The Journal of Technology Studies

Technology Transfer: A Third World Perspective

Anthony I. Akubue

The application of technology to stimulate development in the Third World received unqualified endorsement and support after World War II. In the postwar period from the late 1940s through the early 1960s in particular, a great number of former European colonies in Africa and Asia emerged from the bonds of colonialism to become independent countries. The acquisition and application of technology was considered integral to accelerated development in the newly independent nations. From a classical economic standpoint, development was synonymous with economic growth and industrialization was essential to that growth. Thus, to industrialize, capital accumulation, infrastructure development, foreign technical experts, and the importation of modern technology from the industrialized countries were deemed indispensable. Each newly independent country opted for a strategy of industrialization deemed appropriate for its national development goals. Depending on those goals, a country adopted either an import-substitution industrialization (ISI; to enable the country to manufacture goods that were previously imported for domestic consumption), an export-oriented industrialization (EOI; to enable the country to manufacture goods for export to other countries), or a combination of both. Regardless of the strategy adopted, implementation invariably required the importation of capital goods (that is, machines, equipment, and plants) and the development of national infrastructure for domestic production of manufactured goods. The importation of technology or the so-called transfer of technology from the rich to the new nations that ensued, especially from the mid-1960s, was intended to spur development through industrialization. Thus the development of the Third World for all intents and purposes was linked with the acquisition and utilization of technology from advanced Western countries.

Decades of technology transfer have not produced the expected outcome, considering the dismal social and economic conditions in many Third World countries today. The anticipated transformation in the economies of Third World countries has, so far, been elusive. What went wrong? Why has the outcome of technology transfer to the Third World been so disappointing? What is technology? What is technology transfer? Is technology transfer to the Third World what it should be? Under what conditions can the transfer of technology stimulate innovation and development in the Third World?

We in the technology education and allied professions contribute significantly to the technological and socioeconomic development of the Third World. Graduates of our programs are successfully developing and implementing technology education programs in an increasing number of Third World countries. We also contribute through the scholarly work we undertake in some Third World countries from time to time. Our professional conferences and journals, where papers such as this are presented and published, disseminate useful information for use in the Third World. Suffice it to say that in our profession we take pride in making a difference worldwide.

This article discusses the issues raised in the preceding questions concerning technology and its transfer to the Third World, specifically, the current practice of technology transfer and how it can be made more effective in stimulating development in the Third World.

Technology Transfer to the Third World

As many in our profession know, technology encompasses both material and nonmaterial components. That said, perceptions and assumptions about technology can and do affect the outcome of its transfer. A popular perception of technology is that it comprises physical devices. However, the problem with equating technology with physical objects is that so much is often assumed away. It is often assumed that if a machine or a "technique of production" works perfectly well in the country and circumstances in which it was created and nurtured, it ought to do just fine in any other locale. First, technology does not function in a social vacuum as this line of reasoning seems to suggest; it depends on factors such as the

prevailing social relations, physical as well as human infrastructure, and raw material availability. Second, the suggestion is also made that the transfer of technology provides all that Third World countries need for technological, social, and economic development when these countries receive machines or techniques of production from the advanced countries. This notion of technology transfer is overly exaggerated and sanguine. It is even false, because several implied elements have no basis in reality. It is not true that Third World countries have no problem absorbing transferred technologies, that adaptations are not required, that all companies remain equally efficient, and that firm-specific learning or technical effort is unnecessary and irrelevant (Lall, 1992).

Indeed, capital goods embody, but do not by themselves constitute, technology; they are products or object-embodied technologies that can be purchased freely on the international market. If the import of such means of production were all that was necessary, many Third World countries would be as industrialized today as their counterparts in Europe and North America. Saudi Arabia can be used to illustrate this point. With all its oil wealth and billions of dollars in foreign reserves, Saudi Arabia is able to buy sophisticated machines and equipment from Europe, North America, and Japan; however, the country's telephone system, for instance, remains comparatively second-rate. The transfer of technology entails much more than the mere acquisition of physical assets. The purchase of a house, for instance, does not constitute a transfer of the architectural and construction knowledge and skill that went into its establishment. The technology transfer process is more like learning carpentry than purchasing a new drill. "If one does not develop the skill to use the tool adeptly, and if one does not understand how one particular stage relates to other stages of production, one's product will be inferior and not sell" (Mittelman & Pasha, 1997, p. 61). By the same token, the purchase and possession of a machine or equipment by a Third World country neither bestows upon the people of the country the scientific and technological knowledge essential to its production locally nor the ability to set it up for efficient production. In fact, it is often the contention that material-transfer is not actually a form of "technology" transfer. According to this school of thought, the important ingredient in material-transfer "is not 'know-how' but 'show-how' and the core technologies are embodied within the physical items" (Simon, 1991, p. 8). Emmanuel (1982), an adherent of this school of thought, argued similarly that the export of a machine "rather constitutes a substitute for the transfer of the technology which would have been necessary in order to produce it locally, and is a sort of non-transfer" (p. 22).

Nevertheless, most models of the technology transfer process do seem based on across the board assumptions that do not reflect current realities. The models are usually based on ideal conditions for technology transfer where transactions involve equally endowed senders and receivers of technology. In other words, no distinction is made whatsoever between senders and receivers of technology. Thus, Third World countries are expected to possess the capacity to integrate imported technology into production processes on their own without needing assistance. As Stolp (1993) pointed out, "this perspective places the recipient and its capacity to absorb new technology on an equal conceptual footing with Northern senders of technology" (p. 156). It is rather obvious that this is certainly not the case. Whereas the transfer of technology involving two firms from two technologically advanced countries often results in mutual benefits and technological interdependence between the participants, the same cannot always be said about transactions involving industrialized and Third World countries. A strategic alliance involving Motorola of the United States and Toshiba of Japan illustrates this point. In this alliance, Motorola exchanged its microprocessor technology with Toshiba for the latter's memory technology. In addition, Toshiba also agreed to assist Motorola in expanding its sales into the Japanese electronics market (Simon, 1991). This is typical in most strategic alliances, where the critical and determining factor is the existence of parity in the benefits that each firm derives from the transaction. That the transfer of technology between two firms from industrialized countries is mutually beneficial to the firms can be attributed to their superior scientific and technological knowledge, which constitute the basis for the development of capital goods and related physical structures. The successful

economic recovery of both Europe and Japan after World War II, with the help of the U.S. Marshall Plan, is another event that illustrates this point. Those who equate technology with physical structures believe that the fast recovery of Europe and Japan was an "economic miracle." The truth is that physical structures constitute only the visible character of technology or, metaphorically, a tip of the iceberg. The submerged base of the iceberg or the invisible aspect of technology—knowledge, skills, and organization—remained intact after the physical industrial structures were smashed to pieces during World War II. It was this invisible form of technology, of which people are the carriers, which enabled the countries to rebuild their economies as rapidly as they did after the war. Europe and Japan possessed an absorptive capacity lacking in most Third World countries and were able to rebuild once they received Marshall aid funds (Aharoni, 1991).

Technology "transfer connotes the movement of knowledge, skill, organization, values and capital from the point of generation to the site of adaptation and application" (Mittelman & Pasha, 1997, p. 60). It is the useful exchange of ideas and innovations enabling the receiving region or country to expand on and utilize the knowledge received. This means that technology transfer also includes the knowledge of getting things done (Ofer & Polterovich, 2000). A critical test of technology transfers, therefore, is whether they stimulate further innovations within the recipient country. It is wrong to see technology transfer as an end in itself; rather, its importance derives from its ability to stimulate and strengthen the innovation process. In other words, it is an avenue with a great potential to increase the rate of technological innovation (Osman-Gani, 1999). For instance, the transmission of information about the invention of gunpowder and some basic gun-like devices in China stimulated the invention of the formidable cannon in Europe. Information about transistor technology from the United States provoked the development of new kinds of consumer products in Japan (Pacey, 1990). This is not happening in Third World countries to the extent expected despite decades of massive importation of object-embodied technologies from the industrialized world.

The intent here is not to imply that capital goods are not important. On the contrary, investment in capital assets is an indispensable prerequisite of economic growth. However, the primacy of people as the ultimate basis for the wealth of nations is indisputable. As the active participants in any economy, human beings accumulate capital, exploit natural resources, build social, economic, and political organizations, and affect national development. Capital and natural resources, on the other hand, are passive factors of production that depend on human manipulation to be useful. In other words, the development of a nation significantly depends on the skills and knowledge of its human capital.

The point is that many Third World countries are not developing the human as well as the physical capital that they need to build and enhance the national stock of capital. Domestic capital development and investment is essential to a country's income generating capacity. Foreign ownership of capital has served foreign investors well, enabling them to repatriate large amounts of income or profit abroad at the expense of the host Third World countries. Aggarwal (1991) identified the direct or first order costs associated with the disadvantages of technology transfer to Third World countries vis-a-vis the transferring firm to include the "outflow of dividends, profits, management and royalty fees, interest on loans, and other remittances by the firm including the possible use of high transfer prices" (p. 69). The transfer of technology as we know it has neither engendered domestic expansion of innovations nor done much to promote indigenous human as well as material capital development in most Third World countries.

When a country cannot on its own exploit imported technology to improve domestic production, let alone learn from it to further domestic innovation, it is inappropriate to speak of a transfer of technology taking place. The capacity to assimilate, adapt, modify, and generate technology is critical to an effective transfer of technology. It is perhaps appropriate to note the deficiency of the phrase "technology transfer"—it suggests a process in which the recipients of a new technique passively adopt it without modification. Pacey (1990) suggested differently: "transfers of technology nearly always involve modifications to suit new conditions, and often stimulate fresh innovations" (p. 51). The capacity to make necessary adjustments to imported technology

requires a superior level of skill, knowledge, and expertise of the recipients.

Without the benefit of absorptive capacity mostly achieved from *capacity-transfers*, Third World countries cannot take advantage of the preponderant power of technology as an effective means of fostering sustainable socioeconomic development. The concept of absorptive capacity is not limited in meaning only to the acquisition or assimilation of knowledge, but also includes the ability to exploit it. The concept is similar to what the United Nations terms indigenous technological capability (ITC), which has to do with the knowledge and skills of a country's human capital, and other absorptive provisions such as infrastructure, raw materials, and such things as the nature of the soil and climate. Among the attributes of a society with ITC are: an understanding of its technological needs; an effective policy on technology and its acquisition; effective global scanning and search procedures for identifying and selecting the most beneficial technology and supplier; the ability to evaluate the appropriateness of the technology to be imported; a strong bargaining or negotiating expertise needed for technological acquisitions; technical and organizational skills to use imported technology; the ability to adapt imported technology to local conditions; the availability of requisite infrastructure and raw materials; and the capacity to solve its problem using its resources. According to the United Nations (1983), ITC is not an alternative to a successful technology transfer but a necessary condition for it. The difficulty that most Third World countries face in trying to build their ITC can be blamed on internal as well as external obstacles.

Obstacles to Building Indigenous Technological Capability (ITC)

Third World countries have relied heavily on industrialized world sources for the acquisition of technical knowledge and skills. Those involved in the export of technology from industrialized countries are individual entrepreneurs, nongovernmental organizations (NGOs), government agencies, multilateral agencies, religious organizations, foundations, universities, consulting firms, and, of course, multinational corporations (MNCs). In terms of the magnitude of activity undertaken, MNCs, described as the most prolific purveyors of technology transfer (Simon, 1991), are by far the dominant group. They own and operate multibillion-dollar research and development facilities for generating new knowledge and innovations. The resulting knowledge and innovations are protected under lock and key within the confines of the MNCs. The extent to which MNCs transfer or provide technological knowledge and innovations to Third World countries remains open to debate. It is no exaggeration that the vaunted transmission of technological knowledge and innovations by MNCs often is a carefully monitored flow from corporate headquarters to the premises of a subsidiary in the Third World (Mittelman & Pasha, 1997). In fact, the activities of most MNCs may be described as guided primarily by the profit motive. It does not come as a surprise to anyone that MNCs do not operate with the objective to intentionally transfer innovative capacity to the Third World. In fact, Mittelman and Pasha (1997) observed that "the transfer of technology, to the extent that it actually occurs, is nothing other than leakage from [M]NCs" (p. 63). In other words, MNCs are not into capacity-transfers to host Third World countries. Ironically, capacity-transfers are the most coveted category of technology transfer that can lead to the development of absorptive capacity in Third World countries. According to Osman-Gani (1999), capacity-transfer "involves the transfer of knowledge and the capability to develop new technology" (p. 4). As critical as capacity-transfers are to the development of absorptive capacity, it is easy to understand why MNCs generally will not willingly transfer such capabilities outside the confines of their own organizations. It is naïve to expect MNCs to work willingly to build the self-reliance of countries that constitute a very significant source of corporate profits.

Similarly, bilateral and multilateral assistance to Third World countries is not, as most people would believe, an act of charity. It has been said that aid actually inhibits forms of development that do not suit the donor (Mason, 1997). This statement cannot be entirely false, especially knowing that government-to-government assistance without expecting something in return goes against the fundamental law of economics that "there is no free lunch." Foreign aid was intended to accomplish two major purposes:

> to ensure that the economies of the Third World functioned efficiently, because the prosperity of the West was closely connected to the purchasing power and raw materials of the non-West; and, just as in Europe, to discourage the development of national capitalism or communism in any form. (Mason, 1997, p. 433)

This is not an attempt to diminish the value of foreign aid. The point, however, is that foreign aid seldom happens without strings attached. It is hardly a secret that foreign aid has helped create foreign appetite in the Third World. Not too long after World War II, most Third World countries could feed themselves, but that is hardly the case anymore. Mason (1997) noted, for instance, "As a result of U.S. food aid policies, recipient countries were forced to modify both their own food policies and the eating habits of their people" (p. 431). The beneficiaries of this turn of events were most U.S.-based multinational agribusinesses, U.S. farmers, and consumers. Today, in the Third World "local peoples largely produce what they do not consume and consume what they do not produce" (Mittelman & Pasha, 1997, p. 47). Thanks to sophisticated communications and transportation technologies, the Third World is no longer shielded from the global wind of change ushering in what Mason (1997) termed "'McWorld,' a gustatory metaphor for globalization" (p. 408).

However, the impediments to technological development in the Third World are not all externally induced. Reluctance on the part of Third World elite to undertake the educational and technological effort needed to gain mastery over technology is also a part of the problem. Believing the acquisition of machines and other technical devices to be their priority, Third World countries embarked on a massive but passive importation of technology. Today, the landscape of most Third World countries is littered with expensive machines and construction equipment that are rusting away due to scarcity of spare parts and lack of maintenance. The literary educational curriculum inherited from past colonial administrations has not been changed or adapted to address the technological and socioeconomic needs of most Third World countries. Technical, technology, and vocational education are regarded to be less in importance relative to literary education. In fact, graduates of technical and vocational education are often looked down upon as individuals without enough brainpower or mental aptitude for literary education, who are, therefore, routed to the less prestigious technical schools. In other words, they are rejects of literary education (Akubue & Pytlik, 1990). The ambition of most Third World youth to work in air-conditioned offices just like the former colonial administrators, themselves graduates of literary education, can be attributed to the assimilative effect of colonialism. Until they see fit to develop educational systems that address their particular needs and develop a sense of their true priorities, Third World countries will continue to lack the absorptive capacity to utilize technology to foster their development and raise the general standard of living. This is a point that is supported by the many years these countries have tried to take advantage of different mechanisms of technology transfer to no avail. Mechanisms of technology transfer are vast and varied, including direct foreign investments, joint ventures, licensing, training, commercial visits, print literature, the Internet, sales of products, turnkey projects, and so on. Some of these are discussed in the next section.

Mechanisms for Technology Transfer

Due to the constraint of space only four of the major modes of technology transfer are discussed here; namely, foreign direct investments, joint ventures, licensing, and turnkey projects.

Foreign Direct Investments

Foreign direct investment (FDI) is one of the more frequently used channels of technology transfer. An FDI is usually a long-term productive investment in foreign countries in which an investing multinational corporation exercises either full or partial management control of assets and production in the countries involved (Mallampally & Sauvant, 1999; Siddiqi, 2001). To attract FDIs, Third World countries are promising policy liberalization, political stability, privatization, and minimal government intervention. Where all or a portion of these conditions are assured, a foreign corporation may be motivated to set up production facilities in a Third World country. Among other things, multinational corporations invest in the Third World to protect an existing market or to create a new one, to bypass prohibitive barriers and import restrictions, to discover or protect raw

material sources, to renew a product's life cycle, to take advantage of cheap labor and skills, and to increase profits (Kaynak, 1985). Opinions differ as to the benefits of FDI to the Third World. While some argue that benefits include transfers of production technology, managerial expertise, skills, innovative capacity, and increasing access to global markets, others are less convinced and argue that any transfers to the Third World as a result of FDIs are mainly unintended leakage (Mittelman & Pasha, 1997). Whatever the argument, it is doubtful, from decades of experience, that FDIs are a significant source of capacity building and national capital formation in host Third World countries.

In any case, FDIs are once more in high demand after the setback in the 1970s when a number of Third World governments nationalized many foreign firms after accusing them of exploitation and excessive profit repatriation. It has to be pointed out, however, that as many Third World countries improve their bargaining power and the ability to absorb foreign technology, their quest for equity in contract negotiations with foreign multinational corporations has been growing. One of the consequences of this development is a growing interest in establishing joint ventures between multinational corporations and host Third World country governments or enterprises. According to Goulet (1989), "Pressured by new demands from governments, many TNCs which have favored direct foreign investments only when they could be sole owners of enterprises are now agreeing to become minority equity holders in joint ventures.

Joint Ventures

Joint ventures have become attractive as many MNCs seek to take advantage of similar benefits as in FDIs, but at the same time avoid the risk of nationalization that may be potentially high with FDIs. Broadly, a joint venture may be defined as "a partnership formed by a company in one country with a company in another country for the purpose of pursuing some mutually desirable business undertaking" (Certo, 1986, p. 521). In strategic alliances such as this, ownership is based on equity share. The partners in the alliance each provide a portion of the equity or the equivalent in physical plant, raw materials, cash, or other assets (Griffin, 1990). In some Third World countries, MNCs are limited in equity ownership to 50% or less. Even then, joint ventures are attractive to MNCs for reasons that are both tangible and intangible. First, the Third World private or government partner may contribute land and funding as well as vital knowledge of domestic markets, suppliers, and patterns of business practice (Kaynak, 1985). The alliance combines the technical expertise of the MNC with the understanding that the host-country partner has regarding how to circumvent or eliminate government red tape that may affect the operations of the firm. In addition, joint ventures offer a number of intangible advantages, such as creating goodwill with Third World governments, employees, and customers as well as reduced risk of nationalization or unfavorable government legislation (Kaynak, 1985). In a rather unusual alliance, Cabot Corporation, a major manufacturer of carbon black, agreed to "50% ownership in Malaysia and Iran, and in Brazil it sought an equity share lower than one-half so as to be legally able to charge technical fees to its Brazilian affiliate" (Goulet, 1989, p. 55). Still, other MNCs remain less tolerant of joint ventures that require substantial, not to mention controlling, interest held by host Third World partners. These corporations may prefer to have firms in the Third World manufacture or market their products under a licensing agreement.

Licensing Agreements

"Under a licensing agreement, a firm allows another company to use its brand name, trademark, technology, patent, copyrights, or other expertise" (Griffin, 1990, p. 794). The licensee in this case agrees to operate under specified conditions in addition to the payment of fees and royalties. The fees and royalties are usually based on a percentage of sales or value-added.

Licensing relationships can be between independent business enterprises, parent companies, and wholly or partially owned subsidiaries, and joint ventures between private and/or public firms. The dominant form of licensing occurs between MNCs and their affiliates in Third World countries. This is also the most suitable arrangement for transfer pricing. With improving absorptive capacity, an increasing number of Third World firms are signing licensing contracts with foreign MNCs as a technique to expand innovation

domestically. According to Larson and Anderson (1994), "Licensing arrangements are generally associated with a greater degree of local, post transfer innovation as compared to other forms of transfer" (p. 548). As Third World countries gain in domestic technological capability, they are turning increasingly to licensing arrangements as a method of furthering domestic innovation. Japan, for example, made extensive use of licensing in its socioeconomic transformation into a world economic power. Where a country is interested in running a production facility after it is set up by a foreign source, the appropriate mode of transfer of choice may be a turnkey project.

Turnkey Projects

The last technology transfer technique is known as a turnkey project. A turnkey project is one in which a foreign organization undertakes the construction of a production facility and turns the key to a domestic firm or some other organization when the facility is ready for operation. "Investments funded by international organizations and government agencies are basically of the turnkey nature" (Stewart & Nihei, 1987, p. 11). Turnkey projects usually are more suited to a single activity production facility such as a cement factory, sugar refinery, steel mill, etc. For instance, several Indian steel mills were initiated through turnkey operations. A turnkey project may also include the training of domestic personnel to eventually take over the operation of the factory. It is worth noting that in a turnkey investment domestic personnel are able to operate the new plant but may lack the ability to set up a cement factory or a sugar refinery. The ability to reproduce or set up a production plant may indeed be more beneficial in terms of fostering self-sustaining development in the long run than having one from a turnkey arrangement in which the recipient only consumes or operates the technology involved.

Remaining Challenges

I have focused on explaining the concept of technology and the conditions in which it can be more beneficial to Third World countries in their efforts to achieve self-sustained socioeconomic development. Technology is a passive resource whose effectiveness depends on an active human resource capital. To take advantage of technology as a potent source of positive change, Third World countries must work hard on their absorptive capacity. It is erroneous to speak of technology transfer if the ability of Third World countries to assimilate, adapt, modify, and create technology is limited or nonexistent. Channels of technology transfer such as the MNCs will train Third World workers only to the extent it enables them to maximize profits. By their nature MNCs do not operate to make Third World countries self-sufficient, self-reliant, and able to do "their own thing." Training domestic labor to be able to operate production facilities neither puts them in a position to produce capital goods nor automatically prepares them to be able to set up production facilities on their own. It is the ability to create and accumulate national capital, to set up the necessary infrastructure, and to operate and maintain the infrastructure that promotes self-sustained development.

The importance of producing domestic vocational education graduates, technicians, technologists, engineers, scientists, and entrepreneurs as sources of a country's absorptive capacity cannot be stressed enough. Any country that hopes to develop a modern industrial system will realize sooner or later that developing this cadre of professionals is an indispensable requirement. Without these professionals in place to establish the foundational technical developments upon which the prosperity of a country depends, attempts to develop socially, economically, politically, and technologically will be no more than a false start. As experience has shown, this approach to development only serves to perpetuate Third World dependence on the West. It is perhaps appropriate to end with a quote that captures the message of this article: "A country's comparative advantages increasingly lies [*sic*] in its ability to use effectively new technology, which is generally a function of the capacity of its population to absorb new technologies and incorporate them in the production process" (Aharoni, 1991, p. 80).

Dr. Anthony Akubue is a professor in the the Department of Environmental and Technological Studies at St. Cloud State University. He is a member-at-large of Epsilon Pi Tau.

References

Aggarwal, R. (1991). Technology transfer and economic growth: A historical perspective on current developments. In T. Agmon & M. A. Von Glinow (Eds.), *Technology transfer in international business* (pp. 56–78). New York: Oxford University Press.

Aharoni, Y. (1991). Education and technology transfer: Recipient point of view. In T. Agmon & M. A. Von Glinow (Eds.), *Technology transfer in international business* (pp. 79–102). New York: Oxford University Press.

Akubue, A. I., & Pytlik, E. (1990, Summer/Fall). Technology, technical, and vocational education in Nigeria: Past neglect and present attention. *Journal of Epsilon Pi Tau*, **16**(2), 43–48.

Certo, S. C. (1986). *Principles of modern management* (3rd ed.). Dubuque, IA: Brown.

Emmanuel, A. (1982). *Appropriate or underdeveloped technology?* New York: Wiley.

Goulet, D. (1989). *The uncertain promise: Value conflicts in technology transfer* (New ed.). New York: New Horizons Press.

Griffin, R. W. (1990). *Management* (3rd ed.). Boston: Houghton Mifflin.

Kaynak, E. (1985). Transfer of technology from developed to developing countries: Some insights from Turkey. In A. C. Samli (Ed.), *Technology transfer* (pp. 155–176). New York: Quorum Books.

Lall, S. (1992). Technological capabilities and industrialization. *World Development,* **20**(2), 165–186.

Larson, B. A., & Anderson, M. (1994, August). Technology transfer, licensing contracts, and incentives for further innovation. *American Journal of Agricultural Economics,* **76**, 547–556.

Mallampally, P., & Sauvant, K. P. (1999). Foreign direct investment in developing countries. *Finance & Development,* **36**(1), 34–37.

Mason, M. (1997). *Development and disorder: A history of the Third World since 1945.* Hanover, NH: University Press of New England.

Mittelman, J. H., & Pasha, M. K. (1997). *Out from underdevelopment revisited: Changing global structures and the remaking of the Third World.* New York: St. Martin's Press.

Ofer, G., & Polterovich, V. (2000). Modern economics education in TEs: Technology transfer to Russia (transition economies). *Comparative Economic Studies,* **42,** 5.

Osman-Gani, A. A. M. (1999). International technology transfer for competitive advantage: A conceptual analysis of the role of HRD. *Competitiveness Review,* **9,** 9.

Pacey, A. (1990). *Technology in world civilization: A thousand-year history.* Cambridge, MA: The MIT Press.

Siddiqi, M. (2001, January). Luring the investor. *African Business,* pp. 14–16.

Simon, D. (1991). International business and the transborder movement of technology: A dialectical perspective. In T. Agmon & M. A. V. Glinow (Eds.), *Technology transfer in international business* (pp. 5–28). New York: Oxford University Press.

Stewart, C. T., Jr., & Nihei, Y. (1987). *Technology transfer and human factors.* Lexington, MA: Heath.

Stolp, C. (1993, March). Technology, development, and hemispheric free trade. *The Annals of the American Academy,* **526,** 151–163.

United Nations. (1983). *Transnational corporations in world development* (ST/CTC/46). New York: Author.