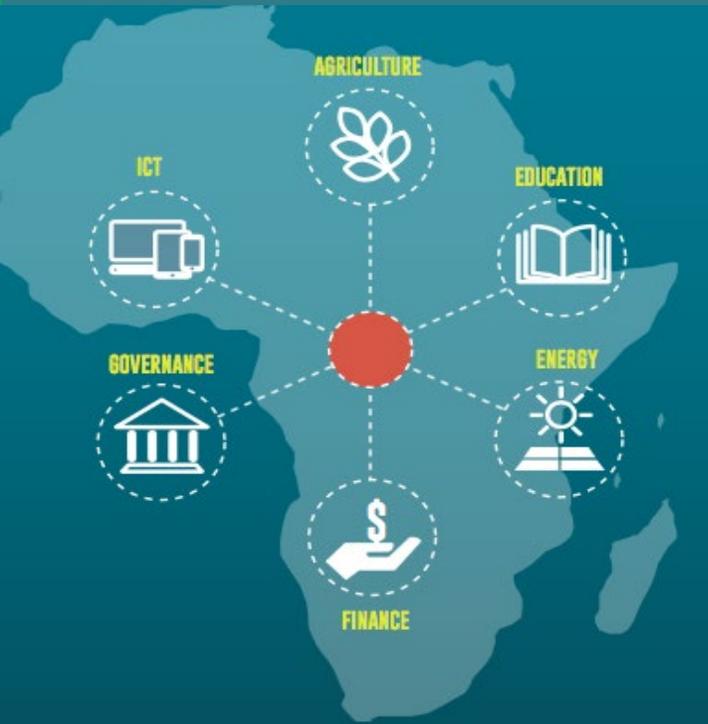


LEAPFROGGING: THE KEY TO AFRICA'S DEVELOPMENT?

FROM CONSTRAINTS TO INVESTMENT OPPORTUNITIES



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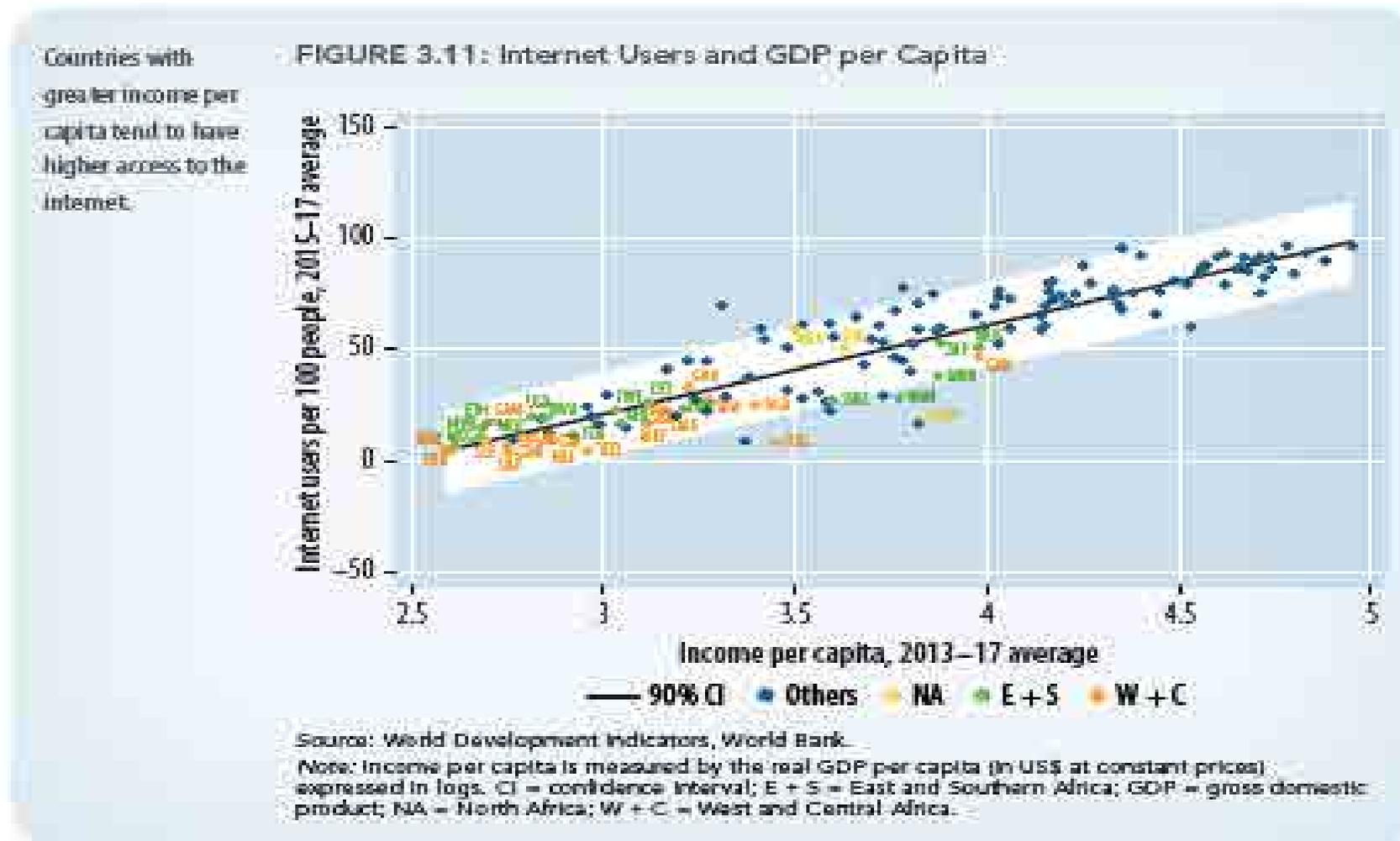


Why leapfrogging is key to development

Theoretical background

- Almost all contemporary growth and development consider technology and innovation as the most important drivers of economic growth
- **Examples include growth theories models:**
 - ✓ Solow Model (Solow, 1956): This model identifies two possible sources of variation in output per worker: differences in capital per worker and differences in the effectiveness of labor, also understood as technology.
 - ✓ Product-Variety Model (Romer, 1990): This model assumes that innovation causes productivity growth by creating new, but not necessarily improved, varieties of products.
 - ✓ Schumpeterian Growth Theory (Aghion & Howitt, 1992): It focuses on quality-improving innovations that render old products obsolete, and hence involves the force that Schumpeter rightly called “creative destruction”.

Why leapfrogging is key to development Evidence (1)

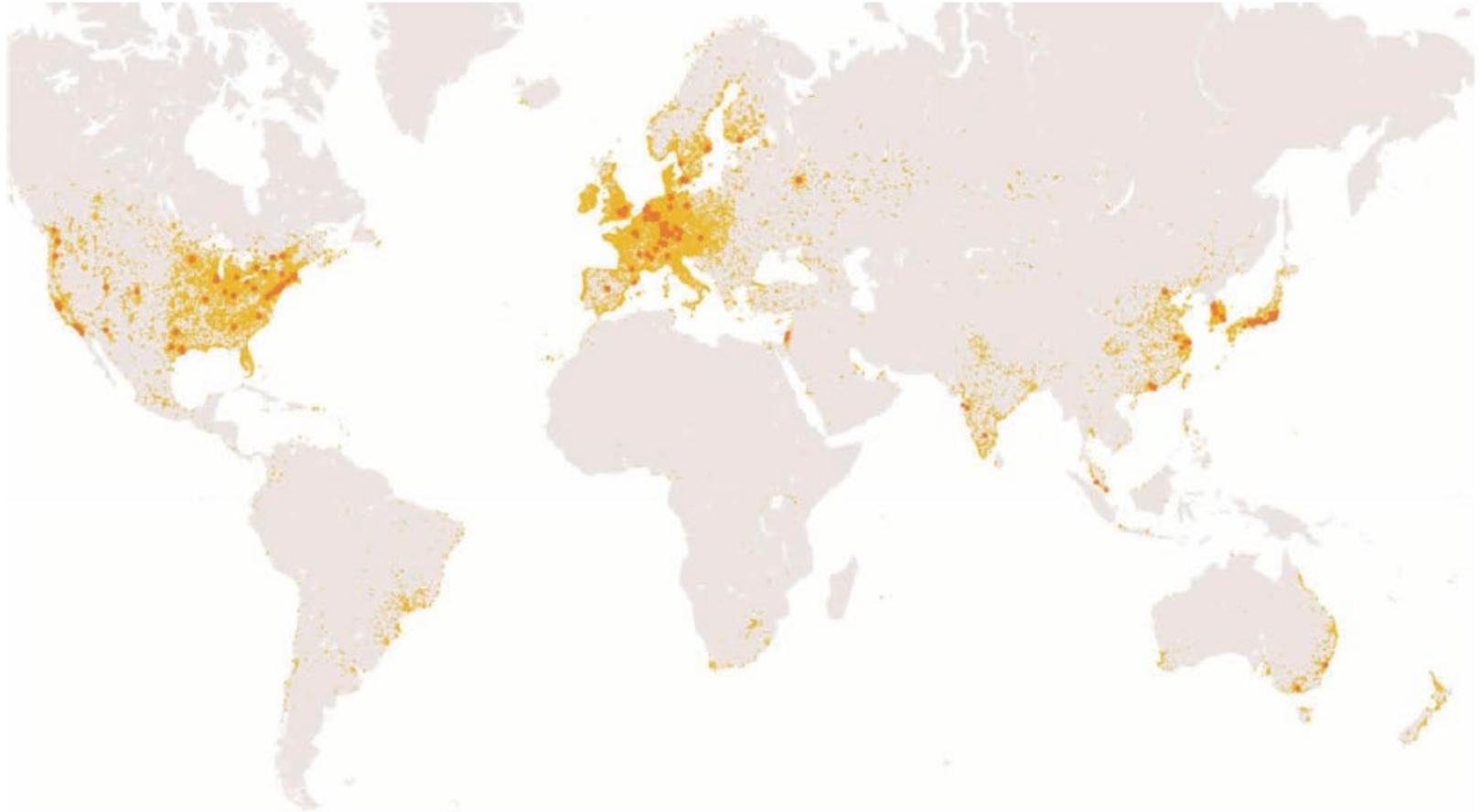


Source: Africa Pulse, April 2019 – World Bank

Why leapfrogging is key to development

Evidence (2)

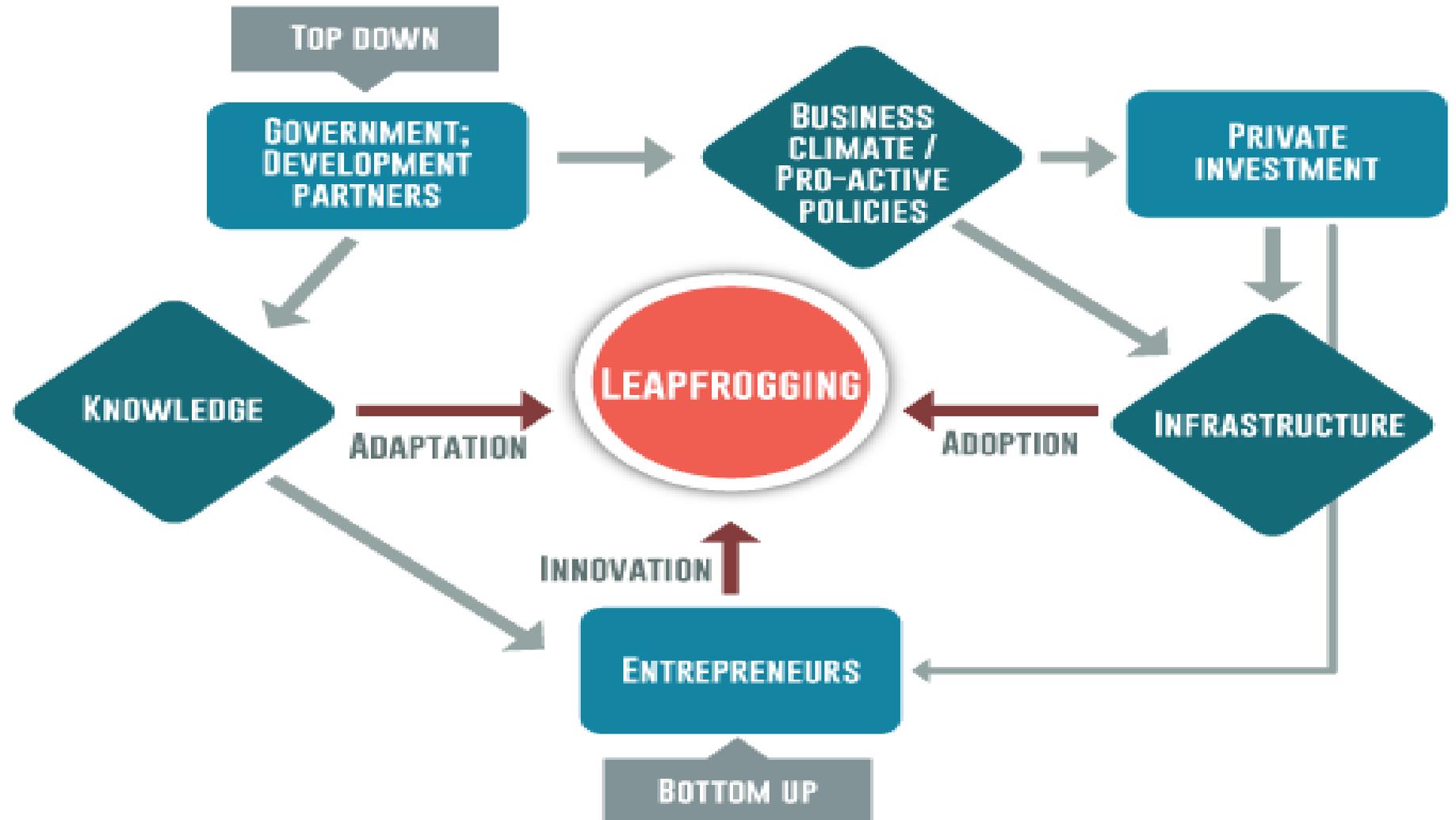
MAP 1.1: Top 100 Innovation Clusters Worldwide



Source: Dutta, Lanvin, and Wunsch-Vincent 2017.

Leapfrogging: A conceptual framework

Both bottom up and top down efforts are needed. Different actors should focus on their strength while coordinating efforts.



Stylized facts

1. Africa is not an exception, is not new to leapfrogging, and is generating its own innovations;
2. Not all leapfrogging attempts are successful, there is a need to embrace risk;
3. Existing technology are not always adapted to the local.

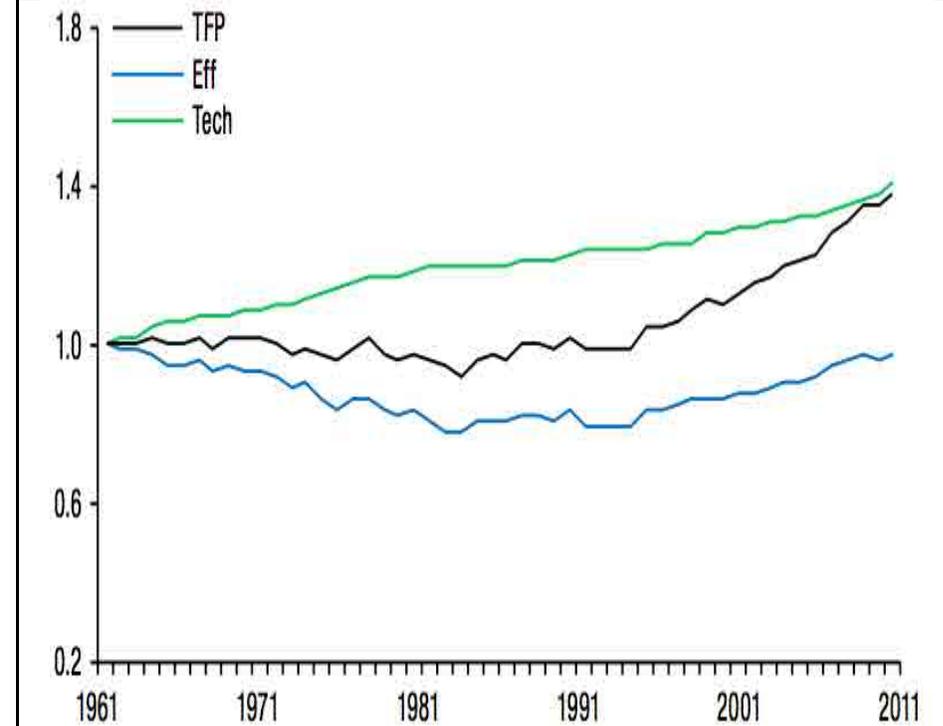


WHAT WILL IT TAKE FOR LEAPFROGGING
TO HAPPEN IN AFRICA?

AGRICULTURE

- Agricultural productivity has been low in Africa.
- Over 90% of African agriculture depends on rainfall with no irrigation.
- Technology has the potential to raise agricultural productivity .
- These technologies include mobile phone applications, sensors, satellites, drones, and so forth.

Stagnation of technology adoption in Agriculture



Source: Benin, 2016 – IFPRI.

Notes. **TFP** refers to the Total Factor Productivity, **Eff** to the movement toward the technology frontier (efficiency), and **Tech**, the technological change.

Pre-conditions for Leapfrogging in African Agriculture

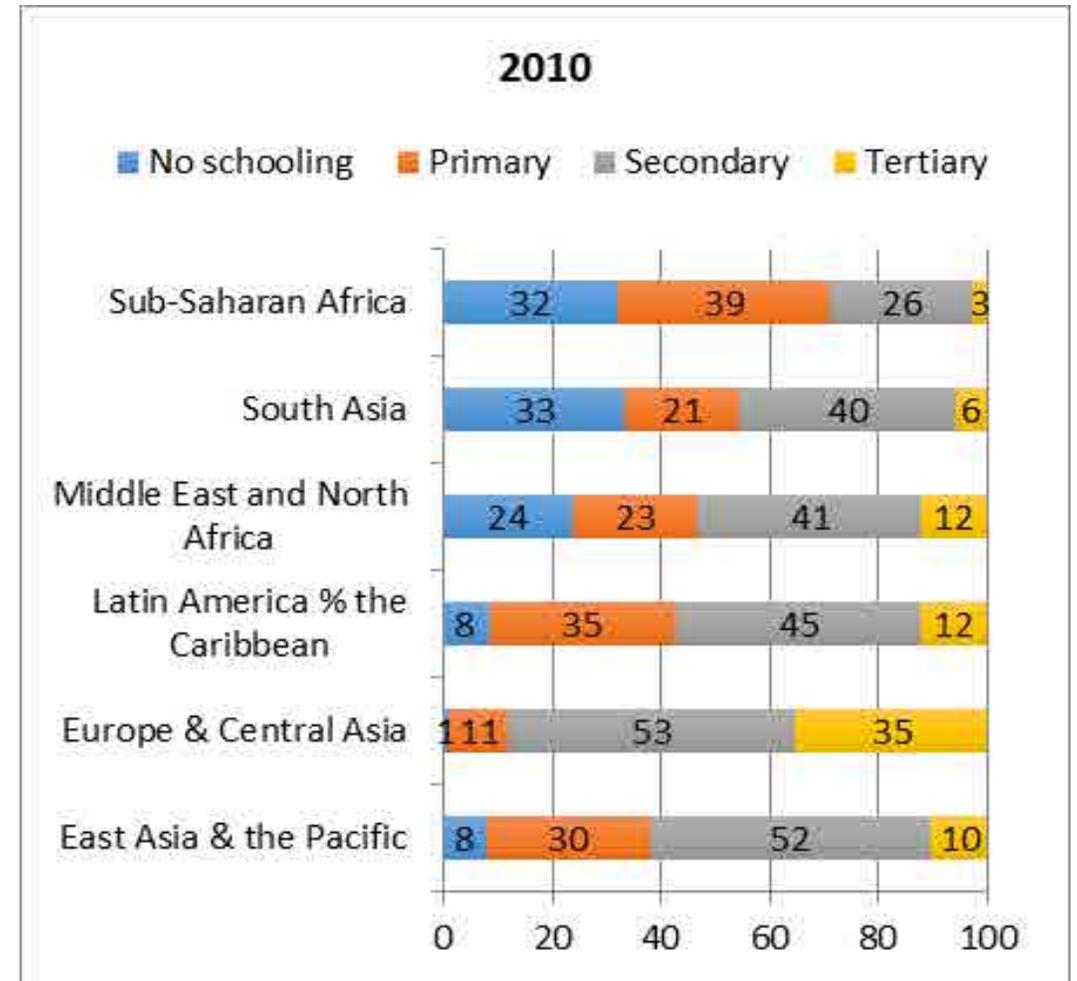
- Research and development (R&D) is essential for developing and adapting new technologies and is positively associated with high returns.
- Investment is needed in rural infrastructure, especially transportation, electricity, telecommunications, and irrigation is essential.
- Skills and education are needed at all levels, including policy making, research, application of technology, and the farmers themselves.



EDUCATION

- The population aged 15 and over in SSA are still without education.
- Education in Africa must leap forward to catch up with the transformation of labor markets.
- One of the ways Africa's education system can be transformed is through innovation and technology, which are often linked.
- The Internet is a cross-cutting enabler for education (Internet Society 2017)

Educational Attainment (population ages 15 and over)



Source: Adapted from Barro and Lee 2013.

Pre-conditions for Leapfrogging to happen in Education

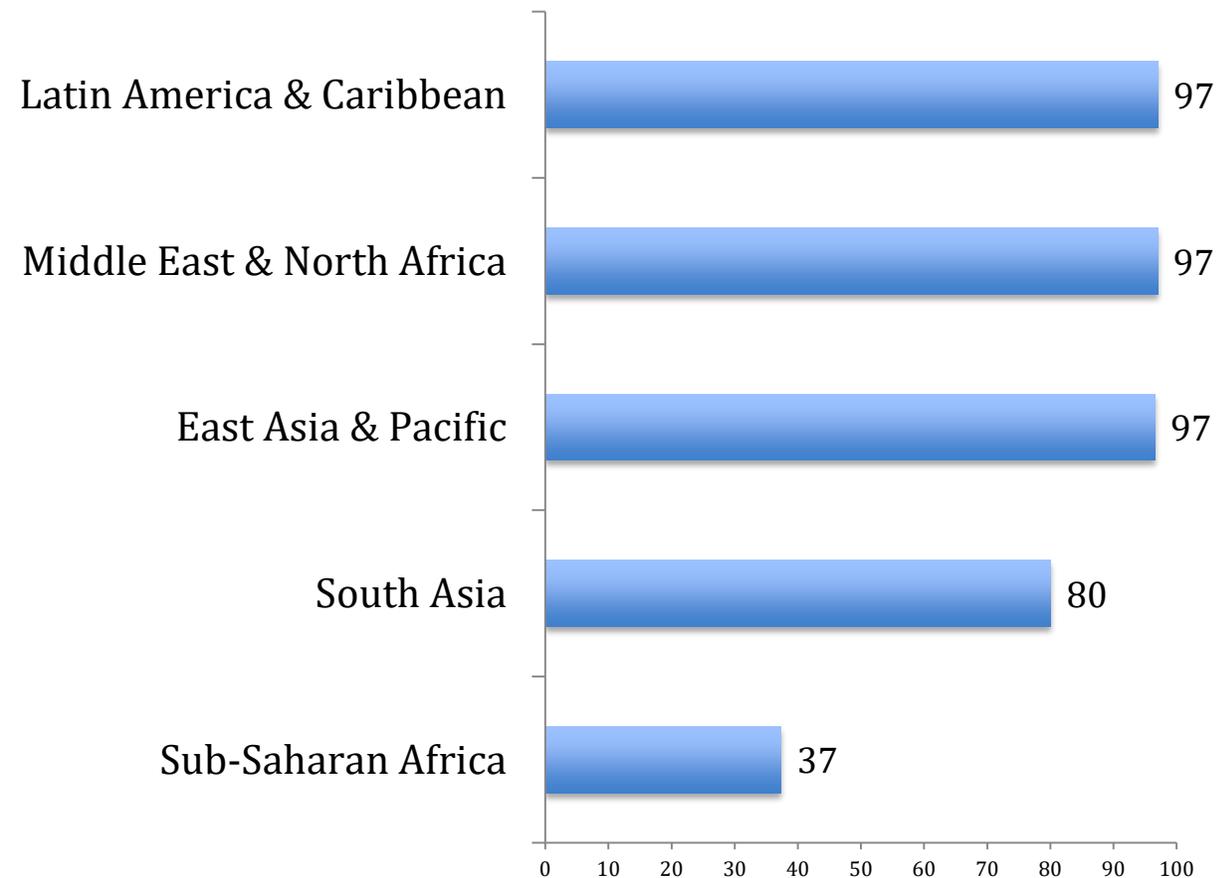
- **Forming partnerships is essential.**
 - African governments with education ministries, private sector and other countries to share scarce resources, learn innovative educational practices, and apply them on a large scale.
- **Deploying Digital Infrastructure.** The application of ICT in education necessitates digital equipment and Internet access (and regular and reliable electricity)
- **Teaching the Teachers.** More effort is needed to train teachers and ensure that they are appropriately allocated throughout the education system.



ENERGY

- Only 37% of the population in Sub-Saharan Africa had access to electricity in 2014.
- As a result, more than 600 million people in Sub-Saharan Africa —almost two-thirds of the population—live without electricity.
- Innovations already present in African energy sector include Lighting Africa – a WB/IFC project launched in 2007 in Kenya
- By 2016, the project had been deployed in 11 Sub-Saharan African countries affecting almost 21 million people

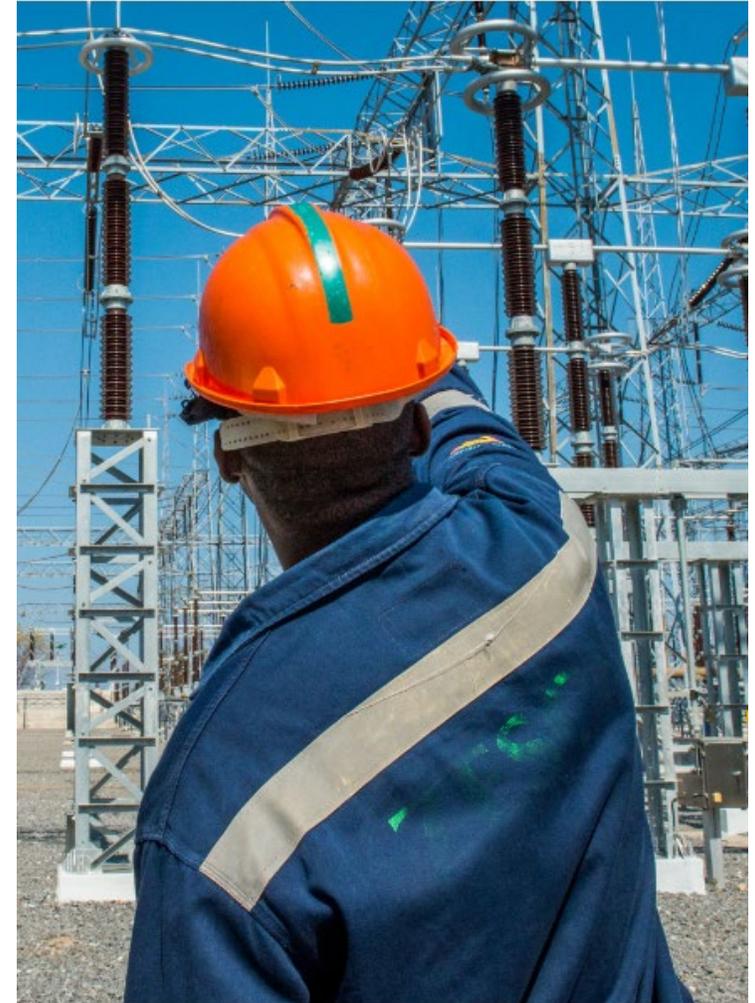
Access to electricity, by region, 2016 (% of population)



Source: World Bank.

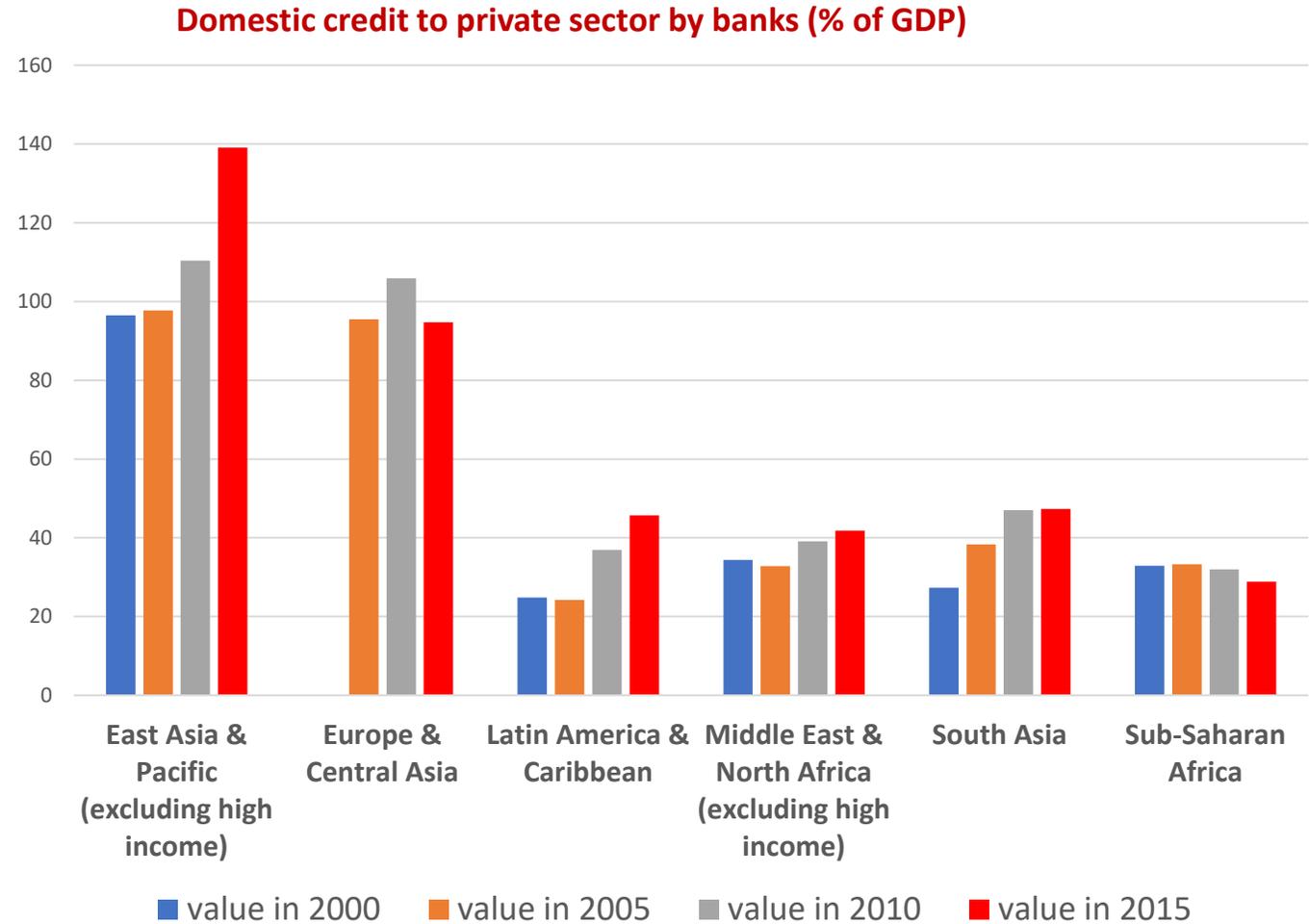
Preconditions for Powering Africa

- Enabling leapfrogging in the African energy sector will require modernization of institutions, regulations, and finance.
 - Market reforms are crucial for creating an attractive environment for investment.
 - Improving the financial sustainability of public utilities in Sub-Saharan Africa is critical.
 - Capacity building is needed in climate change finance, which is critical for the implementation of clean energy solutions.



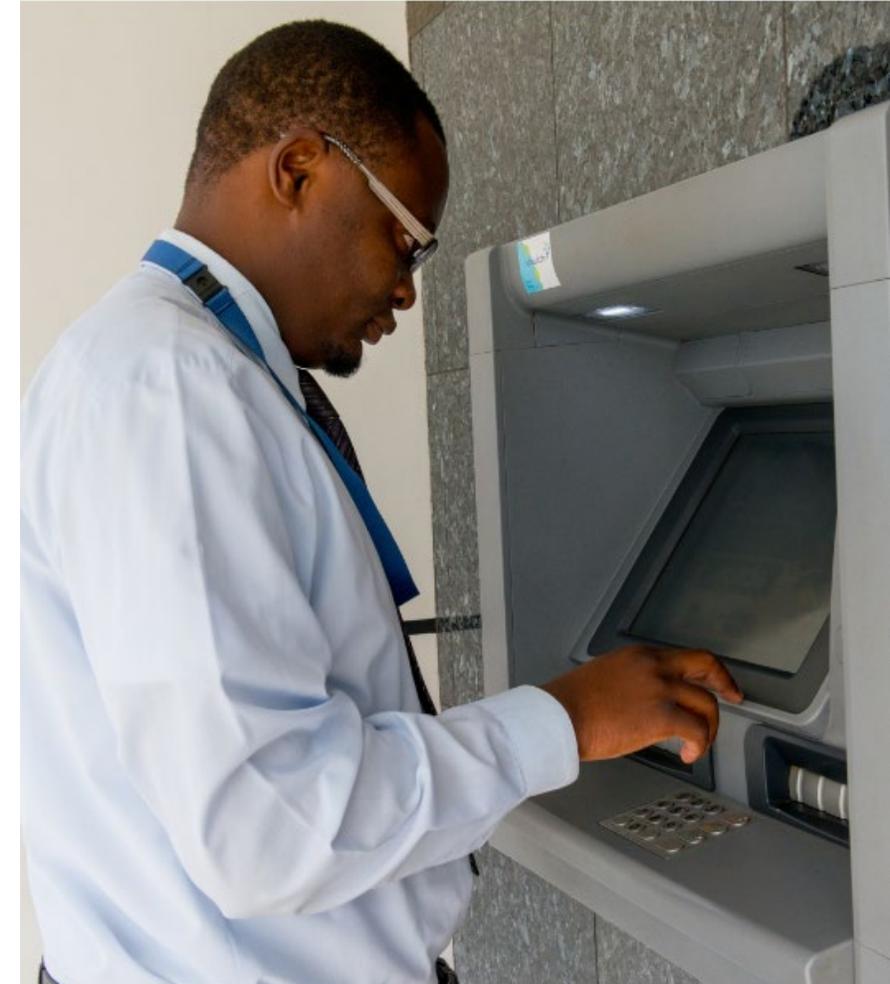
Finance

- As opposed to other regions in the world, domestic credit to private sector in SSA is shallow.
- Financial innovation can provide opportunities for leapfrogging in financing and make capital more efficient, risk management more targeted, and trading less costly.
- The most notable and common leapfrogging example in the financial sector is M-Pesa in Kenya.



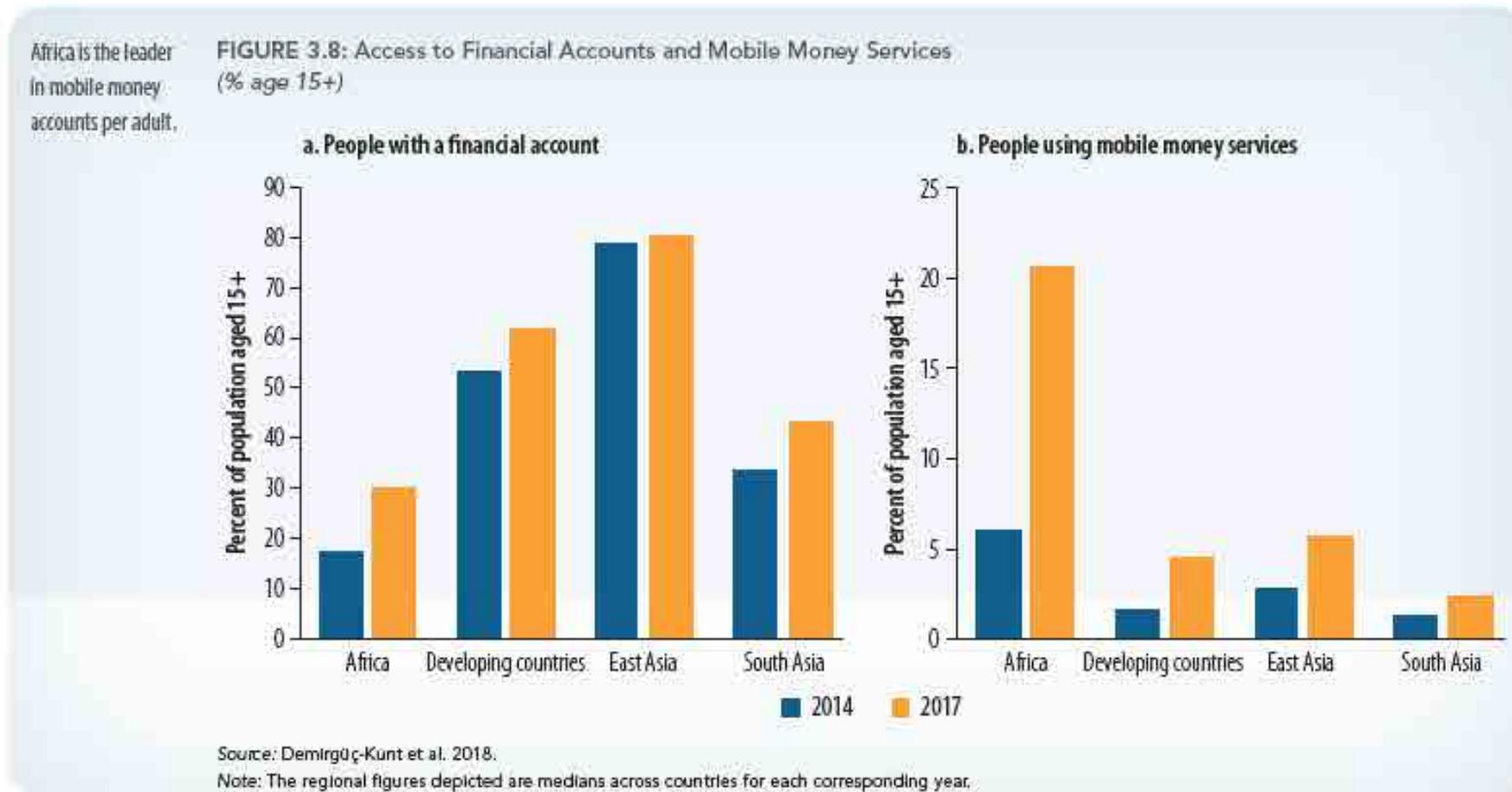
Leapfrogging Africa's Financial System

- Regulatory bottlenecks can be tackled by establishing and enforcing laws and creating facilities that enable smoother credit flows.
- The banking system needs to be reorganized by opening the sector to competition, reviewing prudential ratios, and putting in place innovative savings and borrowing instruments adapted to local needs.
- The gap between the informal and formal financial sectors needs to be bridged by formalizing microfinance institutions to help them scale up activities while developing financial products geared toward SMEs.



Leapfrogging Africa's Financial System

Mobile banking: A successful example of leapfrogging in Africa

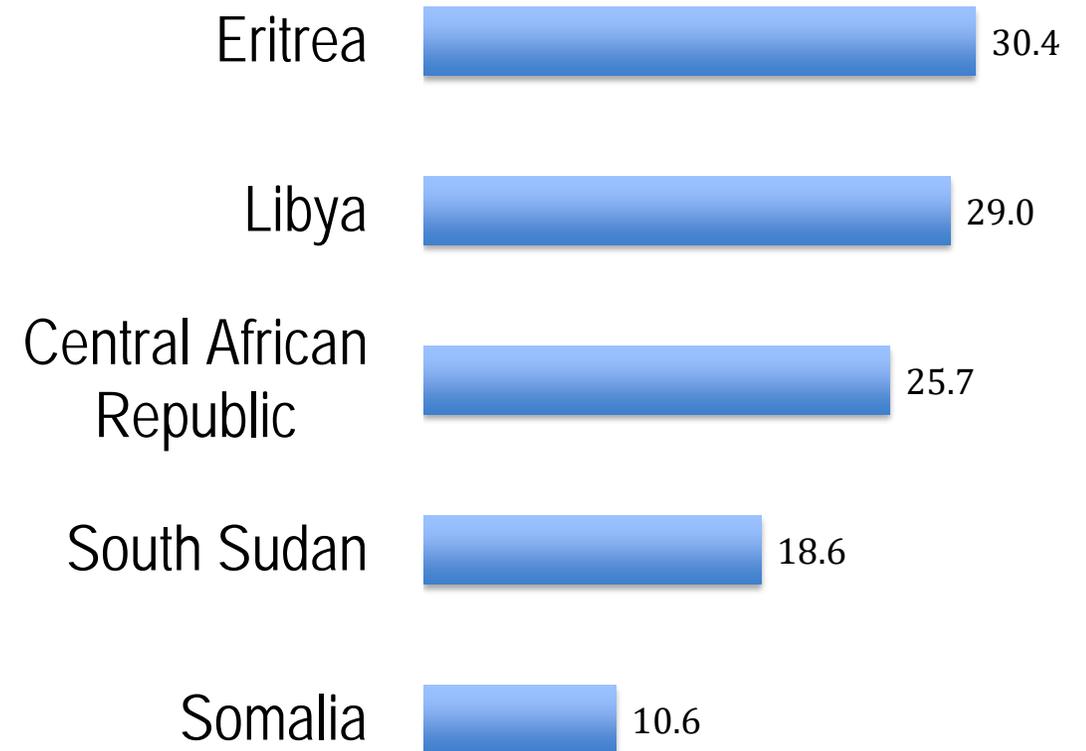


Source: Africa Pulse, April 2019 – World Bank

Governance

- Good governance is critical for government and market efficiency, and this strongly influences economic development.
- The potential of digital technologies for improving governance has been recognized for some time, especially the use of ICT.
- Examples of leapfrogging experiences include Tanzania's creation of a dedicated agency for electronic government, and Rwanda's success in connecting government agencies and deploying online public e-services.

Ibrahim Index of African Governance,
Bottom Five Countries, 2015



Prerequisites to Leapfrog governance

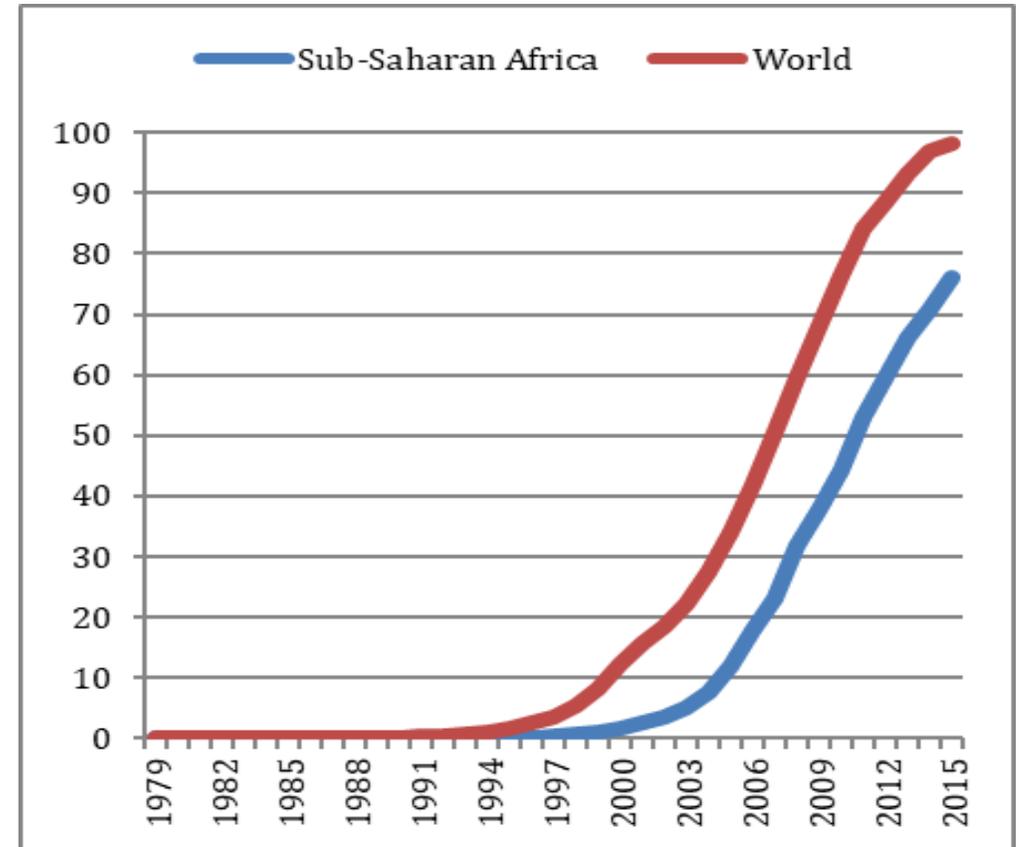
- High-level government support is necessary. Without strong government commitment, there will be inevitable bureaucratic resistance and lack of coordination among ministries.
- Governments also need to have a citizen-centric approach, especially when devising e-services. This is particularly relevant in Africa, where most citizens do not have access to the Internet.
- Sensitization and training are also needed for successful implementation of e-government initiatives.



Information and Communication Technologies

- ❑ Despite improvements, there remains a large digital divide in Sub-Saharan Africa, due in part to large rural populations and high costs.
- ❑ Mobile communications technologies are the one type of ICT where Africa has been closing the gap with the rest of the world.
- ❑ The gap between Sub-Saharan Africa and the rest of the world dropped from 99 percent in 1989 to 23 percent by 2015.

Telephones per 100 People



Preconditions for digital leapfrogging

- African countries need the right *enabling framework*, including the creation of a sector regulator, introduction of competition, and private sector investment.
- The quality of competition matters. The strength of telecommunications operators, their involvement in other countries, and scale make a difference.
- Digital *skills* across various domains are essential for Sub-Saharan Africa to be successful in exploiting ICT opportunities. Governments need the right skills to create policies and regulate the sector.



WHAT DOES THIS MEAN?

Implication 1: we need to be bold and ambitious

- Most of the times, development partners and private sectors focuses more on diagnostics without providing concrete solutions. **We need to be solution-driven.**
- Research agenda and investment projects have lots of time focus on specific projects, and not enough on programmes
 - **We should not shy away from big questions and taking risk**



Implication 2: Political economy must be systematically part of the equation

- It is imperative to work together with the government, as this may help not only target the right questions and projects but also help bridge the gap between projects, policies and local context;
- We should not try to circumvent political incentives, but recognize their existence, and work with it.



Implication 3: Leapfrogging require embracing risk

- **Risk is part of the equation** and that should apply to us
 - We should not be only output driven for the sake of producing output;
 - The selection of projects should not be based on how easy it is to execute and produce output but solely on their potential to meaningfully transform Africa's development.



Implication 4: We must strive to understand the process from successful pilots to scale up

- Too many « successful » pilots « success story » in Africa which cannot scale because it is only at scale that political economy comes into play;
- There is a need to understand the disconnect between pilots and scales
 - Understand how to make these projects to scale up
- Interdisciplinary or multidisciplinary research may help and once again local context matter

Implication 5: Three keywords while thinking about leapfrogging in Africa

Adaptation

Adoption

Innovation



We all have role to play here by developing, funding and supporting «**excellence centers**» in Africa in order to promote adaptation, adoption, and innovation, **ensuring the transfer of knowlegde and skills**

KEY MESSAGES

1. Leapfrogging is enhanced through the proper balance between top-down and bottom-up approaches;
2. Africa is not an exception, is not new to leapfrogging, and is generating its own innovations;
3. Not all leapfrogging attempts are successful, there is a need to embrace risk;
4. Constraints that African economies face are investment opportunities;
5. Having the right regulatory environment is crucial for enabling leapfrogging;
6. Innovation must scale and pilots must scale to trigger leapfrogging;
7. Public investment should prioritize skill acquisition and low ROI investments;
8. R&D is key for adapting technology to local contexts

THANK YOU