DETERMINANTS OF DECISION TO USE AND CONTINUED USE OF ONLINE SHOPPING MEDIUM: A BIVARIATE PROBIT APPROACH

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Abstract

Internet shopping has grown rapidly all over the world, Nigeria, inclusive owing to the associated benefits and growth in digital environment. Despite the benefits associated with online purchasing, the medium has not been widely used yet in Nigeria. This study was therefore, conducted to determinants factors influencing decision to use and continued use of online shopping medium in Nigeria. Data for the study were collected using self-constructed structured questionnaire administered to 210 respondents out of which data from 198 respondents were suitable for coding and analysis. Descriptive statistics and biprobit regression model were used for analysis. Data collected were analyzed using SPSS version 16.0 and STATA version 12.0. Results of analysis showed that 106 respondents have used online purchasing medium while just 56 of them continued the use of online purchasing medium. Decision to use online purchasing medium was negatively influenced by age and positively influenced by online literacy while continued use was negatively influenced by perceived financial risk involved and positively influenced by perceived convenience, perceived privacy concern, year spent using the internet and amount spent on internet subscription monthly. The study concludes that socio-demographic factors, risk factors and web-based factors significantly influence decision to use and continued use of online purchasing medium in Nigeria.

Keywords: Determinants, online shopping, bivariate probit,

Introduction

Internet has today become prominent commercial platform, more than a means of communication that it was known for. This gains popularity especially in the era of globalization where the world becomes one. Online shopping is taking over the traditional method of buying that involved buying from stores or malls. Online shopping is a modern way of buying
everything from home or the process of purchasing goods or services over the internet (Naz, 2019). It involves television, internet and mobile-based shopping.

UCLA Center for Communication Policy (2001), posited that online shopping is number three most popular web-based activity after electronic mail and web browsing. Internet based marketing gains prominence because it possesses characteristics of a good market segment. Businesses, especially, purchasing, using the internet has gained a new dimension of interaction with the other businesses and organizations (Tekin et al., 2018).

Kartiwi et al. (2018) reported that e-commerce is beneficial for both small-and medium-scale businesses while Bucko et al. (2018) reported that trading through modern technology brings about a quick response to the modern trends in goods purchasing. Naz (2019) posited that the benefits of online shopping for customers include time saving, convenience and no restriction by store hours or location. Today, E-commerce has become the popular way of conducting business all over the world (Downing and Liu, 2014) owing to associated benefits.

Online buying or purchasing is not only popular in developed western-countries but also in African countries, Nigeria, inclusive, despite the infrastructural and internet growth rates in the region. The increasing adoption rate of online purchasing is associated with technological progress currently recorded all over the world in terms of digital environment and improved socioeconomics of citizens (Lim et al., 2016).

Studies on e-commerce, especially with emphasis on online purchases have variously been carried out. Lim et al. (2016) reported that perceived usefulness of online purchases significantly influenced online purchasing in Malaysia while Nuno and Paulo Rita (2016) reported that privacy concerns determines online purchasing in Portugal. Inegbedion et al. (2016) reported that privacy and usefulness of online medium were determinants of online purchasing decision in Nigeria. Pilik (2013) reported that age, internet literacy, problems of returning and delivering wrong products were significant determinants of online purchasing. Despite the popularity online purchasing is gaining, consumers are not much habituated yet to practice online shopping
frequently in Nigeria. This behaviour is a function of online purchasing decisions made by Nigerians. This decision is traced to risk factors associated with online purchasing decision, web-based factors influencing online purchasing intension, and socio-economic characteristics of intending buyers. Published studies in this area were focused mainly on the influence of privacy concern (Bianchi and Andrews, 2012, Nuno and Paulo, 2016) and personal characteristics (Pilik, 2013) on online purchasing behaviour. However, these studies did not only not measure the influence of the above mentioned factors on continued use of online purchasing medium but also did not investigate the influence of risk, web-related and socio-economic factors on the decision to use and continued use of online purchasing. Also, Inegbedion et al. (2016) used Analysis of Variance (ANOVA) to investigate factors influencing consumers’ attitude toward internet buying in Nigeria while Lim et al. (2016) used Structural Equation Modeling to examine factors influencing online purchasing behaviour. These studies did not use binary choice model to measure decision or otherwise.

Therefore, the study considers these facts as gaps in the literature that should be filled. Another gap the study considers to fill is the paucity of studies conducted on determinants of the use of online purchasing outlets in Nigeria, despite the increase in the number of non-bricks and mortar all over outlets. This study therefore analysed the possible determinants of individual’s online shopping decision and sustained/continued use of online shopping in terms of risk, web-based, and socio-demographic characteristics of respondents.

Therefore, the research questions that guide this study are: (i) how do risk, web-based, and socio-demographic characteristics influence the use of online purchasing medium (ii) What influence do risk, web-based, and socio-demographic factors have on sustained use of online purchasing medium? The study was thus conducted to (i) investigate factors influencing the use of online purchasing medium; (ii) examine factors influencing sustained use of online shopping medium.

**Data and Estimation Method**

The population for this study consists of internet users, teaching in private schools in Ondo State, Nigeria. Data were collected from a randomly selected 210 school teachers out of which
information from 198 respondents were suitable for analysis. To ensure representativeness, especially in terms of primary and secondary private schools (school categorization), the study used quota sampling with the two-dimensional categorization. Structured questionnaire was employed to obtain information from respondents. Data were collected on socio-demographic information, risk related factors, web-based information etc. Data collected were estimated using a sequential decision making model called bivariate probit model and descriptive statistics.

**Specification of model**

The model for analysis presented in this research is based on household or individual decision making process as contained in literatures. Logit and probit models are binary choice models that have extensively been used in the study of household or individual decisions (e.g. Koyuncu and Lien, 2003; Ng’ombe et al., 2014). The two models provide the plausibility of estimating the probability of ordering (purchasing) through internet or non-ordering (non-purchasing) through internet.

However, the decision to use and continued use of new technology usually involves more than a stage, which are undertaken most often sequentially (De Graaff et al.2005). This study adopts Shiferaw and Holden (1998)’s two-stage decision processes. This implies that for this study, the decision-making on online purchasing and continued use of online purchasing medium is nothing but a two-stage process that would be undertaken one after the other.

The study developed a two-stage sequential model using the bivariate probit estimation (biprobit) model with sample selection procedure to investigate the determinants of online purchasing medium use decision and continued use of online purchasing medium. The two-stage model for purchasing decision and continued use of online medium is specified: (i) to regress the potential factors that explain the likelihood of decision to purchase online and (ii) determine the potential factors that explain the probability of continued online purchasing. Therefore, the respondents are grouped as ‘users of online purchasing medium’ and ‘non-users of online purchasing medium’ in the first stage of the analysis, and in the second stage of the analysis, users from the
first stage are grouped as ‘sustained (continued) users of online purchasing medium’ and ‘non-sustained (continued) users of online purchasing medium’.

Therefore, the study assume unobserved or latent variables \(Y_{1i}^*\) and \(Y_{2i}^*\) that generate observed variables \(Y_{1i}\) and \(Y_{2i}\), which represent online purchasing use decision and continued online purchasing decision. It is assumed that a number of respondents have bought or ordered or purchased items online (users) and stopped online purchasing while another set have bought or ordered or purchased items online and continued using online purchasing medium. The two equations are specified as follows based on Amsalu and De Graaff (2017):

\[
Y_{1i}^* = \beta_{1i} X_{1i} + \varepsilon_{1i} \quad \text{Eq1}
\]

\[
Y_{2i}^* = \beta_{2i} X_{2i} + \varepsilon_{2i} \quad \text{Eq2}
\]

Where \(\beta_1\) and \(\beta_2\) are parameters of explanatory variables to be estimated; \(X_{1i}\) and \(X_{2i}\) are vectors of explanatory (independent) variables; and \(\varepsilon_{1i}\) and \(\varepsilon_{2i}\) are random errors which are normally distributed. Data for the second stage of the analysis (continued use of online purchasing medium) are only for those who have bought, ordered or purchased online at least once. The sample selection based on bivariate probit model is hence specified as follows:

\[
Y_{1i} = 1 \text{ if } Y_{1i}^* > 0; \ 0 \text{ Otherwise} \quad \text{Eq3}
\]

\[
Y_{2i} = 1 \text{ if } Y_{2i}^* > 0; \text{ and } Y_{1i}^* > 1; \ 0 \text{ Otherwise} \quad \text{Eq4}
\]

\[
L_i = \ln \phi_2 (\beta_{1i} X_{2i}, \beta_{2i} X_{2i} p) + \ln \phi (\beta_{1i} X_{1i} - \beta_{2i} X_{2i} - p) + \ln \phi (-\beta_{1i} X_{1i}) \quad \text{Eq5}
\]

Estimation was carried out using Stata/SE 12.0 software.

**Results and Discussion**

**Online shopping typology and frequency**

Online shopping typology and frequency are contained in Table 1. From the 198 sample respondents, 106 have purchase through online medium while 92 have not used online medium at all. Results further showed that 56 of the users have continued in the use of online medium as purchasing outlet. The average number of times items were purchased online in the last six month were 4±1.8 and 7±3.1 for all users and continued users, respectively (Table 1).


Table 1: Online purchasing typology

| Characteristics       | Online purchasing | Non-online purchasing | Continued online purchasing |
|-----------------------|-------------------|------------------------|-----------------------------|
| Number of sample      | 106 (54%)         | 92 (46%)               | 56                          |
| Average number of times shopped in the last six months | 4±1.8             | -                      | 7±3.1                       |

Summary statistics of variables used

There are more males (59%) among the respondents and the mean age of respondents was 33±7.6 years (Table 2). The average number of year of formal education was 16±1.6 years while the average monthly income was N19,150±20,016. About 29 percent of respondents engaged in off-teaching job for the purpose of getting multiple streams of income. The average teaching experience among the respondents was 8.3±3.3 years. This implies that the respondents are moderately experienced.

The results on risks factors shows that 66 percent of respondents perceived that online purchasing is financially risky while 74 percent perceived that online purchasing is full of product risks in terms products quality. Also, 88 percent of respondents perceived that online purchasing is convenient while 67 percent perceived that online purchasing ensures privacy (also Table 2). The high proportion of respondents who perceived that purchasing through online medium is full of financial and product risks could be the reason for non-use of online medium by large proportion of respondents.

The results of web-based factors showed that just 12 percent of the respondents had online literacy. The low proportion of respondents who had online literacy could be responsible for non-used of online medium by large proportion of respondents. The average year of use of internet in the area was 8±3.4 years. This implies that the respondents had spent moderately good number of years using the internet. High proportion of respondents (89%) owned browsing
device. The average amount spent on subscription monthly by respondents was 1,047±354 (also Table 2).

Table 2: Summary statistics of variables used in the estimation of the decisions to use and continued use of online purchasing medium

| Variables               | Description                                                        | Mean | SD   |
|-------------------------|--------------------------------------------------------------------|------|------|
| **Socio-demographic**   |                                                                    |      |      |
| SEX                     | Sex of respondents (1=male; 0= female )                            | 0.59 | 0.49 |
| AGE                     | Age of respondents in years                                        | 33   | 7.6  |
| YEAREDU                 | Number of years of formal education                                | 16   | 1.6  |
| MONTHINCOME             | Monthly income (₦)                                                | 19,150 | 20,016 |
| OFFINCOME               | Off-teaching work (1 if participate in off-teaching work, 0 otherwise) | 0.29 | 0.46 |
| EXPERIENCE              | Teaching experience                                               | 8.3  | 3.3  |
| **Risk factors**        |                                                                    |      |      |
| PERCFINRISK             | Perception on financial risk (1 if financial risk is perceived, 0 otherwise) | 0.66 | 0.51 |
| PERCPRODRISK            | Perception on product risk (1 if product risk is perceived, 0 otherwise) | 0.74 | 0.47 |
| PERCCONV                | Perception on convenience (1 if convenience is perceived, 0 otherwise) | 0.88 | 0.32 |
| PERCPRIVACY             | Perception on privacy (1 if privacy is perceived, 0 otherwise)     | 0.67 | 0.47 |
| **Web-based factors**   |                                                                    |      |      |
| ONLINELIT               | Online literacy (1 if had online literacy, O otherwise)            | 0.12 | 0.32 |
| YRINTERNET              | Year on internet                                                  | 8.1  | 3.4  |
| DEVICOWNSHIP            | Ownership of browsing device (1 if owned, 0 otherwise)             | 0.89 | 0.32 |
| DATAAMT                 | Amount spent on data monthly (₦)                                  | 1,047 | 354 |
| **Dependent variable**  |                                                                    |      |      |
| Use online shopping     | 1 = use, 0 = non-use                                               |      |      |
| medium                  |                                                                    |      |      |
| Continued use           | 1 = continued use, 0 = non-continued use                           |      |      |

₦ is Nigerian currency

1 ₦ = 0.0025
Empirical results
The empirical results of the probit model showed the influence of socio-demographic variables, risk factors and web-based characteristics on respondents’ decision to use online purchasing medium and continued use decisions in Nigeria (Table 3).

Determinants online purchasing medium use
Age of respondents was significant and inversely related to online purchasing medium use in the study area. This implies the older teachers are likely reluctant to the used of online purchasing medium in the study area. This in agreement with previous study (Pilik, 2013) that age and innovation adoption are inversely related to online purchasing behaviour. Respondents’ perceived financial risk associated with online purchasing medium has positive and significant effect on the use of online purchasing medium in the study area. This implies that financial risk is a necessary but not sufficient condition for non use of online purchasing medium in the study area. Online literacy had positive and significant influence on the use of online purchasing medium. This implies that those who had online literacy are more likely to use online purchasing medium than their counterparts who did not have. This is in agreement with Koyuncu and Lien (2003) that online experience and online purchasing decision are directly related.

Determinants of continued use of online purchasing medium
Respondents’ perceived financial risk associated with online purchasing medium was negative and significantly influenced continued use of online purchasing medium while respondents perceived convenience and perceived privacy associated with the use of online purchasing medium were positive and significantly influenced continued use of online purchasing medium in the study area. The more risk they perceived associated, the lower the likelihood that they will continue to use the medium. This implies that risk perception and online purchasing medium use are inversely related. This is in agreement with previous studies (Bianchi and Andrews, 2012; Nuno and Paulo, 2016) that risk perception and online purchasing behaviour are inversely related. The positive relationship between continued use decision and convenience shows that
the more respondents perceive that online purchasing medium is convenient, the greater the likelihood that they will continue to use the medium. This implies that convenience perception and continued use of online medium are directly related. This is in agreement with Lim et al. (2016) and Bucko et al. (2018) that convenience is a determinant factor influencing consumer online purchasing behaviour. The positive relationship between privacy perception and continued use of online purchasing medium shows that the more respondents perceive that privacy is guaranteed in the use of online purchasing medium, the greater the likelihood that they will continue to use it. This implies that privacy perception and continued use of online purchasing medium are directly related. This is in agreement with previous studies (Numo and Paulo, 2016; Inegbedion et al., 2016) that privacy concern and online purchasing behaviour are directly related.

Online literacy, years spent using internet and amount spent on data monthly for subscription were significant determinants of continued used of online purchasing medium among respondents. Online literacy was negative and significantly influenced continued use of online purchasing medium in the study area while years spent using internet and amount spent on data subscription monthly were positive and significantly influenced continued used of online purchasing medium. The inverses relationship between online literacy and continued use of online purchasing medium could probably be due to the fact that people are literate for online activities other than buying. The more the number of year spent using internet the greater the likelihood that online purchasing medium would be selected as buying outlet instead of visiting brick and mortal stores. Those who had spent more years using internet had adopted online purchasing medium while reverse is the case for those who had spent less number of years using internet. Similarly, the greater the amount spent on data subscription monthly the greater the likelihood that respondents would continue to use online purchasing medium. Data subscription is the medium of accessing the internet for whatever activities.

Table 3: Biprobit estimate for determinants of decision to use and continued use of online shopping medium in Nigeria

| Explanatory variables | Use decision | Continued use decision |
|-----------------------|--------------|-----------------------|
|                       | Coefficient  | P-value | Coefficient | P-value |
| Socio-demographic     |              |         |             |         |
SEX 0.296(0.211) 1.161 -0.244(0.395) 0.535
AGE -0.026*(0.014) 0.069 -0.001(0.027) 0.745
YEAREDU -0.058(0.0650 0.377 0.003(0.141) 0.985
EXPERIENCE 0.003(0.031) 0.928 0.077(0.064) 0.231
OFFINCOME -0.325(0.212) 0.152 -0.350(0.411) 0.396

**Risk factors**

PERCFINRISK -0.450**(0.212) 0.034 -2.161****(0.597) 0.000
PERCPRODRISK 0.158(0.226) 0.484 -0.619(0.381) 0.104
PERCCONV -0.302(0.295) 0.306 1.553**(0.671) 0.021
PERCPRIVACY -0.116(0.224) 0.605 1.676****(0.447) 0.000

**Web-based factors**

ONLINELIT 0.744****(0.284) 0.009 -1.422*(0.782) 0.069
YRINTERNET 0.029(0.034) 0.395 0.137**(0.063) 0.030
DEVICOWNSHIP -0.096(0.317) 0.762 0.752(0.542) 0.165
DATAAMT -0.0001(0.0003) 0.706 0.002**(0.001) 0.020
CONSTANT 2.070(1.431) 0.148 -5.663**(3.068) 0.065
LOG LIKELIHOD FUNCTION -70.396

**Number of observations** 198
**Censored observations** 56

*Significant at 10%, **Significant at 5%, ***Significant at 1%

Monthly income dropped from the model due to infinitesimally small coefficient value.

**Conclusion**

Online purchasing is a rapidly growing phenomenon caused by improvement in internet infrastructure. Several factors have been found influencing online purchasing behaviour in terms of buying decision. The study concluded that factors influencing the use of online purchasing medium and that of continued use of online purchasing medium are not the same. The decision to use is significantly influenced by age and online literacy, while continued use is influenced by perceived financial risk, perceived convenience, year spent using internet and amount spent on data monthly for internet subscription. The likelihood of using online purchasing medium is lower with increase in age and higher with increase in internet literacy. Continued use of online purchasing medium is lower with increase in perception of financial risk and higher with increase in perceived convenience, perceived privacy, year spent on internet and amount spent on...
on data subscription monthly. Retailers can therefore, build on integrity as a means of attracting and holding consumers through online buying.

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