



50 FINANCIALLY IMPACTFUL ICT INNOVATIONS IN NIGERIA

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INTRODUCTION

All over the world, the increasing impact of Information and Communication Technology (ICT) has gained momentum, with the broader perspective of providing creative ideas to everyday problems in a 21st-century globalised world. These ICT innovations, which cut across different sectors, enhance efficiency in delivering services and value to national governments, international communities, and global citizens.

In both formal and informal ways, the industry has incorporated players from all parts of the world into a common task of engaging communication technology in the most seamless way to enhance usefulness. Communication technology innovation, which encompasses properties such as the internet, wireless networks, cell phones, computers, software, middleware, video conferencing, social networking, and other media applications, has impacted almost all industries, in both public and private sectors.

Not surprisingly, Nigeria's ICT ecosystem has recorded significant growth and investment commitment recently, with Nigeria producing the highest number of unicorns in Africa, which are interestingly within the tech space. Interswitch, Flutterwave, Opay and Jumia are unicorns which have thrived within the primarily challenging environment. Andela is another popular fintech company that is identified as an American company with an African focus strongly tied to Nigeria, as its co-founders are Nigerians.

In an early study of the evolution of the computer hardware sales cluster in Lagos, Oyelaran-Oyeyinka (2006) noted that Otigba Computer Village had proceeded largely without direct state intervention or support. It was incubated within a decidedly hostile institutional and arid infrastructural ecosystem. On Nigeria's urbanisation journey, the same author alludes to the fact that the country's experience has been of a highly damaging complexity as a result of the coordination of disparate actors via a bureaucratic structure that is largely bereft of the fundamentals of science, technology and [an] industrialisation process (Oyelaran-Oyeyinka, 2014). Nonetheless, Nigeria has led the way in terms of industrial development and ICT innovation.

In tandem with the large-scale opportunities for growth, there have been decidedly significant innovations, both locally created and externally introduced, in the ICT sector in Nigeria. Therefore, the objective of this editorial is to identify, summarise, and extol 50 financially impactful ICT innovations in Nigeria. The need to use the 'financial' qualifier has to do with the operational environment and the relative scarcity of patient capital in Nigeria (Economist, 2021). To this end, the listed ICT innovations will be examined under six sub-headings; Telecommunication/4G LTE, Education, Datacentres, Submarine Fibre Optic Cables, Financial Technologies (fintech/payment, switching and payment processing infrastructure) and E-Commerce.

A. Telecommunication/4GLTE

Innovations are of two categories: process and product. It has been tough, historically, to delineate between both process and product innovations and owner-companies. The two telecommunication/4GLTE products shortlisted, are process innovations, an enhancement of an existing service.

1. Smile Network

Smile Network provides voice and data over its 4G Long-Term-Extension communication network. It has 4G LTE footprints in Lagos, Port Harcourt, Ibadan, Abuja, Benin City, Kaduna, Onitsha, and Asaba. Its mission is to deliver fast and reliable internet and communication services to businesses and individuals.

2. Spectranet

Spectranet's process innovation is visible in its speed and relative cost in comparison to its competitors. The network provides voice and data services over its 4G LTE in Lagos, Ibadan, Abuja and Port Harcourt.

B. Education

In all parts of the world, including Nigeria, there have been a series of impactful innovations in education. However, four financially impactful innovations in the educational industry shall be considered here.

3. uLesson

uLesson provides educational content to Nigerian primary and secondary school students through interactive graphics. Beyond its educational value, the uLesson app mimics the classroom environment and uses colorful illustrations to interpret the curriculum and teach students different subjects across various grades.

4. School On Air(SOA)

The School On Air lesson teacher is an Android-based tool that delivers educational content via mobile phones or tablet computers to students in primary and secondary schools. SOA's mission is to provide students with convenient access to high quality educational content.

5. SAF School Management Software (SAF-SMS)

The SAF-SMS is a school management package that includes tools like financial management, process improvement, administration, and attendance. At the moment, SAF has 500 institutions that use the software for school administration.

6. Bluebic

This is another school management software. The tool aids in financial management, report card generation, grading and assessment, and human resource management. It also assigns user roles, permissions, calendars and event schedules.

7. Computer Based Test for University and Tertiary Institutions Matriculation Examination (UTME)

It is difficult to quantify the financial impact of the Computer Based Test (CBT), especially when the organisation in charge of the UTME also generates significant revenue from the sale of the UTME forms. Nonetheless, it has a financial impact on business centre owners and agents in the industry who have carved out businesses in registering candidates sitting the exam and subsequently checking their results. In any case, the CBT has streamlined, overall, the examination writing process and restored integrity to the UTME.

C. Data Centres

Data Centres have become strategic to businesses, organisations and public agencies in today's Nigerian economy. According to Palo Alto Networks, "a data centre is a facility that centralises organisations shared IT operations and equipment to store, process, and disseminate data and applications. Because they house an organisation's most critical and proprietary assets, data centres are vital to the continuity of daily operations" (Palo Alto Networks, 2020; Para 1). The two industry leaders in data centres and cloud computing services in Nigeria are examined below.

8. Rack Centre

Founded in 2012, Rack Centre is a carrier-neutral Tier III data centre located in Lagos, Nigeria. It is not affiliated with any telecommunication company or carrier. It provides colocation, cloud connectivity, backup and disaster recovery, managed cloud security, as well as virtual and physical data centres. It has been reported to have achieved 100 per cent uptime since its inception in 2013.

9. MDXi Datacentre

Mainstreet Technologies Limited owns MDXi. Like Rack Centre, it is also a Tier III carrier-neutral data centre in Lagos, with centres in Ghana and Cote d'Ivoire. It provides colocation, cloud connectivity, backup and disaster recovery services, managed cloud security, virtual data centre, among others.

D. Submarine Fibre-Optic Cables

The level of information technology development today requires top-notch reliability in data connectivity. Submarine fibre-optics are "fibre optic cables that connect countries worldwide via cables laid on the ocean floor. These cables – often thousands of miles in length – can transmit huge amounts of data rapidly from one point to another" (Datacentre Dynamics, 2021: Para 2). Two products dominate the provision of submarine fibre-optic infrastructure in Nigeria, and they are examined on the next page.

10. Glo-1

Glo-1 is a submarine cable system owned by Globacom Limited, a private telecommunications organisation in Nigeria. The cable connects Lagos-Nigeria to the United Kingdom with footprints along the coast of West Africa. It is 9,800 km long, starting with a data capacity of 640 gigabytes per second in 2011. It has since achieved an expanded breadth of 2.5 terabytes per second as of 2021.

11. MainOne Cable

MainOne Cable is a subsea communications cable which stretches from Portugal to Nigeria in the first phase, and from Nigeria to South Africa in the second phase, with a length of 14,000 kms. It is owned by Main Street Technologies, a Lagos headquartered communications and information company.

E. Financial Technologies (payments and banking apps)

Most ICT innovations in Nigeria are within the financial technology space. Financial technology or 'fintech' are businesses that use technology to improve financial activities. (Schueffel, 2016)

12. Nigeria Inter-Bank Settlement System (NIBSS)

Nigeria Inter-Bank Settlement System (NIBSS) is a Nigerian incorporated entity owned by all licensed banks, including the Central Bank of Nigeria (CBN). NIBSS began operations in June 1994 and has created systems, platforms and products for handling inter-bank payments to remove the potential issues associated with inter-bank funds transfers, fees and settlements.

13. OPay

OPay, a unicorn, is a payment application created by the Chinese-owned Opera for the Nigerian market. It allows bill payments, mobile money transfers, e-commerce, Unstructured Supplementary Service Data (USSD) offline banking, savings and loans. The app essentially works like similar payment apps and has an e-commerce component, where selected sellers can sell to other users and get paid.

14. ChipperCash

Founded in 2018, the three-year-old application, as of 2021, had over 4 million users and in the same year attained unicorn status. ChipperCash allows users to send and receive money; it provides a virtual card and enables investment and bill payments. The app's objective is to allow users to send and receive money across Africa.

15. Carbon

This innovation provides instant, short-term loans, investment intermediation and payment facilitation. It

allows users to track expenses, access financial reports and view credit history. It enables the opening of a carbon bank account and funds transfer. The digital bank has raised \$10.8 million in series A and B funding since its inception in 2012 by two brothers, Chijioke and Ngozi Dozie.

16. Sparkle

Apart from digital banking and payments facilitation, Sparkle provides business registration services within its app, including acquiring a Tax Identification Number. The digital bank also enables savings and loans. As of 2021, the app had processed \$16 million in transaction value, issued 3,500 virtual and physical cards, acquired more than 20,000 customers, and received N400 million in deposits since its launch in 2018. (Techcabal, 2019).

17. Palmpay

This payment app has attracted a total of \$40 million in funding from investors. It allows payments and transfer of funds. It also facilitates bill payments and the purchase of airtime, among others. As of 2021, the app had 100,000 registered users.

18. Patricia

This financial technology company enables cryptocurrency for payment and facilitates the buying and selling of cryptocurrencies. The app has 660,000 registered users, and it processes 30,000 daily transactions. Founded in 2017, the app was one of the official sponsors of the 2021 Big Brother Naija Show on DStv.

19. Abeg App

This app is a financial technology solution that eases social spending. The word 'abeg' is derived from the Nigerian pidgin for 'please help' or 'assist'. The app enables the transfer of funds, purchase of airtime, and bill payments. It allows a user to request funds as assistance or compensation for debt settlement from another user.

20. TeamApt

The application enables digital banking solutions for individuals and business owners. It has products like Money-Manager; a digital banking service for financial institutions to monitor transactions via web and mobile interfaces. The software has attracted \$5.5 million in funding so far. It has a network of money agents that provides financial services through cash withdrawal, cash deposit, fund transfer, airtime purchase, and bill payment.

21. Zowasel

This innovation enables peer-to-peer trading of agricultural commodities in real-time for farmers. It is an online marketplace where agricultural buyers can

connect with farmers and producers to buy products. Consequently, it enables the verification of buyers and sellers, as well as the receipt and payment of funds.

22. Nomba

As of 2021, this digital microfinance bank had garnered \$5.1 million in investor funding. Kudi, formerly Nomba, is an e-banking platform and financial service provider that enables financial intermediation through natural language processing, conversational interfaces, and Artificial Intelligence. This is done through traditional savings and cash withdrawal via bank deposits and POS terminals. It also allows the funding of digital wallets.

23. Appzone

This application interfaces with financial institutions by facilitating Banking Software as a Service (BSaaS). BSaaS allows for complete digitalisation of all banking operations. It also facilitates the provision of interbank payment infrastructure in a decentralised network through blockchain technology. Furthermore, it provides end-user payment apps to individuals and organisations via a variety of channels. The innovation has maintained an average of US\$2 billion yearly transaction value since 2018 (Techcabal, 2021).

24. Okra

The mission of Okra is to democratise financial services through technology. Okra provides Application Programming Interface (API) that enables businesses and developers to create seamless access to financial data and safe payments. Furthermore, it allows the authentication and verification of bank account holders by allowing banks to access credentials, income, and insights into the customers' type, value, and liquidity status. Since its founding, Okra has raised US\$4.5 million in two series of funding from investors.

25. Paga

The total investment in Paga to date is US\$35 million. Paga is a direct-to-consumer mobile payment service that enables the transformation of mobile phones into electronic digital wallets. The application has 17 million users and enables money transfers and bill payments. The application also has a network of mobile money agents who provide cash withdrawals and deposits.

26. Creditclan

Creditclan is a financial technology platform that enables merchants, schools and businesses to offer goods and services on credit by facilitating deferred payments. As such, the application works by providing credit cards to pre-qualified customers. It provides credit and recollection management services. The credit card enables consumers to purchase goods on accredited sellers' marketplace and pay later.

27. Cowrywise

Cowrywise taps into the traditional thrift collection philosophy (ajo or esusu) and digitised savings. This is achieved via an online savings and investment platform that facilitates personalised financial services, which periodically automates savings through a user's bank account.

28. Piggyvest

This online savings and investment platform operates as a microfinance bank. Piggyvest has attracted US\$1.2 million in seed funding since its founding in 2015. As of 2020, Piggyvest has one million users on its platform (Piggyvest, 2020).

29. Kippa

Kippa is a free online accounting software in Nigeria that allows small business owners to keep track of their daily income and expense transactions, create invoices and receipts, manage inventory and generally monitor how their businesses ebb and flow over time.

30. Bankly

Bankly enables the digitisation of the informal thrift collection systems. It is similar to Cowrywise, and it is targeted at the unbanked sector of the economy, making use of both online and offline methods to serve these customers. Bankly has attracted US\$2 million in seed investment since its founding in 2018. It has 15,000 agents across Nigeria and a customer base of 35,000 as of 2021 (Techcrunch, 2021).

31. KudaBank

This is another digital bank which interfaces with users/customers via a software application. The app, owned by Kuda Technologies Limited, enables paperless account opening for customers. The app provides 25 free transfers every month, free physical debit cards and card delivery, zero card maintenance fee, amongst other benefits. The strength of the innovation is evidenced by its ability to raise US\$91.5 million from investors.

32. V by VFD Microfinance Bank

This banking application allows users to track expenses and income, create personal or group budgets, save and withdraw money from their wallet.

33. Fairmoney

This is a loan application that can give loans of up to N1 million to an individual. Fairmoney is a licensed online lender that can give loans of up to N1,000,000 without collateral. It also facilitates payment, such as the payment of bills.

34. Eyowo

The Eyowo digital bank's most notable innovation is that it allows customers to convert their phone number into an account number by removing the first zero. Eyowo allows users to send money to any phone number and pay bills.

35. Barter Card by Flutterwave

Bartercard enables the sending and receiving of money from any other person. It also facilitates foreign payments via its virtual visa cards. BarterCard allows users to create an unlimited number of virtual cards. This app can be downloaded on Google Play.

36. Alat by Wema

Alat by Wema is the first digital bank in Nigeria. Developed and owned by Wema Bank Plc, it was designed to meet the needs of digital natives. It facilitates account opening, following app download, and provides savings, transfer and payment services. It also provides virtual dollar card on request.

37. Bank Verification Number (BVN)

The BVN is a unique identification number that is matched to a single individual, irrespective of the number of accounts held in Nigerian banks. The objective of the BVN is to facilitate bank's mandate of KYC (Know Your Customer). The BVN has been useful in ensuring that all customers' biodata are linked to a single number assigned to a single account holder. The BVN has been beneficial towards the evolution of the digital banking industry as it allows for customers' identity verification to give access to financial services. Additionally, the Bank Verification Number has facilitated credit reporting and fraud management in the industry.

38. eNaira

eNaira is the recently released Central Bank of Nigeria's innovated currency. It is a Central Bank Digital Currency (CBDC) issued by the CBN as a legal tender. It is the digital equivalent of the paper Naira currency, a "complementary" legal tender in Nigeria with the same exchange value as the Naira. The eNaira was built on a blockchain open ledger technology that prevents it from being duplicated. It was released to help the financially excluded and is also expected to bring in the vast majority of the unbanked Nigerians who have no bank account but have a mobile phone, into the formal financial economy.

39. Permanent Voter's Card

Permanent Voter's Card (PVC) is an innovation by the Nigerian electoral umpire, the Independent National Electoral Commission, to eliminate electoral malpractices. The Permanent Voter's Card is machine readable and largely designed to restore confidence in

the Nigerian election process. The PVC is financially impactful as it safeguards the democratic process; this alone contributes to the overall well-being of the economy. Importantly, the PVC has been used by many as a tool of identification to open bank accounts.

40. Mobile Money Vending

There is a mobile money revolution in Nigeria. Mobile money vending is the provision of withdrawals and deposits to the general public through registered agents of financial institutions. Mobile money vending has created employment opportunities for the unemployed.

41. AbokiFx

AbokiFx assists in reporting daily changes in the prices of major currencies in comparison to the naira at the parallel market in bureaux de change. The platform effectively allows individuals to be informed about the prices of the major currencies. However, the platform has temporarily suspended its publication of forex rates after the Central Bank of Nigeria (CBN) accused it of manipulating the market prices. Meanwhile, the platform has the historical data of changes in the parallel markets, which is usually made available after payment.

42. Automated Teller Machine

Since the introduction of ATMs, banking halls have experienced fewer queues than they used to. This technology allows customers to have access to funds during business and non-business hours.

In addition to the foregoing, switching and payment processing infrastructure are critical subsets of financial technology.

E.1.1 Switching and Payment Processing Infrastructure

Switches are an important aspect of the financial technology ecosystem. The switch facilitates an extension of the payment network by adding new payment methods and providers easily, without enormous integration costs. As independent entities, switches are providers or softwares that facilitate communication between several providers. A switch or payment processor performs payment and settlement processes, with its main function being to facilitate real payment processing between providers, accepting payment requests, choosing the provider to which it needs to route a transaction according to the payment request, formatting and sending a message to the provider, receiving a response, generically formatting the response, and issuing it back to the caller (Bright, 2019).

43. Flutterwave

Flutterwave is an African based fintech company that recently acquired its unicorn status. It is an online

payment company that allows businesses and individuals to easily make and collect payments from any part of the world. It also offers online stores for businesses to facilitate e-commerce. The company, which was founded in Nigeria, in 2016, now has its headquarters in San Francisco and has offices in Kenya, Ghana, South Africa and seven other African countries.

44. Paystack

Paystack was founded in 2015, and it prides itself as the first company in Nigeria to be accepted into Y Combinator (an exclusive for business incubation and access to angel investors). In August 2018, it raised \$8 million in Series A funding from investors, and has since processed a minimum of 10 billion in transaction value every month. Paystack enables businesses and merchants to integrate its Application Programming Interface into their payment gateways.

45. Remita

Remita is a payment solution developed in 2005 by the foremost Nigerian technology outfit, SystemSpecs. It helps individuals and businesses make and receive payments, pay bills and manage their finances across multiple banks on a single platform. One of the unique features of Remita is its ability to aggregate all payment channels on one platform so that a user can access all of their accounts from a single screen. In 2015, Remita was adopted as the sole payment gateway for the Nigerian Treasury Single Account (TSA).

46. Cellulant

Cellulant is a payment platform infrastructure service provider to consumers, governments, small businesses and large organisations, established in 2004. It is used to access financial instruments like cards, bank accounts, digital wallets, and mobile money.

47. eTranzact

The eTranzact switching innovation, launched in 2003, enables payments singularly and across multi-channels. They are well known for being the pioneers of the USSD payment solutions in Nigeria. Its switching and transaction processing technology authorises, processes, and validates transactions. It also facilitates disbursements, salary payments and bulk payments for corporate organisations. In addition to switching and payment facilitation, eTranzact provides wallets for individual payments and money transfers.

48. Quickteller

Interswitch, the company behind Quickteller, provides payment cards, payment application software and the switching infrastructure which connects different banks, ATMs in Nigeria and the basic

technology for ATM cards. The company was founded in 2002, and it currently manages an estimate of 12,000 ATMs and accounts for nearly 18 million cards out of approximately 25 million in circulation. Its payment app, Quickteller, is an online payments platform that is integrated with most ATMs. The company's market valuation as of 2019 was \$1 billion, positioning them as a unicorn, and it has received a total funding of \$10.5 million to date (Bright, 2019).

F. E-Commerce

E-commerce, also known as electronic commerce or internet commerce, refers to the buying and selling of goods or services using the internet and the transfer of money and data to execute these transactions. (Shopify, 2021). The E-commerce sector in Nigeria is highly volatile, with several organisations and websites collapsing within their first three years of operation. This section examines some of the enduring e-commerce innovations with a financial impact on Nigeria's economy.

49. Jumia

Jumia, established in Nigeria in 2012, became the first tech startup and e-commerce to be valued at \$1 billion in Africa, and it has since expanded to 14 African countries. Jumia is an online marketplace for electronics, fashion, logistics and shipment. Jumia enables customers to use the web interface to view product displays and specifications as well as place orders for their product of choice. While the company encountered difficulties as an e-commerce business in a country burdened with poor postal system, this was surmounted with Jumia's proprietary delivery vans and personnel.

Furthermore, Jumia emerged at a time when online payment solutions were latent. They confronted this challenge by introducing 'pay-on-delivery,' a solution that allows customers to make payments for goods at the point of pick-up or doorstep delivery. The e-commerce site was also able to build customers' trust via a 14-day return policy. During this period, any product bought can be returned if the product has deficiencies that can be attributed to either the seller or manufacturer.

50. Konga

Konga is a Nigerian e-commerce firm established in July 2012, and is a keen competitor of Jumia. According to the founder, it means 'water reservoir', in the Yoruba language of Nigeria. Konga provides both a third-party online marketplace and first-party direct retail in various categories, including consumer electronics, apparel, home appliances, books, children's items, computers & accessories, phones and tablets, health care, and personal care products.

CONCLUSION

Although this report does not mention all the ICT innovations in Nigeria, it shows that significant investment has been committed into the sector, mainly reflecting investors' optimism – primarily private sector-led investments - and creating a complex and networked industrial sector with multi-clusters. This is a sine qua non for future innovation, both in process and product. While it is clear that the overall infrastructural environment is challenging and stifling due to a myriad of problems such as poor power supply, and the often-antagonistic relationship between regulators and industry participants, the ICT ecosystem in Nigeria has provided innovation and strong positive financial effects within the economy.

In the final analysis, ICT innovation in Nigeria is, in the words of the late American rapper Tupac Shakur, like "a rose that grew from concrete."

APPENDIX

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