

The Review of the State Policy in the IT Industry and HRD in South Korea

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ABSTRACT

This article is concerned to investigate the changing nature of the role of the state in relation to industrial policy to foster the IT industry in the Republic of Korea. In doing this, it has started with economic globalization introduced to the Korean political economy since the late 1980s. It has identified in what ways the state responded to the change, and to what extent the role of the state has fundamentally been changed in the context of policy mechanism in the process towards facilitating the IT industry in Korea. In addition, it presented how the state played a role in skill formation in relation to the industrial policy. In consequence, the role of the Korean state in fostering the IT industry has fundamentally changed from that as the developmental state in the industrialization process. In the process, that the strategic co-ordination role of the state and relations between the state and private capitals and societies are very significant to achieve the economic goal is presented as results, as well as some future tensions that would encounter in the way of charting the current policies.

Key words : Industrial Policy, Skill Formation and HRD, IT, Globalization, the State Role

1. Introduction

This paper examines the changing role of the state in the facilitation of the IT industry in the Republic of Korea. To do this, it identifies particular examples that illustrate the changing nature of state policies with regard to the IT industry under the 'new' conditions of globalization since the late 1980s. It also looks at the state's human resource development (HRD) strategies in relation to industrial policy.

The questions raised in this study are important for

both policy and theoretical reasons. In policy terms this study will be able to provide the basis for a critical analysis of the Republic of Korea's policies that seek to foster IT industry development, and especially as they relate to HRD or skill formation[1].

In theoretical terms, there is now a major debate about the limits and possibilities of state policy making within the global economy with respect to industrial and skill formation policy[1][2][3][4][5]. The neo-liberal orthodoxy in the United States and U.K. suggests that the state can only develop a supply-side industrial policy in which the emphasis is on providing skilled and flexible labour for the economy and especially MNCs[4]. However, in other countries, e.g., Singapore the state actively intervenes to encourage employer demands for higher skilled labour. In fact Singapore is

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a good example of where industrial and skill formation policies go hand in hand[6].

Therefore, this study built on this debate is important because it enables a consideration of what the possibilities for state intervention and action are, or at least can be sought, under the new global economic conditions.

For the purpose of this study, the principal research instrument is elite interviews together with documentary research enabling interviewees' accounts to be checked on triangulation validation, where possible against documentary evidence. The research design combines 32 'interviews with the powerful'[7], where the powerful represents the major stakeholders (civil servants, trade unions, employers and employer organizations, university professors, and government research institutes' researchers) and the document does secondary source materials, primary official policy documents. Other important secondary materials included working papers, journals, and books, relevant to the research.

2. Research Questions and Theoretical Framework

In addressing the questions this paper raises, a two stage theoretical strategy is adopted. The first is to ask what political and institutional factors locked Korea into the path of the developmental state, that its concept is brought from the basis for the economic miracle in all the Asian Tigers economies[8][9][10]. To the extent that the institutions which generated path dependency have changed, so it might be argued will be the role of the state. The second is to develop a way of judging how the state has changed as between the developmental phase and now. Several questions follow from such a strategy.

The questions to be raised are:

- 1) Are there certain forces that locked Korea into a form of path dependency during the developmental era?

- 2) To what extent have the institutions that locked Korea in now changed?
- 3) How can we best judge whether the role of the state has changed?
- 4) Has the role of the state changed and if so what are the consequences for economic and industrial development?

In examining the institutional factors involved in 'path dependency' the work of Mauro Guillén[11] is utilized. He has identified that there are certain forces that have locked states into a form of path dependency in their economic development. For example, Guillén has argued, the path of the Korean state was locked into its relationship with business elites (chaebol conglomerates) through import protection trade policy. Then, such forces (paths) function as the key links to questions (1&2). As regards developing criteria by which to judge the changing role of the state, the work of Peter Evans[8] will be adopted and developed in order to identify how the role of the developmental state is changing. Evans identified four key roles (patterns of state action) concerned with state involvement in economic development. Evans' contribution to the literature on the development state is of particular importance because while others[9][10] have identified the social and economic conditions that gave rise to the developmental state, he has analysed the particular mechanisms through which state policies were advanced. He identifies the following four key roles concerned with state involvement in economic development: custodian, demiurge, midwife and husbandry. The definitions of the four roles are:

The role of custodian is played by all states as a regulator through the formulation and enforcing of rules. The key objectives of rule-making provided by them are promotional (protection) and regulatory (policing).

The demiurge is the state taking the role of producer that played by all states. A traditional role of the demiurge has been that of taking direct responsibility for delivering infra-structural goods: e.g., transportation, communication, power and water supplies.

The aim of midwifery is to induce private capital to play an entrepreneurial role that it would otherwise be reluctant to undertake, thereby creating organizational and institutional resources committed to new sectors or new kinds of endeavors. By midwifery, the emergence of new entrepreneurial groups can be assisted and existing entrepreneurs can be induced to take on more challenging endeavours. In contrast to the demiurge role:

if promoting a new sector is the goal, acting as a midwife is likely to be easier and less risky than creating state-owned productive capacity[8].

A variety of techniques and policies including provision of subsidies and incentives can be utilized in playing the role of midwife, which is mostly intended to reduce the risk and uncertainty entailed in entering a new sector or a new kind of endeavour.

The role of husbandry, overlapping 'midwife' techniques, can be seen as a combination of 'supporting and prodding' to encourage private capital confronting global changes. It may also be seen as the state entering where there is market failure. For example it may involve R&D where private capital sees such activity as highly risky. It is generally less demanding than midwifery and presupposes the pre-existence of private counterparts with which the state can be involved.

In seeking to apply these criteria to identify the changing role of the state there are at least two considerations. The first is to ask whether all or any of these criteria apply to the state's activities at the present time. If for example custodian, demiurge and vision no longer apply then that might suggest that the nature of the state has fundamentally changed from developmental to some form of a new 'kind of' state.

The second is whether in the new environment some or all of these roles might remain but that the way they are carried out has fundamentally changed. This may be because the processes by which the state seeks to implement a vision have changed, for example by taking into account the views of new policy players like the trade unions. In this case, the state's goal of

economic development built on nationalism might be the same but the processes for achieving it might have changed.

3. The History of the Korean IT Industry up to the Late 1980s

The Korean IT policy began with the enactment of the Electronics Industry Promotion Act in 1969. The Korean IT industry in the 1970s-80s was represented by production of consumer electronics, PCs and especially in the 1980s' communication sector expansion. The electronics industry was one of the six strategic industries selected for the Heavy and Chemical Industry plan. Thus, its development was under the general policy apparatus.

The IT (electronics) industry was fostered and protected under the generic 'greenhouse' strategy against foreign competitors, just as the other industries. Entry of foreign firms and their direct investments was carefully restricted. It was in the late 1980s that opening up the 'greenhouse' began. The state's support policy of offering loans at below-market interest rates was actively designed in order to help domestic entrepreneurial companies move into new strategic sectors. Some chaebol conglomerates were able to move rapidly into the electronics industry in the 1970s; because of their manufacturing capabilities achieved by the results of past state support fostered in the 1960s: the state-chaebol symbiotic relationship was also tightly maintained in the IT sector.

Specifically, the 'demiurge' state made efforts to overcome the crude conditions of the communications infrastructure. It was spurred on through the establishment of the Korean Telecommunication Authority (currently KT) in 1981 which contributed to investment concentration in the communication sector. In addition, its subsidiary for mobile communication was established in 1984.

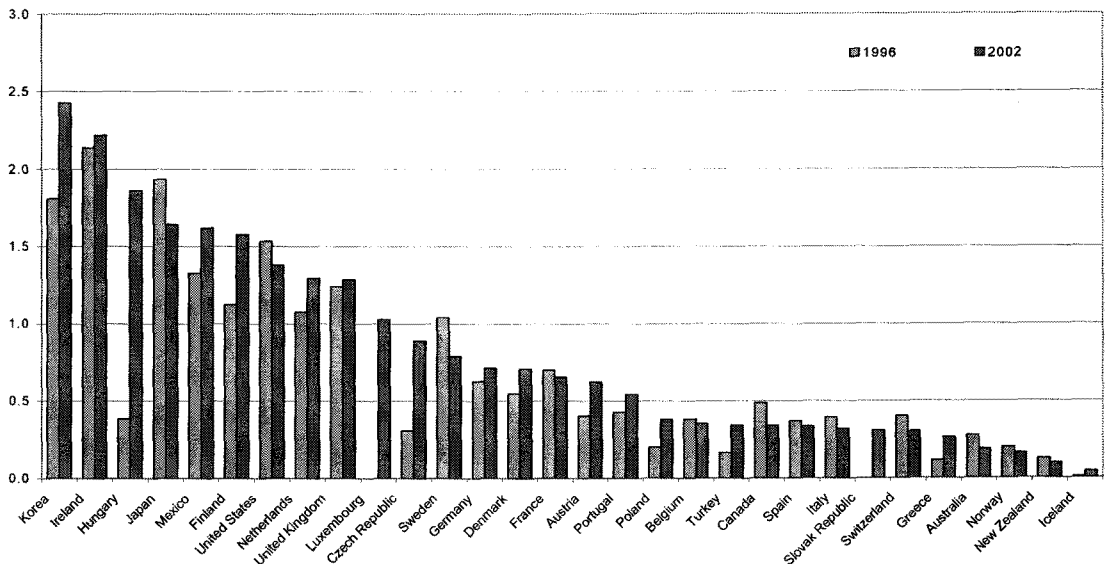
Especially, concerned with midwife and husbandry, in the 1980s state policy emphasized investment in R&D. Participation of large firms in national R&D projects, including electronic switching systems and

memory chips, was indispensable to the development of their technological capability; they were essential partners in high-tech development, resulting in a GRI-centered complementary system between the state and indigenous large firms[8].

4. Where is the Korean IT Industry Now?

According to Business Week[13], Korean multi-nationals have emerged as globally leading competitiveness in the IT industry: e.g. LG Electronics was ranked 1st in 2004, and Samsung Electronics 3rd and 11th in 2003 and 2004, respectively.

There are several indicators concerning the development of the IT industry. Of these, the 'revealed comparative advantage' index of the OECD is an indicator enabling the measurement of the comparative advantage in the manufacturing of IT equipment. It aims at seeing whether the IT industry performs better or worse in a given country than the average of the performance throughout the OECD. As shown in Figure 1, in 2002 there were ten OECD members that had a comparative advantage in IT manufacturing[14]. Of these, Korea had the greatest comparative advantage in IT manufacturing: Korea (2.43) and Ireland (2.22).



<Figure 1> Revealed comparative advantage in IT equipment, 1996-2002

Communication equipment trade surplus/deficit per capita also indicates that Korea is in the leading group[14]. During 1996-2003, Korea was ranked fourth among the OECD member states; and as of the end of 2003 Korea had the greatest trade surplus in communication equipment by US\$13billion dollars of any manufacturing country: Mexico (the 2nd by US \$11billion), Finland (the 3rd by US\$7.2billion), Japan (the 4th by US\$6.6billion), and United Kingdom (the 5th by US\$5.5billion).

In particular, with regard to broadband penetration by June 2003 Korea recorded 23.2 subscribers per 100 inhabitants[15], which was the highest among the OECD member states. This successful establishment of information infrastructure has drawn the attention of policy makers around the world. Even, the OECD[16] and the ITU[17] have indicated that the Korean case of broadband infrastructure development can be seen as a benchmark.

However, deployment for business use of ITs has been relatively low, according to a report[18] that

examined various IT related indices for eleven countries: Australia, Canada, France, Germany, Republic of Ireland, Italy, Japan, Republic of Korea, Sweden, United Kingdom, and the United States. Korea came seventh. Of the other indices, Korea had the greatest awareness of IT skills that is very important in understanding as to how it acted in relation to industrial policy, which will be discussed later.

The consequence of such rapid IT development has been that it has contributed an increasing share to GDP. In 1998, it was 9.9 per cent; in 2000, 15.1 per cent; and by 2002, it had grown to 16.9 per cent[19]. In addition, IT products comprised 28.5 per cent share of total exports in 2002[12]. Between 1991 and 1999, the growth rate of the Korean IT industry was 23.9 per cent. IT industry development was sustained even during the period of economic crisis in 1997/8: IT production increased by 16.7 per cent in 1998, despite production decline in most other traditional major industries[12]. These overall results are remarkable, given that IT production and consumption is based on cutting-edge technologies and not reverse engineering[20] in which Korean firms learnt from their western counterparts as to how to manufacture certain strategic goods and then sought to improve on them.

However, one of the clear findings from the fieldwork is that there was some degree of state intervention in facilitation of the IT industry. Nevertheless, state strategies applied to the Korean IT industry development were different from those used by the Korean developmental state for the initial industrial transformation. This brings us to two further questions that need to be asked: what are the differences in strategy adopted with the IT industry as opposed to other industries and how in particular did the state facilitate the IT industry? The following sections are devoted to addressing these questions.

5. Changes of the State's Role

5.1 State Vision and Strategic Co-ordination

Informatization was one of the two national foci of

the Civilian Government (1993-98) according to an interviewee, a former senior secretary for policy planning of the Civilian Government:

The Civilian Government's strategies were globalization appropriate to the newly emerging WTO system, and informatization for the qualitative advancement of traditional industries.

The informatization policy continued, as a key driving force, towards development of the national economy and facilitation of a knowledge-driven national economy and society as President Kim Dae-Jung emphasized in his New Year 2000 Policy Speech. It may be useful to note a statement of a policy-maker in the interview that there is a shared motto in relation to the Korean IT industry development:

Industrialization in Korea lagged behind, but Korea should lead in informatization.

In addition, the policy-maker emphasized:

Our government [Korea] was monitoring global policy trends [of IT], and there was a desperate feeling that we should not fall behind.

In order to address the vision, the Ministry of Information and Communication (MoIC) was established in 1994. And it was at the 'grand informatization promotion meeting' presided over by President Kim Young-Sam in May 1995 that the state informatization policy was decided as a national priority[12]. The commission for informatization promotion was consequently organised in order to foster the national project built on the 'five year basic master plan', according to the 'Framework Act on informatization Promotion' (August 1995). The Commission chaired by the Prime Minister consists of twenty four ministerial level members which cover all administrative, legislative and judicial sectors. Under this configuration, the MoIC played the key role in the facilitation of informatization, supported by special

government-funded institutions. Further, the senior secretary to the President for policy planning assumed responsibility as the Chief Information Officer of the national project.

It is also important to note the informatization promotion fund (IPF). It is because the fund has acted as a key means in the process towards fostering IT industry, enabling flexible and long-term investments in IT related projects and R&Ds in response to changes and/or challenges in the process. In the use of the fund, the MoIC had some degree of freedom from the general inflexibility of the state budget controlled by the Ministry of Planning and Budget. In consequence, the MoIC looks like a little modified EPB in undertaking the role of informatization planning and infrastructure construction.

However, developmental strategies employed by the Korean developmental state were no longer possible due to internal and external changes. An example is that because of the WTO membership, underlying the desire for Korea to lead the globe in informatization was a need to steer a course in which state vision and support did not transgress WTO rules.

5.2 The Demise of 'Greenhouse'

Just as with other industries, the Korean communication market had to be opened up, as the communication agreements of the WTO were implemented in 1997. The agreements resulted in the demise of the 'custodial greenhouse' strategy in trade and foreign direct investment. Korea planned to expand foreign share holdings to 33 per cent of the total share of the communication sector (20 per cent for Korea Telecom, KT) by the end of 2000, and to 49 per cent (33 per cent for KT) from January 2001. However, in reality, the 1997/98 Korean economic crisis speeded up foreign ownership; the expansion to 49 per cent planned to begin from January 2001 was executed from July 1999. In addition, foreign investors' KT share-holding limit of 33 per cent became available from 1998, and the 49 per cent limit was allowed from 2001.

Furthermore, viability of the 'purchase development' R&D strategy by the developmental state was threatened. An interviewee stated:

For example, there is [communication] equipment that will be needed in two years, but there is no technological capacity to develop it this year. To address this problem the equipment is collaboratively developed by a state sponsored institute and private companies with manufacturing capabilities. Financial resources are invested by both the private companies and the state. When the development is completed, the equipment is purchased by state owned communication service providers.

In general, there may not yet be a market for new products. These products may not be perfect, either. This prevents private capitals from investing in them, basically. However, through the 'purchase development' R&D strategy, as one policy maker noted:

the state solved this difficulty by creating a market for the goods. Based on this, [the manufactures] improved their technological capabilities enabling them to produce world-class goods, and advance into international markets.

Alongside the WTO agreement, there has been a growing idea of competition and privatization. As a result, KT was fully privatized in 2002. This challenges not only the 'demiurge', but also the 'husbandry' role of the state, for the government-owned KT had acted as the direct 'demiurge' agent in building the national communication infrastructure. Moreover, from the technological perspective, full privatization signalled the end of the 'purchase developmental' R&D strategy, mentioned above. As a result, it is now impossible for the state to foster the initial markets for indigenous firms through the 'husbandry' R&D strategy.

5.3 The High-Speed Information Network Infrastructure and a New Form of Demiurge

At the end of 2000, the nation-wide installation of the high-speed information backbone networks was completed. A key feature in this national project is that it was facilitated in a hybrid partnership between the

state and private capitals.

In the construction of the networks there was an allocation of investment, divided into three broad types of: the commercial networks in the range from 155Mbps to 5Gbps, the non-commercial public networks, and the research networks. Private telecommunication service providers invested in building the first type of networks through cable TV and optical fibre or ordinary copper telephone lines. These networks were aimed at providing commercial services for high-speed information flows to households and companies, for instance.

In contrast, the second and the third types of networks were under the responsibility of the state. The second type has interconnected major and small and medium sized cities of the country, that were aimed at providing services at low cost to public sectors including: central government agencies and regional authorities, educational institutions, libraries and museums. The third type has been utilized for a non-profit test-bed in the context of provision of an R&D environment for high-speed IT equipment and application services to universities, research institutes and corporations (laboratories of).

In consequence, as a leading-edge user the state has contributed not only to the informatization of the public sector, but also to the 'deliberate' creation of demand for high-speed information flows, and importantly has induced private firms' investments in the entrepreneurial sector including the development of relevant technologies. This distinctive evidence redefines the role of the traditional 'demiurge' state as a combination between the traditional and a 'midwife', for the developmental 'demiurge' would have chosen to achieve the goal either through an exclusive government-owned enterprise or through commanding the private sector to install the networks without consideration of the hybrid partnership.

5.4 Midwifery and Husbandry: Towards the Development of the IT Industry

The success of commercialization of the Code Division Multiple Access (CDMA) technology is a good

example of a state's midwife and husbandry roles. It was an outcome of an entrepreneurial state initiative through a national R&D project to develop the digital mobile communication system in Korea.

There was no country that had developed use of CDMA technology, commercially, before Korea, although the patent for its basic technology was owned by Qualcomm Inc. of the United States. Whilst CDMA was adopted as an interim standard in 1993 by the US Telecommunication Industry Association, Time Division Multiple Access (TDMA) was a unique standard at that time and already in the completion stage of its commercialization by developed countries. That is, CDMA was newer but riskier than TDMA, although both are technologies equally at the cutting-edge. Then what was the driving force behind the state's decision of CDMA? It was the national willingness to overcome dependence on foreign MNC's technology and any improvements in the imported technologies through the process of reverse engineering, under the fading condition of the state's 'custodial greenhouse' strategy.

With its adoption, CDMA generated a new 'kind of' 'custodial' protection from foreign leading-edge firms. The thinking behind was elaborated by policy-makers:

Regardless of the excellence of [TDMA-based] GSM, the [Korean] state strategically decided CDMA to be the standard.

Then global leaders in GSM could not enter into the Korean market. They were still in the infancy stage of TDMA, and also unwilling to risk exploring the potential of CDMA.

From the economic globalization perspective,

Since the WTO was launched in 1995, the state could determine the standard [technology] for mobile communication. With its authority to permit mobile communication service providers, the state could choose the [technological] standard and approve just those service providers that followed the standard.

This strategy resulted in a consideration of possibility for a 'new' state constructed 'custodial greenhouse' by technology standardization and a 'midwife and husbandry' role through risk-taking in the process towards developing cutting-edge high-tech industries in the new era.

Another feature related to the CDMA commercialization is that it was through an international collaboration scheme. Qualcomm Inc. who owns the patent for its basic technology participated in the national R&D project, unlike in the developmental era limited to only indigenous firms.

Alongside, there have been contributions of venture firms in fostering the IT industrial policy, as several interviewees mentioned. For example, as a result of the 1997/98 crisis, the state was unable to assist all the unemployed, financially. The gap was filled, to some extent, by small and medium sized venture firms. In 2002 seventy two per cent of venture firms (6329 of 8778) were in the area of 'new technology' and the rest were more specific to venture investment in R&D[21]. Most of them 64.7 per cent (5679 or 8778 firms) were in the manufacturing sector. Their key five export goods were mobile phones, receiving apparatus of satellite broadcasting, other mobile communication product parts, and acoustic product parts and data display devices. Some of the dotcom firms such as DAUM and NHN have emerged as leading players in the Korean stock market in a remarkably short time as a result of venture capital firms.

6. Investment in IT Skills Formation and HRD

Since the late 1990s the state has implemented various programmes of IT skills to enhance individuals' and societies' awareness. An example is the "ten-million people informatization education programme," intended to expand a base of users who utilize the high-speed information network infrastructure. MoIC in partnership with ten other ministries also initiated the "Internet education for one-million housewives" programme, conducted through authorized private

computer institutes throughout the country. 13.8 million people from all sectors They covered housewives, disabled people, soldiers, senior citizens, prisoners, students, teachers and civil servants, fishermen, farmers or peasants, regional dwellers, workers and public sectors' employees. through 2000 and June 2002 benefited from an education and training in IT skills[12]. There was also a national Internet PC supply project which was employed in order for less rich people such as peasants and fishermen to purchase PCs at lower costs. Price reduction was made possible through competition between participant vendors and co-operative purchases of product parts.

Of these, the global IT expert cultivation project is to second IT workers to developed countries for the short and mid term. Through this, a double-edged effect expects to be gained: cultivation of high-level manpower and knowledge of advanced technologies. Secondly, the state supports the IT research centre project, including the foundation of an IT-specific university: the Information and Communications University. This project aims at marshalling universities' outstanding researchers in order to develop core technologies, and with it supplying an IT high-calibre workforce.

In addition, the Electronic Commerce Resource Centre (ECRC) system was established to provide education, training, consulting, and technical assistance in order to foster utilization of ITs and ultimately e-business, especially for SME workers, venture firm entrepreneurs, the public sector, and job seekers through various programmes.

What can be inferred from the activities is that state encouraged the wide diffusion of IT skills in order to raise demand for IT services. An interviewee explained this policy in this way:

Where there are many people who wear shoes, there will be more shoe factories [businesses]. Where there are many shoe businesses, there will be more competition for better design, better durability, and better marketing. Ultimately, they will invest in technological development. The same is true of IT education and training. As

consuming power increases, IT industries will grow and their technologies will develop further.

The traditionally simple role of consumers may be changing if they can be as knowledgeable as the producers. That is, education and training of IT skills in the range from individuals to societies contributed not only to IT uses in the demand side, but also to generation of IT-related markets in the supply side by expanding its demanding power as a means in relation to the IT industrial policy. In a word, the investment in the IT skills formation and HRD played the double-edged roles. In Korea they are considered as a test-bed for new products in the digital economy. In this context the quote below for Samsung is quite a bit notable:

Samsung's approach to digital communication ... has another advantage, which is more difficult for any European rival to counter: the willingness of young South Koreans to pay high prices for new electronic devices. ... South Korea has more than 5m[illion] subscribers to third-generation services. That has helped Samsung to develop better designs for camera handsets at home before applying the lessons in Europe and the US. ... Of course, Japanese companies ... have done that for several decades, ...But countries such as South Korea have a demographic advantage over Japan and Europe - a plentiful supply of young people. ..., those consumers will become increasingly valuable. ...Design skills are transferable in a way demographics are not. ... the Samsung example has shown that the process ... can use [its] own domestic markets to develop global products[22].

If we consider that the society itself may act as a test-bed for new products this contributes not only to enhancement of local companies' R&D capacity, but also acts as a magnet to bringing foreign R&D centres to Korea.

7. A New Model for Facilitation of High-Tech Industrial Sectors

A new and important role for the Korean state has been to invite foreign MNCs to establish their R&D centres in Korea. The state has made deliberate efforts to this end. An example is the 'Special Law for Facilitation of DAEDUK R&D Special Zone' through which foreign R&D centres are eligible for the state's fiscal and monetary incentives in the same way as they are in the 'offshore zones'. To do this, the Korean state provides a variety of supports coupled with the relaxation of administration regulations: i.e. taxation, financing, relaxation of regulations including employment and industrial relations, and improvement of education and residential conditions. Especially, in these zones foreign education institutions are allowed to be founded.

What is interesting about this strategy is that the principle behind it is not far from that of reverse engineering. Korean workers for foreign R&D firms may be able to job hop in time back to indigenous firms thereby transferring knowledge.

8. A Note on the Future of Global Competition in IT

As the technological level of the national economy has come closer to the cutting-edge, even the neo-liberal United States is involved seeking to protect its cutting-edge technologies. No matter what technologies, if they are at the cutting edge, they have its intrinsic nature of 'custodial greenhouse' in this contemporary global IPR world because those that gain the IPRs have a monopoly.

As all states move towards the global economy emphasizing knowledge-driven wealth creation, R&D investment has become an essential element for development of the national economy. Thus, all states may place their policy emphasis on R&D. Leading economies may tend to be protective, while late industrializing economies will be aggressive in catching up or even overtaking them, even to the point where

IPRs are flaunted and their products reverse engineered. This may be where the future conflicts between economies will lie.

This leads to an important insight into a new feature of the global economy. It is unlikely that the focus of attention will remain on an ideology of free markets and fair trade once key local markets have been opened up. Rather the next phase may be characterised by international tension over the ownership and exploitation of new technologies and protectionism may take the form of seeking to 'dampen down' or retard the research capabilities of those countries seeking to catch up. The global story of 'opening-up' markets may have to be written anew in near future.

9. Conclusion

Korea created its own strategies in the process of reconstructing its economic, innovation and skill formation (or HRD) systems, rather than applying some else's blueprint. That is, to Korea, the IT revolution and globalization have been realised not only as constraints, but also opportunities. Under conditions of globalization and cutting-edge technologies, the Korean state has been constructing a 'new' model for development of the national economy. The current Korean IT industry has been developed on the foundation laid by state initiatives in state-private partnerships.

Alongside the fading of the 'custodial greenhouse' strategy, the Korean state has introduced the idea of competition policy, and deliberately used key features of the regulatory system to foster the IT industry. Given the nature of cutting-edge technologies and pursuit of high tech sectors, the state has placed great emphasis on R&D investment. It is an emphasis on the husbandry role of the state. The state has also been involved in bargaining to establish foreign MNCs' research centres in local areas and allying foreign MNCs with national R&D projects.

The state has also devised a custodial role by linking it to standardisation policy as in the adoption of CDMA. This feature is subtly different from Evans (1995)

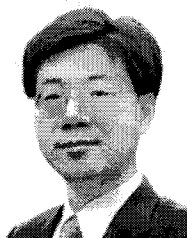
argument about the dependence of IT in Korea on TNC technology. Although Korea still relies on foreign basic blue sky technologies, foreign MNCs also rely on local R&D projects in order to apply cutting-edge technologies. Overall, the state has redefined the 'midwifery and husbandry' roles in relation to the IT industry. Through support for R&D the state acts as a risk-taking and leading-edge user incubator to new sectors of global significance, giving the midwife strategy a new life.

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