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Technology Transfer to LDCs

The following contributions deal with the much discussed problem of technology transfer from the industrial nations to less developed countries (LDCs).

Changing Attitudes in the Developing World

Miguel S. Wionczek, Mexico City *

Until about the mid-sixties the developing world, including the Latin American subcontinent, did not show any particular interest in the problems of modern science and technology. It was generally assumed that the scientific and technological gap between advanced and underdeveloped parts of the world economy was of such a magnitude that the low-income countries were condemned forever to be the unconditional and unilateral receivers of fruits of science and technology developed in the Northern Hemisphere. Furthermore, both the economic policy makers and the private sectors of most of Latin America, Africa and Asia were accepting the proposition that science and technology, denominated jointly as know-how, were circulating more or less freely around the planet in the mutual interest of their producers and consumers. Such a state of affairs in the developing world could be only explained, first, by the absence

of a clear vision of the role of know-how in economic development and, second, by the divorce between their economic theoreticians and policy-makers, on the one hand, and technological innovators and practitioners, on the other.

Over the past five years, the lack of interest in science and technology, characterizing the developing world, gave room to new attitudes, especially in the more dynamic or larger semi-developed countries like Argentina, Brazil, Mexico, India, Pakistan, in some Middle East countries (Egypt and Iran) and in the industrializing countries of the Far East (from South Korea to Malaysia and Singapore). It is now broadly accepted in these areas that their economic future will largely depend upon their ability not only to acquire know-how abroad but also to adapt internally and build upon the imported know-how their own scientific and technological capabilities. While many factors are responsible for this rather sudden change of attitudes within the developing world, perhaps the most important

one is the progressive change from the development strategy based upon import substitution for domestic markets to that calling for the broader participation in the world trade in manufactures and semi-manufactures.

The belated discovery in the theoretical literature of the advanced countries of the role of technical innovation in the process of overall economic growth; the appearance on the global scene of transnational manufacturing corporations; the entry into force of the UNCTAD-sponsored system of general trade preferences for manufactures produced in the less developed countries, and, last but not least, the relative stagnation of the traditional commodity exports originating in Latin America, Africa and Asia, stand out as other factors responsible for the preoccupation of the developing world with its own scientific and technological backwardness and the ways to overcome this serious handicap.

Search for New Formulas

Given the growing nationalism all over the so-called Third

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World the proposition that the strengthening of its scientific and technological capabilities should be left mainly in the hands of foreign capital and foreign investors is being questioned in many places at the same time. This questioning has been leading to the abandonment of the old formulas and the search for new ones.

While not denying the role of foreign enterprise as the bearer of scientific and technological knowledge to the world economic peripheries, the increasing emphasis is being put in these regions upon the critical evaluation of means by which the advanced know-how was being made available to them in the past. One of the additional factors supporting this search for new solutions is the growing conviction that the flow of scientific and technological innovations to the more backward members of the world economic community is much less free than it was previously thought, involves considerable foreign exchange expenses and, moreover, constitutes a flow of the know-how without any adaptation to local conditions. Some particularly harsh critics of the traditional situation in the developing countries go as far as to deny the usefulness of the existing international arrangements in the field of the technology transfer, particularly the working of the international patent system, the practices of uncontrolled licensing of foreign knowledge to its final consumers, and the modalities of the transfer of know-how within the transnational manufacturing corporations, where the decision of what kind of know-how, and at what price it is to be transferred to their subsidiaries in the developing world, is left to the corporations' headquarters located as a rule in the advanced countries.

The changes of attitudes toward the problems of science

and technology lead many developing countries to profound alternations in the basic conceptual approach. First, the notion of a world-wide free flow of technical knowledge is being progressively abandoned in favor of that of the existence of an international technology market. Second, the concept of technology transfer has been substituted by that of an international technology trade. Third, know-how of any sort is considered to have characteristics of a commodity, available in the international market and subject to commercial transactions.

Elements of Technology

In other words, while noting that in the past technology has often been referred to in a vague and diffuse way and surrounded by mystery, more and more developing countries accept presently the position that the concept of science and technology is neither vague nor mysterious. Technology is an essential input for physical production of goods and services, and as such is bought and sold in the world market as a 'commodity' embodied in one of the following forms:

□ in capital goods and sometimes intermediary goods which are subject of commercial transactions, particularly in connection with new investment decisions;

□ in human labor, usually qualified and sometimes highly qualified and specialized manpower, with capacity to make correct use of equipments and techniques and to master the problem solving and the utilisation information required to produce the needed goods; and

□ in information, whether of a technical or of a commercial nature which is provided in markets, or kept secret, as part of monopolistic practices followed by the owners of modern scientific and technological knowledge.

This new approach getting rapidly new followers in the developing countries leads them to realize that they do not master to any significant extent these three elements in which technology is embodied. Because of the traditional international division of labor, the centralization of higher technical and scientific training in the high-income countries, and the lack of systematic scientific policies in the developing world, the less developed countries have only limited supply of technically qualified manpower, and they tend to lose a large proportion of these scarce resources through 'brain drain'. Finally, monopolistic practices of technology suppliers put severe barriers to their access to information, particularly about production processes. The developing countries are thus placed in a position where, on the one hand, they have to import technology on a large scale and, on the other, they have to pay heavily for access to technology, and get it on conditions which, unless they are counteracted by appropriate policies, lead to self-perpetuating dependence on technology produced in the industrial world.

New Approach

Anyone who attends the numerous international or regional meetings on the subject of technology transfer to the developing countries and watches the developments on national level in Latin America, Africa and Asia is perfectly aware that the issue is not that of cutting their dependence upon foreign technology but of acquiring it under more advantageous conditions. The most recent legislations adopted by Argentina, Brazil and India, among others, do not call for "expropriating" foreign technology owners but for introducing some kind of government control over the purchases of technical knowledge abroad, in respect to its

quality, adaptability to local conditions and price. It is perhaps a symptom of our time that Brazil, a country particularly generous to foreign investors, insists upon detailed screening—case by case—of the know-how purchases.

One may state without exaggeration that the country offering inspiration these days to the developing world in this respect is Japan that had long ago developed the art of choosing and buying foreign technology from alternative sources and at low prices. This does not mean that the developing countries lack awareness that Japanese policies and practices cannot be imitated elsewhere. Their aim is not to create obstacles to foreign investment and concentrate exclusively on the purchases of know-how, but to unravel—for negotiation purposes—the traditional pack-

age: foreign capital-technology-management.

There is no basis for a belief that the developing countries will abandon their present efforts to diminish the degree of technological dependence and to cut down the costs of imported know-how. What should be expected instead is an increase in the number of countries that will follow the road taken by Argentina, Brazil and India. Most probably, the main thrust of new policies will be directed towards elimination of all sorts of restrictive business practices that accompany the sales of technology under licensing agreements between foreign technology owners and domestic manufacturing firms. The main argument of the developing countries is that these practices, frequently embodied in licensing contracts, are not only illegal in the industrial countries themselves, but offer

insurmountable obstacles to the entry of the semi-developed nations into world trade in manufactures.

It would be very useful to the technology exporting countries to take note of the described changes in the attitude of many less developed nations towards the problems of science and technology transfer. Otherwise, serious and unnecessary conflicts may arise between both groups that would not serve the best interests of the parties concerned. In this particular field there is a great need for mutual understanding and for keeping all channels of communication open. It is an encouraging sign that World Intellectual Property Organization (WIPO), that represents a meeting place for technology producing and purchasing countries, shows growing awareness of the issues involved.

The Concept of Appropriate Technology

by Dr Karl-Wolfgang Menck, Hamburg *

At the end of the second development decade the industrial countries' technical aid is in the centre of severe criticism:

to some of the LDCs it has made technologies available that they were unable to apply because the necessary qualifications were missing;

to most LDCs technical aid has brought capital-intensive methods that ran contrary to the widespread under-employment;

finally, for many receiving countries technical aid proved

too costly because the methods made available to them necessitated imports from the industrial countries. For this purpose the LDCs have had to expend part of their already scarce foreign exchange.

In view of these reproaches, at least partly justified as they are, the concept of the technology transfer evolved. Particular methods and skills specifically geared on the aims and requirements of the receiving countries were to be made available to the receiving countries as appropriate or intermediate technology. In this connexion appropriate or intermediate technologies are tech-

nical methods in the widest sense which have yet to be discovered and provided for the countries of the Third World.

The development of appropriate technologies is possible either by down-grading technical methods of the industrial countries according to the receiving countries' aims and conditions or up-grading the methods known to, and applied in, receiving countries by way of supplementing them with technical capabilities of the industrial countries. Partly, methods and techniques so far only held on the record are being practically applied again. It is in any case important that ap-

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