PRESSURE POINT

The Science of Influence

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Knowledge-based development is the mantra of our time. Can someone tell our finance minsters?

"Can we have more funding?" This heartfelt plea is almost always at the top of any wish list for scientists and science policy-makers in the developing world. This is for good reason: compared with countries in the developed world, the governments of Southern nations spend a much smaller proportion of their national incomes on science, technology and innovation (STI). Unless this situation is changed, these countries are unlikely to become producers of knowledge in their own right.

How then, could more funding be obtained? What strategies could be employed? What are the available sources, and what are the tools of the trade?

South Korea provides some useful lessons. Forty years ago, South Korea was one of the poorest countries in the world. In the intervening years, it became what I would call an Innovating Developing Country (IDC). How did it achieve this goal? It invested heavily in its scientific and technological infrastructure, expecting that by doing so, it would eventually become an economically strong nation. The approach worked, and has since been adopted by other countries, including Brazil, China, Chile, India and South Africa.

Yet, what does capacity building in STI mean in practice for these countries?

It means expanding horizons beyond laboratory-based scientific research. Many, if not all, of these countries are investing in a web of complementary activities that include the following: a comprehensive educational system for training scientists, engineers, technicians and vocational workers; diaspora-led initiatives in which 'brain drain' gives way to 'brain gain' and ultimately to 'brain circulation'; foreign investment that leads to the acquisition of new knowledge by placing a premium on technology transfer and diffusion; and the purchase of capital goods that contain more advanced technologies than those capital goods currently in the economy.

If we assume that this is an effective approach for developing countries, the question is how to get there?

One important strategy is to find a way to involve everyone in government who matters — in other words, to convince all those departments and ministries that would not normally see themselves as users of science and innovation — that STI matters for economic development. The support of the ministry of finance is vital to this effort.

Turner Isoun, Nigeria's minister for science during the government of President Obasanjo, summed up the challenge in a recent speech to the World Bank. He said that his fellow ministers needed convincing that spending on science would boost economic development, and would not just be a drain on the national budget. In return for their support, ministers will need evidence that an investment in science and innovation can indeed catalyse development, and they will want clearly defined goals and targets tied to tangible socio-economic benefits. Performance is the key.

So, the vision and the strategy are in place. The principal players in government are convinced. What next?

Large developing countries, such as Brazil, China, India and South Africa, have the resources to pursue such strategies on their own. Indeed they have begun to do so over the past few decades. However, smaller developing countries, such as those in Central America or sub-Saharan Africa, do not have the financial capacity to embark on this strategy by themselves. For them, the regional pooling of resources and the creation of regional centres of excellence are fundamental to success.

Regional integration would not only help to boost the capacity of small countries but would also prove useful in building scientific excellence in such fields as biotechnology, information and communications technologies, and nanotechnology. The good news is that regional research networks are emerging in Africa. Examples include the Africa Economic Research Consortium, the Africa Institute of Science and Technology, the African Mathematics Millennium Science Initiative, the African Institute for Mathematical Sciences and the US-Africa Materials Institute.

> **"Science and innovation can catalyse development. Performance is the key."**

Sound strategies that are crafted from within could also benefit from many new international partnership opportunities that have emerged in the past few years. These opportunities would also provide a useful vehicle for integrating scientists, who have left home to work in the developed world, back into the scientific communities in their homelands. According to some estimates, the USA has more African-trained scientists than African countries themselves.

The New Rice for Africa (NERICA) project is one such example of an indigenous initiative that attracted international partners as well as scientists from the African diaspora. Some of the most committed international partners to Southern development include the European Union (EU) through its Research Framework Programme, individual government departments such as the UK Department for International Development and the Swedish International Development Agency, and multilateral agencies and development banks such as the World Bank.

Between 1980 and 2004, for example, the World Bank loaned more than US$8.5 billion in support of some 650 projects. The loans, in turn, leveraged about US$10 billion in national investments in STI capacity building. Projects ranged from bolstering research and development capacity, to venture capital financing, to human resource development.

At the same time, the EU's current research framework programme (2007–2012) is committed to promoting partnerships between scientists from Europe and those in the developing world in fields such as climate change, energy efficiency, nanotechnology and sustainable development. The UK recently announced a US$2 billion research strategy for 2008–2013 that focuses on strengthening science and technology in Africa by supporting regional centres and international partnerships.

Clearly, there are many opportunities to be had from both regional and international initiatives, but it is worth reminding ourselves that money alone will not achieve results.

National wealth is not an automatic guarantee of scientific and technological excellence. South Korea and many of the world's oil-producing countries have per-capita incomes that are well in excess of global averages. Yet among these, it is the former that is more scientifically advanced. The latter countries still have some work to do.

At the other end of the income spectrum is Rwanda, one of the world's poorest states, which has recently emerged from a violent and tragic conflict. Yet this has not prevented the country's president Paul Kagame from investing in science and creating a new ministry that reports directly to him. "We in Africa must either begin to build up our scientific and technological training capabilities or remain an impoverished appendage to the global economy," he said during a recent speech to the Royal Society of London.

That is good news for Rwanda. Forty years of development in South Korea show us what to expect if some of the poorest countries take the brave step of investing and building capacity in STI. ■

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