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Overview

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1. Purpose of the Study

This volume is a report of the research group on the issue of "regional cooperation to enhance industrial technological capabilities." The purpose of the research group was to assess the series of programs which have been carried out, mainly under the auspices of MITI (Ministry of International Trade and Industry), JETRO (Japan External Trade Organization), JODC (Japan Overseas Development Corporation) and AOTS (The Association for Overseas Technical Scholarship), to develop supporting industries in Asia. The first of the series was the New AID Plan, which was launched in 1987. The group focused on Thailand and Malaysia where the programs are believed to have achieved satisfactory results. As the APEC-wide applicability of industrial assistance, which may be considered a form of Japanese-style industrial policy is far more complex, it was decided not to approach it at this time. The purpose of industrial policy is considered to prevent possible market failure or to compensate for them once they occur. It affects the allocation of resources to industry or it affects industrial structure.[1] Recently Japan's assistance in this fields intends to pursue such kind of purposes. But the scope of this report is confined

[1] Ryutaro Komiya, “Introduction,” in *Industrila Policy of Japan,* Komiya et al. ed., Academic Press, 1988.

to the aspect of enhancement of technological capability. The group's investigation was focused on mold and die industries because they have been the key supporting industries targeted under the development programs. It goes without saying that the group's members also recognized that Japan's mold and die industry has provided vital support for the development of its mass-production manufacturing sector. As Professor Saito(1997)[2] noted, molds and dies constitute the mother tool of manufacturing, and technologically, the industry itself forms the base of the automotive and electrical appliances industries.

Inoue's paper in Chapter 2 identifies supporting industries as "the manufacture of components/accessories and basic materials, and in the narrower sense as the processing of materials (casting, forging, pressing, welding, machining, heat treatment, plastic processing, etc.)". Such supporting industries consist mostly of smaller independent manufacturers.

In the area of industrial support policy, Japan has been successful in the strategic development of specific sectors, while the United States boasts a more macroeconomic involvement. The New AID Plan was devised as a new-style tripartite cooperation package combining economic assistance, direct investment and import. Naturally, the plan tended to reflect Japan's stance in pursuit of national interest as foreign investment boomed in the rest of Asia. The foreign-investment boom in Asia has triggered the establishment of international production networks where Japanese manufacturers play a central role. Thailand and Malaysia singled out mold and die industries for priority promotion. Behind this decision was the fact that their automotive and electrical machinery and electronics industries, which are important because they embrace an extensive range of peripheral segments, depended on imports to secure components. The

[2]Eiji Saito, "Kanagata-sangyo Kenkyu Shiron," Chuushokigyo-kiho, 1997, No.4 (in Japanese).

recent economic crisis has dealt a severe blow to such international production arrangements, which has prompted Japan, at both government and private levels, to further increase its support. In Japan, the government has not contributed much to the mold and die industry's development; to the contrary, it is the set manufacturers that have stimulated and supported its growth. However, in other Asian nations, the rapid entry of foreign manufacturers has hastened rapid development of the parts industry. In view of this, and at the request of local governments, the Japanese government decided to support the mold and die industries, along with other sectors.

2. Growth of Supporting Industries

There are many ways in which Japan has relocated its production to nations where the cost of labor is cheaper. Some firms manufacture high-grade products in Japan, while building lower-grade products in other Asian nations. Others undertake the technical development and other initial stages of the production process in Japan, while shifting the final stages to other Asian nations. Whatever the purpose, Japanese firms – not only set manufacturers but also their suppliers – have advanced in droves to Thailand and Malaysia, forming a substantial industrial base.

Inoue’s paper in Chapter 2 takes special note of the formation of such production networks in Asia. In Japan's case, large machinery-assembly firms, including electrical machinery and electronics manufacturers and automakers, initiated the move into the ASEAN region. SMEs followed in their footsteps in order to supply the components needed by these assemblers. Local firms also played a role in supplying the Japanese

assemblers, often establishing joint ventures or technical tie-ups with them. The early assembler-supplier relationships were hierarchical, however they changed as the assemblers and suppliers became more equal or independent. The whole process indicated the Asia-wide growth of Japan's so-called "Full-set-type"[3] industrial structure, or the formation of a coherent production network in Asia. The network is not limited to Japanese-ASEAN links, but also embraces American, European, South Korean and Taiwanese manufacturers as well. The inter-firm relationships within the network are now more equal and independent than hierarchical.

Tsunekawa's paper in Chapter 3 emphasizes Thailand's need to strengthen the international competitiveness of its machinery sector, because it is this sector that will sustain the Thai economy in the long term. For that reason, the paper insists upon the "internalization" of basic technology as the source of the sector's strength, and the development of a wide range of supporting segments to supply quality materials and parts. Special emphasis is placed on the building of domestic manufacturers' linkage with foreign firms who have extensive management resources. The rationale for Thailand's development of its supporting industries is explained as heading off the growth of a foreign "enclave" and improving its international balance of payments. JETRO's survey of Japanese manufacturers in Thailand reveals a decline in their local procurement ratio between 1987 and 1996. The decline indicates local suppliers' failure to fully meet the growth of demand ensuing the massive influx of Japanese manufacturers. Electrical machinery and electronics makers have made less progress in local procurement compared with transport equipment makers. A reason is identified as the former's tighter quality requirements because they are more oriented towards export markets. The decline in

[3] Mitsuhiro Seki, *Furusetto-gata Sangyokozo wo koete*, Chuko-shinsho, 1993 (in Japanese).

Japanese manufacturers' local procurement ratio is likely to continue as ASEAN's regional liberalization progresses. Tsunekawa reiterates the importance of developing supporting industries because of a possible widening of the bipolarization of Thailand's industries. The bipolarization concept sounds familiar because it is similar to the situation in Japan where the need to correct the gap between large corporations and smaller firms was also debated at length. That debate later subsided as fresh expectations of growth of technology-oriented venture businesses gained ground.

Tsunekawa's paper explains two distinctive ways in which a supporting industry may develop. In one way, growth of an assembly industry precedes that of a supporting industry (backward linkage). In the other, development of a parts industry triggers that of an assembly industry (forward linkage). Because history shows that the latter pattern is the more common, policy priority is given to promoting supporting industries or establishing local manufacturers' links with foreign interests. The Thai government adopted various privileges and incentives to attract foreign supporting industries as well as placing extra emphasis on promoting the automotive industry. To that end, tariffs were used as a way of protecting it, because the government intended it to serve the domestic market. As the Thai economy became more globally integrated, and especially as the economic crisis erupted, emphasis was shifted to making the export sector more competitive. Today, the electronics industry has moved into the spotlight.

Dr. Kitti (1999)[4] took notice of the difficulties smaller Thai firms had raising funds in the face of the currency crisis. According to Ministry of Industry's survey, smaller firms' sources of financial capital comprised their own capital funds (38%), commercial loans

[4] Dr.Kitti Limskul, *Future Prospects of Selected Supporting Industries in Thailand,* Institute of Developing Economies, 1999.

(56%) and government loans (10%). Dr. Kitti noted the lack of loan facilities to accommodate the needs of high-risk venture businesses.

The paper of Yamazaki in Chapter 4 discusses Malaysia's historical policy for the development of supporting industries. In Malaysia, under MITI's auspices, the VDP (Vendor Development Program) was adopted as an experiment to develop parts suppliers by promoting a linkage between SMIs (vendor) and big corporations/MNCs (anchor). Specific efforts included the Proton Components Scheme (which was started in 1988 to promote tie-ups between Proton and bumiputra-operated smaller auto parts makers) and the Electrical and Electronics Components Scheme (which was started in 1992 to promote tie-ups between Sharp, Sapura and smaller electronics and electrical parts makers). MITI, which coordinated the operation of these schemes, emphasized the tripartite concept based upon which they were designed. Up to 1994, 40 MNCs and financial institutions had taken part. Many observers said that the schemes had yet to achieve satisfactory results, which reflected the fact that the bias in favor of bumiputras hamstrung assemblers in search of ideal partners. While most mold manufacturers were operated by Chinese, VDP favored bumiputras, so the Chinese manufacturers were not entitled to the benefits. Dr.Rasiah (1999)[5] pointed out that, whereas the automotive sector has been generously protected by the government, the electronics sector has not. He explained that the former has benefited from the government's Malay-oriented policy in Kelang Valley, while the latter, which consists mostly of Chinese operators, has received provincial rather than state support in Penang.

In 1996, the Malaysian government set up SMIDEC as a body in charge of smaller

[5] Dr.Rajah Rasiah, *State Support and Machine Tool Subcontracting Links in Malaysia: Microelectronics and Passenger Car Assemblies,* Institute of Developing Economies, 1999.

firms. The corporation initiated ILP (Industrial Linkage Program) in accordance with the nation's 2nd industrial master plan.

Malaysia imports an estimated 70% of all molds and dies it needs. The development of SIs has made less progress in the electronics and electrical parts sector than in the automotive sector. Malaysian manufacturers can handle plastic forming satisfactorily, but have difficulties making pressing molds or precision molds. They are enthusiastic about forming joint ventures with Japanese manufacturers. Competent bureaucrats, company managers and engineers tend to disregard basic technology. This attitude must be overcome by promoting further incentives, technical cooperation and the integration of efforts between government agencies, trade associations and manufacturers.

Despite all the efforts which have been devoted to the development of the parts industries in Thailand and Malaysia for many years, Japanese manufacturers apparently remain reluctant about teaming up fully with local suppliers. The local manufacturers have trouble winning the complete confidence of Japanese set makers who demand they meet tight quality control and delivery-schedule requirements. This picture seems little likely to improve any time in the near future. Nonetheless, local manufacturers may also explore the possibilities of tying up with American or European firms, or of introducing CAD/CAM technology to quickly enhance the quality of their products. It is becoming increasingly difficult for the Japanese manufacturers to stay competitive on their own. More important, the base of their supply chain in these nations is weak. Strengthening it necessitates the development of local suppliers.

3. Japan's Assistance to Asia

Inoue's paper in Chapter 2 stresses that, of the SI firms dealt a severe blow by the crisis in 1997, export-oriented manufacturers have proved less vulnerable. Domestically oriented manufacturers also have been trying to maintain their production levels by increasing their proportion of exports. Japanese corporations envision the establishment of an Asia-wide mechanism of horizontal international division of labor over the next 10 to 15 years. This region is strong in the manufacture of goods, and they believe that its production network may be competitive globally. The current crisis might erase the rewards of past efforts before they can be reaped and make the future uncertain unless SIs are promoted and workers' skills improved. The governments throughout Asia, including that of Japan, are eager to cooperate in achieving these objectives, with Japanese corporations adhering to their policies. They are well aware that efficient SIs are essential to establishment of an intra-regional production network.

Inoue's and Tsunekawa's papers introduce the BSID (Bureau of Supporting Industries Development) as an example of Japan's industrial cooperation in Thailand. BSID was restructured in 1997 to take care of plastic processing in addition to metalworking, in order to step up the promotion of SIs in Thailand. Japan supports BSID in enhancing local SIs' technological levels and training skilled workers. The impact of the economic crisis has been great on the local SIs, where layoffs have had to be increased, which has made Japan's support vitally important. The Ministry of Industry has drawn up an Industrial Restructuring Plan, which has identified Thailand's manufacturing sector's weaknesses as low technological level, unskilled workforce, lack of SIs, want of brands, inadequate management skills, and overconcentration of industries in Bangkok. As ways of overcoming these shortcomings, the plan calls for: improving productivity; enhancing

technological level; promoting design development; promoting foreign investment; improving workers' skills; promoting SME; and decentralizing factories. The plan asks for the Japanese government's support in such areas as long-term financing, experts' services, incentives to promote foreign investment, and training of workers, engineers and corporate managers.

As Yamazaki's paper points out, MITI needed to promote local suppliers in the ASEAN region and establish their linkage with Japanese manufacturers. Toward this end, MITI drew up its policy for the development of SIs in the region, for which it implemented projects to foster model local manufacturers. Yamazaki's paper describes three areas in which JETRO extends its cooperation: promotion of foreign investment, arrangement for Japanese experts to provide technical guidance, and cultivation of partnerships between assemblers and parts suppliers. In the area of technical guidance, more than 20 local manufacturers have been singled out. Of these, six have significantly bettered their QC, productivity and competitiveness by introducing the 5S's, appropriate maintenance of moldings, and better use of measuring devices. They are now models on the receiving end of cooperation projects.

MITI's strategy has now been extended to support Japanese manufacturers along with local suppliers. Behind this move lies the fact that Japanese manufacturers have already come a long way in completing their Asia-wide production network, which cannot be given up because of the current crisis. Commencing January 1999, the AOTS undertook a training project involving more than 10,000 trainees in the region, which is funded in the supplementary budget for fiscal 1998. The idea is to educate/train the labor force while it remains idle due to recession. In the same budget, JODC's project to offer the services of technical instructors has been expanded to make Japanese manufacturers

also entitled to the benefits.

On their part, assemblers have been pushing the development of a system of international division of labor for Asia, with an eye on the creation of AFTA (ASEAN Free Trade Area). Despite the initial difficulties, AICO (ASEAN Industrial Cooperation) looks as if it will finally get under way. The region's automotive sector already has all essential supporting sectors, including mold manufacturers, ready at hand, if Japanese suppliers are included, meaning that further investment in the supporting sector should not be required in the immediate future. The more pertinent question is how export-oriented the sector will be able to become. The region's national governments agree on general principles, but when negotiation becomes specific, they are reluctant to abandon a key domestic parts industry. The slump in domestic demand has forced the region's automotive industries to strive to become export-oriented. However, it is questionable whether they will be able to make sufficient progress, as they must address problems such as conformity with international standards before they may be globally competitive.

The region's exports of electronic components continue to increase. Thailand is increasingly likely to become the base for the worldwide supply of Hard Disc Drives (HDDs). The region's nations have the potential to develop into a major base for the manufacture and export of electronic components. To realize this potential will require promotion of investment in parts industries, development of adequate infrastructure, and training of skilled workers and engineers in addition to importing technology from abroad. The product life cycle of electronic components is becoming shorter, with increasing demand for higher precision, speedier delivery, and lower pricing. With regard to short lead-time for delivery, related industries need to be located nearer to each other. Improving precision in addition to this requires even more engineers to provide necessary support.

Japanese workshops often operate all night long to keep the promised delivery date; however, this way of doing business may not necessarily be appropriate in other Asian nations.

One of the major issues facing manufacturers today is how to establish the most appropriate global production system. As Yokota's paper points out, as building precision molds and dies in Asian countries outside of Japan is still difficult, Japanese imports should be utilized instead. Transfer of technology cannot take place overnight, but should progress suitably over a period of time. While the region's manufacturers understandably value operation and maintenance/repair manuals, they need to be combined with OJT to develop the skill required to put the theory to practical use. Installing the newest machinery is not necessarily a step forward for a company, as it requires maintenance for which engineers' service, and jigs, fixtures and tooling must be provided. If the highest level of precision is demanded, even the best machinery still cannot completely replace human craftsmanship. Japan remains the strongest in this area. There are few skills that cannot be mastered by accumulating experience, and considering the shortage in Japan of workers to inherit or pursue skilled craftsmanship, production might be relocated to other Asian nations in the future. As Yokota's paper notes, in addition to slow progress Japan's mold and die industry has been making in globalization, another source of concern is the low regard in which molders are held. In Tokyo's Ota Ward, where a cluster of mold making shops operate, the importance of seasoned molders needs to be reinforced. Attracting renewed interest in skills is also extremely meaningful throughout the remainder of Asia.

In addition, serious thought should be given to establishing a system networking Japan and Asia (excluding Japan) to reconcile the requirements of the region's die and

mold industries and to accelerate the transfer of technology. This system should function in the role of that of sales representative in order to identify the needs of Japanese and Asian industries. It should also act as a forum where Japan and Asia share their knowledge to promote technological development with a view to invigorating the region's mold and die industries as a whole.