

Effective Innovation Policies for Development: Uganda

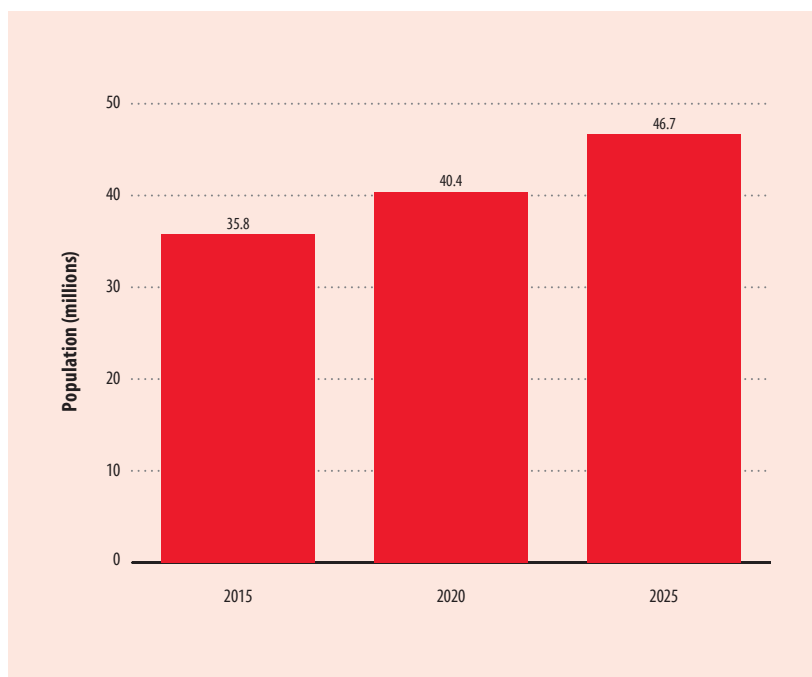
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As a landlocked country, Uganda's economy is largely dependent on neighbouring countries for access to and participation in global economic activities. Until recently, following two decades of armed conflict that lasted from 1966 to 1986, Uganda relied on Kenya for the majority of its consumer goods. Since 1986 the country has focused its efforts on recovery, with socio-economic activities and public policies geared towards development in key sectors such as roads, energy, agriculture, health, education, and security. Uganda's recent progress in the Global Innovation Index (GII) is the result of nearly 30 years of consistent and relatively predictable socioeconomic policies aimed at transforming the country from a peasant society to a middle-income economy by the year 2040.¹

The country has changed dramatically in both economic terms and other areas as a result of its relative political and economic stability. Demographic changes are the most notable. Between 1969 and 2014, Uganda's annual population growth rate was 2.88%—one of the highest in the world.² As shown in Figure 1, the 2014 census projects that the population will reach 46.7 million by the year 2025.³ The population growth rate between 2015 and 2025 is expected to be 3.03%—again, one of the highest globally.⁴ Although a healthy growing population is commendable, such demographic

Figure 1: Projected population: Uganda, 2015–25



Source: Uganda Bureau of Statistics, 2014a.

trends—where the population is becoming predominantly one of youths—place significant pressure on limited resources. Such a rapidly growing population requires simultaneously expanding the economy to accommodate the people's needs and adopting more sustainable practices in natural resource management. It is, therefore, absolutely critical for Uganda to turn to innovation and the creative use of resources across all sectors of the economy. So far Uganda's development strategies and policies have emphasized innovation

through science and technology capacity development for various core sectors, including manufacturing and agro-processing, which are growing.⁵ That growth partly explains Uganda's recent improvement in GII rankings.

This chapter presents a plausible explanation for Uganda's consistent improvement in the GII. The next section reviews Uganda's innovation ranking in the GII. Subsequent sections highlight what Uganda has done to score higher than other low-income countries, the innovation

policies that appear to have fostered innovation, and areas in policy that may need improvement. The chapter concludes with lessons to learn from Uganda's experience and that of other countries, and, finally, a proposal for policy mixes that would enable Uganda and similar countries improve in their innovation ranking.

Uganda's innovation ranking

In 2014, Uganda was classified as an 'innovation achiever' for the second time by the GII.⁶ This means that Uganda's GII score relative to its GDP is significantly higher than that of other economies in its low-income bracket. Uganda was ranked 106th in 2011, 117th in 2012, 89th in 2013, and 91st in 2014, consistently outperforming a number of low-income countries. Although its GII performance might appear to be an outlier, long-term observers of the country's stable economic policies and performance will not find its GII scores surprising. For the period 1986–2010, the government's emphasis was on economic recovery; now it is on transforming Uganda into a middle-income society.⁷ The government is currently focusing on deepening private-sector investment by improving its business environment and competitiveness through innovation. Uganda's GII strength in areas such as strong foreign direct investment net inflows is a direct result of the relative stability of the economy. Reform processes currently underway are aimed at addressing structural and institutional weaknesses that directly relate to Uganda's weak areas in the GII indicators, such as the ease of starting and the cost of doing business. However, as discussed below, the existing legal and policy framework is responsible for Uganda's positive innovation attributes.

Uganda's growth prospects

Uganda's economy is largely agro-based. The country's major exports are coffee, tea, cotton, and tobacco. Fish, assorted fruits, essential oils, vegetable, cereals, pulses, animal products, and minerals make up the pool of its non-traditional exports. Thus innovations in agro-processing and value addition may be essential for creating new sources of growth and agribusiness. Already Uganda is among a few African countries that are prioritizing investments in modern biosciences, especially in disease diagnostics, vaccine development, crop productivity improvement, and value-added agro-produce. Arguably, this type of investment puts Uganda on the path towards sustainable agricultural transformation. It also presents an opportunity to transition the majority of Ugandans from subsistence to commercial farming. Such effort could be an impetus for minimizing exports of raw materials and obtaining more revenue from trade in finished or semi-processed products.

Uganda's growth prospects look bright in both the medium and the long term. Uganda's recent positive innovation ranking is attributable to government efforts to increase and sustain higher rates of economic growth. Development experts project that economic growth rates of at least 7% per annum are needed if Uganda is to achieve middle-income status within the next two or three decades.⁸ Its real GDP growth rate has so far averaged 5.3% per annum between 2001 and 2011. This growth in GDP has made positive gains in reducing poverty rates—these have fallen from 56% in 1992 to 31% in 2006, and they fell again, to 19.7%, in 2013.⁹ These and other indicators are expected to improve even more as the country takes advantage of the crude oil discovered in 2006 in the

Albertine Rift in western Uganda; production is expected to begin by end of this decade.¹⁰

Uganda's innovation policy reforms

Uganda's innovation policies can be traced through different sector policies, strategies, and pieces of legislation. Among these are the National Industrialization Policy 2008; the National Science, Technology and Innovation (STI) Policy 2009; the National Development Plan 2010; the Agricultural Sector Development Strategy and Plan; and several others. Although Uganda appears to have numerous policies relating to research and innovation, its challenge is to get a policy mix that is synergistic and creates an environment conducive to learning and interaction among actors in the public sector, private businesses, and civil society. Nonetheless, the emphasis on science and technology in today's government policies and strategies calls for more action from national organizations such as the Uganda National Council for Science and Technology as well as from local and regional innovation networks such as the Innovation Systems and Clusters Programme at Makerere University, Bio-Innovate, AfricaLics, and the Pan African Competitiveness Forum.

Policy discussions over the last decade have centred on institution building. These efforts have identified a need for a standalone ministry for science and technology, and have developed incentives such as a national innovation and industrialization fund to support the commercialization of new technologies.¹¹ Consequently, science and technology have been added to the Ministry of Education and Sports, creating a new Ministry of Education, Science, Technology, and

and Sports. This ministry augments government's capacity development efforts in the science, technology, engineering, and mathematics (STEM) fields.¹² These institutional, structural, and human capacity elements of the innovation ecosystem have been emphasized in Uganda's Vision 2040. The challenge going forward will be to match the policy commitments to STEM promotion with financial resource allocations and to encourage the various actors to interact and learn from each other to spur innovation. Uganda's GII ranking may improve if the government sustains the momentum it has created—for example, through initiatives such as the National Innovation Fund (US\$0.2 million) in the period 2003–04, the Presidential Support to Scientists (US\$4 million) in the period 2006–14, and the Millennium Science Initiative Project (US\$33.35 million) in the period 2007–13.

There is also a need to improve the management of intellectual property (IP). A number of IP laws have been updated in the last decade; updates include the Patents (Amendment) Act (2002), the Copyright and Neighbouring Rights Act (2006), the Trademarks Act (2010), the Plant Variety Protection Bill (2014), and the Industrial Property Law (2014). However, many scientists and innovators in Uganda are not aware of the existing IP laws. As a result, many simply do not take advantage of IP protection to leverage their competitive advantage. Furthermore, universities and other research organizations—with the exception of Makerere University, Uganda's largest public university—do not have internal policies that address and encourage research and IP management. Where such policies do exist, they are not used or implemented.¹³ Probably more problematic is the inadequacy of the institutional

framework for administering IP protections, especially in areas such as patents, which require highly trained and experienced experts in law and examination. Although the recent restructuring of the Uganda Registration Services Bureau (URSB) into a semi-autonomous agency will go a long way towards building administrative capacity, much remains to be done in terms of human capacity in the legal fraternity to support IP and knowledge-based businesses.

Innovation policy initiatives that appear to have worked

Successful initiatives fall into two general categories: those that enhance the competitiveness of firms and those that boost learning and competence. Both these areas are addressed below.

Enhancing the competitiveness of firms

Uganda promotes the private sector as the engine for economic growth and development, but the private sector must be competitive domestically and internationally. Efforts have been made to develop the private sector since Uganda's independence in 1962, but these have become more vigorous since the 1980s. The founding of the Private Sector Foundation for capacity and policy advocacy (1995), the Enterprise Uganda Foundation Limited for promoting entrepreneurship and business growth, the Uganda Investment Authority (1991) to create a favourable investment climate, and the Uganda Export Promotion Board to facilitate exports of Ugandan goods and services are probably some of the best known. Collectively, these entities have established a solid institutional foundation for developing Uganda's private sector. To this end, the policy focus has shifted to enhancing firm competitiveness.¹⁴

Furthermore, since 2004, the annual Presidential Investors Round Table (PIRT)—which is chaired by the country's president—has become an influential forum in which industry can advocate for reforms in policy and service delivery that promote their business interests. As a result of the president's personal involvement, resolutions made at PIRT are often given priority in their implementation.

Innovation and competitiveness in service delivery within the public sector is also emphasized. The Civil Service College recognizes innovative public-service organizations. Bodies such as the Uganda Revenue Authority have deployed information and communication technologies in tax administration, making it increasingly easier for tax payers to comply with their tax obligations. Similarly, the Ministry of Finance has rolled out the Integrated Financial Management System, making it easier for public agencies to manage their financial resources. As previously noted, reforms taking place within the URSB have improved IP administration and management as well as business registration services. Implementing the URSB's Strategic Investment Plan for 2012–17 may remove institutional bottlenecks involved in business registration, which in turn would improve Uganda's current low score on the ease of starting and cost of running businesses.

Learning and competence building

Higher education in Uganda has dramatically grown in the last decade. Uganda has 189 tertiary institutions, of which 72% (115) are privately owned.¹⁵ As shown in Table 1, enrolment is primarily in universities, leaving little room for other institutes such as technical colleges, which traditionally play

Table 1: Enrolment in Ugandan institutions 2011–12

Institution type	Number of Institutions	Enrolment, male	Enrolment, female	Total	Percentage of total institutions
Universities	32	78,817	61,270	140,087	71.3
Business institutes	58	12,260	12,724	24,984	12.7
National teachers colleges	7	4,989	2,853	7,842	4.0
Health care institutes	21	3,924	3,564	7,488	3.8
Management institutes	12	2,293	3,179	5,472	2.8
Technical colleges	5	2,914	336	3,250	1.7
Agriculture, fisheries, and forestry institutes	3	1,169	456	1,625	0.8
Media institutes	4	967	653	1,620	0.8
Theology colleges	11	1,326	271	1,597	0.8
Law institutes	1	500	300	800	0.4
Cooperative colleges	2	204	144	348	0.2
Tourism institutes	3	137	89	226	0.1
Art institutes	1	134	61	195	0.1
Aviation institutes	1	127	20	147	0.1
Meteorological institutes	1	15	24	39	0.0
Survey institutes	1	27	3	30	0.0
Others	2	452	188	640	0.3
Total	165	110,255	86,135	196,390	100.0

Source: National Council for Higher Education, cited in Uganda Bureau of Statistics, 2014b, p. 18.

critical roles in STI training. Public universities, which constitute 28% of tertiary institutions, are mainly science and technology-oriented. However, enrolment in STEM programmes is still under 25% for all universities, a rate that is captured by the GII as a weakness. Teaching is the main focus of most universities in Uganda, although research capacity is growing in a number of public universities, especially Makerere University. Furthermore, the co-location of public universities in the various regions of the country, and an emphasis on STEM education, may in the long term have a positive influence on the local innovative activities of surrounding firms and communities.

At the same time, entrepreneurial activities are gaining prominence within university systems, especially Makerere University. These show an increasing recognition of the value of university–industry–government

links. At Makerere University, for example, the Innovation Systems and Clusters Programme, which started in 2003–04 with initial support from the Swedish International Development Cooperation Agency (Sida), has established and is working with more than 50 innovative clusters in different sectors of trade. Cluster formation is encouraged by the industrial policy of Uganda of 2008. Another example is Makerere University's efforts to build competence in innovation and development through a Master of Science Programme in Technology Innovation and Industrial Development (TIID) at its College of Engineering, Design, Art and Technology. Although the programme is still quite new (it was established in 2012), it builds on many years of collaboration between Makerere University and the Norwegian University of Science and Technology. TIID will be

instrumental in locally training the next generation of STI experts. TIID draws from and is deeply rooted in activities of key partners such as the Uganda Institution of Professional Engineers, the Uganda Association of Architects, the Uganda National Association of Building and Civil Engineering Contractors, the Uganda Manufacturers Association, and the Uganda Small Scale Industries Association.¹⁶ These initiatives, among others, may go some way towards explaining Uganda's GII strength with respect to innovation linkages and research and development financing from abroad.

One important dimension of innovation in Uganda is its learning by doing aspect, especially in the informal sector, which constitutes about two-thirds of the country's businesses.¹⁷ Because the majority of agricultural activities are informal in nature and 72% of the labour force is engaged in agriculture, the informal

Box 1: Formal and informal sector collaboration: The Kiira EV

One of the major breakthroughs that resulted from the Presidential Support to Scientists is East and Central Africa's first electric vehicle, called the 'Kiira EV'.¹ The Kiira EV is a prototype electric car designed and produced in Uganda by engineering students and faculty researchers at Makerere University's College of Engineering, Design, Art and Technology through the Centre for Research in Transportation Technologies (CRTT). Although the Kiira EV is an important technological breakthrough for Ugandan researchers, the involvement and integration

of the informal-sector artisans in its production is an even more important aspect of the innovation process. The Kiira EV project was designed by CRTT researchers and students, and informal-sector artisans were heavily involved in the fabrication of its components and in translating theoretical designs into practical solutions. Informal-sector artisans who worked on the project were required to sign non-disclosure agreements, which would help to protect Makerere University's trade secrets. The Kiira EV is expected to go into production in 2018 with a unique

labour model that integrates informal-sector workers into the manufacturing of the cars. This distinctive model of vertical integration between formal and informal sectors exemplified in the Kiira EV project is critical to transforming African labour markets and economic activities that are predominantly informal in nature.

Note

1 Kawooya, 2014.

economy contributes significantly to the country's GDP.¹⁸ To foster productivity in the informal sector, efforts have been made—particularly by non-governmental organizations such as the Gatsby Trust, SNV, the Belgian Development Agency (BTC), Deutsche Gesellschaft für Technische Zusammenarbeit (GTZ), and Swisscontact, among others—to improve the skills of youth and women so they can either start or improve their businesses. Although these efforts have so far focused on poverty alleviation, job creation, or income enhancement, attention should be paid to the competitiveness of the informal sector. Complementary initiatives by the Uganda government and development partners have concentrated on improving business, technical, and vocational skills through the Skilling Uganda Project. This programme was launched in 2012 with the goal of meeting the skills needs of small and medium-sized enterprises.

Innovation promotion

Innovation promotion by the government, especially by inspiring

young people to be creative and demonstrating this support at the highest political office, the presidency, builds a culture of innovation that pays off in the long term. The president's support has been evident through funding creative programmes at Makerere University, such as the electric Kiira EV motor vehicle (Box 1), and through developing value-added products by the Colleges of Agriculture and Environment and of Veterinary Medicine. Prototypes have been developed, some patented, through the president's initiative, part of which is also implemented through the Uganda National Council for Science and Technology. Scaling up these prototypes into commercial products remains a challenge, however. Although access to credit has improved dramatically, as shown in Uganda's GII data, the ease of starting businesses based on new home-grown technologies remains challenging. On the other hand, anecdotal evidence shows that the president's emphasis on wealth creation within communities is inspiring creativity and innovative

thinking among youth, especially in agro-processing and agribusiness. Such creativity has often drawn the attention of the media, which have featured successful entrepreneurs and products. Examples of such media attention include 'Seeds of Gold', a feature article published every Wednesday in the *Daily Monitor* newspaper,¹⁹ and 'Pakasa', a feature story published in every Friday edition of *New Vision Newspaper*.²⁰

What Uganda's innovation policy should emphasize

Uganda is making progress with respect to building innovation capabilities in both the public and private sector. However, a policy mix that promotes innovation and creativity in universities and firms is needed. The rapid growth of universities is an opportunity to harness young talent by supporting creative work, research, and innovation. Streamlining the financing policy for research and innovation is a vital next step. Public universities and research organizations receive direct funding from government, but less than 2% of funds received is

allocated to research and innovation activities. This direct funding, albeit small, should be supplemented with competitive grants that are made available annually. Competitive grants for research and innovation attracts good talent and encourages creativity in research organizations and universities. This model of financing research and innovation ensures accountability for results and resources, and it is usually the bedrock upon which international research funding and collaborations are built. Creating new businesses through active business incubation should also be pursued. Some work in this regard is being done at Makerere University and the Uganda Industrial Research Institute, but it is centred more on technology development and incubation than on business incubation. Capacity development for business incubation is desirable and can be matched with support offered to innovative cluster initiatives, where universities play enhanced roles in knowledge brokerage for business.

Regionally, collaboration among universities and research organizations within the East Africa Community appears to be growing. Regional networks such as Bio-Innovate, which support bioscience innovations across the region, have made remarkable progress in capacity building for bio-based innovations. This, along with other regional initiatives such as the Biosciences eastern and central Africa Hub – International Livestock Research Institute,²¹ catalyse and support innovation processes at national and regional level. Another example is the newly established East Africa Commission for Science and Technology in Kigali Rwanda, which also emerges as a regional platform for collaboration in science and technology.²²

Lessons to be learned

The key lesson for countries low in the GII rankings, especially those in the low-income bracket, is that policy formulation and institutional capacity development around STI must be addressed concurrently.

Innovation-driven economies owe their success in part to strong political leadership in STI policy and implementation. The recent creation of a Ministry of Education, Science, Technology and Sports (in March 2015), with respect to science and technology governance, puts Uganda on par with Kenya, Tanzania, Ethiopia, South Africa, and the Republic of Korea, to mention a few countries. Having a standalone ministry for science and technology is good but not necessarily sufficient as a driver for innovation, however. The new institutional arrangement, which creates a new docket for science and technology, should interact and work synergistically with the other actors—particularly the Finance Ministry and the Trade and Industry Ministry. Such co-working would mimic scenarios in innovation-driven economies, which have their trade and industry ministries tightly connected within their national systems of innovation, and which play enhanced roles in bridging the gap between research and innovation centres and industry. This also requires support for active business incubation programmes closely linked to higher education institutes.

Conclusions

Uganda can maintain its lead and do progressively better in its innovation ranking. The GII rankings for the period 2011–14 consistently show Uganda outperforming other low-income countries at the same level of development. As shown in

this chapter, Uganda's innovation performance is closely linked to the wider mix of socioeconomic policies, which over the years have remained stable and predictable. The policy mix has enabled both the attraction of foreign direct investment and the advance of other conditions favourable to learning and innovation. That notwithstanding, much remains to be done. The cost and ease of doing business remain unacceptably high compared with that of other low-income countries. Also needed are sustained support and government commitment to research and innovation activities in universities, research institutes, and other centres through direct as well as annual competitive grants.

Uganda has made great strides towards improved innovation capacity. Its promise is that the country is positioned to make even more progress in the near and medium term.

Notes

- 1 Government of Uganda, 2013.
- 2 UBOS, 2014a.
- 3 UBOS, 2014a.
- 4 UBOS, 2014a.
- 5 UBOS, 2014b.
- 6 Countries in this classification were previously termed 'innovation learners'.
- 7 MFPED, 2010.
- 8 MFPED, 2010.
- 9 MFPED, 2014.
- 10 Silvia, 2014.
- 11 Ecuru et al., 2012.
- 12 MoES, 2013.
- 13 Kabi et al., 2013.
- 14 MFPED, 2012.
- 15 MoES, 2013.
- 16 For details about the Master of Science in Technology Innovation and Industrial Development Programme, see <http://cedat.mak.ac.ug/graduate-programmes/master-of-science-in-technology-innovation-and-industrial-development>.
- 17 Kawooya, 2014.

- 18 UBOS, 2014b.
- 19 For example, on 25 March 2015 the 'Seeds of Gold' featured a journalist who ventured into passion fruit farming (Afedraru, 2015); The *Daily Monitor* newspaper is available at www.monitor.co.ug.
- 20 For example, on 20 March 2015 the 'Pakasa' story featured a businesswoman who ventured into trade in South Sudan (Kanaabi, 2015); the *New Vision Newspaper* is available at www.newvision.co.ug.
- 21 For details about this hub, see <http://hub.africabiosciences.org/>.
- 22 Bahati, 2014.

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