A MODEL OF CROSS-CULTURAL TRAINING IN THE TRANSFER OF TECHNOLOGY

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During the past few decades, many aspects of the transfer of technology from developed to less-developed countries have been examined in detail. Although much of the transfer has been done by transnational corporations (TNCs), one area that has received scant attention in the literature is the cross-cultural training of workers in the host country. A model is developed to show how critical training the worker is to the success of the TNC in the host country. This model emphasizes the need for workers to be trained to understand and use the new (foreign) technology and to understand the culture of the foreign corporation.

International technology transfer has been the subject of a growing body of literature during the past 25 years. N.M. Reddy and L. Zhao (1) have provided an excellent consolidation and review of this work. The importance of training programs to adequately prepare the host-country workers for the new technology and organizational climate is often overlooked. This paper will review the role of the worker in the process of technology transfer by a transnational corporation (TNC) and develop a model of cross-cultural training in this transfer.

The role of the workers is often overshadowed by discussions of technological capability, government policy, and transfer costs. Within this section, a group of studies concerning the effective transfer of technology is identified. This analysis of cross-cultural training addresses the factors influencing effective transfer and the adaptation/integration of technology.

When a TNC transfers technology, often a transfer of personnel is required as well. The need for cross-cultural training for these workers given foreign assignments and the effectiveness of the training is a topic of recent interest. The literature ranges from documentation of unsuccessful work related to cross-cultural interactions to an extensive review of the empirical literature on the effectiveness of cross-cultural training.(2) The need to provide such training to the employees of the host country is the missing element in the literature. The effectiveness of technology transfer by the TNC is enhanced when workers in the host country are trained to understand both the foreign technology and the organizational climate and culture of the TNC.

B.L. Kedia and R.S. Bhagat (3) suggest that the cultural differences between the two nations involved may be more important than strategic management issues in determining the efficacy of the transfer. As pointed out by J.S. Black and M. Mendenhall (4), "Cross-cultural training enables the individual to learn both content and skills that will facilitate effective cross-cultural interaction by reducing misunderstandings and inappropriate behaviors." This is important for expatriate managers and for workers in the host country.

A MODEL FOR TECHNOLOGY TRANSFER

Many studies over the past 40 years have placed importance on how a less-developed country (LDC) can best acquire and apply technologies for industrial development.(5) A recent conceptual model created by C.N. Madu pulls together many major factors including technology transfer.(6) A slight modification of Madu's model is shown in Figure 1. The major factors in this model will be briefly examined.

Technology: The technology available for

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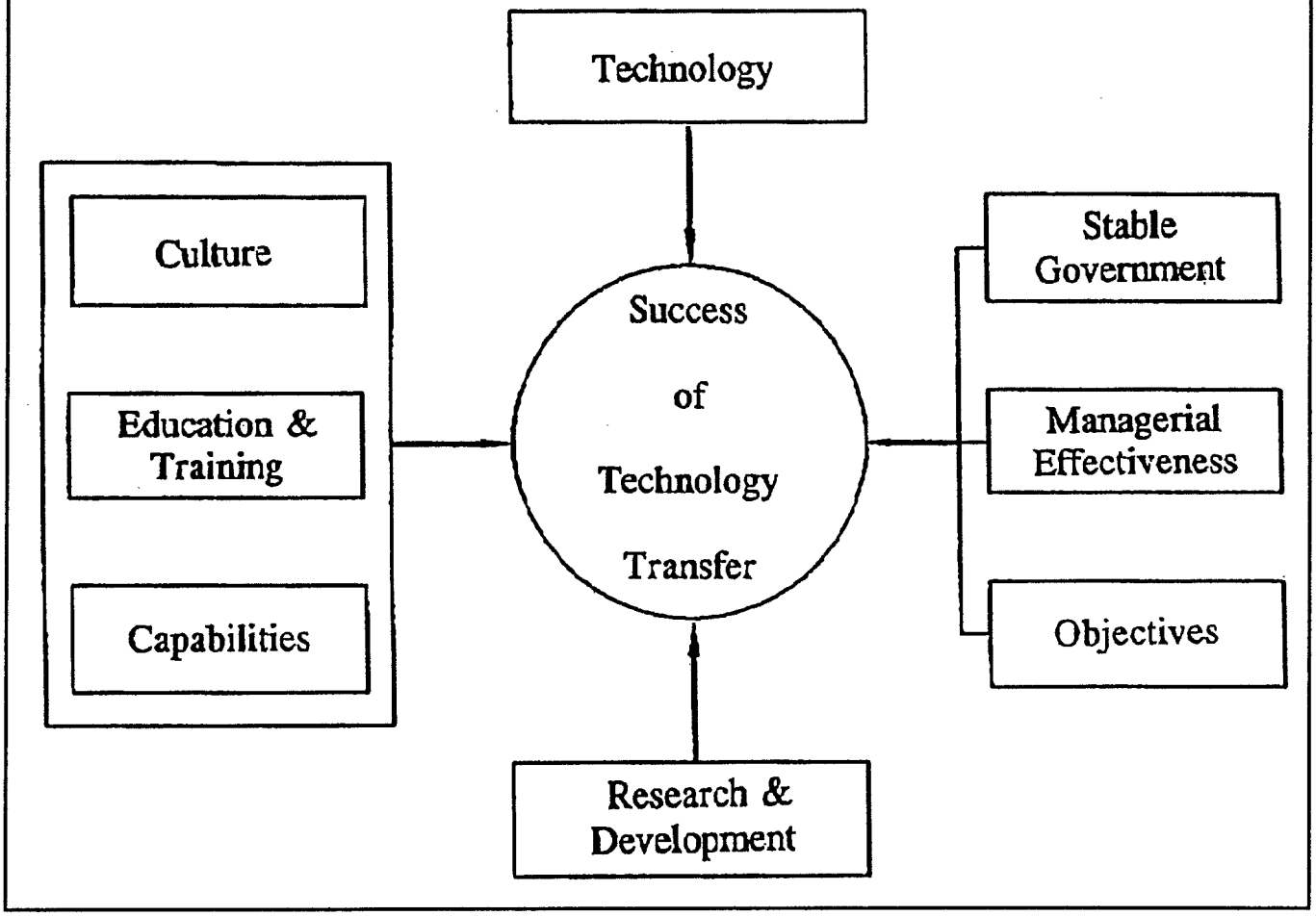
Figure 1. Madu's Model (Modified)—Critical Factors for Successful Technology Transfer



transfer is vast. F. Komoda notes that the appropriateness of technology is an important area that has received considerable attention.(7) One important lesson from research is that scale is often the critical factor when a firm makes a choice of technology.(8) Basically, the firm links the choice of technology to expected sales. These may be expected sales in a domestic market, an export market or some combination of the two. Additional factors that influence the different types of transfer are discussed by K. Marton.(9) The TNC has a range of control over the subsidiary depending on the degree of ownership. The variety of ownership arrangements from wholly owned subsidiaries to licensing agreements are examined by M.E. Rosenfeldt.(10) The wholly owned subsidiary of a TNC may not have a choice of technology because the parent would make the decision. Other degrees of ownership would give more decision-making authority to the operation in the host country.

Stable Government: The stability of the government is the second area examined by Madu. This applies to the government itself and its policies, laws, and enforcement of those laws.(11) The latter could include a wide range of subjects. Some examples of objectives of the host country's policies could include restrictions on foreign ownership, restrictions on repatriation of profits, access to markets and raw materials, protection of intellectual property, tax policies, and the orientation of the country either toward import substitution or export orientation. A TNC would perceive a stable government in the host country as reducing the risk to TNC.

Managerial effectiveness: This applies to both local and expatriate managers. For examples of the research done in this area see P. Evans and Y. Doz (12), D.M. Noel (13), J. McEnery

and G. DesHarnais (14), and K.S. Parkin.(15) T.F. Gross, E. Turner, and L. Cederholm (16) found the work of international teams of managers becoming increasingly important to TNCs in the resolution of different perspectives, business strategies, and tactics. As pointed out by S.C. Schneider (17), the TNC needs to develop a human-resource-management strategy to address the fit of the corporate culture to the different national cultures of the subsidiaries. F. Ghadar and N.J. Adler (18) addressed the need for firms to adjust their human-resource-management systems to deal with cultural differences. (The effects of culture on both local and expatriate managers is acknowledged, but will not be developed further in this paper.)

Objectives: Madu did not elaborate on objectives in his discussion of technology transfer. The objectives of a firm making a Direct Foreign Investment (DFI) include the search for markets, raw materials, and labor to allow for profit maximization. Country objectives also are relevant. Many of these are reflected in the policies and laws of the host country. Obtaining foreign exchange, reducing unemployment, access to modern technology, and developing specific sectors of the economy are a few examples.(19) Again, this list is not meant to be all inclusive.

Research and Development (R&D): A TNC can conduct this activity either in centralized or decentralized facilities. As reviewed in Reddy and Zhao (20), the extent and location of R&D can vary extensively with the maturity of the product, different technologies used by different elements of the TNC, and the capability of the work force in different countries to conduct R&D. This also can be negotiated between the host country and the TNC. The importance of R&D to the TNC and the host country are critical factors in these decisions.

Capabilities, Education and Training, and Culture: The other three components of Madu's model will be examined as an entity. With this modification, it is possible to examine the worker in the host country and the societal factors that influence him. The emphasis is on application of these factors to host country workers who will be employed by a foreign corporation and will be using foreign technology. The importance of the worker in the transfer of technology will be the focus of the next section.

THE ROLE OF THE WORKER

Capabilities: The size and skills of the labor pool in the host country are important considerations. When the available workers are literate and have acquired job skills in an industrial environment, they can be more easily trained than those without education and training. When unskilled workers must be used, they require more supervisors and inspectors. An important consideration is whether the labor pool in the host country has trained supervisors and inspectors available in sufficient numbers and with appropriate skills.

Education and Training: M. Rivas (21) cites lack of education as a major factor that prevents workers from grasping technology. This suggests education will have a direct effect on the capability of the worker to accept new technology. K. Marton and R.K. Singh (22) list training as an important part of the contract between the TNC and the host country or the firm in the host country. J. McEnery and G. DesHarnais (23) state that a key to a TNC's success is having the right people in the right place at the right time. The implication is that if trained personnel are not available, they must be trained. A fair amount of literature addresses training for new job skills (24,25), but little deals with workers in another culture.

CULTURAL BARRIERS

R. Lamm (26) emphasizes that the culture of the country is a main factor in determining whether technology will be accepted. D.C. North (27) expands on this concept suggesting that culture consists of the intergenerational transfer of knowledge, values, and norms. Culture also varies radically among different ethnic groups and societies. These variations in beliefs, customs, language, religion, and other aspects of culture between the TNC and host countries serve as a major barrier to be overcome in the transfer of technology.

An examination of the process of international technology transfer indicates one of the

earliest reactions to cultural variations was avoidance. W.H. Davidson and D.G. McFetridge (28) referring to studies by R. Vernon and Davidson (29) and Davidson (30) noted that social factors such as religious and language similarities were positively related to direct investment in a less-developed country. However, the growth of international trade and competition has decreased the ability of TNCs to exclude countries with different cultures from their expansion plans.

The difficulties associated with cross-cultural interactions are often related to contact between expatriates and indigenous personnel. Claudine Michel (31) points out:

> One source of difficulty has been the expatriates' ignorance of the societies' customs so they say and do things which offend the local people with whom they work. Or even when they understand the local culture, such as religious beliefs and social etiquette, the foreigners may not sympathize with such practices and thus may reflect their disdain in their behavior.

Many of these difficulties can be seen in the experiences of the expatriate managers assigned to work in a foreign culture. Black and Mendenhall (32) found that 16-40% of managers given foreign assignments end the assignments early due to poor performance or their inability to adjust to the foreign environment. Copeland and Griggs (33) found that 50% of the managers that do not end their assignment early function at a low level of effectiveness. While firms would prefer that their failures remain unpublicized, the direct costs of these failed expatriate assignments to US firms have been estimated by L. Copeland and L. Griggs (34) to be over $2 billion a year, and this does not include unmeasured losses such as damaged corporate reputations or lost business opportunities. While these costs are extensive, they represent only one aspect of international technology transfer. While managers are focusing on the culture of the host country, the workers must adjust to a new technology and the organizational culture of the TNC.

Those who design strategies to deal with cultural change must recognize that there are two points of origin for cultural clash: the culture of the host country's workers and the corporate culture. Corporate (or organizational) culture is described by E.H. Burack (35) as the particular way things are done in an organization. More specifically, he views it as the shared assumptions, beliefs, and values that define behavioral norms and expectations representing the organization's social energy and personality and the assumptions of the founders regarding people, desirable business practices, and the reasons for corporate being.

The success of the technology transfer will depend on the ability of the workers to learn the new technology and their roles within the organizational structure. This cultural adaptation involves presenting the basic principles of the training program in such a way that the workers from the host country can understand and apply them.(36) This need for cross-cultural training is based on the belief that people learn better when they can connect what they're being taught to their own experience.(37)

CROSS-CULTURAL TRAINING

The acceptance of the worker as a critical factor in the process of technology transfer leads to the need to find ways to ensure that the workers understand the new technology and the organizational culture. The principles associated with the application of the new technology remain unchanged, but the way in which it is presented and explained must be tailored to the local users. The need to move beyond translation and design training programs that contain culturally relevant materials shifts the attention to the trainers.

In an examination of rural development, A.D. Jedlicka (38) found the success of technology transfer was dependent on the skills and management techniques of the transfer agent, the agricultural extension worker. The farmer's access to information about new farming methods and materials did not significantly matter. The extension agent was the main determinant of whether new technology was

accepted. The examination of international technology transfers (ITT) has demonstrated similar results.

T. Buswick (39) found the trainer could be the key in getting technology investigated and implemented in the host country. He observed that a technical expert who learned to teach was more effective than a teacher who had to learn technology. C.C. Potter (40) suggests that there should be a budget for "training the trainers," which would be used to teach trainers how to transfer skills, technology, and cultural differences. In either case, the training of the trainer would necessarily include exposure to the culture of the host country.

L. Copeland (41) lists steps for a TNC to take in preparing the trainer. These include analyzing the receiver country and the sending firm, and recruiting and training the trainer. When different cultures are involved, barriers impede the training. To overcome these barriers, Copeland (42) formulated rules that he considers necessary for the trainer to follow in order to be able to successfully train a worker to assimilate and use new technology. These rules are specifically directed at a trainer working in a different culture and can be viewed as hurdles the trainer must overcome.

Copeland emphasizes the need to consider and integrate the culture of the worker into the training program. When a trainer understands the cultural differences between his culture and the culture in the host country, he can develop the trust of the worker and inculcate teamwork. This allows the establishment of a motivational system and helps the workers develop a sense of responsibility to the company.

While Copeland is correct in stressing the need to integrate the culture of the worker into the training, he ignores another critical aspect of the training. The workers in the host country must be exposed to the behavior considered appropriate within the corporate culture of the TNC. In this new working environment, the corporate (or organizational) culture constitutes the context for the interpretation of an ordered system of meaning within which social interaction takes place.(43)

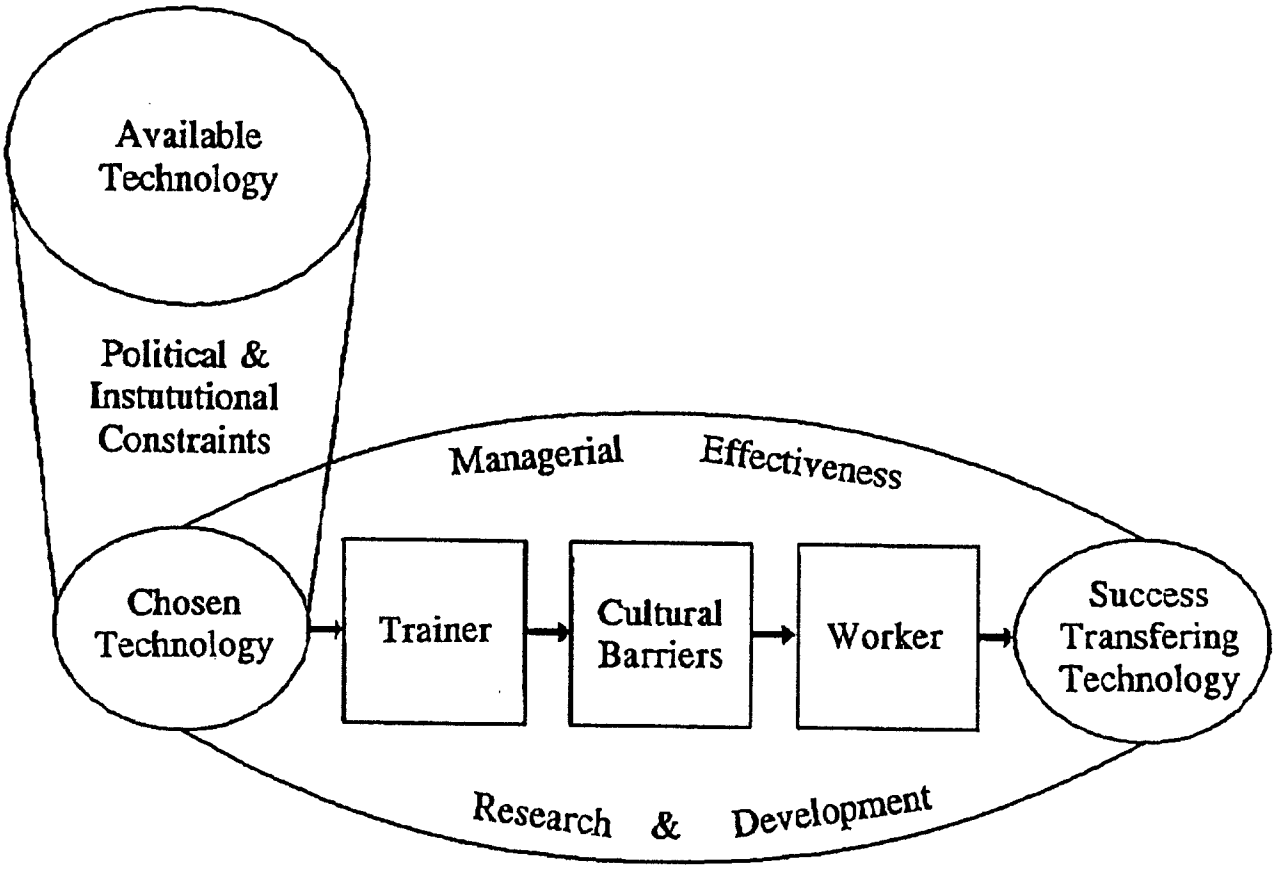
As stated above, culture is a highly enduring characteristic of an organization that evolves very slowly. Organizational climate incorporates those behaviors that can be seen to operate at the level of values and creation of the corporate culture.(44) In the context of training, climate evolves out of the same elements as culture, but it forms more quickly and alters more rapidly. E.T. Moran and J.F. Volkwein's (45) cultural approach to organizational climate suggests that training could transfer the basic elements of the organizational climate (supportiveness, achievement, orientation, autonomy, and decision centralization) and provides the groundwork for the more long-term transfer of the organizational culture.

A person familiar with the workers' culture (a trainer) will explain the new system and provide models of appropriate and inappropriate behavior in the new environment. The training can be enhanced by exposure to those familiar with both the technology and organizational culture. A trainer can expose the workers to cultural tendencies from the source country and allow the workers to form a knowledge base of the mores of members of the other culture. The success of the training will be judged by the adjustment and performance of the workers with the new technology.

Schneider (46) noted the need for the TNC to address the fit of corporate culture with the different national cultures of their subsidiaries to assure strategy implementation. This requires an expansion of the scope of the training to encompass the culture of the workers, the corporate culture, and the technological knowledge. This type of training may require a training team with members familiar with the technology, the organizational culture of the foreign TNC, and the host country's culture.

The successful transfer of technology to a developing country is a more complicated process than often portrayed. As discussed above, the choice of the appropriate technology from all that is available is influenced by the objectives of the firm and the political and institutional constraints of the host country. Once the technology and appropriate ownership arrangement are chosen, the success of the transfer is influenced by the managerial effectiveness,

Figure 2. The Process of Technology Transfer



research and development, and work-force training. With these factors in mind, it is possible to derive a conceptual model to show their relationship to the successful transfer of technology.

This model now focuses on the critical importance of the trainers, the barriers that must be overcome, and the role of the worker in the technology-transfer process. Copeland's rules mentioned above are guidelines to help the trainer break through the barriers between the TNC and its culture and the culture of the workers in the host country. The trainer has two functions. The first is to help the worker develop the skills required by the new technology. The second function is to help the worker adjust to the culture of the new firm.

CONCLUSIONS

This paper has documented the deficiency in the coverage of the role of the worker in the use of transferred technology. The model developed (Figure 2) emphasizes the choice of the appropriate technology and then the role of management, research and development, and the worker in the successful transfer of technology. In particular, the need for trainers to work through the cultural barriers (including the corporate culture) and help the worker develop the necessary skills is emphasized. The training also must reach beyond the current focus on the expatriate managers.

This analysis suggests the need for some changes in future research. More work needs to be done in the areas of human-resource management, specifically to examine the motivational forces and the work ethic in different cultures. Once these are examined, the more practical issues of selecting workers, testing them, designing effective training programs, and testing after training must be dealt with. A.H. Meleka

(47) advocated this in fostering good relations with host-country governments. One possible way to approach this would be to compare workers in the same or similar cultures who show differences in their acquisition of new skills, then examine training programs of TNCs to decide which one proved to be the most effective. An extension of this would be to use training programs that were successful in one culture and adapt them to a different culture, modifying the program as necessary for the cultural differences.

The implications for a TNC are that the cultural differences between countries have an effect on the worker accepting new technology. Unless the TNC realizes this and develops viable training programs to address the cultural differences (48), the transfer of technology will suffer. When this happens, neither the TNC nor the host country will be satisfied with the results. This could lead the TNC to reexamine its operations in that country. When this happens, the achievement of the long-range goals of production and profit may not be met. Research about cross-cultural training of workers can strengthen the ties between the TNCs and the host country. This will help the host country in reaching its objectives of development, especially in domestic employment and training. This also can move the TNC from the seemingly "no-win" situation currently associated with the transfer of inappropriate technology to a "win-win" situation with the host country.

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