THE EDUCATION COLLABORATIVE

# Entrepreneurship Ecosystem Development (EED) Cases

## About the Entrepreneurship Ecosystem Development (EED) Cases

The document contains curated collection of exemplar case studies of building entrepreneurial ecosystems from five higher education institutions within sub-Saharan Africa. The institutions are Ashesi University, Strathmore University, Bahir Dir University, Makarere University and Stellenbosh University.

The lessons learned from these case studies are particularly relevant for universities aiming to establish successful entrepreneurship ecosystems. The authors provide lessons and strategies deployed by these institutions.

## Acknowledgements

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ASHESI UNIVERSITY

Strathmore UNIVERSITY

Bahir Dar University

MAKERERE UNIVERSITY

Stellenbosch UNIVERSITY IYUNIVESITHI UNIVERSITEIT

# An Incentive Journey of Self-Discovery for Entrepreneurship

ASHESI UNIVERSITY

# An Incentive Journey of Self-Discovery for Entrepreneurship

## 1.0 Case Context

Ashesi University is a private, non-profit university in Berekuso, Eastern Region in Ghana. The mission of the university is to educate and develop ethical and innovative entrepreneurial leaders, foster the creation of ventures that drive job growth, and contribute to the local community development with the aim of transforming Africa.

In building an entrepreneurial ecosystem, Ashesi has established an Ashesi Entrepreneurship center which oversees and manages all aspects of entrepreneurship promotion on campus, such as entrepreneurship-related curriculum, programs, and initiatives.

Once graduated, alumni often face uncertainty in choosing between entrepreneurship or going into the field of work, and this can be because of limited exposure to entrepreneurship, as well as limited knowledge about the associated risks and rewards[1]. To mitigate some of these challenges that students face, one solution was the one-year Ashesi Venture Incubation (AVI) program for recent (1-3) graduates and alumni of Ashesi. This incubation program helps recent graduates and alumni to develop hybrid business models1 through business coaching and professional support.

## 2.0 Entrepreneurship Ecosystem in Practice and the case of Ashesi University

One of the initiatives that Ashesi uses towards building its entrepreneurship ecosystem is the Nexti2i Project (New Entrepreneurs Exchange for Transformation: Idea to Impact) which was launched in 2019 with seed funding from USAID. The project is implemented by Ashesi in collaboration with the D-Lab at the Massachusetts Institute of Technology (MIT).

Once graduated, alumni often face uncertainty in choosing between entrepreneurship or going into the field of work, and this can be because of limited exposure to entrepreneurship, as well as limited knowledge about the associated risks and rewards[2]. To mitigate some of these challenges that students face, one solution was the one-year Ashesi Venture Incubation (AVI) program for recent (1-3) graduates and alumni of Ashesi. This incubation program helps recent graduates and alumni to develop hybrid business models2 through business coaching and professional support.

### *2.1 Initiative Process*

Recent graduates and alumni who have graduated from Ashesi University up to about three years can take part in the Ashesi Venture Incubator (AVI). They come in, either with a business idea that needs validating or a business they are already running, which requires structure or may need support in scaling. In the design of the incubation program, university graduates, whilst developing and validating their hybrid business models, meet their National Service3 requirements, a one-year mandatory program that all Ghanaian citizens 18 years and above must undertake after completing their tertiary education. During their one-year service, National Service[3] personnel are posted to various sectors of the economy, including education, health, agriculture, and other areas where their skills and expertise are needed.

With the one-year incubation period, the University hires graduates as national service personnel with similar conditions of engagement as their national service counterparts in Ghana. From an operational perspective, the AVI involves employing enterprising students upon graduating as national service persons. However, their primary responsibility is not to support faculty or run campus programs; instead, they focus on building their businesses.

In essence, they are compensated the same way as other national service persons, under the same contractual framework, albeit with some differences in the job description. They work on their business for a year at the end of this period. This year-long incubation period allows them to validate their business models and transform them into hybrid businesses.

The Ashesi Venture Incubator (AVI) program beneficiaries are usually termed as AVI fellows for the corresponding year that they are engaged. These beneficiaries have access to resources and support they need to turn their ideas into impactful investments.

[1]Hybrid business models are business ideas with demonstrable profit and intentionality to generate measurable positive impacts for society and the planet, with emphasis on the sustainable development goals.
[2]Mueller, S. L., & Thomas, A. S. (2001). Culture and entrepreneurial potential: A nine country study of locus of control and innovativeness. Journal of business venturing, 16(1), 51-75.
[3]https://www.nss.gov.gh/about

### *2.2 Understanding the Conceptual Framework*

The literature seeks to situate the role of university-led incubators within the broader field of entrepreneurship education, whilst defining the framework around the approach Ashesi is taking in combating the uncertainty that graduating students face in choosing between entrepreneurship and working for an employer.

#### *2.2.1 University Incubator Support for Entrepreneurial Ecosystems*

Business incubators (BI), in general, are a versatile source of innovation when considering entrepreneurship development. In higher education, there are "business incubator programs" that offer "tools and assistance" to "help students and teachers in converting their creative ideas into profitable businesses4."

These higher education business incubators are usually implemented through a range of techniques that include "mentoring, business planning, marketing techniques, and assisting the businesses with finding financing or investors[4]", and all of which are techniques also used in the Ashesi Venture Incubator. The Ashesi Venture incubator, apart from providing its fellows with resources such as office space, equipment, and seed funding, they provide fellows with coaching and mentorship from experienced local and international experts and technical support services.

Based on a longitudinal study, research supported the assertion that entrepreneurship can both be taught, or at least enhanced[5]. This, thus, feeds into the framework by which to view Ashesi Venture Incubator's approach, and that is the internal entrepreneurship education ecosystem, which involves curriculum, co-curricular activities, and research among others. This is important because it further breaks down the entrepreneurship curriculum activities which encompasses teaching "about", "for", and "through" entrepreneurship. "Through entrepreneurship" aims to graduate entrepreneurs, support new venture creation, and develop entrepreneurial competencies[6], which, in a nutshell, summarizes one of the key goals of the Ashesi Venture incubator, especially when there is the awareness that not all graduates of the AVI program may go into entrepreneurship. Dr Gordon Adomzda succinctly puts it as such:

*"This approach is not intended to imply failure if they choose the latter, as the experience gained from testing their models most likely will be applicable elsewhere"*

Regarding the "through" entrepreneurship approach, one crucial factor is that the programs and activities supporting this educational approach involves other ecosystem stakeholders such as government, public institutions, and business sectors[7]. In the mentorship program offered, the AVI utilizes partnerships with industry players.

This collaboration within the ecosystem further points to another framework regarding universities and their collaborations in entrepreneurial ecosystems. A European report of research and innovation program's goal of incubators stated that work should be at the outlines of the triple helix where university, industry and public sector reinforce each other by taking innovation and entrepreneurship into account[8].

## 3.0 Challenges and Successes

### *3.1 Challenges*

The AVI program has faced some challenges, but there are also gaps that the incubator can take advantage of as well.

1. The AVI program is under the Ashesi Entrepreneurship Center. Sessions are sometimes supposed to be held at the center, but since the incubator also deals with alumni businesses, movement from outside the center to the campus has been difficult.
2. One challenge that the literature points to, and that the Ashesi Venture Incubator is all likely aware of, is that incubators may not be able to deal with the macroenvironment such as fiscal and monetary policies, political instability, and currency volatility (Ikebuaku & Dinbabo, 2017).

### *3.2 Successes*

Among the successes of the AVI, these include:

1. **Effective Relationship Building.** In some cases, there have been occasions where collaborations have happened with alumni of both Ashesi and the AVI program. The Entrepreneurship center, which houses the AVI program, was part of the Ghana Hub Network and they sometimes run events and programs for entrepreneurs. For instance, there were a couple of times when the AVI team reached out to the founder of Beautiful Stories, one of the fellows in the inaugural launch of the incubator, who helped with photography and videography services

[4]Rukmana, A. Y., Meltareza, R., Harto, B., Komalasari, O. & Harnani, N. (2023). Optimizing the role of business incubators in Higher Education: A review of supporting factors and barriers. West Science Business and Management, 1 (3), pp. 169-175.

[5]Ibebuaku, K. & Dinbabo, M. (2018). Beyond entrepreneurship education: business incubation and entrepreneurial capabilities. Journal of Entrepreneurship in Emerging Economies, 10 (1), pp. 154-174. DOI: 10.1108/JEEE-03-2017-0022

1. **Continuity.** The incubator has been able to establish structures post-exit for the AVI fellows. Once they graduate or exit the AVI program, there are grants available to them like the AVI X program.

[6]Sirelkhatim & Gangi, 2015 as cited in Agbodjah et al., 2023.
[7]Ferrandiz et al., 2018, as cited in Agbodjah et al., 2023.
[8]Hassan, N.A. (2020). University business incubators as a tool for accelerating entrepreneurship: theoretical perspective. Review of Economics and Political Science. Emerald Publishing Ltd.
*Agbodjah, S., Murithi, W., Gakii, A., Asante-Darko, D. & Kwarteng, A. (2023). A Framework for defining, describing, and diagnosing ($D^3$) Entrepreneurship Ecosystems within sub-Saharan African higher educational institutions [Thought Leadership Project].

## 4.0 Lessons learned

There are a few actions undertaken by the team which supports the effectiveness of the Ashesi Venture Incubator. Some of these enablers and lessons that would benefit other universities involve:

1. Collaborations. The AVI program makes use of partnerships to effect out its support to the fellows.
    a. Internal Stakeholder Collaboration: The Ashesi Venture Incubator program works closely with faculty to carry out most of its model sessions. The yearlong project is divided into different areas of business development and work is done with Ashesi faculty to carry out some of the model sessions.
    b. External: Experts in various industries also support Ashesi faculty to carry out the model sessions.
2. Partnership with Industry: As part of the AVI program, mentorship support is one of the offerings, and industry players are paired with the fellows based off the industries of their businesses in the incubation period. These mentors are both local and international, so it is not just limited to Ghanaian mentors. Some mentors are from Nigeria, Jamaica, United States of America (U.S.A). and the United Kingdom (U.K). These industry players work together with the incubator to provide business coaching, and mentoring to ventures that are under the program. This mentorship aspect is critical to the incubator program. In Rukmana's study on optimizing the role of business incubators in higher education, one of the major enabling factors was mentoring and expertise. In providing expertise, these potential mentors must have at least six years of professional, entrepreneurial, or industry experience, including providing a proven track record of leadership in developing and executing strategies that grow ventures for profit and impact. Rukmana et al. (2023) revealed that "access to experienced mentors and subject matter experts is crucial for guiding starts and transferring valuable knowledge" (p. 172).
3. Financial Simulations: The incubator also works with grants, organizations, financial institutions, and investor groups to help prepare the fellows for investment by the time they are done with the incubator. It is important for universities to leverage external stakeholders even in conducting their entrepreneurial activities.

[4]Rukmana, A. Y., Meltareza, R., Harto, B., Komalasari, O. & Harnani, N. (2023). Optimizing the role of business incubators in Higher Education: A review of supporting factors and barriers. West Science Business and Management, 1 (3), pp. 169-175.
[5]Ibebuaku, K. & Dinbabo, M. (2018). Beyond entrepreneurship education: business incubation and entrepreneurial capabilities. Journal of Entrepreneurship in Emerging Economies, 10 (1), pp. 154-174. DOI: 10.1108/JEEE-03-2017-0022

# Enhancing the Entrepreneurial Ecosystem through Leadership

The Ashesi Journey

ASHESI UNIVERSITY

# Enhancing the Entrepreneurial Ecosystem through Leadership: The Ashesi Journey

## 1.0 Case Context

Commentators note that even if an entrepreneurial ecosystem is endowed with all other enablers (e.g., funding and infrastructure), leadership is needed to mobilize the other enablers to work in a synergy for a desired ecosystem. Leadership that is mindful and visionary about making Ashesi an entrepreneurial university and suitable for raising entrepreneurs and intrapreneurs. A leadership that listens to the needs of students, alumni, and industry every step of the way is at the core of Ashesi's Ecosystem. celebrates innovation, supports, and provides an enabling environment for its members to identify, build and create things. A leadership that is open to innovation and pursuing novel but promising opportunities. This type of leadership transcends from the university's Founder & President, the Executive, provost to every other gatekeeper of a unit of the university. Leadership of the University has always been intentional about what they wanted the University to become and getting the right followership. Hence, this case presents how Ashesi University was able, at the back of strong leadership, to improve upon its Entrepreneurial Ecosystem.

## 2.0 Entrepreneurship Ecosystem in Practice and the case of Ashesi University

Building the EE of an HEI is a complex process that requires a comprehensive approach but there is no one format fit it all (Agbodjah et al., 2023). Building an entrepreneurial ecosystem is a continuous process and requires a commitment to long-term development. Ashesi rolled out its ecosystem in bits making room for reviewing milestones and adjusting because change is constant and new opportunities would emerge that must be leveraged.

Isenberg (2011) highlights the importance of leadership and policies as one of the six critical domains to be considered in establishing an entrepreneurship ecosystem. It is possible to define entrepreneurship ecosystems by different parameters. However, one of the underlying dimensions of any EE is the leadership that guides the determination of the direction of the EE and the kind of strategies and resources required to attain expected outcomes. Agbodjah et al. (2023) highlight leadership and visioning as a strategic enabler. It is realized that leadership does not only sit at the top to set the vision, but it should run through every aspect of the university to achieve the goals of the EE. The Ashesi University case is a prime example of how leadership and visioning is critical to attaining successful outcomes in the EE.

### *2.1 Leadership and Visioning at Ashesi University*

Under the visionary leadership of Mr. Awuah, Ashesi University identified a crucial gap that necessitated the establishment of a dedicated committee. This committee, comprised of key stakeholders including executives, the Head of the Business Department, and other essential members, was tasked with aligning the envisioned entrepreneurial ecosystem with the university's overarching mission and strategic plan.

Recognizing the paramount importance of a clear vision, the committee embarked on a comprehensive desk research initiative. This involved an in-depth review of various entrepreneurial ecosystem models and frameworks to benchmark structures for implementation. Among the frameworks considered, a modified version of Isenberg's model was adapted to guide Ashesi's unique ecosystem. While these frameworks provided valuable insights, it is crucial to note that they are descriptive rather than prescriptive, laying the foundation for a strategic plan.

### *2.2 Strategic Planning and Blueprint*

The initiation of Ashesi's entrepreneurial ecosystem involved the meticulous creation of a strategic plan. This blueprint outlined the necessary structures, including support systems and the establishment of an endowment fund. The leadership, represented by key individuals within the committee, attended conferences, workshops, and undertook scoping visits to renowned entrepreneurial ecosystems, particularly those of Ivy League Universities. This hands-on approach facilitated the gathering of insights, enabling the adaptation of best practices to the Ashesi context.

Given the scarcity of exemplars within the African context, the adaptation process considered the unique circumstances of Ashesi, recognizing that what works in one setting may not necessarily be effective in another. Stakeholder consultations played a pivotal role, involving internal and external collaborators such as students, staff, alumni, development partners, and the private sector. This inclusive approach ensured the alignment of the ecosystem with the diverse needs and aspirations of the university's stakeholders.

### *2.3 Stakeholder Engagement and Capacity Building*

A critical aspect of Ashesi's ecosystem development involved engaging stakeholders to gather ideas and document lessons learned. This inclusive approach incorporated feedback from students, staff, alumni, and external partners, ensuring a holistic alignment of the ecosystem with the collective vision. To cultivate an entrepreneurial spirit among staff, comprehensive sensitization and education initiatives were implemented. For students, the focus shifted toward mindset development, supported by co- and extracurricular activities designed to provide active involvement and memorable entrepreneurial experiences. Additionally, the strategic hiring of staff with specific skills, including fundraising and public relations specialists, aimed to enlist their participation and align their efforts with the ethos of Ashesi.

### *2.4 Curriculum Enhancement and Collaborations*

Ashesi University underwent significant structural and curricular changes based on needs analysis and emerging trends. Courses such as business negotiations, creative problem-solving, principles of design, and approaches to African development were introduced to provide a robust foundation for entrepreneurship. External collaborations with stakeholders such as the Venture Capital Trust Fund, Ghana Angel Investors Network, Innohub, and financial institutions were fostered to leverage both cash and in-kind support.

### *2.5 Institutional Framework and Financial Support*

The establishment of a governing council comprising industry leaders, an investment committee, and a management committee underscored Ashesi's commitment to institutionalizing its entrepreneurial ecosystem. This led to the creation of the Ashesi Enterprise Fund (AEF), an evergreen fund designed to provide student startups with proof-of-concept grants and soft loans. This financial support mechanism aimed to empower students to validate their business models, products, and services, ensuring sustained growth within the university's entrepreneurial ecosystem.

Agbodjah, S., Murithi, W., Gakii, A., Asante-Darko, D. & Kwarteng, A. (2023). A Framework for defining, describing, and diagnosing ($D^3$) Entrepreneurship Ecosystems within sub-Saharan African higher educational institutions [Thought Leadership Project].

## 3.0 Challenges and Successes

### *3.1 Challenges*

The AVI program has faced some challenges, but there are also gaps that the incubator can take advantage of as well.

1. Shifting the mindset of both staff and students towards entrepreneurship required comprehensive sensitization and educational initiatives, which required a significant amount of time and resource allocation.
2. Recruiting and retaining staff with the necessary expertise and a shared ethos presented challenges, as finding individuals who were not only 'hands-on' but also aligned with Ashesi's values required careful consideration.
3. The dynamic nature of entrepreneurship ecosystems necessitated continuous adjustment. Ashesi's approach of rolling out its ecosystem in bits allowed for flexibility but also required a commitment to regular review and adaptation.
4. The absence of successful ecosystems within the sub-region made it challenging to find relevant benchmarks for certain aspects of the ecosystem, requiring a more innovative and adaptive approach.
5. While global benchmarking provided valuable insights, the challenge lay in ensuring that the adaptations made were suitable for the local context and would contribute effectively to the success of Ashesi's entrepreneurial ecosystem.

### *3.2 Successes*

1. Ashesi University demonstrated a commitment to entrepreneurial development, initiating the creation of a dedicated committee and aligning the ecosystem with the university's overarching vision.
2. The adoption of a modified version of Isenberg's model showcased Ashesi's adaptability, allowing the institution to tailor its entrepreneurial ecosystem to its unique context and needs.
3. The inclusive approach to stakeholder engagement, including internal and external collaborators, fostered a sense of collective ownership and alignment with the diverse needs and aspirations of the university community.
4. The restructuring of the school curriculum to include courses focused on entrepreneurship and design thinking demonstrated a commitment to providing students with a holistic education that prepares them for entrepreneurial challenges.
5. The establishment of a governing council and the creation of the Ashesi Enterprise Fund (AEF) demonstrated an adherence to institutionalizing the entrepreneurial ecosystem, providing a sustainable source of funding for student startups.

## 4.0 Lessons learned

The following lessons can be drawn from Ashesi University especially for universities who want to explore how leadership and visioning is critical to establishing a successful entrepreneurship ecosystem:

2. Emphasizing intentionality has been foundational to the success of Ashesi's entrepreneurial ecosystem, providing a strategic and purposeful approach at every step.
3. Core members of the community or leadership of the ecosystem working in silos degenerates' efforts toward success.
4. Documenting processes and sharing milestones on achievements and failures help to keep the ecosystem builders accountable.
5. Developing a clear vision and strategy is crucial, ensuring the creation of a sustainable ecosystem that can evolve and adapt over time.
6. Clearly communicating the value of entrepreneurship to the HEI community is essential in building support and buy-in for the ecosystem.
7. Developing a clear vision and strategy is essential for creating a sustainable ecosystem that will continue to evolve and adapt over time.
8. Having a clear structure and supporting people to work collaboratively accelerates gains.
9. Building an entrepreneurial ecosystem takes time and requires sacrifices, patience, and perseverance. It cannot happen overnight.

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# Entrepreneurial Ecosystem Building: Steering Impact through Students and Community


Strathmore
UNIVERSITY

## 1.0 Case Context

Strathmore University (SU), a Kenyan based private university, envisions being the leading entrepreneurial university in the region, offering world-class and accessible high-quality university education and training across diverse programs. In encouraging entrepreneurship, there are two target audiences that Strathmore University caters to. The university first supports its undergraduate students, and that usually involves the startup ventures, the business plan competition, and incubation centers among others. The other target group are recipients of the executive education and business training programs. These individuals are usually already business owners but need capacity building to support their growth.

There are key areas by which this case study highlights SU's entrepreneurial ecosystem building, and these are: university's approach to supporting entrepreneurship, its collaboration with external partners, and the impact of government policies on its entrepreneurial ecosystem.

## 2.0 Entrepreneurship Ecosystem Practice and the case of Strathmore University

With Strathmore University's entrepreneurship ecosystem, much emphasis lies on pedagogy and the activities from the university and how it is leveraged to support mainly students, and entrepreneurs. In establishing a thriving entrepreneurial ecosystem, students, through various departments and initiatives, are offered valuable opportunities to develop their entrepreneurial skills and engage with real-world business ventures.

The university first ensures there is shared purpose among the departments within the institution in promoting entrepreneurship. For example, in the hospitality department, students are encouraged to sell food, while in the School of Computing and Engineering Sciences, the students focus on app development. The Institute of Mathematics focuses on financial engineering and encourages students to work with small-scale entrepreneurs, creating hands-on experiences. It, thus, becomes essential that students are exposed to hands-on, practical ways to make an impact. For instance, during one of the classes, students had the opportunity to identify businesses and through this process were able to consult for a local vegetable seller and advise the introduction of delivery services using a mobile app, which more than doubled her sales.

The experiential element of the learning process touches on aspects of the internal entrepreneurship education ecosystem, in considering the different ways to promote entrepreneurship, especially among students.

When dissecting the curriculum and pedagogical approach of SU, there is a specific conceptual model; that is, the internal entrepreneurship education ecosystem. Under this framework, emphasis is laid on curriculum, co-curricular activities, research, infrastructure, stakeholders, resources, and culture to characterize "internal entrepreneurship" (Brush, 2014, as cited in Agbodjah et al., 2023).
Additionally, Strathmore University has seen success with student startups operating in countries like Congo and Kenya, fostering international engagement.

Outside of departments, and the design of classroom activities, the university organizes programs such as business plan competitions. These competitions, since 2018, has had 60 students every year, and totaling approximately 360 students over three years currently.

The approach towards the entrepreneurial ecosystem building has tried to bridge research. This is implemented through a department called the Institute of Small Business Initiative...

To support its entrepreneurial activities and initiatives, the university is generally supported by partner organizations that are also aligned towards developing the ecosystem. These organizations include USAID and German GIZ and government institutions, such as the Ministry of Cooperative and SME. For instance, the project involving USAID and the government ministry has to do with creating a center for small business development set up across the country and ensure support, training, information, financing resources, coaching and mentorship. The university has also established various support centers for entrepreneurs, including the Enterprise Development Center, the African Key Center, and more.

Other kinds of partnerships that SU has engaged include several financial institutions. The university collaborates with commercial banks like NCBA and ABSA, as well as venture capital providers, who support different initiatives. In terms of direct support to entrepreneurs, these are based on the independent evaluation from the banks.

### *2.1 Conceptual Models under consideration*

Two core frameworks emerge in considering the process of Strathmore University; that is, the quadruple helix model and the internal entrepreneurship education ecosystem.

In understanding the Quadruple Helix model, one must understand its roots. The Triple Helix model is one of the popular frameworks which consider the role of Higher Education Institutions within the entrepreneurship ecosystem. With this model, academia, industry, and government must collaborate to improve innovation.

Due to shortcomings, the Quadruple Helix model emerged as an extension and took into consideration the inclusion of society and non-governmental institutions in the ecosystem (Farinha & Ferreira, 2012, as cited in Agbodjah et al., 2023). The Quadruple Helix model maps seamlessly to Strathmore's approach in the course establishment and running of the family-business programs. Innovations have emerged because of Strathmore's engagement of the Kenyan local community. As was established earlier, family businesses are a major part of the community, and challenges have been identified with the succession of these businesses. Strathmore's action to innovate with an Afrocentric program that propels these businesses aligns to the Quadruple Helix model. Considering the non-governmental actors that also contribute towards innovation, this is evidenced by SU's partnerships with the private sector and development partners such as USAID and ABSA Bank.

At the broader and more structural level when considering its entrepreneurial activities, the actions that SU is taking aligns strongly to the triple helix model approach which posits the collaboration of these different entities in creation innovation for the entrepreneurship ecosystems.

On the other hand, when dissecting the curriculum and pedagogical approach of SU, there is a specific conceptual model; that is, the internal entrepreneurship education ecosystem. Under this framework, emphasis is laid on curriculum, co-curricular activities, research, infrastructure, stakeholders, resources, and culture to characterize "internal entrepreneurship" (Brush, 2014, as cited in Agbodjah et al., 2023). The university also leverages student-led activities to build an entrepreneurial culture on campus. Though the framework falls short of including networks, local community, and collaborations, Agbodjah et al. (2023) proposed conceptual framework of the Higher Education Institutions (HEIs) entrepreneurship ecosystem compensations for these shortcomings.

In the proposed conceptual framework, it maps act the core areas of "curriculum and co-curricular activities" into HEI activities. Under these activities, the framework recognizes that other ecosystem stakeholders such as accelerators, governments, public institutions, and the business sector play a role in the entrepreneurship ecosystem.

## 3.0 Challenges and Successes

### *3.1 Challenges*

1. here are challenges with sourcing multiple streams of funding to enable the growth of the entrepreneurship ecosystem for SU. The university relies heavily on school fees as its main source of Internally Generated Fund to finance its entrepreneurial activities.
2. Student entrepreneurs have difficulties accessing seed funding to support their startup businesses. This, sometimes, affects the ability of students into fruition as banks are also unwilling to provide any loans to them without collateral.

### *3.2 Successes*

1. Concerning wins for the entrepreneurial ecosystem, SU has the backing and alignment of the school leadership, as the visionary leadership at the top and across units is one of the key drivers for the ecosystem.
2. One significant success is the impact they can have on the community. They have had meaningful engagements with their community to enhance support for the entrepreneurial ecosystem.
3. The entrepreneurial training run by SU has reached nearly 5000 individuals with majority of them being students at the university.

## 4.0 Lessons learned

1. Though SU has a strong pedagogical and curriculum-based design in the building of its entrepreneurship ecosystem, it is important to recognize and engage the other ecosystem stakeholders (inclusive of external collaborators and partnerships) involved in the process.
2. Partnerships are encouraged by the university leadership. The backing and alignment of the university efforts towards entrepreneurial building is crucial to the success of the ecosystem,
3. Government plays a key role and development of favorable policies for the entrepreneurial ecosystem. The Kenyan government has introduced policies and initiatives aimed at fostering a conducive environment for entrepreneurs. These include simplified licensing, industrial parks, and market development. Government policies have directly impacted Strathmore University's entrepreneurial ecosystem by encouraging entrepreneurship, simplifying business processes, and creating growth opportunities. The university collaborates with government agencies to engage students and foster a better understanding of taxation and business regulations.

# Paid Mandatory Internships for Teaching Faculty in Engineering for Transformational Teaching

## Bahir Dir University (BDU)

## 1.0 Case Context

Bahir Dir University (BDU) recognized a gap in effectively teaching subjects such as engineering and entrepreneurship, and where their intersections lie.

In building their entrepreneurial ecosystem, this was one of the actions the university took. In the process of innovating towards filling that gap, BDU implemented a unique approach towards enhancing entrepreneurial pedagogy in engineering education, where faculty are required to take part in a mandatory six-month paid internship. BDU was strategically positioned towards making these changes because of two nationwide initiatives in Ethiopia, one being to promote the acquisition of critical technical skills throughout the country and the other being the Engineering Reform Program. Under the initiative involving critical technical skills, a TVET-oriented teaching and learning approach[1] from the German system was modeled.

## 2.0 Entrepreneurship Ecosystem in Practice and the case of Bahir Dir University (BDU)

### *2.1 Background*

The paid-mandatory internship program is one other major approach that BDU is using to drive its entrepreneurial ecosystem, particularly with a focus on pedagogical practices for engineering faculty. During this internship program, faculty, for a limited period (usually 6 months), gain internship or working experience in a business or entrepreneurial setting. They still receive their university wages during this time and return to teach after the internship period. The process seeks to help lecturers acquire a deeper understanding of the practical aspects of entrepreneurship. For students, having faculty members with hands-on experiences provides them with more relevant and practical lessons, which better prepares them for starting their businesses or working in the business world.

Mäkimurto-Koivumaa and Belt (2016) found that it was important to "discuss how to promote entrepreneurial mindsets and behaviors with engineering education" (p. 512). In a similar vein, BDU recognized the importance of coinciding these mindsets with engineering education but stressing the entrepreneurial mindsets of the educators as well. In implementing the faculty internship initiative, BDU positions faculty members with hands-on experience which consequently allows them to provide students with more relevant and practical lessons.

Regarding implementation, BDU highlights a clearly thought-out process in approaching the development of its faculty. The program was introduced gradually, and as learning was gained, they were incorporated into it. BDU began by selecting teachers who were naturally enthusiastic about the program (early adopters), and later, they were able to attract the participation of the late majority and "laggards." The interns are assigned to local institutions within the country that are relevant to their field and interest.

The university has a University-Linkage Office (UIL), which set up the University-Industry Linkage Directorate (ULD) to facilitate the internship operation. The UIL officer first has a meeting with the company, and they both work towards an agreed set of objectives in terms of learning goals from the internship period. Throughout the faculty internship period, interns go through rigorous reporting, for example, capturing daily activities and challenges. There are other reports captured as well such as the intern's immediate supervisor and the organization's comprehensive blind assessment report. At the end of the program, the intern provides a self-assessment and completion report, which details lessons learned and these lessons can be incorporated into teaching and learnings.

Prior to sending an intern to a particular company, there is an agreed clear and shared objective in terms of learning goals agreed with the company, which is co-created with the UIL officer. These objectives form the basis for the assessment of the internship. Interns are supervised by an experienced mentor or supervisor at the host organization, who provides guidance and feedback on their work. Interns also keep daily records of their activities and challenges using an activity logbook. The intern's performance is evaluated using a three-pronged approach. (1) BDU conducts on-site visits, led by the University-Industry Linkage (UIL) Officer and a department staff member, to assess the performance of intern teachers. The intern's immediate supervisor is interacted with during these visits. (2) The organization hosting the intern submits a

[1]'Technical and vocational education training' (TVET) is defined as "comprising of education, training and skill development relating to a wide range of occupational fields, production, services and livelihoods" (UNESCO, 2015)

[2]Mäkimurto-Koivumaa, S. & Belt, P. (2016). About, for, in or through entrepreneurship in engineering education. European Journal of Engineering Education, 41 (5), 512-529. http://dx.doi.org/10.1080/03043797.2015.1095163

comprehensive blind assessment report, and (3) the intern completes a self-assessment plus a completion report. This report details among other lessons learned and how these would be incorporated into teaching and learning.

The university employs two approaches to address the resulting human resource gap because of some teachers being away for internship. These are offering part-time teaching opportunities or assigning overload teaching duties to other teachers. In the case of the latter, these teachers receive additional payment for their work. This arrangement implies that the university bears the cost of the teacher's six-month salary and the cost of hiring other staff to meet the demand.

These linkages are critical to an assertion made by Mäkimurto-Koivumaa and Belt (2016) that developing curricula that effectively addresses the "diverse requirements of entrepreneurship education", especially from the perspective of engineering education is a "demanding task." Thus, this development process requires building "multi-skilled teams" connecting "teachers of engineering substance", "experts on pedagogy" and "external experts on entrepreneurship", since people from different "backgrounds and working environments" tend to understand "entrepreneurship differently" (p.523). This multi-faceted thinking also pokes at the justifications under the triple helix model, which discusses the role of HEIs within entrepreneurship ecosystem, specifically advocating for the strength of the collaborative relationships between academia, industry, and government to improve innovation. Between these core areas, there is a focus on partnerships and support cooperation which includes academia (representing the key to knowledge) and industry (the production key). One must also recognize the government's influences in creating a conducive environment for BDU to change how it develops its faculty. The case study points to BDU being able to take these steps because of two nationwide initiatives that were launched by the government.

Considering, why BDU's approach focuses on industry internship and the focus on faculty, an earlier study using national survey data for full-time faculty in engineering, Fairweather and Paulson (1996) examined whether previous work experience in industry affects faculty attitudes and behavior towards teaching and research. The results were promising. Faculty with greater work experience were found to spend more time teaching above and beyond their work assignment. These results further throw light on building industry experience among faculty to ensure their development for transformational teaching.

[3]Fairweather, J. & Paulson, K. (1996). Industrial experience: Its role in Faculty Commitment to Teaching. Journal of Engineering Education, 85 (3), 209-215. DOI: https://doi.org/10.1002/j.2168-9830.1996.tb00235.x

Agbodjah, S., Murithi, W., Gakii, A., Asante-Darko, D. & Kwarteng, A. (2023). A Framework for defining, describing, and diagnosing ($D^3$) Entrepreneurship Ecosystems within sub-Saharan African higher educational institutions [Thought Leadership Project].

### *2.2.2 Conceptual Framework*

In further exploration of the intersection between engineering education and entrepreneurship through the approach of mandatory faculty internships to equip engineering educators in transforming their pedagogical approaches to education, there were two main frameworks underlying the study.

***Internal Entrepreneurship Education Ecosystem***

This framework, proposed by Brush (2014), is important to the study because the internal entrepreneurship education ecosystem is interpreted as curriculum, co-curricular activities, and research in this case. It further speaks to other players such as infrastructure, stakeholders and the resources that characterize this ecosystem. In the same way this framework focuses on educational stakeholders in driving ecosystem change, such is the case with BDU and its engineering faculty.

***Conceptual Framework for Defining, Describing and Diagnosing ($D^3$) Entrepreneurship Ecosystems***

However, under the Proposed Conceptual Framework by Agbodjah et al. (2023), there are pillars and activities involved in developing the entrepreneurial ecosystems in HEIs.

One of these pillars include teaching for, through and about entrepreneurship, with Sirelkhatim and Gangi (2015) recognizing that there are practical-oriented courses that teach 'for' entrepreneurship (as cited in Agbodjah et al., 2023) With this approach, students are encouraged and their intentions towards entrepreneurship are enhanced.

However, within these pillars, are core HEI activities that define these pillars. In the process of defining core themes for the various HEI activities, participants (consisting of university leadership, lecturers, university support staff, etc.) were engaged in a focus group discussion. Through the discussions, themes emerged such as conducive environment, curriculum, student engagement, transdisciplinary (for example, health, education, engineering, etc.), and curriculum.

Among these themes, transdisciplinary stands out because it aligns with the earlier assertion made by Sirelkhatim

and Gangi (2015) about practical oriented courses used to teach "for" entrepreneurship (as cited in Agbodjah et al., 2023). It also links to one of the HEI aspirations; specifically, building up students with an entrepreneurial mindset. However, what makes this framework particularly important to the initiative being undertaken by BDU towards its faculty, is its recognition of HEI enablers. Among the HEI enablers with strategic importance to this case study are faculty, training and development opportunities, and strong faculty development systems. Under this framework, it is recognized that when activities are framed around certain key factors such as faculty, it plays an important role in building an internal education entrepreneurship ecosystem.

## 3.0 Challenges and Successes

### *3.1 Successes*

1. The assessment of the initiative comes with a high return in investment and benefits that outweigh the different costs associated with the project.
2. The program demonstrated the resiliency of the BDU team, as they were able to pull together the human resource (UIL Directorate), the navigation team to support the internship initiative. Using their expertise and commitment, they were able to navigate the intricacies of the industry and build the essential links to make the internship program successful.

### *3.2 Challenges*

1. The lack of readiness to embrace innovation in the industry has significant implications for internship outcomes. Interns have limited exposure to innovative ideas and technologies, limited autonomy to experiment and develop their skills, limited mentoring and coaching, and limited impact on industry or society. For example, this limits interns' ability to learn by doing and to develop their problem-solving and critical-thinking skills. This results in a less fulfilling internship experience and lower quality outcomes for the intern, especially in taking back to the classroom.
2. Even though stakeholders were made aware and informed about the initiative, it still encountered resistance from some employees. At the start, garnering stakeholder cooperation and support, particularly from the staff, was challenging. This is a common occurrence when it comes to implementing change. Some members perceived the initiative as just another fleeting endeavour, following in the footsteps of previous unsuccessful initiatives.
3. Closely related, some interns find the internship structure and strict industry protocols to be overwhelming. The workspace and regulations are unfamiliar, and the demands placed on them infringe on their freedom. Additionally, some staff consider the internship a challenging task compared to the conventional method of obtaining appropriate course materials, creating lesson plans, and presenting them to students, which is less strenuous and more convenient.
4. Securing suitable leadership possessing the necessary expertise and dedication, along with a combination of experience in entrepreneurship and human resource development, proved to be a challenging task that impeded the program's progress.

## 4.0 Lessons learned

This BDU case provides useful lessons that other universities can learn from:

1. Proper structuring of the internship program and experience including its objectives are key to its success. The working experience should be structured in such a way that interns get to work in various divisions of the organizations. The internships must align with the faculty member's area of expertise and career goals ensures that the intern brings back valuable insights and knowledge to the classroom.
2. The government plays a key role in enabling the environment that supports university-wide entrepreneurial actions.
3. It is important to outline clear objectives, a shared vision, and an understanding of the challenge being faced and why change is important; in this case, the change being setting up an internship program for faculty. It is important because the internship program required changes for faculty from the academic environment and incorporated having other faculty to take up an increased load or the university hiring additional part-time staff during the internship period. Also, throughout the case, they set out expectations for the internship program to ensure effective program management.

[3]Fairweather, J. & Paulson, K. (1996). Industrial experience: Its role in Faculty Commitment to Teaching. Journal of Engineering Education, 85 (3), 209-215. DOI: https://doi.org/10.1002/j.2168-9830.1996.tb00235.x

Agbodjah, S., Murithi, W., Gakii, A., Asante-Darko, D. & Kwarteng, A. (2023). A Framework for defining, describing, and diagnosing ($D^3$) Entrepreneurship Ecosystems within sub-Saharan African higher educational institutions [Thought Leadership Project].

# Entrepreneurship Ecosystem in Practice and the case of Bahir Dir University (BDU)

## 1.0 Case Context

Bahir Dar university, established in 1963, is a public university in the city of Bahir Dar in Ethiopia which emphasizes on technology and engineering education. BDU currently has a total student population of 52,830 across 219-degree programs. BDU is a well-known techno entrepreneurial institution. Activities of the university are tailored along the three-signature mandate of universities 'triple helix': teaching, research and innovation, and community service for domestication and decolonization of the entrepreneurial ecosystem. Bahir Dir University (BDU) recognized a gap in effectively teaching subjects such as engineering and entrepreneurship. In the process of innovating towards filling that gap, BDU implemented a unique approach towards enhancing entrepreneurial pedagogy in engineering education, which includes a requirement for faculty to take part in a six-month paid internship. BDU was strategically positioned towards making these changes because of two nationwide initiatives in Ethiopia, one being to promote the acquisition of critical technical skills throughout the country and the other being the Engineering Reform Program. Under the initiative involving critical technical skills, a TVET-oriented teaching and learning approach from the German system was modeled.

The approach to entrepreneurship at Bahir Dar university centers on supporting its students and staff to be entrepreneurs. BDU looks within the university for solutions to local problems by tapping into its human resources for solutions before thinking about outsourcing to well-established firms. Three different approaches are employed by BDU.

The first approach is the university purchasing products or services such as such as training, software, or logistics from student startups for a limited period, usually five years instead of outsourcing the service to a well-established company. The second approach is the university itself selecting a business to operate and outsourcing different small operations of that business to its own student and staff startups. This approach can help the university to develop its own business operations while providing opportunities for student startups to gain experience and revenue. For instance, when the university needed a software on student information, it tapped into the skills of its members that led to the development of a good software which later became renowned in Ethiopia.

## 2.0 Entrepreneurship Ecosystem in Practice and the case of Bahir Dir University (BDU)

BDU's entrepreneurship ecosystem is centered on nurturing and co-creating locally relevant solutions tailored to their institution and context. The fundamental pillars driving this initiative encompass:

1. Community of Support for Student Startups: BDU fosters a supportive community for student startups, offering guidance, mentorship, and resources to help these budding entrepreneurs thrive.
2. Strategic Partnerships with Private and Public Entities: BDU forges strategic alliances with private and public organizations to provide the vital support necessary for entrepreneurial growth and innovation.
3. Transformative Entrepreneurship Education: BDU reimagines entrepreneurship education by emphasizing hands-on, exploratory learning over pure theoretical instruction. They aim to equip students with practical skills and experience.

BDU's approach to Entrepreneurship Ecosystem (EE) development aligns closely with the principles of the EED Framework, which revolves around the examination of three key aspects: HEI Enablers, HEI Activities, and EE Aspirations. The Entrepreneurship Ecosystem Development (EED) Project conducted an in-depth desk study, focusing on the conceptual research and methodology surrounding entrepreneurship ecosystem development within higher education institutions. Several theoretical frameworks were explored, some of which strongly resonate with BDU's approach.
Underlying BDU's unique approach to "domesticated entrepreneurship" is a conceptual framework proposed by Agbodjah et al. (2023) that examines entrepreneurial ecosystems within Higher Education Institutions. This framework introduces HEI entrepreneurship ecosystem aspirations, defined by Agbodjah et al. (2023) as the "HEI goals, motivations, and desires to develop entrepreneurship ecosystems supporting the entrepreneurial intentions of students, staff, alumni, communities, and stakeholders."
BDU, within this framework, demonstrates an aspiration to positively impact local and indigenous communities, a clear priority embedded in their entrepreneurship ecosystem development approach.

What distinguishes BDU's entrepreneurial efforts is their holistic approach to infusing an entrepreneurial mindset among their internal university stakeholders while pursuing these aspirations. In essence, BDU not only imparts

entrepreneurship education but actively engages in entrepreneurial practices.

The university positions itself as the primary customer for student businesses, providing a real-world testing ground for innovative ideas. Moreover, BDU collaborates with student startups, outsourcing various aspects of its operations, thus fostering a unique synergy between academia and entrepreneurship. This approach not only nurtures the entrepreneurial skills of students but also bolsters the local entrepreneurial ecosystem through student-led enterprises.

BDU's emphasis on public-private partnerships underscores their recognition of the collaborative nature of entrepreneurship ecosystem development. These strategic partnerships with private institutions and government entities offer invaluable support and resources for entrepreneurial endeavors.

To steer their research and innovation objectives in a structured and strategic direction, the university has introduced "the blue" as a guiding framework document. This ensures a well-defined approach to entrepreneurial ecosystem development, characterized by an emphasis on research and innovation.

BDU's approach acknowledges that entrepreneurship education should be customized to the unique needs of society and the institution itself. In doing so, they break away from one-size-fits-all models, highlighting the importance of aligning entrepreneurial education with the specific cultural and regional requirements. This tailored approach ensures that entrepreneurship education is both relevant and effective in their context.

## 3.0 Challenges and Successes

### *3.1 Challenges*

1. The help from the government and the private sector in supporting the entrepreneurial ecosystem of the university is inadequate.
2. Collaboration with the private sector is quite limited to competitions on entrepreneurship but does not extend to funding startups from the university.
3. In addition, the university is yet to develop a monitoring and evaluation tool for tracking progress among alumni ventures.

### *3.2 Successes*

1. Deployed an action plan that recognizes the development of contextualized entrepreneurship ecosystems
2. The reliance on social media, led by the university, tools was a "game changer" in reaching out to markets for designed products and services.
3. Established some partnerships with private entities and government agencies to advance entrepreneurial goals.

## 4.0 Lessons learned

BDU's case provides useful lessons that other universities can learn from:

1. Universities should be purposeful in nurturing entrepreneurial ecosystems within their institutions. BDU's proactive approach to entrepreneurship ecosystem development highlights the importance of creating an environment where innovation and entrepreneurship can thrive.
2. BDU's innovative approach suggests that entrepreneurial research can be more impactful when co-led by students and academic staff. This collaborative model enhances research quality and empowers students to participate in knowledge creation.
3. 3. The traditional theoretical approach should be complemented with more exploratory and experiential learning methods. BDU's focus on practical, hands-on entrepreneurship education aligns with the evolving needs of students and the entrepreneurial landscape.
4. 4. African universities should contextualize their entrepreneurship education resources. BDU's case highlights the importance of tailoring education to specific needs and opportunities within the local and regional context.
5. 5. Universities must take the lead in driving entrepreneurship within their communities. BDU's example of establishing businesses in collaboration with students highlights the potential for universities to actively engage with and support student entrepreneurs.
6. 6. Universities should be willing to showcase and promote the products and services of student entrepreneurs to a broader market. This exposure not only benefits student startups but also contributes to the university's reputation as a hub of innovation and creativity.

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# Entrepreneurial Ecosystem Building: A multi-pronged approach


MAKERERE UNIVERSITY

## 1.0 Case Context

Makerere University is Uganda's oldest and largest Higher Education Institution (HEIs), having been established as a national independent university in 1970 and located in Makerere Hill, and known for research. The university provides a wide range of academic programs, with approximately 145 undergraduate programs and over 139 postgraduate programs across several colleges. The university's entrepreneurship department and college started work with research and innovation, leading to a process where the School of Business was working towards autonomy, with an independent campus.

The Makerere University Business School became a college which entails business, entrepreneurship, research, and innovation, and established the Makerere University Business School Innovation & Entrepreneurship Incubation center.

## 2.0 Entrepreneurship Ecosystem in Practice and the case of Makerere University

As part of Makerere University's entrepreneurial ecosystem, it seeks to leverage the available resources such as curriculum, partners, and infrastructure amongst others to foster entrepreneurship through innovative start-ups. In the case of students, the ideas that would otherwise remain as school projects can be turned into sustainable businesses, encouraging them holistically as entrepreneurs and/or entrepreneurs within organizations (intrapreneurs).

Regarding Makerere's entrepreneurial ecosystem, the university provides different streams such as incubation services, acceleration for student businesses and mentoring support and some form of funding; specifically, through the Makerere Research & Innovation fund (put together by the university, government, and a few partners, which supports faculty and staff towards the advancement of their research projects). Staff might write project proposals (usually involving students and their projects) and the end goal is usually some form of prototype. In this process, however, sometimes the team engages an external entrepreneur. In spearheading innovations, it becomes clear that the ecosystem forming extends beyond the university gates. Once innovations involving products are involved, it is imperative to understand the intellectual property (IP) policy that is available. Usually, ownership lies in the hands of the university, but depending on how a project or product is developed, then, there are conversations around shared policies.

The university, pertaining to its curriculum, has always had entrepreneurship-based courses, both at the undergraduate and postgraduate level, but has taken intentional steps to build out its ecosystem, with entrepreneurship and innovation as the focal area. The university has also pivoted to research-based academics, with 8 colleges having specific focus areas so that research can inform projects that are done for both students and faculty. Some courses, which have been identified as duplicates, were scrapped and other structural changes were implemented to make them more practical, and real-life based.

For the different, mostly independent colleges of the university, there are efforts that are also being made. For instance, the college of IT, as part of its curriculum, includes activities like hackathons and entrepreneurship week. Though more effort is required to actualize the entrepreneurial strategy across the campus, the colleges are usually encouraged to align curricula with the entrepreneurial strategy. Programmatic efforts also augment the entrepreneurial strategy, with the university taking up opportunities with events such as the Uganda Innovation week, bringing together entrepreneurship support organizations and startups, which usually share their progress.

The incubation innovation center program has been put in place to take students through a journey of research. There are also three additional incubation centers; one on food science, entrepreneurship and IT with the same aim and ensure that students are more conscious of research and innovation in the entrepreneurial process to create research-based innovations.

As a public university, Makerere can leverage certain benefits, for example, the university being able to engage parliament on crucial issues. Beyond engagement in accordance with its status as a public university, there have also been efforts to engage with the private sector through industry linkages.

The university has taken a lot of promising steps towards contributing to a strong entrepreneurial ecosystem. As a result, most of these actions are best summarized in Agbodjah et al. (2023) proposed conceptual framework. For instance, Agbodjah et al. (2023) indicates that the distinct entrepreneurial ecosystems are an interaction

of several factors (categorised into three broad areas – Aspirations, Activites and Enablers). In the case of Makerere University, tbere has been a strong focus on start-ups and spinoffs, research and development in patents and product development, and institutional culture to drive its entrepreneurial ecosystem.

Pertaining to the steps that Makerere is taking, this falls in line with the Higher Education Institutions (HEI) activities that support the development of the internal entrepreneurship education, as identified in in Agbodjah et al. (2023)'s proposed conceptual framework. One of the major themes of entrepreneurship education includes practical oriented courses that teach 'for' entrepreneurship and that aims to encourage students to enhance their intentions of being entrepreneurs in the future (p. 60).

Makerere explores this 'for' entrepreneurship dynamic through its efforts of engaging students through its curriculum structuring efforts to ensure that courses are practical oriented, and as well as other support activities and events such as the hackathons held specifically by the IT campus. In lieu of the steps the university has taken, the school also incorporates additional co and extra-curricular activities to strengthen the experience of its stakeholders in pertinence to entrepreneurship. Some of the extra-curricular activities include special events, and incubators and accelerators, which have created some success points for Makerere university.

Additionally, outside the conceptual framework, there is also the triple and quadruple helix model which recognizes some areas that Makerere University has leveraged in some capacity. In connection to the entrepreneurial education ecosystem, there are other ecosystem stakeholders; some of which include business sectors to drive some of the activities that can support the entrepreneurial ecosystem. According to the triple and quadruple helix model, it is essential that the university strengthens partnerships with academia, private sector (industry), government and the local community when it concerns innovation. The university already has a strong partnership with the government, even having the opportunities to make cases to parliament due to its public university status. It also has made efforts towards private partnerships though sometimes there can be the challenge of slow implementation due to the processes involved. There are steps to include the community, but to effectively serve the community, leveraging a "collaborative relationship" between the aforementioned areas would inevitably support the community and the university's entrepreneurial environment as well.

In pertinence to the framework, Makerere has taken great strides that make it strongly align when it comes to the partnerships involved in building an entrepreneurial and innovation ecosystem.

## 3.0 Challenges and Successes

### *3.1 Challenges*

The department has faced some holistic challenges which have been highlighted:

1. The university being public also means that it has a political arm. As a result, there are sometimes limitations on which engagement can be made because adherence to protocols must be met.
2. There are also challenges with bureaucracy in dealing with the incubation center and partnerships. In cases where the partnership process is ongoing, there are issues concerning the responsibilities and activities on both ends. This, then, affects implementation.
3. The university has an intellectual property (IP) process, usually spearheaded by one of the ministries, who are charged with informing entrepreneurs. However, there have been challenges with sensitizing IP.

### *3.2 Successes*

Among the successes of Makerere University, these include:

1. Programmatic Support. In terms of entrepreneurship support, the university has been able to design a structured program that lays out activities, deliverables, steps and phases. This program enjoys the success of being benchmarked by other universities, and seven (7) universities set out to replicate the program. Additionally, the incubation centered has supported over 200 entrepreneurs, and secured over a million dollars in funding for these entrepreneurs, through government and stakeholders.
2. Reach. The university has been able to have engagement outside of Uganda, having had several engagements across Africa through its affiliation with AfriLabs.

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1. Structural Support. They are part of the organizations leading an ecosystem building association, StartUp Uganda, which is a community that brings together entrepreneurship support organizations and ensure the building of an enabling entrepreneurial ecosystem.
2. Partnerships. The university enjoys the prestige of being one of the biggest and oldest university in Uganda. As a result, the university attracts engagement, ranging from ministries to organizations such as UNDP interested in exploring different ways to support the entrepreneurial and innovation ecosystem. Steps have also been taken to form international collaborations, including universities outside Africa.

## 4.0 Lessons learned

Even though the entrepreneurial ecosystem concerning Makerere university is under development, and growing from its inception stages, there are key lessons to be gleaned from the establishment process, which benefits other institutions:

1. Incubators and accelerator programs can go a long way towards creating a healthy entrepreneurial ecosystem because students require support in the idea generation and prototype development stage when it comes to business building. These programs are essential to offering support in product-market fit, building, testing, financing, and technical support for building and running a business. It is essential that there is a clear pathway for students who come in with ideas and/or potential products to have the systems and structures that would support entrepreneurial journeys that emerge from innovations, and that particularly value the role that research must play in building a business.
2. Learning can take place in different schools or departments on the campus. In the case of Makerere University, they observed how the public health school engaged in terms of simpler, and smaller research activities and innovations. One resource, however, that has been critical to progress has been funding. Thus, funding plays a critical role regarding innovations.
3. Makerere has leveraged strong enablers such as infrastructure; having enough space to allocate for projects, effective internet resources through organizations such as CISCO and IBM, and a strong road network joining all the different colleges on campus towards its entrepreneurial ecosystem efforts.

*Agbodjah, S., Murithi, W., Gakii, A., Asante-Darko, D. & Kwarteng, A. (2023). A Framework for defining, describing, and diagnosing ($D^3$) Entrepreneurship Ecosystems within sub-Saharan African higher educational institutions [Thought Leadership Project].

# Commercialization of Research and Innovation for Impactful Solutions

Stellenbosch
UNIVERSITY
IYUNIVESITHI
UNIVERSITEIT

## 1.0 Case Context

Stellenbosch University (SU) is one of the oldest Higher Education institutions in South Africa, having attained its status as a public university in 1918. It is commonly known for its vibrant entrepreneurial ecosystem with a strong entrepreneurial orientation, education, and practice in Africa. The university is currently a leader in research and innovation, with a strong focus on promoting entrepreneurship among its community and creating employment opportunities.

Stellenbosch University is actively building its entrepreneurial ecosystem through groundbreaking research and innovative ideas by creating start-ups and spin-off companies and obtaining patents. The university has an impressive portfolio, including **43** provisional patents, **146** developed ideas, **96** licenses, **30** spin-out companies, and **307** employees working in portfolio companies.

## 2.0 Entrepreneurship Ecosystem in Practice and the case of Stellenbosch University

In building its entrepreneurial ecosystem through the focus on research and commercialization, this university has established various structures and facilitators to aid in commercialization, which revolves around the university itself, students, faculty and three of its wholly owned spin-offs: Innovus (technology transfer office) and SUNCOME, US Enterprises (Pty) Ltd1 and Launchpad (Incubator and accelerator).
In this model, the relationship is more of a value chain, where the three independent, but interrelated structures of the university interact at various levels to convert ideas, research, and innovations into commercially viable products or services.

Through researchers, innovators and entrepreneurs, the university generates impact potential ideas, research outputs and innovations. After this first step, the various factors work together to drive forward research commercialization.

1. Innovus, the Technology Transfer Office supports them by commercializing their outputs into commercial products and services. The office helps them understand and navigate the complex legal and commercial issues surrounding intellectual property through routine awareness training programs, workshops, and boot camps. The programs and opportunities help the offices to identify what elements of their research or innovation may be eligible for IP as (patents, trademarks, or copyrights), including scope and channels of protecting and guiding them through securing and managing these rights.
2. SUNCOME, which is a division of Innovus, focuses on identifying and commercializing non-academic projects, especially IP not affiliated with the university that involves commercialization.
3. SU also has a business accelerator, LaunchLab which promotes entrepreneurship by providing tailor-made hand-holding services for accelerating spin-off companies and student-founded businesses from Stellenbosch University into successful companies. LaunchLab also incubates students with viable business ideas through its ‘hot desk’ and extends its acceleration services to external start- ups in need. External businesses are those not related to SU. Some of the initiatives of LaunchLab include mentorship and co-working spaces, organization of periodic entrepreneurship community events, experiential learning workshops (such cold learning sessions, velocity engagement programs and countdowns2), and entrepreneurship competitions. For instance, an idea-pitching session is held on the last Friday of every month to advise entrepreneurs on the areas of the idea and potential business that can be developed.

The university also has designed structures around curriculum changes to further its goal in the commercialization of knowledge. These actions involve:

1. The creation of educational resources to support efforts towards the commercialization of research
    I. A spin-out information guide, which is an e-book offering step-by-step guidance and information to researchers and students on the processes and nuances of technology transfer process through Innovus.
    I. An instant start-up toolkit, which is an online platform with tools, forms, documents, videos, and support services for SU’s spinout companies.
2. The enactment of a translational fellowship program specifically for PhD and master’s students to encourage them to turn their research into a successful business or product.
3. The formation of a multi-stakeholder membership network of entrepreneurs, industries, government, and academic institutions to collaborate, cross-pollinate ideas and support each other.

[1]The US Enterprises (Pty) Ltd is a subsidiary of SU and responsible for managing the university's shares in its portfolio companies and interactions with equity holders. This includes overseeing the university's commercial interests in these companies and ensuring that the portfolio companies operate in a way that benefits the university and the companies themselves.

### *2.2 Understanding the Conceptual Framework*

The systems, structures and systems highlighted that have been put in place by Stellenbosch University to aid in commercialization of research brings forth an understanding of the crucial role that higher education institutions play in innovation. Agbogjah et al. (2023)3 supports these insights succinctly, and further corroborates the need to equip HEIs (Higher Education Institutions) and their entrepreneurial systems towards the commercialization of research:

> Higher Education Institutions (HEI) are important actors and contributors to the development of entrepreneurial ecosystems through research, innovations, and education of a skilled labour force. This has enabled researchers worldwide to begin to see HEIs and their surroundings as a distinct ecosystem that helps entrepreneurs develop their business ideas. Therefore, universities are a force to reckon with as they promote entrepreneurial culture and act as a catalyst for start-ups and spin-offs, in addition to providing knowledge and human capital (students and faculty). (p.21).

Other than the importance of this research, there are varying frameworks that support the structures that Stellenbosch has put in place. Among the different frameworks (triple helix model, and entrepreneurship education ecosystem (EEE)), each re-echoes insights that point towards the importance of structures such as "technology transfer offices (TTOs) and entrepreneurship centres4."

Specifically, under the EEE framework, the authors call for a shift towards a more practice-based approach and with more engagement with researchers or scientists, for example engaging scientists in incumbents, spin-offs, or consulting projects. Furthermore, the authors, by pushing for the development of entrepreneurial capabilities and mindsets not only improve the experiences for students and businesses, but also engage "would-be entrepreneurs with scientists and businesses to advance and promote further knowledge commercialization4." As was established earlier, SU engages researchers, innovators, and entrepreneurs when developing its impact potential ideas.

In connection to the EEE framework, links can be drawn to the Higher Education Institution activities element under Agbodjah et al. (2023)'s proposed conceptual framework. With these activities, it highlights key components, of which core curriculum (entrepreneurship) curriculum and research, innovation and development have ties to Stellenbosch's activities. LaunchLab provides support for the development of entrepreneurship curriculum for faculty and assists them on the best areas to include and invest in in the classroom. In pertinence to the framework, SU has taken a unique approach of blending its co- and extracurricular activities to the development of its curriculum program by having LaunchLab "advise" for the entrepreneurship curriculum.

Additionally, SU's partnerships and collaboration with industry and government agencies have provided access to critical network, financial and technical support to build its entrepreneurial ecosystem. These partnerships align with the precedence of the "triple helix-model", which recognizes the importance of academia, government, and industry to improve innovation.

[2]Velocity engagement programs comprise workshops and other interactive sessions aimed at imparting entrepreneurial knowledge and skills to participants and encouraging innovative thinking to foster an entrepreneurial mindset and countdown is a program for early-stage businesses or individuals with a business idea who want to determine if it is viable and grow it further.

[3]Agbodjah, S., Murithi, W., Gakii, A., Asante-Darko, D. & Kwarteng, A. (2023). A Framework for defining, describing, and diagnosing (D3) Entrepreneurship Ecosystems within sub-Saharan African higher educational institutions [Thought Leadership Project].

[4]Belitski, M. & Heron, K. (2017). Expanding entrepreneurship education ecosystems. Journal of Management Development, 36 (2).

## 3.0 Challenges and Successes

### *3.1 Challenges*

1. One major problem facing their entrepreneurial ecosystem is the irregular flow of funds, especially government funding which makes it difficult to plan and/or execute entrepreneurial activities.
2. The SU LaunchLab is currently skewed towards students and faculty and recognizes that room must be made for other support staff of the university to benefit from its initiatives.

### *3.2 Successes*

1. Stellenbosch University (SU) has had some of its spin-off companies gain international recognition. Some examples include the SU satellite company that is a crucial supplier to NASA, controlling over 100 satellites and exporting to 25 countries.
2. SU has been ranked the number two university in Africa and part of the top 300 worldwide in the 2023 Times Higher Education Rankings

***Internal Entrepreneurship Education Ecosystem***

This framework, proposed by Brush (2014), is important to the study because the internal entrepreneurship education ecosystem is interpreted as curriculum, co-curricular activities, and research in this case. It further speaks to other players such as infrastructure, stakeholders and the resources that characterize this ecosystem. In the same way this framework focuses on educational stakeholders in driving ecosystem change, such is the case with BDU and its engineering faculty.

***Conceptual Framework for Defining, Describing and Diagnosing ($D^3$) Entrepreneurship Ecosystems***

However, under the Proposed Conceptual Framework by Agbodjah et al. (2023), there are pillars and activities involved in developing the entrepreneurial ecosystems in HEIs.

One of these pillars include teaching for, through and about entrepreneurship, with Sirelkhatim and Gangi (2015) recognizing that there are practical-oriented courses that teach 'for' entrepreneurship (as cited in Agbodjah et al., 2023) With this approach, students are encouraged and their intentions towards entrepreneurship are enhanced.

However, within these pillars, are core HEI activities that define these pillars. In the process of defining core themes for the various HEI activities, participants (consisting of university leadership, lecturers, university support staff, etc.) were engaged in a focus group discussion. Through the discussions, themes emerged such as conducive environment, curriculum, student engagement, transdisciplinary (for example, health, education, engineering, etc.), and curriculum.

Among these themes, transdisciplinary stands out because it aligns with the earlier assertion made by Sirelkhatim and Gangi (2015) about practical oriented courses used to teach "for" entrepreneurship (as cited in Agbodjah et al., 2023). It also links to one of the HEI aspirations; specifically, building up students with an entrepreneurial mindset. However, what makes this framework particularly important to the initiative being undertaken by BDU towards its faculty, is its recognition of HEI enablers. Among the HEI enablers with strategic importance to this case study are faculty, training and development opportunities, and strong faculty development systems. Under this framework, it is recognized that when activities are framed around certain key factors such as faculty, it plays an important role in building an internal education entrepreneurship ecosystem.

## 4.0 Lessons learned

Stellenbosch University highlights that are combination of strategic structures and holistic impact leverages the best support in driving commercialization of its research. The lessons touch on some of the enabling factors that contribute towards driving research, and serve as insights that other universities can tap into:

1. Government and/or Macroenvironmental policy. The National System of Innovation (NSI) policy, the Intellectual Property Act (2010) and a regional innovation system have significantly impacted the development of SU's entrepreneurial ecosystem by spurring innovation and creating a favourable legal environment for commercializing knowledge products and protecting IP. The Act for instance mandates HEIs in South Africa to engage in knowledge commercialization though with guidelines that are flexible for adaptation to context, providing a foundation for development of a pipeline of start-ups and spin-off companies. Other universities can be intentional about its partnerships with governmental agencies.
2. Location. The central location of Stellenbosch University in the town benefits student businesses to grow, as they have access to a built-in audience of potential customers. Upcoming universities can take strategic actions when it comes to location and building for their institutions.
3. Leadership. The university staff and leadership are dedicated to promoting entrepreneurship and providing students with entrepreneurial opportunities and experiences, and this is crucial towards the efforts of the university. University leaders must align with the goal of entrepreneurial ecosystem building.
4. Evaluation and Feedback. SU has established a framework for monitoring, evaluation, and impact measurement to improve efficiency, effectiveness, and accountability of its entrepreneurial ecosystem-building activities. This allows SU to track its performance and take corrective actions when needed. Universities must monitor progress and take actions based of key findings from its evaluations.
5. Access to alternative financial capital. SU has other avenues than the government when it comes to the financial capital to fund research, innovations, intellectual property development and commercialization of technologies. Some of the funds that make this possible include the R2-million University Technology Fund (UTF), the first of its kind in Africa to seed private investments in SU technology. Others are the Seed Fund for entrepreneurs and the National Intellectual Property Management Office (NIPMO) funding. Beneficiaries can draw between $500k-$1.5 million with follow-on funding in the case of the UTF, as pre-seed

funding to secure a higher Technology Readiness level (TRL). The TRL is an indicator that shows that the technology is more developed and has a higher probability of being successfully commercialized. Thus, it is good to have de-risking vehicle (fund) within the university for that period between early adopters and the mass market. Universities can learn to diversify its funding sources and ensure an in-house fund to helps deal with delays in government grants for innovation, or other agencies.

6. University's research identity. SU, being a research-intensive university is a key advantage in commercializing knowledge, research, and technology. The expertise and reputation around research also help to attract investments, partnerships, and other support for commercialization efforts. Thus, it is important to have skilled staff capable of fostering partnerships among stakeholders to ensure a thriving entrepreneurial ecosystem that focuses on research commercialization. Universities must have expertise around a core niche that it can leverage towards fostering its entrepreneurial ecosystem.