

External Review of the Innovation, Technology and Society Program

September 2010

This findings brief is based on the reports “Innovation, Technology and Society Prospectus Final Report: 2006-2010” by the program, April 2010, and “Report of the External Review of the Innovation, Technology and Society (ITS) Program” by Carlos Aguirre-Bastos, Andy Hall and Janice Jiggins with support of Melissa Yule, August, 2010.

1. Overview of the Innovation, Technology and Society Program

Under the Innovation, Policy and Science program area, the Innovation, Technology and Society program is nearing the end of its first prospectus period (2006-2011). The program built on previous exploratory research competitions (Research on Knowledge Systems), the Centre Task Force on Biotechnologies and Emerging Technologies, and a number of science, technology and innovation policy reviews.

The program’s vision is to contribute to just, equitable, and sustainable social and economic development in low and middle-income countries. To achieve this, the program’s prospectus defines three interlinked objectives:

- improving understanding, capacity and linkages of innovation system actors (organizations and individuals) in developing countries;
- supporting the development of explicit and implicit science and technology policies contributing to improved functioning of developing country innovation systems; and
- strengthening socio-economic impact analysis, social inclusion and learning capabilities in support of innovation and the governance of new technologies.

As of December 31, 2009, the program had funded 39 research projects and 35 research support projects, worth just over \$16 million. The projects are divided evenly across the entry points of the three program objectives. 34% of the program’s project investments were in South East Asia, 20% in Africa, 17% in South Asia, 16% in Latin America and the Caribbean, and the remaining 13% of project investment was global in nature. The geographic distribution bears out the placement of the program’s staff, with full-time program officers for South East Asia, South Asia and Latin America, and less staff time dedicated for other regions. There has been a relatively high level of staff turnover during the prospectus period.

2. Methodology

External reviews of programs at the Centre begin with the program analyzing its own achievements, followed by an assessment of program performance by an external review panel made up of independent experts. The program’s final prospectus report outlines the program’s strategy and evolution, key research findings, major program outcomes and

the main lessons drawn from the program's experiences. The external review panel report judges: the appropriateness of the prospectus implementation; the quality of research outputs; and the relevance, value and significance of the program outcomes. The external review panel report also identifies key issues for consideration.

The external review panel conducted 34 key informant interviews, assessed program and project documents, administered a written questionnaire for projects aimed at policy influence, and reviewed the quality of research outputs for the projects that were covered by interviews and the questionnaire. In addition, the external review panel reviewed the programs' rolling project completion reports, used a web-based survey of the LINK network (a global network of researchers and decision-makers in the field of rural innovation, one of the program's peer communities), a desk review of a sample of projects to scan the extent to which and how "social inclusion" and "gender" have been mainstreamed, as well as a citation index and impact factor analysis of key research outputs.

3. Research Findings

In its final prospectus report, the program highlighted research findings from projects within each program objective. The program selected findings based on the quality and originality of the research, relevance to program objectives, and their realized or potential connection to significant outcomes. The findings are somewhat disparate as they arise mainly from the seven research projects that were closed and 20 that were ending. The program explained that a critical mass of well-developed knowledge with depth is not yet apparent as it is still a relatively young program. This brief highlights one cluster of findings per objective.

3.1 Understanding developing country innovation systems

Projects from the third Research on Knowledge Systems competition developed methodologies for analyzing national innovation systems in developing countries, including university-industry linkages. The research on university-industry linkages showed that in Latin America, while these linkages were the exceptions rather than the rule, their number has been underestimated. In Africa, research documented sectoral variation, from weak university involvement in Nigeria's oil industry, to dynamic interactions on biotechnology in South Africa. Surveys in Asia found that linkages are not widespread, even in more advanced countries, but collaboration is increasing. In Asia, researchers concluded that university interaction with industry supplements rather than substitutes firm capabilities. Knowledge transfer predominates when the firms already have some in-house research and development capacity.

3.2 Development of science and technology policies to enhance innovation systems

The project on megacities innovation has found that science, technology and innovation policies in Southeast Asia focus primarily on private sector innovation for economic growth. Very little effort has been made to link the national innovation system to development challenges and poverty. Singapore, and to a

lesser extent Malaysia, have integrated innovation into urban development policies, but the focus is still on private-sector development. Thailand has, so far, focused on reforming science, technology and innovation institutions, while the Philippines and Vietnam are working on building innovation system components. These findings have the potential to convince science, technology and innovation agencies to consider a more development-oriented agenda.

3.3 Impacts of emerging technologies on developing country communities

Research assessed benefits and risks of several genetically modified crops, particularly Bt cotton. Bt cotton was found to be economically advantageous for smallholder farmers. However, the results are not categorical, and political, educational, and economic limitations constrain wider use. Moreover, further studies will need to look more at impacts on labour, health, gender, and the environment. In the Philippines, research found few observable differences in social status or gender relations between farm families who grow Bt maize hybrids and those who grow non-Bt hybrids. Growing herbicide-tolerant soybeans appears to reduce family labour requirements for soybean production amongst small-scale growers in Bolivia, but the government's opposition to genetically modified crops impedes wider use. In Honduras, the research showed that the performance of genetically modified varieties is constrained by inadequate information for farmers, and up-front costs prohibit investment by growers with less than 2 hectares. In China, research showed that Bt cotton resulted in reduced crop loss due to pests, but farmers were still overusing pesticides on their cotton.

4. External Review Panel Findings

4.1 Implementation of the Prospectus

At the level of individual projects, the external review panel concluded that Innovation, Technology and Society-supported projects have generated useful and/or significant outcomes and, with exceptions, have been appropriate to the contexts in which they were implemented. The exceptions relate to choice of partners in some cases, and the program's limited support to networks. The review assessed that key strengths of the program were that program staff were flexible and responsive; they engaged with national and regional stakeholders; and the program facilitated research in countries where research funding can be difficult to access.

However, the evidence probed and assessed by the external review panel converges toward the conclusion that overall the implementation of the prospectus has been weak and ineffective at the program level. The core issue is how the initial choice for breadth was interpreted. The program lacks an identifiable niche and identity and never developed well-defined program logic. Without this clarity the necessary operational program elements were either missing or the choices made proved ineffective.

4.2 Niche

The external review panel argues that the domain in which the Innovation, Technology and Society program operates is large, cutting across many economic sectors, technology fields and policy domains and concerns. A relatively modest-sized program needs to make choices about where and how it can best contribute to reach its objectives. The program, however, did not identify its niche. Instead it cast widely for individually interesting research projects. This was supposed to identify interesting researchers and groups in partner countries, who could be capacitated to contribute to national, regional and global policy-making. While this approach may have some validity within a clear, intellectually-rigorous and defined niche, in the absence of such boundaries the chosen approach to implementation became progressively less appropriate as the program evolved. There is no evidence that Innovation, Technology and Society sought to identify projects that might test explicit hypotheses, or took justified experimental risks that could push the boundaries of the state of the art. The outcome is a portfolio of individual projects that do not make up a ‘program identity’, nor were developed such that learning across projects could be rigorously gained.

4.3 Lack of explicit theories of change

The program had a broadly-defined ambition of contributing to policy in the area of innovation. However, the program itself articulated no explicit theories of change that set out how program activity would lead to its desired outcomes. Nor does it appear that researchers were required as a general rule to make explicit their own understanding of how ‘research’ influences policy. On the contrary, both the external review panel’s assessment of the documentation and the interviews make clear that the implicit hope was that research would lead seamlessly to policy change. This assumption ignored the accumulated learning on the topic of policy influence. And indeed it ignored the program’s own conceptualization of innovation systems that positions research as a responsive element embedded in a system of interacting agents and change processes.

4.4 Ineffective strategies for project support and development

The Innovation, Technology and Science program adopted a grant-plus business model where program officers also acted as research advisors and mentors. The external review panel notes that despite the difficulties associated with communicating a challenging prospectus to potential research partners, the program did not adequately support its program officers — who were typically not well-grounded across the fields of science, social science, technology and policy — even after senior members of the program team left. A consequence was that research project development did not benefit from accumulated, worldwide learning on many common aspects of policy and innovation processes. This severely weakened the significance of much of the research.

4.5 Ineffective use of accumulated expertise on innovation studies

The external review panel acknowledges the laudable program efforts made to support teams of (often young) researchers in partner countries, to strengthen their

capacity for research in this area. However, the panel notes that much of the research funded is on topics that have already been widely researched for many years and that research supported by the program has not been adequately informed by this history. The panel's view is that the Information, Technology and Society program should have used its projects to connect researchers to the global research community more purposefully and that this should have been seen as a key capacity development measure.

4.6 Outcomes

The program's final prospectus report highlights outcomes in five key areas. The program reported that the projects have:

- contributed to policy influence - both science, technology and innovation policy reviews and policy recommendations from selected projects
- contributed to a better understanding of the impacts of emerging technologies on developing country communities
- improved sharing of science, technology and innovation information, knowledge and experience
- built the capacity for production, sharing and use of science, technology and innovation knowledge; and
- built partnerships and strengthened regional and international networks of researchers and policy-makers.

The program qualified its claims by stating that in some cases, outcomes are only just emerging. The program noted that while national-level policy influence has occurred, impacts in building local capacity are less clear and that it should have done more on gender, earlier. Some intended outcomes were not achieved, including generating information on how developing country innovation systems connect to global systems, fostering open access mechanisms, and enhanced functioning of innovation in developing countries; in retrospect, the program felt these were ambitious for a five year period. The program also noted the absence of an outcome for its first objective--i.e. that while a third of budget was allocated to better understanding the processes of innovation in developing countries, a comprehensive understanding of the innovation system in any particular country is lacking.

The external review panel said with confidence that each project was relevant and contributed value to someone. It noted that the individual project outcomes were highly variable, but were in general acceptable, except for those on themes of social inclusion and gender. However, they found that at the level of the program, the weaknesses in program implementation mean that the projects do not add up to anything of particular or general significance. The rest of this section outlines the external review panel's assessment of each outcome claim in turn.

4.6.1 Policy influence has been achieved in the policy review studies, but to only a minimal extent in more academically-oriented research projects. This may be because explicit strategies for achieving policy influence were not a standard

consideration in project design. Moreover, policy analysis was directed at a narrow set of innovation, technology and society policies, even though important policies are spread across sectors, and rest on implicit assumptions about what promotes innovation.

4.6.2 The external review panel concluded that the program's work on social inclusion is weak, and confirms the program's own assessment that gender outcomes are negligible. The external review panel notes that the impact studies have been conducted in an 'end of pipe mode' based on implicit models of linear processes of knowledge generation, sharing and use, and transfer of science and technology – a theory of change that is applicable only under a limited set of conditions. The work has not built on IDRC's historic strengths in socio-economic analysis and missed opportunities for adding value.

4.6.3 The external review panel's interviews revealed that on sharing science, technology and innovation knowledge, some researchers would have given little thought to this without mentoring by the program. The program chose conventional means for information sharing: policy briefs, seminars, workshops, journal articles, etc. Project partners appreciated opportunities for attending conferences. The more specialist activity on science communication has been highly appreciated by project partners and the wider peer community. However, it was not rated so highly by program staff, who saw it as a non-research activity.

4.6.4 The external review panel concluded that the program did build project-level capacity for research in producing, sharing, and using science, technology and innovation knowledge. However, there was little evidence that significant outcomes were achieved, with the exception of the area of science journalism. The means used to build capacity were based on a conventional and narrow understanding of what it takes to strengthen capacity, compared to current understandings of capacity being a combination of processes at different levels in institutions and organizations – something that requires a more specific strategy than was found within the program.

4.6.5 The program highlights its support of research networks because "...networks are an important means for influencing policy, including science, which is the *raison d'être* of the programme" (final prospectus report page 2). The external review panel found that regional small grants programs have been insufficiently networked into the international innovation, technology and society community and the accumulated expertise in the program's research domain. Research support to existing networks is helpful in that it has added resources and conferred some additional 'recognition' on their work. But it has not helped network members expand their networking into the policy arena. Moreover, project-based research support to establish new networks has not (yet) created sustained partnerships and networks beyond periodic meetings. The program lacks explicit mechanisms for building networks with policy partners and other innovation actors. Interviews with program staff and experienced research-based

project partners indicate that the program's lack of strategic clarity, frequency of staff changes or inexperience of staff might be contributing reasons for the outcome.

4.7 Research Quality

The external review panel's reading of the evidence is that the quality of the research is acceptable, but highly variable. Research output in quantitative terms is modest, but acceptable. A handful of outputs have been outstanding, a few are significant, the majority are useful and relevant at the project level, a large minority contribute modest value to the science, technology and innovation domain, and a few are methodologically sound, but add little to science, technology and innovation. Quality was weak in the area of social inclusion and unacceptable on gender. Research outputs have been only moderately visible to the program's peers, or to decision- and policy-makers.

5. Issues for Consideration

In its final prospectus report, the program noted it is a fairly small program in its first cycle, and it has had challenges in communicating what it does, internally and externally. Referring to its lack of outcomes under its first objective, the program concluded that while developing a comprehensive understanding of innovation systems is important, it may be better to leave this complex systems research to others.

The external review panel concludes that the program potentially addresses challenges of critical importance at national, regional and global levels. It is convinced that IDRC could make a significant contribution in this area. However, it concludes that without relevant intellectual leadership and professional experience, IDRC cannot expect significant outcomes. Investing in 'more of the same' is not going to deliver anything outstanding in what is a fast-moving and highly-dynamic environment. There are reputational risks if a turnaround is not accomplished.

In consideration of IDRC's historical advantages, reputation and strengths, the external review panel recommends evolution of the program on the basis of a justification based on the "grand challenges" and existential threats facing human society, and within a context of dynamic policy evolution and a rapidly-evolving understanding of innovation. The program requires an explicit and robust identity in a "niche" selected for its potential as a model to generate significant outcomes. Finally, it needs a program logic and strategy, anchored in explicit theories of how research shapes, informs or influences policy and processes of innovation and change.

Evaluation Unit