FOREIGN DIRECT INVESTMENT, LOCAL SMALL AND MEDIUM ENTERPRISES AND TECHNOLOGY TRANSFER IN DEVELOPING COUNTRIES: A STORY FROM INDONESIA

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Abstract
Official reports, academic papers and many case studies on small and medium enterprises (SMEs) in developing countries show that large enterprises (LEs) produce better products than those by SMEs, partly because the first enterprises have better technology, which make them more innovated compared to the second ones. Thus, as general rule, to be able to do innovation, SMEs need to improve, among other things, their technology. Improvement of technology can take place internally (inside the firm) or can be fostered through access to external sources, including from foreign direct investment (FDI). This study aims to examine how important is the presence of FDI for local SMEs with respect to transfer of technology in Indonesia. This study is based on a literature survey and a case study on SMEs in metalworking industry in Tegal, Central Java. It appears that in some cases foreign companies are the only source of technology for local SMEs through subcontracting arrangements. However, not all local SMEs, especially small enterprises (SEs) can become local subcontractors, due to their lack of skilled workers and basic technology. This study therefore suggests that government has an important role to play to support capacity building of especially SE so they can be accepted by foreign companies as their local suppliers.

I. Introduction
It is often argued that a key to increasing the competitiveness and productivity of small and medium enterprises (SMEs) in developing countries is to build the capacities of these enterprises through improved technology, among others. This technology development can take place internally (inside the firm) or can be fostered through access to external sources, including from foreign direct investment (FDI) through subcontracting arrangements. Technology here is defined broadly including product, process, as well as management skills.1

There is a large body of literature on technology transfer from FDI to local companies in host countries. However, very little work or empirical studies on technology transfer from FDI to SMEs in developing countries. Thus, the main objective of this study is to fill this gap. It addresses the following two research questions. First, how important are foreign firms as a source of technology transfer to SME in developing countries? Second, what are SMEs’ main constraints to become local subcontractors for FDI?

Methodologically, this study is based on two sources of information: (1) a survey of key literature on technology transfer from FDI to SMEs through subcontracting activities in developing countries in general and in Indonesia in particular, and (2) a survey of SMEs in Tegal metalworking industry (Central Java). This case study, as the core of this article, was part of the World Bank Study Project on Rural Investment Climate (RIC) Assessment in Indonesia,

1 As generally realized, there is no universally accepted definition of technology. The most common approaches define technology as a collection of physical processes that transform inputs into outputs and the knowledge and skills that structure the activities involved in carrying out these transformations (Kim 1997, page 4), or as stated in Rosenberg & Frischtak, (1985) that technology is a quantum of knowledge resulting from the accumulated experience in design, production and investment activities that is retained by individual teams of specialized personnel. This knowledge is mostly tacit and often (is) not made explicit in blueprints or manuals. So, technology and knowledge will be used interchangeably in this study.
2005-2006, in which the author was the main researcher. For this case study, in-dept and semi-structured interviews and focus group discussions were conducted in Tegal district.

This study is organized as follows. Sections II and III present and discuss main findings of key literature survey on the role of FDI as a source of technology transfer to SMEs in developing countries and Indonesia, respectively. Section IV presents and discusses main findings from the Tegal case study. The study conclusion is given in Section V.

II. Technology Transfer from FDI to SMEs in Developing Countries

FDI is often mentioned in the literature as the most important source of technology transfer to local firms in developing countries. This has been obviously evident during the 1960s and 1970s in the so-called Newly Industrializing Countries (NICs) in Southeast Asia such as South Korea, Taiwan, Hong Kong, and Singapore. From these countries experiences, Soesastro (1998) states the following: there is no doubt that FDI plays an important role in cross-border flows, transfers and the diffusion of technology. The story of technology flows in the Asia-Pacific region has centred on the dramatic surge in FDI, particularly in the East Asian developing economies........It is generally believed that FDI brings in more advanced technologies than alternative channels. This is particularly the case with MNCs (multinational companies), because they play a dominant role in the generation of technology and are usually associated with new or technologically complex products......(page 312). This is also supported by many studies evaluating the technology transfer or spillovers from FDI in Indonesia. For instance, by using cross-sectional data, Sjöholm (1999a,b) and Blomström and Sjöholm (1999) found positive spillovers from FDI in Indonesian manufacturing industry. These studies focus only on large enterprises (LEs) and they show that both the level and growth of labour productivity to be higher for locally-owned plants in subsectors with a high foreign share of output. This suggests that foreign firms do play an important role in transfer of technology.

Also similar evidence can be found in other Asian developing countries. For instance, Thailand, Tangkitvanich (2004) concludes that linkages between foreign assemblers and domestic suppliers have always been crucial to the competitiveness of the Thai automotive industries. Assemblers have been major sources of technologies, especially management technology in the areas of quality control and production. The linkages also enabled domestic suppliers to gain a foothold in the international production network. (page.218).

It is generally known that technology transfer from FDI to local firms mostly takes place through subcontracting arrangements. Unfortunately, evidence on technology transfer from FDI to SMEs in developing countries is very scarce. Berry and Rodriguez (2001) in their World Bank paper also state this

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problem that, where as LEs in developing countries achieve productivity increases to a considerable extent imply by borrowing from the shelf of technologies available in the world, for SMEs as a group it is not so evident that processes such as FDIs, technology licensing, joint ventures, and access to engineering and other advances will provide the gains needed.

Probably, Islam (1992) was the first serious effort to examine the process of transfer, dissemination and adoption of technology from FDI for SMEs, especially small enterprises (SEs) and micro enterprises (MIEs) in the manufacturing industry (which he called small-scale and cottage industries, or SCIs) in the Asian developing region. He comes with the following important statement: 

"...technology can get transferred to SCIs through multinationals, although the usual notion is that they operate only in the large and medium-scale industries. For example, some multinationals engage subcontractors who are often in the SCI sector and provide them with designs of products and training. Also, by creating a learning effect in the receiving country, multinationals can help the emergence of a class of entrepreneurs and skilled workers who in turn can initiate similar industries at smaller scales. Thus, even in the absence of a conscious policy of transferring technology to SCIs, the sustained operation of multinationals may create conditions conducive to such a process (page 7)."

Wattanapruttipaisan (2002) also observed subcontracting activities in a number of Asian developing countries, and argued that subcontracting and other collaborative supply relationships would help shorten the period for capacity building and on-going learning needed by SMEs to come up with the required product quality and design, and delivery timeliness plus their on-going innovation and differentiation.

Another important study is from Morcos (2003) who argues that subcontracting arrangements act as very efficient mechanisms and tools for the technological enhancement of SMEs. By engaging in an active collaborative agreement with specific customers, suppliers and subcontractors benefit from a large amount of technology transfer.

**III. Technology Transfer from FDI to SMEs in Indonesia**

During the Soeharto era (1969-1998), the government tried to encourage the development of subcontracting linkages between SMEs and LEs, including domestic located foreign firms by imposing a system of protection and local content rules in several industries including machinery, electronics and the automotive industry, as part of import substitution policy. These local content rules stand as a clear lesson in how government interference does not facilitate the use of subcontracting as a means for achieving the domestic diffusion of technology. The main aim of this policy was to encourage industrialization in the country and also to encourage a pattern of industrial development that followed the industrial pyramid

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3 The definition and concept of SMEs vary by country. There is no common agreement on what distinguishes a SME from a LE (largeSE, or a SE from a ME, and a ME from a LE, or, within SME, a SE (small enterprise) from a ME (medium enterprise). In Indonesia, the official definition of SME from National Statistics Agency (BPS) is based on number of employees, in which enterprises are distinguished into four categories: MIEs (microenterprises), SEs, MEs, and LEs are business units with, respectively, 1-4, 5-19, 20-99, and 100 workers or more.
model from Japanese. In this model, SEs were at the base to support MEs, which then supported LEs at the top of the pyramid (TAF, 2000).

However, industrial development in Indonesia did not follow the same pattern as in Japan. On the contrary, the local content policy resulted in a vertically integrated production system within LEs. The Asia Foundation (TAF, 2000) argues that the lack of success of this policy in creating strong interdependence between SEs, MEs and LEs was largely due to the government’s excessive interference, aimed at replacing the market mechanisms. Similarly, Thee (1990, 1997) argues that such production linkages did not develop smoothly during the New Order era because of market distortions and the lack of skills and low technological capabilities of local SMEs. SRI International (1992) found that such linkages between LEs and SMEs are weak and only a small number of clusters (all located in Java) established subcontracting relationships with LEs.

Although the mandatory deletion programs during the New Order era were largely unsuccessful in developing viable domestic supplier firms, successful private-led subcontracting networks did arise in some industries, with the evidence showing that these arrangements did successfully facilitate technological capacity building. For example is the case of Astra Otoparts, part of the Astra international business group, Indonesia’s largest integrated automotive company. Through Astra Otoparts, Astra international was able to develop several SMEs into efficient and viable suppliers. As a result of the rigorous training which Astra provided to local suppliers with potential, overtime, these suppliers were able to produce a wide range of parts and components for cars and motorcycles according to the strict quality standards set by Astra, and also to meet its strict delivery schedules (Tambunan, 2008).

Hayashi (2002) made a study on subcontracting activities between SMEs and LEs (including Japanese firms) in Indonesia, in four industries, i.e. diesel engines, pump units for oil, bicycles and motorcycles. It reveals from this study that the subcontractors obtained technical support in various forms, ranging from quality control (QC) support, technical support in production process, inspection via dispatch of experts, selection of proper production equipment; study tour to foreign markets, assistance in designing, to various technical trainings.

In overall, most existing studies including from Harianto (1993), Kitabata (1988), Sato (1998, 2000), Supratikno (2001), JICA (2000), Iman and Nagata (2002), and Pantjadarma (2004) show that subcontracting arrangements between SMEs and foreign firms in Indonesia is still very weak, mainly because SMEs cannot meet the required standard of quality due to their lack of technology and skills. However, they have one

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4 The economic rationale behind the local content policy was to create a captive market for domestic products in order to increase the economic scale of production and thereby to increase efficiency. However, government interference went too far. The government decided which products were to get priority in this policy, and introduced fiscal incentives in line with the type of priority recipient products. The determination of priorities does not always appear to have been on economic considerations, such as SMEs’ capacity for investment and absorption of technology.
common conclusion that through such production link, foreign firms can play an important role for the capacity building, including in technology, in local SMEs.

IV. Evidence from Tegal Metal Working Industry

Tegal metalworking industry is a good example of the importance of FDI for the development of SMEs in Indonesia through subcontracting linkages. It is in the district of Tegal (Kabupaten Tegal), hereinafter Tegal, which is part of the provincial government of Central Java located at the northern shore near the north coast of West Java on key trucking and rail routes. Major industries in the district include processed food (tea and tofu), textiles (batik and embroidery) and furniture (bamboo and wood). The district generates 22.09% of its annual income from the industrial sector, compared with 24.24% and 24.62% from its trade and agriculture sectors respectively. These three sectors are the largest contributors to the district economy. The remaining 29.05% of district income comes from service (10%), financial services (7%), construction (4%), transport (4%), mining (2%), water supply and electricity (1%). The district has a population of 1,423,346 people (Regional Office of Industry and Trade, Tegal).

Tegal is among few areas in Indonesia with a long history of development in the metalworking industry. It has been a metalworking center since the mid-1800s when it was the locus of several sugar processing factories and related enterprises including locomotive repair shops and metal processing factories. The industry continued, thriving particularly under the New Order’s massive infrastructure and development agenda. In the beginning of the 1980s, as many FDIs, especially in the manufacturing industry, already entered the country, the first subcontracting activity started between local producers and a foreign affiliate company (Kubota), sparking government activity to develop the metal working industry.

Most of Tegal’s metal workshops rely on the same basic metalworking technologies, e.g. casting, cutting, bending, drilling or stamping depending on product, machining, welding, and finishing (painting or electronic plating depending on product, and assembly). Most of the metal products are final consumer goods; metal craft, kitchenware, building fixtures, furniture, accessories and agricultural tools (sickle, shovel). Industrial goods range from various small items (nuts, bolts, washers, locks, hinges, door handles, some automotive components and ship parts) to hydrant pumps, hand tractor, coffee bean peeler and rice dryer. Their comparative advantage has been in filling small orders for simple metal products or components. The small size of workshops gives them greater flexibility and Tegal’s abundant cheap labor can outweigh the productivity advantages of more capital-intensive production. There is often intense price competition between workshops.\(^5\)

\(^5\)Pantjadarma (2004) made a general assessment of the level of sophistication of the production facility in the sentra which was based on a capability to utilize high-precision equipment such as computer numerical control (CNC) machine for production, degree of order and cleanliness of the plants. Although, it is an imprecise technique, it provides some insights to the level of
According to the size of production and level of production sophistication, there are two types of workshops in the Tegal metalworking industry: MEs and LEs as a modern type and SEs and MIEs as a traditional type of workshop. In addition, there are two types of subcontractors: workshops which receive orders for metal components directly from LEs such as FDI-based companies, state-owned companies or private firms outside the district, called inti, and workshops which do subcontracting arrangements not directly with LEs but with the inti workshops, called plasma. The first type of subcontractors consists mainly of MEs and some LEs and plasma workshops are dominated by SEs and MIEs. Especially large inti workshops with total employees up to 100 men derive a majority of their income from sub-contracting work.

Plasma workshops usually hire cheap, unskilled labor or use family members (mainly men) as unpaid workers (helpers) and the owner passes basic metalworking skills on to his employees, leaving the technical capacity of the workshop highly dependent on the technical capacity of the owner. Inti workshops often sub-contract part of their production to plasma workshops.

There are several large foreign affiliate companies which subcontracted work to Tegal metal workshops, including PT Komatsu Indonesia Tbk, PT. Daihatsu, and some divisions of the Astra Group such as PT. Sanwa and PT. Katshusiro. These companies often source metal components from several parts of the country, mostly in West Java. Among these companies, the most prominent one is PT Komatsu Indonesia Tbk (say from now on KI) which is a subsidiary of a Japanese company that has established subcontracting production linkages with Tegal metal workshops since 1998. This company produces various equipments for construction and mining activities under the global trademark of Komatsu, such as hydraulic excavators, bulldozers, motor graders, frames and related components, steel cast products as well as off-highway dump tracks.

In general, the technical capability of the Tegal metal industry has derived from a long history of family experience in metalworking industries. With accumulated technical knowledge of over 20 years, since the first subcontracting activity started in the district, sparking government activity to develop the metal working industry, they are now capable of producing various kinds of agricultural and industrial machinery as well as automotive and ship components. However, the quality of most of their products is low. Only in a few firms whose core businesses cater to such as KI does the need for consistent product quality become a concern. In such firms, the ability to translate technical drawings and to manufacture products according to listed or drawn specifications is actively developed (Iman & Nagata 2002).
Tegal metal industry’s main external technology providers are LEs, mostly foreign affiliate companies such as KI to their subcontractors (i.e. inti workshops), and to a lesser extent, local government. Inti subcontractors supply heavy equipment components to KI. Some domestic retail market suppliers also act as knowledge providers by informing metal workshops about consumer preferences, demand, and new innovations. While for KI, quality is the first priority, retailers generally emphasize low cost over quality. For small workshop owners who have no subcontracting links with KI, either as inti or plasma subcontractors, wholesale/retail market is their only choice to have business linkages. They sell to this market a limited range of simple final products, i.e. pulleys, ship windows. While these retailers may demand a sample product, there is much less emphasis on precision.

It was found, however, that not all local producers/workshops can easily establish subcontracting relations with these foreign companies. To become subcontractors, local firms must have attained a certain level of technical and managerial capacity. They must proof that they have the capacity to produce high quality components and meet the stringent delivery times. An audit determines if they have the required machinery, manpower, facilities, legal standing and use of ISO standards. After that, then they are requested to produce a sample component from provided technical drawings. According to KI’s inti workshop owners interviewed, before an agreement is signed, KI often ask for a trial run of the mass production process, subjecting the output to quality control tests. If they could produce a certain product item on a regular schedule and consistent quality, they would then be granted a license for manufacturing different product items, thereby expanding their product lines. In the last 10 years, many suppliers have been tested through a few initial batch orders, but, in the end, only some of them were able to meet KI’s satisfaction; two of them, i.e. PT Prima and PT Karya Paduyasa, were included in the sample. Their brief histories are given in box below. The owners of these firms have learned a lot about many things from KI such as quality control, standardization, and efficiency and all these have increased their innovation capability.

After winning a contract, an inti subcontractor has access to a significant level of technical training. According to a sub-contractor of KI, trainings directly addressed the technical needs of the workshop in meeting the production requirements of KI. Indonesian experts from the Jakarta Komatsu office leading the training used a teaching style that clearly delivered the necessary knowledge and emphasized practical application, with 90 percent of training time spent in hands-on experience. Trainers also help the workshop identify problems and troubleshoot.

During the survey, it was learned that larger and more modern metal workshops are more likely to adopt new technologies in their bid to become subcontracting inti to LEs. Those who have been accepted as subcontractors for KI had worked before as employees for many years in KI or other foreign affiliates companies. Those who failed to become subcontractors, lack of capital, limited skill, and no access to information appeared to be the three most important constraints. They did not have enough money to
purchase the required machinery and to hire many workers. They often use second-hand or homemade equipment. If they hire workers, often low-skilled workers with little or no experience and rely on shop owner’s technical knowledge. Since many SE owners built their expertise through working in small shops and rarely have formal academic training, they have difficulties reading technical drawings and instead rely on copying samples, leading to less accurate output. Those who ever tried to become subcontractors for KI or other companies and failed had never worked before in LEs. So, they lack the technical experiences to produce complicated components with the precision required by LEs. Also, due to lack of information and no skill, they did not know how to meet ISO standards. They said that from the government they could not expect too much. The government did give some information, but they need direct assistance too.

The subcontracting system does not only provide knowledge or technology but also, though indirect, some market opportunities for smaller workshops to benefit from the virtuous circle affecting inti capacity building. Plasma gains from the incentive to produce higher quality for a higher price with technical coaching from inti clients in their own virtuous circle. Inti respondents for auto components, for instance, turn to plasma workshops to produce some parts of their orders from LEs, usually components of components or basic parts made more cheaply in small workshops while still passing the quality control requirements of LEs. Often soft loans are provided by inti to plasma to help them acquire new machines capable of higher quality output. Inti and plasma involved in subcontracting are more likely to use government sponsored facilities such as the UPT (i.e. technical service unit, including laboratory.), especially to test the quality of materials. They are more able to offset lab usage costs through the higher price paid by LEs for quality parts.

However, according to the owners of these two KI’s inti workshops, the training does not seek to develop their capability to rise beyond their capacity as low-cost production centers for selected components. Moreover, KI does help them gain the capacity to manufacture component parts, but there has been little interest in upgrading from specialized parts manufacture to manufacture and assemblage of finished products.

For workshops who were rejected by KI (or other LEs) as inti subcontractors, the only source of technology or knowledge is from retail suppliers, or from inti subcontractors if they have subcontracting linkages as plasma, or they depend largely on un-targeted, irregularly publicized government programs, which may not be suit their needs. Some interviewed MIE owners who sell their products only to retail market said that strong competition among retail suppliers inhibits knowledge transfer and, instead, encourages production of low-quality, inexpensive products.

For plasma subcontractors, they gain from the incentive to produce higher quality for a higher price with technical coaching from their inti clients in their own virtuous circle. Inti respondents for auto components, for instance, turn to plasma workshops to produce 10–15% of their orders from their clients, usually
components of components or basic parts made more cheaply in small workshops while still passing the quality control required. Often soft loans are provided to plasma to help them acquire new machines capable of higher quality output.

It was also found that inter-firm linkages inside this Tegal cluster exist to a certain extent. Notably, producers in the Tegal metal working industry have a tradition of collaboration as indicated by the important role of recently initiated by Takaru cooperative. This cooperative specially established by producers in the cluster to stimulate strategic alliance among them. This activity has a strong flavor of business and technology which is based on market requirements and it has produced a hand tractor with own design for the domestic market. As quoted from Pantjadarma (2004), the manufacturing of customized hand tractor is considered as a ‘bonding agent’ for this collaboration (page 20). The production of this hand tractor involves 17 firms producing different parts. The Takaru cooperative organizes, assembles and performs quality control checks. The latter requires certification process and this has to be conducted by other institutions including government research laboratory (Pantjadarma, 2004). Many of these producers involved had ever done subcontracting activities before with foreign firms. No doubt, as they said themselves that their knowledge obtained from working before with foreign firms, has made them able to produce this hand tractor.

However, from the interviews, it appears that in general knowledge transfer among small workshops is often contingent on personal networks and conditioned by competition. Especially, among workshops producing for the retail market competition sometimes becoming “unhealthy” which has opposite effects, inhibiting knowledge diffusion among them. For example, when a competing firm bought off a shop owner’s driver after a marketing trip and followed up with lower bids to the same potential clients. Many workshop owners were worried about firms’ tactics to reduce production costs, often at the expense of quality. Some workshops find the right combination of cheap scrap metals to get their products to pass buyers’ inspection standards, but these lower quality items wear out more quickly and do little to strengthen the reputation of the Tegal metal working industry as a whole. This cost cutting in turn creates price pressure forcing competing workshops to a race for the bottom in terms of quality.
PT Prima Karya:

This company specializes in making parts and components for heavy equipment, and it was formally incorporated in 1983, beginning operations with the manufacture of spray cans and agriculture machinery such as hand tractors. Currently, the company has 50 employees, of which about more than 50% of them are high school graduates or under and two are university graduates. The company’s first experience as a subcontractor started in 1985, as it won a contract with a large local conglomerate for manufacturing large quantities of ‘coffee peeler’ machines (but, the contract was later terminated due to the economic crisis in 1997/98). Currently, the company is one of the Inti suppliers for KI, and also succeeded in becoming one of the prime local suppliers for Natra Raya (NR), an affiliate of U.S. Caterpillar, which came to Tegal in search of potential suppliers. It has managed to expand its product lines to more than 100 items supplied to KI and to NR on a regular basis. Total turnover in 1999 was Rp650 million per year and increased continuously though slightly in recent years. The company virtually was a manufacturer of heavy equipment parts, including engine tools, dashboards, and forklift parts. It expanded its operations to include the manufacture of pumps, agriculture equipment, parts for scales and door railings for sale to the general market. These jobs were merely incidental orders received along with the routine work the company did for KI and NR. Prospects for growth are extremely favourable. However, the company is chronically short of working capital because of the arrangement whereby payments are made only after the final products are manufactured and delivered.

The company has a great innovative capability. The fact that the company was able to advance from making relatively simple products to supplying metal components with higher grades of precision on a consistent basis demonstrates its ability to learn and increase its skills. This ability is largely attributable to the owner who has been vigilant in solving on-site technical problems. According to the owner, being accepted as a prime KI supplier was his company’s first milestone, a role which requires in advance the ability to translate technical drawings and to work toward the final product. Another prerequisite fulfilled by PK as a prime KI supplier was a level of quality that ensured that no rejects were classified as fatal ones; the company was able to correct defects easily and ship the products back to KI.

The company reached the second milestone when it was presented with the challenge of supplying a large complex piece associated with engine hoods. Making the first sample proved to be quite difficult using the inappropriate machinery available at the time. Even with several days help by an expert from KI, the company was still unable to produce a satisfactory sample according to specifications. After several trials driven forward by the persistence of the owner, PK finally sent the finished sample to KI at the end of the week. Approval was achieved not long afterwards.

All jigs and fixtures that allow assemblage and welding on a consistent basis are built by the company itself. Much of the machinery is developed in house, such as large bending and pressing machines, with up to 70% local contents. This level of accomplishment demonstrates the experience and skills the company acquired, largely in tacit or unspoken form, as it overcame each major challenge. One of the benefits obtained by working with KI is the opportunity to send employees to be trained at KI’s facility in Jakarta.

PT. Karya Paduyasa

The company has three plants, each with a specific production objective, namely for: (i) casting, principally hydrants and fire monitors; (ii) incidental job orders, usually in small lots; and (iii) a stamping process especially for large parts and automotive components. It began by making textile equipment and parts in Jakarta in the 1950’s. After the company moved to Tegal, it diversified into making agriculture tools and machinery. While rapidly diversifying its product base, it improved its productive capability. Among the important achievements of the company was the development of the casting capability to produce hydrants. Hydrant manufacturing was driven by government contract. At the peak of production, the company made around 200 units per month.

One major milestone for the company was to be selected as one of the few local prime suppliers for heavy equipment for KI and NR. Furthermore, because of its ability to deliver the products in timely fashion with consistent acceptable quality, KP’s base of product lines in the heavy equipment business expanded rapidly. However, the company manufactures less items as compared to that of PT Prima Karya for both KI and NR.

Recently, a sign of positive growth emerged as hydrant orders began to increase to 10-20 per month, with a similar increase in orders from KI and NR. However, because of the arrangement under which payments are sent only after the final products are manufactured and delivered, the company suffers from shortages of working capital, especially after the substantial layoff of workers.

The company has ample facilities for metalworking operations, which range from casting to welding to finishing. What is more impressive, however, is the company’s ability to make an increasingly complex range of products as it acquires experience over time. As noted previously, this ability was a key factor in being chosen as one of the regular suppliers of KI and NR. The company’s most recent accomplishment was its expansion into the manufacture of automobile components for an automaker. This move was soon followed by the construction of a plant dedicated to the stamping process. The company equipped the plant with its own dies and fixtures, and also set up a small crane to make a large heavy bottom piece for a tractor. It manufactures many of the machines and tools it uses in this plant. Its dedication to efficiency is also demonstrated by its efforts to minimize waste from paint spraying by constructing six large fans directed at a pool of water to capture paint droplets. The stamping plant’s overall facilities are well organized and maintained.
Finally, the company devotes considerable attention to skill development. It provides incentives to employees to participate in various training activities at other locations by covering their travel and accommodation expenses.

Source: own survey and some written information from Iman and Nagata (2002),

V. Concluding remarks

This Indonesian story supports the view that foreign firms can play an important role as a source of technology transfer to SMEs in developing countries, through two main channels, as demonstrated by the Tegal case. First, via subcontracting arrangements: KI has functioned as the most important source for technology improvement in its initi subcontractors and, indirectly, its plasma suppliers. Second, via transfer of labour: local workshops accepted as subcontractors for KI had ever worked before as employees in KI or other foreign affiliate companies.

However, only few workshops are able to be as local subcontractors, since KI (as foreign companies in general) is more likely to subcontract parts of its production to local firms which have already a certain level of technology capability. This means that the presence of FDI in an industry in a developing country does not automatically lead to technology improvement in SMEs in that industry. It depends on the readiness of SMEs to absorb advanced technologies brought by FDI. In other words, the more technology absorptive capacity the local SME have, the more benefit they will gain from the presence of FDI-based companies.

If only some SMEs are ready to become local suppliers for FDI as in the case of Tegal, then technology transfer from the latter will be limited only to a small portion of SMEs in developing countries. Consequently, the presence of FDI will result in an increased technology gap and hence development dualism within SMEs. Here, the role of government is then crucial: its SMEs development programs emphasize on capacity building in less technological advanced SMEs.
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