
Role of Telecommunications in the Economic Development in Korea*

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I. Introduction

Since the early 1960s, Korean economy has progressed at an unprecedented growth rate and has emerged as one of the leading economies in Asia. This remarkable progress is mainly due to the strong government leadership and economic development plans that mobilized the whole nation to aggressively seek for an export-oriented economic growth. The success of export-oriented industrialization of Korean economy would not have been possible, if Korea had failed to build the infrastructures including telecommunications. With the rapid economic growth since the early 1960's, the telecommunications sector in Korea has been one of the fastest growing sectors. Particularly in the 1980's, the telecommunications related fields in Korea have expanded at an annual rate of 28.6%, which is twice the rate of the overall economic growth.

Such a remarkable growth of the Korean telecommunications field, like other economic infrastructures, is often attributed to the strong government leadership under which massive investment in building telecommunications infrastructure was possible in a relatively short period of

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time.¹⁾ Yet, recently there was a strong controversy among policy makers whether or not to keep the current level of investment in the telecommunications sector. This national controversy finally ended, defining the telecommunications field including information technology as the strategic focus in the 1990s in order to give a boost to the national competitiveness.

The definition for competitiveness varies²⁾ depending on when and for what purpose this is used by decision makers, since the term contains the notion of one's ability to do something at least as well as others. For instance, today's business decision makers perceive competitiveness as the ability to compete in the world market, while government administrators often perceive competitiveness as the ability to maintain the sustainable economic growth and balance of trade. As the meaning varies depending on situations, so does the source of competitiveness.

Competitiveness involves a number of complex and diverse, but inter-related, factors, such as national and international economic conditions, government policies, political and social stability, industrial practices, and human resources. Recently with public interest rapidly intensifying, industrial competitiveness of a nation has received more attention, because certain industries face severe foreign or multinational competitive pressures.³⁾ Competitiveness is, in a large measure, a function of productivity which is influenced by capital, labor, technology and knowledge. Recently among these factors, technology and knowledge became the focus of interest due to the rapid technology changes, particularly in the information technology(IT). In this regard, investigating the roles of telecommunications in association with competitiveness of a nation's economy is meaningful, because the telecommunications sector is the field that is most closely related with a series of IT innovations.

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- 1) For instance, capital formation(including land, buildings, and equipments) in the telecommunications and related fields consisted more than 7.5% of the Korean gross fixed capital formation in 1987 when investment reached its peak.
 - 2) Porter, Michael E.(1990), *The Competitive Advantage of Nations*, The Free Press.
 - 3) U.S. Department of Commerce, *U.S. Telecommunications in a Global Economy: Competitiveness at a Crossroads*, August 1990, p.40.

II. Telecommunications and the National Economy

Several normative studies⁴⁾ conceptually explain the relationship between a nation's economic development or economic strength and the telecommunications sector, emphasizing and enumerating the benefits of telecommunications infrastructure and use of telecommunications services. Though there have been many empirical studies on the impacts of information technology on business activities, few theoretical studies are available that examine the roles of telecommunications in enhancing competitiveness of a nation's economy. Two major reasons account for this⁵⁾; (i) the lack of a well-established economic theory of the relationship between telecommunications and a nation's economic development or competitive advantages, and (ii) the difficulty of measuring the effects of telecommunications. The measurement problems can arise from the wide range of telecommunications services and the characteristics of telecommunications such as intermediate goods and externality. Despite these limitations, however, many economists have attempted to explain the role of telecommunications in a nation's economy. Common approaches in examining the effect of telecommunications at the macroeconomic or country level include statistical correlation⁶⁾ or regression analysis using both cross-sectional and time series data, and structural economic analysis(input-output analysis) to investigate the sector specific effect of

4) For example, Cho and Lee(1991) outline the benefits of information / telecommunications as increasing the production efficiency and the consumption utility in the perspectives of supply and demand products helps farmers adjust the production thus avoiding too much price fluctuation. In the secondary industry, the computerization of the production process and integration of R&D, office, production, and sales process through information network help firms to enhance their competitiveness. In the tertiary industries, the importance of information and telecommunications cannot be too much emphasized.

5) Cho and Lee(1991), "The role of the information and telecommunications industries in advanced countries and their perspectives", Paper presented at the Summer Policy Seminar, the Korean International Economics Association.

6) For example, Hardy, A.(1980), "The role of the telephone in Economic development", Telecommunications Policy.

telecommunications.⁷⁾

Many empirical studies⁸⁾ reveal a strong correlation between the telecommunications and the national economy, though the degree of correlation varies to a certain extent by country or time period.⁹⁾ Thus, ever since the first empirical report by Jipp(1963), it is generally believed that economic development(or growth) and telecommunications are closely associated with each other.¹⁰⁾ The varying degree of relationship can be explained by the innate nature of cross-national or time-series analyses that researchers have adopted in investigation.¹¹⁾

In general, a stronger relationship is found in nations with a lower level of GNP and the strength of the relationship diminishes as GNP grows. This varying degree of correlation can be attributed to the heterogeneity of the data stemming from the facts that (i) the installation and maintenance costs dropped substantially over the past 30 years due to innovations and technological development in the telecommunications

7) Because the effect of telecommunications on a nation's economic development is sector specific, the results of input-output analyses are also country specific reflecting the conditions of other infrastructures. For example, a study by Kuriyama and Oniki(1991), measuring the contribution of new information technology on the growth of Japanese economy, found that a part equal to 0.64% per year in the average annual growth rate 3.9% of the Japanese economy from 1974 to 1985 owes to the development of new information technology.

8) Studies by the group, GAS-5, of the CCITT.

9) CCITT, Economics Studies at the National Level in the Field of Telecommunications, Geneva : ITU, 1968.

E.L. Bebee and E.T. Gilling, "Telecommunications and Economic Development : A Model for Planning and Policy Making," Telecommunications Journal, vol. 43, no.8, August 1976, pp.537-543.

10) U.S. Department of Commerce, U.S. Telecommunications in a Global Economy : Competitiveness at a Crossroads, August 1990, p.40.

11) The CCITT(1976) and the Japan National Committee for Pacific Economic Cooperation(JANPECC)(1991) used the correlations, as the key relationship between the telecommunications sector and the of the economy.

equipment industry,¹²⁾ (ii) the reductions in tariffs along with the lower prices of terminal equipment have activated potential demands for telecommunications services, and (iii) the strategic importance of the telecommunications sector¹³⁾ for a more effective social and economic development has increased.

Given these problems, the previous findings of the existence of high correlations at the macro level stimulated some researchers to rigorously investigate the causal relationship between telecommunications and economic growth. However, since telecommunications and other infrastructure investment and economic development commonly occur together, it is generally expected that researchers attempting to empirically investigate the relationship with a focus on causality will have difficulty determining which comes first. Being a "chicken and egg" question whether a change in the overall economic development causes a change in telecommunications development, or vice versa, many empirical studies attempted to quantitatively estimate the causal relationship despite the possibility that their tests may simply be tests of joint variations.¹⁴⁾ Thus, naturally, these

12) For further discussion and examples, refer to Saunders et al.(1983). "The extent to which the unit cost of providing telecommunications services falls because of economies of scale depends in part on the rapidity with which policy makers allow the system to expand and on the extent to which sector organization and management are flexible and responsive to new opportunities for organization, management, and procurement efficiencies related to size."(p.33)

13) "Although, in general, telecommunications appears to command a lower order of priority in developing countries than is justified, in recent years the high financial returns on telecommunications investment and the benefits they imply have been increasingly recognized."(Saunders et al, 1983 ; p.16)

"Economic policy-makers, practitioners and theoreticians alike are in broad consensus today that any successful strategy of economic development must be based in large part on the information sector."(Snow 1990 ; p.184)

14) "Not only do the authors suggest that their hypothesis is proven by the statistical regression analysis(which it cannot be), they also interpret what in fact is a lack of good fit of the model to the data as having a normative value : they contend that countries placed above the curve should give priority to telecommunications investment, whereas those below the curve should expand other development inputs."(Saunders et al. 1983 ; p.83)

studies report similar results (Hardy 1980, Cronin, Parket, Colleran and Gold 1991) that indicate the existence of a bidirectional causality in the strong relationship between telecommunications and a nation's economy.¹⁵⁾ There has been one study, by DRI, which strongly suggests, despite some criticisms on its statistical tests, that increased telecommunications investment and usage cause U.S. economic growth in later years.

Yet, the investigation of the causal relationship bears an important implication to policy makers in terms of deciding a nations's public investment priorities. However, because of the limitations on investigating the causality between telecommunications and the national economic development on an ex post basis, it is important to understand the above empirical findings with a caution. That is, while telecommunications does not obviate the importance of other infrastructures and production factors,¹⁶⁾ many conclude that positive and reciprocal relationships do exist between telecommunications investments and economic development.

In sum, telecommunications is one of the important infrastructure of the economy and serves as an invaluable factor of production for the other industries. But the degree of relationship and the role of telecommunications vary depending on the conditions of other infrastructures. For example, in many advanced nations the telecommunications industry is emerging as the leading industry that strongly influences other industries' products and services both as the demand and supply source, while in many developing

15) Hardy used gross domestic product(GDP) and the number of telephones per capita with time-lagged offsets of one year.

Cronin, et al.(1990), using 31 years of US data(1958-88, inclusive) suggest "a feedback process in which telecommunications investment enhances economic activity and growth while economic activity and growth stimulates demands for telecommunications infrastructure investment."

16) Until the early 1970s, telecommunication development in France lagged significantly behind that of most other advanced industrial countries. Yet, this had little obvious adverse effect on the rate of economic growth in France because strong growth occurred in the primary and secondary sectors. This suggests that the potential benefit or use of telecommunications services is sector specific, indicating disaggregate analysis like input-output analysis is more appropriate to investigate the effect.

countries with poor economic infrastructure, the telecommunications sector usually do not play the same role and is very limited. Thus, even though building a sound telecommunications infrastructure today is a necessary condition for any nations seeking economic development, investment in telecommunications do not necessarily bring economic development or growth in later years.

III. The Roles of Telecommunications in Korean Economic Development

1. The Telecommunications Sector in Korea

As Korea's economic growth during the past 30 years has been encouraged by the government policies, examining the roles of telecommunications in Korea requires the overview of Korea's two important national plans, 5-years National Economic Development Plans and 10-year Comprehensive National Development Plans.

The 5-year National Economic Development Plans

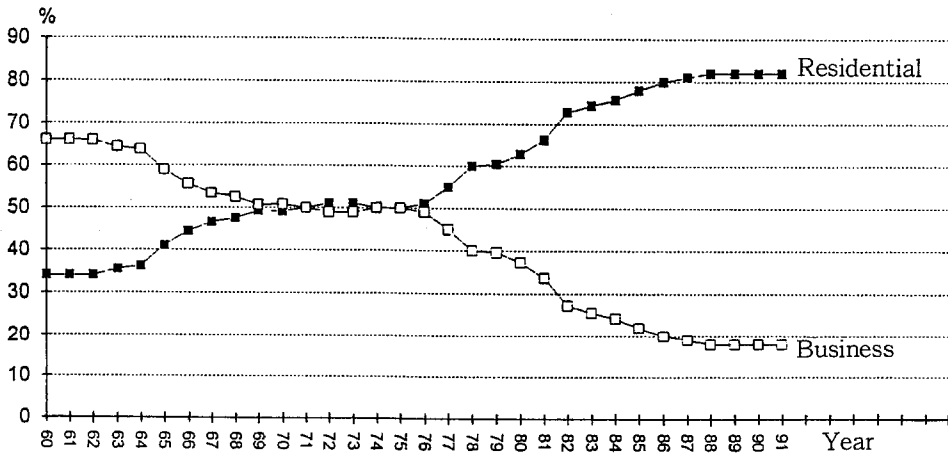
Over the past 30 years, Korea had experienced three distinct stages of economic growth : (1) the preparation stage to build economic infrastructure and labor-intensive industries(the 1960's), (2) the rapid expansion stage toward more capital-intensive industries(the 1970's), and (3) the restructuring stage from heavy industries to technology-intensive, resource saving, high value-added industries(the 1980's).

In the 60s, little attention had been paid to the demand and supply aspects of telecommunications services because the focus of economic development plans during this period was on developing transportation and energy infrastructure that were urgently needed to support the launch of industrialization. Low living standards and simple industrial patterns failed to generate sufficient user demand for telecommunications services to be developed. On the supply side, not to mention the lack of investment capital, the government could not allocate funds sufficiently in the telecommunications sector due to its lower priority than other infrastructures, such as road, electricity, and regional development. Thus, low

demand for and supply of telephone services caused few problems.¹⁷⁾ Yet, considering the average economic growth rate during this period, one important aspect to note is the fact that, despite the low level of supply, demands by the industries and the public sector were still satisfied enough to support the economic growth. The major reason that accounts for this unique phenomenon is that telephone service was regarded as a luxury rather than a commodity among most Koreans.

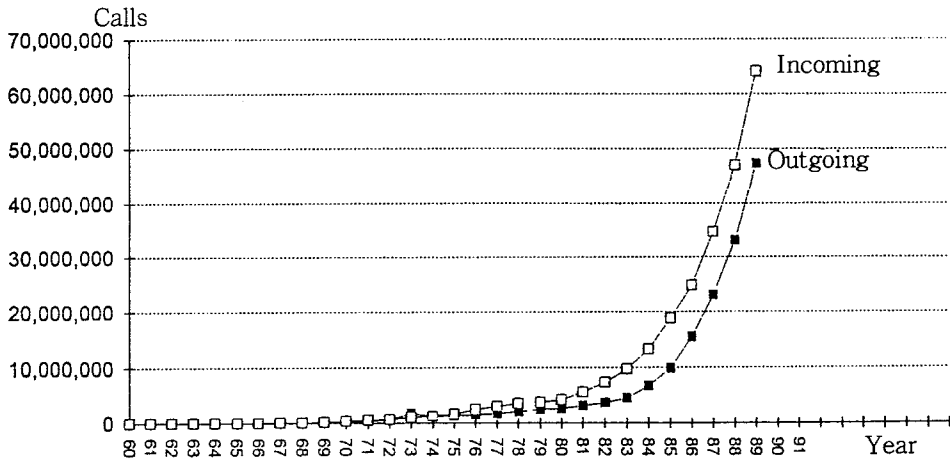
In the 1970's, however, user demand for telecommunications services rapidly increased for both private and business purposes, either local or international communication needs(see Figure 1 and 2). However, the government could not successfully meet the rising demand, particularly by the residential users. Sufficient capital was not available in the telecommunications field since it was not directly related with either exports or manufacturing activities ; instead, the government concentrated on heavy machinery and chemical industries. Furthermore, supplying additional telephone lines was very costly due to the low level of technology and unsophisticated electronic industry. Thus, chronic backlog in

Figure 1 Proportion of Business and Residential Telephone



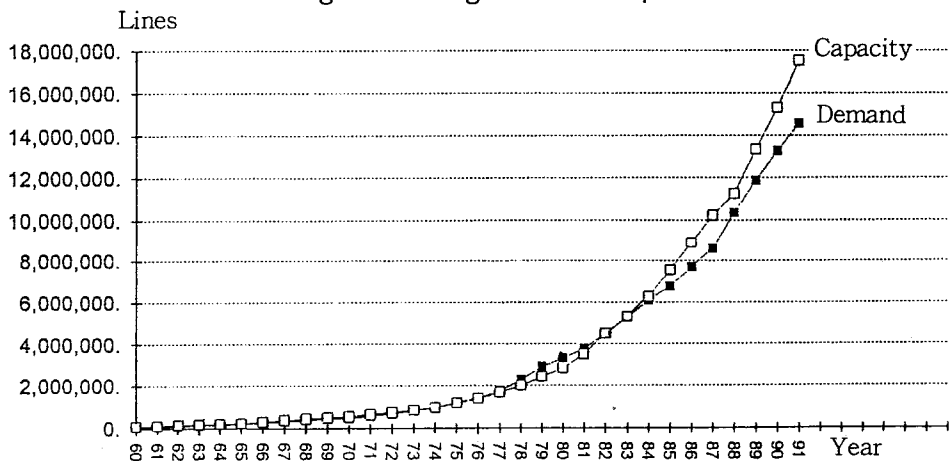
17) Residential demand for telephone subscription accounted for less than 50 percent during the 1960s. In 1969, the number of residential subscription was only less than 220,000.

Figure 2 Increase of International Telephone Call



the telephone subscriptions eventually became a serious social problem in late 1970s. However, the excess demand for telephone subscriptions could be effectively managed through the dual pricing mechanism(white and blue phones) in the marketplace by allowing users to sell and buy blue phones at a premium price, while white phones were not allowed to trade once they got the subscription from the ministry of communications (MOC). Thus, industrial demand for telecommunications was effectively satisfied through this dual pricing mechanism, while residential excess demand was effectively controlled(see Figure 3).

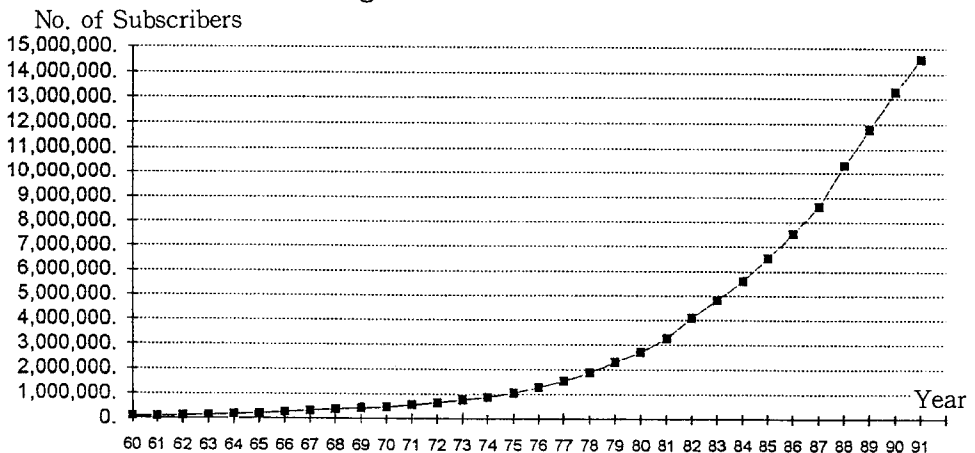
Figure 3 Congestion of Telephone Lines



The 1980s marked a milestone in Korea's telecommunications sector, as economic conditions changed favorably for the telecommunications. That is, on the demand side, user demand for telecommunications services increased almost at the rate of the 1970s, particularly for private uses. In 1982, demands for telephone service exceeded 5 million lines. Business users began to demand more diversified and specialized telecommunications services, recognizing the importance of telecommunications in resolving various managerial and competition related problems. During the same period, the supply sector experienced dramatic changes. First, telecommunications technological development was accelerated throughout the world. There were various breakthroughs in technology ; technology life cycle was shortened; new products and services were introduced. These technological changes made telephone line expansions less costly and difficult. Second, the telecommunications field became a technology-intensive, resource-saving, and high value-added industry as the government policy goals intended. Such changes in supply induced the government to place a high priority on the telecommunications sector in national economic development plans as seen in Figure 4.

The above mentioned three stages fairly match the four evolutionary stages of national competitive development (Porter 1990) : factor driven, investment driven, innovation driven, and wealth driven stage. In the fac-

Figure 4 Increase of Subscribers



tor driven stage, national competitive advantage comes from low factor costs, mainly labor. The capital accumulation in the investment driven stage helps firms to enjoy scale economies, a competitive advantage that rises from mass production which in turn requires capital investment. The truly powerful and lasting competitive advantage, however, comes from product and process innovation in the innovation driven stage. Lastly, the wealth driven stage is characterized by slow growth in per capita income and productivity, and a diminished rate of return on capital investment. According to this framework, Korea just passed the investment driven stage of the national competitive development in which basic telecommunications can sufficiently meet the industrial needs of communications, and it now is entering the innovation driven stage in which the importance of advanced telecommunications surpass that of basic telecommunication in the development of national competitiveness.

Comprehensive National Development Plans

In 1972, the starting year of the 3rd National Economic Development Plan, Korea initiated its first 10-year Comprehensive National Development Plan(NDP 1972-1981) in an effort to best utilize the national resources and to promote a balanced regional development. During this period, only 10. 2% of the total transportation (19.3%), power plants (19. 0%) and civil engineering and construction projects (13.1%). As the figures show, telecommunications had a lower priority than other infrastructures since the focus of this plan was to improve the efficiency in developing economy, later resulting as typical urbanization problems.

The 2nd Comprehensive National Development Plan started in 1982 in order to eliminate the unbalanced development between southeast and southwest regions in the Korean peninsula, and to alleviate the environmental problems. The 2nd NDP was set as an adjustment process to cure the problems which occurred during the 1st NDP. Thus, instead of huge construction projects, the government focused on building roads and railroads, expanding seaport and airport facilities, and modernizing and expanding telecommunications facilities. Particularly the telecommunications project drew an unprecedented strong public attention since the chronic backlog of telephone subscription at that time was regarded as one

of the most serious social issues. Thanks to the continued efforts by Korea Telecom and the support from the Ministry of Communications, more than one million lines were annually added during the period(1982-1991) with the exception of 1983 and 1984, completely resolving the backlog problem. By the end of 1991 when the 2nd NDP was completed as planned, the number of installed telephone lines have reached 17.5 million circuits with 14.5 million subscribers and electronic switching systems which account for more than 90% of total switching capacity.

The 3rd Comprehensive National Development Plan which started in 1992 re-emphasizes the importance of expanding and modernizing the transportation infrastructure and the development of the regions along the west coast. As far as telecommunications is concerned, the plan focuses on building the advanced telecommunications network and systems rather than the basic network, indicating that the government recognizes the need of shifting telecommunications infrastructure toward the one that can provide more advanced, faster, and diverse telecommunications services.

2. Relationship between Economic Development and Telecommunications in Korea

It is very recent that the roles of telecommunications in the Korean economy drew attention among Korean researchers. Thus, although there are a few normative or descriptive studies on the roles of telecommunications in the Korean economy, very few empirical studies are available in Korea that investigate the relationship between economic growth or development, and telecommunications in Korea. Furthermore, many studies focus on the role of information technology rather than that of telecommunications ; even the recent interest in telecommunications within the academic circle was discouraged by the research institutes and government agencies that emphasize the critical roles of IT in the coming decades.

Researchers in Korea found similar results. For example, Kim (1992), using the number of main lines and GNP data from 1970 to 1989, found consistent results with Hardy(1980) and Cronin et al.(1990), arguing that

the telecommunications sector in Korea promotes the overall economy.¹⁸⁾ Also, based on a comparative analysis of 32 nations, he suggested that the telecommunications follows the development of national economy in the developed nations, while the telecommunications leads the development of national economy in the developing countries. Cho(1990), in his input-output analysis of 1975, 1980 and 1985 data, found that the portion of the telecommunications industry in Korea has been continuously rising(4.5% of GDP in 1985) and that this trend is expected to continue. The same trend is also found in the use of telecommunications services and products as the intermediate inputs. Lastly, in terms of the multiplier, while the telecommunications-related manufacturing sector shows relatively low output and value-added multipliers with a high import multiplier. This implies that, despite an important role of telecommunications in the economic development of Korea, the supply side of telecommunications has been mainly supported by foreign suppliers, indicating a room for improvement in Korea's telecommunications industry, particularly in electronic component and telecommunications equipment manufacturing sectors.

3. The User's Attitude and Evaluation of Telecommunications in Korea

The IMD's World Competitiveness Report(1991)¹⁹⁾ ranks Korea as the third among 10 newly industrialized countries(NICs) according to the statistical data, following Singapore and Hong Kong.²⁰⁾ This report, based on a survey of businessmen in Korea, also ranks Korea as the sixth in competitiveness and the seventh in managers' knowledge of information / telecommunications, showing a substantial discrepancy between the statistical and the survey results(Table 1). Despite the limitation of subjective evaluation by respondents, this discrepancy suggests Korean business-

18) Under the hypothesis that the telecommunications investment induces GNP growth, he estimated the elasticity as 0.63.

19) The categories used in this report include domestic economic power(1), science and technology(1), management(3), degree of globalization(4), social infrastructure(4), labor force(4), the functionality of government(6), and finance(7).

20) Among the developed countries, Japan is in the first place, U.S. A the second, Germany the third, Switzerland the fourth.

Table 1 Ranking of Competitiveness

Classification	Overall Competitiveness	Knowledge and Usage of Information / Telecommunication
Singapore	1	76.44 (2)
Hong Kong	2	77.78 (1)
Korea	3	58.33 (7)
Taiwan	4	70.24 (3)
Japan	1	76.19 (1)
U.S.A.	2	72.22 (2)
Germany	3	67.53 (6)

Source : IMD(1991)

1. Overall competitiveness is based on the statistical data.
2. Knowledge and Usage of information and telecommunications is based on the survey performed to businessmen in the nation. The survey question is how much they know about using information and telecommunications equipments /services and how intensively they use them. The scale ranges 0 to 100(0 means negative response and 100 affirmative).

men's lower level of confidence in national competitiveness and lower appreciation of the important roles of information /telecommunications in daily operations.

On the other hand, however, Korean businessmen seem to be satisfied with telecommunications(Table 2). The degree of satisfaction in telecommunications is next only to electricity.²¹⁾ This implies that telecommunications in Korea has properly met the business demand for telecommunications services. However, although not much difference is found in the ratio of telephone lines penetration between Korea and the U.S.A., Korea is far behind them in advanced telecommunications services (Table 3). This apparently suggests that Korea is still in the investment driven stage in which a variety of advanced telecommunications services do not play an important role as basic telecommunications services, indicating an

21) Korea Chamber of Commerce(1991), The Status and Solutions of Shortage in Social Overhead Capital.

Table 2 Degree of Satisfaction for various social infrastructure

Road	Harbor	Railroad	Airport	Electricity	Telecom	Water	Land
-50.2	-33.0	-13.0	-7.1	31.4	27.2	0.3	-6.7

Source : Korea Chamber of Commerce(1991).

Based on the survey data to Korean businessmen on the degree of satisfaction for social infrastructure.

The number is scaled-100 to 100. 100 represents great satisfaction, while-100 dissatisfaction.

Table 3 Korea's Information and Telecommunications in Comparison with Japan and the U.S.A.(1989)

	Korea	Japan	U.S.A.
Telephone Lines Per 100 Persons	100	157	214
Number of Mainframe Computers Per 1 Million Persons	100	1306	4216
Per Capita Sales of Data Communications	100	1780	3005
Per Capita Sales of Information Processing	100	3269	5433

Source : KISDI

* The numbers in the table are the index numbers at Korea=100.

urgent need to make the transition to the innovation driven stage for the sustained economic growth in the future.

4. The need for a structural change in Korean industry and the role of the advanced telecommunications

Recently, Korea is experiencing a lower economic growth rate than what she had enjoyed during the past 30 years due to rising wages, energy-dependent industrial structures, and pressures from environmental concerns. However, according to Porter(1990), rising wages support, rather than impede, true economic development by encouraging the right kind of innovations as well as a desirable reorientation of firm strategies. In addition, rising wages also improve the quality of consumer demand by shifting demand to more advanced segments and widening consumption into new industries. Korea seems to be at the turning point from the invest-

ment-driven stage to the innovation-driven stage. In this sense, many agree that it is necessary to transform the industry structure toward a high value-added, technology-intensive, soft, and flexible one in order to successfully enter the innovation driven stage of national competitiveness. So, when the 7th 5-year National Economic Development Plan was set, planners seriously considered the possibility that Korea might have reached the saturation point of economic growth that simply relies on mass production, standardized production technologies, and skilled labor.

In the 7th 5-year National Economic Development Plan, the government has stressed the development of ten emerging industries which were selected in accordance with six criteria : (i) large market potential, (ii) substantial industrial linkage, (iii) high value-added, (iv) high technology, (v) low pollution, and (vi) low energy-consumption. One of the ten major projects in this plan, is to accelerate technological development and informatization. In particular, there has been a consensus among policy makers that informatization will be a prerequisite and will play a crucial role in achieving the first two of the following three basic goals of the 7th 5-year Economic Development Plan : (i) raising industrial competitiveness, (ii) establishing better social equities and balanced regional development, and (iii) achieving increased liberalization and concrete preparations for reunification.

Policy makers expect telecommunications in Korea, particularly informatization, to help firms reorient their strategies to high value-added, technology-intensive markets; thus, raising industrial competitiveness. Also, through the development towards advanced telecommunications, social problems such as fast-growing urban population, traffic congestion, and unbalanced regional development can be alleviated as more information is made available throughout the nation. Furthermore, various tax measures against land speculation, such a consolidated land-holding tax and capital gains tax can be enforced more effectively with more information.²²⁾ These external socio-economic benefits along with the high po-

22) Lee, Kyu-Uck(1992), "Future development strategies and utilization of information technology and telecommunications to achieve national goals : The Korean case", Paper presented at the OECD-ICCP /TIDE 2000 /KISDI Conference, March, 1992.

tential growth of the information and telecommunications industry make it very attractive and rewarding to invest in this industry with a high priority.

IV. Conclusions

As discussed, it is generally accepted that there is a strong correlation between telecommunications and economic development. Yet, the causal direction between them is not clear and the degree of relationship varies depending on several factors. Korea's case is not an exception, in that there is a strong correlation between telecommunications and economic growth, and telecommunications sector alone cannot induce economic development.

As seen in Korea's case, the roles of telecommunications vary depending on the stage of economic development. Until the economic development reaches a certain level, the most important role of telecommunications comes mainly from the telephone services decreases as the basic communication needs are satisfied after a certain point at which the so-called enhanced telecommunications services become more important in improving the efficiency and effectiveness of a nation's economy.

Clearly, telecommunications sector in Korea has played an important role in the economic development and continues to play an important role in the future because telecommunications infrastructure is a pre-requisite to the economic development. Yet, the content of roles played by the telecommunications sector covers more functions than before as the term "telecommunications" means a lot more than mere communications through a wire network. As technology progresses at an astonishing rate, a nation has a wire network. As technology progresses at an astonishing rate, a nation has to prepare many requirements for informatization in order to fully utilize the benefits of today's telecommunications.²³⁾ Those requirements, among others, include information networks, telecom-

23) For example, it has been estimated that the usage of facsimile service in Seoul reduces traffic costs by 10 million dollars per year. See Lee, Soo-Seong(1992), p.4.

munications equipments, education of personnel, and the flexible business culture to implement and use information technology effectively. Achieving all these requirements will take a long time and need concerted efforts by all relevant entities, both private and public. In this regard, it is fortunate that Koreans have recognized the importance of strategic roles of telecommunications, represented by the information technology, in building up national competitiveness. The 1990s will mark a new milestone in Korea's history as we once again continue to invest in the telecommunications sector in an effort to enhance the national competitiveness.

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