# Innovations in tertiary education - How can universities respond to Kenyan needs?

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The socio-economic development of any country is based on the transformation of knowledge, science and technology into goods and services. For Kenya, integration of science, technology and innovation (ST&I) into national production processes is central to the success of the Government's policy priorities and programmes based on new innovative ideas, as outlined under Kenya Vision 2030. This is of particular significance in this era of global competitiveness and concerns for achieving sustainable development and equity.

Development of the necessary scientific and technological infrastructure as well as the technical and entrepreneurial skills is an essential prerequisite to the transformation of Kenya into a knowledge-based society. Development of innovative ideas into products, processes and services is highly dependent on a well-defined and supportive policy, institutional and legal framework that effectively addresses citizens' needs and aspirations. It is my conviction that tertiary institutions must have a central role to make this happen.

The university is an integral part of the higher education system and is expected to conduct research, deliver quality programmes and provide qualified personnel who can conduct research, as well as highly skilled professionals in line with the societal needs. Through research, universities act as a bridge between science and development. Traditionally, universities have played a key role in the process of economic growth, as both a source of new knowledge and as a trainer of scientists and engineers who work in industries and laboratories. However, the spate of change and the need for timely responses, require dynamic institutions with a demonstrated capacity and willingness to innovate. Curriculum development and review within universities must be participatory and include key stakeholders including students to address their demands.

Research in the university faces challenges such as a lack of close communication and co-operation between team members, outcomes that fail to provide an integrated or holistic framework for solutions to be identified, reluctance to accept new ideas and new research approaches, competition and not forgetting limited research financing, which is a major problem. The silo mentality must be broken, and universities must have more collaboration and partnership; internally and externally.

The National Council for Science and Technology (NCST), on behalf of the government of Kenya, has administered the Science, Technology and Innovation grant since 2008. The grant was created with the aim of supporting and developing research capacity, generating scientific solutions to the challenges faced by the country, providing a basis for policy recommendations and advancing technological and social innovations for economic development. The grant is targeted to address ST&I priority areas in relation to the development agenda of the Government as provided in Kenya Vision 2030 and Medium-Term Plan. The NCST has structured the grant to support different specific categories in order to maximize on return. These categories are: research, innovations, research facilities, post-doctoral research, women scientists, postgraduate research (PhD and MSc/MA), bilateral collaborative programmes and support for scientific conferences and symposia.

The government of Kenya should have research policy activities, which emphasize the universities' pivotal role in the research and innovation process. It should aim to ensure that the

full potential of both public and private universities in the production of knowledge and its transmission, dissemination and utilization in technological innovation, is fully realized. Hence maximizing the university's contribution to innovation and sustainable social and economic development should be a priority. Through its identified projects, the government should provide policy actors with expertise on a range of issues; university research strategy and research funding, collaborative research with external partners, doctoral training programmes, research career development and international research cooperation. University staff must be in the forefront and dialogue with policy makers in addressing the challenges.

The universities in Kenya are embedded in cities and regions as key components of social and economic development; and, not least importantly, they should be focal points for dialogue and knowledge exchange with citizens and society. They must address the needs and demands of society. They should be key stakeholders in establishing the national research agenda. They should play a major role in the following: supplying trained researchers; encompassing diverse missions in basic and collaborative research; and having the capacity to foster interdisciplinary research skills and expertise. Building partnerships is increasingly important in in research and innovation. Establishment of the "open innovation" model in university–business cooperation should be encouraged. This model can lead to opportunities for enhanced employability and entrepreneurial skills of university graduates and researchers, greater inter-sectoral mobility of staff and knowledge exchange. Successful partnerships in research and innovation activities require sound project management and intellectual property management reflecting respective interests.

The universities can only respond to the Kenyan needs, which include (but are not limited to) food insecurity, floods, droughts, communicable and non-communicable diseases, by collaborating with industry. The collaboration will contribute to the following; speeding up the innovation process, ensuring relevance of doctoral education, increasing visibility, strengthening recruitment, developing the network and providing financial support for research. Strategies must be put in place to address this. One way is through supporting research chairs and strengthening postgraduate research.

Industrial collaboration must be designed into the doctoral education process. Having the right people on both sides of the collaboration is key. Some collaboration models are more suitable for small and medium enterprises, and therefore flexibility should be allowed. Encouragement for getting one of the supervisors from industry is critical. Dissemination of research findings must be well conducted to address the needs of society.

The broadening of the national science education base in primary and secondary schools, technical colleges and universities and the existence or setting-up of advisory, promotional and coordinative organizations for science and technology is important in terms of delivering the necessary human capacity in science, technology and innovation. Networking of research organizations and institutions of higher education including public universities through such networks as the Kenya Education Network is important for research and promotion of innovation. Equally important is improving quality and enforcing standards. The Commission for Higher Education must continue to step up the quality assurance mechanism.

For Kenya to fully benefit from the national research and development (R&D) initiatives and realize the national goal of becoming a knowledge-based economy, provision of a favourable environment and necessary financial resources for R&D is a prerequisite. Therefore, there is

need to increase R&D funding, which will enable the Kenyan R&D sector including research institutes, universities, technical and vocational education and training and innovators to benefit and focus on the national priority areas in a global context. I advocate that at least 1% of gross domestic product (GDP) should be spent on supporting R&D and that there should be minimum donor dependence.

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