EXCHANGE FOR POLICIES

POLICIES TO PROMOTE IMPORT OF TECHNOLOGIES INTO DEVELOPING COUNTRIES: EXPERIENCES FROM ASIAN COUNTRIES

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Abstract:

Successes achieved from import of technologies of some developing countries in Asia are closely linked to efforts to build up and to implement related policies. The most impacts coming from these policies are supports for domestic enterprises to import technologies, to encourage external sides to transfer technologies, to administer the import of technologies and to enhance local capacities for import of technologies. In this context, certain flexible measures were applied for implementation of policies of import of technologies.

Keywords: *Science and technology (S&T) policies; Policy for import of technologies; Enterprises.*

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Imported technologies have brought considerable benefits for developing countries. Namely they help enhance economic competitiveness, to contribute to development of new economic sectors, to shift economic structure to modern models, to create jobs, to promote export activities and etc. The success achieved from import of technologies is closely linked to great efforts of these countries where policies related to import of technologies play important roles. Here we deal with some remarkable policies which got considerable attentions and were applied successfully.

1. Policies to support domestic enterprises in import of technologies

State policies to support domestic enterprises in import of technologies from external sources are clearly seen in certain aspects in practice by some countries.

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- *Interventions by the Government in technology transfer contracts to favorite enterprises*. The Governments issued policies to control toughly import of technologies.

  When South Korea was still a developing country, the Government made interventions in technology transfer contracts for key industries to enhance capacities of buyers, to maximize the involvement of local consulting agencies and to reduce technology purchase prices.

  Malaysia Government controls directly and globally activities of technologies import through application of incentive rules for import of technologies, particularly application of incentive taxation measures in investment activities (this country has no specific law for technology transfer). According to issued policies and guidelines for technology transfer in industrial sectors, Malaysian authorities require: for all the production projects which get investment licenses according to Malaysia Industrial Co-ordination Act 1975 or get incentives from Malaysia Promotion of Investments Act 1986, the technology transfer contracts for projects have to get written acceptances before getting signed with foreign counterparts. This requirement was promoted to prevent terms which may be unequally or disadvantageously imposed to technologies buying enterprises or cause bad effects to national interests. It targets also to justify the costs of technology transfer which have to meet the level and the nature of transferred technologies.

  The intervention measures from the Government have also enhanced positions of domestic enterprises in negotiation procedures for technology transfer. This practice was applied by Japan during 1950 and 1960 decades and then followed in practice by some countries.

- *Rules to favor domestic enterprises*. There were applied certain rules to bring benefits for domestic enterprises in their import of technologies from external sources.

  Before entering WTO, China regulations had some requirements imposed to foreign technology transferors such as limited time durations of payment for IP rights, tough conditions for liability commitments and complex procedures for legal acceptance. After having entered WTO (December 2001), these regulations were amended to be more moderate but still remained rigorous: The State holds rights to apply a unified legal system to protect a free and equal trade order in conformity to legal laws.

  The Malaysia Government, in its policies and guidelines for industrial technology transfer, issued regulations which reflect clearly procedures

to protect interests of domestic sides. These measures were seen in rules applied for payment modes, namely the payments for all the IP rights in contracts for technical supports, licensing rights and know-hows signed between Malaysian enterprises or joint venture companies and any foreign counterparts have to follow the rules: installment payments not to exceed 3% of net turnovers, full immediate payments not to exceed 500,000 Ringgit (MYR), full immediate payments and IP right payments not to exceed 3% of net turnovers; IP right payments of contracts for trademarks and inventions signed between Malaysia enterprises or joint venture companies and any foreign counterparts not to exceed 1% of net turnovers of each item (note that net turnovers are defined as the total incomes deducted by income tax reductions, interest rate reductions, logistic costs, insurance costs, various taxes and other related costs and fees (if applied), costs of materials, pieces or components imported from related foreign sides, sub-companies or joint venture companies).

In connection to contract terms and conditions and their extensions, the regulations require them to be sufficiently long for the transferred technologies to be wholly absorbed.

In connection to training, the regulations require the terms and conditions for full training for human resources of domestic enterprises made in facilities of technology suppliers as well as at sites of technology transferees have to be included and clearly indicated in contracts.

In connection to taxes, the regulations require a tax rate of 10% from payments made to foreign technology suppliers and the taxes are to be paid by foreign recipients.

- *Financial measures to supports technology importers*. The Singapore Government used to issue policies for financial supports for the period up to 1980. The most typical incentive support was the audacious measure to exempt import taxes imposed to imports of inventions patents, licenses, machines, equipment and materials.

  Incentive financial policies applied to technological innovations and applications of new technologies by enterprises were also seen as support measures causing indirect positive impacts to import of technologies. For example, the Philippines Government issued tax incentive policies such as exemption of corporate income tax for those enterprises which apply new technologies, enhance productivity rate and increase economic efficiency of their activities.

- *Measures to support information supply*. Discrepancies in information between sides usually lead to limitations in their transaction agreements. Some countries treated this problem by setting information supplying centers for domestic enterprises. This measure helped to reduce their disadvantages in negotiations for technological transactions.

  The typical case in this aspect was Singapore. For purpose to supply information for import of technologies, Singapore Government set up a system of representative offices for promotion of investment and technological innovation in developed countries (these representative offices conduct activities of direct promotion and selection of investors and abroad services for international business projects of Singapore). Also, Singapore Government set up specific centers for promotion of purchase of technologies, equipment and machines for technical innovation of key and spear head sectors of national economy.

- *Supports to coordinate activities of public research institutes with enterprises*. These supports were offered by many countries to link S&T organizations with enterprises, to enhance supports by S&T organizations for enterprises to receive and to master transferred technologies. As results of these policies, enterprises get more motivated and enhance their capacities in import of technologies. Typically, the Philippines Government set up research and application institutes to mobilize the exploitation of foreign high technologies.

2. Policies to encourage external suppliers to transfer technologies for national economy

Many policies were issued to encourage external suppliers to participate for technology transfer, namely:

- Governments of many countries issued regulations to protect effectively copyrights and IP rights to make foreign technologies suppliers more assured in their business;

- Regulations were issued also to enhance roles and rights of technology transferring sides which are to be recorded firmly in contracts of technology transfer. For example, the regulations for technology transfer issued by the Philippines by 1993 permitted to include some restricting articles such as to limit the scope and volume of products and to fix prices for products, to require the use of qualified experts (assigned by technology supplying sides), to assign exclusive product selling rights to technology supplying sides, and to fix 2 days as terms for approval of cost free contracts or amended contracts (previously registered) and 30 days for approval of other contracts;

- Some developing countries implemented incentive policies for foreign sides to invest in R&D activities in their countries where the typical case was Singapore. The Singapore Government prioritizes financial supports to set up science parks, research centers and other S&T infrastructure facilities to attract international prestigious giants, such as IBM and Hewlett-Packard, into R&D activities. Other incentive measures are also applied such as a half reduction of taxes imposed to R&D components in activities of trans-national companies which have their R&D facilities in Singapore, 10% reduction of taxes imposed to enterprises which extend production automation and business scale, exemption of income taxes imposed to enterprises which apply advanced techniques, the highest rate being up to 40% for a term up to 10 years;
- Attentions are also paid to attract expatriates. As one of measures during the first stages of development, Japan paid attentions to import technologies from the world through sending people to go to study abroad. China also extended abroad study programs for young people in Western countries (mainly in USA). The objectives of education development of China were clearly defined in three directions: (i) Modern oriented education (targeting to meet requirements of modernization of economy development); (ii) Future oriented education (shortcutting to meet requirements of movement and development of the world's economy); and (iii) External world oriented education (keeping Chinese specific characteristics and, at the same time, paying attentions to trends of development of science, technics and education of the world).

3. Policies to administer the import of technologies

3.1. Objectives and orientations of administration of import of technologies

In addition to incentive and support measures, the Governments of many developing countries paid attentions to administration and orientation for import of technologies.

The objectives of administration and orientation of activities of import of technologies are to unify local, individual interests with global, common ones, and short term interests with long term ones. Thanks to administration measures, it is possible to control the import of out-dated, polluting and other technologies which may cause harms to national interests. It is also to reduce ineffective outcomes of import technologies, from global vision of national economy.

In this aspect, China can be taken as typical example. The administration of import of technologies in this country looks to prevent not only the import of out-dated and polluting technologies but also the ones which may lead to external interventions or losses of "economy sovereignty"[2].

Actual measures were applied by numerous countries to implement administration and orientation of import of technologies, namely:

3.2. Modes of administration

- New industrialized countries (NICs) paid attentions to studies and classification of features of technologies and specific particularities of transfer channels to prevent the import of "waste technologies" and to target directly modern and advanced technologies;
- South Korea issued necessary control mechanisms for selection of advanced technologies with adequate prices. They put accents to technology transfer through FDIs mainly on basis of contracts for import of technologies and technical patents;
- China used to apply tough control measures for import of technologies through concrete rules and regulations. The Charter for Import of Technologies promulgated by the China State Council on 20th December 1987 and the Detail Rules for Implementation of the Charter issued on 20th January 1998 were based on the principle which states: Regardless of the original country of technology transferors and the capital source and payment modes of technology transferees, the contracts for import of technologies are subject to control and acceptance by authority agencies. The main contents of these regulations include:
  + Companies, enterprises, organizations and individuals which have no licenses of import business need to assign the import to authorized service companies;
  + Ministry of Trade and External Economy Cooperation is assigned to approve all the contracts of import of technologies of projects attached with Feasibility Reports which are to be approved by competent services of ministries and/or State Council Departments. The time term of contracts is required not to exceed 10 years, except being permitted by competent agencies;
  + Contracts are not permitted to include binding articles for purchase of materials, technical services, half-made equipment and other terms and conditions to limit the afterward development of imported

[2] See more in "China is getting vigilant to foreign investments" - Washington Post, February 2007.

technologies by technology transferees. However, China Government permits the capital contribution in joint venture companies through technology transfer, but the contributed technologies are required to meet the rigorous conditions such as: (i) Imported technologies are used for fabrication of urgently required products, new products or export designated products; (ii) Imported technologies can help to improve clearly quality and specifications of existing products, (iii) Imported technologies permit to use materials, fuels and energy in the most efficient way. In this case, investors may be required to provide evidences for values of technology-transfer-based contributions, the evidences being shown through provision of complete documents on capacities of those technologies.

- China and some other countries issued clear regulations for classification of technologies: non-limited, limited, and banned. The list may be subject to amendment during implementation.

3.3. Priority orientations for import of technologies

- State competent agencies issued priority orientations for import of technologies, namely:
  + Priority orientations for import of technologies for development of certain economic sectors. Namely: high techs for Singapore; electronic industry, computer industry, information and communication industry for Malaysia; semi-conductor industry and information technology for Taiwan; metallurgy, petro-chemical industry, chemical industry, textile industry and engineering (1960-1970 period) and metallurgy, electronic industry and petro-chemical industry (post-1980 period) for China

    Import technologies are usually selected toughly to meet assigned great expectations. Developing countries take into consideration Japanese experiences in efforts to shortcut gaps to USA and West-European countries. These import technologies were considered carefully on basis of hard and exhaustive studies of the world's existing technologies, the advantages of every one of which were compared in details each to other. Then great effects were produced thanks to tough administration measures of import activities as well as the right selection of import technologies. Many import contracts gave contributions as backgrounds for development of new industries in national economy such as invention patents of nylon from Dupont and Terilen companies which opened the synthetic fiber textile

industry. The same case was for semi-conductor industry and color television industry for this country.

In addition to their great efforts, experiences from many countries show well that it is absolutely possible to orient the import of technologies to development of key important economic sectors;

+ Priority orientations for import of technologies designed for identified regions and areas. In China, coastal regions, being considered as "nests for phoenixes to lay eggs", got great attentions to attract FDI projects which brought in not only technologies but also techniques and management experiences;
+ Priority orientations to focus investments for import of certain identified technologies. China paid high attentions to concentrate sources to get key important technologies for development. For example, by 1970, priority investments of a volume of USD3.5 billion were focused on 26 groups of extra-size equipment including metal cutting equipment, 13 groups of equipment for production of chemical fertilizers, 4 groups of chemical fiber equipment, 3 groups of petro-chemical equipment, many groups of 2.3 million KVA generators and 43 integrated groups of coal extraction equipment[3];
+ Priority orientations of import of technologies to develop endogenic (locally generated) technologies and economic development. NICs, China and Malaysia combined closely the import of technologies and domestic technological innovations. The Governments of these countries increased investments for R&D activities to target development objectives and to improve external technologies

In China, the import of technologies is linked closely with production development and market extension. The China path of "adaptive transformation" of foreign technologies was realized in a three stage procedure: (i) *initially,* Attracting FDI sources for assembling and fabricating facilities of products on basis of original designs and prototypes; (ii) *next*, Transferring, through links and joint venture business, to domestic production of products in high tech fields while still holding original trademarks of foreign corporations; and (iii) *finally*, Manufacturing products in high tech fields with China's own designs and trademarks, being still based on links and joint venture business. It can be seen that the China path to approach new technologies is partially similar to the Japan one, namely: imitation of

[3] Source: KCN Library and China Import Technology: Policy and Performance, Commercial Technology Transfers to the People's Republic of China, 12th September 2006.

technologies and, then, "adaptive transformation". By this way China became a "prototype model" for "local production of foreign commodities" for purpose of external consumption markets. This strategy leads to a large presence of "made-in-P.R.C." products almost in all the world's countries including products of mainly simple labor values (such as clothes, foot wares, toys and etc.) up to products of high tech values (such as cars, motorbikes, computers, television sets, fridges and etc.). Even, many enterprises in developed countries suffered failures when facing cheap price commodities made in China.

- The State priority orientations for import of technologies were realized by many measures, namely:
  + Setting up and implementing strategic plans in connection to established priority orientations. Typically, the Singapore Government followed regularly S&T activities: (i) to update information and to access in-timely the most advanced technologies appearing in the world; (ii) to collect points of views of local technological experts, and, at the same time; (iii) to use actively consulting services by foreign technological experts. On basis of all of that they plan middle-term and long-term policies for technological development;
  + Linking closely priority orientations of import of technologies to master plans of S&T development and directives of the country's economic development. Typically, China set up integrated national plans which were realized as long-term strategic implementation for S&T development in nationwide scale. Since 1952, the two key tasks which were linked closely in the first 5-year plan were economic development and import of technologies and equipment from the Soviet Union. As results, the development of heavy industries were pushed up on basis of large scale import of technologies (called the "out-break" of the first import of technologies during the 1950 decade).

4. Policies to enhance local capacities for import of technologies

Local capacities for import of technologies include: (i) Purchasing right technologies from right sources (enough access to sources of import technologies); (ii) Using effectively imported technologies; and (iii) Improving and upgrading imported technologies and creating endogenic technologies on basis of imported technologies. Experiences from many

countries confirm the meanings of these capacities. The practice, from another side, provides some points of high attention.

First, the important role of import of technologies is confirmed and the efforts for realization of import of technologies are made by almost all the developing countries. But there exist some differences in practical outcomes. Differences are seen in volumes, types and levels of imported technologies, efficiency rate of use of imported technologies, levels of improvement and innovation for imported technologies, and large propagation of imported technologies (including impacts from imported technologies to economic development in general and S&T development in particular, and impacts from development of imported technologies to change positions in activities of local enterprises in external technology transfer).

Another difference which is highly remarkable reflects more basically the senses and objectives of import of technologies in developing countries, namely: it is not only to use externally transferred technologies to produce locally certain groups of products but, on basis of imported technologies, to establish new economic sectors capable to compete external markets.

It is a big difference between the use of imported technologies for fabrication of foreign ordered products and the use of imported technologies to produce locally products to enter the world's markets.

It is a big difference between the improvement of local technological level thanks to addition of new externally transferred technologies to the system of old technologies and the development of endogenic technologies, on basis of imported technologies, to meet requirements of real contexts and development orientations of the country.

The mastering and development of imported technologies are very important to create a new position of domestic enterprises in activities of external technology transfer (which is seen through a development helix: i) import of technologies for effective use in production and business activities leading to development of imported technologies, ii) upgrading of imported technologies and creation of endogenic technologies leading to a higher position in external technological transactions). These inter-links are far different from efforts to make the best for individual and disintegrated activities or only for linear and segmented links between them (import-use-upgrading).

The main objectives of import of technologies are to get provided with "weapons for counter attacks" in external markets which is far different from tools to reduce the domestic backward situation.

Up to now, there are only some limited cases of success such as NICs, China, Malaysia and etc. in these aspects. Here, they get successful not only to import those technologies they need (and they wish), to use imported technologies for intensive economic development, to create endogenic technologies but also to advance gradually their position in international markets of technology transfer. They provide good examples to illustrate a vain seemed concept: the objectives to be achieved are not to increase binding links but to advance to equal links and to get out of external dependent ties.

Second, the successes of some countries are due to capacities other countries do not have. In addition to specifically technological capacities, some remarkable capacities are worth to be noted.

- Concentrated finance sources specifically mobilized for import, mastering, improvement and creation of technologies were huge and gradually increased. In order to secure these sources, it is not only a problem to mobilize a huge volume of currencies but also to get consensus in investments for purchasing technologies. As experiences show the most optimal way to succeed it is to use the volume of currencies collected from promotion of export of commodities produced by imported technologies. As example, statistic figures by China Ministry of Trade and Foreign Economic Cooperation show a strong growth of import of technologies during the X-th 5-year plan (2001-2005). During these 5 years the total values of import of technologies was USD70 billion making almost one third (1/3) of the total volume of import of technologies of China since the start of reforms and opening of the national economy during 1980s[4].However, the volume of values of import of technologies made small parts being compared to the volume of values of export of high tech products (which, in considerable parts, were produced by use of imported technologies) of China. From another side, China gained considerable volumes of currencies from export of technologies. The volumes of China export of technologies increased very fast: USD880 million by 1989, USD990 million by 1990, USD1.28 billion by 1991, USD2.17 billion by 1993, USD1.51 billion by 1995, about USD5 billion by 2003[5] and further;

[4] The Role of Technological Development in China's Industrialization and Economic Growth, www.gwu.edu, February 2002; Chinese Civil Law Forum, 30th January 2007.

[5] Vietnam National Center of Science-Technology Information (MOST). (2005) *International experiences in promotion process for technology transfer and absorption*. (in Vietnamese). Science-Technology-Economy Summary Report, No. 3, p. 27.

- Developing countries need to develop R&D capacities to serve import of technologies from external sources. Here, R&D capacities are required for studies of technologies to be imported, mastering and localization of imported technologies, upgrading of imported technologies and then development of endogenic technologies. The most remarkable reason of success of NICs and China is their early efforts focused on development of R&D potentials and orientation of R&D activities to settle problems of import of technologies;
- The successful use of imported technologies to bring in economic values requires capacities in fields of marketing, quality control and many others;
- In macro plans, policy making capacities of State agencies play very crucial roles. The success in sectors of import of technologies depends on policy making skills which are, at the same time, firm and flexible, global and local, extended and actual. Briefly, certain capacities need to be developed to make and to realize these policies.

Third, it is necessary to enhance technological capacities to keep pace with requirements of import of technologies. There exist inter-links between technologies to be imported and capacities for import of those technologies. The level of success of import of technologies is found to correspond to the level of capacities for import of technologies and the level of integration of capacities for import of technologies. NICs and China being successful in import of technologies, in comparison to the remaining countries, have a higher level in capacities for import of technologies and are more rich in diversity of capacities required for import of technologies.

5. Policies to be flexible for import of technologies

As observed in practice, every country may amend its policies for import of technologies. The more policies are clear the more the changes get more remarkable. Some typical cases can be listed.

- In South Korea, policies for import of technologies passed three stages. In the first stage, the State controlled toughly activities of import of technologies to provide better instructions and supports for enterprises as initial backgrounds for transfer and mastering of imported technologies. In the second stage, the State interventions were loosened to offer more initiatives to enterprises in their choice and selection of technologies to be imported. In the third stage, the State interventions were maximally reduced in aspects of import of technologies. Now, the State administers the import of technologies through issuances of technical standards

(mainly focused on environment protecting regulations) and enterprises remain self-liable for their decisions for other aspects;

- In China, policies for import of technologies, in initial stages, permitted enterprises to import low level technologies and, afterwards, require them to enhance the quality of imported technologies to meet the world's standards and levels;
- Lists of priority sectors for import of technologies vary also. Chemical industries, textile and engineering were named in priority lists during the 1960 and 1970 decades but remain absent during post-1980 priority lists;
- Since entering WTO[6], tough regulations having been heavily imposed on external subjects of technology transfer were amended;
- In the Philippines, one of main changes in policies for import of technologies dealt with regulations for technology transfer (recorded in Law on Foreign Investment which was promulgated on 15th March 1993). New regulations made transaction for technology transfer into the Philippines easier and more attractive;
- In South Korea, Taiwan, Singapore and China, the technology transfer was shifted from the targets of learning nature to the ones to serve a creative development of technologies in the country.

Trends of changes were focused mainly on the first rank roles of the State which got shifted from a position to protect interests of domestic enterprises

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[6] China entered WTO on 11th December 2001. The China Government committed to remove existing regulations which impose heavy liabilities and cause limitations to foreign technology transferors. By end of December 2001, the State Council and Ministry of Foreign Economic Cooperation and Trade (MOFEC) issued new rules and regulations in their efforts to adapt China regulations for import/export of technologies to WTO standards and requirements. According to these post-WTO regulations, transactions for import of technologies get less dependent on administrative controls in both aspects of formalities and power. In the statement of regulations, the political wording way normally emphasized on liabilities of foreign technology transferors were reduced in tones. Previous regulations required that technologies to be imported have to be qualified as advanced and adapted. New regulations get more moderate in these requirements, namely the Government encourages the importance of advanced and adapted technologies. Though there still existed general statements that imported technologies are required to be beneficial for development of China and the rights and interests of China would be protected, detail standards for import of technologies as noted in pre-WTO regulations were removed.

At the same time, a new term was added to new regulations for import/export of technologies. This term stipulates that the State will apply a unified legal system to secure a free and equal trade order in accordance to legal practice.

China's post-WTO regulations removed certain cumbersome procedures. Import technologies get classified into three main categories: non-limited, limited and banned. MOFEC was assigned to be responsible to make public the lists of limited and banned technologies, these lists being subject to amendments if required. On 30th December 2001, MOFEC made public a two-page list of technologies classified as limited and banned for import. The scope of limited and banned technologies was narrow to include less than a dozen of groups of technologies. The list of import banned technologies include mainly low level and polluting technologies in sectors of metallurgy and chemicals. The list of limited technologies include some out-dated technologies in traditional industrial sectors. (See also "*The Role of Technological Development in China's Industrialization and Economic Growth", www.gwu.edu, February 2002; Chinese Civil Law Forum, 30th January 2007).*

and to guard internal interests to a position of arbitrators in transactions of technology transfer between sides.

The new stands and changes of policies for import of technologies show some remarkable points. *First,* there exist always certain conflicts between sides in process of technology transfer. The favors for one side would cause bad impacts to interests of other sides. The impacts caused to interests of sides would restrain activities of technology transfer. Despite of these complex and conflicting links, certain stage of development requires actual policies. The establishment and the effective application of policies for import of technologies in some countries permit to confirm the possibility to integrate interests of sides involved in process of technology transfer in clear policy-based solutions. The balance would be established on basis of comparison of inter-links of interests and positions of sides in certain contexts and under certain subjective visions. The example for that would be the consideration of policies to support domestic enterprises which should be put in necessary scopes and accepted contexts.

Second, the balance established in policies for import of technologies cannot be sustainably stable in time. The inter-links of interests and positions of sides would change and the subjective visions may vary and then they require changes of policies.

Historical experiences of many countries show the following factors leading to changes of policies for import of technologies.

- *Compatibility to development of internal levels*: (i) the growth rate of domestic enterprises and the enhancement of potentials of endogenic technologies permit to reduce support measures from the State; (ii) Financial capacities, strong enough, offer favorable conditions for technologies importing countries to conduct more equal forms of technology transfer; and (iii) modifications of orientations of economic development put new tasks which require import of satisfying technologies;
- *Compatibility to context*: the entering into international organizations requires adjustments to meet the rules of games of every type of organizations. In fact, the rules of international organizations are also results of fights and compromises between involved powers. In case of WTO, the developed nations actually hold dominating positions and many regulations are beneficial for them. Then, developing countries, once entering WTO, have to remove certain regulations disadvantageously imposed to technologies importing countries;

- *Adjustments of policies on basis of practical experiences*. The adjustment of policies for import of technologies may be results obtained from practical experiences of failures as well as changes of minds for searching more effective solutions./.

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