

# Leveraging on Emerging Technologies Landscape to Bolster Kenya's Innovation Ecosystem

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## Abstract

Emerging technologies (ETs) are globally recognised as critical to achieving socio-economic transformation and sustainable development. The rapid technological change caused by ETs are increasingly affecting all areas of human activities including the markets and societies. ETs are modifying the field of opportunities and risks for countries, governments, industries, academia and society in general. However, the ability to generate, adopt, adapt, utilize and distribute the benefits of ETs vary in different countries, settings and social groups.

This policy brief presents the results of a study that sought to gain a deep understanding of the emerging technology ecosystem in Kenya. The study encompassed an investigation into the landscape and context, enabling factors, risks, opportunities, and early precedents being set on use cases, governance, and the enabling (or not) environment. Specifically, the study sought to provide an in-depth analysis of the ETs landscape in Kenya with a view of maximising development impact; and to identify the main gaps in emerging technologies and recommend opportunities for bi-lateral and/or multi-lateral partnerships.

Seven primary ETs were identified in Kenya's landscape, namely, artificial intelligence (AI), blockchain, internet of things (IoT), big data/data analytics, geographic information systems (GIS), biotechnology, and nanotechnology, impacting several sectors of the economy primarily agriculture, education, financial services/business, health, information, communication and technology (ICT) and water and sanitation.

A five-dimension maturity model based on five fundamental activities, namely education, research, end-use, linkages and implementation, was used to define the stages of maturity of the ETs ecosystem in Kenya. Three stages of maturity were defined as ideation, nascent, and growing. Overall, the ETs ecosystem in Kenya was found to be between the nascent and growth stage of maturity, based on the analysis of each of the fundamental activities and the roles played by each of the actors. The key actors in different ETs may be broadly related in terms of operational sectors, however different ETs have varied distribution of actors and levels of skills base. Application and maturity of ETs is not uniformly distributed across the various sectors. Education, research and end use of biotechnology in Kenya was found to be in growth stage whereas in nanotechnology all the fundamental activities are in ideation stage.

Levels of investment in ETs are not the same and they mainly differ with the interests of the key funders. Digital emerging technologies in Kenya have been attracting increased attention from funders locally and internationally. Similarly, the existence of policies, regulations and standards are not uniform for all ETs. Although most ETs are not well understood and do not have defined functional processes and structures, some like biotechnology are at a stage where actors follow standard practices, policies, and procedures which are well known, and can be replicated and scaled.

The gaps in the ETs ecosystem are identified, which provide potential areas to address and for collaboration, including capacity building, joint research programs, technology transfer, innovation and policy accelerator programs, and academia-business community engagements.

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## 1. Background

Emerging technologies (ETs) have been transformative around the world, and Kenya has not been left behind. The rigorous revolution almost all facets of life driven by emerging technologies is growing at a remarkable rate and is quite inevitable. The transformational nature of these technologies' manifests in economies through enhanced transparency, efficiency, inclusivity, better decision-making processes and service delivery.

Over time, Kenya's technological and innovation track record has remained impressive. In the 2021 Global Innovation Index, Kenya was ranked the second most innovative country in the Sub-Saharan Africa and was among the four developing economies with a record of over-performing on innovation relative to their development for the 11th year in a row. Notably, emerging technologies have allowed the country to leapfrog legacy infrastructure systems, generate economic growth and promote social inclusion for citizens. Indeed, Kenya's willingness to embrace innovation in partnership with the private sector has earned her the moniker of 'Africa's Silicon Savannah'.

This policy brief provides the findings of a study that sought to gain a deep understanding of the emerging technology ecosystem in Kenya through an investigation of the context, enabling factors, risks, opportunities, and early precedents being set on use cases, governance, and the enabling (or not) environment. The brief shares identified primary ETs in Kenya's Landscape, the key actors, the stage of maturity of the ETs ecosystem, and the opportunities for leveraging on ETs Landscape to bolster Kenya's innovation ecosystem. It further recommends opportunities for bi-lateral and/or multi-lateral partnerships regionally and globally.

## 2. Methodology

The study methodology involved an in-depth literature review; a review of the policy and regulatory environment; stakeholder engagement through

interviews/surveys, and a maturity assessment of the emerging technologies ecosystem. The governance frameworks, embodied in policies, laws, and regulations relevant to ETs and arising from the literature review, were identified and synthesized providing an overview of the regulatory and policy environment for ETs in Kenya.

Insights were also obtained through questionnaires and interviews with select key actors including researchers, practitioners, policymakers and funders. Their views were sought on a wide range of issues including the trajectory of the different ETs and their potential impact on the economy, the effectiveness and efficiency of the current governance frameworks, and areas of mutually beneficial outcomes for cooperation regionally and globally.

## 3. Maturity Model of the Emerging Technology Ecosystem

An ecosystem maturity model was developed to form the basis for the assessment of the emerging technology ecosystem both individually and collectively. It enabled the study team to answer the following questions: What impact has the ETs had on the economy? What is the level of investment in these technologies? How is Kenya aligning itself to be a global player in the technology space? How are these ETs shaping the Kenyan society overtime? What factors have supported or hindered growth of ETs in Kenya? What are the main gaps in the ETs?

The stage of maturity or the development stage model of an ecosystem provides insights into the current level of success factors that have been recognised to be essential for the maturity, health, and sustainability of the ecosystem. This study employed the five fundamental activities and their attendant primary and secondary actors as the basis for analysis of the development stage or maturity level of the ecosystem. The selected indicators are presented in Table 1.

Three developmental stages of maturity are identified as **ideation**, **nascent** and **growth**.

Fundamental Activities	Potential Indicators
<b>Education</b>	Quality of graduates (measured by quality or availability of hires), New Masters and PhDs, university post-graduate programmes, researchers/professionals engaged in R&D, Africa/global ranking of universities with post-graduate relevant programmes, policies.
<b>Research</b>	Related Publications, R&D projects, patents, availability of funding for R&D, pilot projects, availability of required equipment, policies.
<b>End use</b>	Government targets, industry targets, demand from government, demand/opportunities in the market, demand/opportunities beyond the borders, policies.
<b>Linkages</b>	Technology dedicated workshops and conferences, network size, network intensity, collaboration with academia (or with private sector).
<b>Implementation</b>	New entrants, diversification activities of incumbents; availability of funding (traditional, equity, venture capitalists, angel investors), interest groups, policies.

**Table 1.** Indicators of maturity of fundamental activities

**Stage I: Ideation.** This stage is mainly characterised by Research and Development (R&D) activities with pilots and proof-of-concepts on potential commercial applications. It is beyond basic research on fundamental principles.

**Stage II: Nascent.** This stage embodies the very early stages of the ecosystem development and formation. Its characteristics include extreme ambiguity driven by uncertainties in technology, competition, structures and demands. Commercial ventures are formed at this stage and sales begun.

**Stage III: Growing.** At this stage, the commercial applications of the technology start gaining strong acceptance in the market with increased demand and new entrants. Also, the ecosystem governance structures start becoming clearer.

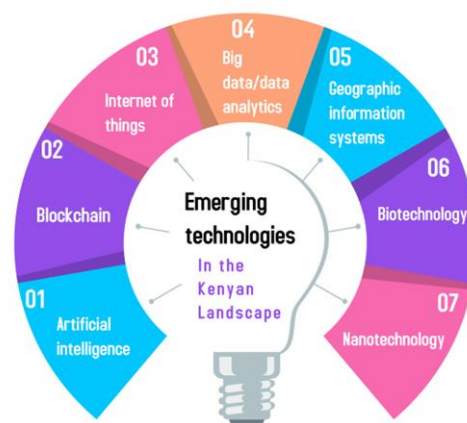
## 4. Findings

### 4.1 Emerging Technologies in Kenya's Landscape

Seven primary ETs were identified in Kenya's landscape, namely, Artificial Intelligence (AI), blockchain, Internet of Things (IoT), big data/data analytics, Geographic Information Systems (GIS), biotechnology and nanotechnology (Figure 1).

The identified ETs were found to impact on several sectors of the economy primarily agriculture, education, financial services/

business, health, Information, Communication and Technology (ICT) and water and sanitation. The ETs are generated from research, continuous industrial development programs, or from individual innovative and entrepreneurial initiatives.



**Figure 1.** Emerging Technologies in Kenya's Landscape.

#### 4.1.1 Key Actors

The key actors in Kenya's ETs landscape are categorised into:

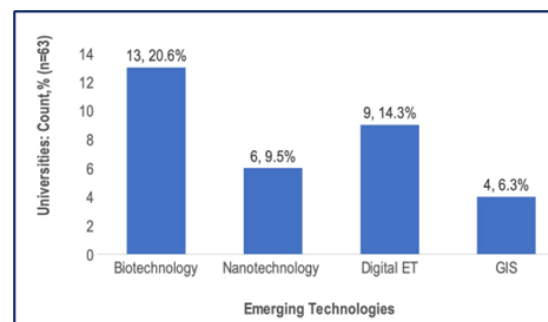
- Primary actors**, which are organisations that perform one or more of the five fundamental activities. These actors include academic and research community, private sector, not-for-profit organizations, Small and Medium Enterprises (SMEs) and other beneficiary organizations.
- Secondary actors**, which are organisations that affect the behaviour of or the action between primary

actors. They include government, investors/funders and development partners. Their role can be direct (eg. through mandates, regulations) or indirect (eg. through policies, incentives).

#### 4.1.1.1 Primary: Education

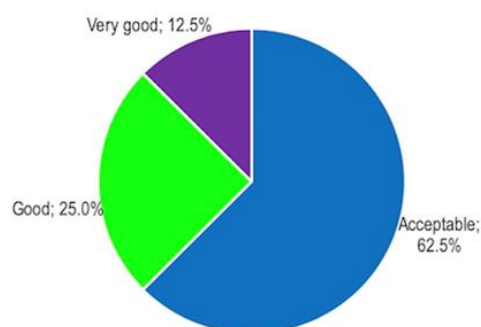
University education is essential in monitoring and assessment of global developments in the different ETs, and assimilation, development and implementation of the new paradigms locally<sup>1</sup>. Universities also provide the ET ecosystem with a continuous stream of new knowledge and new carriers of knowledge<sup>2</sup>. They generate “qualified personnel (in ETs) who can monitor technological and other trends, assess their relevance to the prospects of the country and individual firms, and help to develop responsive strategies while taking advantage of the trends<sup>3</sup>.”

A review of the undergraduate and postgraduate programmes encompassing the identified ET reveals that out of 63 universities accredited by the Commission for University Education (CUE) in 20214, only 21 (33%) offer post-graduate programmes (masters and PhD) covering any of the ETs. With these, there is great disparity across the different identified primary ETs, whereby biotechnology related post-graduate programmes are on the top of the spectrum, offered at 13 universities (21%) and GIS at the bottom with only four universities (6%) offering related postgraduate programmes (Figure 2).



**Figure 2.** Universities offering postgraduate programmes in the identified ETs.

The students’ foundation for ETs was considered to be adequate, as the quality of the post-graduate students on their ability to grasp the concepts, think independently, carry out quality supervised research was rated to be acceptable at 62.5% (Figure 3).



**Figure 3.** Average quality of post-graduate students in ET programmes.

#### 4.1.1.2 Primary: Research

Some universities in Kenya are actively engaged in basic and applied research on the identified ETs. In addition, research institutes, including Kenya Medical Research Institute (KEMRI), among others, and some multinational research and development centres like the Microsoft Africa Development Centre and IBM Research Africa have significantly been engaged in various types of ETs research in Kenya.

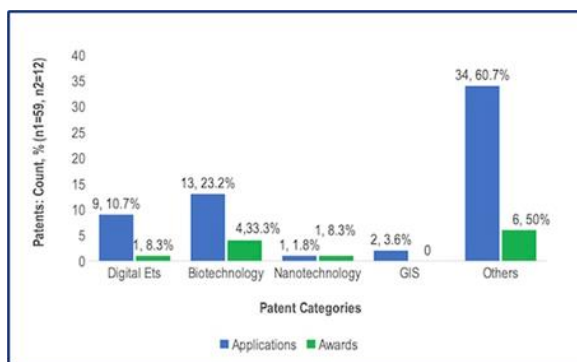
However, outputs of research still remain low. This is demonstrated by the number of patents applied for in 2021, which was 59 while only 12 were granted. Specifically, in the identified ETs, Kenyans only applied for 25 patents and only 6 were granted (Figure 4).

<sup>1</sup> Feinson (2003)

<sup>2</sup> Leydesdorff and Zawdie (2010)

<sup>3</sup> Dahlman and Nelson (1995, p 97)

<sup>4</sup> Commission for University Education (CUE) (2021)



**Figure 4.** Distribution of Patent applications and awards in Kenya in 2021.

The ability to conduct meaningful research in ETs requires scientists to have the necessary equipment and facilities. However, the facilities and equipment for research in the areas of ETs are inadequate as was indicated by 60% of researchers that they do not have the necessary equipment/tools/facilities to carry out research work in the area of their selected ETs.

#### 4.1.1.3 Primary: Implementation and end use of ETs

Kenya has had a vibrant production and application record of emerging digital technologies, especially in the financial sector as demonstrated in the Global Innovation Index and other internationally recognized rankings. This has been attributed to the vital role played by young innovators and entrepreneurs, as well as industry actors in producing and utilizing these technologies. For example, Kenyan banks and non-banking entities have continued to adopt application of emerging digital technologies such as IoT, AI, big data/data analytics and blockchain at a higher rate. Leveraging on the well-known and established mobile money transfer service, M-Pesa by Safaricom, several locally developed fintech solutions such as Jambo Pay (an electronic payment platform)<sup>5</sup> have emerged and are currently in use in the country.

Other sectors in Kenya, including health, agriculture and manufacturing have also benefited from the digital ETs, which have

been produced, adopted and applied in areas such as telemedicine, e-health, health record and information management, farm and soil nutrition management, farmers' online marketplace, product design, energy management and logistics management among others. Examples of solutions in health and agriculture, which have been developed by Kenyans and/or have been adopted for application include Ujuzi kilimo (farm and soil nutrition sensors and data analytics tools)<sup>6</sup>, Mkulima Young (an online marketplace for farmers)<sup>7</sup>, Afyakit (a health analytics platform)<sup>8</sup>, and Mydawa (an online pharmacy)<sup>9</sup>.

The Government is one of the key beneficiaries of the emerging digital technologies. Among the digital emerging technology applications adopted by the government include digital services such as the Ardhisasa (a platform for access to land information and processes undertaken by Government)<sup>10</sup>, and e-citizen (a service access and payments platform that has significantly improved public service delivery)<sup>11</sup>.

In addition to emerging digital technologies, other key ETs used in the Kenyan landscape are nanotechnology and biotechnology. Applications of nanotechnology and biotechnology are primarily in agriculture and health.

#### 4.1.1.4 Primary: Linkages

The ETs ecosystem linkages are primarily provided by the network of innovation hubs, incubators, accelerators and associations. The government is also providing linkages through the development of the Konza Technopolis. Konza Technopolis Development Authority (KoTDA) was created to facilitate the development of a world class and sustainable technology hub with a vibrant mix of businesses, workers, residents, and urban amenities.

Further, several associations have been formed to promote linkages among players

<sup>5</sup> <https://www.jambopay.com/>

<sup>6</sup> <https://www.ujuzikilimo.com/>

<sup>7</sup> <https://www.mkulimayoung.com/>

<sup>8</sup> <http://www.afyakit.com/>

<sup>9</sup> <https://www.mydawa.com/about-us/about-mydawa>

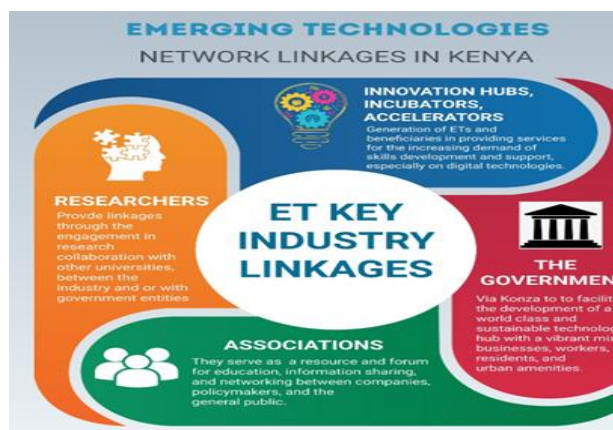
<sup>10</sup> <https://ardhisasa.lands.go.ke/home>

<sup>11</sup> <https://www.ecitizen.go.ke/>



in the different ETs. These include the FinTech Association of Kenya (FINTAK)<sup>12</sup>, which is a not-for-profit organization representing leading FinTech companies of all sizes and serves as a resource and forum for education, information sharing, and networking between companies, policymakers, and the general public; the Society for Biomedical and Biotechnology Research-Africa (SBBRA)<sup>13</sup>, among others.

The network linkage in Kenya's ETs landscape is illustrated in Figure 5.



**Figure 5.** ETs Network Linkages.

#### 4.1.1.5 Secondary: Governance

Globally, the governance on ETs has experienced tremendous growth and continues to evolve albeit at a pace slower than innovations in most sectors of the economy. Regulation of ETs remains a complex phenomenon given that there is need to mitigate associated risks while promoting innovation and maximizing benefits for all.

Government policies therefore need to balance public interests such as human dignity and identity, trust, nature preservation and climate change, and private sector interests such as business disruption and profits. Consequently, players have called for new governance frameworks, protocols and policy systems for the new digital era to ensure an all-inclusive system and equitable benefits. The debate on governing the ETs ecosystem has further underscored the importance of holistic regulatory approaches that are

human-led and human-centred as well as nature-led and nature-centred.

There is a series of interrelated challenges facing the ETs governance ecosystem particularly resulting from sluggish systems which do not quickly adapt to rapid technological transformation. This is compounded by fragmentation which creates regulatory silos and robustness of outdated rules.

ETs not only provide new growth opportunities but also create new social and legal challenges. Policies, legislations, regulations and standards are therefore required to govern adoption and application of different ETs, as well as protect the society and environment from anticipated negative impacts.

In Kenya, most of the ETs are yet to be comprehensively understood, implying that not all are effectively governed. In some cases, there are concerns that regulations hinder the adoption, application and growth of ETs. For instance, in the case of drone usage, there are restrictive regulations that have been the cause of outcry from some stakeholders. In biotechnology, specifically the Genetically Modified Organisms (GMOs), policy directives have hindered progression on development and adoption of the technology.

Government ministries and regulatory agencies are the main actors in guiding and regulating the adoption and application of the ETs. They engage stakeholders in the development of regulations to ensure inclusion of diverse voices and incorporate the knowledge and experiences of those directly or indirectly affected.

In some cases, the private sector through their associations have stipulated self-regulating rules and mechanisms to support and ensure discipline and effective application of ETs. For example, the Kenya Bankers Association has a self-regulatory framework of standards for member banks to enhance governance and ethical practices in the sector.

Kenya's ETs landscape has grown exponentially thus creating demand for a strong governance framework. The evolution of the ET governance ecosystem has not been in tandem with the rapid

<sup>12</sup> Kenya's Fintech Association <https://fin-tech.co.ke/>

<sup>13</sup> AIBBC, [aibbc-society.org](http://aibbc-society.org)

technological developments and innovations which have been experienced, particularly over the past two decades. These are developments that have had significant impacts on key industries such as agriculture, banking, e-commerce, finance, health, and logistics.

There are several pieces of legislation and policies which have provisions on certain aspects of ETs governance (though not explicitly) and are scattered across

production and service sectors leading to incoherence in their application. Regulations for specific sectors are often more stringent as they are defined by the normal mode of operation of the sector rather than its potential for innovation. The financial sector has been the most extreme due to the need for precautionary measures to prevent potential misuse and abuse of new technologies.

A summary of key governance actors, policies, legal frameworks, and standards guiding ETs in Kenya is provided in Table 2.

**Table 2.** Key Regulatory Institutions, Policies, Regulations and Standards for ETs in Kenya.

Regulatory Institution/Agency	Policy, Law, Regulation or Guideline	Covers
<b>Ministry of Industrialisation, Trade and Enterprise Development</b>	<ul style="list-style-type: none"> <li>National Industrialisation Policy, 2012</li> </ul>	<ul style="list-style-type: none"> <li>Seeks to drive commercialization of research output</li> <li>Prioritises nanotechnology and biotechnology-based industries</li> </ul>
<b>Ministry of ICT, Innovation and Youth Affairs</b>	<ul style="list-style-type: none"> <li>The Kenya Information and Communications Act [Rev. 2011]</li> <li>The National ICT Policy, 2019</li> <li>Digital Economy Blueprint, 2019</li> <li>National ICT Policy Guidelines 2020</li> </ul>	<ul style="list-style-type: none"> <li>Emerging Digital Technologies</li> </ul>
<b>Ministry of Health</b>	<ul style="list-style-type: none"> <li>Kenya National eHealth Policy 2016-2030</li> <li>Health Information System Policy (2014-2030)</li> </ul>	<ul style="list-style-type: none"> <li>Strategic direction on the use of ICTs in the health sector</li> <li>Guidance on the collection and processing of medical data of patients</li> </ul>
<b>Office of the Data Protection Commissioner</b>	<ul style="list-style-type: none"> <li>The Data Protection Act, 2019</li> </ul>	<ul style="list-style-type: none"> <li>Data protection</li> <li>The Act provides Privacy Regulation on the breach of certain aspects introduced by the IoT</li> </ul>
<b>Communications Authority (CA)</b>	<ul style="list-style-type: none"> <li>The Kenya Information and Communications Act (Registration of SIM Cards) Regulations 2015</li> </ul>	Data management, Information and Communication, Internet of Things (IoT)
	<ul style="list-style-type: none"> <li>The Kenya Information and Communications (Consumer Protection) Regulations (2010)</li> </ul>	Data Protection - Information and Communication
	<ul style="list-style-type: none"> <li>Guidelines on the use of IoT Devices</li> </ul>	IoT
<b>Kenya Civil Aviation Authority (KCAA)</b>	<ul style="list-style-type: none"> <li>The Civil Aviation (Unmanned Aircraft Systems) Regulations, 2020</li> <li>Unmanned Aircraft Systems – Manual of Implementing Standards, 2020</li> <li>The Civil Aviation (Regulatory Fees and Charges for Unmanned Aircraft Systems) Regulations, 2020</li> </ul>	<ul style="list-style-type: none"> <li>Regulations and standards of operating drones in Kenya</li> </ul>
<b>Central Bank of Kenya</b>	<ul style="list-style-type: none"> <li>National Payment System Act, 2011</li> </ul>	<ul style="list-style-type: none"> <li>Regulation and supervision of payment systems and payment service providers (including Mobile money)</li> </ul>

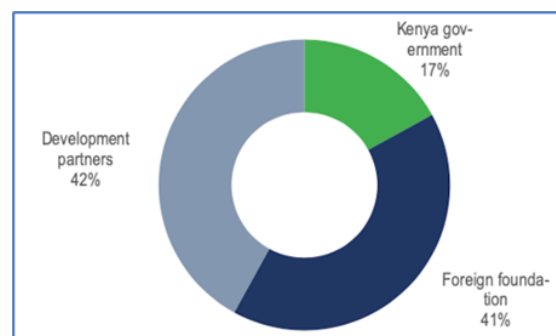
	<ul style="list-style-type: none"> <li>• National Payment System Regulations, 2014</li> <li>• Guideline on Cybersecurity for Payment Service Providers, 2019</li> <li>• Digital Credit Providers Regulations, 2022</li> </ul>	
<b>Competition Authority of Kenya (CAK)</b>	<ul style="list-style-type: none"> <li>• CAK Consumer Protection Guidelines (2017)</li> </ul>	<ul style="list-style-type: none"> <li>• Consumer Data Protection</li> <li>• Broad Consumer protection on health, safety and economic interests.</li> </ul>
<b>National Biosafety Authority</b>	<ul style="list-style-type: none"> <li>• The Biosafety Act, 2009</li> <li>• The Biosafety (Environmental Release) Regulations, 2011</li> <li>• Guidelines for determining the regulatory process of Genome Edited Organisms and Products in Kenya, 2022</li> </ul>	<ul style="list-style-type: none"> <li>• Biotechnology – Regulation of the transfer, handling and use of genetically modified organisms (GMOs)</li> <li>• To provide a technical guidance to applicants and reviewers on the criteria for determining which genome editing techniques and/or derived end products are regulated under the Biosafety Act.</li> </ul>
<b>National Commission for Science, Technology and Innovation, National Research Fund and Kenya National Innovation Agency</b>	<ul style="list-style-type: none"> <li>• Science, Technology and Innovation Act, 2013</li> </ul>	<ul style="list-style-type: none"> <li>• NACOSTI regulates and assures quality in the ST&amp;I sector, as well as advises the Government in ST&amp;I matters</li> <li>• KENIA develops and manages the National Innovation System</li> <li>• NRF facilitates research for the advancement of ST&amp;I through mobilisation of resources.</li> </ul>

#### 4.1.1.6 Secondary: Funding

Production, adoption and application of ETs require a supportive environment and adequate funding. Different actors, including the government, investors, private sector, foundations, philanthropists and development partners contribute in different ways towards facilitation and support of ETs in Kenya.

Although government ministries and agencies provide some funds in support of R&D, adoption and application of ETs, public institutions mainly contribute to resource mobilization through provision of guiding policies and supportive infrastructure thus enabling an environment for adoption and application of ETs.

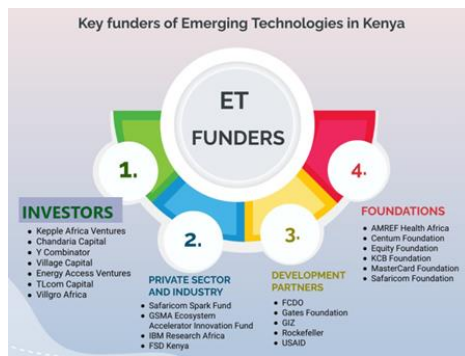
A survey of researchers working in the areas of the identified ETs revealed that a bulk of research funding in Kenya is foreign. 84% of the projects were found to be funded either by foreign governments or foundations with only 17% funded locally (Figure 6).



**Figure 6.** Percentage of Funded Projects by Source of Funding.

The key funders of ETs in Kenya are the private sector players, investors (mostly foreign focusing on ETs of their interest), development partners and foundations (Figure 7).





**Figure 7.** Key Funders of ETs in Kenya.

#### 4.1.2 State of Maturity

The ETs ecosystem in Kenya was found to be between the nascent and growth stage of maturity, based on the analysis of each of the fundamental activities and the roles played by the actors.

**Biotechnology ecosystem** in overall is at the growth stage of maturity. Based on the analysis of each of the fundamental activities and the roles played by each of the actors, linkages in the biotechnology ecosystem are at nascent stage compared to education, research, end use and implementation of biotechnology, which are all in the growth stage. This implies that there is weak network with only a small number of linkages, partnerships, international connections and clusters within the biotechnology ecosystem in Kenya.

The **nanotechnology ecosystem** was assessed to be at the ideation stage of maturity. This is attributed to few higher education programmes related to nanotechnology offered in Kenya. Nanotechnology research is limited and there exist almost no actual implementation and use of commercial locally developed nanotechnology products. No linkage structures, organisations, or associations were identified focussing on nanotechnology. There is no governance framework for the development of nanotechnology in the country.

The **Digital Emerging Technologies Ecosystem** is the most vibrant in Kenya's ETs landscape. Due to their interconnected applications, AI, blockchain, big data/data analytics, GIS and IoT are presented collectively under the banner of digital emerging technologies. Overall, digital

emerging technologies ecosystem was assessed to be at the growth stage of maturity. Looking at each of the fundamental activities, the research dimension in this ecosystem was found to be at nascent stage of maturity compared to education, end use, linkages and implementation which were found to be in the growth stage of maturity. This implies that in spite of increasing application of digital emerging technologies and the growing linkage opportunities, which are primarily held by innovation hubs, incubators, accelerators and relevant associations there is limited output or contribution of significant research and development on digital emerging technologies in the country.

### 5. Areas for Policy Intervention and Recommendations

In the identified primary ETs, research and linkages are key fundamental activities, which are found to be in nascent stage of maturity. To stimulate development and application of ETs, there is need to strengthen research and enhance linkages through requisite policy interventions and implementation of programmes and projects.

#### 5.1 Key Policy Areas for Intervention

- Government funding for research and cutting-edge institutional infrastructure for ETs research.
- Supportive policy for sharing of cutting-edge institutional infrastructure for ETs research.
- Policy on collaboration between industry and universities.
- Support ownership of patents by researchers, the protection of intellectual property rights and development of research outputs.
- Promotion of integration of data and information, and access to information on government interventions.

## 5.2 Recommendations

To favourably position Kenya's ETs landscape and thus bolster the innovation ecosystem, the following recommendations are made:

- i. Explore and collate existing research and evidence, capacity and resources to enable reflection, capacity strengthening and open avenues for collaboration and knowledge sharing between industry and academia at national, continental and global level.
- ii. Incentivize ongoing (and seek new) national and international partnerships in ETs. Kenya should enhance the matching efforts on ETs programmes to tap and strengthen partnership opportunities with global partners. This will enable indigenization of the ecosystem for local context driven and globally informed solutions.
- iii. Support ETs activities and practices with favourable procedures and policies that are routinely reviewed to adapt to changing global environment.
- iv. Increase knowledge exchange, collaborations and networking forums for academia, industry/ business community and global partners. The creation of ETs knowledge hub would support international collaborations with shared values and interests and build closer relationships for shared policy and learning on product development in the ETs space.

## Acknowledgement

This study was funded by the UK Foreign Commonwealth and Development Office.