

Chapter 2

Commercial Channels for Sustainable Technology Deployment in Developing Countries

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Abstract Technological advancement is instrumental to enhancing productivity, generating economic growth, and improving peoples' lives. "Technology diffusion" is the dynamic process by which new solutions are developed and deployed, adapted, and improved upon. Among the many approaches to stimulating technological innovation and diffusion, the most effective integrate knowledge held by different actors with complementary expertise. Partnership is a powerful driver of innovation and can help to ensure that new solutions effectively address user needs, thus enhancing the sustainability of technology deployment. In light of this, commercial models for technology innovation and diffusion increasingly involve collaborative, "open" innovation. Commercial approaches to technology diffusion are most effective when an enabling policy environment is in place. This paper reviews enabling policies and other factors that support partnership, innovation, and global technology diffusion involving commercial entities. The analysis is based on presentations at the 2014 EPFL-UNESCO Conference on Technologies for Development (2014 Tech4Dev) by four experts on commercial approaches to technology diffusion.

2.1 Introduction

The deployment of new technologies can accelerate improvements in social and economic welfare in developing and developed countries alike. A key factor in enhancing productivity, generating growth, and improving lives, technological advancement plays an important role in development.

New technology offers solutions to critical challenges where none existed previously, as well as new solutions that are more cost-effective. New technology can improve the ability of governments to address pressing public policy challenges,

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while enabling people to enjoy longer, more comfortable lives. Moreover, the process by which technology is developed, deployed, adapted to local needs, and improved upon involves a dynamic process of learning that enhances the local knowledge base and improves the innovative capacity of all involved. Made up of individual technology transfer transactions over time, the process by which technology and knowledge flow and are absorbed locally can be called “technology diffusion.”

Speakers at the 2014 EPFL-UNESCO Conference on Technologies for Development (2014 Tech4Dev) highlighted a range of models for the development and diffusion of innovative technology solutions for users in developing countries. Approaches grounded in charity, community initiatives, public–private partnerships, regional and national government initiatives, commercial transactions, and other approaches were discussed. Irrespective of the particular approach adopted, many speakers agreed on: the need to accurately identify and effectively respond to the needs of technology users; the value of cost-effectiveness as a characteristic of new solutions; and the need for creative business models that can support not only the development of new solutions but also their sustained deployment where most needed.

Commercial models provide one sustainable approach to global technology innovation and diffusion. In this context, “sustainable” means self-sustaining over time, from a financial perspective or in the sense that knowledge is being transferred so as to enable local partners to continue working with and improving upon the technology. With their high growth rates, need for massive infrastructure investments in coming years, and sizeable and growing customer base, it is no surprise that increasing attention and resources are being directed at needs in developing countries. Global firms consider that sustainable technology innovation for and deployment in these markets will require the right business and policy environments.

Enabling environments that stimulate and reward investments in research and development (R&D) and that support collaborative innovation can accelerate technological advancement in developing countries. An enabling business environment develops over time, the result of actions by both private and public actors. It includes: investments in education and training (which enhance local “absorptive capacity”); investments in infrastructure; macroeconomic stability; a sound financial system, including access to finance for entrepreneurs; the existence of networks for knowledge creation, such as universities and research centers; functioning courts and rule of law; and the provision of public services such as intellectual property (IP) protection. While not sufficient on its own to drive development, the right policy and business environment can support entrepreneurship while attracting investments and technology partnering, contributing to job creation and a better local innovative capacity.

Partnership is most likely to thrive in an environment with the above elements. Collaboration, also known as “open innovation,” is a crucial channel through which technology and know-how flow globally. Collaborative innovation is rapidly becoming the premier innovation model as firms are driven to partner with a range of entities—including universities, NGOs, government agencies, and other firms—with complementary knowledge and skills, wherever they may be located. Collaborative

innovation models, in concert with globalization and advances in information and communication technology (ICT), have opened up new opportunities for entities in developing countries to participate in global innovation networks.

A collaborative innovation model enables firms to better manage risks associated with product development and commercialization, in an era of rising product complexity, competition, and R&D costs. It is underpinned by trust and supported by IP protection and other laws. IP systems are particularly important for partnerships in that they provide recourse if one partner uses proprietary knowledge shared by the other as part of their collaboration without authorization or in a dishonest manner. In places with an effective IP system, firms are generally more willing to share their most valuable technology and know-how.

Companies engaging in global technology transfer, that is, any firm collaborating and commercializing solutions across countries, regularly point to partnership with local actors as critical to successful technology deployment. By working with local partners, foreign firms can gain the knowledge necessary to successfully adapt their offerings to local needs. This can ensure that, once deployed, solutions are used and maintained properly, and that customer feedback is integrated into future R&D. Local partners benefit from the foreign firms' technical knowledge and know-how.

The following additional observations can be made about commercial channels for sustainable technology innovation and diffusion in relation to developing country markets.

Cost-effective innovations are not necessarily simple. Many people have heard about "frugal innovation," which is the development of low-cost, low-tech solutions for users in developing countries. But they may not be aware that complex solutions are also valued by customers in developing countries, as they can provide the same or greater cost savings as simple inventions. For instance, General Electric has developed a prefabricated production module for biopharmaceuticals that is aimed at developing country markets (Mages 2014). The KUBio results in production that is, on average, 30 % cheaper than a traditional facility built from the ground up. This saves the customer, whether a government agency or firm, money over the life of the technology. Value for money is also important for customers in developed countries, and solutions originally intended for developing country users often find commercial success in mature markets.

Sustainability requires developing offerings that users are willing to pay for. Firms know this well: if a solution is not useful or appropriately adapted to the context in which it will be used, customers will not materialize and the business will not thrive. In other words, to be convinced to part with their money, customers must derive real value from an innovation. This was the case with a project run by a public-private consortium, working under the Qualcomm Wireless Reach initiative (Tronchon 2014). The consortium provided South African nurses with innovative 3G-connected mobile libraries. After an evaluation determined that this technology enabled nurses to better serve patients, particularly in remote areas, the regional health authorities began the process of mainstreaming the technology into health services delivery. Because the solution had effectively solved a healthcare challenge, the government considered it to be worth paying for.

Developing an appropriate, desirable technology solution is not enough. There must also be a business strategy that can effectively get the technology to where it can actually be used. Simpa Networks, a green energy company based in India, has been open about how difficult it can be to turn green electricity users into paying customers (Needham 2014). Simpa's innovation is not the solar energy systems that its partners install for customers, but rather the Simpa pay-as-you-go business model for the provision of green energy, notably the innovative hardware/software system that supports it. Creative conditions in new markets, for instance collaboration with unconventional partners, for instance firms working with nongovernmental organizations (NGOs), may be needed to sustainably get solutions to those who can benefit from them.

Knowledge exchange is important to ensuring that a solution truly solves a problem. Partnerships with local actors can help firms to adapt their offerings to meet real needs and conditions in new markets, for instance those relating to customers at the bottom of the pyramid (Parthasarathy 2015, Chap. 6). Within partnerships, knowledge flows in multiple directions. Foreign firms supply technical solutions as well as knowledge and training, a process that over time contributes to the local knowledge base and improves local innovative capacity. In return, outside firms benefit from local market knowledge and opportunities to explore new ideas with partners.

Cost-effective innovation often entails using existing tools in new, efficient ways. Innovation may be a question of discovering new ways to use tools that are already accessible to people to deliver services and meet their needs more cost-effectively. Cell phones provide an example of a ubiquitous tool that can be leveraged and combined with new tools, such as new applications, to improve productivity and support the effective delivery of public services.

Social entrepreneurs' impact is diminished when they cannot secure adequate finance. The 2014 Tech4Dev conference featured presentations by a range of startups that were formed to address important social challenges in innovative ways. These "social enterprises" will need funds to demonstrate their concept, build the business, and grow and scale. Although recognized as important actors in innovation, startups often find it challenging to secure the resources they need to launch. Social entrepreneurs face particular difficulties. They must often rely on their own resources to get started, and they face a dearth of funding until they can create a track record of success that can enable them to attract traditional investors. "Development finance" systems, targeted specifically at the needs of social entrepreneurs, could help.

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