TECHNOLOGY TRANSFER; A PROBLEM OF BUYER-SELLER RELATIONSHIPS.

Indriyo Gitosudarmo

ABSTRACT

Technology transfer can be considered as a transaction between the two nations in the marketing of technology that needs dyadic motluations for relational exchange. Understanding the process of such exchange relationship between the supplier and receiver is of benefit in the situation that should be improved to encourage a better "buyer-seller relationship" between the two nations. This relationship has a strong effect to stimulate the trade through technology transfer between the supplier and recipient country. Marketers who understand that causal interaction and use it in decision-making have powerful ally in their battle for superiority in the market place.

Introduction

Human beings can not be separated from technology, because it is included in their daily life in society. Technology is also inseparable from human beings in that it exists only by the hand of humans. Mankinds' gift of systematic, analytical and creative thinking evokes knowledge, and knowledge creates technology; that is, the science-based method of producing goods and services. People typically utilize technology in the process of adding value; namely, the process of improving some materials into other materials or products which possess a higher value. The process of adding value is often complex and multilevelled, and can only be considered as successful if its utilization of machinery, human skill, and material are integrated through technology so that the worth of the output is significantly greater then the merit of its separate inputs. The more efficient and productive a technology is in creating added value, the more income is generated. The increase in income will enable research and

development which in turn improves creative thinking, knowledge and technology itself; thus completing the cycle of technology.

The Acquisitions of Technology

Technology has great importance in any country because of its impact on the country's future economic growth and on the international competitiveness of its products. This significance is exacerbated in developing countries, such as Indonesia, which is attempting to catch up with large gaps in the technological base necessary for its economic development. The acquisition of a technology can be obtained through internal development or through purchasing from abroad. Internal technology development requires heavy expenditures on research and development activities, of which the success is largely dependent upon the availability of well-trained, qualified technical personnel; a high risk and long payback period is entailed. On the other hand purchasing existing technology from abroad leads to a large drain upon foreign financial reserves. In some circumstances, such as the situation where there exists a dearth of technical R&D personnel and research infrastructures, it is still more efficient to purchase or import the required technology. This is usualy considered as the cheapest way in transferring technology.

The Forms of Technology Transfer

International technology transfer is an expression heard more and more. It has a broad meaning that includes trade in various kinds of know-how; consultancies, training, technical and military aid; and carries the implication of substantial elements of knowledge wrapped up in the export of sophisticated products, plant and equipment. Technology transfer has existed for many years but it acquired its modern character during the 1950s and 1960s along with the expansion of multinational or transnational corporations and a general resurgence of world trade (Mil/man, 1983).

More and more companies have resorted to a wide diversity of international operational forms in order to enter and develop foreign markets. This

diversity has been one of the features *oi* international marketing over the past decade, even though it appears that the entry mode to internationalization is still via simple export of products or services, with perhaps a shift to foreign investment later on *(Welch,* 1985). Exporting of products through a domestic intermediary requires the least control. Firms that export products do not have to invest in manufacturing facilities abroad. Technology transfer may occur in several ways and take several shapes. The United Nations Center on Transnational Corporation has described the major forms *(United Nations Center on Transnational Corporation* 1987), they are briefly presented here.

1. *International Sub-contracting*

In this arrangement the technology supplier places an order with the recipient to produce components or assemble finished products using inputs and technology provided by the supplier who absorbs the final product into its own production or marketing efforts. The technology provided consists of specifications, production know-how, and sometimes machinery and equipment as well. In this arrangement, no payments for technology are involved, since it is the transnational or foreign corporation that pays the sub-contracted organization for work carried out. For this reason, it might be argued that the relationship does not belong to the category of technology transfer arrangements. None the less, it can be considered, since there is always any responsibility that technological spin-offs may be generated for local enterprise involved. Sub-contracting arrangement in developing countries usually occurs in the area of electronic equipment and components, semiconductor assembly and aircraft components. By the same token the import of sophisticated products from an industrialized country can also be considered as technology transfer because there is a possibility that technological spinoff may be generated to the local enterprise through the imitation of imported products.

2. *Turnkey Contracts*

A turnkey contract is one in which the contractor organization undertakes the responsibility of carrying out all {or most of) the activities required for the planning, construction and commissioning of a discrete project. Where as the contractor may subcontract specific activities and tasks to other firms, s/he alone is responsible to the contractee for completion of the project as a whole and for the delivery of a fully operational production system. The specific responsibilities covered by turnkey arrangements vary from contract to contract; but they would normally include provision of process know-how - both patented or unpatented - basic design and engineering, supply of complete plant and equipment, design and construction of civil works, complete erection of plant and equipment, commissioning of plant facilities up to the start-up stage, initial training of process operators, and sometimes post startup trouble-shooting. Turnkey contracts therefore provide for the complete, once and for all, physical transfer of technology as a package, from one party to another. They are especially popular in situations where the supplying firm will not have an ongoing interest in the ownership or management of the operations of the customer firm, as for example between international engineering firms and State-owned enterprises. The Suralaya geothermal power development in West Java for example, has been in the form of New Zealand's turnkey project in Indonesia (Indonesian Investment Coordinating Board, 1987).

3. Technical Service Contracts

Under a technical service contract, the contracting firm agrees to provide technical services associated with one particular aspect of the contractee's operations. Examples of these include maintenance and repair of machinery; advice on process know-how; trouble-shooting and quality control. The services may be provided on an ongoing basis, or on an as-needed consultancy basis.

4. *Marketing Contracts*

A marketing contract is an arrangement in which the contractee firm assigns to the contractor the responsibility for marketing its product, or part of it, and all the activities associated with it, in return for a fee which is normally a percentage of sales revenues.

5. *Management Contracts*

A management contract is an arrangement under which operational control of an enterprise - or over one phase of its activities which would normally be exercised by the board of directors or the managers selected or appointed by its owners - is vested by contract in a separate enterprise which performs the necessary managerial functions in return for a fee. The functions that may be provided for are production management including responsibility for the technical and engineering aspects of production; personnel management including the recruitment and deployment of foreign personnel and the training of local personnel; purchase and procurement of capital goods and raw materials; marketing; and financial management.

6. Franchising

A franchise is a particular form of arrangement implying a continuing relationship in which the franchisor provides rights, usually including the use of a trade mark or brand name, plus the services of technical assistance, training, merchandising and management, in return for royalty payments. Examples of these include the well known success of the Kentucky Fried Chicken and the Me Donalds franchising operations worldwide.

7. Licensing

A Licensing agreement is a legal contract under which the licensor confers certain rights upon the licensee for a specified duration in return for certain payments. The right may consist of permission to use industrial

property rights, such as patents, trade marks, brand names and copy rights, and it can include secret unpatented know-how such as method of production, scheduling and quality control, which are usually combined with the provision of technical services. Licensing is a way to shift the risks of production and marketing to a licensee, yet gain the benefits of an entry into foreign markets. However, licensing has its risks. One is that the licensor can lose control. In addition, if the licensee is very successful, it may cancel the license and become a competitor.

8. Joint Ventures

A joint venture is a business association between two or more parties who agree to share the provision of equity capital, the investment risk, the control and decision making authority, and the profits and other benefits of the operation. A firm that does not have the required expertise or financial resources to exploit an opportunity abroad might consider entering into a joint venture with foreign company. Both companies would invest in the venture and share ownership. In some cases a foreign government might require joint ownership as a means of ensuring local participation in the foreign investments.

9. *Foreign Direct Investment*

This is the establishment by the transnational corporation of an affiliate in a foreign country over which the parent firm is therefore assumed to exercise effective control. Normally such control is realized through whole or majority ownership, but it is possible for an arrangement to be made which gives the transnational corporation control even with a] minority equity participation. Foreign direct I investment may involve either the acquisition I of existing enterprise or an entirely new enterprise. The technology is provided as part of a complete package. It may include any of all of the following : capital goods; industrial property rights in the form of patents, trade marks, and brand names; secret unpatented process know-how

that is specific to the investing firm, and the investing firm accumulated experience and skills in organization, management and marketing. Direct investment in manufacturing facilities represents the greatest commitment to, and control over, foreign operations. Direct ownership provides the firm with several advantages. First, it is generally cheaper to produce abroad than in home country. Second, stronger relationship with foreign wholesalers, retailers, and suppliers can be established. Third, the firm can avoid trade barriers against home country's made goods. Fourth, the firm can follow a more active marketing strategy since it retains direct control over product quality, pricing, distribution and advertising.

2. Stimulation of Local Technological Activities

The impact of transferring technology in this area could take place through undertaking research and development activities directly within their subsidiaries and through contracting with local research and development institutes, manufacturers of machinery and equipment, and engineering firms for the supply of technological goods and services.

The Essential Aspects of the Transferal *3.*

The extent to which foreign investment contributes to technological development is of primary concern to developing countries. The essential aspects of the transferal, and the effect of foreign investment on technology transfer upon the development of technological capability, can occur in the following areas: transfer of skills to the employed labor force; stimulation of local technological activities (research and development, capital goods and so forth); and diffusion of techniques throughout the economy.

1. The Transfer of Skills

The methods for transferring and developing skills would include formal inhouse training programmes, an active promotion policy aimed at facilitating learning by nationals through exposure to progressively higher levels of responsibility, and sponsorship of off-the-job training through provision of scholarships and support from technical and professional training institutes.

2. Stimulation of Local Technological Activities

The impact of transferring technology in this area could take place through undertaking research and development activities directly within their subsidiaries and through contracting with local research and development institutes, manufacturers of machinery and equipment, and engineering 9t(firms for the supply of technological goods and services.

3. Diffusion of Technology throughout the Econom

This aspect of the contribution of technology transfer could occur in a number of ways: through the establish-ment of or support for linkage industries within the local economy; through the turnover of personnel and the secondment of staff to local industries, or through the provision of technical assistance to other enterprises within the local economy.

There is an evidence of a technological gap between industrialized countries and less developed countries. Generally speaking, the LDCs operate economies based on agriculture for domestic consumption, and mineral as well as cashcrop commodities for export purposes. By purchasing technology from abroad they can increase substitution of imported manufactured goods and export commodities in semi-processed or finished form, thereby adding value and creating wealth. Industrialized countries have a range of technologies. Inevitably, there is a degree of specialization amongst companies and countries, leading to an interchange of technology. Under the circumstances, suppliers of technology seek a wider return on their research

and development, and the recipients obtain access to proven technology more quickly and cheaply and with less risk than generating their own.

Requirements for Successful Technology Transfer

The prerequisites of technology transfer are the existence of appropriate channels and a framework of international relation conducive to trading. In these respects, buying and selling technology is no different to marketing products. The most important thing to be considered in order to make a successful technology transfer is "the self supporting technological capability" *(Dawson,* 1987). The most important transfer of technology from industrial nations does not lie in transferring knowledge of how to use specific technique developed elsewhere. Rather, it lies in the transfer of self supporting technological capability, that is, the ability on one's own to choose, adapt, employ, and even generate technology.

Technology transfer can be considered successful if it creates the cycle of technology -income improvement, through the creation of value added, controlled market opportunity, income improvement, and research and development improvement. The application of efficient technology will create value added, and by the availability of a great market opportunity it will generate income. The increase in income will further improve the ability to establish research and development activities, which will in turn generate better technology. For a successful transfer, there must be a conducive attitude. It is necessary to synchronize the needs of the suppliers and the receivers of technology, and to make preparation for eliminating or handling the hurdle of technology transfer.

The needs of the technology supplier, that are usually applied as factors to assist in the choice of a specific country as a receiver of technology, are as follows *(Dawson,* 1987):

1. Availability of a large potential market;
2. Availability of a skilled labor force for improving research and development;
3. The possibility of protected intellectual property through a patent system;
4. Political stability for long run future development;
5. The availability of good business partners.

On the other hand, the needs of the technology receivers - usually expressed as factors utilized in evaluating and choosing a specific country as technology supplier - are as follows *(Gitosudarmo,* 1989):

1. The reliability of the technology;
2. The adaptability of the technology;
3. The training facility offered by the supplier for further development of technology;
4. Political relationship for long run cooperations;
5. Other benefits such as tourism and environmental conservation.

Conclusions

Technology transfer is an exchange relationship between technology supplier and receiver. This exchange relationship serves as a focal event between those two parties and it provides an important frame of reference for identifying the network of individuals and institutions that participate in the exchange formation and the execution of such transferal.

It needs dyadic motivations for relational exchange. This bilateral relationship is required and should be maintained in order to develop buyer-seller relationships. Consistent with this condition a specific technology from a specific country will not be purchased without any positive attitude toward it as perceived by the technology *receiver*. Then again, a technology will not be transferred without any positive attitude toward a recipient country as perceived by the supplier country.

Matching out of the needs and motivations of the two parties is necessary to eliminate the discrete, and develop the continuous transactions. To be successful over the long nan requires, a continuing commitment to the process of relationship building. Effective interaction may also lead to a meaningful relationship both for the supplier and the receiver. On the one hand the user of technology needs to get into the marketplace as rapidly as possible before competitive products emerge, while on the other hand the supplier needs to get a wider return on their internationalization.

References.

Dawson, L. M. (1987), "Transferring Industrial Technology to Less Developed Countries," **Industrial Marketing Management,** 16, 265-271.

Gitosudarmo, I. (1989), "Technology Transfer Between New Zealand and Indonesia; Requirements for Attitude Change," **M. Com. Thesis in Marketing & International Business,** University of Auckland, New Zealand.

Indonesian Investment Coordinating Board (1987), **Indonesia, A Guide for Investors,** Indonesian Coordinating Board, Jakarta.

United Nations Center on Transnational Corporation (1987), "Transnational Corporation and Technology Transfer: Effects and Policy Issues," **United Nations Publication,** Sales No. 87, II. A. 4.

Welch, L. S. (1985), "The International Marketing of Technology: An Interaction Perspective," **International Marketing Review,** Spring, 41-53.