Usability, Security and Trust of E-commerce Websites: The effect on the Nigerian E-shopper

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Authors’ contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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ABSTRACT

With the internet fast-penetrating the Nigerian populace, e-commerce businesses have become commonplace, this has given rise to an increase in the number of Nigerians shopping online. However, there is a growing concern that most Nigerian e-shoppers prefer foreign to local online shops, resulting in an online fund-leak from the local economy. This work presents a comparative analysis of the usability of e-commerce websites in Nigeria, highlights the key findings viz: security and lack of trust. The findings were then related to why Nigerians prefer shopping from foreign rather than local e-commerce websites. We argued that for e-commerce to thrive; usability should be given prime consideration, security should be guaranteed and trust-building ethos is practiced. We conclude that despite the ‘pay on delivery’ mode applied by e-commerce websites to woo customers and gain trust, the insecurity posed by the prevalence of online fraud in Nigeria has created apprehension and distrust among Nigerians towards local e-commerce websites and is contributing to why Nigerians prefer to buy from foreign rather than local e-commerce websites.

Keywords: Usability; e-commerce; security; trust; user-test; e-shoppers; on-line shopping.

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1. INTRODUCTION

The impact of e-commerce on the Nigerian economy has been investigated by different researchers and the outlook has been positive [1,2,3,4,5]. This is evident in the emergence of several e-commerce websites, fast-rising internet penetration, and a continuous increase in the number of online shoppers in Nigeria [6,2,7].

However, despite positive signs that e-commerce businesses will thrive in Nigeria, most Nigerian online shoppers prefer to buy from foreign rather than local e-commerce websites [8] – thereby creating an online domestic fund-leak. Several factors ranging from security, infrastructure, trust, and payment modes have been given as mitigating against Nigeria’s e-commerce growth [9,10,11,12,13].

[14] employed the user test method to examine the usability of some e-commerce websites in Nigeria and found several usability issues with all the e-commerce websites tested. Specifically, they listed the issue of security and trust as salient factors to be considered in the e-commerce business in Nigeria. The analysis of results however was not very exhaustive. This work carries out a comparative analysis of the usability of three websites and discusses the key findings concerning online shopping in Nigeria. We conclude that the prevalence of online fraud in Nigeria has created apprehension among Nigerian online shoppers towards local e-commerce websites and is contributing to why Nigerian e-shoppers prefer to buy from foreign rather than local e-commerce websites.

2. LITERATURE REVIEW

Web usability is a concept that has been widely defined, discussed and analyzed since the advent of the first functional website. Website usability relates to the functionality, effectiveness, ease of learning, ease of operation, ease of task performance. The term has been extended to include remembrance, appearance, appeal and satisfaction of customers after use (Fadeyev 2009, Suarez 2016) [14].

Usability evaluation is a measure of how the design of a website obeys the principles set out by usability experts. The user-test method of usability evaluation involves a pre-test which evaluates the user’s general knowledge of the usability term and the degree of competence in the use of the computer and the internet. The real test takes the test participant through tasks carefully chosen to test the functionality, ease of use and other factors that determine usability. While the post-test stages seek the impression formed by test participants, elicit a general perception of trust, security, and willingness of test participants to continuously do business with and recommend the website to friends, family and colleagues.

The twin concept of trust and security of e-commerce websites in this work relates to the willingness of customers to freely carry out transactions with e-commerce websites without fear of being defrauded financially or having personal data stolen.

This work was conceptualized based on careful observation of test participants and their perception of security and trust in the post-test evaluation in Abraham et al [14].

Several researchers have explored e-commerce generally and its effects on the economy of Nigeria and recommended measures to improve e-commerce growth. [9] examined the challenges of online shopping in the retail industry in Nigeria and revealed how cultural background, infrastructure, security, perceived risk, and inadequate regulatory framework contribute to the slow adoption and growth of online shopping in Nigeria. The security and risk factors in [9] also serve as a pointer to this work. Despite these revelations, e-commerce was identified as a platform that offers small and medium companies a level playing field to compete favourably with bigger companies and has the potential to improve efficiency and productivity. However, a study by, [15] found that regulatory bodies and regulations were near absent in Nigerian cyberspace. The study also found a near absence of small and medium enterprises in the e-commerce business in Nigeria and called on financial institutions and the government to give e-commerce a chance by investing in it. This works pointed to the gap in regulation and why online fraud is prevalent in Nigeria.

The negating effect of trust on e-commerce in Nigeria was also highlighted by [11] when they explored the risks associated with online shopping and how it relates to the trust of the vendors and concluded that the presence of risks negatively affects trust in online shopping. In a related study, [16] observed that online shopping was just taking root in Nigeria and most third-
world countries and emphasized the need to build trust in the online shopping experience to enable the growth of e-commerce. A related study by [12] employed different regression analysis to relate online shopping experience and its effects on customer satisfaction in Nigeria. The findings revealed that online shopping was still new and growing. However, they forecasted that customers' intention to continue shopping online was high.

[13] considered several factors pertinent to online shopping in Nigeria and observed that the Nigerian online market is fertile for investment. They also exposed the negative effects of security, internet scams, poor infrastructure, and the preferred mode of payment (purchase after delivery) were having on the growth of online shopping generally.

[17] also examined the online shopping industry and its consumers in Nigeria and concluded that 'if factors like demographic attributes, purchase experience, and intentions are not taken into consideration – the prospect will be gloom'. They stated that these factors could help firms to make strategic decisions. The implication, however, is that if these factors were considered, e-commerce would improve in Nigeria.

On a smaller scale but still related to e-commerce and online shopping, [10] investigated user satisfaction of online shopping in Delta state and found that users were satisfied with online shopping - with a positive attitude towards online shopping. However, the study also revealed that factors like the safety of personal information, lack of warranty, fake or counterfeit products, and the non-availability of after-sale services were discouraging online shopping in Delta state. This work also reveals the lack of trust by the Nigerian e-shoppers and the general perception to safe-keep personal information.

In the same vein, [18] also highlighted the importance of trust in online shopping in Nigeria. Their work on u-commerce (ubiquitous-commerce) involving online shoppers in Nigeria, revealed that trust was pivotal in increased user perception and experience, noting that usability and privacy directly impact users’ experiences.

[19] also studied the twin effect of usability and security on the success of e-commerce in Nigeria. They examined critical design challenges faced by designers of e-commerce applications at various design stages. They asserted that security and networking were critical factors that determine the success of the website at the high-level design stage. While at the lower-level stage, they identified user interface and language as major determinants. They stated that the user interface can force designers to adopt a more customer-centric concept.

All the literature relates to the issues of security, trust and usability and their impact on Nigerian e-commerce. However, none of the above work combined all three factors. Also, the studies never engaged real users in the tests. Again, they did not concentrate on usability which is a major determinant in the success of web and mobile applications. Although, they harped on user perception and user interface - which embraces usability. This study carries out a comparative analysis of the usability of three e-commerce websites (using the user test method) and offers general recommendations on e-commerce business in Nigeria. The study also discusses the key findings (security and trust) and relates them to why Nigerians prefer shopping in foreign rather than local online shops.

3. COMPARATIVE EVALUATION OF USABILITY OF E-COMMERCE WEBSITES IN NIGERIA

This section discusses the comparative usability of e-commerce websites and other issues bothering on e-commerce business in Nigeria. This analysis is based on data collected from test participants in an earlier study in [14] and offers useful insight and recommendations to e-commerce operators on how to build trust among the Nigerian e-shoppers to improve e-commerce, usability, and acceptability, and reduce the domestic fund leak.

3.1 Attractiveness of Design

It is impossible to know exactly what makes a website appealing or attractive. To determine the attractiveness of the design, participants were asked if the website design was appealing or attractive. 90%, 80%, and 60% of the participants either agreed or strongly agreed that the design of websites A, B, and C respectively were appealing or attractive. A website’s appeal implies that the colour scheme blends seamlessly. It also implies that the organization of the contents of the websites is consistent on
all the pages. In this category, website C ranks lowest with 60%, followed by website B with 80%. When participants were asked if the website is well-designed and is consistent; 90%, 100%, and 60% of the participants either agree or strongly agree that websites A, B, and C respectively are well-designed and consistent. In this segment, website C lags behind websites A and B.

The aggregate and categorized analysis of the usability test results are shown in Table 1 along with the standard deviation. Fig. 1 shows a bar chart derived from Table 1. Table 2 shows the correlation between the test categories. From Table 2, the usability correlation between websites A and B is medium; the correlation between websites A and C is strong, and between websites B and C are weak. This indicates that usability issues are not treated equally among the e-commerce websites, this also mean that the websites did not adhere to usability standards equally. Fig. 2 shows the graph of standard deviation, the standard deviation among the test categories varies, this also indicates disparity of usability between the websites.

### Table 1. Usability of websites for each category and total task completion in percentage

| Assessment categories                  | Website A (%) | Website B (%) | Website C (%) | Stand Dev |
|---------------------------------------|---------------|---------------|---------------|-----------|
| Content, organization and readability | 96            | 84            | 68            | 14.04     |
| Evaluating navigation and link        | 70            | 75            | 45            | 16.07     |
| User interface design                 | 87            | 93            | 47            | 25.00     |
| Effectiveness evaluation              | 80            | 82.5          | 43            | 22.11     |
| Total task completed                  | 92            | 88            | 64            | 15.14     |

**Fig. 1. Combined usability of the three websites**

**Table 2. Table of correlation between test categories**

| Correlation between Website A and B | Correlation between Website A and C | Correlation between Website B and C |
|-------------------------------------|-------------------------------------|-------------------------------------|
| 0.6842                              | 0.8320                              | 0.2433                              |
3.2 Ease of Understanding

The content users see on the website as they visit the homepage is of utmost importance. Do the users understand what they see? Participants were asked if they could find what they wanted. 100%, 80% and 80% of the participants either agreed or strongly agreed that they could find what they wanted on websites A, B and C respectively. Also, at least 80% of all participants completed 75% of their tasks without asking any questions.

This means participants found it relatively easy to know where to conduct a search or buy products on each website. When asked if links can be easily identified, 80%, 60% and 20% of the participants either agreed or strongly agreed that they can easily identify links in websites A, B and C respectively. It did not matter whether the links in question were pictures or text. What is important is that the links are easily understood. From the data analyzed, it is evident that website A is easier to understand than website B and website B is easier to understand than website C.

3.3 Ease of Navigation

The ease with which users navigate around an e-commerce website is very important. The user's ability to understand the website also contribute to the ease with which a user navigates a website. However, when participants were asked if the website was easy to navigate, 80% of the participants either agreed or strongly agreed that websites A, B and C are easy to navigate. The three websites are clearly at par in this category. However, a website’s loading speed can also contribute to the ease of navigation. When participants were asked if the pages and images load fast, 80%, 100% and 40% of the participants either agreed or strongly agreed that the pages and images in websites A, B and C respectively load fast. In this category, website C lags behind websites A and B. Two participants made clear comments that website C was slow even though the same computer and internet connection was used for all the tests. Also, one participant commented that the links in website A failed to respond sometimes, this implies that some of the links in website A were broken.

3.4 Ease and Simplicity of Tasks

The ease with which users understand the website and how to move from one page to the next contribute to the ease of task performance. Simplicity of task is important because if users find regular tasks like finding a given product or buying it difficult, they simply turn to the next website they know. When participants were
asked if the websites were easy to use, 60%, 80% and 20% of the participants either agree or strongly agree that websites A, B and C were easy to use. The ease of use refers to the task completion process for each website. In this segment, website B leads websites A and C. However, the comments made by the participant in this area are interesting. Over 50% of the participant commented about the mandatory registration on the website. This means that e-shopper must register before they are allowed to buy products. Most e-shoppers don’t have the time to complete a registration process. Also, at least 20% of the participants commented about the lack of ‘help links. These comments came from participants with less than three years of computer and internet experience and who rated themselves average on the competence of computer and internet use.

3.5 Help Links and Interactivity

One of the major problems noticed from the responses of participants is that the websites do not offer help to users. When participants were asked if the websites offered help for errors made by users, 60%, 40% and 40% of the participants disagreed or strongly disagreed that websites A, B and C respectively offers help for errors made by users. About 40% of all participants commented that the websites need to incorporate help links to enable them to complete a given task (transaction). More than 50% of the participants that disagreed or strongly disagreed with the above question had less than three years of experience with the use of computers and the internet.

Up to 60% of the participants did not care if there was any kind of interactive tool or help-links on the homepage that will help them understand and navigate the websites. About 40% of the participants needed help links to enable them to complete at least two of the tasks. These participants all had less than three years of experience in the use of the computer and the internet and had not purchased any product from an e-commerce website. Thus, it is fair to conclude that users with little computer and internet experience who had not purchased any product from e-commerce websites (first-time customers) will find it more difficult to understand and use the website compared to users with more experience.

3.6 Key Findings

Several issues were raised by test participants during and after the test. Up to 80% of the participants commented (think-aloud) during the test that they will not be able to complete the task of buying a product because they are unwilling to complete the registration process as a customer on the websites. The registration process required users to confirm telephone numbers and emails on the website before completion. The reluctance shown by test participants with the registration process shows that the actual end-users will act similarly and this will impact the rate at which first time visitor buys a product. The general reluctance and apprehension exhibited by test participants in completing the registration process prompted further discussion.

3.7 The Issue of Security

A major issue with all participants is security. When participants were asked if they feel secure buying products from the website 80% of the participants disagreed or strongly disagreed that they feel secure buying products from website A. About 60% of the participants disagreed or strongly disagreed or did not know (Neutral) if they feel secure buying products from websites B and C. Over 80% of those who feel insecure purchasing products from the websites have never purchased any product from an e-commerce website.

Another salient problem identified by almost all the participants is the issue of mandatory registration on the websites and the reluctance of the participants in registering. Over 90% of participants commented on the post-test form that registration is mandatory for all customers who intend to buy any product. The mandatory registration process evoked a feeling of frustration among test participants and there was a general reluctance to register.

How then will the end-users of the websites feel? The very moment a user feels reluctant and frustrated on the website, that customer will simply look elsewhere to buy the product or forget it altogether.

The reluctance exhibited by test participants in registering with the websites is directly related to fraudulent activities experienced in Nigeria. There is a general belief that the only way to stay safe is to not give out useful information to untrusted persons, websites, or telephone callers.

3.8 The Issue of Security and Trust

Security and trust account for the success of many businesses, this is more so with the e-
commerce business. To build security and trust among the Nigerian online shoppers, virtually all e-commerce businesses offer customers the option of making payments on delivery [6]. Despite this method of wooing customers, this study has revealed the low level of trust and high level of security consciousness among online shoppers in Nigeria. Over 50% of the participants commented negatively about the mandatory registration on the website before purchase. It was clear they don’t want to be quick to divulge personal data when they are yet to be engaged in any meaningful activity that can engender trust between them and the e-shop. The general feeling is not to divulge personal information to stay safe from the fraudster’s lenses.

Distrust among Nigerian online shoppers contributed to why more than 70% of the participants reneged from making online purchases. The issue of distrust results from the growing concern over the increasing online fraud in Nigerians.

A Cyber Security report in 2017 indicates a damning prevalence of online fraud among organizations and government agencies in Nigeria, a menace that costs the country over 649 Million Dollars which is approximately 197.9 Billion Naira annually. The report also indicated that over 90% of online fraud victims range from the common citizens, media persons and government officials. Also very damning, the report showed that 81% of cases are unreported or unresolved and most worrisome is that the country has the lowest number of cybersecurity experts [20,21]. Another report from the Nigerian Electronic Fraud Forum (NeFF) indicated that Nigeria reportedly lost N5.572 billion to electronic fraud between 2015 to 2017 [22].

The prevalence of internet and online fraud and its persistence in Nigeria has been investigated by several researchers including [23,24,25,26,22,27].

Nigeria has a population of over 200 million most of whom are graduates without gainful employment [28,29,30,31,32]. This has created a mass of hungry and smart people constantly scheming to make ends meet; a situation that has created many fraudulent people with intent to defraud the unsuspecting masses [33,30,34,31,35]. These fraudulent activities have found a footstool online and many Nigerians are aware of these activities [23,36]. In 2018, internet fraud accounted for 60% of N15.5 billion bank fraud that took place in Nigeria. These frauds are committed by bank staff, Nigerian fraudsters or in collusion between the bank staff and the fraudsters [37]. Several Nigerians have been targeted and many have fallen victim to online fraud [21]. As a precautionary measure, banks now constantly update customers with fraud alerts – advising customers not to give out personal and other useful details to individuals – including bank staff [38,37]. Weak laws and weak policing have served as the fertile ground for fraud to thrive in Nigeria - where most internet fraudsters openly flaunt their wealth and are celebrated as role models [23,20,27,36]. This has further ensured that online fraud remains on the increase and incidences of occurrence more rampant [25,26,39,40,37].

These experiences have created a general sense of safety and awareness among Nigerian e-shoppers and engrained a ‘survival feat’ that makes them ‘precautionary’. To avoid being a target and easy prey, online shoppers have to obey the simple instruction of ‘not letting out information cheaply’.

This is the apparent reason why participants were not too willing to give out their information (so quickly) when asked to register. Somehow, e-shoppers are going online mindful of the prevalence of fraud and chances of getting defrauded if they are not careful with their information. Hence, the prevalence of online fraud in Nigerians has created (among e-shoppers) the fear of being defrauded if they don’t treat their information with care. The fear of getting defrauded also accounts for why most Nigerian e-shoppers prefer to make payment on delivery rather than payment at the point of checking out as practiced elsewhere- this also points to the lack of trust and a feeling of insecurity among e-shoppers towards e-commerce websites in Nigeria. [41] hinted that the very instant a customer feels frustrated on the website, that customer will simply look elsewhere to buy the product or forget it altogether. The lack of trust and prevalence of fraud in Nigeria explains why a good percentage of Nigerian e-shoppers prefer shopping from foreign e-shops rather than local e-shops and why the fund-leak from the local market to foreign market will continue to plague e-commerce in Nigeria.

The frequent experiences of Nigerians with fraudsters have created a sense of distrust among online shoppers and caused most
Nigerians to prefer shopping from foreign e-commerce websites instead of local e-commerce websites.

The twin issue of trust and security (if not given proper attention) will be the Achilles-heels to the growth of e-commerce in Nigeria. For e-commerce businesses to thrive; usability should be given prime consideration, transactions and customers data should be secured and protected from the countless fraudsters roaming with unfettered freedom in the country’s physical and virtual space. This will endear trust from e-shoppers, and trust will translate to an increase in the volume of local transactions.

4. RECOMMENDATIONS

The ability of users to navigate and carry out tasks such as searching for products, adding them to cart, registering as a customer on the website, adding or changing delivery address, making payment on the website and contacting customer care depends on their computer-and-internet-use expertise. Users with good experience can accomplish the above tasks with ease but users with low expertise will encounter some level of difficulty. It is therefore recommended that e-commerce websites incorporate interactive applets or help-links in their respective websites. This will enable e-shoppers with little or no experience to find and buy products on the websites with ease.

All the websites tested exhibited a significantly longer process of buying a product by a first-time e-customer. When a first-time user clicks the buy button, the user will be prompted to register. A serious user would want to continue and complete the registration process. The registration process itself requires the user to confirm his or her telephone number. Again, a serious-minded user will be willing to complete the process. But, what fraction of first-time users are willing to go through such an unexpected process? We recommend that e-commerce websites categorize customers such as guest or one-time users who will not need to register as users and regular users who will be required to register as users. This way a customer who visits the e-commerce website for the first time will not be made to go through a lengthy registration process that might make them lose interest in the product they desire to buy.

Another major problem noticed in the responses of participants is that the websites do not offer help to users in any way. Participants needed the websites to incorporate help links to guide them on how to get tasks done. A customer who is very mindful of his data (as Nigerians are) does not like to get hanged in one place. Without help links, data-minded e-shopper can simply find the next e-shop which is but one or two clicks away.

Customers were unwilling to divulge their information too quickly; this is because e-shoppers feel insecure and distrustful of the websites. Security and trust are serious usability issues that need to be addressed at all costs. To gain the trust of potential Nigerian e-shoppers, e-businesses must incorporate trust-building measures. They should also at the point of registration display to users their data use policy; this will (to an extent) build trust among potential customers.

If a user feels secure about a website, the user will freely do business with the site; in the same vein, insecurity will drive away potential customers. E-businesses in Nigeria should improve on their security features, to gain and build trust among the e-shoppers. This will in turn increase their share of the market value of the billions spent online by Nigerian e-shoppers and divert the attention of the Nigerian e-shoppers from foreign online shops.

For e-commerce businesses to thrive; usability should be given prime consideration, transactions and customers data should be secured and protected from the countless fraudsters roaming with unfettered freedom in the country’s physical and virtual space.

The near absence of policies and enforcement on online fraud is also of concern. More damning is the seeming collusion between law enforcement agents and online fraudsters. Government agencies responsible for the fight against online fraud should do more than just statistics gathering. The agencies should formulate policies and clamp down on fraudster.

The low number of cybersecurity experts in a country with high prevalence cases of online and internet fraud is also not encouraging, we recommend the training of more security personnel to help combat and curb the menace.

5. CONCLUSIONS AND FUTURE THOUGHTS

This section discusses the conclusion and future thoughts.
5.1 Conclusions

Based on the user test and participants responses, it can be argued that all three e-commerce websites tested passed the usability test. However, participants noted the absence of help links and navigation guides.

The post-test interview, think-aloud and observation of participants during the test revealed the issue of security and trust. Fraudulent incidences in Nigeria have made many e-shoppers safety conscious and precautionary in their online activities. This was shown in the reluctance exhibited by all test participants during the mandatory registration process. They simply were unwilling to give out personal information cheaply.

The online security awareness and lack of trust explain why most Nigerian e-shoppers prefer to make payment on delivery rather than paying at the point of checking out. Lack of trust in the local e-shops also explains why a good percentage of Nigerian e-shoppers prefer shopping from foreign e-shops rather than local e-shops and why the fund-leak from the local market to foreign market will continue to plaque e-commerce in Nigeria.

5.2 Future Thoughts

This study concentrated on only three e-commerce websites and the number of participants used was randomly selected. So far, more e-commerce websites are taking root. In the future, we hope to conduct the same usability test on all the local websites and some foreign websites operational in Nigeria. The aspect of security and trust was discovered through test participants behaviour during the test. In the future, we hope to concentrate on this issue among Nigerian e-shoppers.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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