



Science, Technology, Innovation and Culture: Partnering for Solutions for Sustainable Development

Issues Note

Background

Science and technology (S&T) are universally recognized as drivers, along with education and investment, of national economic development and key contributors to poverty reduction, disease prevention and environmental conservation. Information and Communication Technologies (ICTs) and the development of the internet in particular are having a transformational impact in the socio-economic and political realms.

Innovation¹ is both a central driver of economic growth, as well as conferring important benefits across all three dimensions of development – economic, social and environmental. Technological innovation has led to the most significant of social benefits throughout history, from the development of new medicines and treatments, to the explosion in economic output and incomes associated with the Industrial Revolution to more nutritious, abundant and safer foods. Innovation has underpinned core changes in the way we live and continues to drive most of the significant improvements in quality of life. For example, the World Bank estimates that innovation in plant breeds in the 1980s and 1990s accounted for as much as 50 percent of the growth in yield of food staples, with poor consumers being the main beneficiaries. Without those gains, world cereal prices would have been 18-21 percent higher in 2000, and caloric availability per capita would have been 4-7 percent lower.

Policymaking designed to close the “innovation divide” must take into account that innovation does not occur in a vacuum, but requires a culture of innovation encouraged by the innovation “eco-system”: human capital, funding sources, legal systems, business engagement, government policies, research and development, etc. Therefore, reaping the benefits of innovation requires a culture that promotes science, technology and innovation, where institutions and organizations work together according to a coherent policy framework or national systems of innovation.

¹The concept of innovation as used in this note covers innovation in programmes, in products in processes and in partnerships with a focus on promoting equity, reaching the most vulnerable communities.

As technology diffusion depends on the “absorptive capacity” of the targeted population, including factors such as: literacy rates, technical expertise, infrastructure quality, and general governance or the rule of law, innovation policies should be rooted in local “ownership”, with adequate funding, clear lines of accountability, and strong private sector involvement. Supporting the STI sectors in developing countries empowers communities to solve the problems they face, using locally-designed solutions at more affordable prices.

Indeed, science, technology and innovation can play a critical role in fostering progress towards each Millennium Development Goal (MDG), including by:²

- Fostering access to knowledge;
- Increasing productivity, industrialization, economic growth, and the creation of decent jobs;
- Promoting health and access to essential drugs;
- Achieving food security through sustainable, equitable agricultural systems and by raising production and incomes, especially of smallholder farms;
- Promoting renewable energy technologies in order to respond to the dual challenge of reducing energy poverty while mitigating climate change.

The role of culture in fostering sustainable development is also being increasingly recognized. Many are becoming more aware of the powerful contribution culture can make to the economic, social and environmental dimensions of development.³ Culture-led development also includes a range of non-monetary benefits, such as greater social inclusiveness and rootedness, resilience, creativity and entrepreneurship for individuals and communities, and the use of local resources, skills, and knowledge. Culture can also support innovation. An innovation culture is open to change, embraces experimentation, and recognizes failure as something to be learned from.

The changing face of innovation

Many countries have been able to transform their development prospects by being open to innovation.⁴ As outlined in the 2013 Human Development Report (HDR) on the “Rise of the South”, developing countries are now emerging alongside the industrialized countries as a breeding ground for technical innovation and creative entrepreneurship. South–South interactions are enabling companies in the South to adapt and innovate with products and processes that are better suited to local needs. This is creating new business models, as companies develop products that can reach the “base of the pyramid” customers with lower disposable incomes.

The report also notes that countries of the South are also emerging as natural hubs for absorbing technologies and developing new products. New “trickle-up” innovations have developed in places – for example in Kenya, where innovators have used affordable Asian-built mobile phones for “cellular banking” which is cheaper and easier than opening a traditional bank account or using “mobile money”

² <http://www.un.org/en/ecosoc/about/science.shtml>

³ By January 2012, culture was included in 70% of the United Nations Development Assistance Frameworks.

⁴ 2013 Human Development Report

(M-PESA) to transfer money. The crowd-sourcing “app” developed by Ushaidi, and subsequently used in Haiti and later in the United States to map the impact on communities of the BP oil spill and in Japan during the Tsunami, shows that ideas that take shape in developing country markets can work their way back to developed countries. However, the development of innovative information and communication technologies such as these are increasingly dependent upon access to affordable broadband and are more often stimulated in countries where national broadband plans have been implemented, regulatory licensing reforms have been undertaken and private investment has been encouraged and respected.⁵

The 2013 HDR report also points to the rise of the South as also spurring innovation in bilateral partnerships and regional cooperation, resulting in greater options within the South for concessional finance, infrastructural investment and technology transfer. Countries such as China, Brazil, Singapore and others have pursued policies that promote partnerships between Governments and the private sector to develop comparative advantage in the most promising sectors while ensuring effective macroeconomic management and promoting innovation. They have also paid special attention to expanding social opportunities by setting policy priorities, nurturing selected industries, fostering state-market complementarities, committing to long-term reforms, having strong political leadership, learning by doing and boosting public investment.

Partnerships for Sustainable Development

If innovation is key to meeting sustainable development challenges, then partnership is key to innovation. Over the past decade, public-private sector partnerships have become a creative and sophisticated mechanism for addressing priority challenges and for leveraging skills and resources of the private sector and civil society toward the goals of sustainable development. Each change agent has unique skills and resources to bring to bear on today’s most difficult challenges. Non-profit organizations and other independent players have the on-the-ground knowledge and experience, theories of change and the local manpower to ensure that the right services are delivered with integrity. Private foundations bring subject matter expertise and funding. Community members can bring a nuanced understanding of the cultural strengths that can be harnessed to turn challenges into opportunities. In addition to funding, corporations bring expertise in marketing, logistics, research and development, efficiency in project execution and management. The United Nations provides unparalleled access to leaders and policy-makers and, most importantly, the ability to unite and coordinate those seeking to make a difference. By fitting these pieces together, the result is much more than the sum of the individual parts.

Partnerships are particularly critical for those countries that lack financial resources, research and development capacity, design and process engineers and technical and production workers as well as the infrastructure to spur innovation. Governments, the private sector, research and institutes of higher learning working together can help these countries achieve a critical mass of STI capacity by promoting ‘Inclusive Innovation’. This refers to research, knowledge creation and dissemination,

⁵ 2012, Broadband: A platform for progress – ITU/UNESCO Broadband Commission for Digital Development)

and specialized efforts to solve the challenges of people who are socially and economically disenfranchised.⁶ Inclusivity focuses on bringing together creative minds so that combined efforts can produce innovative solutions to age-old challenges. The Government of India has partnered with a technology company, Datawind, to produce and distribute a locally-designed, low-cost tablet computer with internet connectivity to school children in India. The Aakash computer is expected to revolutionize education in India by not only changing how children are educated, but also enhancing their access to information through the Internet.⁷

Partnerships can extend the reach of high-quality education institutions. North-South and South-South partnerships can provide training opportunities for scientists, engineers, technicians (knowledge workers), and policy-makers. The African Higher Education Partnership Initiative (AHEPI) at Michigan State University is one example. AHEPI, working together with African colleagues, the African Studies Association, and UNESCO, developed ways to strengthen African higher education institutions. Combining focused research, internet connectivity and website hosting, an African e-journals project and promoting further links through study opportunities and professional associations, AHEPI continues to build the capacity of numerous institutions and capabilities of countless students.⁸

Strengthening the capacity of local scientific and engineering institutions through partnerships with like-minded organizations can augment their ability to conduct the necessary research and development (R&D) needed to adapt these technologies for local use. Building on existing technologies, local scientific and engineering institutions can generate new socially and economically relevant technologies modified for their own communities. Locally-developed technologies are often produced and sold at significantly-reduced prices, making them more accessible for potential users. The iCow project in Kenya uses widespread mobile technology to disperse agronomic and weather information to subsistence-level dairy farmers. iCow provides farmers with direct access to buyers and sellers, replacing their previous grueling 40-mile, three-day walk to market. It also delivers information about cows' gestation periods through voice and SMS. Since its inception, forty two percent of farmers using iCow have reported increased incomes; half of these farmers attribute the rise to an increased milk yield ranging from 1.5 to 3 liters per cow, substantially improving their livelihoods.

Partnerships can also help move innovations from the laboratory to the market. Specialist organizations can provide direction and oversight, and play a key role in mobilizing private finance to scale-up and facilitate commercialization. With strong support, entrepreneurs have more opportunities for turning smart ideas into business opportunities for small-to-medium enterprises (SMEs) and women entrepreneurs. mLab is a start up accelerator that brings together experts and local developers to build sustainable technology businesses in Africa, Asia and Eastern Europe. mLab provides state-of-the-art equipment to develop, test and scale software, together with technical training and workshops for its members. The organization also acts as a gateway to local, regional and international markets and

⁶ <http://www.theglobalresearchalliance.org/en/What-we-do/Inclusive-Innovation.aspx>

⁷ <http://ubislate.com/aakash/index.html>

⁸ <http://africa.isp.msu.edu/AHEPI/>

facilitates connections between entrepreneurs and seed, venture and angel investors.⁹

One key issue for entrepreneurs and investors will be intellectual property rights. These will enable those innovators bringing new products to market to take the final step towards commercialization and to invest in market development and ensure that those who are the most creative reap the most reward. Disclosure through the patent system will also make a contribution to the knowledge base and facilitate follow on development.

Bringing together like-minded people can inspire local enterprises to become more innovative and motivate others to continue working on their own start-up companies. Partnerships can help the distribution of information on best-practices, access to resources and general know-how as to how to develop innovative ideas into business opportunities. Hive Colab in Uganda is a business accelerator and incubator for East African startups. It provides coworking space for the tech community to promote interaction, mutual learning, and knowledge sharing. Hive Colab facilitates mentors for young entrepreneurs and specialized knowledge on how to start and grow a tech business.¹⁰

The national system overseeing STI development can also benefit from assistance through partnerships. Partnerships at the bilateral or regional levels can provide ideas and support on how to improve governance and policy frameworks, as well as how to build human capacity and infrastructure for cooperation and commercialization. The Asia-Pacific Economic Cooperation (APEC) Policy Partnership on Science, Technology and Innovation (PPSTI) supports the development of STI cooperation and effective innovation policy in APEC economies. Dialogue between members addresses issues of innovation policy development and aims to strengthen cooperation between governments, businesses and academia.¹¹

Critical issues and challenges for partnerships

Creating sustainable partnerships requires concerted efforts during their establishment and continued maintenance to keep them on track. The interests of all stakeholders need to be aligned; the relationships need to be fostered so that they grow to be mutually beneficial; partnerships should be continually cultivated so they remain strong and productive; and there is a clear and mutual understanding of the contribution and roles of each partner. Challenges will inevitably arise; however, partners should aim to create a stimulating environment conducive to collaboration for innovative solutions.

External funding practices can also impact on the sustainability of partnerships. Many individual partnership programmes do not have sufficient capacity to generate systemic improvements or to build a durable capacity building legacy to mobilize follow-on “donor” support. Partnerships need to combine a diversified mix of traditional funding sources, such as government programmes or

⁹ <http://www.mlab.co.za>

¹⁰ <http://hivecolab.org/>

¹¹ <http://www.apec.org/Groups/SOM-Steering-Committee-on-Economic-and-Technical-Cooperation/Working-Groups/Policy-Partnership-on-Science-Technology-and-Innovation.aspx>

overseas development assistance, with innovative funding sources from both the national and international level, such as foundations or even 'crowd-sourcing'. Identifying and accessing sustainable funding sources is a key factor in achieving stable and sufficient long-term financial resources.

Partnerships involving donor and recipient countries should place the priority needs of the latter at the centre of the relationship and be integrated into national poverty reduction strategies and plans. Ensuring that partners in developing countries are involved in setting the agenda for the partnership is crucial to its sustainability and impact. After all, partnerships will only be successful if they provide an innovation that is relevant and fulfils the needs of local communities. To this end, the Swedish International Development Cooperation Agency (SIDA) established the Partner Driven Cooperation Programme. The programme facilitates mutual interests for cooperation to stimulate sustainable relations. One example is the pairing of industrial companies in Hyderabad, India with the IVL Swedish Environmental Research Institute. A desire for specialist knowledge and technology to purify waste water in India led to the Swedes gaining expertise on developing holistic solutions for polluted water, resulting in a mutually beneficial solution.¹²

The benefits of promoting North-South and South-South partnerships in the STI sectors are increasing exponentially. By aligning like-minded organizations and sharing knowledge, expertise and networks, partnerships can be mutually-beneficial and promote sustainable development and the achievement of the MDGs. Promoting partnerships between and among the UN, the private and non-profit sectors, and with civil society stakeholders, will increase the innovation momentum and result in more creative solutions to development challenges.

Questions for consideration

- i. How to effectively narrow the technology gap and ensure that the benefits of S&T are widely shared?
- ii. What steps can be taken by the UN system to strengthen its role in promoting STI for development, as well as monitoring the implementation of past commitments in S&T?
- iii. How can partnerships help to convert innovative ideas into business opportunities?
- iv. How can South-South collaborative partnerships for innovation be better supported?
- v. How can partnerships be utilized for mapping new and emerging technologies for sustainable energy, food and water security, urbanization, health care and job creation?
- vi. Some parts of the UN system currently use partnerships, collaborations and the use of open source technology to leverage technology and design thinking to

¹² <http://www.sida.se/English/Countries-and-regions/Asia/India/Programmes-and-projects/Environmental-work-in-India-provides-jobs/>

solve problems; how can the rest of the UN system learn from their experiences and promote similar partnerships?¹³

- vii. Communication technology means that future innovation partnerships are less likely to be bilateral and more likely to be multi-stakeholder, with a focus on merit-based communities and tangible outputs, regardless of their location; what will be the main barriers to these types of multilateral partnerships and how can these be overcome?¹⁴
- viii. Information and Communication technologies have been recognized as cross-cutting enablers for the three pillars of sustainable development – economic growth, social inclusion and environmental sustainability, how can this best be recognized as an essential element in partnerships for development?
- ix. How can international development cooperation contribute to building the necessary capacity for innovation?
- x. What policies could Governments put in place to encourage partnerships in STI? What are some of the most effective incentives?

¹³ <http://unicefstories.org/partners/private/>

¹⁴ <http://unicefstories.org/2013/02/21/innovation-to-strengthen-governance-my-opening-remarks/>