**FRONTIERS OF KNOWLEDGE
IN SCIENCE AND TECHNOLOGY
FOR AFRICA**

**UNIVERSITY LEADERS' FORUM**
UNIVERSITY OF CAPE TOWN

**Report of the Inaugural Forum Meeting
Cape Town, November 19-21, 2006**

*Executive Summary*

African universities find themselves in new national, regional, and global contexts as they seek to revitalise themselves in the new millennium. A growing number of African states have set out along different paths of democratization and liberalization. Although these developments are very uneven across the continent, taken together they raise the possibility of a broader political, economic, and social transformation that African higher education can both benefit from and contribute to.

At the same time, advances in information and communications technologies (ICT) and the unfolding global knowledge society are reshaping the higher education terrain internationally. Universities in the South and in particular those in sub-Saharan Africa have yet to feel the full impact of this shift. However, there is an unambiguous understanding that harnessing ICT is critical to sustained economic growth and other societal benefits. African universities have important new roles to play in enabling and accelerating ICT-led economic development.

It is, therefore, appropriate that the inaugural meeting of the Frontiers of Knowledge University Leaders' Forum was organised around the theme of the University Role in Harnessing ICT for Economic Development. The meeting was hosted by the University of Cape Town, and held November 19-21, 2006.

The Forum was launched to provide an opportunity for African academic leaders to share ideas and challenges across the continent as they look to the frontiers of knowledge and

the potential of repositioning their institutions. The participants include representatives of those universities in Uganda, Tanzania, Mozambique, South Africa, Kenya, Nigeria, Ghana, and Madagascar supported by the Partnership for Higher Education in Africa (PHEA).

The Forum meetings are designed so that university leaders can exchange perspectives with leading African and global experts in key science and technology fields. Over time, it is expected that the Forum will develop as an expert network engaged with senior government officials responsible for higher education, and with science academy leaders contributing to the ongoing reconstruction of higher education in sub-Saharan Africa.

An important feature of the Forum is the awarding of competitive seed grants in the months following the meeting, so that universities can experiment with new ideas at their institutions. In this way, the high level Forum discussions are translated into real outcomes.

The November 2007 inaugural Forum meeting in Cape Town featured cutting edge perspectives on a range of ICT topics and themes. The discussions explored a number of important opportunities for African universities to build capacity and contribute to economic development at the national and continental levels.

**Knowledge Strategies in a Changing African and Global Context**

One of the main, hopeful, themes that ran throughout the discussion was that positive political and social trends are laying a foundation for sustained economic growth in most of the countries participating in the Forum. These trends include increasing political stability, movement toward democratic governance, utilization of peer-review mechanisms that allow evaluation according to internationally agreed standards, and progress toward more effective conflict resolution.

As these positive trends continue, African nations and leaders will be able to plan and implement knowledge strategies designed to meet a new set of challenges, such as confronting the global knowledge economy and achieving economic growth while protecting the natural environment.

To be sure, there are significant barriers to progress. Too often in the past, for example, African leaders have preferred to be directed by outside third parties rather than tackle challenges proactively. In a global economy where the developed world and its interests

have the most power in making the rules that govern trade, investment, and the diffusion of knowledge, Africa has not been able to realize its potential leverage as a unified continent.

Also, much additional work is needed to create favorable policy contexts in individual African countries. The importance of science and technology, and even ICT, is still not well understood by policymakers. There is often a mistrust of entrepreneurs, and a legacy of regulatory approaches aimed more at social control than at creating market environments that foster the creation and diffusion of technology.

The Forum heard about recent developments in Mozambique, where the government has recognized science and technology as a primary productive force, especially in the areas of poverty reduction and economic growth. Its current polices and planning aim to capitalize on the potential contributions of ICT, and reflect an expanded role for scientists and engineers in the policy process. Important tasks that are being addressed include the development of reliable indicators of trends related to the economy and innovation, and building effective partnerships between government, academia, and industry.

A key element of successful knowledge strategies is education and skill development. The examples of India and China, developing countries that have pursued successful knowledge strategies, are instructive in this regard. In India, for example, ICT diffusion is still comparable to that of Africa in many respects. Reflecting a long-term commitment to investments in higher education, the Indian Institutes of Technology were created soon after independence, and a significant number of Indian scientists and engineers received advanced training in the developed world.

With the liberalization of the Indian economy, which picked up steam in the early 1990s, India has been able to realize the payoff on its educational investments, as its domestic human resource base and Diaspora have fueled a tech boom. Cultural changes, such as greater openness to entrepreneurship, as well as expanded cooperation between universities and both domestic and multinational businesses in areas such as developing curricula, have also taken root and flourished.

**The Promise of ICT for Africa**

It appears that there is a new development narrative at work in Africa, wherein African leaders are looking at ways in which technological innovations can be used to foster continuous progress at all levels. African leaders are moving from a stance where their first assumptions about ICT were overwhelmingly negative to a greater appreciation for

the benefits ICT may have to offer. It is important that ICT be seen as more than just an assortment of physical devices. Rather, ICT must be seen as a platform for improving performance—a generic and pervasive set of tools for improving social and economic welfare.

The Forum participants learned of several specific examples of innovative ICT solutions making a positive impact in Africa and other parts of the developing world in existing sectors. For, example, the combination of hardware technologies appropriate to rural environments (e.g. low-power displays), terrestrial wireless networking, microenterprise financing, and supportive policies that make needed spectrum available has great potential for contributing to healthcare, education and agriculture.

- For example, E-government services provided through an Internet kiosk in a village in India led to an increase of 5 and 3 times the average number of applications received for birth certificates and old age pensions respectively, while providing cost and time savings.

- Cell-Life is a South African ICT-enabled partnership that addresses public HIV/AIDS healthcare, specifically the management and monitoring of individuals' ARV regimens. In this case, a technological innovation–an alternate use of cellphone programming and data-relay capabilities—enables the service. Originally a University of Cape Town-based academic research project, Cell-Life is now strongly in the public domain.

- The Digital Equalizer Programme in Punjab, India helps familiarize young learners (and their teachers) with computer basics, popular productivity tools (MS Office, Open Office etc), using the Internet for research, and using email and other digital technologies to help create rich, multimedia content, thus fostering an ICT-savvy populace.

In harnessing ICT to develop new industries, a number of speakers and discussants emphasized the importance of building a human resource base that is ICT-savvy and possesses the attributes needed by African and global businesses. Africa must have an attractive talent pool if it is to avoid future marginalisation—it must be part of the global "army" of skilled, mobile workers. In the 21st century, the wealth of Africa is not in the ground (oil, diamonds); it's in the minds of the people. In this respect, African leaders can look to the Asian models, where the university and its graduates ARE the economy.

The off-shoring phenomenon, in which skilled engineering and professional work is being performed in India and China for the global market, illustrates the relevant trends in the global economy. Managerial and production networks are changing rapidly, with ICT as a driver. The old hierarchical models of business organisation are giving way to decentralized and more collaborative models. China, for example, has embraced the software revolution, the intensification of competition, the need for simultaneity, and the speed of innovation – other factors that are central to developing global talent.

Concretely, the emerging generation of African leaders will need grounding in a number of areas, such as the clear ability to manipulate the "three Rs" in the modern, digital context, and fluency in expert thinking and complex communication. Currently, these skills are seldom fostered in African systems of education.

Representatives of several global ICT companies participating in the Forum explained how they are working with governments, educational institutions, and other organisations in Africa and other parts of the developing world to help cultivate a human resource base with the appropriate ICT-related skills. The approaches being utilized include donation of curricula, donation of equipment, accredited training in soft skills, and the development of a new area for education and research ("services science"). These companies realize that the future growth of the knowledge economy, and their own bottom-lines, depend on the broad diffusion of ICT-skills.

**An Expanding Role for Universities: Opportunities and Challenges**

Universities have key roles to play in developing and implementing African knowledge strategies. It is clear that higher education is a critical infrastructure for 21st century economies. Universities must be proactive in demonstrating their value so that it is understood by political and industry leaders, as well as by the broader public. The Forum explored several areas where universities can expand their role in facilitating ICT-led growth.

African universities are not alone in grappling with these sorts of issues, as higher education institutions around the globe are seeking to revitalize links with their national economies and the broader society. Universities around the world face several common challenges, albeit from different perspectives and with disparate resource bases.

To begin with, universities must continue to build on their core competencies as first-class institutions for scholarship and learning. Africa in particular needs a new

generation of problem-solving, world-class scientists to lead science-based development in the continent.

In addition, universities need to become social service providers, meeting the needs of the populations they serve, both in terms of output of information and of suitably-qualified/equipped students. For example, universities need to work towards producing job-creators rather than job-seekers by embracing today's entrepreneurial culture. In the United States, there is a long list of successful ICT companies that have been started by university students. Cell-Life is an example of an important ICT innovation emerging from an African university context.

Universities face two significant barriers as they seek to expand their roles in the global knowledge economy. The first barrier is limited resources. Despite numerous commitments and declarations, public spending on higher education in Africa is declining.

The second barrier is that universities as institutions are inherently resistant to change. Their stability is a great value in turbulent times, but can stand as a barrier to innovative approaches. In Africa, the fact that universities have traditionally been focused on public sector needs and demands acts as an additional barrier to change.

How can African universities overcome these obstacles? First, they can engage more effectively with the public sector. This in turn will involve universities themselves tackling issues of funding and financing, the renewal of infrastructure and the strengthening of gender equity. Innovative funding mechanisms will increasingly be necessary, such as the Ghana Education Trust (GET) Fund, which allocates a percentage of Ghana's Value Added Tax (VAT) to education. Moreover, such changes and improvements must happen at both the institutional and system level in order for higher education in Africa to become a passport to global citizenship.

One specific area that was discussed was the expansion of education and research programmers in public policy areas relevant to African and global ICT development, such as telecommunications policy and ethical issues arising from new forms of communication. The PHEA's work with National Research and Education Networks (NRENs) was cited as a good example of this.

Second, African universities can reach out to the private sector and to an expanding group of potential international partners. The Faculty of Information Technology and

Computing at Makerere University in Uganda is a good example of how this can be approached at a departmental level. Utilizing mechanisms like publishing its own journal, organising an annual international conference, and collaborating with global companies on research and curricula, Makerere University has raised its profile, expanded its resource base, and increased the number of graduates. The university also reaches out to the African Diaspora through visiting professorships.

The MIT iLabs and OpenCourseWare programmers in the United States illustrate the sort of IT-enabled educational and research resources that are increasingly available. With iLabs, for example, which encompasses a set of science and engineering experiments that can be undertaken remotely, work has been done to overcome bandwidth and other limitations and enable students in Africa to participate. Programmers like the Cisco Networking Academies, the Stanford Digital Vision Programme, and IBM's development of the "services science" field show the range of possible international partnerships and resources that can be tapped.

Finally, universities can focus on their own utilization of ICT, through effective management of their own bandwidth and networking enterprises, and through more effective infusion of ICT into research, teaching, and learning.

**Priorities and Next Steps**

Although the challenges are significant, the Forum discussions left participants energized with the sense that significant progress can be made in the next several years in expanding the role of universities in harnessing ICT for Africa's economic development. The priority areas include:

- **Connectivity: Universities as the custodians of African ICT implementation.** Universities can continue their leadership role in building effective research and education networks (RENs) in their national contexts. In working together at the policy and technical levels, they can also accelerate the expansion of inter-African and transoceanic fibre networks. Lowering the cost and expanding access to broadband connectivity is a key to Africa's future ability to capitalize on ICT to drive growth and development.
- **Content: Universities as the stewards of African knowledge**. As the stewards of continental knowledge and scholarship, African higher education institutions can play a leadership role in developing new institutions and business models for knowledge dissemination at the African and global levels. Some of the existing North American and European institutions can act as barriers to realizing the potential of African knowledge, and are under severe pressure themselves from the advance of open source and open access approaches.

- **Curriculum and Learning:  Universities as the generators of Africa's ICT skills base**.  African universities can take advantage of the new wave of global corporate philanthropy that is emerging from the ICT sector, leveraging industry's need for trained students to increase the quality and quantity of graduates trained in areas important for the global knowledge economy.  African universities can also develop new ways to take advantage of the increasing availability and quality of open educational resources at the international level.
- **Engagement:  African universities as the catalysts for social and economic progress**.  The Forum discussed many examples of how ICT can enable new capabilities in the service of K-12 education, healthcare, agriculture and rural development.  Working with communities, social entrepreneurs, and others, universities can expand their activities in these areas in ways that serve their educational and research missions, as well as increase their standing and relevance with the broader public.  For example, leveraging university land and connectivity to enable new enterprises in fields like business process off-shoring (BPO) is an area that might be explored.