of Long-Term Loan

Presently the term of the loans are limited to 5 years, which is not long enough to

provide long-term support from the technical development to the commercialization. Also, the support for technology-intensive small and medium companies with no ability to provide mortgages is more in want, as the loans are provided through private banking institutes requiring mortgages. Therefore, long-term loan covering from the technical development to the commercialization should be considered as an incentive for technical developments. In addition, non-mortgaged loan should be provided to the high-tech small and medium industries so that the Fund may act as the venture capital for the telecommunication companies.

3. Manpower Training

(1) Problems in Educating Human Resources for the Industry

1) Establishment of Comprehensive Education Policy for Human Resources

An inclusive education policy must be set up to effectively develop human resources. As a whole, the education for human resources is a key issue in expanding the potential of the industry under the rapidly changing technologies, tough competition and the changes in the industrial structure.

Also, based on the appreciation that the control of total demand cannot solve the present economic difficulties, micro policies for human development, including education, training and employment, and the reinforcing competitiveness through system reform have gained significance in the industry.

An inclusive human resources policy should not target the simple, short-term control of the imbalances between demand and supply. Rather, it should incorporate all major aspects of the human resources : education, job training, science and technology, labor market, adjustment of industrial structures, employment practices.

Data on human resources must also be systematically collected, filed and evaluated in order to establish an integral policy, and for performing projects, establishing policies and supplying human resources through database, basic statistics should be collected and filed.

2) Linkage between Human Resources and Industry

The fact that the industry is in want of manpower, especially engineering manpower despite the general surplus supply of highly educated human resources clearly demonstrates that the human resources policies are not completely linked to the need of the industry.

Human resources development should therefore be responsive to the needs of the industries, and the training and the education should be closely linked to the workplaces as the cycle of the technical developments is shortened, and the technical standard is getting stricter and more refined.

3) Provision of Education to the Public to Expand the Base for Human Resources

As the computers are introduced on a greater scale to our society, telecommunication through computer networks is commonplace, spreading the use of new methods of communication throughout the whole society.

With this new trend, the education on the public and especially child education become a major concern in all countries for their future. Education on computer skills should be incorporated into the school curriculum to widen the base from which qualified human resources may be supplied to the industry.

(2) Support for Manpower Training

1) Establishment of Comprehensive Support Policy for Manpower Training

In order to advance national economy and to enter the informatized society, the information & telecommunication industry should be developed to build the other industries and the society as a whole upon the base of computers. Therefore, a comprehensive, systematic, and long-term policy should be enforced to raise qualified manpower who will lead and back the spread of computer-based communication skills.

Thus, the government should organize a body which will incorporate all the policies enforced by different governmental agencies for the raising of qualified manpower.

2) Study on the Cooperative & Democratic System between Government and Private Sector for Manpower Training

In order to establish and enforce a comprehensive, systematic, and long-term policy, a policymaking organization is required which will determine any policies for the manpower education. An organization consisting of the experts from the scholastic field, research institutes and the industries should be incorporated so that it may adjust different views of relevant governmental agencies or be solely responsible for the human resources for the industry. This way an inclusive, long-term policy may be established and enforced.

3) Long-Term Adjustment of Human Resource Supply

It is estimated that the manpower from the vocational high schools and technical colleges will be excessive, the human resources from 4-year universities will be a bit short, and the quality work force having master's or doctor's degree will be short.

Therefore, the increase of high school students is not necessary, and the human resources of different qualification should be balanced to meet the needs of the industry.

For technical colleges, the numbers of students should be adjusted in proportion to the number of faculty. As quality human resources are very short, the effort should target the increase of schools providing postgraduate courses in the field of telecommunication and information.

V. Conclusion

In order to demonstrate the importance of the industry, we have discussed the effect and derivative influences of the industry on the national economy and looked into the growth of the market so far and the prospect of the industry in two different areas : the market of network equipment and the market of terminals.

Also, we have pointed out the standing and weaknesses of the industry in the global scene by comparing the level of the domestic industry with developed countries and our competitors. With the standing and the weaknesses of the industry and with the analyzed demands for the telecommunication services, policies have been extracted which are required to develop the industry.

The rapidly changing environment surrounding the industry in Korea has been depicted. With the current condition, problems and weaknesses in the industry, we have suggested the policies and the measures for the promotion of the telecommunication and information industry.

First, the industry itself is growing fast and has great impact on facilitating the development and efficiency of the other industries. It plays a significant role in growing national economy and improving national competitiveness.

Second, the industry is growing rapidly compared to the developed countries and competing countries. However, in terms of the supply of high functional telecommunication services, the level of information utilization, and the introduction of multi-media terminals, the industry falls short of other countries and therefore political response to these weaknesses is urgent.

Thus, governmental long-term support should be provided to improve infrastructure for the industry and the quality of information available on the market.

Third, the government should see the industry as a foundation for the prospective informatized society and for the development of advanced technologies and for the cultivation of globalized enterprises. For this, the basis for the network facilities, software, database, and computer industries should be reinforced. In addition, advanced technologies, high-tech basic technology, and technologies for essential parts production should be developed, and the parts industry for the telecommunication terminals production, which is competitive in the world market, must be strategically promoted.

Fourth, rearrangement for the industry support system, the establishment of comprehensive policy, effective operation of the Information and Communication Promotion Fund, and effective system for the supply of qualified human resources are required to foster the industry. In the meantime, standardization of the standards used in the industry, strategic undertaking of R & D, and flexible operation of purchase system for telecommunication systems are imperative.