

The Development of Telephone Switchboard Manufacturing industry and Industrial Policy in Korea (1961-1979)

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I. Introduction

Nearly all the literatures concerning the Korean industrial policy in the 1960s and 1970s place the focus on the successful industries. But it is not so easy to find literatures which place focus on the industry which had difficulties during infant industry period.

And concerning the Korean industrial policy in the 1960s and 1970s, two alternative approaches have been presented, namely the international division of labor approach and the developmental state approach. The international division of labor approach(Lipietz 1987 ; Kim 1987) stresses changes in the structure of international division of labor allowed Korea to take chances to promote some industries. In contrast, the developmental state approach(Amsden 1989 ; Kim 2003) focuses on the elaborately devised and executed economic policy by economic bureaucrats and disciplining of big businesses under the hegemony of the strong state.

This paper focuses on the development of telephone switchboard manufacturing industry in Korea. This paper also focuses on the behavior of individual enterprises as well as the processes of formulation and execution of industrial policies.

II. The formation of South Korea telephone switchboard industry

1. Introduction of telephone switchboard in Korea

The first telephone switchboard was installed at the Palace of Choson Dynasty in 1898. Since then, manual telephone switchboard facilities were spread throughout Korea. And in the mid-1930s Siemens H-type automatic telephone switchboard and Strowger-type automatic telephone switchboard started to be introduced.

As the Korean War ended, recovery of communication system started and the expansion of the telephone switchboard at the national level occurred. Especially, international bidding for adoption of 15,000 lines of telephone switchboard facilities was held in 1959, and finally EMD-type automatic telephone switchboard system by Siemens was selected (Ministry of Communication, 1985, p.668).

Financing for the establishment of telephone switchboard system during the recovery period was possible by the ICA grant funds until 1958, and after 1958 financing the expansion of telephone switchboard system became dependent on public loans, especially the DLF loans of the United States and government loans from West Germany.

2. Industry overview in the early 1960s

South Korea's leading four companies in the communication industry during the early 1960s were Oriental Precision Company, Limited (hereinafter referred to "Oriental Precision"), Gold Star Co., Ltd. (hereinafter "GoldStar"), Hankuk Communication Equipment Industrial Company (hereinafter "Hankuk"), and Taihan Electric Wire Co., Ltd. (hereinafter "Taihan").¹

¹ Hankuk was established in 1947, and Oriental in 1953, Taihan in 1955, and GoldStar was established in, 1958, respectively.

Among these, Taihan was producing communication cable wires, and the other three companies were making the telephones and parts of telephone switchboard.

At the end of 1963, approximately 180,000 telephone lines were established in South Korea, of which about 53% were mediated by of the automatic telephone switchboard system. Furthermore, expansion of the telephone lines was one of the most important projects for the Ministry of Communications at that time. Ministry of Communications made the five-year plan for the establishment of communication facilities in parallel with the Five-Year Economic Development Plan. According to the first five-year plan for the establishment of communication facilities in 1962, telephone lines would be increased by 230,000 lines by the end of 1966. The demand for telephone switchboard facilities was anticipated to increase rapidly.

During the first three years of five-year plan, the Ministry of Communications' local telephone business expenditure in the total expenditure accounted for 64.6%, 61.5% and 60.5%, respectively. So at that time, the telephone switchboard manufacturing industry was considered to be very attractive business, of which the long-term demand was predictable and secured.

3. Competition among companies

1) Oriental Precision Company, Limited : first mover

Sang Sen Park, graduated from technical high school in Japan, returned to Korea after WWII, established Oriental Precision, which started to make plugs, coils , switches, and other parts of telephone switchboards. Since 1960, Sang Sen Park of Oriental Precision started to develop telephone switchboards, but a full-scale production of telephone switchboard was possible only

with the technological help from NEC of Japan(Oriental Precision Industry Co., Ltd. , 1974, p.73). Oriental Precision delivered telephone switchboard of 300-lines capacity to central telephone office in 1962 and telephone switchboard of 1,000-lines capacity in 1963.

According to the technical cooperation agreement between Oriental Precision and NEC on February in 1964 , the contract period was five years with first three years free of charge. Oriental Precision, through technical cooperation agreement, tried to acquire data for designing production process, characterization of the specifications of raw materials for localization, and standardization methods necessary for further mass production(Economic Planning Board , 1968).. And Oriental Precision, in the documents presented to Korean government, planned to increase the localization rate for Strowger-type automatic telephone switchboard parts from 60% level in 1966 towards 80-90% level in the early 1970s. And it was realistic, according to the Ministry of Commerce and Industry, which was responsible for the technical review(Ministry of Commerce and Industry 1967a; Ministry of Commerce and Industry 1967b)

2) GoldStar and Hankuk

GoldStar in Busan, which was producing radios, fans, and telephones since 1958, made technical cooperation agreement with Siemens of West Germany, and tried to enter the telephone switchboard market(GoldStar 25 Years Compilation Committee , 1985, p.339). And Hankuk made a preliminary agreement for the license production of crossbar-type automatic telephone switchboard with ITT of United States in 1964(Hankuk Communication Equipment Industrial Company 1964a). Competition for the entrance to the telephone switchboard market began.

Especially, Hankuk submitted a petition letter to the Economic Planning Board on February 18th in 1964, in which Hankuk asserted that Korean government should reconsider the plan to introduce EMD-type automatic telephone switchboard system and re-examine the technical characteristics of crossbar-type automatic telephone switchboard system. Hankuk insisted that crossbar-type

automatic telephone switchboard would be delivered at more reasonable price and localization would much easier if government accept the crossbar-type automatic telephone switchboard system(Hankuk Communication Equipment Industrial Company 1964b).

4. Industrial policy : “dual policy”

Because Hankuk submitted a petition letter to the Economic Planning Board, EPB sent the Ministry of Communications a memorandum, in which EPB ask the Ministry of Communications' opinion and request for a technical review. In this memorandum, EPB also requested the Ministry of Communications to take measures to avoid the problem of monopoly, and to devise policy for standardization and localization(Economic Planning Board , 1964a).

Although very important policy issues were raised in the relevant ministries, including determination of the standard for telephone switchboard system, monopoly regulation policy, and industrial policy for import substitution, the standardization of telephone switchboard system since then was decided without any further consideration of policy issues.

On 1st May in 1964, Ministry of Communications blitzly announced a principle of "EMD-type automatic telephone switchboard system for cities and Strowger-type automatic telephone switchboard system for rural areas". And Ministry of Communications called this principle as a "dual policy". A decision for a standard of telephone switchboard system which would last over 20 years was made. And according to this decision, Goldstar could supply 74,600 lines of EMD-type automatic telephone switchboard during 1965-66, which occupies 80% of the whole automatic telephone switchboard, respectively. At the end of the 2nd Five-Year Economic Development Plan period, GoldStar would occupy 73% of local telephone switchboard market and 100% of long-distance telephone switchboard market, as shown at <Table 1>.

<Table 1> Market Demand for automatic telephone switchboard and EMD-type automatic telephone switchboard Supply Plan of GoldStar during the 2nd Five-Year Economic Development Plan period(1967-71)

(unit : lines)

		1967	1968	1969	1970	1971
local call	Market demand	59,000	95,000	99,000	103,000	114,500
	Supply plan of GoldStar	50,000	68,200	70,000	73,500	83,500
Long-distance call	Market demand	-	-	-	1,154	1,139
	Supply plan of GoldStar	-	-	-	1,154	1,139

Source : Ministry of Commerce and Industry(1966)

According to the decision by the Ministry of Communications, GoldStar has further strengthened its market power at local telephone switchboard market as well as at long-distance telephone switchboard market

5. Competition for entry again

Although Ministry of Communications announced a dual policy principle in May 1964, attempts to enter the telephone switchboard market were continued. ITT of United States has attempted to enter the market through submitting a direct investment proposal to the Ministry of Communications on March 1966, but the proposal was rejected for the afraid of causing overproduction. And Fujitsu of Japan proposed a crossbar-type telephone switchboard system, which was also not accepted by the Ministry of Communications(Taihan Electric Wire Co., Ltd. 2005, p.199).

Meanwhile, Taihan submitted Economic Planning Board an application for importing capital goods for the production of crossbar-type automatic telephone switchboard on February 1966. According to the application, Taihan was planning to purchase electrical and electronic equipment(\$ 2.5 million equivalent) from Fuhrmeister & Co. of West Germany and telephone switchboard parts(\$ 1.0 million equivalent) from Oki Denki of Japan(沖電機) and was scheduled to produce 60,000 lines of line crossbar-type automatic telephone switchboard by 1971. On 15th April in 1967, Ministry of Communications notified Taihan the principle not to adopt the crossbar-type system. However, Kyung-Dong Seol, the CEO of Taihan submitted a petition to the President Park Chung-Hee on 28th of November 28 in 1967, in which he insisted the relative superiority of the technology of crossbar-type system. Taihan's efforts to enter the market were in vain because of dual policy principle of Ministry of Communications, however, this happening led to arouse social concern regarding the next standard for telephone switchboard.

For example, Ministry of Science and Technology in 1968 insisted that high-performing crossbar-type telephone switchboard system should be accepted and crossbar-type telephone switchboard should be responsible for 50% of newly installed telephone switchboard in the urban areas since 1971. But the Ministry of Communications backlashed against these claims(Maeil Business News, 1968.2.26. & 1968.3.1.).

On 10th of April in 1969, Ministry of Communications reported at the 24th Economic Ministers' Meeting that the next standard for telephone switchboard would be the "ESK-type(improved version of EMD-type)" and Ministry of Communications would make agreements with Siemens to install 200,000 lines (Presidential Office 1970a), which means that GoldStar's monopolistic position would be continued. Because of this report, Ministry of Communications became the focus of criticism after that time. Standardization and technological performance of new-types of telephone switchboard were topics of ongoing debates. On the 13th of January in 1970, President Park Chung-Hee told the minister of Ministry of Communications that Ministry of Communications

should examine the plan to establish Korea-US joint venture company with 'Bell' company, which had technological superiority concerning electronic telephone switchboard system.

However, standard selection for the electronic telephone switchboard system was postponed. On the 18th of January in 1971, President Park Chung-Hee told the minister of Ministry of Communications again that Ministry of Communications should report the next standard of electronic telephone switchboard system. But the final decision has been delayed one year.

Eventually, at the Economic Ministers' Meeting held on 9th of February in 1972, Ministry of Communications reconfirmed the principle of dual principle until 1976, and decided that after 1976 new standard for the electronic telephone switchboard system could be selected again(GoldStar Communication Corp. 20-Years Compilation Committee 1992, p.786).

This decision meant that discussions among ministries regarding the next standard for the electronic telephone switchboard system would be postponed. And because of this decision, market powers of existing two companies became more and more consolidative. The competition towards next standard of electronic telephone switchboard system among companies in the near future could not be avoided.

III. The production of electronic telephone switchboard through the introduction of technology

1. New Approach for a new standard of telephone switchboard

In 1974, Ministry of Communications organized a committee to discuss new standard of electronic telephone switchboard, of which the members were from Ministry of Communications, GoldStar,

and Oriental Precision. However this committee could not operate well. EPB opposed operation of this committee.

Instead, at the Economic Ministers' Meeting held on 27th of February in 1976, decision was made to develop time-division type electronic telephone switchboard domestically. But since the production of time-division type electronic telephone switchboard was not possible immediately, importing certain type of electronic telephone switchboard from abroad was inevitable. So the Economic Ministers' Meeting suggested that KIST(Korea Institute of Science and Technology), which was independent from the power of Ministry of Communications, should investigate proper type of electronic telephone switchboard to introduce during the transitional period and ministries concerning this issue should cooperate. These decisions meant that the Ministry of Communications no longer could make any decisions concerning the development and production of electronic telephone switchboard. And new line of policy concerning the development and production of electronic telephone switchboard was made in the circle of Korean economic bureaucrats.

A task force team at KIST was organized to investigate proper type of electronic telephone switchboard to introduce and RFP(request for proposal) was written, in which the exact unit costs for the production of 0.5 million lines, 1 million line, and 1.5 million lines of electronic telephone switchboard systems respectively, localization plan, and conditions for the transfer of technology were requested.

2. Competition among private companies

According to the new line of policy concerning the development and production of electronic telephone switchboard, the latent entries got new opportunities to enter the electronic telephone

switchboard industry.

In 1976 Taihan Electric Wire Co., Ltd. established new company named as Taihan Communications, which started to produce cross-bar type PABX(private automatic branch exchange) by importing parts of PABX from abroad. And Samsung established a joint-venture company named as "Samsung-GTE Telecommunications Limited"(hereafter "Samsung-GTE") with GTE of United States in 1977, and started to assemble the PABX.

In the face of competitors' entrance, the existing firms resisted. GoldStar and Oriental Precision simultaneously invite high-ranking government officials and made ceremonies to celebrate the production of PABX to show their ability to develop PABX. They were afraid that the production of PABX by competitors would lead to production of time-division type electronic telephone switchboard on a commercial scale

3. Selection of the final type of electronic telephone switchboard system

At the Economic Ministers' Meeting held on July in 1976, they decided to organize an independent task force named as TDTF(Telecommunication Development Task Force), in which the type of electronic telephone switchboard system to be introduced would be decided and technological problems concerning the introduction of electronic telephone switchboard system could be investigated.

On December in 1976, TDTF submitted the Economic Ministers' Meeting a report, in which TDTF insisted that one single-type electronic telephone switchboard system should be selected and capacity of the system should be 2 million lines during 1980-84. TDTF also suggested to establish a new public company which would produce electronic telephone switchboard and a new specialized research institute which could be engaged in research and development of electronic

telephone switchboard.

After this report was submitted, KECRI(Korea Electronics and Communications Research Institute) was established on 31st of December in 1976 and KTC(Korea Telecommunications Company), which was scheduled to produce electronic telephone switchboard, was established on 15th of February in 1977.

Meanwhile, TDTF decided to select the final type of electronic telephone switchboard system to be introduced on September in 1977, and this decision was approved at the Economic Ministers' Meeting immediately. TDTF selected M10CN model of ITT as the final electronic telephone switchboard system, which was space-division type electronic telephone switchboard system. Simultaneously, the Ministry of Communications enhanced its organizational capability concerning development and production of the electronic telephone switchboard by reorganization and made KECRI a subordinate agency, which led the Ministry of Communications to be able to engage the development and production process of electronic telephone switchboard system more actively.

4. Production system led by public company

KTC made technology introduction agreement for the production of M10CN with ITT of United States and BTM(Bell Telephone Manufacturing Company) of Belgium on December in 1977, and sent its 101 personnel to Belgium for training.

Because KTC was scheduled to assemble electronic telephone switchboards, it was necessary for KTC to be supplies parts from the domestic electronic telephone switchboard part makers. KTC appointed parts-supplying companies including GoldStar, Oriental Precision, Taihan, and Samsung-GTE. This situation was not so satisfactory for existing main companies like GoldStar and Oriental Precision as well as latent competitors which aimed to enter the electronic telephone switchboard

industry like Taihan and Samsung-GTE.

For the moment, a nation-wide electronic telephone switchboard production system led by public company – KTC - was formulated, in which all the major private companies concerning the production of electronic telephone switchboard are subordinated as part-suppliers. These part-suppliers also sent their experts to Belgium for training (Ministry of Commerce and Industry 1979a ; Ministry of Commerce and Industry 1979b).

5. A New Dual Policy and Adjustment

The situation, in which all the production of electronic telephone switchboard is led by public company, was also not so satisfactory for the Ministry of Communication. The Ministry of Communication was accustomed to deal with private suppliers like GoldStar and Oriental Precision for nearly two decades. In addition, Dr. Man-Young Lee, the CEO of KTC was an acquaintance of President Park Chung-Hee.

The Ministry of Communication submitted a report to the Presidential Office, in which a new dual policy was suggested on June in 1978. In the report, the Ministry of Communication made a new estimation for future demand of electronic telephone switchboard. According to this report, the newly estimated demand in 1986 would be 1.5 times more than the older estimation. So another assembling company would be necessary for the production of electronic telephone switchboard. An alternative idea of meeting the increasing demand by establishing more facilities within KTC was rejected from the fear of evil effect of monopoly.

Policy switch gave private firms new opportunities to enter electronic telephone switchboard industry as assemblers. The Ministry of Communication made additional report, in which plan for the privatization of KTC was proposed.

After submitting this report, the second type of electronic telephone switchboard was announced on December in 1979. No.1A space-division type electronic telephone switchboard system of Western Electric was selected. GoldStar made a joint-venture company with Western Electric and started to produce No.1A space-division type electronic telephone switchboard. KTC was taken over by Samsung.

IV. Conclusion

During 1960s-70s, one of the most important problems for the Korean government concerning telecommunication was to meet the demand for telephones, which was increasing rapidly with economic growth. Korean government tried to solve this problem by import substitution of telephone switchboard.

The selection of a standard for telephone switchboard was very important issue because path-dependency problem would occur due to compatibility once a standard is selected. A developing country lack of local technological capability to produce telephone switchboard should depend on overseas advanced companies for the technology. At this point, government policy concerning the selection of the standard and localization of technology would be significant, because the government could intervene in the process. Of course, understanding technology trend which is rapidly changing is a necessary for the success of such intervention.

Regarding industrial policies of Korean government during this period many literatures stress the structure of international division of labor or the ability of state to dictate the resource allocation among private companies and cite successful stories of industries, for example steel, shipbuilding, and automobile.

Case dealt in this paper suggests that the government of a developing country incapable of

devising any appropriate policies for import substitution was functioning just as a powerless consumer swayed by local monopolistic suppliers. Widely known model of developmental state through which a developing country could implement effective policies which led to successful industrialization was difficult to find. And the international division of labor approach was not adequate for explaining the development of electronic telephone switchboard manufacturing industry during this period.

In fact, as a consumer of the final product - telephone switchboard – the government could calculate the long-term supply and demand of telephone switchboard, and could devise appropriate policy for the development telephone switchboard industry more easily based on the estimation. But it was a tough problem for government to convert the existing telephone switchboard system to a new standard when the established interests of existing firms are so strong. In addition, the understanding of electronic telephone switchboard technology could not be sufficient for the bureaucrats at that time.

This situation changed in the early 1980s because Korean government started an active role to stimulate the technological capability of native research institutes and private enterprises concerning the manufacturing of electronic telephone switchboard. Institutional rearrangement was attempted, and cooperative relations among research institute, and private enterprises was strengthened. During this process, research-triggering approach for a new industrial policy was being formulated. This would be another research topic, for which additional research would be required.

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