

APPROPRIATE TECHNOLOGY TRANSFER

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Summary

This article reassesses the issue of transferring appropriate technology from the developed to developing countries in light of the phenomenon of globalization. The prospects for appropriate technology transfer transforming the economies of developing countries are also examined. As globalization occupies center stage of modern development thinking, and is redefining what constitutes development, our basic understanding of technology is undergoing significant change also. Technology-induced globalization has different ramifications for different countries. Many developing countries have not really benefited by the much-touted international technology transfer. Many of the developmental problems that technology transfer was intended to address have been exacerbated. Socioeconomic conditions of the mass of the people in most developing countries have deteriorated. For some of these countries, grinding poverty resulting from underdevelopment is no longer an aberration, but a permanent feature of economic existence.

As a result, it is not an exaggeration to say that many developing countries, particularly in Africa, are losing out in the age of globalization just as they did in the industrial revolution. Given the changing character of technology, it is pertinent to confront the question of how “appropriate” is the notion of appropriate technology and its transferability in the contemporary global economic system. In this age of globalization, characterized by information technology and ascendancy of knowledge-based production, a serious rethinking of appropriate technology transfer relative to the

circumstances of developing countries is imperative and needs to be revisited with a critical searchlight. For the notion of appropriate technology transfer to be relevant in the evolving global economic system driven by information technology, it must be redefined to reflect the new reality.

1. Overview

Technology is increasingly shaping and reshaping the world's economic, political, and sociocultural environments. In this contemporary global environment, every discussion of economic development strategies, public policy, and cultural adaptations at the local, national, regional, or global level hinges critically on technology as an indispensable variable. The centrality of technology to the globalization process is such that national planners and captains of industry are preoccupied with how to generate or acquire it.

Today, transnational corporations and nation-states, particularly in industrialized countries, appear to anchor their future economic growth and prosperity on new technology. Consequently, they are engaged in fierce competition for scarce resources while investing heavily in research and development to generate new technologies or intensify innovation of existing ones. Recognition of the catalytic role of technology in the development process is not a recent phenomenon. Economists have long gone beyond mere recognition of technology as a residual factor in growth, and now consider it a major, if not the major, determining factor in industrial transformation and economic growth.

Embedded in this recognition, however, was the untested assumption that all countries—industrialized, industrializing, and non-industrialized, rich and poor, developed and underdeveloped—had the same set of needs and faced the same socioeconomic difficulties that could be remedied by utilizing the same production technologies and management techniques, regardless of their scale and complexity. Emerging from this assumption was also the claim of the universal applicability of Western economic theories and development strategies. Prominent among the array of such theoretical formulations were the stages theories.

Absent from the stages approach, however, was the basic understanding, awareness, and appreciation of the fact that different countries are confronted with different development constraints and that the same technology may not be appropriate to all countries because of the uniqueness of their environments. Even where such technology is presumably appropriate to the local circumstances of the recipient countries, a corresponding level of skills for utilizing the technology may not be readily available.

Moreover, a socio-technical infrastructure to support the introduction, institutionalization, and elaboration of the imported technology is commonly lacking in the recipient developing countries. Such observations and concerns were a prelude to the intense, and sometimes acrimonious, debate on appropriate technology. In this context, appropriate technology transfer became not just an organizing concept, but more importantly also a mobilizing framework for those who challenged the deeply entrenched and dominant conventional development strategies predicated mostly on large-scale, urban-based, capital-intensive production technology.

2. Prelude to the Appropriate Technology Transfer Debate

The 1960s witnessed a significant transformation in world affairs and a revolution in international relations. Protests against conquest, physical occupation of foreign territories, and subjugation of their citizens reached a climax. This culminated in the crumbling of colonialism and its ideological superstructure. The importance of this episode in the less developed countries, but particularly in Africa, was profound. Little wonder that many analysts have appropriately characterized the 1960s as the decade of African independence. Such a characterization is fitting largely because not less than 15 former colonial territories in Africa, more than in any other region, obtained political independence from their colonial masters in that decade alone.

This phenomenon had more far-reaching implications for world affairs and international relations than scholars commonly admitted. First, the decolonization hurricane that swept through Africa boosted the numerical strength of what were termed the less developed countries in many international forums, but especially in the United Nations General Assembly. Second, it provided an opportunity for developing countries to band together to bring about changes in world affairs. Third, less developed countries shared a common fundamental identity: poverty. Notwithstanding that all less developed countries were lumped together and described as “developing,” the reality was that most of these countries had stagnated, and were not developing at all. It was, and still is, self-evident that the world comprised two groups of countries: industrialized and non-industrialized, developed and underdeveloped, or center and periphery. Thus, the 1960s also witnessed a heightening concern about inherent inequality and inequity in international development. The awareness of the yawning development gaps between the haves and have-nots sowed a permanent seed of bitterness, distrust, and discord that has ever since characterized the dialogue between the industrialized and non-industrialized worlds.

The intensity of this dialogue and the ability of the developing countries to speak with one voice and to demand a radical transformation of the international system partly accounted for Resolution 1710(XVI) of the United Nations General Assembly, which designated the 1960s as its first development decade. The objective of that development decade was to “accelerate progress towards self-sustaining growth of the economies of the individual nations and their social advancement so as to attain in each less developed country a substantial increase in the rate of growth, with each country setting its own target, taking as the objective a minimum rate of growth of aggregate national income, of five percent at the end of the decade.” To achieve this objective, the United Nations Secretary-General identified six critical tasks that had to be accomplished.

Two of these tasks deserve specific mention because they are particularly relevant to this article. One was to redirect science and technology in industrialized countries to increase the attention given to specific problems in developing countries. The other was the need to transfer resources from the have to the have-not societies—essentially, from developed to less developed countries. Partly because of this, the 1960s experienced a phenomenal boom in foreign aid and technical assistance programs. Western countries on their own part did not believe they owed developing countries anything to warrant transferring resources to them. However, they were grudgingly willing to consider

resource transfer insofar as it would achieve their foreign policy strategic objective, namely, preempting the newly independent less developed countries from embracing the communist ideology.

By the 1970s, however, it was obvious that the objective of the first development decade had not been realized. The unpleasant and depressing fact was that during the 1960s the development gaps between the developed and underdeveloped countries widened considerably. By the early 1970s, data showed that although the average growth rate had slightly exceeded the target figure set by the United Nations, two-thirds of developing countries had recorded a growth rate that was far lower than 4%, and in certain countries there had been a decline.

Yet, such an experience did not dampen faith in the inevitability and developmental efficacy of technology transfer. Such faith in itself became the justification for advocating technology transfer as well as the corresponding argument for accelerating the process and pace of technology transfer to developing countries. Little wonder that at the threshold of the second development decade in the 1970s, there was unguarded optimism that technology would be effectively transferred to developing countries in a manner that would benefit them. It was also believed that technology transfer to developing countries would bridge the development gaps between developed and recipient developing countries. Consequently, the international development strategy of the General Assembly for the second United Nations development decade, embodied in General Assembly Resolution 2626(XXV), was the first major document with significant focus on science and technology as the key to transforming the economies of developing countries.

However, cognizant of the reluctance of the industrialized countries to transfer technology to developing countries, the developing countries capitalized on their numerical strength in the United Nations General Assembly to press for Resolution 3201(S-VI), which adopted the Declaration on the Establishment of the New International Economic Order in May 1974. Subsequently, the Programme of Action on the Establishment of the New International Economic Order in Resolution 3202(S-VI) of 1975 expressed support for the principles of “giving to developing countries access to the achievements of modern science and technology” and of “promoting the transfer of technology and creation of indigenous technology for the benefit of developing countries in the form and in accordance with procedures which are suited to their economies.”

The wholesale notion that resources could and would be mobilized at an international scale to foster economic development and social progress across nations did not originate in an international political vacuum. Indeed, the logic of promoting international development had historical antecedents. One such antecedent is that foreign aid was instrumental in the reconstruction and rehabilitation of post-World War II Europe of which the famous Marshall Plan remains an unassailable towering symbol. Pursell dated the United States’ post-World War II foreign aid programs to President Harry S. Truman’s “point four” initiative, which he laid out in a speech on July 24, 1949. Truman warned that the “grinding poverty” of the underdeveloped world might cause its populations to “turn to false doctrines which hold that the way of progress lies

through tyranny.” Predicated on this assessment, he enjoined the United States to provide the “technical assistance [that] is necessary to lay the groundwork for productive investment.” There were two parts to this assistance. The first would be “technical, scientific, and managerial knowledge necessary to economic development.” The second would be “production goods—machinery and equipment—and financial assistance in the creation of productive enterprise.”

The other antecedent was the green revolution, which was based on the development of a variety of high-yield crops, mostly rice and wheat, for the tropics. These crops were introduced into a number of developing countries, along with modern agricultural techniques such as irrigation, mechanized agriculture, fertilization, and weeding. The initial results of the green revolution in India, Mexico, Pakistan, and the Philippines were impressive as crop production doubled and in some cases tripled. The green revolution was seen as a successful experiment on which subsequent development strategies involving sophisticated technology in developing countries would be modeled. However, it became obvious that the green revolution favored mechanized agriculture and that the beneficiaries of the innovative agriculture were larger and richer farmers who had the resources to invest in capital-intensive production technologies. Segal, for example, observed that the “obstacle to the implantation of the Green Revolution in much of Africa include the high costs of imported energy, the particular characteristics of African soils, the imports and maintenance costs of machines, and the lack of indigenous research capabilities to adapt *in situ* imported hybrid seeds.”

The failure of the technical assistance and foreign aid programs, green revolution, and the United Nations development decades provided an impetus for a radical critique of the hitherto unquestioned conventional development strategies. There were common threads in the whole gamut of technical assistance, foreign aid, and green revolution. First, these programs emphasized the adoption in developing countries of the same pattern of industrialization prevalent in the Western world. This gave rise to the proliferation of complex factories, mechanized agriculture, and heavy industrial infrastructure that, by their very nature, required the considerable technical expertise and engineering and managerial brainpower that only multinational corporations in the West could provide. Second, it was commonplace that foreign technical experts and consultants were adept at presenting ready-made solutions to socioeconomic problems in developing countries without a proper definition of the problems, let alone adequate understanding of the societal dynamics. In certain cases, socioeconomic problems were often defined to fit the off-the-shelf solutions—a classic case of putting the cart before the horse. The consequence of this approach is that technical assistance, expert advice, and inappropriate technology all compounded the problems they were originally intended to solve. No doubt, this approach was myopic. Worse still, it engendered a climate for pessimism about the developmental efficacy of large-scale, urban-based technology transfer to address significantly socioeconomic problems in developing countries in any substantive and sustainable manner. This situation will continue while developing countries lack the endogenous skills to define their local problems and determine the appropriate strategies to address them. Countries do not develop simply by depending on the benevolence of foreign agents to initiate the process (see *Global Ethics and Economic Security and the Environment*).

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Biographical Sketch

Felix Moses Edoho is a professor of business administration and management at Langston University, Oklahoma, where he is the chairman of the Department of Business Administration. Previously, he was the director of MBA Program, Lincoln University, and also the faculty liaison for the Black Executive Exchange Program (BEEP), under the auspices of the National Urban League. From 1993 to 1998, he was director of a USAID-funded multimillion-dollar international development project in Malawi. Professor Edoho teaches and researches in various areas including strategic planning and management, science and technology transfer, public policy, entrepreneurship and microenterprize, sustainable development, human resource management, organizational behavior, and environmental policy. He is editor of *Globalization and the World New Order: Promises, Problems, and Prospects for Africa in the Twenty-First Century* (1997) and *Management Challenges for Africa in the Twenty-First Century: Theoretical and Applied Perspectives* (2001). Professor Edoho has contributed over 15 chapters to various edited volumes as well as published in academic journals such as the *Bulletin of Science, Technology, and Society*, *Journal of Technology Transfer and Management*, *Journal of Global Awareness*, *Journal of African Business*, and *Journal of Sustainable Development in Africa*. He is recipient of the Distinguished Leadership Award for Outstanding Contribution to Contemporary Society and The Mark A. Haskell Award for Superior Performance in the Field of Urban Affairs and Public Policy as well as being listed in the International Directory of the Distinguished Leadership, ninth edition (2000). Professor Edoho is also a Wakonse Teaching Fellow and a NISSAN-HBCU Fellow.