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INNOVATION AND TECHNOLOGY

BUILDING AN INNOVATION ECOSYSTEM AND CIRCULAR ECONOMY: A CASE OF KONZA TECHNOPOLIS

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ABSTRACT

Purpose of the Study: To present the role of collaborations and partnerships in building an innovation ecosystem and Circular Economy with a focus on the Konza innovation Ecosystem initiative. Innovation ecosystems and Circular Economy are economic engines for creating new ideas and scaling existing innovations. A circular economy just from the name is a production model that attempts to maximize the value of existing material resources by reusing, recycling, and refurbishing. This model of economy attempts to create a chain in which waste from one company becomes raw materials to the next company. The target is to have zero waste within the organization.

Statement of the Problem: Kenya's innovation hubs are currently at a crossroads; at a high level, there need to be conversations about how the community can immediately plug into the existing government initiatives such as Konza Technopolis, Whitebox and the Kenya industry and entrepreneurship project as well as the SME credit guarantee scheme.

Result: The study contributes to the conceptual debate on innovation ecosystems by providing insights on how companies and research organizations collaborate in new non-linear and interdependent innovation ecosystems.

Conclusion: The paper concludes that collaboration comprises both learnings from existing knowledge and the creation of new knowledge to achieve competitiveness. The growth of the

Konza innovation ecosystem is a clear testament that collaboration and partnerships are key components in building a vibrant innovation ecosystem.

Recommendation: This paper thus recommends the need to build strong collaborations and partnerships as a key enabler in the development of a vibrant innovation ecosystem and creation of circular economy. Promoting collaboration and building a stronger innovation ecosystem go together. It is then followed by a platform physical or virtual that enables linkages an environment and system where people can share their ideas, and get feedback, support others, and receive validation of their solutions.

Keywords: *Innovation Ecosystem, Circular Economy, Konza, Technopolis, Collaborations, Partnerships*

INTRODUCTION

This presentation aimed at ascertaining the role of partnerships and collaboration in building a strong innovation ecosystem and a circular economy. It explored how partnerships and collaboration play a major role in building a strong innovation ecosystem, thus attracting business among them, those in the circular economy. This chapter captures the background to the study, statement of the problem, objective, and theoretical framework.

BACKGROUND TO THE STUDY

Innovation ecosystems are economic engines for creating new ideas and scaling existing innovations with high potential (Schaffers, Komninos, Pallot, Aguas, Almirall, Bakici & Ventura, 2021). They provide the web of support that makes it easier for start-ups to launch and grow quickly, and for the established organizations including Civil Society Organisations (CSOs) to pivot on and innovate more aggressively. Fukuda (2020) explains that an innovation ecosystem is made up of enabling policies and regulations, accessibility of finance, informed human capital, supportive research markets, energy, transport and communications infrastructure, a culture that is supportive of innovation and entrepreneurship, and networking assets, which together support productive relationships between different actors and other parts of the ecosystem. The most popular interpretation of an innovation ecosystem is one in which the innovator or entrepreneur is at the centre, and ecosystem performance is measured in terms of how well it meets their needs in

a sustainable way (Xie & Wang, 2020). In these 'entrepreneurial' models, ecosystem 'strengthening' typically comprises efforts to fill gaps in the size, quality and / or availability of resources that individuals need for entrepreneurship. While some of the latter can be objectively assessed, data around entrepreneur attitudes, abilities and aspirations will also come into play in determining how strong or mature that ecosystem is. Innovation Ecosystem is the interaction of operating environment or the context in which the firms find them in. The IE is positively altering the fundamentals of business models, core capabilities and value addition (SDG, 2019).

A circular economy just from the name is a production model that attempts to maximize the value of existing material resources by reusing, recycling, and refurbishing. This model of economy attempts to create a chain in which waste from one company becomes raw materials to the next company. The target is to have zero waste within the organization. The concept of the Circular Economy (CE), evolved from industrial ecology, and it tries to bring under one name a collection of pre-existing ideas from various scientific fields with shared qualities and characteristics, e.g., industrial ecosystems and industrial symbioses, the 3Rs principle (reduce, reuse and recycle), cleaner production including manufacturing systems' circular materials flows, product-service systems, eco-efficiency, cradle-to-cradle design, green growth, biomimicry, natural capitalism, the resilience of social-ecological systems, the concept of zero emissions and others (Geissdoerfer, Savaget, Bocken & Hultink, 2022). According to Korhonen, Honkasalo and Seppälä (2018), the CE paradigm is proposed to change the current production and consumption pattern of "take-make-dispose" that is threatening the sustainability of human life on earth and is approaching the planetary boundaries (SDG,2019).

The steps in this direction require closing the loops by reusing wastes and resources as well as slowing material loops by developing long-lasting, reusable products (Korhonen et al., 2018). The development and implications of CE are still progressing, and there is no single definition of CE because of its interdisciplinary nature. According to the literature review on CE in the building industry, CE is restorative by design and aims to keep products, components, and materials at their highest utility and value at all times, distinguishing between technical and biological cycles (Bianchi, Cordella & Menger, 2022). Suchek, Fernandes, Kraus, Filser and Sjögrén (2021) believe that circular economy is an economic system that replaces the 'end-of-life' concept with reducing,

alternatively reusing, recycling and recovering materials in production/distribution and consumption processes. It operates at the micro level (products, companies, consumers), meso level (eco-industrial parks) and macro level (city, region, nation and beyond), with the aim to accomplish sustainable development, thus simultaneously creating environmental quality, economic prosperity and social equity, to the benefit of current and future generations (Suchek et al., 2021). It is enabled by novel business models and responsible consumers.

A circular economy maximizes the value of material resources and minimizes greenhouse gas emissions, resource use, waste and pollution (Stahel, 2016). Romero-Hernández and Romero (2018) posit that circularity needs to be understood as a property of a system (e.g., the mobility system of a city), rather than a property of an individual product or service (e.g., a car or a car-sharing service). Hence, there is a need for more knowledge on how to innovate towards 'circular ecosystems'. According to Peeters (2022), innovating towards circularity requires fundamental changes in wide-spread economic structures. Circularity therefore needs to be understood as a systemic property (Tyl & Gomez, 2022). For instance, the circularity of a new and reusable packaging solution for food delivery services requires that multiple actors change what they do: the service provider needs to convince a critical mass of restaurants to adopt the reusable packaging solution; the food delivery platforms need to offer the solution to their users as an option in the ordering process; users need to be convinced and incentivized to opt for it; someone needs to provide clean delivery solutions to transport the food and packs; another actor needs to collect, wash and redeliver the packs, and so on (Köseoğlu, 2022). Circular oriented innovation thus widens the innovation perspective to include the ecosystem, next to a product or service and the business model.

The Kenyan Innovation ecosystem dates back to 2004 when there was a drops in prices of phones. This made them accessible and affordable to many Kenyans (Karjalainen & Heinonen, 2018). In 2006 the government of Kenya laid the undersea internet fibre cable thus linking Kenya to the rest of the world through the internet. One revolutionary innovation that cropped up in Kenya in the year 2007 is *M-Pesa* (a mobile money transfer platform). This innovation continues to revolutionize the financial services sector especially traditional banking. It has also become an anchor platform that tech start-ups build added services on (Holloway, Chiira, Oldfrey,

Barbareschi, Albala, Ayah & Austin, 2019). In 2011, the government launched Kenya's Open Data Initiative, where government data is made readily available via a web portal to government agencies, businesses and citizens alike. In 2013, the government launched the countries blue print Vision 2030 and the National ICT Master Plan, a strategy aimed at helping Kenya become a knowledge based economy with Konza Technopolis being an enabler.

Currently, more than 50% of the world's population lives in cities, which is expected to rise to 60% by 2030 and 70% by 2050 (United Nations estimates, 2021). Cities and metropolitan areas account for about 60% of Gross Domestic Product, but they are also responsible for 70% of CO2 emissions and more than 60% of resource use. This urbanization process is increasing environmental, social, and economic pressures and highlighting the importance of finding environmentally sustainable solutions to reduce the consumption of resources, such as urban mining (Leal Filho, Abubakar, Kotter, Grindsted, Balogun, Salvia & Wolf, 2021). Urban systems and their potential resources have great potential and can provide key opportunities for the transition to an environmentally sustainable world in the coming years. Sustainable and smart cities have the opportunity to lead this transition by encouraging a shift in lifestyles to combat climate change and reduce the impact on the consumption of resources (Leal Filho et al., 2021).

Smart Cities and metropolitan areas have the opportunity to drive circular economies whilst also promoting the usage of renewable energy, energy savings, sustainable consumption and production, sustainable transport, conservation of natural resources, and sustainable waste management (Lakatos, Yong, Szilagyi, Clinci, Georgescu, Iticescu, & Cioca, 2021). Policies to achieve these goals are also promoted by the Sustainable Development Goal 11 of the 2030 Agenda to "Make cities and human settlements inclusive, safe, resilient, and sustainable". In addition, the principles of the circular economy encourage sustainable urban systems to guarantee economic growth and, at the same time, reduce the exploitation of resources and the production of waste, mitigating CO2 emissions. Moreover, urban metabolism is proposed to study the interactions of natural and human systems in specific regions.

Konza Technopolis is designed in a way that Knowledge Economy and Innovation are the two strategic pillars (Strategic Plan 2021-2026). The knowledge economy pillar is responsible for developing and coordinating innovation and R&D programs for Konza Technopolis. This includes

development and management of the innovation ecosystem activities by bringing together various stakeholders within the industry to support the commercialization of research findings. The components of the pillar are: Universities, R&D Centers and Research Centers of Excellence, Pre-incubation, Incubation facilities and Centers/lab, Acceleration centers/labs as well as a Collaboration between education, research, and enterprise/business.

The innovation ecosystem in Kenya has seen support by government through the establishment of several government initiatives including: The National data centre at Konza; Whitebox (a platform initiated by the Ministry of ICT acting as a channel for sourcing innovation aligned to government development priorities); National ICT Policy and the passage of the Data Protection and Privacy Act of 2019; Development of a national optic fibre backbone promoting increased connectivity; The Kenya industry and entrepreneurship project under the ministry of industrialization, trade and enterprise development, whose aim is to strengthen the innovation and entrepreneurship ecosystem (Tanui, 2018). These are just but a few examples of government lead programs supporting the Innovation ecosystem.

STATEMENT OF THE PROBLEM

Innovation Hubs in Kenya are mostly based on the type of support or facilities they offer to entrepreneurs and innovators. This includes incubators, accelerators, university-based innovation hubs, maker spaces, technology parks, and co-working spaces (GSMA, 2019). Sustainability remains a big problem with more than half of existing independently owned hubs. Many of the hubs shut down before reaching the 5- year mark due to the lack of proper strategy in the business model, the organization structure, as well as risks associated with revenue composition that is skewed towards grant funding. Konza developed an innovation ecosystem initiative through the physical space as well as bringing together the various stakeholders within the industry, to support the commercialization of research finding and the development of new solutions and enterprises.

Kenya's innovation hubs are currently at a crossroads; at a high level, there need to be conversations about how the community can immediately plug into the existing government initiatives such as Konza Technopolis, Whitebox and the Kenya industry and entrepreneurship project as well as the SME credit guarantee scheme (Horowitz & Botero, 2018). Second, innovation hubs must shift strategy from firm level to state level so that hubs view their going concern from a

national ecosystem view rather than a single entity view. In other words, innovation hubs must evaluate their collective value proposition to startups as a single unit rather as individual institutions and develop a coherent working mechanism of creating and capturing value. A state strategy means open innovation in the short term during the peak of the pandemic and will involve identifying and prioritizing the most pressing challenges faced by society, taking complete stock of available resources and developing interventions that can both create and capture value which will be shared among all. This can form the foundation for continued partnership and collaboration and survival of many innovation hubs in Kenya. Some of the key challenges in the Kenyan innovation ecosystem include lack of commercialization of research and inventions, as well as uncoordinated innovation pipeline. This has hampered growth of enterprises. Konza therefore seeks to consolidate and harmonize innovation efforts by supporting creation of a vibrant Innovation Ecosystem.

OBJECTIVE

To present the role of collaborations and partnerships in building an innovation ecosystem and Circular Economy with a focus on the Konza innovation Ecosystem initiative.

The Konza Innovation Ecosystem Initiative (KIEI)

Konza Technopolis is designed as a special ecosystem, targeting to promote the knowledge sector in Engineering, Life Sciences, and Information Communications Technology. Konza Technopolis Development Authority (KoTDA) is responsible for development and management of the innovation ecosystem activities by bringing together various stakeholders within the industry to support the commercialization of research findings. KoTDA brings together Universities, Research and Development centers and Research centers of excellence, Incubation facilities and Centers/lab, Acceleration Centers/labs as well as serve as a collaboration bridge between education, research, and enterprise/business. The Authority made significant steps in the establishing itself as an ecosystem enabler by facilitating linkages to other actors in this space and leveraging its unique position in the Quadruple Helix Model of innovation.

The KIEI was set up as a link between the different innovation ecosystems within the country to promote collaboration and break the physical barriers through virtual interactions and physical activities. The program seeks to build capacity of the Kenyan youth to promote innovation in Science and Technology by encouraging uptake of Science Technology Engineering Mathematics

(STEM) from an early age. Further it is supporting innovators in creative economy, agribusiness, agri-tech, engineering, manufacturing, and human health. The program also seeks to bring together the start-ups, innovators, and the right ecosystem partners to ensure the country addresses Food Security and affordable Universal Health care for the Kenyan population.

KIEI also aimed at supporting the operationalization of key infrastructure investment made by the government by allowing the private sector to plug in and create value. The involvement of Government and Civil society ensures the right policy framework is in place to allow innovation to thrive. Private sector and academia on the other hand ensures unlocking of capital, creation of demand and capacity building.

Infrastructure as a competitive innovation platform

The following infrastructure developments have been initiated, funded, and implemented by the government and is in turn attracting the private sector uptake:

i. **Smart City services.** Konza Technopolis offers the following services: Comprehensive ICT and smart city services, high-speed broadband, Smart parking, lighting, waste management systems, smart grid, and health solutions. The government of Kenya is investing in the core infrastructure and the private sector is invited to support with the last mile connectivity.

ii. **Digital Media City (DMC):** The project seeks to promote the growth of the creative and cultural sector industries in Kenya and the region. It will provide an excellent digital media ecosystem for gaming, animation, filming, photography, and entertainment. The project will incorporate research, training, propagation of new technologies, innovation and production of digital media content and entertainment facilities. This project has attracted the media training institutions, investors in the media sector and development partners who have committed to funding the project.

iii. **Kenya Advanced Institute of Science and Technology:** Science, Technology, and Innovation are considered a critical catalyst for fast tracking modernization and transformation of the Kenyan Society into a middle-income country by 2030. The establishment of KAIST, a graduate only university at Konza is key in attracting highly

skilled manpower. This will intern attract the private sector, who are keen to locate in a space that with a pool of talent.

iv. **Partnership and collaboration:** The program have attracted over six (6) academia partners, over 20 private sector players, over 25 new enterprises. As a result, the program has attracted more than 10 none state actors as well as over 40 innovation hubs drawn from different parts of the country.

Role of the Konza Innovation ecosystem

- Provides an environment that enhances innovation, Synergy, creativity, and co-existence.
- Assists client businesses innovate more successfully or better exploit their existing technology-based products and services.
- Offers or induces others to offer relevant services needed to enhance the development prospects of client companies, while such services may be absent or weak in the local innovation ecosystem.
- Enables networking and collaboration through well-structured processes and networks between educational, research and commercial partners for innovation.
- Provides pre-incubation, incubation, acceleration, investments and technology transfer services, both virtually and onsite.

Impact of the program

So far, the program has achieved the following:

1. Trained over 200 children between the ages of 9 and 15 on computer programming with follow-up during every school break.
2. Trained over 200 innovators on design thinking, branding, and technology solutions to grow their ideas into businesses.
3. Run innovation challenges in the areas of health, agritech, smart cities and ICT where more than 25 start-ups have emerged and are currently running and thriving.
4. Offered prize money to the winning start-ups and innovations to encourage their growth.
5. Offered incubation and acceleration services to the promising start-ups.

6. Provided hardware to various innovation hubs and labs in the country to foster innovation and allow for collaboration with their colleagues around the country.

CONCLUSION

This paper explored the concept of innovation ecosystem with the perspective of collaborations and partnerships. The study contributes to the conceptual debate on innovation ecosystems by providing insights on how companies and research organizations collaborate in new non-linear and interdependent innovation ecosystems. The paper concludes that collaboration comprises both learnings from existing knowledge and the creation of new knowledge to achieve competitiveness. The growth of the Konza innovation ecosystem is a clear testament that collaboration and partnerships are key components in building a vibrant innovation ecosystem.

Further, it is evident that the ecosystem can be initiated by bringing together new and previously unconnected actors, from business, research, policy, and civil society. Involving new actors stimulates 'out-of-the-box' thinking and ensures that the participants approach a problem from multiple and unrecognized angles. While ecosystem may be driven by firms only, circular ecosystem innovation may often require a push from policy organizations, in this case, through financing mechanisms and the ability to involve and align different actors who would have otherwise not aligned their efforts.

It is evident from literature that Ecosystem innovation can be initiated by bringing together new and previously unconnected actors, from business, research, policy and civil society. Involving new actors stimulates 'out-of-the-box' thinking and ensures that the participants approach a problem from multiple and un- recognized angles. The involvement of policy and research organizations is important for circular ecosystem innovation. While ecosystem innovation may be driven by firms only, circular ecosystem innovation may often require a push from policy organizations, in this case trough financing mechanisms and the ability to involve and align different actors who would have otherwise not aligned their efforts. Moreover, the study concludes that developing joint strategies and goals is important to provide direction for the project that every partner agrees and can identify with. This requires an organized and co-creative process, and part of this process is about building shared meaning and a shared understanding of the higher-order, systemic problem and solution space. Shared meaning can be built, for example, by developing a

common language. The project goals and strategies were developed by the founder in correspondence with the financing body and some of the partners.

Smart city strategies can become successful only if they prove sufficiently inclusive. Smart region strategies pave the way for such digital inclusion. By seeing smaller and larger communities collaborate, procure, set innovation agendas, share know-how, create economies of scale and aggregate demand, digital inclusion can be addressed effectively, with smaller communities benefiting from the same digital innovations large cities typically already enjoy. Smart region strategies help us achieve that goal, and Smart region strategies facilitate the collaboration of larger cities, smaller municipalities and regional authorities; allowing for a comprehensive sharing of knowledge and resources. Moreover, the study concludes that collaboration on a regional level ensures smaller communities can tap into a larger body of knowledge relevant to digitalization that typically involves technology architectures, data management, cyber security and regulations. Regional collaboration also allows for economies of scale by establishing joint procurement schemes or, at a minimum, coordinate individual procurement procedures. Regional collaboration in procurement also allows for an effective avoidance of pitfalls, such as unwantedly getting tied to proprietary solutions, or losing data ownership.

RECOMMENDATIONS

Collaborations and partnerships are essential aspects of the innovation ecosystem because it enables the spread and novel combination of ideas, spread risk, propagate skills, and builds critical mass. Small businesses are particularly dependent on connections and collaborators for innovation. This paper thus recommends the need to build strong collaborations and partnerships as a key enabler in the development of a vibrant innovation ecosystem and creation of circular economy. Promoting collaboration and building a stronger innovation ecosystem go together. It is then followed by a platform physical or virtual that enables linkages an environment and system where people can share their ideas, and get feedback, support others, and receive validation of their solutions. Building an innovation ecosystem requires developing capabilities for exploring new ideas, experimentation, accepting failure, and working with external partners.

It is important to collaborate in Building an Innovation Ecosystem and Circular Economy such as Konza Technopolis. This is because collaboration is more efficient. CEI reduces the chance of

failure in terms of invention. Corporate innovation is costly and time-consuming, especially when considering the time individuals spend trying to solve challenges that arise when working on projects alone and with limited feedback. The concept behind collaborative platforms is simple: rather than investing in tools and ideas on your own, you team up with startups and other stakeholders that share the same vision or mission. Many hands make light work, as they say. Collaboration can help you achieve your objectives faster and more efficiently than if you were doing it alone.

Despite their many benefits, these ecosystems can be difficult to set up, administer, and maintain. Building an ecosystem of corporate business partners, start-up founders, government agencies, and academia takes time and effort. A successful innovative ecosystem program requires a set of conditions and professional proficiencies that not all organizations have in-house. To successfully build an Innovation Ecosystem and Circular Economy such as Konza Technopolis, collaboration between people with different egos and desired outcomes needs a deft touch. Collaborative participants need an organizational structure and a charter that support these efforts. This means creating a space and environment for trust and collaboration. A formal charter and digital virtual collaboration platforms are very useful in providing a safe space and structure. Finally, collaborative ecosystems need to have the right metrics in place: Participants need regular feedback on their progress, so they know how well their efforts are working and when they need an adjustment. The collaborative participants need to understand the progress they are making.

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