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# E-Commerce Security and Customer’s Use of E-Commerce Platforms among Federal Government Personnel in Ibadan, Nigeria

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## ABSTRACT

Advancement in internet infrastructure has aided the rise of online businesses called electronic commerce (e-commerce). However, the security of e-commerce has assumed heightened dimensions in recent times as news of security threats on popular websites abounds in literature and the media. This study seeks to investigate e-commerce security and use among personnel of federal ministries and agencies in Ibadan, Oyo State and provide answers to three research questions. Survey design was adopted and data were collected using a questionnaire. The study employed stratified random sampling technique to select the ministries and agencies, while convenience sampling technique was used to select 262 respondents. Data were analysed with SPSS version 26 using descriptive statistics and Spearman rank correlation. The findings revealed that both the frequency of use and perception of e-commerce among personnel in federal ministries and agencies in Ibadan, Oyo State, are moderately high. There exists a significant positive relationship between e-commerce security and the use of e-commerce among personnel in federal ministries and agencies in Ibadan. Among others, it was recommended that e-commerce vendors should endeavour to take the security of their platform seriously and invest in it.

**Keywords:** E-security, Electronic commerce, E-business, Government personnel, Online marketing

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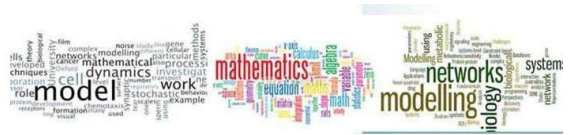
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## 1. INTRODUCTION

The growing popularity of the Internet poses significant challenges to shopping patterns and behaviour among consumers (Milenkovic, 2020). Although the Internet offers several opportunities to consumers which include time-saving, cost-efficiency, convenience, easy access and availability of different brands of products (Nanehkaran, 2013; Chiejina, 2014; Lawal & Ogbu 2015; Milenkovic, 2020; Okolie & Ojomo, 2020), security poses a major concern restricting customers and organisations from engaging in e-commerce. It, therefore, has the potential to determine the success or failure of many business ventures, most obviously e-commerce activities (Bilgihan, 2016).





### 1.1 Statement of Problem

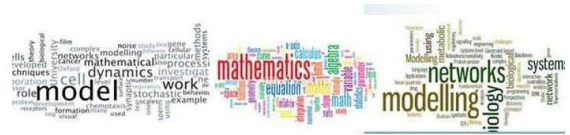
The lack of e-commerce security is a serious social issue threatening e-commerce use and the benefits that such an innovation could bring to development (Sanfilippo, 2021). Pabian & Reformat (2020) identified e-commerce security as a social value, the lack of which could limit business growth and affect competitiveness and sustainability in a business (Jeanrenaud & Jeanrenaud, 2017). This could also cause an increase in poverty and inequality, exploitation, and lack of well-being of the population (Jeanrenaud & Jeanrenaud, 2017). Several businesses could also be hampered due to the inability to embark on e-commerce or marketing strategy (Chai, 2020; Al-masaeed, Johar & ALSoud, 2020). This could increase the inadequacies plaguing the performance of e-commerce in developing nations, and heighten the existing digital divide between developing and developed countries (Al-masaeed, Johar & ALSoud, 2020).

Igwe, Alaba & Abass (2020) studied the adoption of e-commerce in Nigeria by reviewing literature related to security and trust, as well as how they affect customers' behaviour. The study was based on a comprehensive review of the literature using secondary data, however, this study used primary data in examining the use of e-commerce among personnel at federal government ministries and agencies in Oyo State, Nigeria. Ogunsola & Fadoju (2022) examined the relationship between perceived security and the use of cloud computing services among postgraduate students of the University of Ibadan, Nigeria. The study which shows that perceived security significantly influences the intention to use cloud computing services, emphasizes that people will use e-services more when they perceive that it is safe from intrusion, data and information losses.

Rabiu, Ibrahim, Dauda, Mukhtar, Abdullahi & Yusuf (2019) who studied why e-commerce has not been fully adopted in Nigeria, found that among others, lack of confidentiality of users and online fraud poses a significant threat to the use of e-commerce in Nigeria. Ayo, Adewoye, & Oni, (2011) investigated the acceptance of B2C e-commerce and extended the technology of acceptance model (TAM) by adding task-technology fit, relationship-related construct (trust and risk), and the two TAM constructs (perceived usefulness and perceived ease).

Ogunsola & Adetunji (2020), conducted a study among Oyo State public servants, and examined factors influencing e-commerce adoption such as Technology Acceptance Model (TAM) factors like perceived ease of use and perceived usefulness; Theory of Reasoned Action (TRA) factors like attitude and subjective norm; and other factors like trust; perceived risk; infrastructure availability; socioeconomic factors; demographic factors, and the intention to adopt e-commerce. The study provided valuable information on the adoption of e-commerce and its influencing factors. However, e-commerce security as well as its influence on the customer's use of e-commerce in Nigeria were not studied. This study filled the gap.

The main objective is to examine how e-commerce security affects the use of e-commerce among federal government personnel in Ibadan, Nigeria. The study also examined the frequency of use of e-commerce by personnel, as well as their perception of e-commerce security in Nigeria.



## 1.2 Research Questions

The following research questions are a guide for the direction of the study;

1. How frequently do personnel in federal ministries and agencies in Ibadan, Oyo State use e-commerce?
2. What is the level of perception of e-commerce security by personnel in federal ministries and agencies in Ibadan, Oyo State?
3. Is there a significant relationship between e-commerce security and the use of e-commerce among personnel in federal ministries and agencies in Ibadan, Oyo State?

## 2. LITERATURE REVIEW

### 2.1 Definition of Concepts

E-commerce has been defined from different perspectives in literature. From a communications perspective, e-commerce was defined to involve the usage of telephone lines or computer networks for payments or distribution of information about products and services (Nanehkaran, 2013). From a business perspective, e-commerce involves using technology to achieve business transactions and workflows in an automated manner (Szymanski & Hise, 2000). The definition of e-commerce from a service perspective shows that e-commerce is a means by which management, consumers and organisations' requirements are covered to reduce service costs and improve the quality and delivery of goods and services (Milenkovic, 2020). The online perspective sees e-commerce as the purchase and marketing of goods, provision of information and other online services to potential users (Barkatullah & Djumadi, 2018). In this study, e-commerce refers to online activities of selling, purchasing products, and/or the provision of online services to customers.

### 2.2 Forms of E-commerce

According to Chen, Mansa & Courage (2020), electronic commerce has four major classes which are business-to-business (B2B), business-to-consumer (B2C), consumer-to-business (C2B), and consumer-to-consumer (C2C). Business-to-business (B2B) is a form of transaction between businesses, such as those involving a manufacturer and a wholesaler, or a wholesaler and a retailer (Chen et al., 2020). Business-to-consumer is a retail model where products move directly from a business to the end user who has purchased the goods or services for personal use (Chai, 2020). Consumer-to-business (C2B) is a business model where an end user or consumer makes a product or service that an organisation uses to complete a business process or gain a competitive advantage (Sanfilippo, 2021). Consumer-to-consumer (C2C) is a business model in which third-party companies facilitate transactions for products or services between private consumers without a business organisation participating in either end of the sale (Ward, 2021).

### 2.3 E-commerce Security

The significance of e-commerce security has attracted much attention because it is a rapidly growing area of business activity (Ayo, Adewoye & Oni, 2011). The various online transactions between online buyers and online sellers in e-commerce platforms could be difficult and complex due to the challenge of e-security of the platforms posed by the Internet (Bilgihan, 2016). Many potential online customers tend to sway away from the possibilities of using e-commerce due to the high level of insecurity accompanying the system, especially in a developing country like Nigeria (Bilgihan, 2016)



The processes in electronic commerce include enabling a customer to access product information, select items to purchase, pay for the items securely, and have the payment settled financially, this process could be challenging, especially in the online environment (Elbeltagi & Agag, 2016). This means users of e-commerce sites are constantly exposed to security issues because the security policies put in place by owners of the platforms are often inadequate (Elbeltagi & Agag, 2016). These proprietors focus on functionality and ease of use; consequently, security suffers. After the COVID-19 pandemic, the Internet has become the main medium for conducting electronic commerce as many products, tangible and intangible, are browsed through and sold over the Internet (Popov (2021; Bhatti, Akram, Basit, Khan, Naqvi & Bilal, 2020). Several payment methods, such as electronic cash, electronic cheque, debit/credit card, and electronic wallets (O'Mahony, Peirce & Tewari, 2011) have posed significant security challenges among e-commerce users, especially in developing countries, including Nigeria. For instance, if data confidentiality is not ensured, an adversary can obtain sensitive information such as card details and then use them to make payments at the expense of the legitimate cardholder.

However, security requirements for online transactions are not limited to data confidentiality but also include other security services such as user authentication, non-repudiation and data integrity. Online transactions need to be proved as authentic, for example, that they have not been modified in a way that could enable fraud, and have originated from a legitimate user. Moreover, it is important that once a transaction has been made, both merchant and client cannot deny receiving or making a payment. In the past few years, several solutions have been introduced to improve the security of online transactions. Examples include First Virtual, NetCash, and SET (Secure Electronic Transaction). However, Secure Socket Layer (SSL), and its standardised version Transport Layer Security (TLS), remain by far the most widely used means for providing security services for e-commerce transactions (Hancock, 2018) even though the protocols were designed to provide security for communication links, and not for entire e-commerce transactions. Although SSL/TLS does eliminate some security risks such as eavesdropping and unauthorised modification, it only protects information while it is being transmitted. There remain several risks and threats which can lead to e-commerce fraud.

### 3. METHODOLOGY

This study adopted the survey design. This study was conducted among the personnel in federal ministries and agencies at the Federal Secretariat Complex, Ikolaba, as well as other locations in Ibadan, Oyo State, Nigeria. The total number of ministries within the complex is 9 with 68 agencies attached to them (See Appendix I). This study focused on personnel who have been employed for at least two years at the time of the study.

The study adopted a multistage sampling technique to select participants. The nine ministries in the secretariat were divided into three groups by the researchers based on their activities; works/infrastructure, education/human development, and information/interior affairs-related groups. Using the stratified random sampling technique, two ministries were selected from each stratum to get a total of six ministries. From each selected ministry, every four affiliated agencies were selected to produce a total of 24. However, only 21 agencies were functional at the time of the study. Therefore, 21 agencies participated in the study.





The six selected ministries were those of information and culture, industry trade and investments, interior, works and housing, labour and employment, and education. The list of the 21 agencies that participated in the study is contained in Table 1.

**Table 1: List of Selected Federal Government Ministries**

S/N	LIST OF SELECTED MINISTRIES	LIST OF SELECTED AGENCIES
1.	Federal Ministry of Information and Culture	a. Nigerian Communication Commission (NCC) b. Nigeria Television Authority (NTA) c. National Bureau of Statistics (NBS) d. National Postal Service (NPS)
2.	Federal Ministry of Industry, Trade and Investment	e. National Directorate of Employment (NDE) f. National Productivity Centre (NPC) g. Computer Professionals Registration Council of Nigeria (CPN) h. National Agency for Food and Drug Administration and Control (NAFDAC)
3.	Federal Ministry of Interior	i. Nigeria Immigration Service (NIS) j. Nigeria Customs Service (NCS) k. Federal Fire Service (FFS) l. National Human Rights Commission of Nigeria (NHRC)
4.	Federal Ministry of Works and Housing	m. Corporate Affairs Commission (CAC) n. Standard Organisation of Nigeria (SON) o. Federal Character Commission (FCC)
5.	Federal Ministry of Labour and Employment	p. Federal Inland Revenue Service (FIRS) q. National Population Commission (NPC) r. National Health Insurance Scheme (NHIS)
6.	Federal Ministry of Education	s. National Commission for Mass Literacy, Adult and Non-Formal Education (NMEC) t. National Business & Technical Examinations Board (NABTEB) u. Federal Education Quality Assurance (FEQA)

Convenience sampling was then used in the second stage to administer the instrument to 8 participants from each of the agencies under the selected ministries. The participants were divided into categories based on their salary grade levels. Data were collected from the Grade Level 5 and above because they were expected to provide valuable information and patronise e-business platforms more because of their level of education and income. In the second stage, the formula of the Research advisor's (2020) sample size table was deployed to select a total of 300 respondents for the study.

The questionnaire used for the study was subjected to content and construct validity. To ensure the reliability of the instrument designed, the instrument was further subjected to reliability analysis. This was achieved by administering thirty copies of the questionnaires to Oyo State government employees at the State Secretariat, Ibadan, Oyo State. The Cronbach Alpha for the reliability coefficient of each construct was between 0.71 and 0.89, which is usually considered acceptable.



Data analysis was done using descriptive statistics such as frequency counts, percentages, mean and standard deviations. Also, inferential statistics which include Spearman rank correlation was used to establish relationships between the independent and dependent variables and inferences were drawn at a 0.05 level of significance.

## 4. RESULTS

### 4.1. Demographic Distribution of the Respondents

This section shows the demographic information of the respondents that participated in the study based on sex, age group, educational level, and grade level at work. The results of the analysed demographic distribution of the respondents are presented in Table 2:

**Table 2: Demographic Profile of Respondents**

<b>Sex</b>	<b>Frequency</b>	<b>Percentage (%)</b>
Male	138	51.9
Female	128	48.1
<b>Total</b>	<b>266</b>	<b>100</b>
<b>Age Group</b>	<b>Frequency</b>	<b>Percentage (%)</b>
30 years and Below	35	13.2
31 – 40 years	105	39.5
41 – 50years	101	38
51 – 60years	23	8.5
61 years and Above	2	0.8
<b>Total</b>	<b>266</b>	<b>100</b>
<b>Highest Educational Level</b>	<b>Frequency</b>	<b>Percentage (%)</b>
SSCE/NECO	11	4.2
NCE/OND	36	13.5
B.Sc./HND	157	59
M.Sc.	57	21.4
PhD.	5	1.9
<b>Total</b>	<b>266</b>	<b>100</b>
<b>Level</b>	<b>Frequency</b>	<b>Percentage (%)</b>
5	3	1.1
6	13	4.9
7	13	4.9
8	31	11.7
9	36	13.5
10	46	17.3
11	15	5.6
12	47	17.7
13	27	10.2
14	24	9.0
15	8	3.0
16	1	0.4
17	1	0.4
Missing Data	1	0.4
<b>Total</b>	<b>266</b>	<b>100</b>



As presented in Table 1, findings from the analysis revealed that 138 (51.9%) respondents are male, while 128 (48.1%) respondents are female. Also, 35 (13.2%) respondents are below 30 years, 105 (39.5%) are between 31 – 40 years, 101 (38%) are between 41 – 50 years, 23 (8.5%) are between 51 – 60 years, while 2 (0.8%) are above 60 years. On the respondents' highest educational level, 11 (4.2%) have SSCE/NECO, 36 (13.5%) have NCE/OND, 157 (59%) have B.Sc./HND, 57 (21.4%) respondents have M.Sc., while 5 (1.9%) have PhD.

Lastly, on the respondents' grade level, 3 (1.1%), 13 (4.9%), and 13 (4.9%) respondents are on grade levels 5, 6, and 7 respectively. A total of 15 (5.6%) respondents are on Level 11, 47 (17.7%) respondents are on Level 12, also, 13, 24 (9%) respondents are on Level 14, and 8 (3%) respondents are on Level 15. The majority of the respondents are between grade levels 5 and 15.

#### 4.2 Answers to Research Questions

**Research Question One:** How frequently do personnel in Federal Ministries and Agencies in Ibadan, Oyo State use e-commerce?

The different responses about the frequency of use of e-commerce among personnel in federal ministries and agencies in Ibadan, Oyo State are presented in Tables 3 and 4.

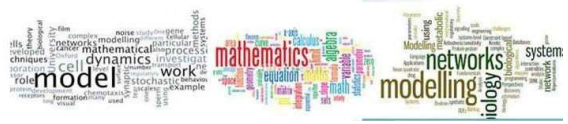
**Table 3: Frequency of use of e-commerce among personnel in federal ministries and agencies in Ibadan, Oyo State**

In the past 2 years, how often have you used E-commerce?	Frequency	Percentage (%)
Daily	45	16.9
Once or twice a week	83	31.3
Once or twice a Month	79	29.7
Quarterly	32	12
Once or twice a Year	24	9

As presented in Table 3, 45 (16.9%) respondents use e-commerce daily, 83 (31.3%) use e-commerce once or twice a week, 79 (29.7%) use the service once or twice a month, 32 (12%) claimed to use it quarterly, while 24 (9%) respondents use it once or twice a year.

Based on these analyses the frequency of use of e-commerce among personnel in federal ministries and agencies in Ibadan can be said to be moderate. In addition to the frequency of use, the study also examined the items or services shopped online by the respondents (Table 4):

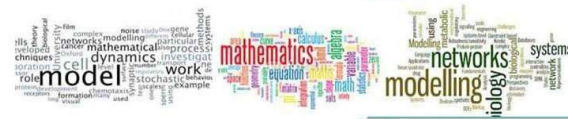




**Table 4: Items and/or services shopped online by personnel in Federal Ministries and Agencies, Ibadan, Oyo State**

Items	Frequency	Percentage (%)
<b>Products</b>		
Shoes	107	7.97
Bags	78	5.81
Clothing	105	7.82
Jewellery	51	3.80
Cosmetics	60	4.47
Furniture	19	1.41
Laptop	43	3.20
Phones	83	6.18
Car	31	2.31
Home Appliances	83	6.18
<b>Services</b>		
Hotel Booking/payment	60	4.47
Payment for Conference	35	2.61
Payment for Online Course	49	3.65
Airline ticket booking	68	5.06
Payment for Government Services	63	4.69
TV Subscription	147	10.95
Order a Cab	114	8.49
Order a meal	70	5.21
Music Subscription	38	2.83
Journal/Blog Subscription	25	1.86
Others: data and call subscription, bill payment, groceries, medicine payment,	14	1.04

A total of 147 (10.95%) respondents revealed that TV subscription is one of the major use of e-commerce services among the respondents, followed by ordering a cab (114, 8.49%), purchase of items such as shoes (107, 7.97%), clothing (105, 7.82%), bags (78, 5.81%), and a meal (70, 5.21%).

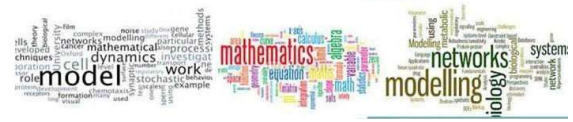


**Research Question Two: What is the level of perception of e-commerce security by personnel in federal Ministries and agencies in Ibadan, Oyo State?**

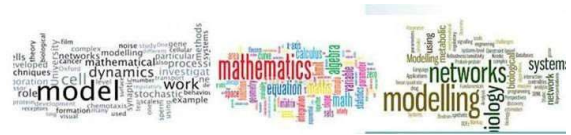
The different responses about the level of perception of e-commerce security among personnel in federal ministries and agencies in Ibadan, Oyo State are presented in Table 5:

**Table 5: Perception of e-commerce security among personnel in federal ministries and agencies in Ibadan, Oyo State**

Statements on Perception of Security	Strongly Disagree (%)	Disagree (%)	Agree (%)	Strongly Agree (%)	Mean	Std. Dev.
<b>Confidentiality</b>						
I hesitate to provide my credit/debit card details when purchasing goods and services online.	38 (14.3%)	90 (33.8%)	95 (35.7%)	43 (16.2%)	2.54 (4th)	0.928
I am confident that my information is protected against the third party.	37 (13.9%)	59 (22.2%)	136 (51.1%)	34 (12.8%)	2.63 (1st)	0.878
The online platform has an adequate mechanism to effectively cushion security breaches.	37 (13.9%)	66 (24.8%)	143 (53.8%)	20 (7.5%)	2.55 (3rd)	0.824
I use only the credit/debit card option for transactions during online purchases of goods and services.	27 (10.2%)	78 (29.3%)	133 (50.0%)	28 (10.5%)	2.61 (2nd)	0.809
I purchase items very often through online purchases of goods and services.	37 (13.9%)	85 (32.0%)	119 (44.7%)	25 (9.4%)	2.50 (5th)	0.848
<b>Privacy</b>						
Online shops share my personal information with other websites.	89 (33.5%)	108 (40.6%)	56 (21.1%)	13 (4.9%)	1.97 (5th)	0.862
I am afraid of online unauthorised access to my information.	43 (16.2%)	76 (28.6%)	114 (42.9%)	33 (12.4%)	2.52 (3rd)	0.908
My personal information could fall into the hands of unscrupulous elements with ulterior motives.	33 (12.4%)	83 (31.2%)	115 (43.2%)	35 (13.2%)	2.57 (2nd)	0.871
I feel safe and secure when purchasing goods and services online if a third party is used to generate OTP.	47 (17.7%)	82 (30.8%)	113 (42.5%)	24 (9.0%)	2.43 (4th)	0.884
I will shop online only from trustworthy websites.	36 (13.5%)	30 (11.3%)	143 (53.8%)	57 (21.4%)	2.83 (1st)	0.918



Statements on Perception of Security	Strongly Disagree (%)	Disagree (%)	Agree (%)	Strongly Agree (%)	Mean	Std. Dev.
<b>Authenticity</b>						
Products bought by online purchase of goods and services are genuine.	35 (13.2%)	89 (33.5%)	122 (45.9%)	20 (7.5%)	2.48 (4th)	0.816
Online shops have proper management of private information.	32 (12.0%)	86 (32.3%)	127 (47.7%)	21 (7.9%)	2.52 (3rd)	0.807
The online transaction I made are from genuine sites.	23 (8.6%)	36 (13.5%)	178 (66.9%)	29 (10.9%)	2.80 (2nd)	0.743
I receive only original and standard products when purchased online.	33 (12.4%)	78 (29.3%)	139 (52.3%)	16 (6.0%)	2.52 (3rd)	0.788
I shop only from websites that provide me with quality information.	22 (8.3%)	25 (9.4%)	172 (64.7%)	47 (17.7%)	2.92 (1st)	0.773
<b>Availability</b>						
Online purchase of goods and services is always available to use.	22 (8.3%)	50 (18.8%)	137 (51.5%)	57 (21.4%)	2.86 (4th)	0.846
There is a variety of different brands of products online.	17 (6.4%)	28 (10.5%)	141 (53.0%)	80 (30.1%)	3.07 (1st)	0.812
Several opportunities for consumers are made available through online purchases of goods and services online.	24 (9.0%)	45 (16.9%)	139 (52.3%)	58 (21.8%)	2.87 (3rd)	0.856
I can compare several product brands before checkout.	21 (7.9%)	55 (20.7%)	121 (45.5%)	69 (25.9%)	2.89 (2nd)	0.880
I am satisfied with the products available on shopping websites.	22 (8.3%)	79 (29.7%)	126 (47.4%)	39 (14.7%)	2.68 (5th)	0.823
<b>Non-Repudiation</b>						
There is the assurance of proof of delivery when I shop online.	22 (8.3%)	47 (17.7%)	154 (57.9%)	43 (16.2%)	2.82 (2nd)	0.799
There are proofs for the online activities I perform.	24 (9.0%)	43 (16.2%)	159 (59.8%)	40 (15.0%)	2.81 (3rd)	0.799
Transactions I made are not denied when I shop online.	18 (6.8%)	69 (25.9%)	149 (56.0%)	30 (11.3%)	2.72 (4th)	0.752
Product prices are affordable when I shop online.	22 (8.3%)	71 (26.7%)	132 (49.6%)	41 (15.4%)	2.72 (4th)	0.823
I can buy products anytime online 24/7.	16 (6.0%)	34 (12.8%)	140 (52.6%)	76 (28.6%)	3.04 (1st)	0.809



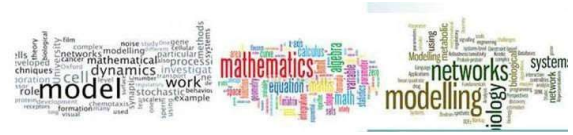
As revealed in Table 5, to determine the respondents' perception of e-commerce security, a special focus was on confidentiality, privacy, authenticity, availability of services, and non-repudiation. On confidentiality, as many as 128 (47.8%) respondents claimed to hesitate in providing their credit/debit card details when purchasing goods and services online, while 138 (51.9%) said they do not. Also, 96 (36.1%) respondents disagreed that their information is protected against a third party, while 170 (63.9%) agreed. Likewise, 103 (38.7%) respondents disagreed that the online platform has an adequate mechanism to effectively cushion security breaches, while 163 (61.3%) agreed. A total of 144 (36.1%) respondents claimed to purchase items very often through online purchases of goods and services, while 122 (54.1%) respondents disagreed.

With regards to privacy, 197 (74.1%) respondents disagreed that online shops share their personal information with other websites, while 69 (26%) agreed. Also, 147 (55.3%) respondents claimed to be afraid of online unauthorised access to their information, while 119 (44.8%) disagreed. However, as many as 127 (51.5%) feel safe and secure when purchasing goods and services online if a third party is used to generate OTP, while 129 (48.5%) disagreed.

For authenticity, as many as 142 (53.4%) respondents claimed that products bought online purchases of goods and services are genuine, while 124 (46.6%) disagreed. Also, 207 (77.9%) respondents agreed that their online transactions are on genuine sites, while only 59 (22.1%) respondents disagreed. Likewise, 219 (82.4%) respondents claimed that they only shop from websites that provide them with quality information, while only 47 (17.7%) claimed otherwise.

On availability, 194 (72.9%) respondents claimed online purchase of goods and services is always available to use, while 72 (27.1%) disagreed. Two hundred and twenty-one, 221 (83.1%), respondents agreed that there is a variety of different brands of products online, while 45 (16.9%) disagreed. Also, 190 (71.4%) respondents agreed that they can compare several product brands before checkout, while 76 (28.6%) disagreed. On non-repudiation, the majority of the respondents, 197 (74%), agreed that there is assurance of delivery when they shop online, while 69 (26%) disagreed. Also, 179 (67.3%) respondents agreed that the transactions they make are not denied when they shop online, while 87 (32.7%) stated otherwise. Lastly, 173 (65%) respondents claimed product prices are affordable when they shop online, while 93 (35%) respondents disagreed.

Based on the analyses above, the mean shows the direction of respondents' answers to the statements under each construct. With a mean ranging from 2.50 to 2.63 on confidentiality, it shows that the respondents' responses to the statements on confidentiality are mostly above average. This shows that their confidentiality is moderate. For privacy, the mean ranges from 1.97 to 2.84 with an average of 2.64. The responses on privacy are a little above average. For authenticity, the mean ranges from 2.48 to 2.92 with an average of 2.87. This according to the respondents, show that the responses to the statements on authenticity are above average. For availability, the mean ranges from 2.68 to 3.07 with an average of 2.87; this shows the responses to the statements are above average. For non-repudiation, the mean ranges from 2.72 to 3.04 with an average of 2.82. This shows that the responses to the statements on non-repudiation are above average. Therefore, it can be said that level of perception of e-commerce security among the respondents is moderate.



**Research Question Three:** Is there a significant relationship between e-commerce security and the customers’ use of e-commerce among personnel in federal ministries and agencies in Ibadan, Oyo State?

To answer this question, Spearman rank correlation analysis was performed on the perception of e-commerce security and the use of e-commerce. Table 6 presents the results obtained from the analysis:

**Table 6: Perception of e-commerce security and use of e-commerce**

Variables	Use of E-Commerce	
E-commerce Security	Correlation Coefficient	.191
	Sig. (2-tailed)	.002
	N	262

Table 6 shows that e-commerce security significantly and positively influences the use of e-commerce ( $r = .191, p < .05$ ). This implies that as the perception of e-commerce security increases, the use of e-commerce also increases.

### 4.3 Discussion of Findings

The analyses suggest that the frequency of use of e-commerce among the study population is moderate. This implies that the personnel in the federal ministries and agencies in Ibadan, Oyo State frequently use e-commerce platforms for several purposes. This could be, as noted by Lawal & Ogbu (2015), because of the level of efficiency buyers experience in their business transactions, the degree of automation involved in the purchase process, the reduced operational cost, and the convenience of shopping online influenced them to use e-commerce. This finding is also supported by Rabi, Ibrahim, Dauda, Mukhtar, Abdullahi & Yusuf (2019) who stated that there is a moderately high level of usage of e-commerce among the study respondents in Kano State, Nigeria.

The findings from the study also showed that the perceived level of e-commerce security among the respondents is moderately high. This finding is supported by the findings of Ogunsola & Akanji (2018), which submit that a lack of e-commerce security could pose a significant effect on the use of e-commerce. Kim, Lee & Park. (2014), also found that the level of perceived security of mobile commerce (a type of e-commerce) was moderately high among customers and that this perception was a significant predictor of their adoption of the technology. Similarly, Xu & Li (2015), discovered that the perceptions of customers’ e-commerce security were moderately high and positively correlated with customers’ overall satisfaction and site loyalty. This implies that since respondents perceive e-commerce to be moderately secure, they tended to use it frequently.

The study also revealed there is a significant positive relationship between perceived security and the use of e-commerce among government personnel in federal ministries and agencies in Ibadan, Oyo State. This implies that the use of e-commerce increases with perceived security heightening.



This study agrees with Ayo, Adewoye, & Oni, (2011) who emphasized that there are significant relationships between task-technology fit and perceived usefulness with intentions to use e-commerce. This also agrees with Ogunsola & Akanji (2018), who posit that a lack of e-commerce security poses a significant effect on the use of e-commerce. This implies that the more users perceive e-commerce to be secure, the more they are likely to use e-commerce. This finding is also corroborated by Folorunso, Gabriel, Sharma & Zhang (2006); Himaloya & Rahman (2015), Harasim & Klimontowicz (2018) and Okolie & Ojomo (2020) who found a positive relationship between perceived security and the use of e-commerce. According to Elbeltagi & Agag, (2016) and Eastin et al. (2016), security influences the uses of e-commerce because users are constantly being exposed to security issues. Igwe, Alaba & Abass (2020) are of the opinion that improved security and trust are germane to the adoption and use of e-commerce in developing countries.

## 5. CONCLUSION AND RECOMMENDATIONS

This study examined the use of e-commerce among personnel in federal ministries and agencies in Ibadan, Oyo State and reported a moderate use of e-commerce with most respondents using it for various purposes like ordering cabs, meals, and purchasing items. The study also reveals that e-commerce security significantly influences its use.

### 5.1 Recommendations

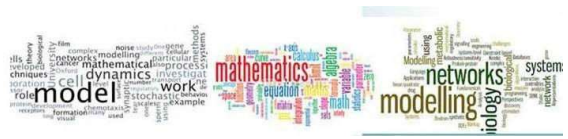
The following recommendations are made:

- (i) This study has identified e-commerce security as a determinant of the use of e-commerce platforms; therefore, e-commerce vendors should endeavour to take it seriously and invest in the security of their platforms.
- (ii) The National Information Technology Development Agency (NITDA) which is responsible for developing the required guideline and regulations for e-commerce should define and monitor security standards for vendors.
- (iii) Vendors should endeavour to comply with relevant consumer protection rules, focus on personal data protection, address variations in the rules, and increase international cooperation on e-commerce.
- (iv) Likewise, users of e-commerce platforms should ensure that they verify the platforms they visit to be sure that they are secured to avoid being attacked.

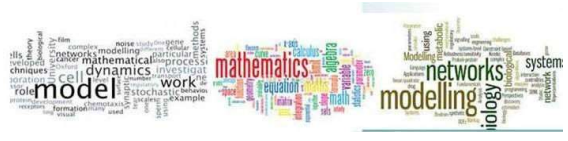
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## APPENDIX 1:

### LIST OF FEDERAL MINISTRIES, AGENCIES AND DEPARTMENTS LOCATED IN IBADAN, OYO STATE.

#### 1. FEDERAL MINISTRY OF INDUSTRY, TRADE AND INVESTMENT

List of Agencies and Departments:

- 1) Corporate Affairs Commission (CAC)
- 2) Industrial Training Fund (ITF)
- 3) National Automotive Design and Development Council (NADDC)
- 4) Small and Medium Enterprises Development Agency of Nigeria (SMEDAN)
- 5) Standard Organisation of Nigeria (SON)
- 6) Standards Organisation of Nigeria Conformity Assessment Program (SONCAP)

#### 2. FEDERAL MINISTRY OF HEALTH / PORT HEALTH SERVICES

List of Agencies and Departments:

- 1) Nigeria Centre for Disease Control (NCDC)
- 2) The National Primary Health Care Development Agency (NPHCDA)
- 3) National Agency for Food and Drug Administration and Control (NAFDAC)
- 4) National Health Insurance Scheme (NHIS)
- 5) Nigerian Institute of Medical Research (NIMR)
- 6) National Agency for Control of AIDs (NACA)

#### 3. FEDERAL MINISTRY OF ENVIRONMENT

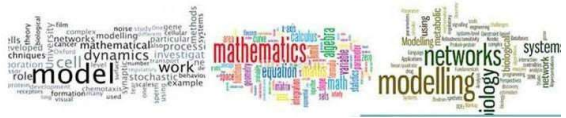
List of Agencies and Departments:

- 1) National Environmental Standards and Regulations Enforcement Agency (NESREA)
- 2) National Park Service (NPS)
- 3) Forest Research Institute of Nigeria (FRIN)
- 4) National Agency for Great Green Wall (NAGGW)
- 5) National Biosafety Management Agency (NBMA)
- 6) Environmental Health Officers Registration Council of Nigeria (EHORECON)
- 7) National Oil Spill Detection and Response Agency (NOSDRA)

#### 4. FEDERAL MINISTRY OF INFORMATION

List of Agencies and Departments:

- 1) National Gallery of Art (NGA)
- 2) Nigerian Film Corporation
- 3) Nigeria Television Authority (NTA)
- 4) Nigerian Press Council (NPC)
- 5) Nigeria Tourism Development Corporation (NTDC)
- 6) Centre for Blacks and African Arts and Culture (CBAAC)
- 7) National Commission for Museum and Monuments (NCMM)
- 8) Nigerian Institute for Hospitality and Tourism (NIHOTOUR)



## **5. FEDERAL MINISTRY OF WORKS and HOUSING**

List of Agencies and Departments:

- 1) Surveyors Council of Nigeria (SURCON)
- 2) Federal Mortgage Bank of Nigeria
- 3) Federal Road Maintenance Agency (FERMA)
- 4) Federal Housing Authority (FHA)
- 5) Human Resource Management
- 6) Planning, Research and Statistics

## **6. FEDERAL MINISTRY OF LABOR and EMPLOYMENT (7 OFFICES)**

List of Agencies and Departments:

- 1) National Directorate of Employment (NDE)
- 2) Industrial Arbitration Panel (IAP)
- 3) National Productivity Centre (NPC)
- 4) Nigeria Social Insurance Trust Fund (NSITF)
- 5) Michael Imoudu National Institute for Labour Studies (MINILS)

## **7. FEDERAL MINISTRY OF MINES and STEEL DEVELOPMENT (5 OFFICES)**

List of Agencies and Departments:

- 1) Council of Nigerian Mining Engineers and Geoscientists (COMEG)
- 2) Mining Cadastre Office (MCO)
- 3) Metallurgical Inspectorate and Raw Materials Development (Metallurgical Inspectorate Division, Raw Materials Development Division)
- 4) Mines Environment and Compliance (Environmental Impact Assessment Division, Reclamation and Rehabilitation Division)

## **8. FEDERAL MINISTRY OF INTERNAL AFFAIRS**

List of Agencies and Departments:

- 1) Federal Fire Service
- 2) Nigeria Security and Civil Defense Corps
- 3) Nigeria Immigration Service
- 4) The Civil Defense, Immigration, Prisons, Fire Service Board (CDFIPB)
- 5) Nigerian Correctional Service

## **9. MINISTRY OF FINANCE**

List of Agencies and Departments:

- 1) Federal Inland Revenue Service (FIRS)
- 2) National Bureau of Statistics (NBS)
- 3) Nigeria Customs Service (NCS)
- 4) Investments and Securities Tribunal
- 5) Centre for Management Development
- 6) Budget Office of the Federation
- 7) Securities and Exchange Commission (SEC)
- 8) Nigerian Institute of Social and Economic Research (NISER)