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AN INVESTIGATION REPORT ON PARAGON-A VIRTUAL STORE FRONT PROPOSED STUDY FOR SYSTEM IMPLEMENTATION

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ABSTRACT

This paper dealt with investigation report and provided detailed study about PARAGON a virtual store front for business information system implementation. Since the commencement of the internet, it has played an active role in the lives of billions of people as it is used extensively and it has brought numerous advantages to individuals. The proposed system will helpful to expand the company's marketplace to national and international markets. And also this study will help the developers to provide relevant and detailed information quicker in seconds. Here design and security standards were discussed. Agile methodology was chosen to make system more reliable and easy accessible. The system architecture followed for this proposed study based on context diagram, DFD, ERD and Story board. After the successful implementation the author would like use unit testing, integration testing and usability testing. Hence this study successfully explained the core concepts, technical things for the better system implementation process.

Keywords: Agile Methodology, Business Information System, System Architecture, Testing

I INTRODUCTION

The internet has numerous conventions. But perhaps the most important would be the dimensional revolution it brought to commercial activities. The internet birthed a new market, diverse from the traditional one for both individuals and organizations. Web-sites affords the luxury of making inquiries about product and services, dropping feedbacks or placing an order without the need to leave your current location [1]. Together with the advancement of technology, a substantial amount of commercial activities is carried out over the internet giving rise to the term "electronic commerce".

1.1 Problem Context

With 55 million internet users in 2014, an estimated 30 million B2C ecommerce digital buyers in 2014, as well as an estimated worth of $3 billion in B2C ecommerce market size as at 2013 [2] and still growing, together with its benefits to both the economy and business as a whole, yet the term "e-commerce" is only associated with financial intuitions and large enterprises leaving the small and medium enterprises trailing behind.Furthermore the expenses

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and overheads incurred while trying to maintain a business can sometimes be a burden for a small company trying to make a push in the market. The current system in place is manual based, business transactions are done face to face or over the phone and limited to a particular geographic location. Lastly Human errors takes its toll when dealing creating and storing with transaction records, customers records and inventory keeping.

1.2 Rationale

Fast forward to 2016 where there are now 97.2 million internet users, that 52% of the country's population and makes up 28% of African internet users [3]. Add that in context to the world's total users, it totals to millions of individuals online at any given time and can be deemed potential customers that are untapped.With Nigeria been a global force in terms of marketing and has the biggest market in Africa as well as the strongest and still growing economy, it would only be a matter of time before they match other heavy weight economies like China, Germany or the USA. Never-the-less, it can only be achieve if they can gain a foothold on the thriving e-commerce boom experienced by other countries.Nevertheless, there are numerous rapidly growing companies but don't have access to a global audience or able to expand their horizon due to limited technologies, limited technical know-how and lacking a suitable platform to propel them to the top, consequently left behind in the competitive market.The intended application will help such companies (in this case PARAGON) expand their reach and provide a platform for them to render their services to a global audience, by transposing the physical front to a virtual one thereby creating more marketing opportunities and avenues. In turn, increase the economic growth of the country as a whole and provide healthy competition between local organizations to push higher.

1.3 Potential Benefits

The potential benefits of the said application is apparent:

- Help expands the company's marketplace to national and international markets. With minimal capital outlay.
- Decreases (by as much as 90 percent) the cost of creating, processing, distributing, storing, and retrieving information by digitizing the process.
- Allows lower inventories by facilitating pull-type supply chain management. This allows product customization and reduces inventory costs.
- Lowers telecommunications costs because the Internet is much cheaper than value-added networks (VANs).
- Gives consumers more choices than they could easily locate otherwise.
- Enables customers to shop or make other transactions 24 hours a day, from almost any location.
- Delivers relevant and detailed information in seconds.

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1.4 Target Users

The main target users are actually the millions of internet users who are online at any given time of the day. These are deemed potential customers.

1.5 Aims

To analyze, design and develop a B2C e-commerce web application for Paragon PLC, Nigeria.

1.6 Objectives

- To provide a platform for the business to attract and cater to a larger customer base without the boundary of time, distance and currency
- To offer an alternative and much better solution to counter the manual based business process.
- To make available a stage for non-stop transactions, while staffs are offline or asleep
- To create a platform that reduces overheads incurred by the business and customer as well as a much more convenient means.

II LITERATURE REVIEW

The purpose of this literature review is to take into consideration already documented factors pertaining to designing an e – commerce system ranging from structure to design methodologies. For the successful development of an e – commerce system, several factors play key roles such as planning, user interface design, security, consideration of usability and security. Along with gaining a deeper understanding of the subject area concerned with project.

2.1 Domain Research

2.1.1 The Internet

Before jumping to the concept of e – commerce, it would be unfair not to brush through what is seemly the backbone of the operation of e – commerce. The underlying factor that is the internet.The internet plays an expectedly fundamental role to the even running of E-Commerce. Companies making use of e - commerce alone, have need of a fast and reliable service. Devoid of connection to the Internet and the strides made in the developments in multimedia, the opportunities for e – commerce would be very limited. More so, the speed of advancement in technology does escalate the mandate for e – commerce, which in turn raises the necessity for faster low-cost technology.The Internet, sometimes called simply "the Net," was conceived by the Advanced Research Projects Agency (ARPA) of the U.S. government in 1969 and was first known as the ARPANet. It be defined as the information super highway, the network of networks. But over the years there has been no shortage of definitions.Merriam Webster defines the internet as “an electronic communications network that connects computer networks and organizational computer facilities around the world” (Merriam-webster.com, 2016). Cambridge dictionary states it as “the large system of connected computers around the world that allows people to share information and communicate with each other” [4].

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2.1.2 E – Commerce

The importance of EC cannot be undermined as it now an imperative for businesses, which consider it a favorable tool to achieving pre-set goals by the company: increased sales and wider reach.There has been no shortage of definitions for the term e – commerce over the years. From simple definitions as: buying and selling over the internet, to: interchange of information in addition to purchasing and peddling of products/services via the internet [5].More definitions include; " the process of buying, selling, transferring, or exchanging of products, services, and/or information via computer networks, including the Internet" [6]. [7]Depicts e -commerce as "all electronically mediated transactions between an organization and any third party".It can be derived that the term e – commerce is simply not buying and selling of products and services over the internet, but rather is a more elaborate topic than previously thought.

On that note, e – commerce is a process of incorporating all business's procedures and activities concerned with the procurement and peddling of products/services, exchange of information and moneys with the business's associates by means of electronic technologies and computer networks as shown in "Fig.1".

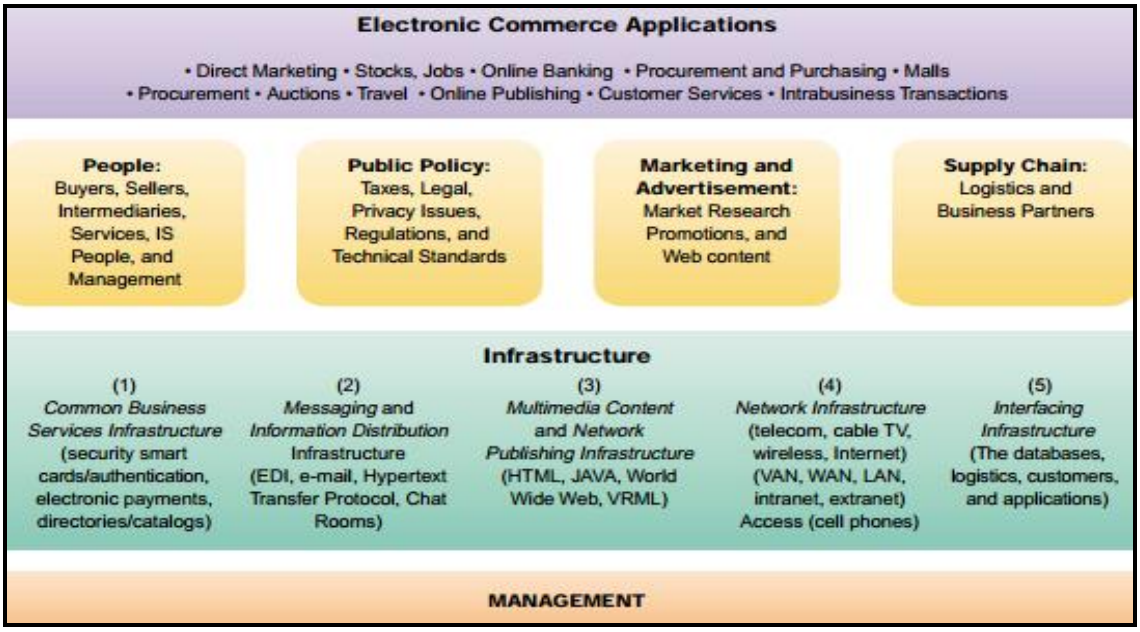

Figure 1. A framework for e - commerce

Source: adapted and modified from [8] [9]

2.2 Technical Research

2.2.1 Design Standards

User experience is the one of the most important aspect of any e-commerce system, as you want your users to have a good experience ultimately leading to them completing a transaction and coming back again. Now a number of users end up leaving sites prematurely due to bad design standards. According to recent e-commerce studies, at least

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59.8% of potential customers abandon their shopping cart (MarketingSherpa puts it at 59.8%, SeeWhy at 83% and MarketLive at 62.14%) [10].That been said it is of high important to follow a set of given guide lines as to the design standards of e-commerce systems but after searching numerous sources no such standard could be found rather personal views. According to [11] designers rely on published user interface standards to help make systems more consistent, and therefore more usable. Though no such published design standards exist for the Web, certain design practices have become increasingly common. Some of these are pervasive enough to be considered de facto standards.

In summary, designs should be kept simple and plain, avoid unnecessary additions of pictures, texts or vibrant colors, use a linear check out system, minimal advert or none, clear error clarifications, automated search and always point directly to vital data.

2.2.2 Security Standards

With threats like identity theft, phishing, debit/ credit card frauds among many others, securing of e-commerce systems cannot be taken likely and therefore must adhere to the security standard set by the PCI Security Standards Council. An open global forum for the ongoing development, enhancement, storage, dissemination and implementation of security standards for account data protection [12].The standards talk about: general requirements, physical security, network security, system security, database security, web server security and application security. To comply with the set standards e – commerce systems should use enhance verification SSL, use PCI and vulnerability scanning services, run periodical network penetration testing, use multi-factor authentication, use managed DNS and use trust seals.

III SOFTWARE DEVELOPMENT METHODOLOGY

Choosing the right SDM plan is very critical to the development of the application in terms of time scale available to roll out the system and also how the development process syncs with the development methodology. Considering all the available methodologies and running a comparisons, as most of them are adept to group and non – academic projects. Agile methodologies are the best candidates for e-commerce systems that incorporate the innovative and dynamic nature of the web. Thus, agile web development is to be used for this project.

3.1 Chosen Methodology

Agile web development is a model for building web applications based on the concept of agile methodologies. This method is more potent and efficient, as it affords early delivery of system functionality during development stage and continues improving all the way through the life of the web application. Now, Agile is not exactly a “traditional” methodology but rather a set of guidelines to be follow for development. This statement is strongly echoed by the agile alliance in the answer to the question that is; what is agile software development? And states that “Agile Software Development is an umbrella term for a set of methods and practices based on the values and principles expressed in the Agile Manifesto. Solutions evolve through collaboration between self-organizing, cross-

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functional teams utilizing the appropriate practices for their context" [13]. Agile methodology identifies that collaboration is imperative for better design, as wells as the need for feedback and quicker solutions to design, thus the agile manifesto."Individuals and interactions over processes and tools, working software over comprehensive documentation, customer collaboration over contract negotiation and responding to change over following a plan" [14].

3.2 Methodology Depiction

Planning, requirements analysis, designing, coding, testing and documenting in parallel, are appearances of agile web methodology through the production process phase. Customer immersion is imperative all through the course of development, thus receiving feedbacks from customer's increases the assurance of making changes, fault free, and client oriented method.

Agile web development have the following characteristics as shown in "Fig.2":

- Application is delivered at a shorter time span as the nature of development procedure is iterative and incremental.
- Progress of creation is measured by testing and completeness of system features during the planned deployment of the application.
- Changes are more adaptable to, as tasks are fragmented into lesser increments.
- The primary identifier in checking the progress of the development, is a functioning application.

Agile web methodology further entails dynamic systems development method (DSDM), feature driven development (FDD), and adaptive software development (ASD).

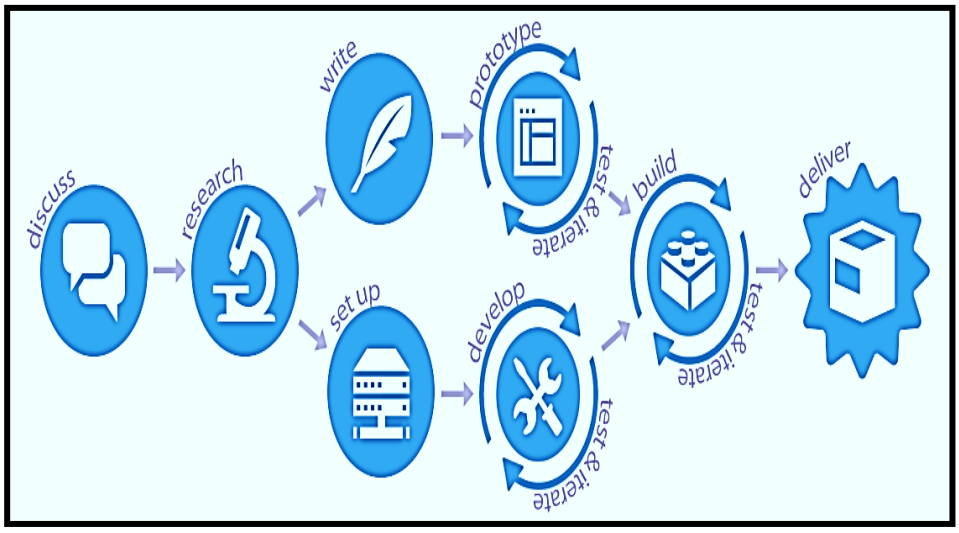

Figure 2. Agile Methodology Life Cycle

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IV PRIMARY RESEARCH

The process of primary research is not just data gathering but also involves data analysis; "the process of transforming raw data into usable information, often presented in the form of a published analytical article" [15]. The importance of data analysis cannot be understated. In fact no software development can be designed or undertaken without proper analysis of data. Among the numerous benefits of data analysis, the most important ones and also useful to this project are:

- Aids in organizing the results from different sources of data and drawing out concrete conclusions.
- Segmenting a large problem into smaller workable parts.
- When it pertains to obtaining meaningful discernments out of a vast data set, data analysis acts like a filter.
- Proper statistical treatment helps in research conclusion, and kicks human bias out of the process.

4.1 System Architecture

The core features of the system can be group into three parts:

a) The Back-end which is basically the database

b) The Front-end which entails;

- An online depiction of the physical store
- The shopping cart and its functionalities as listed in chapter 2
- A language support module

c) Administration Console

4.1 Context Diagram

The "Fig.3" below illustrates the entire system's data flow and processing.

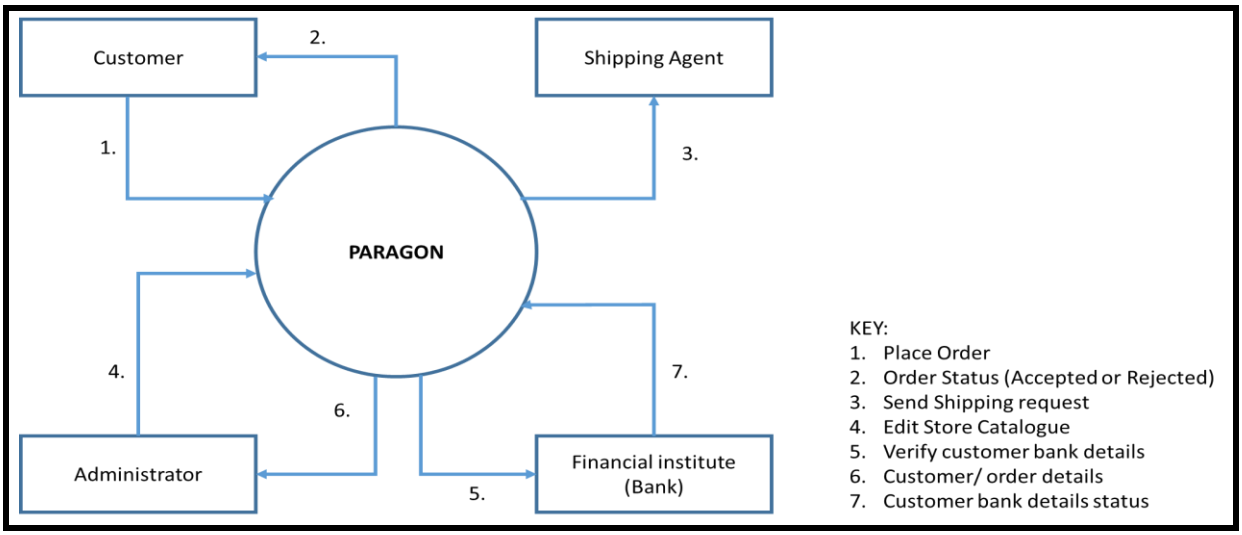

Figure 3. Context Diagram for Paragon

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4.2 Database Design

4.2.1 Entity Relationship Diagram (ERD)

The below "Fig.4" illustrates the entity relationship in ERD.

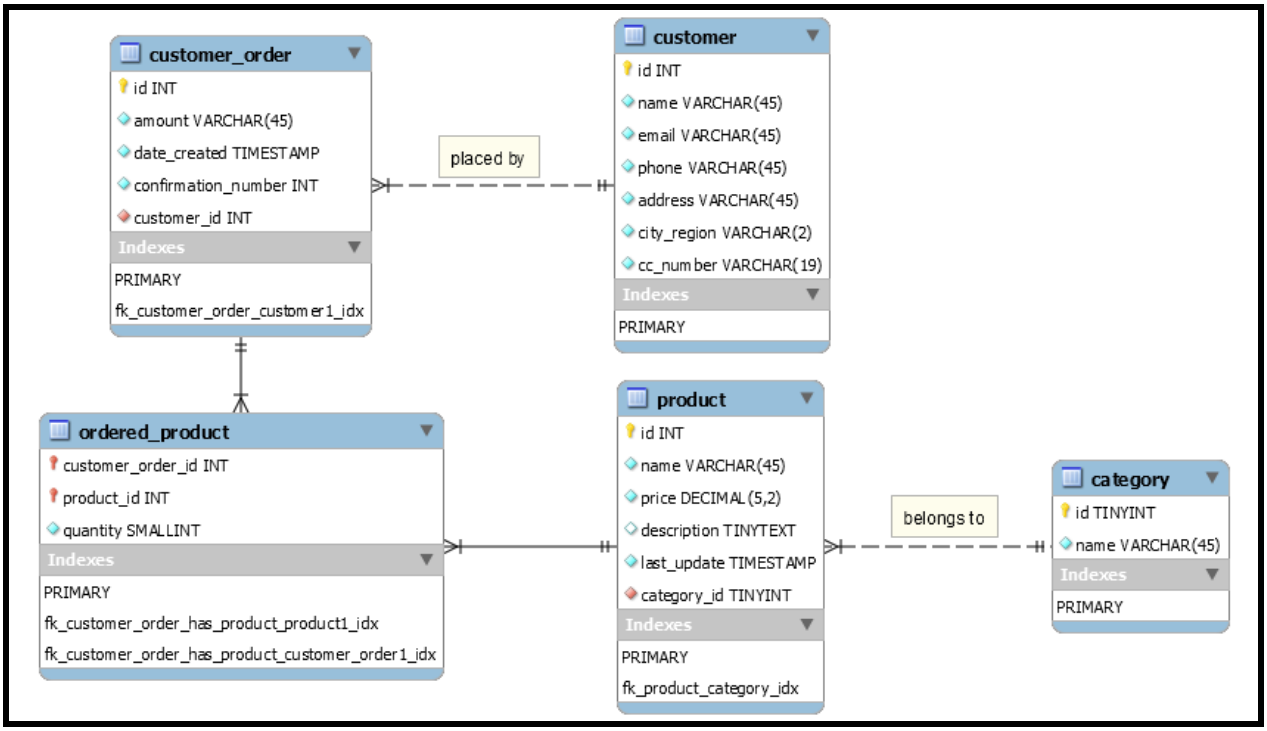

Figure 4. Entity relationship diagram of Paragon

V PROJECT PLAN

Deducing functional tasks from the system requirements is a major part of the project plan. The tasks are then categorized in high-level task list, which is then broken down into smaller tasks that can be tackled individually as the application development proceeds.

5.1 Development Plan

The design and development of the application is to follow the structure listed below:

a) Development platform set up:

- Enlisting of development server in the IDE
- Generate a web project in the IDE
- Test the web project from the IDE (deployment, test accumulation, run capabilities, and confirm communication and exchange of data amongst the IDE, server and browser)
- Registration of database server in the IDE

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- Establishing connection from the IDE to the database server
- An instance of the database is to be created on the database server.

b) Designing the application's data model:

- Create an ERD using MySQL work bench
- Generate an SQL script by forward engineering the entity-relationship diagram
- Create the schema by running the script on the DB server

c) Create front-end project files

- Creation of Style sheet
- Create place-holders for the application JSP pages (interface design)

d) Organize the application front-end

- Place JSP pages in the application's WEB-INF directory
- Create page header and footer
- Remove instances of code duplication (header and footer code from JSP pages)
- Register header and footer includes with the web deployment descriptor

e) Create a controller servlet

- Create mappings for views in deployment descriptor
- Create skeleton code in servlet to handle client requests

VI TESTING

6.1 Success Criteria

The main goal of "***Paragon***" application will rely on the features of the shopping cart functionality, the administration console, and the general interfaces. In order to make sure the system is functioning well before delivering, 5 students and lecturers from different field will conduct the testing as follows.

6.2 Unit Testing

In unit testing, a small part of a testable unit will be taken from the application, and tested to see whether it behaves exactly with the deliverables. Each unit will be tested separately and this would include user admin console, shopping cart functionalities and other web pages. For example, in the login module for the admin console, the minimum length of username should not be lesser than 6 digits and not more than 10 digits. All these units must go through a testing phase before integrated into a component.

6.3 Integration Testing

In integration testing, two tested units are combined into a component. For example, administrator updates a new list of modules for this batch of students from the back-end, the front-end view for students will changed and it will

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fetch the new data from the database. For this phase, blind text will be applied in order to test the functionality level of the front-end, back-end with the database.

6.4 Usability Testing

In usability testing, the satisfaction level of the end-users must be carried out. Participants of this testing phase will apply actual input on how real users use the system. Besides that, they will evaluate the system based on few aspects such as the graphical user interface (GUI), feedback message and the response time of the system. For example, the graphical user interface of the system needs to refine it if it is not user-friendly for a novice user and casual user.

VII CONCLUSION AND REFLECTIONS

E – Commerce has always been an intriguing topic to discuss. From the how's and why's to the technical specifications involved in deploying and running an e – commerce application successfully.The research carried out has help shed a lot of previous misconceptions held about the domain of study, and also proper offer adequate guidelines of how to go about with the rest of the project.There was a lot of information to assimilate and digest, which was overwhelming at times. Not all information studied and accessed could be detailed down into the report as it will be view as information overload hence technical jargon.

VIII ACKNOWLEDGMENT

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