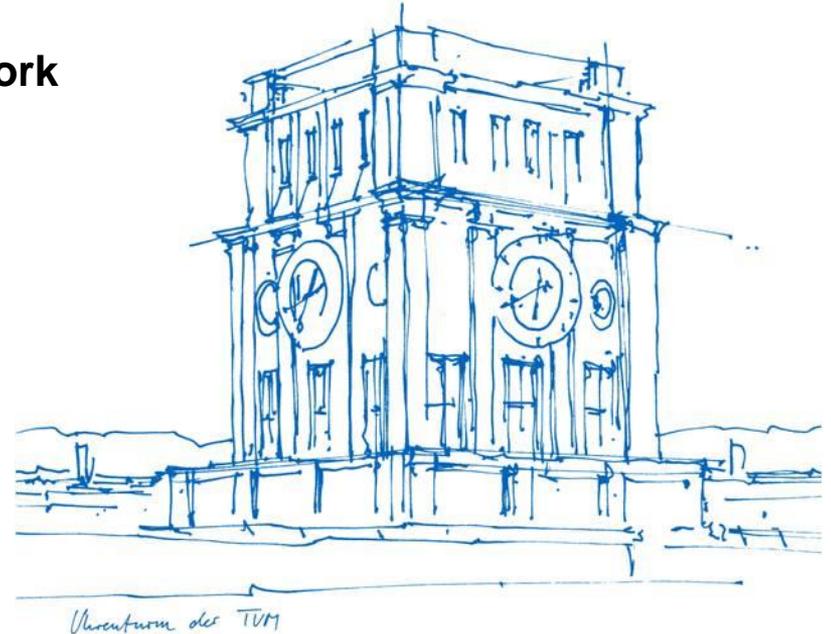


Entrepreneurship as a Leverage for Innovative Energy
Technologies in Africa:
**An Investigation of the Entrepreneurial Framework
in Zimbabwe**

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Chair of Renewable and Sustainable Energy Systems



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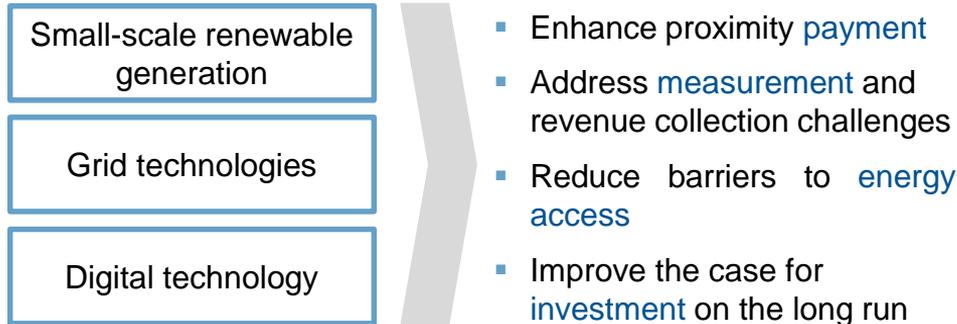
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Motivation



Technology-enabled growth scenario for African cities¹

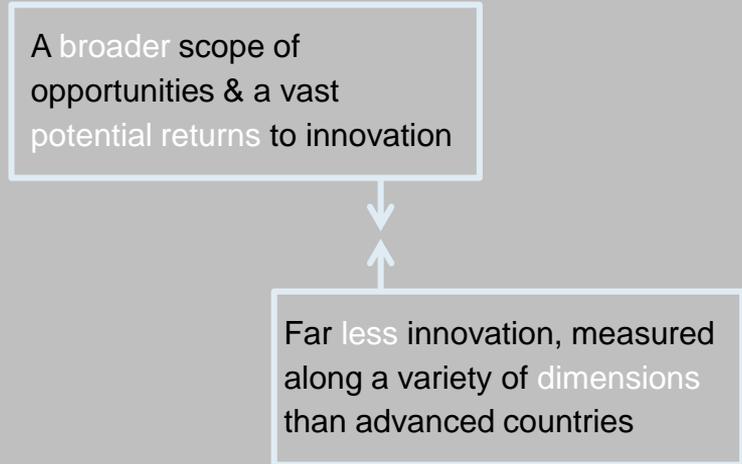


→ Need for **innovation** and **entrepreneurship** to achieve market potential

¹ Escudero, S., Savage, R., Kravva, V., & Steeds, E. (2017). Future Energy Scenarios for African Cities: Unlocking Opportunities for Climate Responsive Development. Eschborn.



The innovation paradox² in developing economies



² Cirera, X., & Maloney, W. F. (2017). The Innovation Paradox: Developing-Country Capabilities and the Unrealized Promise of Technological Catch-Up. Washington DC.

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What is Entrepreneurship?

Literature about entrepreneurship in developing countries

entrepreneurship & small and medium enterprises (SMEs)

Opportunity entrepreneurship & necessity entrepreneurship

Formal entrepreneurship & informal entrepreneurship

Entrepreneurship is the ability of individuals to ¹

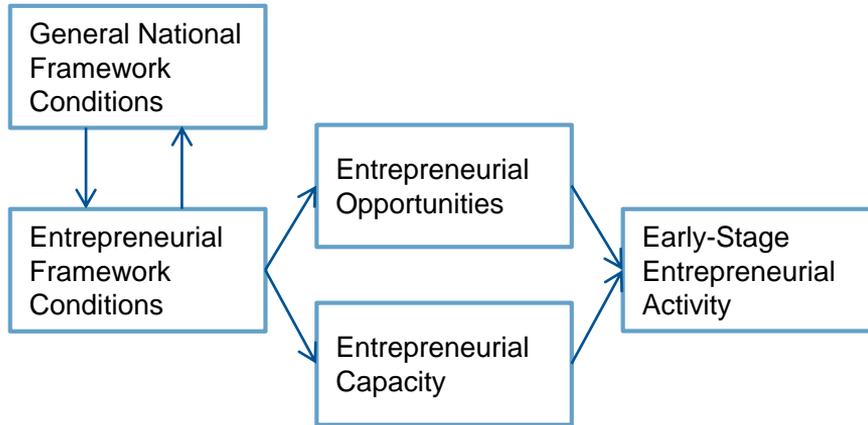
- perceive new economic **opportunities** (new products, processes, markets)
- to **apply** their ideas in the market
- face **uncertainty** and make **decisions** on how to introduce it

Schumpeterian entrepreneur

¹ Wennekers, S., & Thurik, R. (1999). Linking Entrepreneurship and Economic Growth. *Small Business Economics*, 13(1).

Purpose and Methodology

GEM conceptual model ¹



Entrepreneurial Framework Conditions

- Finance
- Regulations
- R&D transfer
- Physical infrastructure
- Education & training
- Commercial infrastructure
- Cultural norms

Entrepreneurial Capacity

- Motivation
- Skills

→ Characterize the entrepreneurial capacity

→ Describe interactions with the EFCs

Qualitative approach:

Interviews with entrepreneurs and representatives of support structures in technology related areas

¹ Bosma, N., Jones, K., Autio, E., Levie, & Jonathan. (2007). Global Entrepreneurship Monitor - 2007 Executive Report. Babson Park, MA and London.

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Findings: Entrepreneurial Framework Conditions

Financing

- **Bootstrapping** and **informal investing** are the only alternative for most entrepreneurs
- Financial support for startups is **limited** to certain sectors (traditional mostly)

Market openness

- Perceived opportunities in the under-development of the market → entrepreneur has to identify specific problems to solve
- Challenges: uncertainty, market size, and lack of data

Entrepreneurship education and training

- A perceived need for additional entrepreneurship training to **bridge** existing ideas to the market or to help existing entrepreneurs to **grow**
- Entrepreneurship training programs need to be **practical** (hands-on), start at an **early age**, and be **relevant** for the country's environment

Network capital

- **Network capital** is perceived as one of the most valuable resources of the entrepreneur
- Most common forms are **one-to-one** mentorship or **peer-to-peer** knowledge sharing
- **Hubs** and entrepreneurship education institutions play a role in developing these networks

Findings: Entrepreneurial Framework Conditions

Labor market

- Young graduates lack **exposure** to professional environment → need on-the-job **training**
- Experienced professionals tend to **leave** the country.

Government programs and regulations

- Lack of understanding of technology entrepreneurship → government support **limited** to traditional sectors
- Demanding **regulations** → barrier
- Complicated registration procedures & lack of trust in the system → pushes many entrepreneurs into operating **informally**

Technology and R&D transfer

- Limited to inexistent knowledge **spillovers** from incumbents and R&D institutions
- **Internet** contributes to reducing knowledge gaps
- Financial limitations and restrictions on imports hinder the **access** to certain technologies

Gender

- Female entrepreneurs face **implicit** barriers → still not well represented in the technology sector
- Reduced access to **financing** (due to objective and non-objective factors)
- They tend to rely more on **social capital** (e.g. key relationships with other individuals)

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Key Recommendations



Public institutions

- > Facilitate regulations & formalizing for entrepreneurs
- > Increase the integration of technology



Investors and donors

- > Develop local risk capital finance for the tech space
- > Consider early-stage ventures through seed funding



Hubs and training institutions

- > Bridge the gap between idea and market through country specific training
- > Help entrepreneurs establish effective networks and develop their capabilities to access the suitable knowledge through them
- > Increase the awareness for informal investing and develop platforms to organize it
- > Dedicate programs for female entrepreneurship in the tech sector



Universities and research institutions

- > Create data about the local market and target R&D outputs to its needs
- > Collaborate with startups and integrate (prospective) entrepreneurs



Established firms

- > Collaborate with entrepreneurial teams to leverage on their ideas while providing professional training