A Review of Case Studies of Digital Agri-Business Technology Innovations for Improving Agri Business Practices in Nigeria

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Abstract
The need to adopt the use of digital and ICT technologies for seamless agribusiness transactions cannot be overemphasized, thus The review highlighted the importance of using digital and ICT technologies in agribusiness transactions in Nigeria and reviewed some csaqe studies from , Nigeria , Africa and out side Africa. Basic concepts such as digital, ICT, Agrbusiness as well Case studies such as Farm crowdy, Markets and Markets , Twiga were reviewed , The potentials of digitalization was also discussed. It was clear that use of digital and ICTtechnologies will ease agribusiness transactions in Nigeria.It was concluded that Adopting digital agribusiness technologies will ease agri business practices in Nigeria. The case studies reviewed can easily be adopted in Nigeria . The following recommendations were made,..- The digital agri business technologies reviewed are recommended for adoption in Nigeria .There is need to sensitize Agri business men and women to embrass the use of digital and ICT technologies.Government should subsidize the high cost of data and provide strong and steady network for ease of online transactions

Keywords: Case Studies, Digital Agribusiness Practices. Innovations, Improving, Nigeria, Technologies

Introduction

The need to adopt the use of digital and ICT technologies for seamless agribusiness transactions cannot be overemphasized Digital agriculture involves the use of digital tools and platforms to collect, analyze, and share agricultural data. This includes mobile apps, satellite imagery, and digital marketplaces. Digital agriculture leverages data-driven insights to optimize farming ICT encompasses technologies used to communicate, store, and process information. In agriculture, ICT includes mobile phones, internet platforms, and geographic information systems (GIS). ICT has become a powerful tool for bridging information gaps and connecting farmers to markets, services, and knowledge resources.(Aker, *et al* 2011)

ICT facilitates the dissemination of agricultural knowledge and connects farmers to markets and services practices, improve decision-making, and enhance market access for farmers.

Digital tools empower farmers with real-time information on weather, market prices, and best practices. not seeing more youth on the farm, but more youth at the top of the value chain pyramid where digital agriculture creates multiple entry points for young people looking to get involved in agribusiness(Spore Magazine, 2020)

Unemployment remains a critical socioeconomic challenge in Nigeria despite the agricultural sector contributing 22.3% to GDP and employing 36.8% of the labor force (. Adejoh *et a*l, 2020) The unemployment rate increased from 23.1% in 2018 to 33.3% in 2020 before improving marginally to 4.1% in late 2024 . (ILO,2024) This paradox of persistent unemployment amid agricultural potential underscores structural deficiencies in financing mechanisms.(Alearo *et a*l 2012) (Approximately 70% of Nigeria's agricultural workforce comprises smallholder farmers who face significant financing constraints due to limited collateral, high transaction costs, and inadequate digital infrastructure .(Kazeem *et al.,2020,*

The use of digital and ICT technologies in Agribusiness transactions can help create jobs , thus helping to reduce unemployment

This work is aimed at highlighting the importance of using digital and IUCT technologies in agribusiness transactions, and reviewed case studies from out side Nigeria

Basic Concepts

ICT (Information and Communication Technology)

ICT encompasses technologies used to communicate, store, and process information. In agriculture, ICT includes mobile phones, internet platforms, and geographic information systems (GIS). ICT has become a powerful tool for bridging information gaps and connecting farmers to markets, services, and knowledge resources.

ICT facilitates the dissemination of agricultural knowledge and connects farmers to markets and services. For example, mobile-based advisory services like *Esoko* in Ghana provide farmers with timely information on weather and market prices, improving decision-making (Aker, 2011). These services are particularly valuable in remote areas where access to traditional extension services is limited. Additionally, ICT platforms such as GIS and remote sensing technologies enable precision agriculture by providing detailed insights into soil conditions, crop health, and resource availability. By levera9ging ICT, farmers can optimize input use, reduce waste, and increase profitability, contributing9to sustainable agricultural development.

ICT Applications in Agri Business

ICT applications in agricultural business include e-commerce platforms, supply chain management systems, and digital payment solutions. These tools enhance efficiency, transparency, and profitability in agricultural value chains. By digitizing business processes, stakeholders can streamline operations, reduce 9osts, and improve market access.

ICT applications in business enable farmers to access larger markets, reduce transaction costs, and improve financial inclusion. For example, the *M9-Farm* platform in Kenya connects farmers directly to buyers, eliminating middlemen and increasing farmers' incomes (Wyche & Steinfield, 2016). This platform also provides farmers with real-time price information, enabling them to make informed decisions about when and where to sell their produce. Digital payment solutions, such as mobile money services, have also transformed financial transactions in rural areas, providing farmers with secure and convenient access to credit and savings. By integrating ICT into agricultural business models, stakeholders can create more inclusive and efficient value chains that benefit all participants.

The Potential of Digitaliztion

There is a popular assertion that on average, young people are smart, energetic, innovative and capable of integrating technology into their activities. These attributes are complementary to what digital agriculture can offer, enabling young people to transform agriculture in Africa from the palm of their hand. Across agricultural value chains, digital agriculture has proven to be a timely intervention to attract youth into agriculture, but there is need to link youths involved in digital agriculture with substantial financial inclusion, investment support from both the private and public sectors, and tailored agricultural training. (Spore Magazine, 2018)

Dr Akinwunmi Adesina, president of the African Development Bank, emphasizes the potential of digital agricultural technology, such as digitally enabled agriculture, precision farming , hydroponics, robotics, and artificial intelligence, is expanding globally. The future farmers that is not physically engaged in agriculture. Theses farmers will take agriculture to the next level, a level shaped by innovation.

According to Dr Debisi Araba " prosperity approach needs to overtake a poverty reduction approach, to encourage young people into making a career in agribusiness. The future of Africa is not seeing more youth on the farm, but more youth at the top of the value chain pyramid where digital agriculture creates multiple entry points for young people looking to get involved in agribusiness

Review of Case Studies

Case Studies from Nigeria

Farmcrowdy ,a digital platform, which is connecting farmers in rural areas with young professionals in cities Aims to increase food production in Nigeria, while also promoting youth participation in agriculture. Through the digital start-up, Farmcrowdy, smallholders are linked with investors who are willing to sponsor agricultural activities, which enable farmers to improve their production and expand their farming operations. The company's Mobile app sends a notification to potential investors when farms are open for sponsorship, and investors then select the smallholdings they are interested in supporting, at the end of the farm cycle, farmers, sponsors and Farmcrowdy share the profit from the harvest sales.

In Nigeria, convincing commercial banks to invest in small agribusiness is challenging, with lenders usually shying away from farming because of the associated risk. Farmcrowdy aims to address this issue by pooling funds from numerous investors and spreading the risk among a large population of middle-class Nigerians, most of whom invest about ₦100,000 (€24) per farming cycle. iNvestors receive between 6% and 25% as returns on the funds they provide-usually within a year- in addition to the capital they invest, and are able to monitor their investment from their homes or offices through the text, picture and video update the revceive via app.

"I have always wanted to invest in agriculture without getting my hands dirty and Farmcrwody has given me the opportunity to do so," says Julcit Bali, a sponsor based in Nigeria's Capital, Abuja. Another sponsor, Chigozie Egbunefu, based in Port Harcourt in the south of Nigeria says, "[farmcrowdy] is unique because of the coordination of its activities and regular updates to sponsors. It took away the burden of supervision and monitoring and I would certainly recommend Farmcrowdy to others."

Farmcrowdy provide information on the availability of farm produce – usually cassava, soya beans, and rice through their websites and app, which

helps farmers from other platforms is that it turns a complex problem into a digital marketplace," says Farmcrowdy CEO, Onyeka Akumah. The company is also connected with agri-based companies that use raw agricultural materials in their production processes, creating a ready market for farmers, in addition, Farmcrowdy uses the sponsorship funds to provide agricultural inputs and services, such as seeds, fertilizers and farm equipment to ensure good yields, as well as to pay for insurance cover both the farmers and sponsors in the event of a poor harvest.

In less than 2 years over 7000 farmers have benefited from 13,683 sponsorship and the platform has amassed over 64,000 follower. "Before Farmcrowdy, I used to cultivate one or two plots, but now I have expanded to cultivate 16 plots, which is about 1 ha of land," says Blessing Jacob, a 24 year old cassava farmer from Akwa Ibom state. Through Farmcrowdy's technical support and agricultural advice which is provided by the company's field agents, Jacob has also been able to boost her yields of cassava, we now get bigger and healthier cassava roots," she says. Victor Akpan, another young farmers says " I have learnt so much about farming through Farmcrowdy and I am making much more money. With the money I have recieved, I can now pay to continue my educations

Case Studies from outside Nigeria

According to Markets and markets, an Indian research Company, in 2018 the worldwide AI in agriculture market was valued at € 545 million and, by 2025, is expected to reach € 2.4 billion as more and more smallholder farmers adopt new, data- driven technologies. With the help of data-driven technologies. With the help of data scientist and big tech companies, small scale farmers in ACP countries are increasingly benefiting from the predictive abilities of AI and machine learning in order to access finance and insurance in order to access finance and insurance, predict yields and tackles pest and diseases, to run more profitable and 'smarter' sustainable farms. For example, the *e-Choupal* initiative in India provides farmers with digital access to market information, enabling them to negotiate better prices for their produce (Mittal & Mehar, 2016). By connecting farmers directly to buyers, this platform eliminates intermediaries, ensuring fairer prices and higher incomes for farmers. Additionally, digital platforms such as weather forecasting apps and soil health monitoring tools enable farmers to make informed decisions, reducing risks and improving productivity. The integration of digital technologies into agriculture also facilitates traceability and transparency in supply chains, enhancing consumer trust and marketability of agricultural products. By 2025, an estimated 330 million young Africans will enter the labour market. Hence, there is a need to match youth unemployment with the enormous potential of African agriculture. Young people picture the druggery of farming and perceive agriculture as low income employment sector in recent years though. Digitalization and agriculture technologies have enhanced the way that food is produced. ICT-enabled agriculture is gradually changing the mindset of young people and creating young entrepreneurs who are willing to take risks and invest in agriculture.

Digital solutions and platform, such as smart-mobile applications, remote sensing technology, big data, digital soil maps, social media, blockchain, drones, precision technology and cloud based computing, have the tendency to not only increase food production and market efficiency, but also accelerate youth involvement in agriculture. Over the past years, private sector companies and donor agencies have become increasingly aware of the role that digital agriculture can play in driving agriculture, Mobile applications and low tech solutions have been developed by different stakeholders, including young entrepreneurs, to tackle issues related to production, input supply, finance, processing, logistics, and marketing. The key question is whether digital agriculture is enough to drive growth and ensure sustained youth involvement in agriculture.(Spore Magazine, 2019)

In Kenya, over 17, 000 farmers are being provided with access market and increased farm gate prices. Whilst cost for fruit and vegetables Wholesalers are being reduced. Established-to-business system in matching more than 6,000 urban retailers with smallholder produce to improve the supply chain from farms to market, and reduce agricultural losses.

Twiga foods developed the food supply platform in 2014, at a time when middlemen, oversupply and significant post-harvest losses were taking a toll on farmers earning. While increasing food prices for consumers. To overcome these issues, Twiga initially worked on connecting banana farmers directly with local vendors, "we realized that there was a very disjointed chain regarding how produce moved from farms to markets," says Grant Brooke, Twiga Foods CEO. " Our initial proposition was that, if we could get critically mass of retailers ordering on a daily basis, this would stabilize demand and allow us to offer producers guaranteed markets," Brooke adds.

Through its platform, Twiga cuts out the middlemen and can therefore offer higher prices and reliable, high quality supply to vendors. Farmers deliver their produce to the nearest Twiga foods collection centre, which are spread across 20 countries, and receive SMS receipt of the goods and payment within 24hours through the mobile money service, M-PESA. "they pay well, I'm assured of my payment and they don't have many conditions," says Alvan Muriihi , a farmers from Enmbu County, who, since working with Twiga, has nearly doubled the profit he makes from the sale of his pawpaw fruits.

Produce is processed and packed at a central warehouse in Nakuru, Kenya, before being distributed to 6,000 street vendors around the city. To uphold food

safety standards, the company works with international experts in setting up post-harvest regulations that mirror international practice, including cleaning produce at the time of harvest to reduce the development of Fungi, and the use of cold rooms to manage temperature and humidity. Twiga also works with kenya plant health inspectorate Service officials to ensure that produce coming from collection centres conforms to the required standards.

Buoyed by an increase in platform members and by the evident benefits for both farmers and vendors, Twiga Foods is now looking at rolling out operation across East Africa. The company has also expanded its product, including other fruits, vegetables, maize flour, cooking oil and sugar. In 2018, the company raised over €8 million from investors, led by the international Finance Corporation (IFC), to add processed food and product line-up. "The IFC investment will enable us to reach more farmers, improve efficiency in service delivery and increase access to high quality produce and foodstuffs for vendors," says Brooke .(Spore Magazine, 2020)

Conclusion and Recommendations

Conclusion

Adopting digital agribusiness technologies will ease agribusiness practices in Nigeria. The case studies reviewed can easily be adopted in Nigeria

Recommendations

The digital agribusiness technologies reviewed are recommended for adoption in Nigeria.

There is need to sensitize Agri business men and women to embrace the use of digital and ICT technologies.

Government should subsidize the high cost of data and provide strong and steady network for ease of online transactions

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