Enhancing Agricultural Productivity in Nigeria Using a PPFApp Approach

Ekundayo O S[*]   G.O Olupitan

Mathematical Sciences Department, Achievers University, Owo, Ondo State, Nigeria

Abstract

Nigeria is a nation that is naturally blessed with both natural and human resources. However, the country is challenged with high rate of unemployment; even one of her economic sectors that is viable, which can greatly assist the growth of the economy is not receiving an adequate attention. This sector (Agricultural sector) couple with Information and Communication Technology (ICT) could help reduce the problem of unemployment and low agricultural produce to a bearable minimum. This paper proposes an integration of ICT into Agriculture by developing a mobile application known as Poultry and Piggery Farm application (PPFA) on android platform for livestock disease management (Poultry and Piggery). Sqlite was used to create the database for different diseases, likely symptoms and their respective clinical treatment. Java Programming language was employed for the creation of the interactive interface. The application was developed with Android Studio on Linux Fedora box, the hardware used was 8gb RAM, and 1Terabyte hardware. The application was deployed and tested on android 4.1, 4.2 and 4.3 jelly bean and Android 4.0 Ice Cream Sandwich.

Keywords: Agriculture, ICT, PPFA, Nigeria

1. Introduction

Agriculture is one of the major determinants of the economy of any nation. It is an ancient existing occupation; dealing primarily with the production of foods and animals, and these are in turn supply various raw materials for industrial use, and contribute immensely to a nation GDP (Gross Domestic Product). Nigeria, just like many other countries in the world, acknowledges the importance of Agriculture and therefore creates a sector for it. This sector sees to the improvement of agricultural practices and productivity by implementing government agricultural programmes through awareness creation and distribution of farm inputs. Some variables within Nigeria economy like media, ICT infrastructure, technology just to mention a few, has helped to improve the Agriculture productivity.

Information and Communication Technology (ICT) finds its way into Nigeria territory few decades ago. Its dominance and influence on the economy of the country cannot be overemphasized. In the actual fact, ICT has the largest market in Nigeria among other African countries (Ayo et al., 2011) capitalizing on her giant population. ICT is widely embraced and acceptable due to the availability and affordability of its infrastructure, which is springing up fast (Seyed and Seyed, 2012.). Nigerians are increasingly getting use to computing devices, digital imaging, the Internet and Wide Area Networking (WAN), mixed media, SMS services and WAP (Wireless Access Protocol) based Internet access.

The incorporation of ICT into Agriculture in Nigeria has of no doubt brought significant improvements to agricultural productivity over the years. ICT through the use of Internet and SMS facility in mobile devices has taken newly introduced agricultural governmental programmes and policy, government support credit facilities, agricultural inputs, research discoveries and timely information to the door step of individual farmers. Adeyemo, (2013) Claimed that ICT has changed the way we do things. This positive effect of ICT in agriculture had taken over the wide gap between government and farmers and also minimized corruption which had eroded the sector. Nevertheless, according to Akintola et.al. 2011, Nigeria has not fully or maximally harnessed the ICT functionability, the limitation can be traced to the proportion of literates in the agricultural practices in the Country. If ICT is maximally embraced in agricultural sector, interest of many unemployed graduates will be facilitated, because of the availability of genuine information capable of limiting risk, and hence reduced unemployment to a bearable minimal. The incorporation of the duo will result into the concept of knowledge economy. Which will in turn facilitate aggressive growth of the agricultural sector as evident in the phone for farmers and mobile money initiative (CBN and Dr Akinwunmi Adeshina). with the latest trend of mobile applications, social media and mobile internet facility, many graduates now spend more time on the internet, the use of mobile application as means of finding solutions to problem is also a trend because hands on application can be deployed on any mobile device which can help such internet user to solve some simple problems like simple health problems, simple mechanical problems and so on.

Animal production, an aspect of agriculture in Nigeria is challenged with animal diseases that affect the productivity of farm animals. Livestock have been known for ages to meet the animal protein requirement for man and many other benefits they provide. Nigeria's population is growing at a faster rate than the increase in animal products in the country and the population is expected to reach 402 million people by the year 2050 (Pwaveno H. Bamaiyi, 2013). Bamaiyi, (2013) stated that an optimum animal production level will be able to

help alleviate poverty, provide food security and meet other needs of such a growing population. In other to meet the provision for the estimated population, this paper propose an ICT based livestock disease management system for poultry and piggery on a mobile devices which will proffer related solutions to some of their popularly known livestock diseases. The paper is organized as follows:

2. Agricultural evolution and ICT in Nigeria

Nigeria agricultural evolution goes along side with Nigeria political history, and this can be traced from the pre-colonial, colonial and post-colonial era. The pre-colonial era comprises the period when Nigeria had not experienced British Incursion. At this period, agriculture was both directly and indirectly the economic power of the nation. The colonial era in Nigeria (1861 – 1960), at this time, Chinweizu, (2006) ascertained that agriculture received so much attention from the government and emphasis was placed on research and extension service. As a result of this, agriculture becomes the leading factor of the country's GDP rate. At the early stage of the post-colonial era (above 1960), agriculture gained more attention, many agricultural programmes and schemes were initiated like; Farm Settlement Schemes; and National Accelerated Food Production Programme (NAFPP) (1972), Operation Feed the Nation (1976), River Basin and Rural Development Authorities (1976), Green Revolution Programme (1980) to mention a few. The country at this period was able to feed her growing population with remarkable left over for exportation. Almost a decade after independence, Nigeria discovered crude oil which is also termed "black gold". The discovery of crude oil posed a great challenge to the development of Agriculture, after oil discovery, Agriculture which was formally 60 -65% (1960 -1974) of the country GDP started declining gradually to 25% (1975-1979) to the present time where almost no significant impact of agriculture is felt. The neglect of this sector for oil boomed has not only affected the agricultural productivity but also closed up great affluence for employment opportunity by the sector.

2.1 The Trend of ICT in Nigeria

Information and communication technology can be generally viewed as the incorporation of both computer science and telecommunication equipments with their respective technologies in obtaining relevant information. Akintola et. al., (2011) warned that for Nigeria to realize her envisaged vision 2020, it is no doubt that Information Technology must play a vital role.

ICT is having its ways in several areas of the country economy sectors. Like Education, commerce, Media, Government and Banking. Nigeria is drastically driven away from the manual techniques and approach of operation and gradually embracing technology to some extents. In education, Many institutions in the country had transformed most of their operations into ICT based; like e-library, on-line registration, e-learning, on-line result processing and accessing, on-line recruitment and Computer based examination, to mention a few. According to Adedara et al., (2014), the prime mover of e- learning and e-commerce is internet. ICT has evolved to a noticeable and appreciable height, which in turn influencing other sectors.

Commerce which is traditionally believed to be the selling of goods and commodities for human consumption is gradually moving towards the national goal of 2020 agenda with the embrace of e-commerce. Rainer and Cegielski (2011), as cited by Kareem et al., (2014), defined e-commerce as a "process of buying, selling, transferring, or exchanging of products, services, and/or information via computer networks, including the Internet". Kareem et al., (2014) examined the impact of e-commerce on business performance in Nigeria and showed that e-commerce adoption has significant impact on service operations, cost operation reductions and profit levels. The success of e-commerce in the country could be traced to the rate of ICT adoption in the banking sector. E-banking facilities which include: ATM, mobile banking, on-line transaction and so on, encourage the sustenance and evolution of e-commerce. The credibility experienced in the just concluded national elections conducted by INEC in Nigeria, under the control and supervision of the former INEC chairman Prof. Atairu Jega was as a result of ICT involvement in the whole process (e-voting).

2.2 E-Agriculture

e-agriculture as described by Kalusam, (2013)., as the involvement of conceptualization, design, development, evaluation and application of innovative ways to use information and telecommunication technologies in the rural domain with primary focus on agriculture. E-agriculture is still evolving in this part of the world, many frameworks have been proposed in order to take agriculture to the new face of technology. Adeyemo (2013), proposed an e-farming framework that compliment the role of the extension services in the country. His framework comprises of the farmer, the agricultural extension worker, help desk officer and the application server that host the agricultural decision support system, web portals, short message services (SMS) provided by a GSM service provider and wireless application protocol that can be consulted by the user of the system.

3. PPF Application Development

In the process of data capturing and preparation, different diseases for each livestock together with their

respective symptoms and standard clinical treatments were collected. Using secondary source of data collection that are available in the field (by consulting experienced farmers and vetenarians) and reputable literatures. Excel sheet was initially employed for the preparation of data collected, before it was properly exported to the database. At the implementation of this application, Java programming language was employed to develop a dynamic and interactive interface that run on android platform with sqlite database. The database contains the related animal diseases, their corresponding symptoms and the suggested treatments.

3.1 *How the System (PPFApp) works*

Our propose system is a mobile application on mobile device. The system allows farmers (poultry and piggery farmers) to diagnose their livestock based on the suspected symptom(s) and also provide prompt treatment in accordance to the system suggestion. The interface gives room for user to select the type of livestock and thereafter a text box is provided for user to enter its observed symptom(s). The symptom(s) becomes the search key for search algorithm employed. A match will automatically trigger the possible disease(s) and also the possible treatment(s) for the cure of the disease. If there is no match, the system suggests that you consult a doctor. This mobile application is made a mobile application that is not WAP base because of the limitation of network coverage area. In the future, the system will be made available on internet so that user will be able to download new version or make update.

4. Conclusion

Information Communication Technology (ICT) and Agriculture market in Nigeria can be much more effective and successful than it is at present with respect to agricultural practices, agricultural productivity, lifestock management, animal husbandry, agricultural extension, enhanced awearness and unemployment amongst graduates. ICT enables the creation, processing and transfer of information across a large space in short time, it has a great potential to boost agricultural productivity, ICT enables the mass media to reach rural farmer with the latest trend in agricutlral practice and enhances access to government policies, ICT promotes information about credit facilities.

This work has showed that all the advantages of ICT with Agricultural practices can drastically reduce unemployment amongst the unemployed, with the system PPFA which was develped to solve poultry and piggery farming challenges, any individual can with this application become a succesful polutry or piggery farmer. To also improve Agricultural production, systems can be developed for other sectors of agricultural production.

5. Recommendation

PPFA is capable of bridging the gap between poultry, piggery farmers and Veterinarians. Embracing the application in Agricultural sector will reduce both the cost of poultry and piggery production and also reduce the risk of venturing into the farming. Furthermore, FFPA will bring back the employment strength of Agricultural sector because the wasted learned youth in the street can now venture into poultry or piggery farming with little or no formal training.

References

Adedara, O.G, Sobowale A, Adedayo Folorunsho, S. O. (2014). Promoting Electronic Commerce In Nigeria Through Electronic Learning. Computing, Information Systems, Development Informatics & Allied Research Journal; 5(4), 13-16 october 2014, www.cisdijournal.net

Adeyemo, Adesesan Barnabas (2013). An e-farming framework for sustainable agricultural development in Nigeria. AcademicJournal: Journal of Internet and Information System; 3(1), 1-9 ISSN 1684–5315 ©2013 Academic Journalshttp://www.academicjournals.org/JIIS

Akintola K.G., Akinyede R.O. & Agbonifo C.O. (2011) APPRAISING NIGERIA READINESS FOR ECOMMERCE TOWARDS: ACHIEVING VISION 20: 2020", IJRRAS 9 (2) ● November 2011, www.arpapress.com/Volumes/Vol9Issue2/IJRRAS_9_2_18.pdf

Amaka Eze and Ojo Maduekwe (2013) "*Phone for Farmers and Mobile Money Initiative*" www.thisdaylive.com/article/ phone-for-farmers-and-mobile-money-initiative/138703

Ayo, C.K, Adewoye, J.O and Oni, A.A(2011). Business- to – consumer e-commerce in Nigeria: Prospects and challenges. African Journal of Business Management. 5 (13), 5109-5117.

Chinweizu Ibekwe, (2006). "Self-reparation for Afrikan Power: Pan Africanism and Black Consciousness" *Paper presented at the Global Pan Afrikan Reparations and Repatriation Conference (GPARRC) on 26 July, 2006, at the University of Ghana, Legon, Accra*

Kalusam, (2013). e-Agriculture and its role in reducing unemployment and Hunger . https://kalusam.wordpress.com/2013/04/19/e-agriculture-and-its-role-in-reducing unemployment-and-hunger/ accessed date: 17th November,2015

Kareem, T.S., Owomoyela, S.K. & Oyebamiji, F. F.(2014). Electronic Commerce and Business Performance: An Empirical Investigation of Business Organizations in Nigeria. International Journal of Academic Research in Business and Social Sciences, 4(8): 215-224

Pwaveno H. Bamaiyi, (2013). Factors Militating Against Animal Production in Nigeria. *International Journal Livestock Resources, 3(2): 54-66 doi: 10.5455/ijlr.20130409050039*

Rainer, K. & Cegielski, C.(2011), "Introduction to Information Systems: Enabling and Transforming Business". *Third Edition. Jonh Wiley & Sons Inc.*

Seyed Reza Zahedi, Seyed Morteza Zahedi, (2012). Role Of Information And Communication Technologies In Modern Agriculture. *International Journal of Agriculture and Crop Sciences*, 4 (23), 1725-1728.www.ijagcs.com

fig1 is an android 4.20 jelly bean emulator in which the PPFApp was deployed from the Integrated Development Environment

Fig 2 the PPFApp interface on a mobile device

Fig 3 PPFA showing the querry and the respective result