A GPS tool helps to optimise rice sowing.
Photo: Jörg Böthling

Unleashing the rural digitisation potential

Information and communication technologies have seen rapid advances since the beginning of the millennium. While they hold a huge potential for rural areas, new Internet developments such as the "Internet of Things" and "Big Data" are set to create further opportunities. However, our authors argue that there is still much room for improvements, especially by bringing the many IT initiatives together on user-friendly platforms for farmers and other rural small businesses.

Already in the early 2000s, when the rapid spread of the mobile phone was about to take off, our research identified the poverty reduction potential of information and communication technologies (ICTs) in developing countries. At the time, mobile phones were largely acces-

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sible through fledgling, though fast growing phone rental services, for instance in Bangladesh and, in some cases, in Africa. Development planners were sceptical about ICT. Much has changed since then and ICTs have evolved far beyond what was imagined at the time. Today, we can safely say that digital technology will be a game changer for inclusive development and positive rural change.

■ **Bringing advanced mobile technologies to rural Africa**

Today, mobile technologies are being used to offer services to farmers

that seek to improve access to inputs, financial services and markets, gather and disseminate information and facilitate social learning and exchange. The impacts are significant. For instance, farmers are better informed about market opportunities, for example in Ethiopia through digital display boards in 29 regional centres of the Commodity Exchange, or by SMS services in many African countries. Weather and food shortage risks can be monitored and responded to more effectively through crowd-sourced information. On the consumer side, digital technologies could soon facilitate the provision of targeted information related to malnutrition to mothers in need.

The transformative potential of mobile technologies does not lie in what is available today, however. Most of the current services offered in Africa still rely on SMS and voice-based systems to cater to basic phones, which limits the sophistication of the services that can be provided and leaves little room for interaction. The true potential will only be realised with the use of new mobile technologies that are currently emerging. Increasingly, people will be able to choose among a wide range of affordable devices to replace the simple phone handsets that dominate the rural African mobile landscape. The advent of smartphones opens up a whole new range of services to their users. The device allows for the provision of more complex content and functions, accessible through interfaces that could also be used by illiterate farmers.

At the same time, the nature of the Internet is changing. The so-called 'Internet of Things' allows to connect diverse devices through the mobile network which can collect huge amounts of data – big data – that can then be analysed through cloud-based technologies. The results can inform decision-making, such as site-specific management of fields or supply chain management, or trigger actions of other devices attached to the network, e.g. for irrigation or fertiliser application. Data collection can also capitalise on the large and growing network of users through their personal mobile devices that can deliver crowd-sourced information and facilitate the dissemination and exchange of information and knowledge. These developments are going to fundamentally change transactions costs, which is the basic cause of high costs of market participation in rural Africa. To the extent road and rail infrastructure is improved in parallel, the opportunities for small farmers and rural businesses will improve.

While these technologies may today seem far-fetched for rural Africa, existing examples show what is in the making. In Kenya, Virtual City's *Agrimanagr* and *Distributor* systems use mobile devices to collect data on weight and location when farmers deliver the produce and track the produce throughout the chain to the processing plant. Also in Kenya, the company ACRE uses data from weather stations and remote sensing to trigger insurance pay-outs via mobile phones in case of severe weather events. In Nigeria, the Uber-like service *Hello Tractor* allows farmers to share tractors through a mobile app, a system already functioning well in India. The hardware to run these services, such as smartphones, tablets or sensors, is becoming cheaper, not least thanks to growing manufacturing capacities in emerging economies.

■ A reality check

Despite rapid technological advances and related opportunities for service delivery, we need to acknowledge that much of the potential still lies in the future. Our research shows that most of the existing initiatives still depend on external financial support, remain small, are often duplicates and have limited impact *(see also article on pages 14–16)*. Indeed, in the ICT for Development (ICT4D) community, constructive scepticism and realism has replaced the initial euphoria. The reasons mainly are:

The myriad of small initiatives tend to be disjoint and highly diverse in their usability. As a result, users cannot easily access different types of services through their mobile device that could otherwise be complementary. To offer integrated solutions for farmers, too few service providers have started combining several functions in one service, such as the agribusiness management tool *mfarms* in West Africa.

Many initiatives are delinked from providers of agricultural information and other business actors in the value webs. Agricultural expertise is often not adequately taken into account during the development and operation of the service, frequently focused on one line of products, and not sufficiently adapted to local circumstances in the diverse African farming systems. There tends to be little room for collecting information on the needs of users and for providing user feedback once the service is operational.

Mobile solutions are developed with insufficient regard for user capacities and the context in which they are provided. Too often, the services are technology-driven, instead of the problem determining the choice of solution and delivery channel.

As a result, many services remain small because external constraints prevent them from reaching scale which were not sufficiently taken into account in the design and marketing strategy.

■ ICT platforms – towards effective integration of mobile services and users

To address these constraints, overarching ICT platforms must be set up to host, connect and scale the dispersed individual applications. Similar to an app store, farmers and other businesses and traders should easily find and access different types of services through a single interface. Review functions would allow users to provide feedback on the service to suggest improvement and stimulate competition between providers of similar services. Service providers, on the other hand, could remain specialised in a certain area and profit from access to a large number of potential customers which would facilitate marketing and create incentives to develop new ICT applications. The platform would need to be modular so that it can cater to different technological and human resource capacities. Thus, while farmers would be targeted directly by some lower-tech services, they could also be reached and benefit indirectly through intermediaries, such as farmer organisations, or co-operatives. Investing in such ICT platform establishments is a key area in which development agencies and innovative private sector initiatives should join forces to actually unleash the rural digitisation potentials.