TECHNOLOGY AND COMMUNITY DEVELOPMENT BCD 216

LECTURE 3

INNOVATIONS AND COMMUNITY

Strategies of Technology Transfer to Developing Countries

Technology Transfer, also called Transfer of Technology (TOT), is the process of transferring skills, knowledge, technologies, methods of manufacturing, samples of manufacturing and facilities among governments or universities and other institutions to ensure that scientific and technological developments are accessible to a wider range of users who can then further develop and exploit the technology into new products, processes, applications, materials or services (Wikipedia). The importance of international technology transfer (ITT) for economic development can hardly be overstated. Both the acquisition of technology and its diffusion foster productivity growth.

Transfer of technology to developing countries has been one of the most discussed areas of international economic relations in the past thirty or more years.

Technology transfer must be recognized as a broad and complex process if it is to avoid creating and maintaining the dependency of the recipient, and if it is to contribute to sustained and equitable development. The end result for the recipient must be the ability to use, replicate, improve and, possibly, re-sell the technology. Transfer of technology is more than just the moving of high-tech equipment from the developed to the developing world, or within the developing world. Moreover, it encompasses far than equipment and other so-called ―hard‖ technologies, for it also includes total systems and their component parts, including know-how, goods and services, equipment, and organizational and managerial procedures. Thus technology transfer is the suite of processes encompassing all dimensions of the origins, flows and uptake of know-how, experience and equipment amongst, across and within countries, stakeholder organizations and institutions. If the transfer of inadequate, unsustainable, or unsafe technologies is to be avoided, technology recipients should be able to identify and select technologies that are appropriate to their actual needs, circumstances and capacities. Therefore, a key element of this wider view of technology transfer is choice. There is no single strategy for successful transfer that is appropriate to all situations. Desirably a technology recipient will choose a technology which at least meets the definition of being ―environmentally sound‖.

Moreover, transferring environmentally sound technologies (ESTs) successfully depends on the potential recipient:

Recognizing and taking advantage of their benefits;
Obtaining information, and having the knowledge and tools to make an assessment and decide on the most appropriate technology option
Understanding the technologies, especially their operation, responsible use and the systems and infrastructure on which they depend; and
Knowing how to implement and manage technological change successfully.

The Seven "C"s for the Transfer and Uptake of Environmentally Sound Technologies

a) *Context*: Technology transfer does not take place in a vacuum. The performance of a given technology is dependent on a wide range of factors, making identification of an environmentally sound or otherwise appropriate technology somewhat problematic. For example, a technology that is assessed to be environmentally sound in a given locale, culture, economic setting or stage in its life cycle may not be in another. Its performance may be influenced markedly by the availability of supporting infrastructure and by access to the expertise necessary for its management, maintenance and monitoring. Moreover, a technology that qualifies as being environmentally sound at one point of time, may not do so at another – the performance criteria against which it is assessed may change as a consequence of new information or changing values or attitudes; a technical breakthrough may give rise to more desirable alternatives. It is therefore vital that recipients and users of a technology are able to choose an option that meets their specific needs and capacities, while also being environmentally sound in its operating locale and over its operational life cycle. It is, of course, highly desirable that the technology is also found to be economically viable and socially acceptable, and hence sustainable.

b) *Challenges*: There are many barriers to successful technology transfer. All along the transfer path, from the supply side of technology transfer (the innovators and developers) to the demand side (the recipients and users), impediments occur at every node and, due to restrictions on the movement of information and materials, for every linkage in the technology transfer chain. While some generalizations are possible, the specific nature and severity of the challenges depend on the prevailing circumstances, varying with the type of technology, its specific application and the characteristics of the technology providers and recipients.

c) *Choice*: A key aim of barrier removal, that is of facilitating technology transfer, is ensuring that technology recipients and users are able to make informed choices by being able to identify

and procure the most appropriate (in environmental and preferably also in economic and social terms) technology for a given application in a given locale. Several requirements must be met, including:

Needs well defined, documented and understood;

Several technology alternatives, all of which are well and reliably characterized in terms of environmental and economic performance and potential social impact;

Rational and functional methods (decision support tools) that facilitate choice of an optimal

Capability to make the chosen technology fully operational, so that it fulfills its potential, and meets the identified needs, without detrimental side effects, including during decommissioning.

d) *Certainty*: A lack of certainty, and the consequential high levels of risk, both real and perceived, are recognized as major impediments to the successful establishment and ongoing operation of functional markets for Environmentally Sound Technologies (ESTs). The common perception that many ESTs are ―emerging‖, and hence ―unproven‖, means there is little confidence in their economic, commercial or technical viability. Removing barriers to technology transfer often translates into increased certainty, and decreased risks, for the key stakeholders such as the developers, suppliers, financiers, insurers, recipients and regulators. One example is ensuring access to sufficient, verified information. Risk assessment and management capabilities for financial institutions are also of special importance.

e) *Communication*: The technology transfer chain is often long, in terms of both distance and time. Effective communication is thus another essential ingredient in the recipe for successful technology transfer. Efficient and effective two-way communication and cooperation between key stakeholders will do much to remove barriers. Effective communication is a requisite to harmonizing the contributions to the processes of technology transfer being made by diverse players.

f) *Capacity*: Enhancing the transfer of technologies that support sustainable development is largely about creating favourable circumstances for technology transfer – ensuring all stakeholders have the ability (potential and realized) to fulfill their roles and meet their responsibilities, expeditiously. Generally speaking, government is the principal player in creating an enabling environment for technology transfer, but financial and insurance institutions and international organizations can also be influential. Circumstances which are supportive of technology transfer include: open and competitive market; comprehensive and credible

specifications on the technology performance; financiers who are at least technology neutral; the most cost competitive technology also has the most favourable environmental and social performance specifications; and Policy risks are addressed.

All key players and stakeholders must have the necessary knowledge and skills to perform the roles and tasks expected of them. High levels of awareness, motivation and empowerment within the public and private sectors and in civil society will help ensure that people, communities and wider societies are able to adapt continuously to new circumstances and challenges that drive and arise from technology transfer.

g) *Commitment*: If there is to be an improvement on the last decade or so, where technology transfer failed to deliver the anticipated and much needed advances in development and sustainability, we must make a commitment to overcoming the challenges, providing technology users with the choice they deserve and desire, increase certainty, thereby reducing risks, enhancing communication between technology transfer stakeholders and building