Overview

Science, Technology and Human Development: Some Basic Conceptual and Definitional Issues

By harnessing S&T, countries are assured of economic growth and can fight poverty, disease and environmental destruction. Thus the building of a national S&T capability is a critical indicator of the future well-being of a country's citizens and how well the country can compete in the global market place. The ultimate end of S&T is the improvement in the multiplicity of goods that enhance human wellbeing. The pursuit of the universal concept of human development focuses on addressing three imperatives:

- Provision for basic human needs
- Development of basic human capabilities
- Provision of space to enable people to apply their innate and acquired assets to acquire higher welfare status.

This Report makes the case that human development is intrinsically linked to freedom from poverty and disease, but acknowledges the widening gap between 'the haves' and 'the have nots' both within and across nations, which is exacerbated by lack of equity in terms of the access to and sharing of resources.

It acknowledges global evidence that the pillars of development crumble in most developing (and poor) nations due to failure of governance institutions to provide security, empowerment, opportunity and incentives. It however cites the contradictions that exist between human freedoms as expressing the ultimate in human development, thus assuming a form of human right on the one hand, and necessity which sometimes forces the abrogation of these rights in response to emergencies. Thus the pursuit of human development from say increased production of goods and services through the application of S&T might have to be curtailed if it runs counter to environmental protection; enjoyment of freedoms might give way to compulsory testing for HIV/AIDS or quarantining of airline passengers to arrest the spread of Severe Acute Respiratory Syndrome (SARS) and many other emergency situations, whether rights are suborned to need.

Botswana thirty-eight years of progress and the tragedy of HIV/AIDS

By zeroing in on the tragedy that is HIV/AIDS, the Report captures in graphic terms the reversal in human development that the scourge has inflicted on Botswana and by extension other countries that are burdened by a high prevalence rate. Botswana had by the end of the 1990s achieved what could only be described as an extraordinary record of development success, surpassing in some specific areas such as per capita expenditure on education even countries in the developed north. This record has brought the country to a stage where it could achieve even higher developmental goals, but all this investment is under strain from HIV/AIDS which has drained not only the human resources (deaths and productive days lost while out on sick leave), but more critically the financial and human resources devoted to it. This has meant that other aresas of development receive little in terms of support. The provision of infrastructure, including ICT and services, has to play second fiddle to the concerted response to this challenge.

Botswana's development record characterised by rapid and sustained growth for more than three decades, is attributed mainly to mineral wealth, a disciplined approach to macroeconomic management, democracy and good governance, international goodwill and policy activism towards priority development, is in danger unless a solution can be found to the HIV/AIDS problem. This is however not the only problem. There is still need to strengthen the economy by diversifying it away from minerals and mining.

Other human development challenges such the persisting inequality, unemployment, poverty and excessive dependence on the state, as well as a slow pace of citizen economic empowerment need to be tackled head on if the impressive gains of the last thirty-eight years must continue and be consolidated. The central theme of this Report is that technology has an important leveraging role to play in facilitating human development through ushering in an information rich and diversified economy. This Report recognises that the problems of health, globalisation and the threat of digital exclusion (both globally and nationally) and environmental sustainability need to be addressed. S&T backed by the appropriate policy and implementation strategy is best placed to play such a catalytic role.

Human Development and Science & Technology: a two way street

Human development and S&T exhibit a complex relationship that clearly demonstrates that the advancement of one depends very much on the other. It has been argued that there exists a paradox between enhanced human development through S&T and the fact that S&T could equally be the antithesis of development such as when it makes possible the development of weapons of mass destruction. One must however look to the harnessing of S&T over time as a key factor behind progress made in human development, that initself will drive future progress.

On a global scale, Botswana belongs to a large group of developing countries that are neither involved in S&T innovation nor its diffusion at any significant level. The capacity to innovate and diffuse technology is a product of the quality of physical and institutional infrastructure; the state of education and educational attainment by the citizenry; the size and maturity of markets; as well as the level of integration into the world economy through trade and investment.

Looking at Botswana's strong fiscal position, the Report argues that it meets the basic requirements for developing a strong S&T capability and capacity. It has research institutions that are well resourced to carry out significant research, but outputs have to date not been reflective of this potential. The Report postulates that part of this lack of output might be due

to lack of focus in both funding and recruitment and retention of skilled personnel. As part of the policy response to this, the Government in implementing the Science and Technology Policy of 1998, is shifting away from the current input funding model to an outcomes based, Incentive Funding Investment Model (IFIM). With this new focus, government funding for research would be based on identified outcomes by the research provider. This should add to the intellectual property developed in the country. These are however, future prospects: a positive outcome will require a creative mix of policy research skills and an institutional framework that facilitates value addition in S&T research and development.

Creating a development dynamic

In order to achieve an information society and economy, the Report indicates that Botswana must first create and sustain a development dynamic necessary to transform itself from its current state. Four elements are singled out as critical to this dynamic, namely, education and training (skills), ICT infrastructure, entrepreneurship and trade and investment. A critical aspect of achieving an information society will be the development of an educational policy framework that affords all school going children access to ICTs and becomes the platform for the development of an enterprise culture in the youth. Thus the Report urges the streamlining of e-learning into the school curriculum in addition to the current provision of ICT infrastructure that the GoB has embarked upon. Beyond this, it must form part of the quest for life-long learning by all citizens.

One of the critical visions of the Government is an economically diversified country that no longer depends extensively on mining for trade. Thus in creating a development dynamic, the Report also focuses on trade and investment in ICT as one possible avenue through which this diversification could take place. To be sustainable, citizens must have and develop an entrepreneurial culture, through both education and the support of the state in encouraging those who take advantage of opportunities. An underlying factor in all these, is investment in the necessary infrastructure to facilitate trade and access to information and markets. On this front, Botswana is performing much better than many developing countries. Various pipeline telecommunications projects will improve the overall capacity and quality of the current infrastructure.

Towards an information society for Botswana

The starting point is the premise that ICTs are vital for enhancing human development as facilitators of economic growth productivity improvements. Access to ICTs is thus seen as the precursor to having an information economy, which is a new global electronic structure, where the production of information goods and services dominates wealth and job creation. Thus the clear digital divide between the North and South manifests the lost opportunities for growth for the latter relative to the developed world.

In Botswana's case, a lack of an information society would not be for lack of ambition. The country's national vision, Vision 2016, envisions 'an educated and informed nation that has mainstreamed computers and the internet and that has entered fully into the information age'. It starts its quest for this new exalted status from a position of strength boasting an expanding world class telecommunications infrastructure and an enviable open and fair telecommunications regulation regime. There are however, a number of problems that the GoB has to address. These relate to increasing and maintaining skills being decimated by HIVAIDS; enhancing deployment and access to ICTs by rural people and the Small Medium and Micro Enterprises (SMME) sector; diffusing support technologies such as electrical energy to make use of ICTs possible.

Measured up against competitor nations of the same demographics and size, such as Namibia, it appears the country is failing to fully utilise its capacity, rendering the impressive telecommunications infrastructure and one of the highest internet bandwidth per capita in Africa, relatively under utilised. Thus another challenge for the country is to exploit its capacity which means the average citizen must be economically empowered to partake in the information age perhaps in much the same way most have taken to the cellular phone revolution. Thus citizen economic empowerment must accompany the creation of a new Botswana information society and economy.

An Agenda for the Future

In charting the way forward and thus challenging the GoB to perform better for its citizens, the Report cites five broad areas that must be addressed and where ICTs could play an anchoring role. These are the fight against HIV/AIDS and the Health crisis; economic diversification and private sector development; development of a research and innovations system for Botswana; development of an ICT framework and finally enhancment of human freedoms.

Under HIV/AIDS:

- The Report advocates finding new ways of continuing the awareness campaign and a consideration of moving beyond routine testing to actually acknowledging the medical emergency it is and taking the route of compulsory testing.
- It equally advocates for developing a local core of expertise in Research and Development (R&D), e.g epidemiologists, medical statisticians and generally the capacity to respond to future epidemics.

As part of economic diversification, the Report calls for providing ICT infrastructure and programs in all schools; building an entrepreneurial culture and empowering the SMMEs (and particularly women) through technology support.

In terms of the research, development and innovations system the Report calls for the building on a centre of excellence in HIV/AIDS research; developing research capacity at tertiary institutions by insisting that 60% or more public servants are trained within the country and providing the funding to allow for the capacity building at these institutions.

The ICT framework focuses on: allowing people access, and thus having policy focus on allowing for security of electronic transactions; calling for legislation that recognises electronic signatures; building the capacity to make the country a Southern African Development Community (SADC) ICT hub as well as providing all schools with the necessary electrical connections and ICT hardware and software to become participants in development.

As a way of enhancing human freedoms, it calls for provision beyond the basic needs of food, shelter and health by advocating for access to information through a freedom of information act. The Report goes further to advocate for public service reform and decentralisation of government, both of which must involve empowerment of service providers by decentralisation of decision making powers and most critically, the provision of tools for enhanced service delivery.