

# Informal Market and the Adoption of E-Commerce in the Procurement of Construction Materials in Lagos State, Nigeria

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## ABSTRACT

*This study aimed at examining the level of adoption of e-commerce in the procurement of construction materials by the informal construction market in Lagos State, Nigeria. This was with a view to creating market hub for construction material through internet. The data for the study were obtained using multiple-choice questionnaire administered on the operators of informal construction market which include 60 merchant builders and 40 local contractors across ten (10) markets in Lagos States which were randomly selected. One hundred (100) copies of questionnaire were administered, out which 63 were recovered representing 63% rate of response. The questionnaire elicited information on the level of e-commerce awareness in the market and level of usage of relevant e-commerce technologies. Data collected were analyzed using descriptive statistics method like percentage and relative importance index (RII). The study showed that there was abysmal low level awareness of 44.44% and moderate awareness of 26.98%. Point of Sale (POS) machine ranked 1st with RII of 0.84, E-banking ranked 2nd with RII of 0.81, interswitch web pay and Mobile banking ranked 3rd with RII of 0.78 while other tools in e-commerce technologies have not been widely used as shown on tables 4.2 and 4.3. The study concluded that there was low level awareness of e-commerce technologies which is responsible for lack of adoption in the market. The paper therefore recommends that more awareness should be created for e-commerce technologies to be embraced and adopted and cyber-security should be improved to enhancing adoption.*

**Keywords:** Construction materials, E-commerce, Informal market, Internet and Procurement.

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## 1. INTRODUCTION

Construction materials contribute immensely to the quality and cost of construction, from what is used from inception to completion, while the building materials industry is an important contributor to the national economy of any nation as its output governs both the rate and the quality of construction work. Blueprint (2017) reported that construction materials play an important role in the construction industry they are those materials put together in erecting or constructing structures. In fact, no field of engineering is conceivable without their use. Additionally, building materials constitute the largest single input in housing construction with about 60% of the total housing expenditure used for the purchase of building materials.

However, the selection, requisition, ordering and supply of these materials are critical to ensure their availability to the consumers through both formal and informal markets depending on the choice of the users. Sometimes ago, traditional exchange had been the only means of supply until recently when the technological development brought about electronic commerce (E-commerce) of exchanging products via internet services.

Banks have used Electronic Funds Transfer (EFTs) to move customer's money around the world and businesses are using Electronic Data Interchange (EDI) to place order and send invoices and also internet facilities have been used by business managers or staff and customers which created a good platform for them to communicate (Folorunso, Awe, Sharma & Jeff, 2006). E-commerce therefore is an extension of traditional commerce which is the facilitation of commercial transaction electronically done using EDI to send commercial documents like purchase order or invoice. Later it came to include activities more precisely termed web commerce i.e, the purchase of goods and services over the World Wide Web (www) through secure sever, a special server protocol.

The advent of internet technology has resulted to increasing use of e-commerce applications, particularly e-Procurement systems in supply chain management by firms across the different industrial sectors, which encrypt confidential ordering data for customer protection (Ibem & Laryea, 2015).

The uptake and or adoption of electronic commerce by the informal market operators dealing with construction materials is limited and weak particularly in construction materials procurement as compared to other engineering sectors such as the automotive or the aerospace industry. The reasons for this could be the fragmented nature of the construction industry, the one-off nature of the product, certain barriers and stringent policy which has given room for several market informalities in the materials procurement particularly in Nigeria. Presently in Nigeria, traditional commerce is still the main method of transaction, only few people are using e-commerce (Folorunso *et al.*, 2006). Folorunso *et al* (2006) said "In terms of international and global comparison, internet usage in Nigeria is still relatively low and therefore e-commerce is still in the rudimentary stage". On this note, the paper therefore examines the adoption of e-commerce technologies by informal market dealing with construction materials procurement.

## **2.0 CONCEPTUAL REVIEW OF INFORMAL MARKET**

The gross market activities can be viewed in two perspectives- formal and informal markets. The focus of this paper is basically on the informal market also known as "grey market". The market is applauded for its wealth creation function, as well as its personal income generation capacity, through a variety of small-scale/entrepreneurial activities is a largely unstructured interface among/between unincorporated entities in any economy. Therefore, informal market can be explained as the transaction platform outside the government regulated contractual relationship of production.

International Monetary Fund (IMF, 2017) said unregistered household enterprises comprise of a significant portion of Nigeria's economy accounts for as high as 65% of Gross Domestic Product (GDP). The informal economy in Sub-Saharan Africa is the second largest in the world, after Latin America and the Caribbean. From 2010 to 2014, Sub-Saharan Africa's economy accounted for 38% of GDP to the region. The IMF stated that informality persists even in advanced economies, which means that the shift from informal to formal will take many years.

The informal market is described as acting as a social safety net as it provides employment and income to many people that may otherwise be unemployed in the absence of sufficient opportunities in the formal markets.

The informal market in Lagos contributes massively to the urban economy of the city; through payment of various taxes and levies but also through sustaining transport, construction, food and other sectors, even in the times of recession. They contribute their share to internally generated revenue and should therefore expect in return social services in form of local infrastructure, access to low interest credit (Heinrich, 2017).

### **2.1 Conceptual Review Of E-Commerce**

Electronic commerce is simply seen as a means of business transaction by electronic means, typically over the internet The concept of electronic commerce is not static (Kosiur, 1997) and depends on the adopted perspective. From a communications perspective, electronic commerce is the electronic delivery of services and information. From a business process perspective, electronic commerce is the automation of business transactions and workflows. Broadly conceived, however, electronic commerce is a modern business methodology that addresses the needs of organisations, merchants and consumers to cut costs while improving the quality of goods and services and increasing the speed of service delivery (Kalakota & Whinston, 1997). The Organisation for Economic Cooperation and Development (OECD, 1999) explained electronic commerce as 'the electronic exchange of information that support and govern commercial activities including organisational management, commercial management, commercial negotiations and contracts, legal and regulatory frameworks, financial settlement arrangements and taxation'.

E-commerce refers to business activities involving consumers, manufacturers, service providers, and intermediaries using computer network. Electronic data interchange EDI has been used to forge automated linkages between the buyers and suppliers to transmit orders, receipts, and payments electronically. Studies have shown that using EDI for linking with so-called “channel partners” can help reduce processing, cycle-time, improve accuracy, and create strategic value (Mukhopadhyay 1998 as cited in Heng, Kong, Pang, Shi & Ling, 2003).

E-commerce is therefore a model of buying and selling of goods and services as well as business communication and transactions over computer networks and through individual computers linked to the World Wide Web (IT Construction Forum, 2004). E-commerce is part of e-business.

E-business is a structure that includes not only those transactions that center on buying and selling goods and services to generate revenue, but also those transactions that support revenue generation. These activities include generating demand for goods and services, offering sales support and customer service, or facilitating communications between business partners.

E-business is growing at a very fast pace in our world. It has impacted businesses as well as governments. People do not write traditional letters to each other anymore, they communicate through the internet. You can acquire permits, or visas online from governments. e-business has expanded the construction market while making the world smaller.

Globalization, communication and collaboration are becoming easier with the advancements in information technology. Business is becoming global with cheaper, faster, and better quality of service. This will increase the global competition within the technologically advanced companies. This competition shapes the business culture and it requires business processes that are fast, specialized, personalized, flexible, functional, reliable, and customer-centric. Companies need to have a well-structured business culture in order to survive in the new digital business world. Business culture is a mindset that an enterprise develops over time that lays the foundation for sustaining a competitive advantage in its particular business environment (Wolf, 2000).

## **2.2 Comparative Studies Of Traditional Commerce And Electronic Commerce Of Construction Material Procurement Process**

Although the goals and objectives of both e-commerce and traditional commerce are the same—selling products and services to generate profits—they do it quite differently.

Traditional commerce presents product information by using magazines, flyers. On the other hand, ecommerce presents by using web sites and online catalogs. Traditional commerce communicates by regular mail, phone, e-commerce by e-mail.

Traditional commerce checks product availability by phone, fax and letter. However, e-commerce checks by e-mail, web sites, and internet networks. Traditional commerce generates orders and invoices by printed forms but e-commerce by e-mail, and web sites. Traditional commerce gets product acknowledgments by phone and fax. On the other hand, e-commerce gets by email, web sites, and EDI (Kong & Love, 2001).

In e-commerce there may be no physical store, and in most cases the buyer and seller do not see each other. The Web and telecommunications technologies play a major role, in e-commerce.

It is important to note that currently many formal companies operate with a mix of traditional and e-commerce systems. Just about all medium and large organizations have some kind of e-commerce presence. The followings are some examples, Toys-R-Us, Wal-Mart Stores, GoldPC, Vatan Computer, Konga, and Jumia.

## **2.3 Typology Of E-Commerce Business Model**

E-commerce models are either an extension or revision of traditional business models, such as advertising model, or a new type of business model that is suitable for the Web implementation, such as Merchant, brokerage, advertising, mixed, info-mediary, subscription are the most popular e-commerce models (Introduction to E-commerce, n.d). To achieve profitability as the final goal, different e-businesses or e-commerce sites position themselves in different parts of the value-chain. To generate revenue, an e-business either sells products/services or shortens the link between the suppliers and consumers. The several types of e-commerce in use today are classified based on the nature of the transactions: business-to-consumer (B2C), business-to-business (B2B), consumer-to-consumer (C2C), consumer-to-business (C2B), and non-business and government, and organizational (intra-business).

E-commerce as a proliferated business practice has at least four types of trading situation on the internet (Liang & Huang, 2000): Off-line order, off-line delivery; On-line order, off-line delivery; On-line order, on-line delivery and Off-line order, on-line delivery.

For the off-line order, off-line delivery type, information is available on the internet, but both ordering and delivery are executed off-line. The on-line order, off-line delivery type of e-commerce system provides on-line information for products and also allows users to make orders on-line. Once ordered, the product will be delivered off-line. In an on-line order, on-line delivery e-commerce system, information for the products is provided on-line, and users can order the products in the system. Once ordered, the products or services will be delivered to the customer on-line. The off-line order, on-line delivery type of e-commerce requires customers to make orders in the traditional way, but the products or services is delivered through the internet.

Among these four types of business practice, off-line order, off-line delivery and the on-line order, off-line delivery types are applicable in developing e-commerce systems for construction material exchanges. However, as the off-line order, off-line delivery type only makes available information related to material and suppliers on the internet, both ordering and delivery are executed off-line. This type of e-commerce cannot overcome all the problems that exist in the traditional material procurement process. It would appear that the on-line order, off-line delivery type, however, is more useful, as this type of e-commerce system makes both product information and ordering through the internet available. Once the user completes the ordering, the ordered products will be delivered off-line to the user. The on-line order, off-line delivery type is selected as the basis for developing our e-commerce system for supporting construction material procurement process, as this type can improve the efficiency of information transfer during the ordering procedure in which all parties can communicate and share information via the internet.

## **2.4 Applicable Tools in E-Commerce Technologies in Construction Materials Procurement**

The construction industry needs different e-commerce solutions and there is no one solution that fits the entire industry. If industry minds are set to simplifying the business process and improving productivity and quality, more than just producing cost savings in a short time, e-commerce will reshape the construction industry for the better. Some of the technologies are: The following technologies were identified by Systematix Infotech (2016).

1. Chatbots: Plenty of retailers will invest in chatbots to help shoppers with required information and completing a transaction. Chatbots otherwise known as messenger bots is a piece of software that can be used by the retailer to chat with customers via text or voice. Well-designed chatbots can offer personalized assistances, enhance the user experience, process orders, track shipments, provide product suggestion, automates processes, and lot more. Currently, chatbots are emerging e-commerce trends for a business that can provide smooth and ravishing experience to online shoppers.

2. Point of sale (POS): This is a payment method through the use of debit card. POS machine automatically debits the account of the customer from the vendor's shop. This very useful as it reduces loss of cash.

3. Biometrics: E-commerce is a rapidly growing industry where the main concern for every retailer is to offer maximum comfort and security to the buyer. Serious security issues such as hacking, spamming, online fraud and theft of confidential data are still holding back many online users from purchasing products online. Biometric verification is a recent and solid e-commerce technology trends that measure the physical characteristics of users such as fingerprints, palm, face, or voice to solve security issues. There will be no more stolen or forgotten password problem, also this enhanced security measures will make forging difficult for intruders.

4. Cross-channel integration: Cross-channel integration is not anything new, yet growing swiftly in the e-commerce industry. Cross-channel simply means that you can seamlessly and interchangeably use various channels to promote, sell and interact with customers. Cross-channel integration has the power of remarketing the product with ads even after a customer has abandoned the purchase or website. In coming years, retailers will continuously integrate their e-commerce into cross-channels as it means tremendous growth opportunity. More interesting e-commerce trends would include cloud hosting, drones, one-click checkouts, digital wallets, social selling, apps payments etc. So, to drive growth in the e-commerce industry, businesses must adopt and embrace these e-commerce tech trends in 2017. However, amid the glamor of technology don't forget the core principle of any business – customer first.

5. Mobile Money Transfers: This is one of the freshest trends in e-commerce. The system has its roots in Kenya, through a platform known as M-Pesa. This platform has experienced tremendous growth, emerging to be the most popular payment system in East Africa, and spreading to other parts of the world such as India and Albania. The popularity of mobile money transfer can be attributed to its incredible simplicity – micro-financing services at the tips of your fingers. It offers such services as deposit, withdrawal, payment and transfer to other accounts including bank accounts. We, therefore, expect to see increased growth and popularity of M-Pesa and similar payment systems.

Zou and Seo (2006) identified various types of e-commerce technologies useable in construction industry such as Electronic mail (E-mail), Internet connection, Online search, Computer Aided Design (CAD), Intranet, Computerised project management, Make/request online orders, bid invitation/tender online, Extranet, and Make/receive online payment.

## **3.0 RESEARCH METHODOLOGY**

A total number of One hundred (100) copies of questionnaire were administered on the operators of informal construction market which include 60 merchant builders and 40 local contractors across ten (10) markets in Lagos States, out which 63 were recovered representing 63% rate of response.

A purposive sampling technique was adopted in the selection of the respondents due to unavailable database to determine their population. While random sampling technique was employed in the administration of questionnaire to the selected respondents within the market. Data collected were analyzed using descriptive statistics method like percentage and relative importance index (RII).

#### 4.0 DISCUSSION OF RESULTS

**Table 4.1: Location of Market**

Location	Frequency	Percent
Mushin	10	15.87
Oshodi	8	12.70
Bariga	5	7.94
IyanaIpaja	6	9.52
Ikorodu	7	11.11
Agege	7	11.11
Alimosho	5	7.94
Epe	6	9.52
Festac	5	7.94
Ikeja	4	6.35
<b>Total</b>	<b>63</b>	<b>100</b>

Table 4.1 showed ten different locations with the response rate of the respondents. It was discovered that highest number of response was got from Mushin with 15.87%, next to it was Oshodi with 12.70% response rate, Ikorodu and Agege had response rate of 11.11%, Iyana-Ipaja and Epe had 9.52%, while places like Bariga, Alimosho, and Festac had 7.94% response rate, Ikeja had response rate of 6.35%. This is an indication that this research spread across different informal markets dealing with construction materials within the state. Therefore, that showed that it is not one sided or concentrated on one market.

#### 4.2 Level Of Awareness Of E-Commerce Technologies

Awareness of a new technology or application is the first phase in the process of engendering such in the scope of practice of the prospective users or adopters of such technologies or applications. The result showed various levels of awareness, none had very high level of awareness, only 7.94% had high awareness, 26.98% were moderately aware of the technology, 44.44% had low level awareness and 20.63% were not aware of the technology at all. It indicates that internet usage in Nigeria is still relatively low and therefore e-commerce is still in the rudimentary stage. This agrees with the research findings of (Folorunso *et al.*, 2006).

**Table: 4.2 Level of awareness of e-commerce technologies**

Level of awareness	Frequency	Percent
Very High	0	0
High	5	7.94
Moderate	17	26.98
Low	28	44.44
Not Aware	13	20.63

<b>Total</b>	<b>63</b>	<b>100</b>
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#### 4.3 Level of Usage Of Relevant Tools In E-Commerce Technologies In Construction Materials Procurement

Some of the tools in e-commerce technologies were identified in the literature review. The findings in table 4.2 below showed the relevant tools in e-commerce technologies and their level of usage in informal market. It was observed that Point of Sale (POS) machine ranked 1<sup>st</sup> with RII of 0.84, E-Banking ranked 2<sup>nd</sup> with RII of 0.81, Interswitch web pay and Mobile money transfer (MMT) ranked 3<sup>rd</sup> with RII of 0.78. Digital wallet (e-wallet) ranked 4<sup>th</sup> with RII of 0.40, Digital tracking device ranked 5<sup>th</sup> with RII of 0.30, Biometric system ranked 6<sup>th</sup> with RII of 0.28 and Cross Channel integration ranked 7<sup>th</sup> with RII of 0.27. This revealed that Point of Sale, E-banking, Interswitch web pay and Mobile money transfer are the most used e-commerce technologies in the market. In other words, other e-commerce technologies with low level usage are probably new in the market to gain acceptance and this could also be attributed to low level awareness and less educational background of the operators of the market.

**Table 4.3: Level of usage of relevant tools in e-commerce technologies of construction materials procurement**

E-commerce Technologies	5	4	3	2	1	Total	RII	Ranking
<b>1 Point of Sale machine (POS)</b>	<b>29</b>	<b>23</b>	<b>10</b>	<b>1</b>	<b>0</b>	<b>63</b>	<b>0.84</b>	<b>1</b>
	(46.03)	(36.51)	(15.87)	(1.59)		100		
<b>2 Electronic Banking (E-Banking)</b>	<b>27</b>	<b>20</b>	<b>10</b>	<b>6</b>	<b>0</b>	<b>63</b>	<b>0.81</b>	<b>2</b>
	(42.86)	(31.75)	(15.87)	(9.52)		100		
<b>3 Interswitch web pay</b>	<b>18</b>	<b>22</b>	<b>23</b>	<b>0</b>	<b>0</b>	<b>63</b>	<b>0.78</b>	<b>3</b>
	(28.57)	(34.92)	(36.51)			100		
<b>4 Mobile Banking (Mobile Money Transfer (MMT))</b>	<b>25</b>	<b>16</b>	<b>14</b>	<b>8</b>	<b>0</b>	<b>63</b>	<b>0.78</b>	<b>3</b>
	(39.68)	(25.40)	(22.22)	(12.70)		100		
<b>5 Digital wallet (e-wallet)</b>	<b>5</b>	<b>5</b>	<b>14</b>	<b>20</b>	<b>19</b>	<b>63</b>	<b>0.40</b>	<b>4</b>
	(7.94)	(7.94)	(22.22)	(31.75)	(30.16)	100		
<b>6 Digital Tracking Device</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>32</b>	<b>31</b>	<b>63</b>	<b>0.30</b>	<b>5</b>



				(50.79)	(49.21)	100			
7	Biometric system	0	0	0	25	38	63	0.28	6
					(39.68)	(60.32)	100		
8	Cross channel integration	0	0	0	21	42	63	0.27	7
					(33.33)	(66.6)	100		

## 5.0 CONCLUSION

In recent years, the world has seen major developments in digital payment systems through the internet, or what is known as e-commerce. By conducting a careful analysis of the e-commerce technology trends, it is more than just clear that there will be further growth of the sector in future. Businesses, therefore, need to closely follow new trends in e-commerce technologies so as to be able to fully exploit the associated opportunities. By staying updated with latest e-commerce trends, a business not only gains competitive advantage but also stands a chance to earn much higher profits.

The study concluded that the level of awareness of e-commerce was low in informal market of construction materials procurement and this was responsible to none adoption of e-commerce and low usage of some relevant technologies that could enhance productivity, payment made easy, tracking of goods, timely delivery and internet/cyber security in business activities.

## 5.1 Recommendations

It is high time formal construction market began to integrate informal market of construction materials procurement in the development programme of the industry at large by organizing seminars, trainings and workshop on new technologies that can promote its services as it plays significant roles in the availability of construction materials. The informal market is described as acting as a social safety net as it provides employment and income to many people that may otherwise be unemployed in the absence of sufficient opportunities in the formal market.

More awareness should be created for e-commerce technologies to be embraced and adopted and cyber-security should be improved to enhancing adoption.

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