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Today's Electronic Commerce in Nigeria: Issues and Prospects in Using Mobile Applications and E-Business Tools

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Abstract: Today's e-commerce has witnessed rapid and massive patronage due to high proliferation of mobile phones usage in developing economies such as Nigeria. The use of smartphones, Tablet phones, Portable Digital Assistants (PDAs) have made it easy for consumers to run e-commerce applications on-the-go without the hassles of carrying heavy and cumbersome desktop computers along. Moreso, the proliferation of internet connectivity via GSM 3G/4G in major cities and towns in Nigeria has made it possible for mobile e-commerce to flourish in a widespread manner. Nigeria witnessed a rapid growth in e-commerce applications vis-à-vis mobile phones and tablets in the last three years. This rapid patronage in the use of smartphones, tablet phones and PDAs has equally opened up a new vista of challenges or issues such as security vulnerabilities and infrastructural bottleneck. This paper explored these challenges that have come up as a result of the rapid and widespread use of mobile e-commerce as well suggested ways to ameliorate or reduce these challenges. This paper equally x-rayed the potentials of e-business tools such as Web 2.0, Social media tools, Google AdWords, SEO, etc, in improving the attraction of e-commerce sites and mobile Apps to consumers so that mobile e-commerce customers to return back and shop more in order to boost profitability.

Keywords: *E-Commerce, Mcommerce, Pdas, Smartphones, GPS, RFID, Intelligent Sensors, Tablet Pcs, CRM, Web 2.0, SEO, Google Adwords, Social Media Networking*

I. INTRODUCTION

The term electronic commerce (e-commerce) is referred to as a wireless electronic commerce used for conducting commerce. In the past, most e-commerce transactions were conducted via desktop and laptop computers and servers but today, most of the e-commerce businesses or transactions are now conducted via mobile phones or portable devices over the internet giving rise to another terminology referred to as 'mobile e-commerce' which implies e-commerce that is conducted wireless using physical devices such as mobile phones, Portable Digital Assistant (PDA) or Palmtops and Tablet phones. Fig.1 depicts some typical PDAs, Tablet phones and smartphones in today's market used in mobile e-commerce applications. This involves the electronic of any transaction, which involves the transfer of money electronically to purchase goods and services via a wireless communication network initiated or installed in a mobile phone or portable device. Mobile commerce is designed in such a way to allow user at their convenience to compare different features of certain products and also the prices of an items to be purchased. This helps user to take decision on what product to buy and time which it can be most needed. Merchants use the same medium to access the number of products with higher patronage and improve on them. Provision or platform for interaction between consumers and merchants is provided and users tend to build their confidence on the person he or she relates with.

User activities in mobile electronic commerce include:

- Buying and selling of goods
- Asking for merchant services
- Transferring of ownership right
- Transacting and transferring money by accessing wireless internet services on the mobile phone
- Post purchase customer support
- Communication between merchant and the bank
- Product search and comparisons by consumers

Mobile e-commerce is gradually taking business transaction to the level that every phone manufacturer now integrates wireless access protocol into his mobile device to enable transactions through a wireless protocol. Manufacturer's ability in ensuring a maximum wireless internet and web facilities in their mobile device enables its user to grab the benefits of transacting business electronically.

One of the significant areas in mobile e-commerce is the use of advanced technology such as smartphone and communication networks interfaced with wireless access to transact business conveniently, not minding the time and location of the business.

A. Advantages of Mobile e-commerce

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Consumers feel very happy if they can access company website through their mobile phones. This makes a consumer to pay more attention and partner with company whose sites are better set up for mobile e-commerce. Consumers' patronage to a site or shopping in a company site show the extent to which the company goes to satisfy or to meet up customers need.

B. Disadvantages of Mobile e-commerce

According [1], the major problem of mobile e-commerce is the mobile device itself and size of webpage, content of companies' e-commerce site or platform and graphics, technology limitations, processing capability of the computer system, compatibility issue of some mobile device and operating system issues. The mobile device may not be able to offer the same level of graphics as contained in the webpage. Most company in order to serve their customers will provide consumers with a desktop version and as well with a mobile version, in such a way that whatever appears in the desktop version will be integrated to the mobile version. Companies have to keep this in mind and endeavour to setup its webpage so that it can be accessible by both personal computer system and as well as mobile devices [1].

The technology of the mobile device and the size of the device screen may limit the complexity the application. This prevents user to access the webpage on his mobile device the same way he would interact with it using a personal computer.

Network Limitation. This can affect the performance of most phones. For example, a customized phone may not work efficiently in an area where the device network is slightly poor and limit transactions. Poor network coverage due to poor quality of equipment used to broadcast network will affect e-business and will frustrate business growth.

C. Features of Mobile e-commerce

The features of mobile e-commerce may include the following:-

- Attraction
- Interaction
- Transaction
- Payment Method

Attraction. Companies should find a way to bring their consumers to their webpage; a product can as well carry some incentives or promotion tag depending on consumer's choice of goods to buy. For example of the incentives are price slash, black Friday which most online merchant uses to attract their customers to their sites.

The interaction level. This provides a platform for consumers to send an SMS to the merchant expressing his feelings towards a particular item purchased.

The ability of the merchant to respond in time to solve the consumers need or request strengthens then interaction level.

The transaction level and payment level are the most essential parts in e-commerce, the company's ability to seal transaction and maintain or build some level of confidence in the consumer will prompt the customer to continue in the business.

Payment level: This should be done on a secure platform (protected by encryption schemes, authorization and authentication), which will not leave the consumers account details vulnerable to hackers and malwares.

II. LITERATURE REVIEW

According to [2], Mobile e-commerce (m-commerce) is a term that describes online sales transactions that use wireless electronic devices such as hand-held computers, mobile phones or laptops. These wireless devices interact with computer networks that have the ability to conduct online merchandise purchases. Any type of cash exchange is referred to as an e-commerce transaction. Mobile e-commerce is just one of the many subsets of electronic commerce.

Mobile devices and wireless network usually work hand in hand and several applications find it suitable to use the platform provided in most mobile phones. There are more application for mobile device than for desktop application and usage patterns differ from those of the normal traditional desktop computers. However, the ubiquitous availability of the application in mobile device enables direct software support and information access for many new business functions in real time. The popularity of the technology used in mobile electronic commerce gave way for individual to display their products online and method of payment. Business transaction take place in the absent of the merchant and consumer places an order, expecting delivery in the shortest period of time.

According to [3], Global Positioning System (GPS) allows a retailer to know the exact location of their customers. Such technology gives them a better understanding of the needs of their target audience. Sensors can be used to transmit data constantly from anywhere while global positioning systems and proximity detection technology will be used to track the device or goods as it moves from place to another. In some cases, the embedded sensors will automatically respond to any changes in their environment hence this concept is referred to as proactive computing. Others technologies that can benefit mobile e-commerce includes- NFC (Near field communication), RFID (Radio Frequency Identification Technology), Bluetooth and Infrared, Augmented Reality (AR) and camera-based applications, Smart objects, light beams and sensors WI-Fi and UWB (Ultra Wideband), and Magnetic field and beacon mapping [3].

Author in [4] proposed the use of the use of Global Positioning System (GPS) in identifying customer's location as an alternative to named physical addresses. This paper describes the study design and discusses the findings concerning the use of GPS tracking application among six retailers and thirty customers in Kenya.. The study reveals that geolocation can substitute physical addresses in m-commerce home deliveries.

III. MOBILE E-COMMERCE TRENDS IN NIGERIA

Over the last ten years Nigeria has seen astronomical rise in the use of mobile phones and portable devices in e-commerce transactions. This is due largely because of increase in GSM internet subscription, the increasing usage of smartphones and

proliferation of e-commerce businesses hosted on the internet as Mobile Apps and the speed and convenience it offers consumers to access it. According to the Nigerian Communication Commission (NCC), from December 2016 to January 2018, the number of subscription of users on GSM internet connectivity rose from 92 million to over 100 million users as depicted in Fig.2.

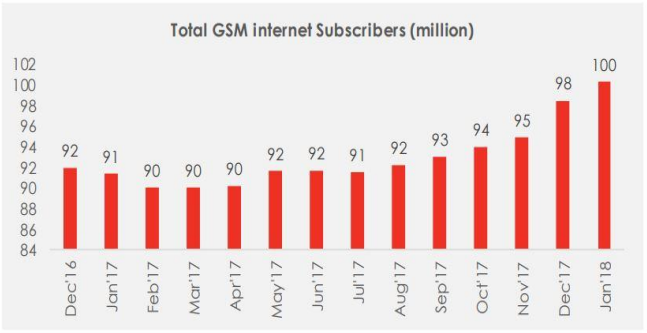

Fig.2. Total GSM Internet subscribers in Nigeria from December 2016 to January 2018 [5]

As depicted in Fig.3, Nigeria was listed amongst the top 5 emerging e-commerce markets in 2015. As a matter of fact, Nigeria has become the world fastest expanding e-commerce scene with its current potential worth about $10 billion [6]. In Fig.3, it can be seen that India has the largest internet penetration (90% of its population) but has a lower e-commerce growth (20%) compared to Nigeria which has about 45% internet penetration but with 90% e-commerce growth within the period under review.

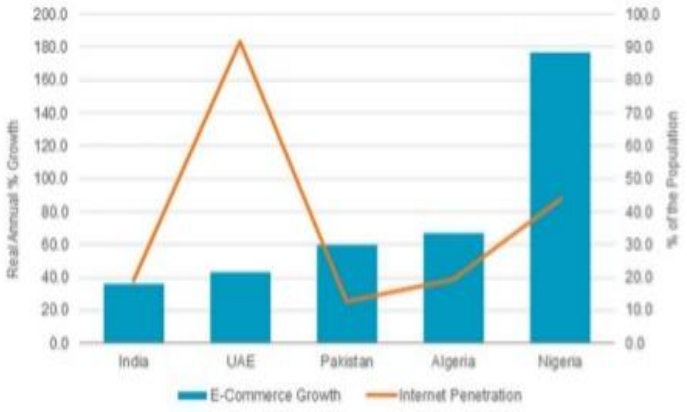

Fig 3: E-commerce growth and Internet penetration on selected market in 2015 [6])

Nigeria can do much better if its internet penetration is increased or expanded. This can be done by taking 3G/4G internet connectivity to the rural areas and other uncovered urban centers.

E-BUSINESS TOOLS

E-business may be defined as the application of information and communication technologies in support of all the activities of business. E-commerce and e-business are the same in the context of buying and selling over the internet and the use of telecommunication network.

Electronic Business (E-Business) tools that have taken today's business by storm include the following:-

- Smartphone and Mobile Apps/sites
- Search Engine Optimizer (SEO) Tools
- Customer Relationship Management (CRM) tools
- Social Media Networks
- Unbxd
- Web 2.0

Smartphones and Mobile Apps/sites:

These are undoubtedly the most important E-business tools. Without the discovery and invention of modern smartphones, Tablet phones and PDAs, there will not be any platform known as mobile e-commerce. These tools provide the hardware platforms upon which mobile e-commerce is built and expanded. Mobile Apps and websites enable e-commerce companies and merchants to showcase their products and services to potential consumers and costumers.

SEO:

Search engine optimizer (SEO) is used to access or rate various search engine such as Google, Yahoo, Bing in the area its relevant to the user. SEO optimizer is the process of increasing the quality and quantity of website traffic by increasing the visibility of a website or webpage to users of a web search engine.

An enhanced webpage attracts customers to the business and the visibility attributes makes it clear and understandable of what product is sold on your site and procedures to obtain one or place an order.

Site visibility is one of the core ingredients to attract users to your site which leads to increase in financial benefit in mobile e-commerce. In other words for companies to make more profit in the business of mobile e-commerce it must consider site visibility to ensure viewer have fully clear view of item and their features, an unclear site doesn't attract patronage, hence it retard e-business.

CRM:

Customer Relationship Management (CRM) system is a tool for collecting and managing the information and interactions your customer, sales lead, suppliers and other businesses.

CRM can help business in the following ways:

- Tracking the success of your marketing activities
- Identifying and following up on prospective customers
- Maintaining relationship with loyal customers
- Grouping your customer's types to develop personalized communications
- Seeing which customers have signed up to your marketing list
- Understanding which customer have responded to your offer or promotion

Building a relationship with your customer in a way to serve him better is CRM. CRM means keeping track of your customers to provide personalized services. For example, customer may be given a special offer on their birthday.

Benefits of CRM tool in mobile E-commerce:

Some Benefits of using CRM tools in mobile E-Commerce include:-

i. Developing personalized and competitive marketing activities that have a better way of creating sales.
ii. Identify the most appropriate time and marketing activity that your customer responds to.
iii. Gather and save customer feedback which will help your improvement and innovations.

iv. Help to keep track of customer's behavior, interactions and purchases of your products and services.
v. Follow up on customer leads when will help in finding a new customer.

Social Media Network:

Social media is a network of people, groups of people that comes together to interact and exchange ideas through the means of a wireless communication network. E-commerce linked to social media network have notice a tremendous impact in their sales. The level of interaction in social media is endless in such that a product advertised in ones page can be recommended to friends if found useful. Hence it spreads like Wi-Fi. Nowadays social media platforms such as Facebook, Instagram, Twitter, WhatsApp, Google, etc. have helped a lot in projecting e-commerce businesses and transactions. Social media proves to be a powerful tool when it comes to growing your brand awareness, it cost you less to advertise on a social network, and it only requires you to buy a data plan. There is a need to formulate a social media strategy that will clearly align your goals with other areas in business such as content marketing, search engine optimization. This will give you an idea on the type of value one should create for a loyal social media follower.

Unbxd as a business Tool:

Unbxd is a relatively new entry to the e-commerce marketer's toolkit. Unbxd provides intelligent, 'context-aware' site search and personalized recommendations. Unbxd is a one-stop product discovery solution and gives marketers and merchandisers the tools to optimize their site search and product recommendations.

Unbxd helps e-commerce sites by offering site search that understands visitor intent, is personalized, error-tolerant (due to spell-check and advanced autocomplete) offers filters and can be merchandised based on business objectives.

Another area of product discovery that Unbxd solves is product recommendations. First made popular by Amazon, product recommendations are now a mainstay on large and small e-commerce websites alike, resulting in consistent conversion increase.

Google AdWords:

Organic search is an effective method for traffic acquisition and sales promotion, but its conversion rates are not always high. Google AdWords is one tool that can help you promote your e-commerce site more efficiently and also boost sales. You can create and run ads using this tool in Google's Search and advertising network.

Google AdWords displays your ads depending on their relevance to the keywords used by the searcher (s). Your ads therefore will be transmitted to searchers interested in your products/brand. Since this tools works on 'Pay Per Click' basis, it helps you to save on your advertising budget. Furthermore, it provides in-depth insight to help you measure advertising effectiveness to assess the attractiveness of your marketing message.

Web 2.0:

This includes a whole lot of web technologies or tools that makes shopping on an internet site or e-commerce shop very smooth, seamless and attractive. This includes technologies such as RSS, podcasts, online surveys, customer's product/service reviews and ratings, AJAX, Wiki, Blogs, etc. It is necessary for one to upgrade his/her existing ecommerce site using some of the innovative ideas related to web 2.0 concepts or build a new e-commerce site with these tools if one is starting a new internet business.

Earlier online merchants were not very keen to have customer interaction elements like product review and rating, online surveys, customer blogs, etc. fearing flames from unsatisfied customers. But a recent poll shows that this fear is unfounded. It seems that 9 percent shoppers polled wrote a product review on a store site about a product they liked against 4 percent who posted a review about a product they did not like. Same goes for surveys! There are 2.5 percent more chances that a satisfied customer will participate in a survey than an unsatisfied one.

Many e-commerce sites lose a large number of their prospective customers due to inadequate product information required to take an affirmative buying decision. Customer reviews and ratings can help merchants in this. More over a positive review works like a call for action for the people reading it.

Most professional classification systems used in e-Business are pretty complicated for daily use. A good way to give users a better method of finding product is to incorporate user added keywords or "tags". If a user likes a product and may buy it now, or may keep a reference of it for future use, she can add one or several informal keywords as tags and save. These tags are visible to others and can be displayed two ways: in tag clouds, where the most popular tags have bigger fonts and most recent tags, a list of newly added tags. The popularity of tags in numerous Web 2.0 sites proves viability of this device in e-commerce sites as well.

Elements like ability to do side-by-side comparison of several products, ability to customize products according to buyer's need, and the ability to filter and search products without constant page reloading can increase conversion rate dramatically.

Many e-commerce sites have the functionality of sending email notification of new listings of products that a user is looking for. A good idea is to add RSS notification ability to enhance product information request service also.

A staggering 60 percent of online shoppers abandon their carts at some point in the buying process. The following site functionalities will help businesses to retain these shoppers:

- Shoppers should have the ability to see thumbnail pictures of the products inside the shopping cart.
- Editing and adding products to the shopping cart should be done automatically without reloading.
- Shoppers should be able to save shopping cart anytime and it should be saved automatically if connection fails.
- Shoppers should be able to drag and drop products to the cart and all calculation should be done automatically.

Many of the functionalities mentioned in this article were available long before Web 2.0 concept emerged and these are only a miniscule number of examples of abilities you can actually add to your Web 2.0 based e-commerce site, however, if you fail to notice the progress and take necessary actions, you maybe losing a great opportunity. Transformation in e-commerce sites is slow, but one thing is for sure, in coming years these sites will be noticeably different from what we have now.

IV. ISSUES IN RISING MOBILE E-COMMERCE USAGE

The major issues or challenges affecting mobile e-commerce usage in developing economies, especially in Nigeria, includes the following:-

- Security and
- Infrastructure issues.

A. Security Issues

The major issues arising from increasing usage of mobile e-commerce in Nigeria and worldwide are security threats from hackers and malwares. Hackers are on the prowl, threatening the smooth and safe operation of mobile e-commerce applications and transactions. Most mobile e-commerce users-consumers, customers and merchants do not possess the technical knowledge on the security vulnerabilities of the platforms they use and how to protect themselves from hackers and malwares. This is why, on daily basis, in Nigeria, you hear stories of people losing their hard-earned money to internet fraudsters called hackers or '*Yahoo yahoo boys'*. These fraudsters trick undiscerning mobile e-commerce users to divulge their login credentials such as usernames, passwords, pincodes, ATM pins, debit/credit card numbers, etc using different social engineering tactics, to steal these credentials in order to hack into their bank accounts and make illicit withdrawals. The mobile e-commerce users need proper and adequate orientation and training on how to forestall this type of security issues from hackers and malwares.

According to authors in [7], security protection in any e-commerce site must be able to provide protection for these basic security requirements- Data confidentiality or privacy or secrecy, Data integrity, Non-repudiation, Data authentication and Reliability. Authors in [12] also proposed a security framework on how an e-commerce site should be protected against hackers and malwares.

Encryption and decryption provides the confidentiality or secrecy of data communication, but intruders still can tap transmission media and falsify the message [8]. Also reneging and forgery from the two parties of the transaction may exist. Data authentication and electronic signatures are applications of encryption systems that provide verification of message integrity, data origin authentication, and protection against repudiation. Data authentication is a procedure that allows parties to verify that the received messages are authentic, i.e., they are genuine and have come from their alleged sources. Before the message is sent, it is fed into an authentication code generator, which creates a code that accompanies the message to the receiver. Upon receipt of the message, the receiver performs an authentication code calculation and obtains another authentication code. If the message has not been altered, the same authentication code will be generated. Multiple algorithms can be used for authentication code generation. If there are no authentication keys, some kind of hashing function can be used, but this method suffers from collision problems, i.e., a falsified message generates the same authentication code with the original message. Encryption/decryption algorithms are often used for authentication. When the AES 128 bit cipher algorithm is used, the generated authentication code is called an electronic signature because it is from a proprietary private key and no one else can falsify his/her signature. Reliability in ecommerce and e-payment system is to prevent computer failure, procedural errors and transmission errors. Hardware failures, software errors, computer viruses and natural disasters can result to failure of e-payment systems and result to loss of reliability and consequent litigations [8].

B. Infrastructure Issues

Infrastructure issues that affect m-commerce in Nigeria include lack of reliable and secure internet connection and lack of reliable power or electricity supply. Others issues affecting mobile e-commerce include low internet bandwidth or lack of broadband internet coverage (most towns and villages in rural communities in Nigeria do not have 3G or 4G internet connectivity yet), this affects connectivity to e-commerce sites and Mobile Apps. Unreliable and erratic public power supply or electricity has made m-commerce in Nigeria difficult as most towns, cities and villages have epileptic power supply and people resort to the use of generators to power and charge their mobile phones, tablets and laptop computers Nowadays, people have started using solar energy but this is still limited because of prohibitive cost of solar panels and solar batteries.

CONCLUSION

E-commerce has been given a boost in today's business due to the proliferation of mobile phones, mobile application and e-business tools. Affordable and fast internet connectivity has equally increased the rate of patronage of consumers to e-commerce. In Nigeria this is true as because of fast rising use of mobile phones and portable devices as well presence of 3G/4G GSM networks in major cities and towns but there are still issues contending with the growth of e-commerce and e-businesses; such factors include uneven spread of broadband internet, poor electricity infrastructure and distribution. The issues of security vulnerabilities, because of increasing threats of hackers and malwares, have also contributed negatively to safe and smooth operation of e-commerce in developing economies such as Nigeria. Consumers should be educated on security issues and how it affects their safe shopping on e-commerce sites/stores and mobile Apps and measures they must take to protect themselves from hackers and malwares. E-business tools have helped a lot in promoting e-business sites, mobile Apps and e-commerce online stores in no small measure. It a good practice to continually review business sites and ensure that such sites do not lack few of the mentioned tools which if used will boost profit in e-commerce. These are only a few e-commerce tools that should be a part of your plan and there are more. All of these tools have potentials to increase your sales in their own way.

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