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Creating an enabling environment for digitalization to transform African Agriculture

Center of Development Research (ZEF) and Forum for Agricultural Research in Africa (FARA)

AGRF2019 GHANA

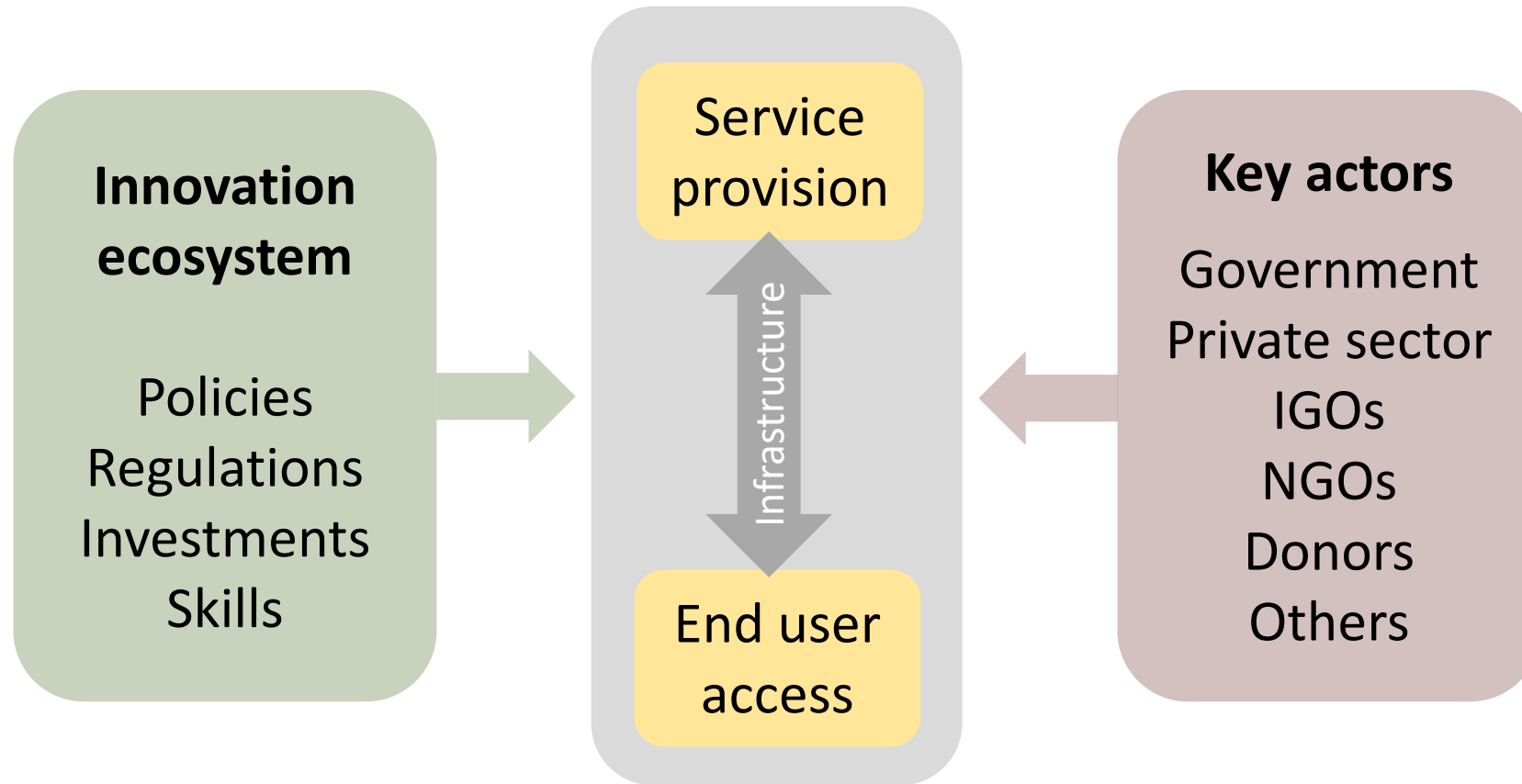
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Elements of a digital innovation environment





Insights from Kenya

Dr. Lawrence Mose,

Kenya Agricultural and Livestock Research Organization (KALRO)

1. Infrastructure to link providers and users

➤ **Key factors** leading to improvements in ICT Infrastructure

- Policies that led to **liberalization of ICT sector** → **Competition among operators**
- Investments
 - **PPP** - undersea cables enabling high speed connectivity
 - **Government** - National Optic Fiber Back-bone Initiative (NOFBI); Digital literacy initiatives (schools)

➤ **Role of actors**

- **Government** – enabling environment for policy formulation
- **Private sector** – investment
- **Donors** – financial support

➤ **Gaps**

- Current infrastructure distribution skewed
- Poor internet access and low digital literacy esp. in some rural areas
- Low rate of ICT use in agriculture

2. End user access

- **Status in 2017** - 90.4% mobile penetration, but low internet penetration <10% among adult population. Higher for youth population – (age 18-35)
- **Factors for improving access**
 - Availability of low-cost digital appliances & after sales support services
 - Expansion of telecommunication infrastructure including broadband, electricity and mobile coverage in rural areas
 - Improvement in data storage e.g. use of hard drives, servers etc.
 - Need for financial service provision - MPESA
 - Use of social media (WhatsApp) for information sharing and motivating collective action (building of a waterpan)
 - Use of SMS to access plant doctors for monitoring incidences of disease and pests
- **Gender or location divide** - No discernible gender divide but location divide exists due to issues of connectivity (North Eastern, Western and Coast vs Nairobi)
- **Digital Literacy** - Low digital literacy especially in remote areas and with age

3. Service provision in food and agriculture

- **Status of digitalization in agriculture** – Many apps available; localised; low usage
- **Digital services offered**
 - Public services that affect agriculture (land registry information; crop suitability)
 - Production (pest & disease incidences; agro-weather) & market information
 - Financial and insurance services
 - Knowledge brokerage – provision of agro-info through mobile phone at a fee
- **Key factors leading to development of the services**
 - Effective demand for real time solutions (e.g. case of plant doctor services)
 - High uptake or use of mobile phones by the population especially the youth
- **Reach of the services** – low to medium
- **Impacts of services** include:
 - Increased crop and livestock yields (case of cow)
 - More farmers reached through e-extension messages

Recommendations



POLICIES / REGULATIONS

- Incentives for PPP investment in ICT sector
- Data Privacy and Security



INVESTMENT

- Energy (solar, electricity) in rural areas
- Establish community based facilities in rural areas
- Infrastructure for data analytics



SKILLS

- Embrace ICT in curriculum of schools (primary to university)
- Promote adult agro-pastoralists and farmers to participate in community based ICT hubs



Insights from Nigeria

Dr. Philip Dayo

Agricultural Research Council of Nigeria (ARC/N)

1. Infrastructure to link providers and users

- Full deregulation of the telecom sector after the Nigerian Communications Act 19 of 2003
- Nigerian Telecommunications Commission, NCC, exclusively licenses and regulates telecom operators e.g. broadband services, mast and towers installation, spectrum allocation etc.

➤ **Telecom actors:**

- **Government** - legislation and regulation; not much infrastructure investment
- **Private telecom operators** - main investors in telecom infrastructure
- **Electricity** - mainly public for 80-83% of population

➤ **Challenges to telecom development in Nigeria:**

- Incoherent policies and governance structure along the telecom value chain
- Sporadic road works lead to damages to fibre infrastructure
- Fragile backbone infrastructure and electricity supply due to low public investment
- Unregulated acquisition of CDMA operators by GSM operators, reducing competition

2. End user access

➤ **Current access status:**

- Voice subscription grew steadily from 74,518,264 in 2009 to 160,886,485 in 2018
- Teledensity from .02 % in 2000 to 75.9% in 2017
- National internet access from .06% in 2000 to 26% in 2016
- International broadband capacity used at less than 10% of available capacity
- GSM accounts for 99% voice and internet access ; <1% through CDMA

➤ **Rural /urban divide:**

- Urban internet access moved from 11.6% (2010) to 29% (2016);
- Rural internet access increased from 1.5% (2010) to 9.8% (2016)
- Total mobile phone access: Urban 84% 2010 to 93% 2016; Rural 59% 2010 to 86% 2016

➤ **Key success factors:**

- Issuance of operating licenses to eligible private telecom operators after deregulation

3. Service provision in food and agriculture

- **Sample of digital devices used for services:** Global Positioning System (GPS), Satellites, Sensors, Camera, Voice recorder, Mobile phone, Short Message Service (SMS), Unstructured Supplementary Service Data (USSD) Interactive voice Response (IVR), Smartphone app, Email, Point of Sale Terminals (POS), Automated Teller Machines (ATMs) and Cards
- **Sample of services offered:** data collection, data analysis, investment platforms, information dissemination, information to farmers on agricultural best practices, linkage of farmers to insurance coverage and processors
- **Impact of services on income:** case studies into five service providers showed that household income increased on the average from NGN871,640.00 to NGN1,480,680.00 per annum

Recommendations



POLICIES / REGULATIONS

- Streamline the policy documents to minimize inter-agency rivalry and end-user confusion.
- Regulators need to urgently resist further acquisition of the smaller operators by the bigger ones.



INVESTMENT

- Improve Government's direct investment in fiber optic cable infrastructure.
- Move from government dominated to private sector driven electricity market.
- Improve coherence between federal and local administrative levels.



SKILLS

- Bridge the divide between the rapid growth in mobile phone access and skills to use the device especially for internet services.



Insights from Ghana

Dr. Rose Omari,

Council for Scientific and Industrial Research of Ghana (CSIR)

1. Infrastructure to link providers and users

➤ Key factors leading to improvements in ICT Infrastructure:

- Conducive policy and regulatory environment e.g. co-location and Facility Sharing
- Emergence of innovation spaces e.g. Ghana Multimedia Incubator Centre
- Investments by both private and public sector e.g. e.g. national fibre network
- Financial, incentives and support systems e.g. corporate tax incentives

➤ Role of actors

- **Government** - regulatory, policy, facilitation, universal service
- **Private Sector** - development of ICT infrastructure, provision of ICT services
- **International Regulatory Institutions** - regulations, ICT development indicators
- **International Development Institutions** - research support, skill development
- **NGOs** - ICT capability building, introduction of innovative services, scale-up projects
- **Donor Agencies** - financing public ICT projects e.g. E-Ghana and E-transform projects

➤ Gaps

- Inadequate implementation of policies and enforcement of regulations
- Limited digital skills reduces ICT use
- Relatively high cost of internet data especially to the vulnerable in rural areas
- No uniformity in quality of service- poor in some areas

2. End user access

➤ **Factors for improving access:**

- Ghana Investment Fund for Electronic Communications (GIFEC) established to bridge the digital divide between the urban and rural areas
- Innovative pricing e.g. bundling for data, MTN zone for calls etc.
- Consumer protection from all forms of abuse - Data Protection Act, 2012 Act 843 established to provides avenue for aggrieved persons to seek redress in courts
- E-skills Development e.g. integration of ICT in education policy and introduction of ICT into the curriculum of both basic and second cycle schools
- Various programmes supported by development partners e.g. Microsoft Partners in Learning Programme, NEPAD e-Schools Initiative, CISCO Academy, and Global Teenager Project and Oracle Academy Initiative.

➤ **Gender or location divides** are closing for mobile phone adoption, but still persist for internet access

3. Service provision in food and agriculture

- **Status of digitalization in agriculture** – Most services established between 2000 and 2017 targeting farmers and other value chain actors
- **Digital services offered**
 - Devices mobile phones, camera, drones, GPS, tablets, sensors, computer.
 - Medium and channels for dissemination web/mobile/ apps, IVR, SMS, call centre, IVR, USSD, RDD, Canvass, video, virtual workshops and webinars.
- **Key factors leading to development of the services**
 - Collaboration with public and private sectors, and development partners and NGOs
 - Wide availability of mobile phones and other devices
 - Funding support for development and deployment
- **Reach of the services** – Mostly farmers in both rural and urban areas
- **Impacts of services** include:
 - Good database on farmers
 - Increased access by farmers to information
 - Increased market access

Recommendations



POLICIES / REGULATIONS

- Improve policy implementation & law enforcement
- Introduce policies to support deployment, uptake of ICTs and scaling



INVESTMENT

- Invest in advanced and emerging ICTs e.g. sensors (drones), robotics
- Increase funding support for start-ups



SKILLS

- Integrate ICT education in the curricula of all agriculture educational institutions
- Promote informal ICT education for actors in the agriculture sector

General Insights

Dr. Heike Baumüller
Center for Development Research (ZEF)

Digital transformation will only happen if...

- ...there is a focus on agriculture at the policy level.
- ...the agricultural context in which digital services are provided is conducive.
- ...digital services meet the needs of the target users.
- ...digital services can function within the prevailing social context.

Lessons learned from the three countries

Factors that facilitated ICT expansion:

- Government investments (PPPs) helped to expand infrastructure into remote areas
- Liberalization of licensing regimes increased competition and lowers cost of services
- ICT services (e.g. M-Pesa and WhatsApp) drove ICT uptake

But...

- Internet adoption is lagging far behind mobile adoption.
- Most Apps are small in scale and often too localized.
- Lack of trust inhibited adoption of digital solutions.
- Reach and impact of digital services are unclear.

Advancing digitalization in agriculture requires

- **effective competition** to lower costs and improve service provision
- **investments in the agricultural context** to address broader constraints
- more **cooperation** between regulators and ICT service providers
- engage the **youth** as a driver of digitalization
- **digital skills training** at all levels of education, incl. schools

- ensuring **diversity and quality of information**
- more apps along the **entire value chain**
- **ICT platforms** to bring together different services
- **more data** on use and impact of digital services



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Thank you

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