

## BUILDING DIGITAL BRIDGES IN AFRICAN VALUE CHAINS

### Use and impact of digital technologies among agricultural intermediaries

High hopes have been pinned on digital agricultural (D4Ag) solutions to increase agricultural productivity and food security in Africa. Such solutions provide digitally-enabled services to agricultural producers and other actors in agricultural value chains, such as mobile payments, supply chain management software, digital advisory services or e-commerce. Many D4Ag solutions are targeted directly at small-scale producers, in part to replace traditional intermediaries, such as e-extension or virtual markets for inputs and output. However, agricultural intermediaries, including extension agents, input dealers and output dealers, perform important functions in the African agriculture sector. D4Ag solutions that integrate intermediaries into their design could help improve rather than replace intermediaries’ service delivery while capitalizing on their networks and trust relationships to engage small-scale producers in digital service provision. At the same time, D4Ag solutions could offer safeguards that protect the interests of intermediaries’ clients against exploitation.

#### Use of digital technologies among intermediaries

A survey of 1,571 intermediaries, including extension agents, output dealers and input dealers, carried out in Ghana, Kenya, Mali and Nigeria sheds light on the uptake of digital technologies among intermediaries:

**Agricultural intermediaries make extensive use of information and communication technologies (ICTs) in their professional activities.** All of the intermediaries use some kind of ICT. Mobile phones clearly dominate, most commonly smartphones, which are often used daily. While voice calls are still the preferred communication channel, other channels are gaining in importance, notably SMS, messaging apps and social networking platforms. Expansion in ICT use was driven mainly by improvements in network connectivity and better access to ICTs among clients.

**D4Ag services are not yet widely used among agricultural intermediaries.** For the most part, D4Ag service adoption is higher in countries where such services are more prevalent, notably Kenya. The low uptake may be due mainly to skill gaps rather than lack of access to the necessary devices or poor connectivity.

**Extension agents show the highest level of digitalization, followed by input and then output dealers.** For instance,

extension agents have the highest level of digital skills, and use ICTs in the widest range of activities with the most sophisticated ICTs and most diverse mobile phone functions. They also interact with the most diverse network of value chain actors (Fig 1) and share the widest range of information via ICTs.

**Mobile payments are widely used among input and output dealers.** Widespread adoption even among the less digitally advanced output dealers shows that intermediaries are willing and able to make use of mobile phone-enabled services other than communication if they are easy to use, adapted to a wide range of devices, useful for their work and sufficiently widely adopted to create network effects.

**A broad comparison between the four countries shows some expected, but also some unexpected patterns.** The level of digitalization among Kenyan and Nigerian intermediaries is in line with the relative level of digital development in both countries – most advanced in Kenya and at mid-level in Nigeria. However, digitalization among intermediaries in Ghana seems surprisingly low, possibly due to the relatively high share of women among Ghanaian output dealers surveyed who have less access to higher tech phones than their male colleagues. In contrast, in Mali digitalization among intermediaries is more advanced than would be expected, in particular the widespread smartphone use. The comparable usage rates for mobile payment services across countries is also interesting to note, given that the countries rank very

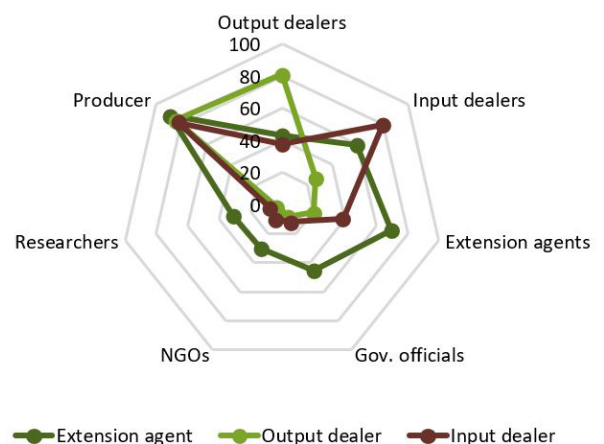


Figure 1. Interactions with value chain actors via mobile phones



differently in the Mobile Money Prevalence Index. These findings suggest that **self-motivation is a key driver in adoption, i.e. where users perceive a utility in the digital tools, they will take advantage of them even if the context is not entirely conducive.**

### Impact of using digital technologies

**ICTs facilitate information sharing between intermediaries and other value chain actors.** This was found to be the main activity and benefit across the three groups. Extension agents can play a particularly important role in information exchanges, given the diversity of professional activities, networks and information shared. Despite widespread ICT use, many intermediaries prefer to exchange certain information face-to-face, such as price information among output dealers, and information about farming methods among input dealers and extension agents.

**ICTs facilitate networking among value chain actors.** Dealers mainly use these networks for two-way business transactions. Extension agents interact with a wider range of actors via ICTs and are part of the most diverse ICT-enabled groups. Digital technologies have also helped extension agents to increase the number and frequency of interactions with producers. They could therefore function

as an important bridge between value chain actors. At the same time, ICTs mainly help to facilitate existing rather than creating new relationships, in particular with regard to market transactions.

**ICTs reduce transaction costs, especially for input and output dealers.** These reductions mainly result from better access to information about buyers, sellers and prices, better timing of purchases, faster payments from customers and reduced travel times. While ICTs have also improved market linkages, this impact seems less important. Interestingly, many dealers did not perceive these cost reductions to have translated into higher profits.

**Verbal and in-person communication remains important in intermediaries' professional activities.** Even though the digital channels have become quite diverse, verbal communication via voice calls is still most common. All intermediaries prefer to exchange certain types of information face-to-face. ICT-enabled group members also prefer in-person meetings and some have voiced concerns that ICT use may exclude some members in the group. They do value voice calls as complementary channels, however, in particular to speed up communication. The results also show that producers are still less easily reached via ICTs than other value chain actors.

### POLICY RECOMMENDATIONS

Our policy recommendation partly call upon governments, partly development partners, and partly can be considered as corporate policy recommendations, but ideally for all of the five recommendations, multi-stakeholder partnerships can be helpful:

- **Develop D4Ag services around existing marketing structure** to improve the efficiency of markets rather than replacing established business interactions.
- **Governments to develop regulatory frameworks that require D4Ag solutions to build in safeguards to ensure fair business transactions** between intermediaries and other actors along the value chain.
- **Invest in digital skills and technologies of extension agents** to strengthen their role as a bridge between value chain actors through ICT-enabled and in-person interactions.
- **Expand digital training opportunities in particular for producers and output dealers with a focus on women.**
- **Provide a conducive policy environment to further increase the use of mobile money services in agriculture** through supportive legislation in the financial sector and infrastructure investments.

The policy brief is based on the study: Baumüller et al. (2022) Documenting the digital transformation of African agriculture: Use and impact of digital technologies among agricultural intermediaries. ZEF Working Paper 214.

Available at [www.r4ai.org](http://www.r4ai.org).

PARI implementing partners: ZEF/University of Bonn, University of Hohenheim, the Forum for Agricultural Research in Africa (FARA) and its national partners, the African Growth and Development Policy Modeling Consortium (AGRODEP) facilitated by AKADEMIYA2063, and research collaborators in India.

PARI is funded by the German Federal Ministry for Economic Cooperation and Development (BMZ).

### IMPRINT

Center for Development Research (ZEF)

Genscherallee 3 | 53113 Bonn | Germany

E-Mail: [presse.zef@uni-bonn.de](mailto:presse.zef@uni-bonn.de)

Phone: +49-(0)228 - 73 18 46

Brief prepared by: Heike Baumüller

Layout: Yesim Pacal (ZEF PR)



**zef**

Center for  
Development Research  
University of Bonn