A Framework for Effective Research-to-Commercialization (R2C) in Africa: Why Distinct But Complementary Roles for Researchers and Entrepreneurs are Essential

Co-Authored by Joshua Okpata and Cecil Kang'ara

Introduction

In recent years, there has been sustained discourse around research commercialization in Africa and this has been further amplified by decision makers recognizing the potential of innovation to address the continent's unique challenges. The "Research-to-Commercialization" (R2C) model promises economic and societal transformation, however, attempts to adopt it in its current form often prove a bar too high.

The traditional approach of requiring researchers to take on entrepreneurial roles in the quest to bridge the gap between the lab and the market has proven to be inefficient largely because it does not appreciate the reality that research and entrepreneurship represent fundamentally distinct disciplines, each with its own philosophies, methodologies, and skill sets.

To fully realize the prospect of R2C across Africa, we must acknowledge these differences and advocate for a complementary model that allows researchers and entrepreneurs to operate in synergy rather than attempting to merge their functions.

This paper discusses the barriers inherent in the existing model, with a focus on the Research and Innovation Systems for Africa's (RISA) R2C component, proposes a framework that allows researchers to contribute their technical expertise while entrepreneurs drive commercialization, and examines the supporting infrastructure that the success of such a framework will demand.

R2C in Africa and RISA: Current State Assessment

Despite the positives, African countries face substantial barriers around the commercialization of research outputs. Notably, some of these challenges include limited funding for early-stage commercialization, disjointed intellectual property (IP) policies and regulatory authorities that stifle progress. On a similar note, universities and research institutions generate valuable knowledge but the road to market remains elusive due to gaps in entrepreneurial education, capacity and a lack of infrastructure to achieve product market fit for scale.

RISA's R2C Program is a useful example of structured support for commercialization of research outputs. It includes the provision of technical assistance and financial resources for training and capacity building, accelerator programs, technology transfer and institutional support to shore up researchers' capacities and improve market readiness across sectors like health, education, clean energy, agriculture, and space technology.

More specifically, the collaboration between the Kenya National Innovation Agency (KeNIA) and ViKtoria Ventures has advanced researchers' transition into market-ready products, while RISA's support to Heritors Labs has enabled local innovators to overcome financing and scaling barriers, emphasizing sustainability and commercialization in Ghana.

In Ethiopia, the emphasis by another RISA Fund grantee, the University of Gondar, on knowledge and technology transfer provides a case study on creating conduits between research outputs and real-life adoption through a multi-stakeholder innovation platform that connects farmers with the government's Bureau of Agriculture and research centers. This approach has enabled the building of capacity among farmers and researchers, and the scaling-up of agricultural solutions including innovative seed systems which in turn improves the livelihoods of female led and rural households living below the poverty line.

Despite noteworthy progress, a thorough analysis of RISA and broader African R2C efforts show that the prevalent barriers continue to hinder the achievement of anticipated commercialization outcomes. Guided by global best practices, commercialization is most successful when research outputs are managed by committed innovation and market oriented teams rather than researchers working independently.

Distinct Disciplines: The Case for a Collaborative Approach

The notion that researchers should assume entrepreneurial roles often overlooks the distinct competencies that each party brings. Research prioritizes rigor, methodical inquiry, precision and validation over extended periods of time while entrepreneurship is rooted in agility, rapid iteration, market intuition and risk tolerance with guiding principles like "fail forward" and "move fast and break things". These contrasts often lead to shortcomings when an individual is expected to excel in both worlds and while it is advantageous for researchers to get trained on innovation and entrepreneurial principles, requiring researchers to pivot into the domain of value creation presents the risk of diluting the impact of their expertise and diverting focus from their primary motivation.

It could prove a lot more beneficial to invest in bridging the gap between researchers and solution-market-fit which will in turn strengthen the ecosystem to leapfrog several conventional steps along the way to an industrial revolution and chart an alternate, more efficient path to economic growth and global competitiveness.

A Framework for Complementary Collaboration

To implement a sustainable R2C framework, stakeholders need to consider adopting a system where researchers and entrepreneurs work within their respective areas of expertise while contributing to a shared goal of commercialization. This cross pollination of efforts can happen through a structured pathway that cuts across four stages.

Discovery: **Research as a Catalyst for Breakthrough Ideas**

At the foundational stage, researchers engage in detailed inquiry to develop new ideas and insights that are transformative. Scientific discovery, driven by curiosity and evidence, often provides the building blocks for innovation—whether through advanced technologies, new and more efficient processes, or systemic solutions.

At this stage, it is essential to create an enabling environment that encourages research productivity and freedom. Investments in research infrastructure, resources and incentives can make all the difference and by aligning academic priorities with societal needs, breakthrough ideas emerge in areas with significant commercial promise.

Matching: **Connecting Research with Venture Builders**

The matching stage involves identifying pathways for research findings to be paired with co-founders. Here, specialized incubators, accelerators, and innovation hubs connect researchers with venture builders who have the relevant skills and experience to scale an idea. Entrepreneurs bring market knowledge, operational expertise, and the ability to navigate commercialization pathways.

Consider the *Kenya Climate Innovation Center (KCIC)*, which matches researchers working on clean-tech solutions with entrepreneurs. Through this model, KCIC fosters partnerships that have the potential to address both technical and commercial challenges, ensuring alignment between research outputs and market expectations.

The effectiveness of this stage relies on value-sharing mechanisms and supportive policies to mitigate risks for all parties involved. By establishing clear co-ownership and intellectual property (IP) agreements, researchers and entrepreneurs can collaborate without conflict.

Incubation: **Translating Research into Viable Solutions**

During incubation, innovation principles are applied to transform research outputs into viable products or solutions. This stage focuses on iterative testing, prototyping, and refining ideas based on feedback. Incubators, accelerators and innovation labs act as facilitators, providing mentorship, administrative support, funding, and access to technical and market networks.

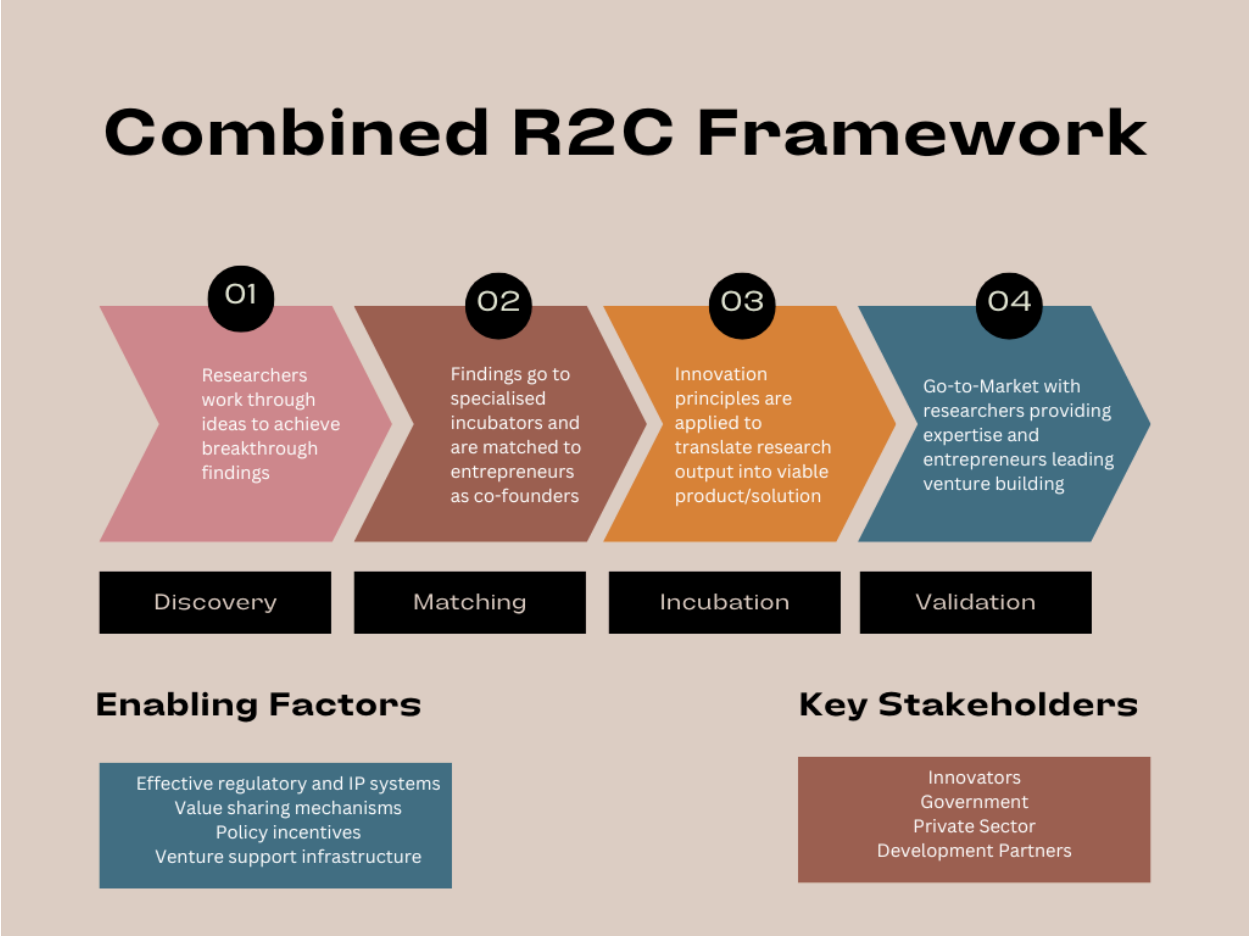
Through incubation support, entrepreneurs work hand-in-hand with researchers to fine-tune the solution into a minimum viable product with a distinct value proposition that can attract significant investment.

Collaboration during this phase ensures that researchers continue to offer technical guidance, while entrepreneurs iterate to achieve product-market fit. Innovation methodologies like Lean Startup, Design Thinking and Agile Development can be applied during this process.

Validation: **Bridging the Access-to-Market Gap**

In the validation stage, the focus shifts to market readiness, distribution, adoption and scaling. Researchers, now collaborators in the venture-building process, continue to provide ongoing technical support to ensure the solution remains robust and adaptable. Entrepreneurs, meanwhile, focus on go-to-market strategies, continuously refining the business model, investor engagement, and customer acquisition.

This collaborative model addresses one of the most common pitfalls of research-led ventures—the gap between invention and adoption. When the right approach is applied, the market provides real-time feedback which can influence product direction leading to rapid iteration, greater user confidence and increased uptake. This continued engagement solidifies the researcher's role as a key contributor to the solution's long-term success and that of the entrepreneur in navigating the solution through various market dynamics.



Research-to-Commercialization (R2C) model that provides for complementary participation

To operationalize the Combined R2C Framework, enabling factors must be established. Key elements enabling this complementary Research to Commercialization framework include:

1. **Regulatory and Intellectual Property Support**:

   A clear, enforceable IP policy is critical for protecting research outputs and incentivizing both researchers and investors. Models from countries such as India, where the Innovation Protection Unit of the government-backed Council of Scientific and Industrial Research (CSIR) manages patents and licensing on behalf of researchers, demonstrate how IP management can be streamlined to favor collaborative commercialization. Important work also needs to be done to reduce the lead time required for addressing IP violations and enforcing the protection of IP rights in legal systems across Africa. Countries such as Nigeria and Kenya can see IP litigation take anywhere between 5-7 years due to limited judicial resources or expertise, procedural delays and extensive backlogs. By implementing policies that allow for equitable IP ownership and protection, research outputs can attract investment, intellectual property can be collateralized and researchers are able to prevent the unauthorized exploitation of their findings.

2. **Value-Sharing Mechanisms**:

   Developing equitable profit-sharing agreements is one way to foster sustainable R2C. The Fraunhofer-Gesellschaft in Germany, one of Europe's leading applied research institutions, utilizes a revenue-sharing structure that allocates a portion of commercialization profits to researchers, thereby incentivizing further research while enabling market-focused innovators to drive product development. Additionally, researchers can hold equity positions, serve as co-founders and board members while providing technical leadership, retain vesting ownership and explore convertible notes or leverage in exchange for IP rights. African universities and research centers can adapt a range of models that are tailor made for context, and ensure that both researchers and their entities benefit from the successful adoption of innovations by the market.

3. **Policy and Incentive Structures**:

   Governments can play a pivotal role in supporting R2C by creating policies that encourage both public and private investment in research. In South Korea, the government has implemented tax benefits and grants that encourage companies to invest in R&D and partner with academic institutions, consequently positioning the country as an emerging leader in R2C globally. Kenya has recently taken steps toward similar incentives with the Kenya National Innovation Strategic Plan 2023-2027 and legislation for the injection of additional funds into the National Research Fund, but further measures including ensuring sweeping implementation together with the provision of an enabling environment and counterpart funding, are needed to scale these efforts and make collaboration with African research institutions more attractive to private enterprises. This is especially relevant against the backdrop of corporations looking to expand across the continent due to the execution of the African Continental Free Trade

Area (AfCFTA) Agreement which increases the market opportunity and potential for commercialisation.

4. **Infrastructure for Venture Support**:

   Establishing incubators and accelerators that are equipped to support researchers is vital for fostering R2C ecosystems. These specialized incubators will connect research outputs with legal, tax and accounting resources, angel investors, venture capital and private equity funds, breakthrough technology capabilities and market experts to jointly develop and commercialize university research. This infrastructure will also be beneficial to indigenous and small scale researchers who form part of the informal economy which according to the IMF contributes between twenty five to sixty five percent of the Gross Domestic Product (GDP) of Sub-Saharan Africa. Creating an environment where researchers can work alongside business and market experts, would provide the essential resources to bring research outputs to market.

Lessons from Successful R2C Implementations

Globally, several successful R2C models illustrate the effectiveness of collaborative frameworks. Stanford University's High Impact Technology Fund which is currently in its third year of "clearing the path to commercialization" and in that period it has supported 32 projects, some of which are in the process of commercialization or have become startups, raising $18m in external funding.

Another success story is Massachusett Institute of Technology's Technology Licensing Office (TLO), which has overseen or to some degree supported the creation of hundreds of successful ventures and products including the biotechnology giant Moderna, which rapidly went on to commercialize mRNA research and develop vaccines, most notably the COVID-19 vaccine. These successes were possible because of MIT's dedicated commercialization architecture that brought together researchers, entrepreneurs, venture capitalists, industry experts and mentors.

Similarly, in the United Kingdom, the University of Cambridge collaborates with multinational corporations such as AstraZeneca, leveraging industry partnerships and incubation to advance high quality scientific research and translate research outputs into commercially viable products.

Government-Led Commercialization: A Rare but Impactful Model

Governments can play a critical role in closing the gap between the trifecta of research institutions, the public and the private sector, through the facilitation of partnerships, funding, and supportive regulation. Singapore's Agency for Science, Technology, and Research (A*STAR) has successfully commercialized research through partnerships with both local and international companies, underpinned by government policies that foster IP protection, tax incentives, and a robust regulatory environment.

TELA maize is another instance of government enabled research-to-commercialization showcasing the critical role of public institutions in advancing nutrition and food security in furtherance of SDG 2 - Zero Hunger. Developed through collaborative efforts by African agricultural research institutes and the International Maize and Wheat Improvement Center (CIMMYT), TELA maize is genetically engineered for pest control, improved drought resistance and greater yield. Government involvement through research funding, regulatory approvals, partnerships with initiatives like the African Agricultural Technology Foundation (AATF) and distribution, has facilitated the adoption of the variant by thousands of smallholder farmers.

In Ghana, the Ministry of Environment, Science, Technology and Innovation established the Ghana Innovation and Research and Commercialisation Centre (GIRC) which has the responsibility of commercializing research outputs from research institutions across the country and with the help of a RISA grant, the Programmes Coordination Office is receiving the technical and financial resources it needs to accelerate research uptake on a national scale.

Amplifying Impact Through Ecosystem-Level Partnerships

The proposed framework underscores the essential roles of researchers and entrepreneurs; however, a transformative R2C model in Africa necessitates the active engagement of diverse ecosystem actors, including financial institutions, corporate innovation teams, and local communities. By fostering triple-helix partnerships—integrating academia, industry, and government—Africa can enhance the scale and impact of its R2C initiatives. For instance, established corporations can facilitate research adoption by co-developing pilot projects with researchers and entrepreneurs, thereby mitigating commercialization risks. Additionally, microfinance institutions and community-based cooperatives can significantly contribute to scaling innovations tailored to local needs, particularly in agriculture and health. An integrated ecosystem ensures that innovations not only reach the market but also remain sustainable, contextually relevant, and inclusive.

Digital Transformation as a Catalyst for R2C Success

A pivotal driver for accelerating Africa’s R2C progression is the utilization of digital tools to bridge gaps in collaboration, market access, and innovation management. Virtual platforms can connect researchers and entrepreneurs across extensive geographies, enabling real-time mentorship, knowledge sharing, and co-development. For example, digital twins can simulate market conditions, assisting teams in refining prototypes prior to costly physical deployments. Moreover, leveraging Africa's burgeoning fintech ecosystem could unlock innovative funding solutions such as crowdsourcing, smart contract-based royalties, and blockchain-enabled IP tracking. By incorporating digital transformation into the R2C framework, stakeholders can establish a more agile, scalable, and resilient pathway for African research innovations to succeed in global markets.

Concluding Reflections

As Africa's innovation landscape continues to thrive, the road from indigenous research to commercialization does not need to rely on researchers becoming entrepreneurs. By establishing structured ecosystems, protective IP frameworks, supportive policies, market linkages and access to funding, Africa can create and sustain an environment where researchers and entrepreneurs work hand-in-hand to successfully take innovations to market. Governments, universities, research institutions, development partners and the private sector however each have a role in creating and adopting this framework.

A re-envisioned R2C model built on collaboration, rather than conversion, will pave the way for impactful, sustainable commercialization of African research and widespread industrialization.