

## DESIGN AND DEVELOPMENT OF A SAFE AND EFFECTIVE ONLINE MARKETPLACE FOR NIGERIA

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### **Abstract**

*Buying and selling has gone beyond what is carried out only in a physical environment, as the availability of internet has made market and marketing a thing done online. Most online marketplaces (Websites) are individually managed in a way that it monopolises and restricts users to only products and services placed on them, thereby making users to think that only goods placed on such media are those available in the market. The paper proposed, designed and developed a web-based marketplace system using UML (Unified Model Language) and PHP as the Front-end (Programming Language) and MYSQL as the back-end (Database) running under WAMP (Window, Apache, PHP and MYSQL) Platform. The study used Case diagram and Class diagram, offered by UML for designing the system. The system provides a secured*

*marketplace for products and services with the resources available online which is secure and provide customers marketplace with unlimited and unrestricted search. With the adoption of limited search engine optimisation that converges, accesses to various marketplaces through the use of links have been made possible. The study recommended that online marketplace should be improved on by not only limited to products in the country but goods and services outside the country.*

**Keyword:** Database, Development,  
Marketplace, Optimisation, Products and  
Services,

### **INTRODUCTION**

In the present era of globalization, trade liberalization and privatization, Information Technology (IT) plays a vital role to make a product competitive in the global market through all its manifestations like e-mail, multimedia electronic banking, internet, World Wide Web and so on (Talathi, 2007). Effective communication is the key to successful business (Naik, 2007). Internet is the fastest growing communication medium on earth at present. There is needed to take product in order to be widely publicised on the internet.

Advertising on the Internet is almost a necessity for modern businesses, especially those that do business outside of their local community. Consumers use the Internet for more than simply entertainment or information, as they do with radio, television, magazines and newspapers. Consumers use the Internet to assist them in nearly every aspect of life, creating countless opportunities to place relevant, targeted ad messages.

The different dynamism of information technology is employed to tone down the frequency at which poverty spreads in our society. The reusability of codes and the encapsulation properties of PHP (Hypertext Preprocessor), an open source, server-side with an object oriented programming language is explored and merged with MYSQL, a relational database system due to its approval routing feature for maximum security and content verification.

Users of online marketplace in Nigeria have over the years' experience challenges in accessing an online marketplace that can serve them satisfactorily, in such a way that they can access whatever goods they want through a single website/location/login, they have to login into various sites for them to have access to varieties. In order to bring solution to this challenge, the authors have designed a one stock online marketplace where users and shoppers can through it access various other online marketplaces with ease.

The site enjoys more patronage compared to other websites that restrict customers because in previous ones, users and visitors have access to only goods and services placed on them. Users of this newly designed marketplace do not only have access to goods and services available to them through the search engine link provided but to other promos and prizes placed on it. The domain in this paper will be Nigeria. Customers will be able to know the exact location of the seller and can even have a direct contact with him/her. Sellers can as well specify the state at which they want their product sold.

The primary aim of this paper is to implement an online marketplace in Nigeria where individuals and small and medium scale producers can market their products and service. It will also serve as a common front for

investors and property merchants who have a product in a particular location to easily project their product to clients because of its ability to state and specify location, also the website expose and bring to lime light newly produced indigenous products. This research, which computerizes a simplified approach for marketers, businessmen and online traders is instinctive out of the authors passion and desire to see small scale business thrive, and also to encourage those that want to start small and ultimately to improve the economy of my nation.

With the design of the proposed system the rigors and difficulties associated with the conventional online marketing will be eliminated, also the system can accommodate a very large pool of entrepreneurs and management of their records will still be easy. The process and way of customer connecting with clients/sellers is easy as because of the specified location.

The database ensures the retrieval of any information about the borrower, and as a result, the information can be forwarded to the appropriate security department in the case of defaulters. It provides an easy and suitable platform for detection of fraudulent users. The standard of living of these individuals, small scale entrepreneurs will be raised and also the economy of the nation will improve. The study objective is to propose online marketplace with a view to giving individuals, group of people and firms opportunity to market their products and services with a view to specifying their location for easy accessibility. It is a web-based application developed to improve and also facilitate the standard of living of small entrepreneurs and also to boost the economy of our nation.

### **LITERATURE REVIEW The Nigerian Economy and Internet**

Lead generation and internet marketing in Nigeria can only be successfully carried out with the right knowledge of the cash culture of Nigeria as well as the potential limitations within which to conduct payment mechanisms. Nigeria is a federal constitutional republic in West Africa with a population of more than 152.2 million people. Nigeria covers an area of 356,667 square miles and share borders to the west with Benin, Chad and Cameroon to the east and Niger to the north. To the south is the Atlantic Ocean. Nigeria is the most populous country in Africa and the most populous black majority country in the world. The Nigerian economy is classified as a mixed economy emerging market and is estimated by Citigroup to achieve the highest GDP growth in the world between 2010 and 2050. Nigeria is also among the 11 countries around the world considered as global growth generators offering high levels of investment opportunities. Nigeria is also the fifth largest supplier of crude oil to the United States.

### **Mobile Phones and Social Media**

Nigeria is reported to be the second biggest mobile market in Africa behind South Africa and is rising at an astounding rate. Nigeria has only reached one quarter of its estimated market potential and already there are 73 million mobile users. Popular searches in Nigeria regarding social bookmarking over the 3 month period up until June 2011 have been regarding Facebook chat downloads and for Facebook Mobile. A recent survey reported that 90% of Nigerian 18 to 27 year olds accessed the internet from their mobile phones more than their computer. A further study revealed that 25% of internet traffic from Nigeria is via mobile phones. The truth is that the Nigerian internet has a long way to go to catch up with the rest of the world but it is catching up rapidly and needs well advised and

experienced internet marketers. These professionals can provide legitimate and professional lead generation campaigns to entice the large corporate firms that are far more ready to listen than similarly sized western companies. The internet marketer who has the insight into how virally content can travel around Nigeria via social media sites such as Facebook and its mobile connectivity can forge the pathway reaping untold profits along the way (Srivastava, Shervani& Fahey,1998).

### **An Issue of Trust**

The issue of trust has a large part to play in the Nigerian internet marketing realm. Value for money is a big issue for Nigerian advertisers as well as paying upfront for services that may or may not be completed as agreed. Large corporations are looking for ways to increase their online presence and brand awareness but present internet marketers in Nigeria are not offering the transparent and sophisticated internet marketing campaigns that are required. This means that they are unable to gain the trust of the major brands. There is enormous potential for foreign internet marketers with provable track records to win the trust of large Nigerian firms willing to invest in lead generation campaigns to generate enquiries and sales (Naik, 2007).

**Market Focused Individual/Organisation** A market-focused organization first determines the potential customer's desire, and then builds the products or services. Marketing theory and practice are justified in the belief that customers use a product or service because they have a need, or because it provides a perceived benefit (Kotler& Keller, 2006). Two major factors of marketing are the recruitment of new customers (acquisition) and the retention and expansion of relationships with existing customers (base management). For marketing plan to be successful, the mix of the

four “Ps” must reflect the wants and desires of the consumers in the target market. Trying to convince a market segment to buy something they do not want is extremely expensive and seldom unsuccessful. Marketers depend on insights from marketing research, both formal and informal, to determine what consumers want and what they are willing to pay for. Marketers hope that this process will give them a sustainable competitive advantage (Meldan, 1984). In marketing the marketers must be aggressive enough so as to win the consumers and ensure that they promote the image of the products or candidates if it is political products in order to convince the consumer or electorate (Aremu, Ameen & Mustapha, 2015). The study of Akinyele (2011) for the oil and gas sector in Nigeria suggest that strategic marketing is a driver of organizational positioning in a dynamic environment, and that it helps to enhance the development of new product/service for existing markets. Aremu (2013), also emphasised the need for strategic marketing by entrepreneur in order to achieve organisational objectives. He suggested that business owners must comb the environment adequately and effectively and must connect to internet (Aremu, 2012; Aremu, 2003 and Aremu, Gbadeyan, & Aremu, 2016).

### **Marketing Impact Model**

The need for measuring marketing impact is intensified as firms feel increasing pressure to justify their marketing expenditures (Gruca & Rego 2005; Rust et al., 2004; Srivastava et al., 2001). Accordingly, marketing practitioners and scholars are under increased pressure to be more accountable for showing how marketing activities link to shareholder value. It is important to know that marketing actions, such as packaging, brand name, density of the distribution channel, advertising, permanent exhibitions, sponsoring, press bulletins, among others (Van Waterschoot and Van den Bulte, 1992) can help build long-term assets or

positions as brand equity and customer satisfaction (Srivastava et al., 1998). These assets can be leveraged to deliver short-term profitability and shareholder value.

### **Online Marketplace**

Marketplace is not a technical term of art, so unfortunately, there exists no precise and well established definition clearly distinguishing what is and is not an online marketplace. However, we can attempt to delimit its meaning with respect to this paper. To begin, what do we mean by a “market”? This term too lacks a technical definition, but for present purposes, we consider a market to be an interaction mechanism where the participants establish deals (trades) to exchange goods and services for monetary payments (i.e., quantities of standard currency).

Scoping the “place” in “marketplace” can be difficult, especially given the online context. Some would say that the web itself is a marketplace (or many marketplaces), as it provides a medium for buyers and sellers to find each other and transact in a variety of ways and circumstances. However, for this the authors adopt a narrower conception, limiting attention to sites and services attempting to provide a wellscoped environment for a particular class of (potential) exchanges.

Many pre-existing marketplaces are now online simply because the Internet has provided an additional interface to existing protocols. For example, online brokerages have enabled any trader to route orders (with some indirection) to financial exchanges and electronic crossing networks (e.g., Island or REDIBook). Although such examples certainly qualify as online marketplaces, the plethora of different interfaces, and usually non-transparent indirections, do make them less pure instances of online marketplaces. For high-liquidity marketplaces like equity

exchanges, these impurities may not substantially impede vibrant trade. For newer and more completely online marketplaces, directness and transparency are hallmarks of the value they provide in facilitating exchange.

Perhaps the most well-known and popularly used online marketplace is eBay (Cohen, 2002), an auction site with over 12 million items (in hundreds of categories and subcategories) available for bid every day. eBay is the canonical “person-to-person” marketplace, with upwards of 69 million registered users.

Whereas many eBay sellers (and some buyers) earn their livelihood trading on the site (which is why the “consumer-to-consumer” label would be inaccurate), participation requires only a lightweight registration process, and most aspects of the transaction (e.g., shipping, payment) are the ultimate responsibility of the respective parties to arrange. Note the contrast with the brokered trading model employed in financial markets, where securities are generally exchanged between broker-dealers on behalf of clients.

Many online market places consider commerce domains that specific to an industry or trading group. One of the most prominent of these is Covisint, formed in 2000 by a consortium of major automobile manufacturers (Ford, General Motors, DaimlerChrysler, and Renault-Nissan, later joined by Peugeot Citroen) to coordinate trading processes with a large universe of suppliers. Covisint provides electronic catalogue tools, operates online procurement auctions, and supports a variety of document management and information services for its trading community.

Although, many of the online marketplaces launched by industry consortia in the late 1990s have since failed, as of 2002 there were still dozens of such exchanges, with projections for renewed (albeit slower) growth

[Woods, 2002]. Similarly, the number of person-to-person sites had reached into the hundreds during the speculative Internet boom. eBay clearly dominates the field, but many niche auctions remain as well.

The examples of person-to-person auctions (eBay), industry-specific supplier networks (Covisint), and online brokerages illustrate the diversity of online marketplaces that have emerged on the Internet over the past decade. Another category of major new markets are the exchanges in electric power and other commodities corresponding to recently (partially) deregulated industries. Many of these are hidden from view, running over private (or virtually private) networks, but these too constitute online marketplaces, and play an increasingly significant role in the overall economy.

## **MATERIALS AND METHODS**

### **System Design Architecture**

The analytical diagram used in representing the architecture of the online marketplace is shown in Figure 1.

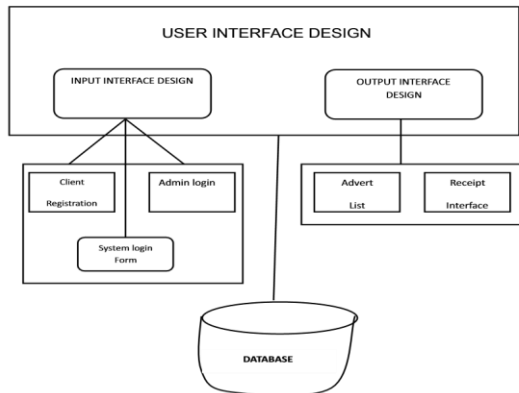
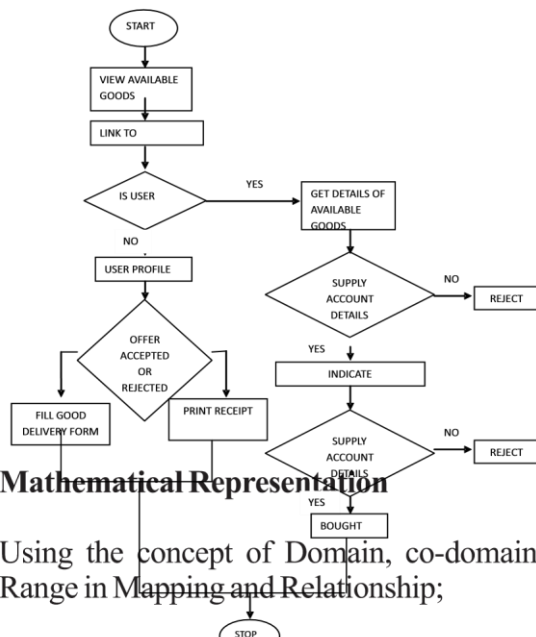


Figure1: Web based on line market system Architecture  
WEB-BASED MARKETPLACE FLOWCHART



**Mathematical Representation**

Using the concept of Domain, co-domain and Range in Mapping and Relationship;

A function:  $X \rightarrow Y$  has  $X$  as **domain** and  $Y$  as **co-domain** Figure ii: **Flowchart for Online Marketplace**. The **image** of  $f$  is the subset of  $Y$  given by  $F(X) = \{f(x) : x \in X\} \subseteq Y$ , that is, the set of values taken by  $f$  Given a function:  $f: X \rightarrow Y$ , the set  $X$  is the **domain** of  $f$ ; the set  $Y$  is the **codomain** of  $f$ . In the expression  $f(x)$ ,  $x$  is the **argument** and  $f(x)$  is the **value**. One can think of an argument as an input to the function, and the value as the output.

The **image** (sometimes called the **range**) of  $f$  is the set of all values assumed by  $f$  for all

possible  $x$ ; this is the set  $\{f(x) \mid x \in X\}$ . The image of  $f$  can be the same set as the codomain or it can be a proper subset of it. It is, in general, smaller than the codomain; it is the whole codomain if and only if  $f$  is a surjective function.

**The technical definition of a function**

The following technical definition of a function is a little abstract.

Given a set of inputs  $X$  and a set of possible outputs  $Y$ , a function is relation between these sets, i.e., a collection of ordered pairs of the form  $(x,y)$  where  $x \in X$  and  $y \in Y$  (confused?), that satisfies one condition: every element  $x$  in the domain  $X$  must be paired with exactly one element  $y$  in the codomain  $Y$ .

That's it. A function  $f$  is just this collection of ordered pairs. Since we know each element  $x \in X$  is paired with exactly one element  $y \in Y$ , we could denote this element by  $y=f(x)$  so that the ordered pairs are denoted by  $(x,f(x))$ .

**Search engine optimisation**

A **search engine** is a software program or script available through the Internet that searches documents and files for keywords and returns the results of any files containing those keywords. Today, there are thousands of different search engines available on the Internet, each with their own abilities and features. The first search engine ever developed is considered Archie, which was used to search for FTP files and the first textbased search engine is considered Veronica.

Today, the most popular and well known search engine is Google.

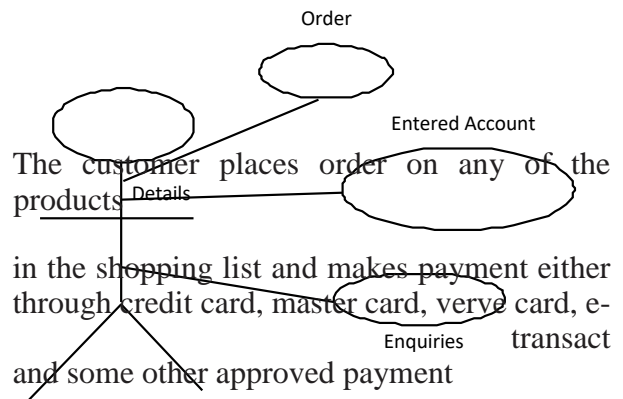
**The Unified Model Language (UML)** Usually, requirements analysis consisted of identifying relevant data and functions that a software system would support. The data to be handled by the system could be described in terms of entity-relationship diagrams, while the functions could be described in terms of data flows (Mylopoulos, 2001). Object-oriented software development utilizes new design methodologies, and computer-aided software engineering tools such as Rational Rose can support these methodologies (Post & Kagan, 2000). The UML (Unified Modeling Language) is a language used to specify, visually model (Quatrani, 1998), and document the artefacts of an Objected-Oriented system under development. It represents the unification of a number of ideas from different methodologists. Using UML to design a system improves its maintainability and reusability. Object oriented analysis techniques offer class, use case, state chart, sequence, and other diagrammatic notations for modeling (Breu, et al, 1998). UML has been used successfully in numerous projects to model varying architectures and requirements. (Wolf, Burkhardt & Philippow, 1998).

The authors selected Use Case Diagrams and Class Diagrams for analyzing the user's requirements, the ordering of messages and documenting relationship among components. We selected Class Diagrams for representing the static structure of classes.

**Use Case Diagrams**

The **use case diagram** at its simplest is a representation of a user's interaction with the system and depicting the specifications of a use case. It portrays the different types of users of the system and the various ways that they interact with the system.

The use case diagrams below shows two major actors which are the customers and the administrator.



The product is sent to the address as soon Customers as payment is confirmed.

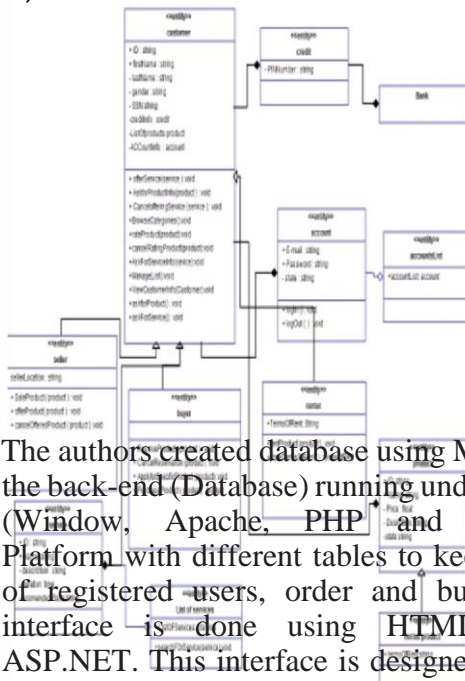
**Figure iii: The Use Case Diagram (Customers) for the Proposed System**

View Register    View  
Invoice

The administrator view to know more about the View Products transactions that take place in the marketplace and also view the products to know what that have being orders, sells and requests that have be View Order List made **The ClassDiagram** The class diagram (Fig. Administrator 3) in the Unified View Purchase BalanceModeling Language (UML) is a type of static structure diagram that describes the structure of a system by showing

**Figure iv: The Use Case Diagram (Administrator) for the Proposed System** the system's classes, their attributes, operations (or methods), and the relationships among objects.

Figure v: the Class Diagram for the Proposed System



The authors created database using MYSQL as the back-end (Database) running under WAMP (Window, Apache, PHP and MYSQL) Platform with different tables to keep records of registered users, order and buyers. The interface is done using HTML, C# and ASP.NET. This interface is designed for easy

and effective interaction with all the actors on the system.

## RESULTS AND DISCUSSION

The implementation phase of any computerization process involves the establishment of some certain principles to be followed in producing service in order to increase efficiency and achieve the desired objectives and goals. The implementation of this application for the institution system in order to replace the manual system, will involve the installation of the application package. PHP and

mysql is used because of its graphical user interface (GUI) features which makes communication with other users possible by displaying pictures and other standard objects.

### Implementation Approach

To implement this system, a parallel approach was used. This approach ensure that the old system and new system to run concurrently together. This is because in the failure of the new system due to avoidance technical inefficiencies.

### Testing the New System

In the course of this design, the development was done in modules. Each module was implemented separately and tested. Every stage entails debugging, which was done and all error fixed. The entire system was integrated by joining each module to work with the main system. At the end of the integration, the entire system was tested and confirmed Ok.

### PHP for Application Development

PHP is a robust server-side open source scripting language that is extremely flexible. It is also cross platform, which means it will run on any operating system. It belongs to the class of software known as open source. PHP also belongs to a class of language known as



middleware, these languages work closely with the web server to interrupt the request made from the World Wide Web, process these requests and then indicate to the server exactly what to serve to the client's browser. Most PHP-based application uses a relational database with SQL interface.

### **MY SQL**

SQL is a standard query language for interacting with the database. MySQL is an open source database server that is more or less free unlike Oracle, Sybase, and Informix even though creates terrific database and its extremely fast. MySQL is also cross platform, it is partially well suited for web applications. When serving out web content or creating a commerce site, MySQL has all the power needed for small to medium sized database and it's extremely fast.

### **Apache**

This is a web server application notable for playing key roles in the initial growth of the World Wide Web. Development of Apache began in early 1996 after work on the NCSA code stalled. Apache quickly overtook NCSA HTTPD as the dominant HTTP server and has remained the most popular http server in use since April 1996. In 2009, it became the first web server software to serve more than 100 million websites.

It is developed and maintained by an open community of community developers under the auspices of the Apache software foundation, and it is as a cross platform application

### **JQuery (Advance Javascript)**

jQuery is a multi-browser JavaScript library, designed to simplify the client side scripting of HTML. It is the most popular JavaScript library in use today. jQuery is a free open source software licensed under the MIT license. Its

syntax is designed to make it easier to navigate a document and provides capabilities for developers to create plug-ins on top of the JavaScript library. The modular approach to the jQuery library allows the creation of powerful dynamic web pages and web applications.

### **CONCLUSION**

### **AND**

### **RECOMMENDATIONS**

The system in the initial stage has been found to be successful to save time and efforts of users. The software has been developed in a web-based environment; this will make advertising on the internet for business organization conducive within and outside the country at any time. The software with minor modifications can be used for other software development organizations.

The proposed system provides detailed general information about users as well as all needed information as regards goods and services carried out through the website. It is very fast and accurate, there's no fear of data loss and it makes it very easy to find, examine and purchase a product. Having weighed all possible sides of the system, it was discovered that it would eventually be more advantageous to implement the online marketplace of this magnitude for Nigeria.

The online marketplace should be considered for more interactive platform where users can navigate extensively and satisfactorily. Also, the online marketplace should be improved on by not only limited to products in the country but goods and services outside the country.

Further research, should make use of unlimited search engine in linking other online markets. In future research, more mathematical representation should be used to represent the processes that take place in online marketing.

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