



UNLOCKING THE ENTREPRENEURIAL POTENTIAL OF HIGHER EDUCATION AND RESEARCH INSTITUTIONS

A Roadmap for Success



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Foreword

Innovation is a cornerstone of economic growth and development. Across the globe, countries are recognizing the immense potential of entrepreneurial universities in fostering a vibrant National Innovation System and Kenya is making strides in this direction! By nurturing an ecosystem of innovation and entrepreneurship, Universities are igniting a spark of economic growth, creating job opportunities, and driving sustainable development.

It is with great pleasure that I present this report, which delves into the pivotal role played by Universities in Kenya in enabling an ecosystem of innovation and entrepreneurship. This comprehensive study sheds light on the transformative power of these institutions and their ability to drive innovation, foster entrepreneurship, and create a culture of collaboration and knowledge exchange. This report was guided by a conceptual framework that highlights the various constructs of entrepreneurial universities i.e. Leadership and governance, Infrastructure, innovation activities, IP management, Policies and strategies, Human Resources, Entrepreneurial education, Internationalization and Link with external environment and informed by a baseline survey that was carried out in 18 institutions across the country. This report examines the initiatives undertaken by these institutions to support innovations, incubate innovative ventures, and bridge the gap between academia and industry.

As we embark on this enlightening journey, I appeal to policymakers, academia, industry leaders, and stakeholders to continue investing in entrepreneurial universities to shape the future of Kenya's innovation landscape. It is essential that we continue this trajectory providing the necessary resources and support and create an enabling environment for entrepreneurship and innovation to thrive.

I extend my appreciation to all the researchers, experts, and contributors involved in compiling this report. May this report serve as a guiding beacon for policymakers and inspire further collaboration and investment in the entrepreneurial ecosystem of Kenya.



A blue ink handwritten signature of Dr. Tonny Omwansa, written in a cursive style.

Dr. Tonny Omwansa

Chief Executive Officer, Kenya National Innovation Agency (KeNIA)

EXECUTIVE SUMMARY

Research institutions and Higher Education Institutions (HEIs) are key drivers of knowledge spillover for societal transformation. They possess the technical resources and capacity necessary to create and enhance new knowledge and technology for socio-economic growth. Likewise, the knowledge-based economy recognizes knowledge and innovation as critical engines for societal development, leading to the emergence of entrepreneurial universities that foster entrepreneurial initiatives with a socioeconomic impact. The entrepreneurial university model integrates economic and social development into teaching and research missions pursuing new technologies while encouraging academic startups that facilitate knowledge exchange between higher education institutions and industry.

As the number of universities in sub-Saharan Africa continues to grow, it becomes imperative to evaluate their role in enabling a vibrant National Innovation System (NIS) for initiating and generating socio-economic growth. Through partnerships, networks, and collaborations, these institutions promote science-based innovation thus playing an essential role in the economic and social development of nations. Despite challenges such as limited funding, a research-based culture vis a vie an entrepreneurial culture, shortage of research scientists, and a lack of supporting infrastructures and enabling policies, Kenyan institutions can overcome these hurdles by embracing the principles of the entrepreneurial university. By establishing collaborations with industry stakeholders, and equipping students with the necessary skills and knowledge for a rapidly evolving labor market, these institutions can unleash their potential.

This study began by establishing a conceptual framework that would enable the development and improve productivity of entrepreneurial universities in Kenya. The framework consisted of nine key constructs, namely:

- Leadership and Governance
- Innovation Infrastructure
- Intellectual Property Management
- Policies and Strategies
- Human Resources
- Funding
- Internationalization
- Entrepreneurial Education
- Link with the External Environment

Out of the total of 61 universities in Kenya, as reported by the Commission for University Education (CUE), the study assessed the entrepreneurial-ness of 18 randomly sampled universities from different clusters by interviewing 334 respondents. Data collection involved a combination of qualitative and quantitative methods, including interviews, surveys, and document analysis carried out between 2022–2023. The findings indicate a varying degree of progress and emphasis across the nine constructs.

While some universities demonstrated notable strengths in specific areas, others lagged. Key areas for improvement were identified, including:

Strengthening leadership and governance structures to provide clear support and guidance for entrepreneurial initiatives. Strong support from management and effective governance is imperative for universities seeking to become entrepreneurial institutions and foster collaboration with industries partners. Universities have institutional-level strategies aligned with entrepreneurship, but decision-making processes are often centralized, limiting involvement from faculty and staff.

Enhancing innovation supporting infrastructures such as incubation hubs and technology transfer offices (TTOs) are essential in commercializing research. 40% of the respondents noted that their institutions did not have incubation centers whereas only 32% of the respondents were sure that their institutions have a TTO. Of the respondents who indicated that their institutions had a TTO or an Industry Liaison Office, only 20% confirmed that this office is functionally responsible for research translation and commercialization, contrary to the expectations as noted by the World Bank (WB, 2018) that TTOs are not only responsible for the legal procedures related to patenting and licensing, but they also help to define the host institution’s commercialization strategy.

Developing robust intellectual property management systems to protect and commercialize university-research outputs. 65% of the participants responded positively to their universities having sufficient capacity to support intellectual property management. However most respondents noted that clear incentives and rewards for supporting the commercialization of research-based innovation are lacking, leading to a low number of registered patents.

Formulating comprehensive policies and strategies that prioritize entrepreneurship and innovation as core elements for enabling an innovation-driven entrepreneurial ecosystem. Although all participating universities acknowledge further investigation to understand the implementation of these policies yielded mixed results. Based on the survey, there was a neutral score on variables related to research policy providing incentives and rewards for staff who actively support entrepreneurship development, sensitization of staff and students on IP policy and operationalization of the IP policy.

Investing in human resource enablers will yield a motivated and knowledgeable technical staff, transparent frameworks, and effective rewarding and promotion systems are essential for cultivating an entrepreneurial culture. However, current training and career development policies primarily focus on academic and research aspects, with limited provisions for recognizing and rewarding excellence in teaching, research, or entrepreneurial engagement. The focus on publication for promotion discourages applied research as evidenced by the opinions below:



The faculty members have no incentive to create and progress research beyond publication; this is because they are yet to experience or witness any evidence of a successful model.

The obstacle to entrepreneurship is that our research is only used for promotion. Even though there is potential to conduct applied research, there is little motivation to do so because there is no support for the research outcome. Much attention is rather focused on promotion which is only possible based on academic publication.



Increasing funding for entrepreneurial activities through partnerships, grants, and internal budget allocation. Insufficient funding was noted as a significant bottleneck in enabling research translation and commercialization.

Expanding international collaborations and partnerships to foster knowledge exchange and global exposure. During the interviews conducted most (84%) of the respondents indicated that their universities considered internationalization as a strategy for becoming entrepreneurial.

Integrating practical entrepreneurial education into curricula across disciplines and providing dedicated support programs for students and faculty. The respondents were neutral on whether their university offered practical entrepreneurial education and adequately evaluated the entrepreneurship learning outcomes.

Strengthening linkages with the external environment, including industry, government, and other stakeholders, to foster innovation and entrepreneurship. Currently most of the respondents implied that their universities were not engaging beneficially with the private sector as evidenced by this response.



Little is known about the university's pilot projects. Also, our university does not communicate with the private sector and there is no forum for students to present their ideas to receive seed funding or technical support for their pilot projects.

These findings provide a valuable baseline assessment of the current state of entrepreneurial universities in Kenya. They serve as a foundation for future initiatives aimed at unleashing the full potential of these universities to drive economic growth, innovation, and societal impact. The recommendations derived from this survey can guide policymakers, university leaders, and other stakeholders in developing targeted interventions and strategies to foster an entrepreneurial ecosystem within Kenyan universities. The recommendations are intended for the wider university sector in Kenya and address three imperatives: mapping internal entrepreneurship ecosystems, enhancing collaboration with industry and research centres, and operationalizing national commercialization guidelines. Additionally, the report recommends establishing Kenya's Network of Entrepreneurial Institution Leaders (KNEIL) as a platform for regional and continental collaboration. Implementation of these recommendations can strengthen universities' entrepreneurial endeavors and establish valuable networks for cooperation. KeNIA together with its partners should support universities in executing this recommendation.



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ACRONYMS & ABBREVIATIONS

ARIN	Africa Research Impact Network
CUE	Commission for University Education
HEI	Higher Education Institution
ICT	Information and Communications Technology
IP	Intellectual property
IPOO	Input Process Output and Outcomes
IPR	Intellectual property rights
KAM	Kenya Association of Manufacturers
KeNIA	Kenya National Innovation Agency
KNEIL	Kenya Network of Entrepreneurial Institutions Leaders
MVP	Minimum Viable Products
NIS	National Innovation System
OECD	Organisation for Economic Co-operation and Development
STI	Science, Technology and Innovation
TTO	Technology Transfer Office
TISC	Technology Innovation Service Centre
ROI	Return on Investment
UNHCR	United Nations High Commissioner for Refugees



DEFINITION OF KEY TERMS

Entrepreneurial University: Universities that operate more entrepreneurially, commercializing the outcomes of their research and spinning out new, knowledge-based enterprises that respond to societal needs and easily engage with industry.

Innovator: a person who transforms ideas into practical reality in the form of products, process or service.

Innovation: The creation of new or distinct improvement of products and processes in the formal and informal sector that have disruptive positive effects on the economy, and the social well-being of the citizens.

Innovation ecosystem: Complex network of people, organizations, institutions, government policy and regulations that support and promote innovation. It includes the interactions between people to take an idea and turn it into a marketable process, product or service.

Technology: Is the state of knowledge on how to convert resources into outputs. This includes the practical use and application to business processes or products of technical methods, systems, devices, skills, and practices.

Intellectual property (IP): Creations of the mind such as inventions; literary and artistic works; and symbols, names and images used in commerce for which proprietary rights may be obtained or enforced by law.

National Innovation System (NIS): is a network or a system of interacting government and private companies (large and small), universities, government bodies whose activities and relations lead to the emergence, import, perfection, and spread of new technologies within national borders.

Higher Education Institution (HEI): refers to those institutions that are degree awarding i.e., universities or university colleges, this excludes institutions that only offer courses at diploma and certificate level.

Prototype: A small-scale, tangible representation of an idea or solution (or part of it). Prototyping allows you to communicate your idea or solution to others in an interactive way, gather feedback easily and quickly iterate.

A spinout/spinoff: An off shoot of an existing going concern that develops a mature technology into a product or a service. Sometimes spinout/spinoff and startup are used interchangeably.

A startup: Newly formed business based on novel innovative technology and IP to address a distinct market need. A startup can be based on university technologies or IP and founded by university faculty, staff or students.

Incubator: An organization that helps start-ups in their infancy succeed by providing workspace, seed funding, mentoring, and training.

Startup accelerator: An organization that offers mentorship, capital, and connections to investors and business partners. It is designed for select startups with promising minimum viable products (MVPs), a clear pathway to the market, a competent team of founders/managers and are ready to scale up.

Innovation lab: Also known as hubs, is a co-working space, both virtual and physical, in which new ideas can be explored, in which hands-on project management takes place, and in which lessons learned are documented and shared with the co-owning Division (UNHCR). Innovation Labs are also a space from which the scaling of good practices can emerge.





1. INTRODUCTION

The NIS is a system of interconnected institutions that play a vital role in creating, storing, and transferring the knowledge, skills, and artefacts that define new technologies. Innovation is a complex system that involves various actors and processes, including inputs, outputs, enablers, impacts, and associated strategic niches. HEI are expected to be agents of social and economic changes, innovating and using the knowledge they generate to serve the public and contribute to economic growth and competitiveness. In Kenya, the recent decrease in public funds available to universities has obligated universities to seek alternative sources of funds. One potential source of alternative funds lies in commercializing the outcomes of their research and spinning out new knowledge-based enterprises. However, the universities do not have clear strategies for successfully transitioning into entrepreneurial universities.

The purpose of this study is two-fold: (1) to describe the proposed conceptual framework for assessing the progress and contribution of local universities to the NIS and (2) to present the findings of the baseline survey conducted between July–November 2022. The study assumes that commercialization of knowledge-based innovations and economic development have a positive correlation while recognizing the need to further interrogate how these innovations further align with the greatest societal needs and how the NIS can structurally qualify this alignment in the future to ensure that all societal challenges are met.

The project was carried out in collaboration with KENIA and ARIN, with the baseline survey taking place between July and November 2022. The survey covered a sample of universities in Kenya, and a structured questionnaire was used to collect data on the key bottlenecks that hinder universities from becoming entrepreneurial. The collected data was analyzed using descriptive statistics and presented in tables and charts.

The findings of the baseline survey revealed that most universities do not have clear strategies for successfully transitioning into entrepreneurial universities. The survey also identified various bottlenecks that hinder universities from becoming entrepreneurial, including inadequate funding, lack of infrastructure, limited access to markets, and poor entrepreneurial culture among others. The proposed conceptual framework provides a roadmap for assessing the progress and contribution of local universities to the NIS.

2. CREATING VALUE FOR THE KENYAN ECONOMY THROUGH ENTREPRENEURIAL UNIVERSITIES

Research institutions and universities play a vital role in the knowledge spillovers and knowledge transformation that are critical for product innovation. These institutions have the advantage of technical resources and capacity, making them well-positioned to create and improve new knowledge and technology. Research institutions are especially crucial in innovation, as they generate new knowledge and technologies, attract investments and researchers, stimulate demand for new knowledge, and create and capture externalities.

However, research institutions and universities face various constraints that hinder their research and development. These constraints include funding, human resources (research scientists and engineers), lack of state-of-the-art equipment, research facilities, and pilot plants. To make research and development in these institutions relevant, there is a need for knowledge transfer or commercialization.

Traditionally, universities have had two main missions; talent development, and the advancement of scientific and technical knowledge. A third mission that focuses on the exchange of knowledge between academia and industry/society is increasingly recognized as vital for the structural transformation of economies. The growth of the knowledge-based economy, fueled by the ICT revolution, has highlighted the role of HEIs in addressing societal challenges.

According to Hannlin & Mshinda (2020), the number of universities in sub-Saharan Africa is growing significantly, and in Kenya, the number of public universities has risen from 7 in 2007 to 31 in 2019. As the number of HEIs grows, there is a need to consider their roles and functions. There is a disconnect between academia and industry, which undermines research translation and commercialization of important research outputs emanating from academia. This leads to a limited translation of research outputs into innovative solutions that address society's contemporary challenges.

The knowledge-based economy emphasizes knowledge and innovation as engines of societal development. Therefore, entrepreneurs, as the main vehicle in materializing the market value of innovation, play a pivotal role according to Guerrero and Urbano (2012) Drawing on their extensive research, Sam and Sijde (2014) conclude that the knowledge economy demands employability attributes, knowledge, and skills required to promote and sustain the knowledge-based economy.

To respond to the rapidly changing demands of the knowledge-based economy, entrepreneurial universities have emerged, epitomized by innovation in their research, knowledge exchange, teaching and learning, governance, and external relations. These entrepreneurial universities can create value for the Kenyan economy by promoting innovation and entrepreneurship and increasing engagement between academia and industry/society.

The concept of an entrepreneurial university, as described by Guerrero-Cano et al. (2014), represents a natural incubator that fosters a supportive environment for exploring, evaluating, and exploiting ideas that can be transformed into entrepreneurial initiatives with social and economic impact. These universities actively engage in partnerships, networks, and collaborations to facilitate interaction and cooperation. Their role is significant in the economic and social development of various countries, serving as key actors in the triple helix of University-Industry-Government relations, which promotes science-based innovation globally (Etzkowitz and Zhou, 2006).

Universities have undergone two academic revolutions, as outlined by Etzkowitz. Initially, their primary focus was on teaching existing knowledge, but in the late 19th century, they began embracing research activities. The second academic revolution occurred in the second half of the 20th century when universities incorporated economic and social development into their teaching and research missions, laying the foundation for the entrepreneurial university concept (Etzkowitz and Klofsten, 2005).

Facing financial limitations, universities, as discussed by Casado et al. (2013), must overcome challenges by innovating and implementing new pedagogical models, reforming curricula to enhance graduates' employability, contributing to societal challenges, and transforming into entrepreneurial entities. The entrepreneurial university concept, closely related to the triple helix model of teaching, research, and extension, places innovation as a key pillar in the relationship between government, university, and industry (Aranha and Garcia, 2013). Encouraging innovation, pursuing new technologies, and improving existing ones are crucial in facilitating knowledge exchange between higher education institutions (HEIs) and industry.

Academic start-ups, particularly those addressing specific societal or industry needs and benefiting the local economy, have significant profit potential. Furthermore, besides financial returns through royalties and sales revenue, HEIs create job opportunities and enhance research and development value, thereby gaining community goodwill and support in addressing societal challenges.

Transforming traditional HEIs into entrepreneurial universities is essential due to their potential for substantial benefits. While economic advantages are evident, the resulting innovations must tackle societal issues. Measuring the impact of social entrepreneurship aligned with social development becomes increasingly important. A contextualized conceptual framework and a National Innovation System (NIS) are necessary to support the structural alignment of innovations with society's greatest needs. Additionally, a regulatory agency such as the Kenyan National Innovation Agency (KeNIA) can streamline the transformation process by introducing key strategies, policies, and, monitoring and evaluation frameworks. KeNIA is actively involved in the development of a 10-year national innovation masterplan and has recently concluded the formulation of national commercialization guidelines, which inform the research-to-commercialization process. At the institutional level, KeNIA provides support and intervention to address commercialization bottlenecks on a case-by-case basis. Based on these initiatives, KeNIA has commissioned a baseline survey to assess the current contributions of Kenyan universities to the National Innovation System, track progress over time, and evaluate the effectiveness of the introduced strategies and mechanisms in bridging the gap between academia and industry.

This baseline survey commissioned by KeNIA aims to gain a comprehensive understanding of the current role of Kenyan universities in the National Innovation System (NIS). The survey will assess the universities' contributions to innovation and evaluate the progress made over time. By examining the strategies and mechanisms implemented, it will determine whether they effectively address the existing disconnect between academia and industry.

The transformation of traditional higher education institutions into entrepreneurial universities is imperative in today's rapidly evolving economic landscape. The entrepreneurial university model not only facilitates the transfer of knowledge and technology but also fosters a culture of innovation and entrepreneurship among students, faculty, and researchers. By nurturing an environment that encourages the exploration and commercialization of ideas, universities can significantly contribute to the economic and social development of their respective countries.

3. ENTREPRENEURIAL UNIVERSITY LANDSCAPE

Typically, an entrepreneurial university plays a crucial role in fostering innovation and cultivating innovators. To establish a successful innovation ecosystem, it is essential to have a clear understanding of innovation and its measurement criteria. The Oslo Manual provides comprehensive definitions and guidelines in this regard. According to the manual, innovation refers to the creation of new or significantly improved products, processes, marketing methods, or organizational practices. It encompasses various forms, including process innovation, product innovation, and organizational innovation. These innovations can originate from different sectors, such as private enterprises, public spaces, and educational institutions, and they contribute to societal development and wealth creation (GoK,2012).

In the Kenyan context, the Science, Technology, and Innovation (ST&I) Act of 2013 defines innovation across five categories. These categories include technovation models, utility models, and industrial designs as per the Industrial Property Act of 2001; novel products, processes, services, or ideas; improved utilization of new products, services, or methods in industry, business, or society; indigenous or traditional knowledge related to the beneficial properties of land, natural resources, and the environment; and other non-patentable creations or improvements that warrant promotion, protection, or sui generis intellectual property rights. The term "innovator" is understood in accordance with these definitions.

Informed by this literature, KeNIA adopted the definition of innovation as creation of new or distinct improvement of products and processes in the formal and informal sector that have disruptive positive effects on the economy, and the social well-being of the citizens (Atela, et. al., 2022).

Innovation-driven Entrepreneurship Ecosystems

Understanding the intricate relationship between innovation and entrepreneurship is of paramount importance when formulating and implementing effective innovation strategies within Higher Education Institutions (HEIs). This clarity serves as a fundamental cornerstone for HEIs to generate ground-breaking outputs that facilitate the exchange of knowledge between academia and industry. Such collaboration is essential for nurturing a dynamic national innovation ecosystem, one with immense potential for generating substantial social and economic benefits. According to Fiona, M., and Phil B. (2017)'s MIT working paper, the innovation capacity and entrepreneurial capacity are the twin engines that power innovation-driven entrepreneurship ecosystems. These capacities rely on foundational institutions and unique inputs, ultimately driving impact through innovation-driven enterprises, which differentiate themselves from conventional small or medium-sized enterprises.

The Stages of Technology Development:

Innovation Capacity: The concept of innovation capacity refers to a location's ability to generate "new-to-the-world" ideas and effectively translate them into useful products, technologies, or services that address genuine problems. It encompasses not only the development of fundamental science and research but also the practical implementation of their solutions.

Entrepreneurship Capacity: Entrepreneurship capacity, within the context of innovation, emphasizes a broader range of competencies beyond those typically associated with small businesses that do not rely on research translation and innovation. In the context of HEIs, entrepreneurial capability entails embracing significant risks inherent in fostering innovation. This involves venturing into uncharted territory with no established product or service, an uncertain market, and the need for dedicated time and resources to bring the innovation to fruition.

To comprehend the process of innovation-driven entrepreneurship, it is crucial to examine the various stages of technology development that a novel concept undergoes before reaching the market. These stages can be categorized as follows:

Idea Stage: This stage marks the inception of a novel concept, which requires further research to validate its proof of concept, formulate technology, and assess its market needs.

Prototype Development: Once the concept is validated, it proceeds to the development and testing phase in controlled laboratory environments and the intended real-world context.

Validation Stage: In this stage, the prototype's performance is tested to optimize its functionality and validate its pre-commercial viability in the field.

Production Stage: This stage involves a series of intermediary steps aimed at achieving full-scale production and ensuring timely delivery to end-users.

Regulatory Approvals: Before launching the product into the market and commencing subsequent sales, it is essential to obtain regulatory approvals for controlled products and services.

National Innovative Capacity: National innovative capacity refers to an economy's potential, at a given point in time, to generate a continuous stream of innovations. The success of an innovation-driven entrepreneurship ecosystem depends on several drivers, including the presence of a shared pool of institutions, resource commitments, and policies that actively support innovation. Furthermore, an ecosystem's effectiveness relies on the innovation orientation of interconnected national industrial clusters and the quality of linkages between academia and industry. Stakeholders, such as governments and universities, assess their local ecosystems from an innovation perspective to evaluate their effectiveness in nurturing innovators capable of generating innovations that yield socio-economic benefits. However, it is important to note that different stakeholders within the industry and corporate world may define innovation in alternative ways. Nevertheless, the fundamental prerequisite for driving social and economic impact lies in achieving a clear understanding of the relationship between innovation and entrepreneurship, ensuring policy coherence, and designing innovation strategies accordingly.



MOSCOW

Must have

Should have

Could have

Want to have

- [Sticky notes: pink, purple, green, yellow]

Too Frustrating Not No time

Building an Entrepreneurial University

To foster the effectiveness of an entrepreneurial university, it is imperative to systematically develop skill training and entrepreneurial education for students, faculty members, managers, and staff. Additionally, there is a need to reinforce entrepreneurial attitudes within the university's human resources (Mahdi, 2016). Merely offering an entrepreneurship theory course does not suffice to transform a university into an entrepreneurial institution. Instead, the university must focus on cultivating entrepreneurial capacity, as highlighted earlier, and foster innovation-based entrepreneurship. It is crucial to differentiate between the two interchangeable definitions of entrepreneurial universities.

Entrepreneurial Opportunities/ Capacity		
	KeNIA's definition	General definition
Level of Research	Research intensive based universities – Translation and Applied Research	Mid-low research / practical skills-based universities
Operation	Require structural adaptation, including government, donors and private sector.	Easier to operate.
Output	Translation of research knowledge into projects/services	Simple trade business
Outcomes	Start-up/ Spin offs	SMEs, youth employment alternative
Level of investment	High investment (research/testing/validation/adaptation)	Moderate to low investment
Return on Investment (ROI)	Long ROI	Short ROI


Transforming HEI into Entrepreneurial Universities

Higher Education Institutions (HEIs) face a range of external and internal challenges, including financial changes from governments, accelerated innovation, shifts in educational policies, youth unemployment, and the mobility of experts (Gibb and Haskins, 2013). It is widely acknowledged that HEIs play a significant role in the knowledge economy (Leydesdorff and Etzkowitz, 1998). Consequently, HEIs act as drivers of innovation by creating new knowledge or reimagining existing knowledge to address contemporary problems. Nelles and Vorley (2011) assert that HEIs have evolved into engines of the knowledge economy, contributing to both national and regional economic growth and competitiveness. Supporting this perspective, Audretsch and Link (2017) suggest that entrepreneurship serves as the mechanism for translating ideas from laboratories, factories, and classrooms into the marketplace. Given this context, HEIs must adopt a holistic approach, extending beyond teaching and research, to foster innovation networks, promote collaboration among HEI staff, students, and businesses, and measure their success.

To effectively navigate the challenges posed by a rapidly evolving environment, the concept of the entrepreneurial university has gained prominence in recent literature. Universities can engage in entrepreneurial activities at various levels, including individual entrepreneurship, team entrepreneurial activities, or institutional entrepreneurship (Fuller, 2005). Entrepreneurial activities within universities encompass:

1. Spin-out and start-up of new ventures (Kirby, 2006; Zhou and Peng, 2008, p. 638)
2. Fund-generating activities such as patents, licensing, research contracts, and partnerships with private enterprises (Etzkowitz, 1983, p. 214; Jacob, Lundqvist, and Hellsmark, 2003)
3. Commercialization activities, such as customized further education courses, consultancy services, and extension activities (Jacob, Lundqvist, and Hellsmark, 2003)
4. Generation of technological advancements (Rothaermel, Agung, and Jiang, 2007)
5. Innovation in how the university conducts its business operations (Clark, 1998)

The entrepreneurial university is characterized by its proactive and positive response to a changing, uncertain, and complex environment, as well as its commitment to innovation (Gibb et al., 2012). As the world undergoes widespread transformation, universities are not exempt from the need to adapt.

A person wearing a green and blue plaid shirt and a brown apron is working in a greenhouse. They are leaning over a row of young green plants in a raised bed. The greenhouse structure is visible in the background, and the overall scene is brightly lit.

In addition to their core activities of research and teaching, universities must assume broader and more relevant roles (Etzkowitz and Klofsten, 2005). The entrepreneurial university model analyzed through the Input Processes Output Outcomes (IPOO) framework by Salamzadeh et al. (2011), identifies specific elements that shape its dynamics. These elements include inputs (resources, culture, rules and regulations, structure, mission, entrepreneurial capabilities, and societal, industry, governmental, and market expectations), processes (teaching, research, managerial and logistical processes, commercialization, selection, funding and financial processes, networking, multilateral interaction, and innovation and development activities), outputs (entrepreneurial human resources, market-driven research, innovations and inventions, entrepreneurial networks, and entrepreneurial centers), and the overarching aim of fulfilling the "Third Mission." These elements collectively define the unique characteristics of the entrepreneurial university.

HEI faculty and students possess immense potential for innovation and economic development. Mobilizing them for entrepreneurial careers, enhancing their entrepreneurial skills, and providing support for business start-ups are new but essential tasks for HEIs. In OECD countries, public policy plays a crucial role in OECD countries by stimulating innovative approaches and promoting good practices among universities, facilitating the exchange of lessons learned. For instance, universities in eastern Germany actively support entrepreneurship by establishing infrastructure and structures that foster innovation and entrepreneurship.

Entrepreneurial University Conceptual Frameworks

The concept of the entrepreneurial university has garnered significant attention in the literature, leading to the development of various theoretical models and conceptual frameworks. Notable models include Kirby and Urbano (2006), Gustomo and Ghina (2017), and the IPOO model by Salamzadeh, Salamzadeh, and Daraei (2011). Guerrero-Cano et al. (2006) conducted a literature review, drawing on the works of Clark (1998), OECD (2012), Sporn (2001), Etzkowitz (2004), and Kirby (2006), as well as empirical studies of the time, to develop a classification of environmental factors influencing the entrepreneurial cycle of universities.

The Model by Guerrero-Cano et al. (2006): Guerrero-Cano et al. (2006) based their model on Institutional Theory, categorizing factors as formal and informal. The "formal factors" encompass the university's organizational structure, government, support measures for university start-ups, and entrepreneurship education programs. In contrast, "informal factors" encompass university attitudes towards entrepreneurship, models and cases of entrepreneurship, entrepreneurship disciplines within the university, and university reward systems. The model also incorporates the relationship between the teaching mission, which focuses on training graduates to become job creators rather than mere job applicants, and the generation of start-ups or new enterprises by students.

Approved Conceptual Framework for The Study

To facilitate successful adaptation to entrepreneurial universities in the Kenyan context and maximize the socio-economic impact of innovations, an approved conceptual framework has been developed. This framework provides guidance on key attributes that enhance a university's entrepreneurship capacity. The following attributes are identified as contributors to becoming an entrepreneurial university:

1. Leadership and Governance
2. Innovation Infrastructure
3. Intellectual Property Management
4. Policies and Strategies
5. Human Resources
6. Funding
7. Internationalization
8. Entrepreneurial Education
9. Link with the External Environment

The successful implementation of this conceptual framework is expected to result in increased employability of graduates, formation of new enterprises leading to job creation, innovative solutions addressing societal challenges, and overall socio-economic growth. The framework has been developed and assessed by various key stakeholders before its adoption by the Kenyan National Innovation Agency (KeNIA). Kenyan HEIs can utilize this framework to assess their current situation and identify areas for improvement. Subsequently, KeNIA will aid in the transition of universities into entrepreneurial institutions by implementing strategies, regulations, and monitoring and evaluation frameworks that are consistent with the approved conceptual framework.

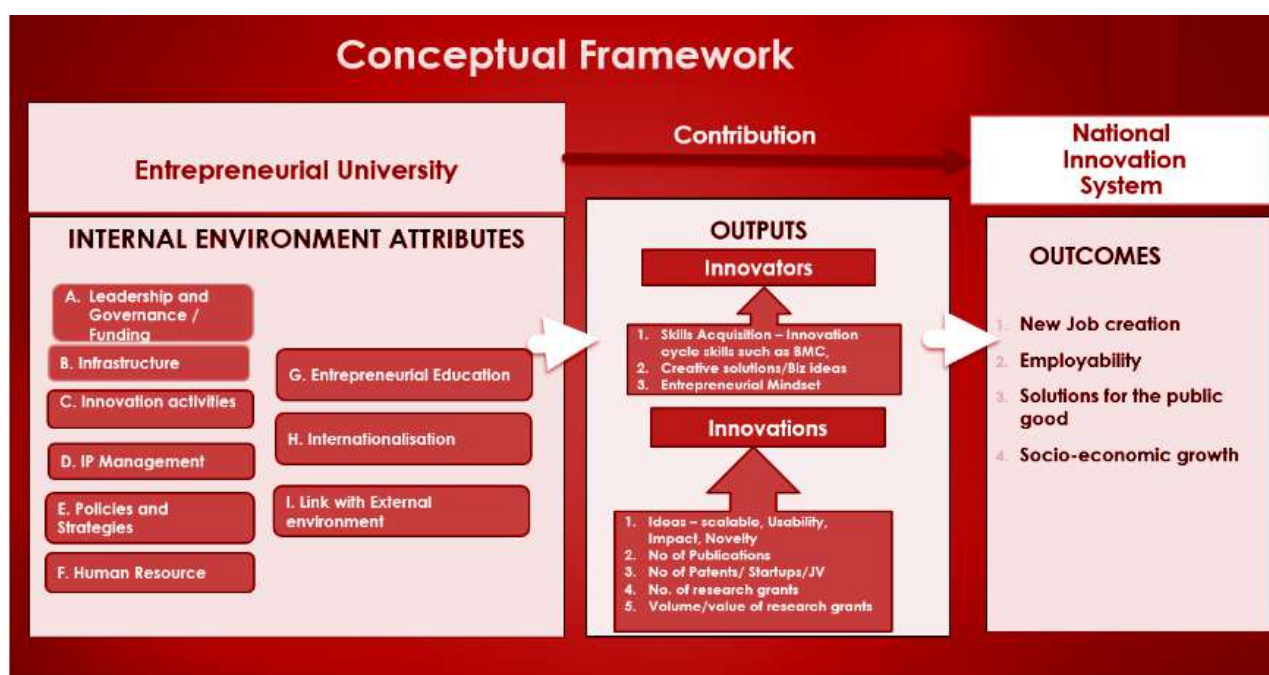


Figure 1: KeNIAs Approved Conceptual Framework

A. Leadership and Governance

The first section of the conceptual framework focuses on leadership and governance, recognizing their crucial role in fostering an entrepreneurial culture within institutions. Effective leadership and good governance ensure alignment between the governing structure, resources, and culture, setting the pace for successful change.



Leadership & Governance Attributes

- HEI mission and vision
- University Council
- HEI focus on entrepreneurship
- Strategic plan
- Performance measurement
- Strategic Communication
- Funding

Figure 2: Leadership and Governance Construct and Indicators

To assess efforts in becoming an entrepreneurial university, the following questions can be considered:

- Does the university's vision and mission statement emphasize entrepreneurship and innovation? Is the strategic plan aligned with these goals?
- Does the university's strategic communication emphasize entrepreneurship?
- Are there indicators in place to measure entrepreneurship and innovation?
- How many members of the University Council possess business/industry experience?
- What percentage of the annual budget is allocated to entrepreneurial activities?

B. Innovation Infrastructure

This construct recognizes that successful knowledge and innovation transfer requires enabling infrastructure (Young, 2007). Specifically, it looks at the infrastructure supporting the research-to-commercialization process and borrows from the outputs as discussed in the IPOO model.



Innovation Infrastructure Attributes

- Innovation Hubs
- Incubation Centres
- Technology Transfer Office (TTO)

Figure 3: Innovation Infrastructure Construct

To assess this construct, the following questions can be explored:

- Does the HEI have an Incubation Centre or a Technology Transfer Office (TTO)?
- What is the vision and goal of the Incubation Centre and/or TTO?
- What key services are offered by the Incubation Centre and/or TTO?
- How many innovations and enterprises have been supported by the Incubation Centre in the past year?
- How would the effectiveness and efficiency of the TTO be rated?

C. Innovation Activities

This construct examines the number and types of innovation activities conducted within the HEI and evaluates their impact both internally and externally. It draws on the OECD and IPOO frameworks. Further analysis can be conducted to understand the nature and outcomes of these activities.



Figure 4: Innovation Activities Construct

D. Intellectual Property (IP) Management

Building on the IPOO model, this construct focuses on innovations and inventions as key outputs of an entrepreneurial university. It assesses the HEI's capacity to support IP management by reviewing metrics such as the number of patents, plant variety rights, start-ups, and invention disclosures within a given timeframe.

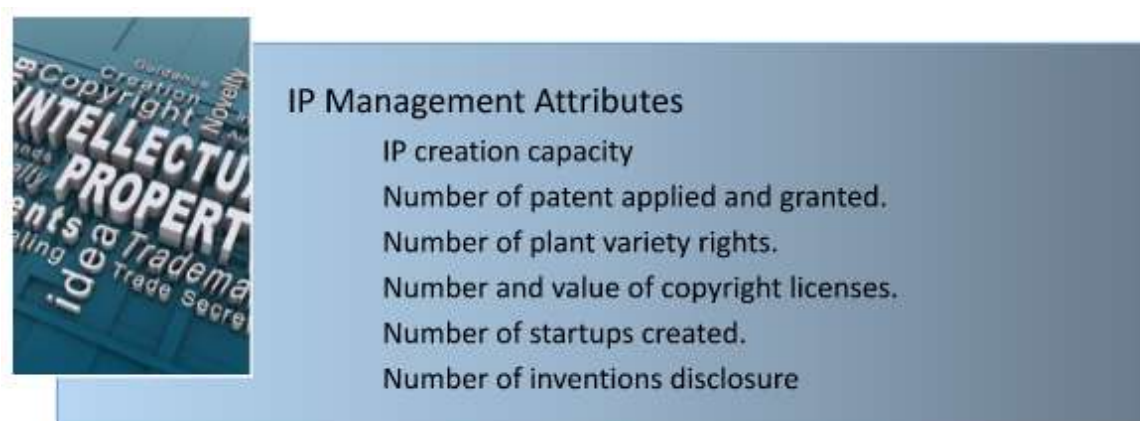


Figure 5: IP Management Construct

E. Policies and Strategies

This construct addresses the importance of relevant policies and strategies in creating an innovation-driven entrepreneurial ecosystem within the HEI.

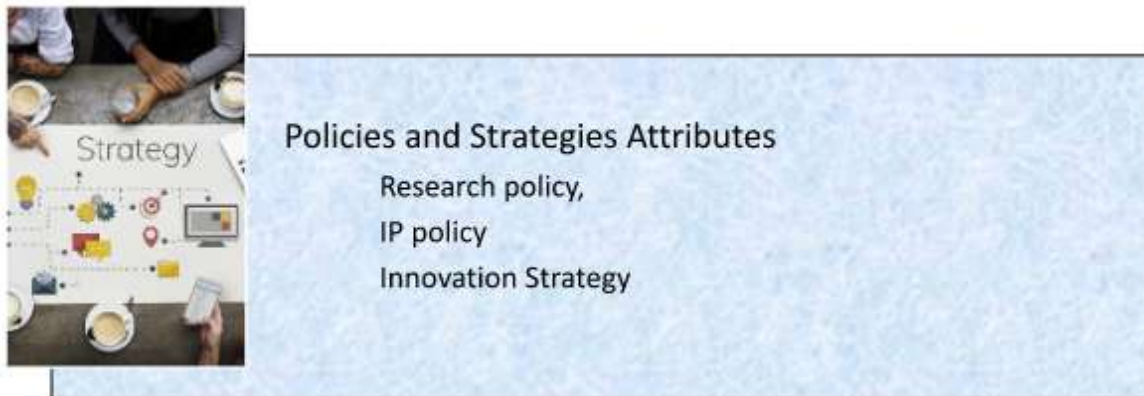


Figure 6: Policies and Strategies Constructs

Key questions to consider include:

- Does the HEI have operational research, IP, and entrepreneurial policies?
- How would one rate the awareness levels of such policies among faculty and students?
- How well are these policies utilized and adhered to by faculty and students?
- Do these policies provide sufficient incentives for researchers?

F. Human Resource (Staff and Students)

This construct is founded on the OECD models organization capacity – people and incentives. This human resource constructs reviews whether the students are encouraged to have an entrepreneurial mindset with a lens focused on cross disciplinary learning, human centered design thinking. Further, the construct outlines whether entrepreneurship is a factor during staff recruitment and interrogates the available avenues for faculty to provide mentorship on entrepreneurship. Lastly this constructs also outlines whether students have received training on any of the innovation cycle management phases i.e., Ideation, Project Selection, Product development and Commercialization.



Figure 7: Human Resource Construct

G. Entrepreneurial Education

This construct focuses on integrating entrepreneurship into teaching and learning. It evaluates the presence and applicability of entrepreneurial courses, measures the learning outcomes, assesses the structures enabling enterprise creation, and examines faculty engagement in entrepreneurial mindset development.

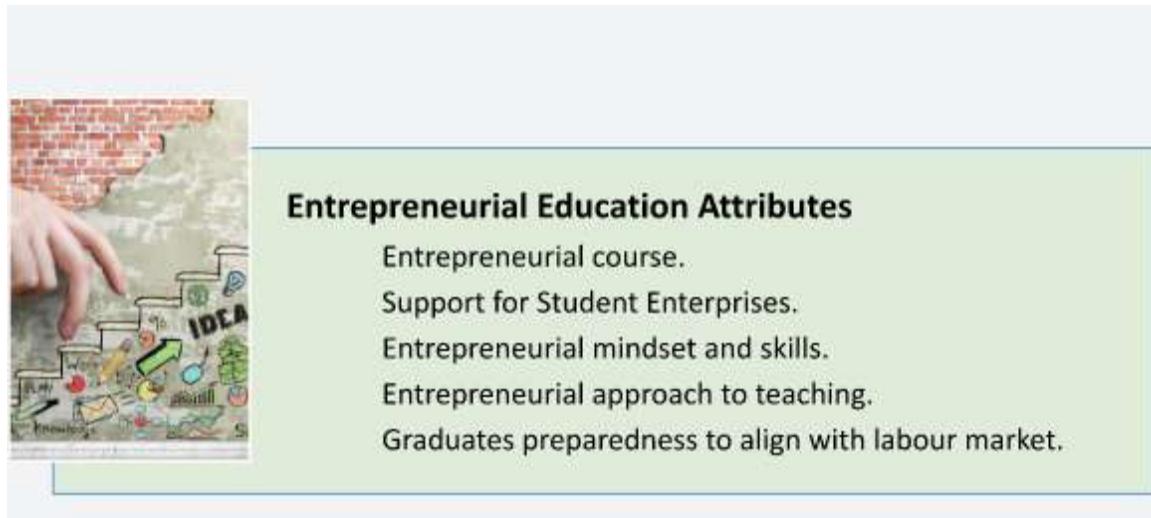


Figure 8: Entrepreneurial Education Construct

H. Internationalization

Internationalization is recognized as an integral aspect of entrepreneurial universities. Informed by the OECD model, which emphasizes the need for informed decision-making and performance assessment in international activities, this construct highlights the significance of internationalization for universities. To evaluate internationalization efforts, the following areas can be assessed:

- The number of international professional development programs offered by the university.
- The number of international exchange programs for students and faculty.

Structures and support systems in place to facilitate student and faculty mobility for international conferences and exchange programs.



Internationalization Attributes

- No of international professional courses
- No of Exchange programs
- Support and enablers of internationalisation

Figure 9: Internationalization Construct

I. Link with External Environment

This construct, also informed by the OECD model, emphasizes the importance of active engagement with external stakeholders for successful entrepreneurial universities. Building and nurturing relationships with key partners and collaborators is essential for maximizing the university's potential in research, teaching, and third mission-driven activities.



Link with External Environment

- Industry engagement
- Connection with external incubation hubs
- Number of joint ventures/joint publications

Figure 10: Link with external environment

The components of the link with the external environment include:

- The university's commitment to collaboration and knowledge exchange with industry, society, and the public sector.
- Active involvement in partnerships and relationships with a diverse range of stakeholders.
- Strong connections with incubators, science parks, and other external initiatives that facilitate knowledge exchange.
- Opportunities provided by the university for staff and students to engage in entrepreneurial activities externally.
- Facilitation of staff and student mobility between academia and the external environment.

4. SCOPE AND APPROACH OF THE BASELINE SURVEY

The survey utilized a mixed-method approach, incorporating qualitative and quantitative methods, including document review and in-depth interviews with key informants to assess the entrepreneurship status of the 18 target universities. The research design, target population, sampling strategy, and data collection methods are described in detail.

Research Design:

For this study, a descriptive research design was chosen to collect evidence and perceptions of the current entrepreneurship status of the target universities. Descriptive research design offers advantages such as efficient data collection within a short timeframe, cost-effectiveness, and the ability to gather insights and preferences from a selected population (Gakuu et al., 2015). The design is aligned to identify key institutions and assess the enablers and impediments to becoming entrepreneurial universities.

To address the research questions, the following steps were undertaken:

1. Mapping out key institutions and assessing the existing ecosystem to identify enablers and hindrances related to entrepreneurial universities.
2. Conducting desktop research on the value associated with entrepreneurial universities and exploring the foundational conceptual frameworks for successful entrepreneurship in universities.
3. Developing two data collection tools—one for management and faculty and another for students—to gather relevant data.
4. Conducting in-depth interviews with representatives from the eighteen target institutions.

Target Population:

The survey population comprised a total of 61 universities in Kenya, consisting of 35 public universities, 1 specialized university, and 25 private universities, as reported by the Commission of University Education (CUE) in August 2022.

Sampling:

Based on the research objectives, a sample of 18 institutions was selected to participate in the survey. The universities were grouped into three clusters based on the number of years of operation:

- Cluster 1-3: 3 universities per cluster (9 universities in total), representing the stronger universities.
- Cluster 4-6: 2 universities per cluster (6 universities in total), representing mid-level universities.

- Cluster 7-11: 1 university per cluster (5 universities in total), representing emerging universities with less than 10 years of operation.

This research adopted a two-pronged sampling approach; i) Random sampling that is geographically representative to select 18 target Universities from the three clusters indicated above, ii) Criterion sampling where the researchers applied a defined criterion to identify the target respondent's institutional knowledge. The sampled universities are outlined on the table below:

Global Ranking – Webometrics	Serial Number	University	CLUSTER	Public/Private
6259	1	Pwani University	E	PU
2444	2	Egerton University	A	PU
6027	3	University Of Embu	B	PU
6653	4	Catholic University of Eastern Africa	C	PR
7135	5	Mount Kenya University	C	PR
7370	6	Dedan Kimathi University of Technology	C	PU
8832	7	Kabarak University	D	PR
9062	8	Meru University of Science and Technology	D	PU
9549	9	Jaramogi Odinga Kubrak University of Science and Technology	E	PU
9597	10	Chuka University	E	PU
10725	11	Kenya Methodist University	F	PR
12053	12	Rongo University	F	PU
12231	13	Cooperative University of Kenya	G	PU
13657	14	KCA University	H	PR
16453	15	Riara University	I	PR
16602	16	Kirinyaga University	J	PU
21014	17	Moi University	K	PR
12267	18	Technical University of Mombasa	C	PU

Table 4:1 List of Sampled Universities

Data Collection

The data collection process incorporated both secondary and primary sources. Secondary data was collected through desktop review, which included scanning official reports, relevant online literature on entrepreneurial universities, and contributions to the National Innovation System (NIS). Sources of secondary data included Google Scholar, online journals, publications, and websites. Primary data was primarily collected through in-person interviews, with a few cases conducted online.

The data collection tools were tested for reliability and content validity before data collection. The interviews aimed to gather both qualitative and quantitative data, focusing on key indicators and respondents' perceptions of entrepreneurship. A total of 334 responses were collected from Vice-Chancellors, Deputy Vice-Chancellors, Director General, representative Directors, Managers, Researchers, Faculty, and Students from the 18 target institutions. Students from undergraduate and graduate schools were included in the sample.

Data Collection Tool

The data collection process involved conducting both in-person and online interviews using a structured online questionnaire. The questionnaire included three types of questions: Yes/No, Likert scale, and open-ended questions. Two different questionnaires were administered—one for administrators, directors, and managers, and another for students, researchers, and innovators. This approach aimed to gather a comprehensive understanding of the universities' contribution to the National Innovation System. The questionnaires were designed to capture data related to the ten constructs of an entrepreneurial university.

5. FINDINGS

This section presents the findings derived from the data analysis, organized according to the conceptual framework constructs: Leadership and Governance, Innovation Infrastructure, Innovation Activities, Intellectual Property Management, Policies and Strategies, Human Resources, Entrepreneurial Education, Internationalization, and Linkages with the External Environment.

Leadership and Governance

The progress of universities towards becoming entrepreneurial institutions is greatly influenced by support from management, strong leadership, and effective governance. These factors play a crucial role in promoting entrepreneurial capacity across all levels of the institution. To foster cooperation between universities and industry, it is important to establish flexible organizational and governance structures that encourage activities such as research collaboration, application of scientific knowledge, idea stimulation, product/service development, and the creation of start-ups. Shared entrepreneurial vision and innovation strategies within the university are vital. All the universities surveyed had institutional-level strategies, which are typically reviewed every five years, outlining the vision, mission, and values of the institution. These strategies are communicated to staff and students through various channels such as the website and official documents. Most respondents confirmed that their universities' strategic plans aligned with entrepreneurship, as depicted in Figure 11.

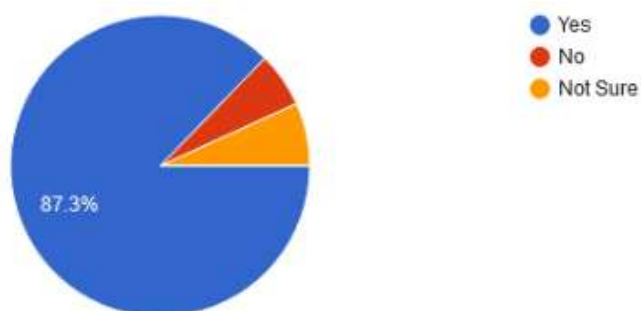


Figure 11: Alignment of University Strategic Plan to Entrepreneurship

This is further evidenced by the respondents, who agreed that their universities focused on entrepreneurship, Table 0.1 below;

Variables	Mean	Std. Deviation	Interpretation
Does the University focus on entrepreneurship	4.28	.244	AGREED

Table 0.1: Results of the Survey Regarding Focus on Entrepreneurship

Note: Responses to all items were on Likert scale ranging from Fully Disagree (0) to Fully Agree (6);

However, the decision-making process in many universities appears to be highly centralized, with only a few individuals holding senior roles. Effective leadership should involve faculty and staff in decision-making processes, enabling the development of self-motivated entrepreneurs who are empowered to make independent decisions.

Innovation Infrastructure

Within the entrepreneurship ecosystem, Incubation Hubs and Technology Transfer Offices (TTOs) play a vital role in commercializing research output. TTOs are not only responsible for legal procedures related to patenting and licensing but also contribute to defining the host institution's commercialization strategy. Through strong leadership, outreach efforts, and encouragement to apply for commercialization grants, TTOs can support universities in cultivating an entrepreneurial culture. Establishing links with industries and providing support structures such as TTOs, incubation centers, linkage and extension offices, and science parks are essential components of an effective innovation infrastructure.

Many universities have established TTOs, Industry Liaison Offices, and Incubation Centers; however, these entities have yet to fully fulfil their mandate in supporting research commercialization. The lack of a clear, transparent, and consistent vision for these offices hinders their effectiveness and restricts the innovative aspirations of the university ecosystem.

According to the survey, only 32% of the respondents were certain that their institutions have an office dedicated to supporting technology transfer from research to commercialization, as illustrated in Figure 12. Similarly, respondents from various universities expressed differing opinions on the existence of incubation centers, as depicted in Figure 13.

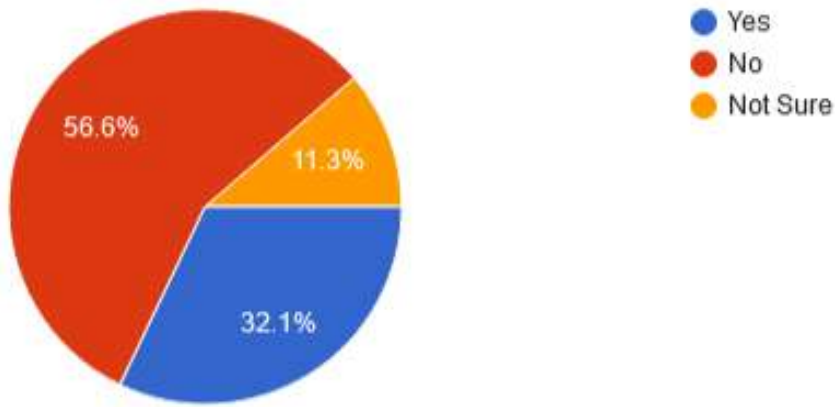


Figure 12: Results of the Survey Regarding TTO/Technology Innovation Service Centre (TISC)

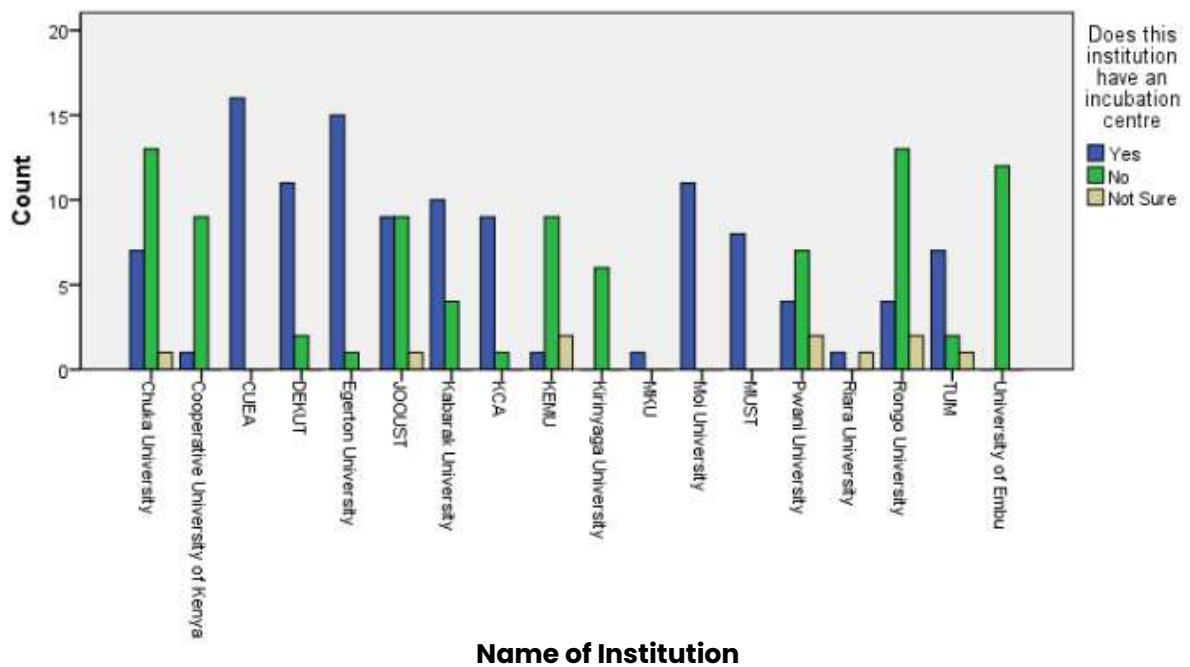


Figure 13: Results of the Survey Regarding Incubation Centers

“As a private university, we don't have sufficient resources which hinders the institution's ability to incubate student projects as this institution does not have state funding to cross-subsidize incubation and/or innovation.”

Every year we make requests to provide resources, but nothing changes”

Funding depends on the university's budget awarded by the government, and we know the capitation from the government has been declining. Where will the leadership get funds to promote innovation?”

Insufficient funding emerged as a significant bottleneck in developing innovation infrastructure. Lack of research funding was identified as a major concern across the surveyed institutions. Several responses highlighted the limited availability of funding for innovations and research output. The following quotes illustrate this concern:

“As a private university, we don't have sufficient resources which hinders the institution's ability to incubate student projects as this institution does not have state funding to cross-subsidize incubation and/or innovation.

Every year we make requests to provide resources, but nothing changes.

Funding depends on the university's budget awarded by the government, and we know the capitation from the government has been declining. Where will the leadership get funds to promote innovation?

The insufficient funding from the private sector can be attributed to a potential lack of awareness or insufficient endorsement of innovative projects by faculty members. This observation was supported by multiple respondents from the sampled universities, who emphasized the following point:

"There is limited knowledge regarding the pilot projects undertaken by the university. Furthermore, our institution lacks effective communication channels with the private sector, and there is no platform for students to showcase their ideas and secure seed funding or technical assistance for their pilot projects."

Intellectual Property Management

Universities primarily focus on patents and employ various strategies for exploitation, such as licensing, patent sales, or utilizing patents as investments in start-up ventures. However, a significant challenge faced by most of the respondents is the establishment of a streamlined invention disclosure scheme that considers the organizational reward system and corresponding obligations between the university and its employees, as highlighted in Table 0.2. Opinions were divided regarding the presence of clear incentives and rewards for staff members actively supporting the commercialization of research-based innovation, which is crucial for the universities' entrepreneurial development.

Intellectual Property (IP), considered vital by survey respondents, was not given sufficient priority and emphasis within the universities, resulting in a low number of registered patents by the Higher Education Institutions (HEIs). One academic leader, when explaining the underlying reasons, commented:



The top leadership, business leaders, and government officials do not perceive us as a platform for delivering Intellectual Property. They view universities solely as educational institutions focused on teaching. They do not recognize our potential for creativity. As a result, we are unable to foster creativity in our students due to the predominantly traditional form of learning.

Policies and Strategies

Well-defined research and IP policies and strategies are essential within HEIs to facilitate an innovation-driven entrepreneurial ecosystem. These policies and strategies serve as organizational frameworks that unite individuals toward a common goal, foster innovation, and harness the emergence of new technologies. They play a critical role in fostering collaboration among various stakeholders, enabling the seamless flow of new knowledge across boundaries. Unanimously, all participating universities acknowledged the existence of a research policy.

Similarly, most surveyed institutions indicated the presence of IP policies, as depicted in Figure 14 below.

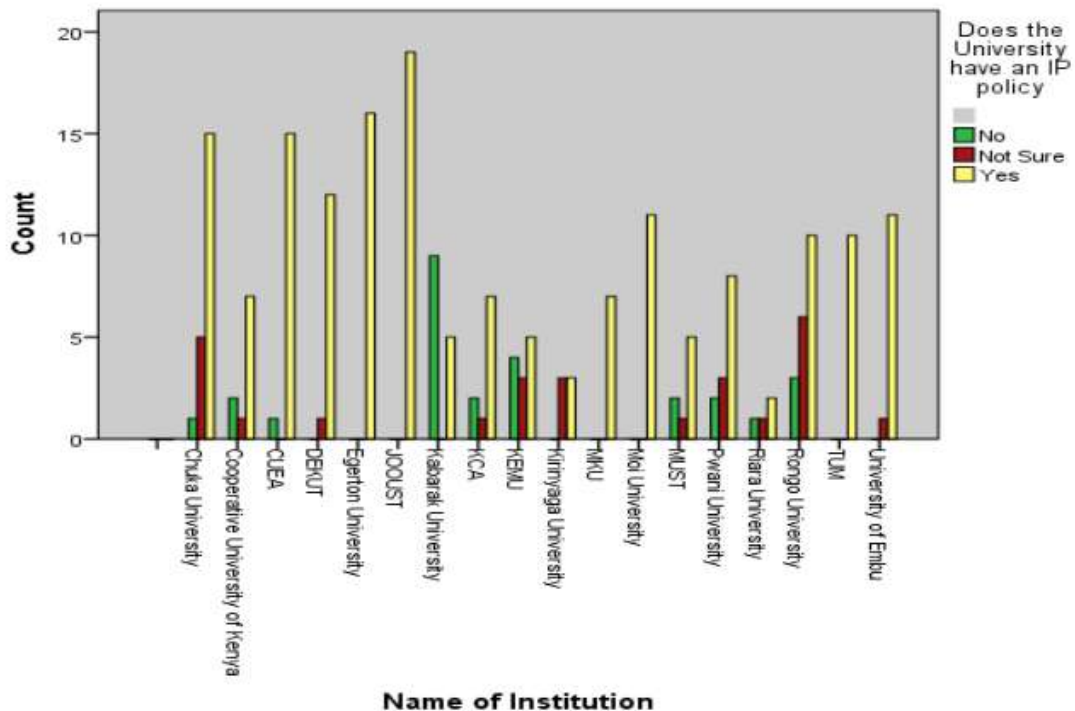


Figure 14: Results of the Survey Regarding IP Policy

However, despite the existence of research and IP policies, further investigation revealed mixed results concerning their implementation. According to the survey, variables related to research policy, such as providing incentives and rewards for staff actively supporting entrepreneurship development, sensitizing staff and students to the IP policy, and operationalizing the IP policy, received a neutral score. Refer to Table 0.2 for further details.

Table 0.2: Results of the Survey Regarding Policies and Strategies

Variables	Mean	Std. Deviation	Interpretation
Research policy provides incentives	3.90	1.404	NEUTRAL
University sensitized staff and students on IP policy	3.21	1.624	NEUTRAL
IP policy fully operationalized	3.28	1.788	NEUTRAL

Human Resources

Human resources play a crucial role in the development of an entrepreneurial institution. To cultivate an innovative and entrepreneurial culture, it is essential to have motivated and knowledgeable technical staff, a transparent framework, and an effective rewarding and promotion system encompassing both monetary and non-monetary incentives. Universities should actively encourage entrepreneurial behaviour and attitudes among their staff and students by providing incentives that align with entrepreneurial approaches at both individual and team levels. All the universities that were interviewed had formal policies for the training and career development of their staff. However, the focus of the training was primarily on academic and research-related aspects. Furthermore, the institutions provided provisions for career advancement for academic staff and researchers, such as financial support for conference participation or scientific publication. Notably, a formal process to recognize and reward excellence in teaching, research, or entrepreneurial engagement was lacking in all the universities. Both university administrators and professors acknowledged that most of the research activities conducted were purely theoretical and lacked immediate practical and economic relevance. This was attributed to the absence of incentives for innovative applied research, which could serve to enhance entrepreneurial ideas and initiatives.

The following opinions confirm this observation:



Faculty members lack the motivation to pursue and advance research beyond publication because they have not witnessed any successful models.

Research outputs are limited to publication in scientific journals.

The disparity between applied research and theoretical research can be attributed to the fact that university departments prioritize faculty members' publication of papers in refereed journals for promotion. Consequently, little attention is given to applied research, which requires significant investments of time and resources. Supporting this view, some faculty members expressed:

The obstacle to entrepreneurship is that our research is only used for promotion. Even though there is potential to conduct applied research, there is little motivation to do so because there is no support for the research outcome. Much attention is rather focused on promotion which is only possible based on academic publication.

Although applied research output was not a priority for researchers, most respondents generally agreed that their institutions encouraged the development of an entrepreneurial mindset (refer to Table 0.3 below).

Table 0.3: Results of the Survey Regarding Human Resources

Variables	Mean	Std. Deviation	Interpretation
The students are encouraged to have an entrepreneurial mindset	4.63	1.162	AGREE
The faculty have specific avenues to provide mentorship to students on entrepreneurship	4.31	1.232	AGREE

Note: Responses to all items were on Likert scale ranging from Fully Disagree (0) to Fully Agree (6);

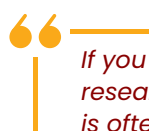
Innovation Activities

A university ecosystem that fosters entrepreneurship should support the career development of enterprising individuals on their journey to becoming entrepreneurs. When asked whether their institutions supported and encouraged innovation and entrepreneurship, the respondents affirmed that their institutions promoted innovation activities, although they were uncertain about the actual impact (refer to Table 0.4). Additionally, the respondents expressed frustration in transforming creative ideas into pilot projects. This outcome is unsurprising given the lack of funding and training.

Table 0:4: Results of the Survey Regarding Innovation Activities

Variables	Mean	Std. Deviation	Interpretation
The University fosters entrepreneurship innovation activities.	4.27	1.152	AGREE
Impact of these activities.	3.68	1.407	NEUTRAL

Several faculty members highlighted that the low motivation for creativity stemmed from two main factors: First, all research belongs to the university and not the individual researcher, resulting in disputes over intellectual property rights. Second, faculty members' promotions are primarily based on publications rather than the commercialization of research or advancing innovative projects through the stages of the innovation cycle. A faculty member questioned the rationale for investing time and effort in innovative projects, as stated below:



If you ask the majority of faculty members, they will likely tell you that the motivation for scientific research is to secure promotion. This requires academic creativity, not a pilot project. Thus, there is often no incentive for creative innovation at the executive level.

Emphasizing publications alone is misplaced in an entrepreneurial university environment, as the primary objective should be to cultivate student ingenuity through productive innovative projects. However, such projects should indeed be considered in faculty staff promotions.

Link with External Environment

Universities are not isolated institutions, and their traditional role as creators and disseminators of knowledge is now closely intertwined with the partnerships they establish. Knowledge exchange between universities and external stakeholders can take various forms, including:

- Involvement of stakeholders in teaching and entrepreneurship activities
- Collaboration on internships and placements
- Collaboration on secondments, where academic staff are temporarily placed in private or public sector organizations
- Joint research initiatives

- Contract research
- Industrial doctorates
- Technology transfer, such as licensing, selling prototypes, or supporting start-ups

By cooperating with various stakeholders, universities can leverage their efforts in knowledge exchange and make meaningful contributions to the economic and social development of the country. The universities involved in this study were asked to identify their modes of cooperation with external stakeholders in terms of knowledge exchange. The most common forms of engagement with external stakeholders were involvement in teaching activities and collaboration on student internships and joint research initiatives, as shown in Table 0.5.

Table 0.5: Results of the Survey Regarding Link with External Environment

Variables	Mean	Std. Deviation	Interpretation
The University is committed to collaboration and knowledge exchange with industry, society and the public sector	4.42	1.043	AGREE
The University demonstrates active involvement in partnerships and relationships with a wide range of stakeholders	4.92	1.003	AGREE
The University has strong links with incubators, science parks and other external initiatives, creating opportunities for knowledge exchange	4.91	.893	AGREE
The University provides opportunities for staff and students to take part in entrepreneurial activities externally	4.13	1.204	AGREE
The University specifically facilitates staff and student mobility between academia and the external environment.	4.15	1.191	AGREE

However, practices such as technology transfer, contract and/or industrial research, and staff secondments were not prevalent. Most universities lacked a formal infrastructure, such as a Technology Transfer Office (TTO), responsible for managing technology and knowledge transfer. Additionally, there was a lack of formal evaluation of knowledge exchange practices and incentives at both the individual and faculty/department levels to render continued support for research commercialization across all the interviewed universities.

Internationalization

In today's globalized era, internationalization has become a widespread practice among higher education institutions (HEIs) due to the numerous benefits it offers at both individual and institutional levels. To remain competitive and sustainable, universities must prioritize expanding their international connections. This includes attracting excellent human capital, both staff and students, from their own countries and abroad. The importance of internationalization has never been greater, as universities are increasingly experiencing the pressures of global competitiveness.

When part of a broader strategy, internationalization can have a profound impact on strengthening cooperation among students and staff from different international institutions. It can also foster strategic thinking by promoting innovation and modernization of infrastructure and pedagogy. Furthermore, internationalization enhances the potential for collaboration in teaching, research, and entrepreneurial activities.

During the conducted interviews, all the universities acknowledged the significance of internationalization for their institutional and organizational development. They recognized the value of developing strategic partnerships with foreign universities. Table 0.6 illustrates the current practices of Kenyan universities regarding international cooperation.

Table 0.6: Results of the Survey Regarding Internationalization

Variables	Mean	Std. Deviation	Interpretation
The University explicitly supports the international mobility of its staff and students	4.20	1.352	AGREE
Internationalization is a key part of the University's entrepreneurial strategy	4.60	1.104	AGREE
The University, its departments and faculties actively participate in international collaboration	4.00	1.213	AGREE

Note: Responses to all items were on Likert scale ranging from Fully Disagree (0) to Fully Agree (6);

Entrepreneurship Education

Entrepreneurial education primarily focuses on cultivating the necessary skills to identify opportunities and establish new ventures. In knowledge-based economies, universities are increasingly taking formal measures to provide support and promote start-ups among their students and staff. A crucial aspect of fostering entrepreneurship within an institution is the comprehensive integration of entrepreneurship education across all study programs, emphasizing the development of entrepreneurial soft skills. According to the responses from the interviewed university representatives, entrepreneurial courses are currently offered at the Bachelor's, Master's, and PhD levels.

However, the entrepreneurial courses offered in the universities were typically limited to a one-semester module that primarily focuses on theoretical aspects. Insufficient attention is given to equipping students with practical skills to apply their knowledge effectively. When it comes to the importance and usefulness of the entrepreneurial courses offered, all respondents acknowledged their relative significance. Nevertheless, it was observed that the majority of universities traditionally teach entrepreneurship through mandatory classic courses, often neglecting to provide practical training opportunities for students in local enterprises. This lack of emphasis on practical application can be seen in the results presented in Table 0.7

Variables	Mean	Std. Deviation	Interpretation
The University stimulates and supports the development of entrepreneurial mindsets and skills.	4.28	.938	AGREED
Staff take an entrepreneurial approach to teaching in all departments, promoting diversity and innovation in teaching and learning	3.92	1.127	NEUTRAL
Entrepreneurial behaviour is supported throughout the University experience; from creating awareness and stimulating ideas through to development and implementation.	4.08	1.092	AGREED
The University evaluates entrepreneurship learning outcomes	3.76	1.250	NEUTRAL
Collaborating and engaging with external stakeholders is a key component of teaching and learning development in this University	4.35	1.099	AGREED
The students are able to apply the entrepreneurial skills acquired when doing their research	3.84	1.241	NEUTRAL

Table 0.7: Results of the Survey Regarding Entrepreneurial Education

Note: Responses to all items were on Likert scale ranging from Fully Disagree (0) to Fully Agree (6);

Most respondents expressed neutrality when asked about the evaluation of entrepreneurship learning outcomes. Education methods and mechanisms predominantly remain theoretical, with assessments and evaluations in higher education institutions mainly based on achieving academic goals in terms of student grades, without much consideration for the application of knowledge or the cognitive value. Participant comments further underscore this point:



The Entrepreneurship section primarily focuses on theoretical aspects. Despite the existence of graduation projects, they are often not implemented due to limited funding and students' inadequate skills in obtaining funding and engaging the private sector.

In addition to the academic knowledge acquired in their respective fields of specialization, students lack essential soft skills and practical knowledge.



6. CONCLUSIONS

The objective of this study was to provide an overview of the current state, practices, needs, and challenges of universities in their journey towards becoming entrepreneurial institutions. It aimed to review the fundamental requirements for an entrepreneurial university as outlined in the KeNIA conceptual framework (Figure 1), rather than conducting a formal assessment. We emphasize that the establishment or enhancement of specific capabilities is crucial for universities to foster entrepreneurship. These capabilities encompass governance, financial resources, infrastructure, entrepreneurial profile, and human resources. A comprehensive assessment of a university's ecosystem helps determine whether it possesses the necessary capabilities to position itself as an entrepreneurial institution.

Based on the results and findings of this study, all the reviewed universities expressed their commitment to and recognition of the value of becoming entrepreneurial. However, each university adopted a distinct strategic and structural approach to foster entrepreneurship. While there were variations in the interpretation of an entrepreneurial university, all universities acknowledged the need to reassess their core mission and focus to maximize their research and academic contributions and generate a positive impact on society. The diverse approaches, successes, and lessons learned from the surveyed universities offer valuable insights that should be shared among all universities, along with other emerging practices identified in different institutions.

The path towards becoming entrepreneurial differed among the universities, illustrating that there is no single prescribed process or pathway to achieve this goal. Each university faced unique challenges to overcome and possessed strengths and opportunities that could be leveraged in their entrepreneurial journey. Although we followed a standardized framework in our survey, it should not be seen as a one-size-fits-all solution for all universities. Instead, it should serve as a guiding document for universities to develop their policies, practices, and procedures that account for their specific contexts.

KeNIA plays a pivotal role in advocating for and championing the goals of each institution within relevant government agencies. KeNIA is well-positioned to lead, coordinate, integrate, and mobilize resources for knowledge and capacity building. Working alongside the universities, KeNIA can provide guidance, support, and monitoring throughout the transition from traditional to entrepreneurial universities.

Given the potential magnitude of this transition, KeNIA will also serve as a significant change manager. It will bring together critical stakeholders and key opinion leaders, fostering efficiency, unlocking opportunities and resources, and avoiding duplication of efforts.



7. RECOMMENDATIONS

The recommendations provided in this report are based on the findings from the surveyed universities, relevant best practices identified through a literature review, and an inductive analysis of the results and findings. While these recommendations are specific to the sampled universities, they hold relevance for the wider university sector in Kenya. The following recommendations address three key imperatives:

Mapping and Understanding Internal Entrepreneurship Ecosystems

To optimize the development of entrepreneurial universities, it is imperative to conduct a comprehensive audit of entrepreneurship-related programs, projects, activities, and initiatives within higher education institutions (HEIs). This audit should align with the conceptual framework outlined in this report, serving as a baseline for understanding the complete landscape of university entrepreneurship and providing a foundation for planning and implementing interventions. By mapping their internal entrepreneurship ecosystems, universities can better coordinate and support entrepreneurship initiatives.

Enhancing Collaboration with Industry and Research Centres

To foster innovation and address societal challenges, it is recommended that key industries with potential for collaboration with HEIs be identified. Mapping these industries will provide insights into the barriers and facilitators for effective collaboration. Conducting an assessment of bottlenecks and enablers will enable a better understanding of the academia-industry linkage gap, allowing for the development of strategies to create symbiotic value through collaborative efforts.

Operationalization of the National Commercialization Guidelines

Respondents expressed a need for clear guidelines on the commercialization process. KeNIA has already developed these guidelines, which should be shared with institutions for adaptation and integration. The guidelines will offer strategic and implementation principles to support the commercialization of research and intellectual property (IP), providing universities with a framework to navigate the commercialization journey effectively.

Establishing the Kenya Network of Entrepreneurial Institutions Leaders (KNEIL)

It is recommended that KeNIA takes the initiative to facilitate engagement with African universities to establish the Kenya Network of Entrepreneurial Institutions Leaders (KNEIL). This network would serve as a platform for regional and continental collaboration, enabling the identification of specializations, partnerships, collaborations, exchanges, and twinning opportunities in teaching, learning, research, and the production of goods and services. Establishing partnerships through KNEIL would not only provide access to African and global markets for universities' IP but also support the mapping and development of the African entrepreneurial ecosystem to advance the goals of entrepreneurial universities.

By implementing these recommendations, universities can strengthen their entrepreneurial endeavors, foster collaboration with industry, enhance the commercialization of research, and establish valuable networks for regional and continental cooperation. It is crucial for KeNIA, in its role as an advocate and change manager, to support universities in implementing these recommendations and provide the necessary guidance and resources for their successful execution.





ANNEX 1: Data Collection Schedule

Data collection Schedule				
	Name of Institution	Agreed Date of Visit	Management	Student
1	Catholic University of Eastern Africa	June 28th to 30th	10	3
2	Kenya College of Accountancy University	July 5-7th	10	7
3	Cooperative University of Kenya	July 13th to 15th	10	4
4	Kabarak University	July 18th to 20th	14	9
5	Egerton University	July 21st to 22nd	16	4
6	Moi University	July 25th to 27th	11	8
7	Rongo University	August 29th to 30th	19	6
8	Jaramogi Oginga Odinga University of Science & Technology	August 31st to September 1st	19	6
9	University of Embu	September 5th to 6th	12	7
10	Kirinyaga University	September 7th to 8th	6	8
11	Dedan Kimathi University of Technology	September 14th to 15th	13	9
12	Chuka University	September 19th to 20th	28	21
13	Meru University of Science & Technology	September 22nd to 23rd	8	8
14	Kenya Methodist University	September 26th to 28th	12	4

Data collection Schedule				
	Name of Institution	Agreed Date of Visit	Management	Student
15	Technical University of Mombasa	September 29th to 30th	10	4
16	Pwani University	October 3rd to 6th	15	8
17	Riara University	October 12th to 14th	2	3
18	Mount Kenya University	October 17th to 18th	7	6
			222	125

ANNEX 2: Representative group pics of the data collectors with the university's leaders

Location	Image
University of Embu	 A group of nine people, including men and women in professional attire, standing in a line inside a well-lit office or meeting room. There are flags on either side and a clock on the wall in the background.
Co-operative University of Kenya	 A group of approximately ten people, including men and women, standing in a line in front of a building entrance. There is a large potted plant on the left side of the group.
Kabarak University	 A group of about twelve people, including men and women, standing in a line in front of a large, classical-style building with white columns and a stone facade.

Location	Image
Rongo University	
Jaramogi Odinga Odinda University of Science and Technology	
Chuka University	

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9. Mr. George Masila - Technical Expert
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11. Tonny Juma - Data Collector
12. Jeff Getenga - Data collector

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