A Collaborative Service Provider Platform For Handyman Services

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Abstract

Nigeria's population is growing at an unprecedented pace of 2.4 percent yearly, boosting the demand for a handyman. Although Nigeria has a thriving informal sector comprised of part-time or freelance handypersons, the country's economy needs to be structured at the national level to offer users excellent service. The unorganized informal sector has made access to handyperson services more challenging, specifically when traveling or moving to a new location. Service providers are spread out over different locations and provide varied pricing, quality, and types of services. Existing solutions to this issue need to be more cohesive, offering contacts spread throughout the internet, some of which need to be more genuine and wind up being fraudsters acting as handyman providers. Hence, this research aims to develop a platform where all handyman service providers can showcase their services, and clients can quickly request and hire one. To achieve the work, an iteration model was employed, the design was created using Draw.io, HTML, CSS, BOOTSTRAP, and JAVASCRIPT to develop the application layer, business logic was constructed using PHP, and Mysql was used for the back end. The application was hosted and deployed for evaluation. Questionnaires were used to capture users' opinions after interacting with the application, and the results proved that the application provides accessible communication between the handyman and those requiring their services.

Keywords: Handyman Services, Handyman Association, Informal sector, Collaborative service provider

1.0   INTRODUCTION

In recent years, research has shown that Nigeria's population continues to grow at an unprecedented rate to about 2.4% annually. Most people live in slums and shantytowns, putting more pressure on the informal sector [5]. Most workers lack educational qualifications and are forced to be in an informal sector for financial survival. This sector has no fixed wage structure; thus, most workers want to avoid permanent employment in this service sector [1]. According to a review done by Irunga in 2015, the author opined that the informal sector is growing as a result of

rising rural-to-urban migration and the formal sector's failure to absorb a large number of job seekers in the country, resulting in the creation of new work opportunities in the informal sector, such as handyman service occupations. A handyman, also known as a fixer, handyperson or handy worker, maintenance worker, repair worker, or repair technician, is a person skilled at a wide range of repairs, typically for keeping buildings, shops or equipment around the home in good repair [15]. These tasks include trade skills, repair work, and maintenance work, are both interior and exterior, and are sometimes described as "side work", "odd jobs" or "fix-up tasks".

In most African countries, handyperson services are part of the informal economy, and the estimated number of people working on handyman services was more than 500,000 in

2019 and 259,146 in 2011 [10]. These numbers are higher than those estimated in NSS 2008, which were 50,834. This shows a strong indication that the handyman services are growing at a breakneck pace due to increases in urbanization, urbanization of rural areas, increasing migration, and increase in the cost of living.

The demand for handyperson services has been on a significant rise over the past few years as against what was obtainable in the past when the work of a handyman was done by a part-time job holder whenever there was a need for one to work in Nigeria for extra income, many freelance handymen are called upon to help with house chores and other types of repair jobs. This growth has been attributed to changes in society and its requirements. The changes have resulted in higher unemployment rates and increased households that have reduced operating budgets [7].

However, locating handyperson service providers is a complex process, especially when one moves to a new place, because service providers are positioned across different areas and vary in rates, quality, and type of service [6]. Similarly, there is no comprehensive database where a person can easily locate qualified handyman and hire them for their needed services. Handyman service providers are virtually invisible and cannot easily be found because they need a web presence, as we have in advanced countries.

In summary, people's general needs still need to be met when it comes to finding a qualified handyman or contractor that provides the service. The existing solutions aiming to resolve this problem are defragmented, supplying contacts scattered throughout the web, which in some circumstances are not real but end up being crooks, unskilled men or scammers disguised as handyman providers. To address this challenge, new technologies should be provided to solve such dubious characters and avoid endangering people's lives. The technology may include but not limited to internet-based and smartphone applications that offer a range of handheld applications that facilitate finding and acquiring handyman services [3].

This work aimed at developing a web platform where a handyman can advertise their services and be connected to prospective customers to quickly request and book any of the services they provide.

2.0 RELATED WORKS

Nafis and Setiawan [9] worked on an Application for Booking Handyman Services using Webhook and Google Event Calendar Technology. The authors believe that Handyman services are a public service and that there is no easy solution for ordering services whenever required. The authors built an Android-based application named Jakang. The application provided an easier way for users to book a handyman service according to their expertise. The technology used in the development is webhook as an automatic notification before the work schedule. Also, the google event calendar was used for the scheduling process, a recommendation system to give a handyman recommendation using a collaborative filtering method with the slope one algorithm and an object-oriented approach. The Jakang application is expected to simplify ordering artisan services.

Sharaj *et al.,* [14] worked on an android based application for Home Services. The application was meant to target social services and aging homes in India. The application was rated on average and was not accepted. The request has to pass through a service provider, which is like a bottleneck in the application.

Saundariya *et al.,* [13] observed that there is a rapid increase in the need for handyman services globally and that it is difficult to find workers offline at the correct time and cost. Therefore, the authors developed a website that can be used to book a handyman and make it available in just one click. The application was created using React JS and MongoDB, a schema-less database.

2.1 Existing Handyman Services Locator Applications

In most countries around the world, there has been an increase in the demand for handyman services, which can be attributed to several factors such as local demand, market influence,

having second homes, and commercial property maintenance. People's lives were becoming more hectic, with more people now looking for help with odd jobs around their homes, such as changing light fixtures or putting up shelves [4]. Existing solutions attempting to address the handyman services availability are fragmented, with contacts dispersed over the internet and no organized mechanism for establishing the location and quality of service offered by these handymen. Following are the available handyman applications reviewed.

2.1.1 TaskRabbit
TaskRabbit is a platform owned by IKEA, where clients search for handymen who can fix a few things around the house. An handyman is termed a Tasker on the platform; the applicants have to pay a non-refundable registration fee of $20 (£25 in the U.K.). A list of requirements is set for future taskers, including an age limit, a mandatory background check, and the right to work in the country of residence. Averagely, a tasker makes about $35 per hour in the U.S. and £24 per hour in the U.K. The application notifies the Taskers of potential jobs near their location. If any of them suits their schedule, the tasker expresses interest. Depending on the number of local Taskers, one may be in a huge competition.

2.1.2 Ubuy Nigeria
Ubuy Nigeria Global Trading Services International Ltd. is an online marketplace headquartered in the Federal Capital Territory (FCT), Abuja, Nigeria. It provides a platform that connects customers with professionals and artisans within their vicinity, offering the services required to execute their projects/tasks at zero costs and without commission via its website and mobile applications.

2.1.3 Jiji.ng
Jiji.ng Marketplace for used goods, including furniture, musical instruments, sporting goods, cars, youngster and baby items, motorcycles, cameras, mobile phones, and property and also has a jobs and services feature that allows users to post and find various such as repair jobs. The search results are usually contacts and location details of these service providers. The search results of this platform are based purely on the type of service and location. The new system

will be superior because the search results will be based on the nearest location, best price and highest ranking [8].

2.1.4 Mila (International)
Mila is an international platform handyman users can sign up as a Friend or Pro on Mila. Over 8,000 tech-savvy Mila Friends carry out simple tasks, and more than 1,500 trained Mila Pros to try to expand their businesses day by day. Business owners with more than one employee can join as Mila Pro Dispatchers. Friends don't need to provide information on their educational training and to be registered as business owners, Pro and Pro Dispatchers do. Everyone has to pass the Mila-Skills-Test. (One can reach Level 2 regarding a skill by doing tests.) Mila keeps a commission of 20% for each completed service performed by Friends and charges various service fees regarding work done by Pros. Also, groups may discuss the price with clients, but not Pros. Like other platforms, Mile sends notifications about requested jobs on a first-come, first served.

2.1.5 Get It Done Now (GIDN)
The Get It Done Now application makes it very easy to hire a reliable handyman covering Lagos and Nigeria at an affordable rate. This application primarily focuses on the user and provides a well-rounded, positive experience. It uses a customer-centric approach to ensure that the user, at all times, is at the centre of the ideas.

2.1.6 MrFixit (International)
It is an online website that contains information about the various handyman services offered by the Handyman Service Providers who are registered members of the website. It also contains their contact details and information on where they are located. The new platform of the system is more suitable because it is a mobile version; hence it can reach more people. It is also flexible as one can search and obtain more desired information about the handyman service providers on the go. The mobile version is widely acceptable in Nigeria Market.

Table 1 shows the summary of the existing system, including its limitations, platform of implementation and the tools used to develop each application.

Table 1: Overview of some existing system

S/N	Existing system	Implemented on	Tools and Technology used	Limitation
1	TaskRabbit	Web	MySQL (PXC), Elasticsearch, Postgres, Memcached, Redis, Riak, Couchbase and cloud hosting	Not open source
2	**Ubuy Nigeria**	Web and mobile	HTML, CSS, Javascript, Jquery, JSON	Not designed for reapair
3	**Jiji.ng**	Web	HTML, CSS, Javascript, Jquery, JSON, XHR, Web socket	Not designed for reapair
4.	**Get It Done Now (GIDN)**	Mobile(Andriod)	Android studio.	Not open source
5	**Mila (International)**	Mobile App	Android studio.	Not user friendly
6.	**MrFixit (International)**	Web	WordPress	Smaller user interface and not designed for reapair

2.2 Gaps and Limitations

A review of existing handyman services applications has shown that the applications currently used to locate handyman services are not capturing the needed information. Their approach was primarily in providing Contacts and addresses of these handyman service providers. This has to some extent, helped provide contact information but does not guarantee the trust and quality of services to be provided by these handymen. Most of the current existing systems are also not suitable for on-demand and location-based services [2]. Therefore, this research developed a web-based application that strives to streamline the process of acquiring handyperson services to meet the timely need and demands.

3.0 METHODOLOGY

This work employed an iterative software development methodology which is a method of software development that divides the process of creating an application into smaller bits. Each element, referred to as an "iteration," comprises the whole development process and includes planning, design, development, and testing processes. Unlike the Waterfall approach, the iterative process adds features one by one, delivering a working product after each iteration and increasing functionality from cycle to cycle. Figure 1 shows the process of an iteration adopted for this research.
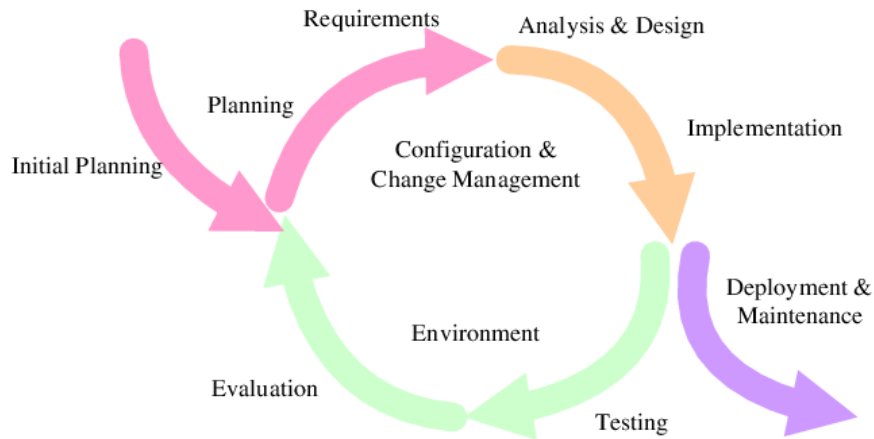
Figure 1: Iteration Development Model (Source: Google.com)

Planning Phase
This phase involves developing a strategy on how the set goals will be achieved, the time required to perform each activity and the development of each functionality. Schedules and milestones are also set to help identify the needed resources for developing the system.

Requirements Analysis Phase
This phase involves analyzing the list of functional, nonfunctional and technical system requirements gathered from the users to determine the system's feasibility.

Design Phase
The unified Modelling Language (UML) notion was used for modelling and designing diagrams to present the system's structural and behavioural aspects [11]. The data flow diagram was used to design the information flows through the system (Bangerter, 2021).

1.1 Data flow diagram level 0 of the handyman provider platform:

A level 0 data flow diagram of system information flow is shown in Figure 2. The admin manages the system by receiving information from the platform and making changes when need is, and the association registers the handyman and manages the handyman platform. The client requests a service from the Handyman platform, and the request is taken to the handyman who supplies the requested services.
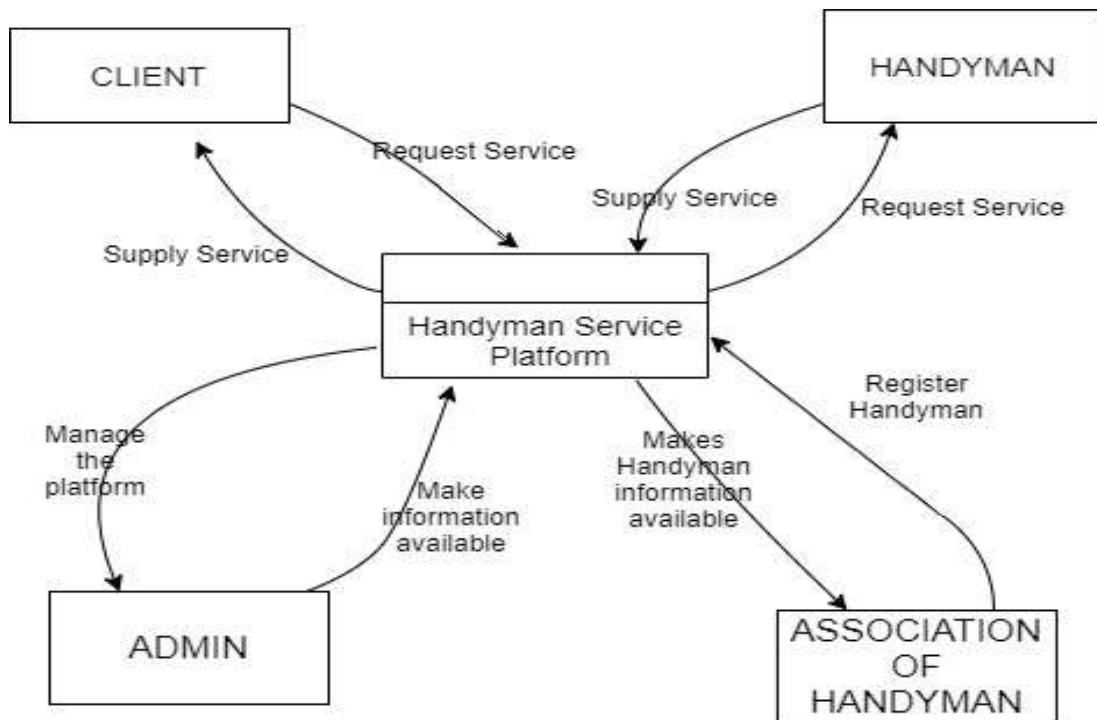
Figure 2: Level 0 data flow for the proposed system

1.2 **Level 1 Data flow diagram of the handyman provider platform**

Level 1 Data Flow Diagram shows more detailed information flow on the application. The client requests a service from the Handyman platform, and the details of the available handyman are shown to the client. When a handyman has been booked, he can accept or reject the request, as shown in figure 2.
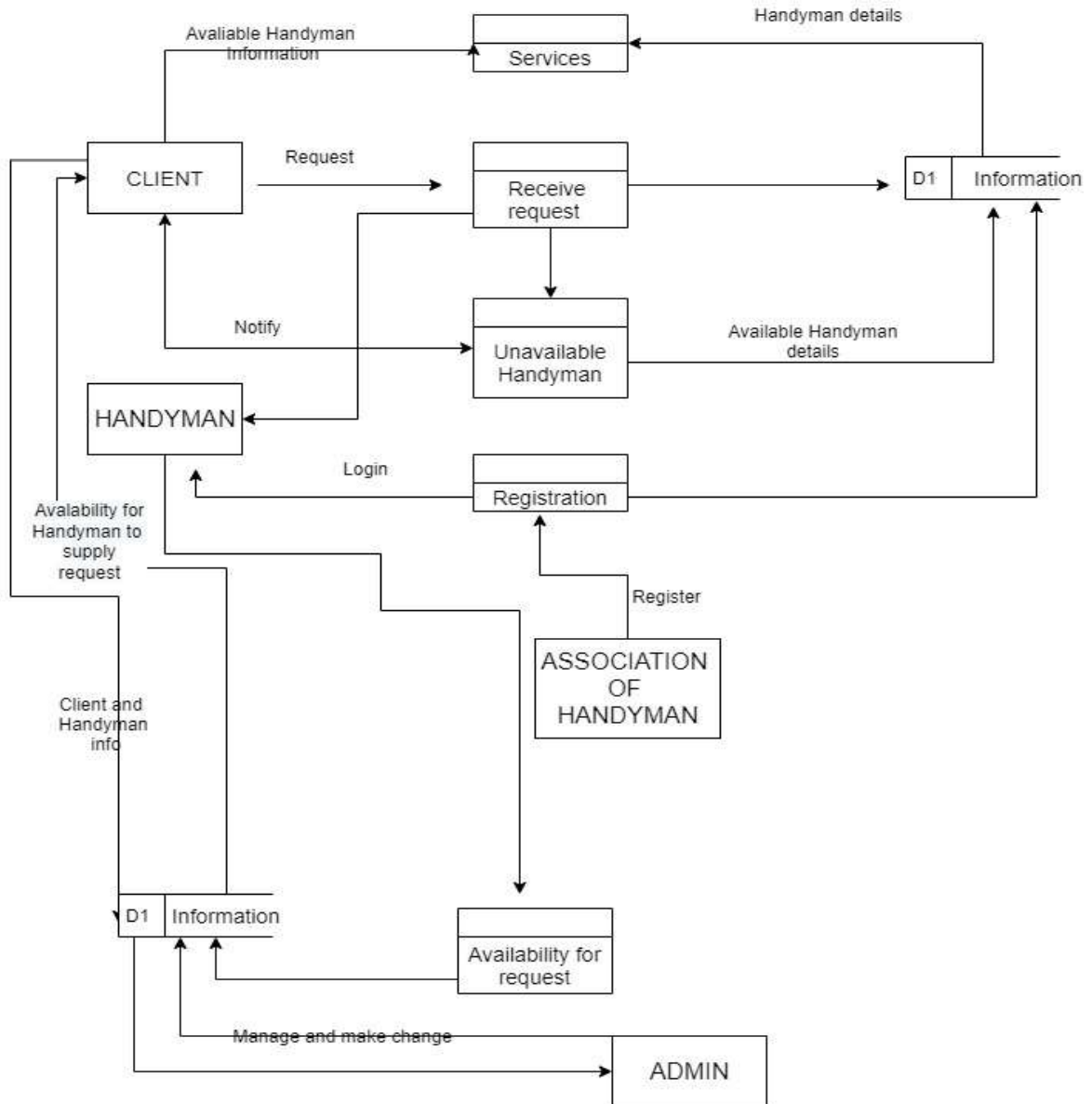
Figure 3: Level 1 Data flow diagram of the system

3.3 System workflow

The developed system requests the user (Client) to select a location around Osun, which would bring out registered handypersons in that location, as shown in Figure 4. The client long on to the app and select a location of his or her residence; these location details is used to provide handyman information in and around that location. The web dashboard reports and monitors the data submitted through the client web app to the database. The database houses data from the client's web application and dashboard. The server processes the request between the clients and the database through the internet sends the response accordingly.
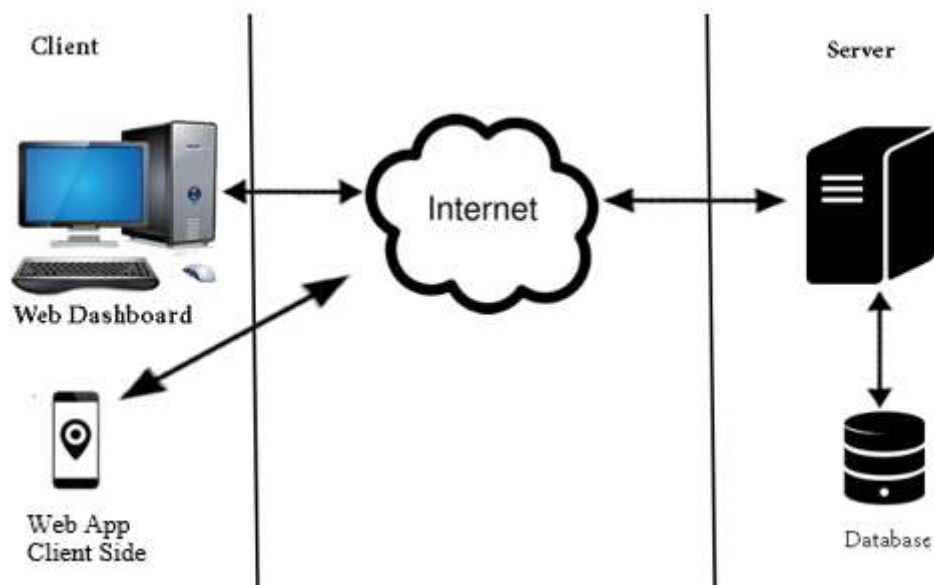
Figure 4: System workflow

4.0 DEVELOPMENT PHASE

This stage involves the development of the system, which involves the Client Side, the Server side and the database. The Client development was web scripting languages, including HTML5, CSS, BootStrap, JavaScript and jQuery, and the Server side was developed using PHP. All these technologies were chosen as the primary development framework due to their stability, security features and high performance. The primary development environment was the Bracket running on Windows operating system, and the localhost server was used to host and test the system locally before deployment.

4.1 Deployment
The system was deployed using Infinity free web host. This is because Infinity Free is an independent free hosting initiative dedicated to providing reliable free hosting service

4.2 System Testing Result And Evaluation

System Testing
The system testing process involved testing the application after development using the following techniques;

i. Usability testing
ii. Functional Testing
iii. Responsive Testing
iv. Performance Testing
v. Evaluation

After the system design, the designs were developed into the existing system, tested for workability, and checked whether they met the requirements outlined in the actual designs. This section presents the implementation and testing results.

5.0 The Web Application Target Environment and Description

The application was built to run on the web, which can be accessed on any device and any web browser engine. Below are screenshots of the web application and its functionalities.

Application Homepage
This is the first page the users (handyman, client) see when they access the website, the page allows the user to select from a category of vocations that would be handled by a different handyman and the search engine. Figures 5a and 5b show the user's homepage.

Client Booking Form

Clients or users can book a handyman by filling out the booking form as presented in Figure 6a and 6b. This form allows the client to input their detail and the problem for which they are requesting the service of a handyman.

Handyman Dashboard Screen

When a client needs the service of a handyman, they do so by Booking or request for such; the Booking then appears on the handyman dashboard, as contained in figure 7; the request appears as *Pending* until the handyman accepts it.

Figure 5a: User homepage
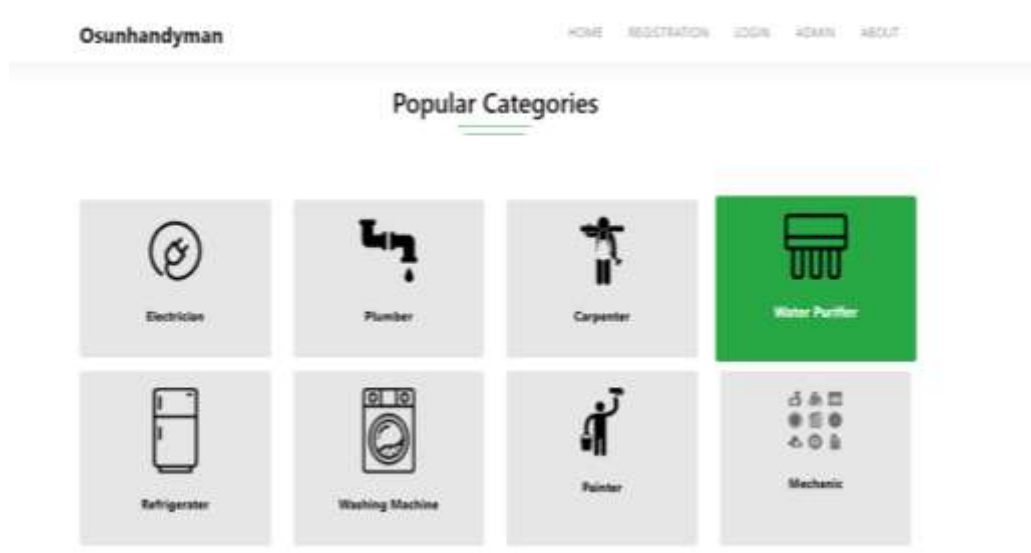
Figure 5b: Category section
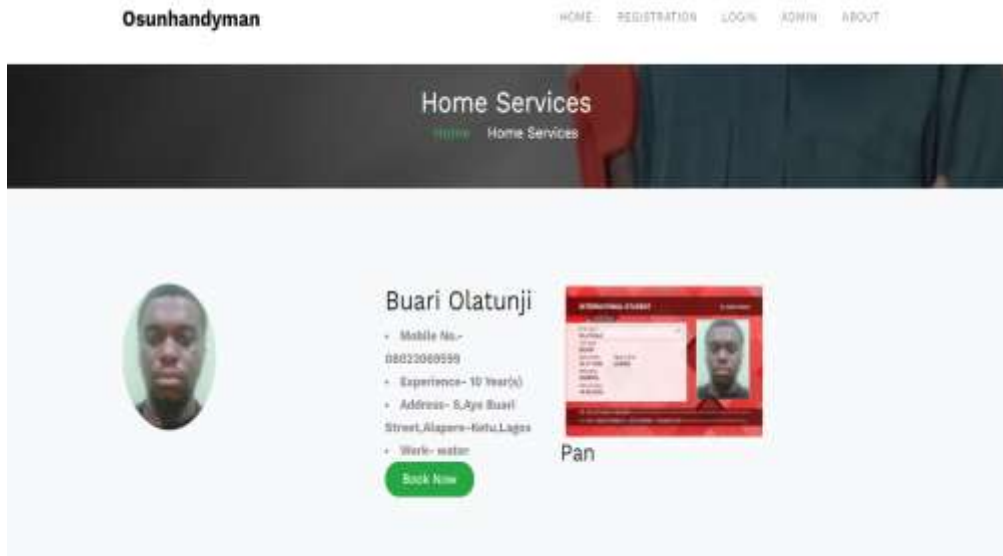
Figure 6a: Book Handyman Section
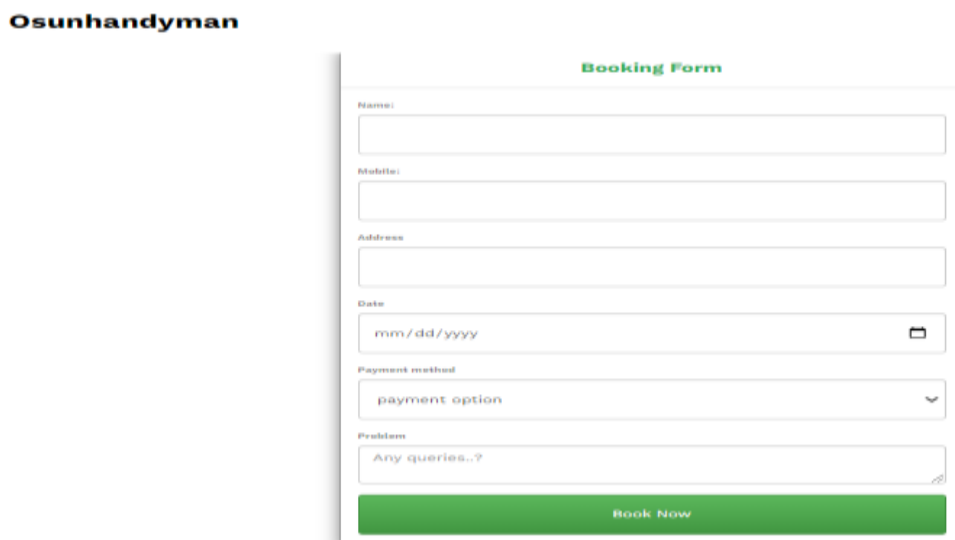
Figure 6b Client Booking form
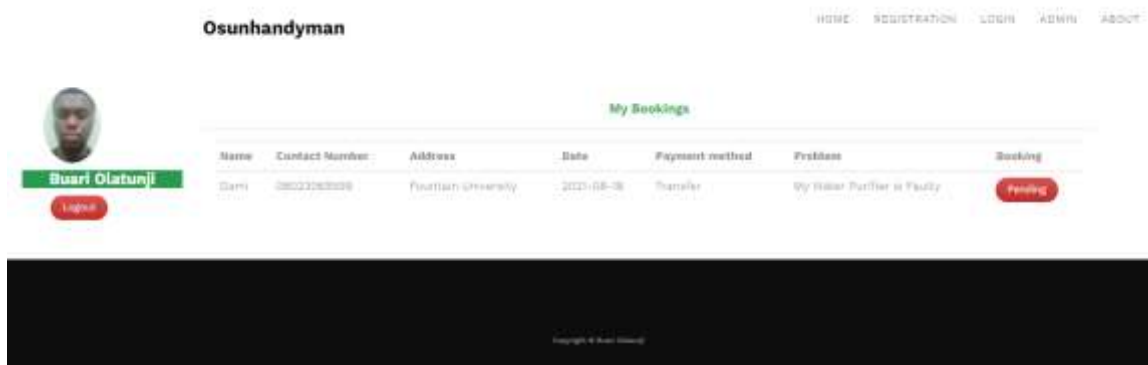
Figure 7: Handyman Dashboard Screen when booking is pending

When the handyman accepts the request, the status changes and turns to Confirmed, as contained in Figure 8.

Figure 8: Handyman Dashboard Screen when booking is confirmed

The Association of Handyman Management Portal

This part of the application is in charge of the registration of handyman through their respective associations, as shown in Figure 9 Only Handyman under these associations can be registered on this platform. The association can manage and control the handyman platform by adding and removing the handyperson. Figure 10 shows the dashboard containing details of registered handyman through their association.
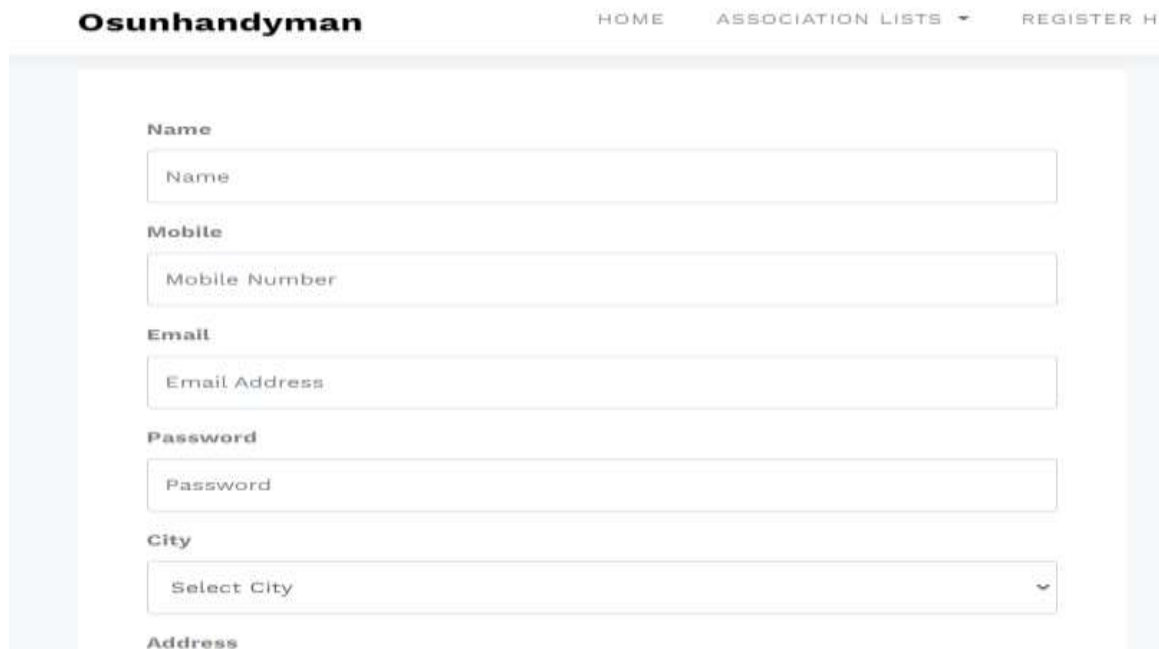
Figure 9: Handyman registration page

Figure 10 Association Dashboard

Administrator Page

This is the primary system administrator who has super administrative rights over the system and can access all the features of the system. The user category can edit the details of both the Booking and that of the handyman registered on the platform, add them to the system and remove them if they are no longer needed. Figure 11 shows the Administrator's dashboard and the functions they can perform. It shows a list of the handymen due to the review committee clicking on the view options of the handyman's menu. He can View or Delete the Handymen details.
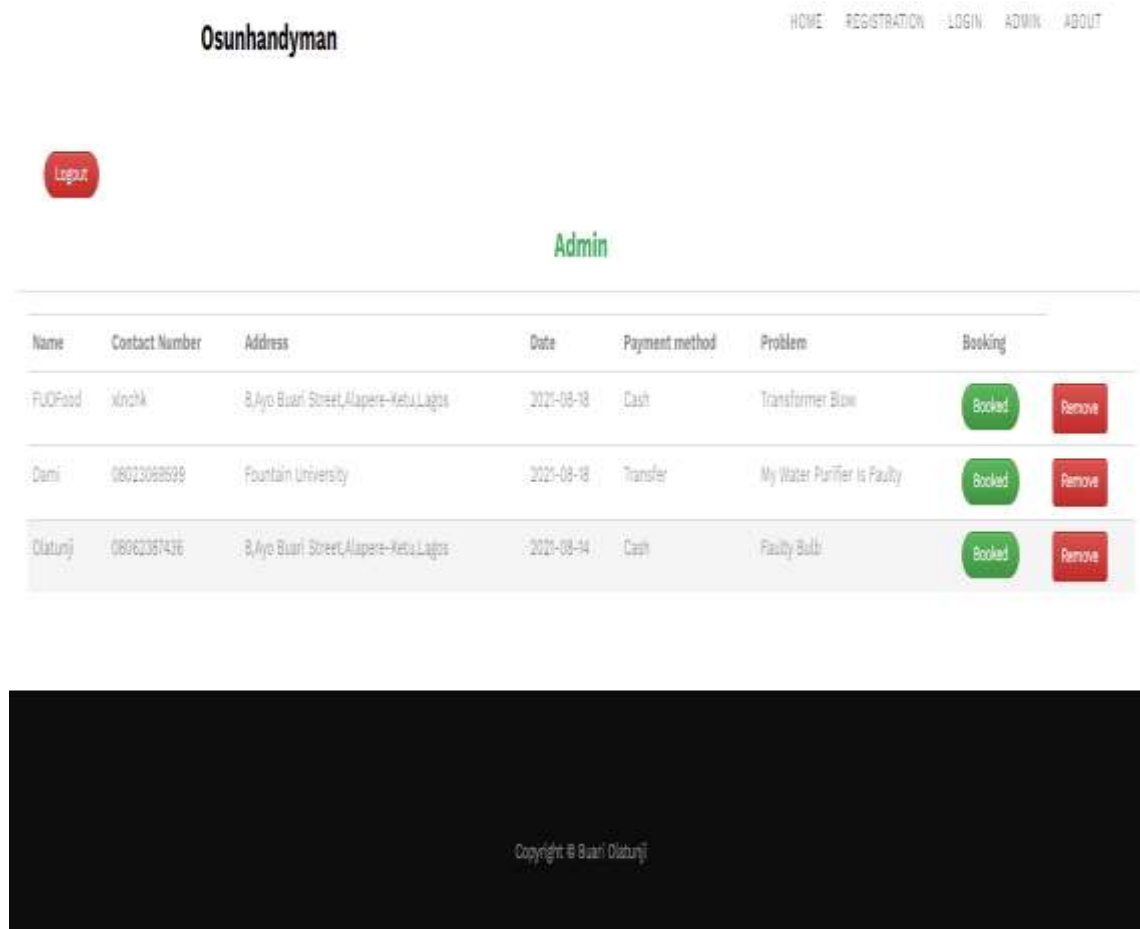

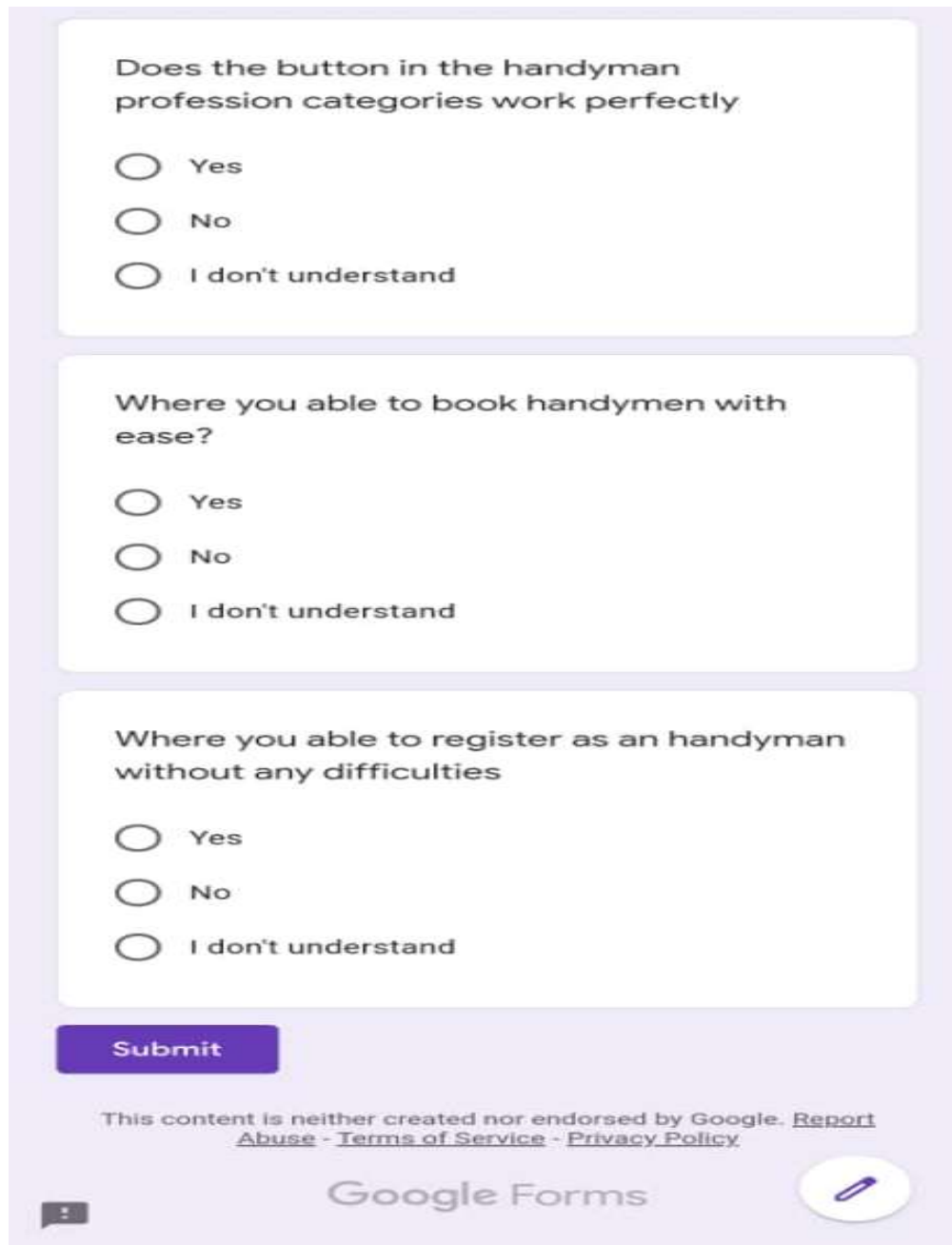Figure 11 Administrators Dashboard Screen

USABILITY TESTING

After the developer testing, the study sought to obtain user feedback on the website. This was done by supplying post-development questionnaires to 40 respondents using a google form to get their feedback after interacting with the web application. Users were given instructions on navigating around the website, interacting with it, and then filling in the question through the link provided. A sample of the questionnaire is shown in Figure 12. The responses from the respondents were gathered and analyzed, and the result is as follows.

Accessing the Website
The website was hosted on infinity for free for testing. This tests users' ability to interact with the website by loading the website online and creating a dummy client and handypersons account for testing. Figures 13, 14 and 15 express the outcomes of the assessments.

Figure 12: Questionnaire for User Testing

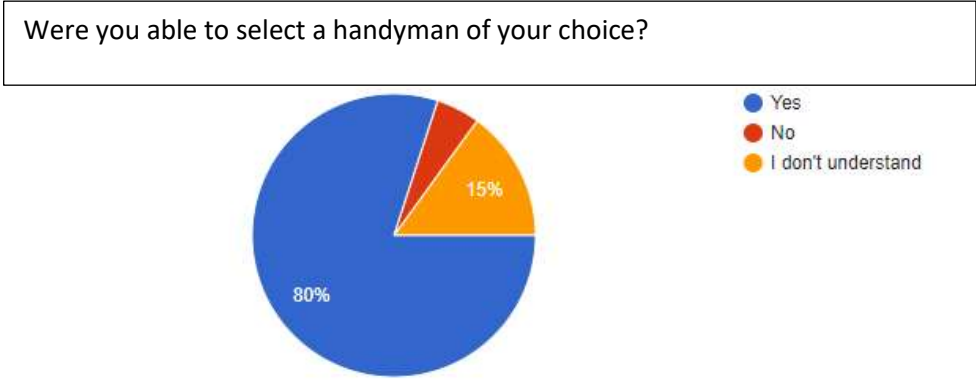Were you able to select a handyman of your choice?

Figure 13: Ability to select a Handyman Service assessment chart

The chart in Figure 13 shows responses from 40 random people after using the system. The chart shows that 80% of people could select a handyman of their choice while 5% couldn't, and the other 15% didn't understand the question.

The chart in Figure 14 shows the response from 40 random people after using the system, and the chart shows that 75% of people were able to book a handyman while 10% couldn't, and the other 15% didn't understand the question.
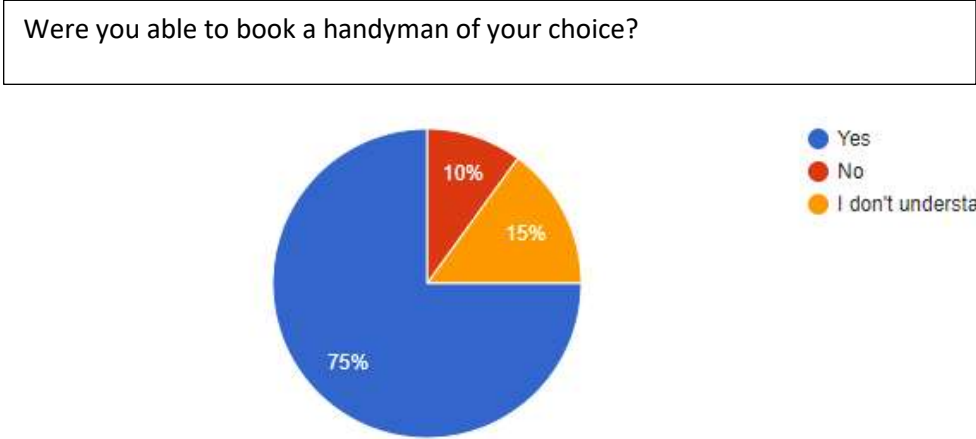

Were you able to book a handyman of your choice?

Figure 14 Booking a Handyman assessment chart

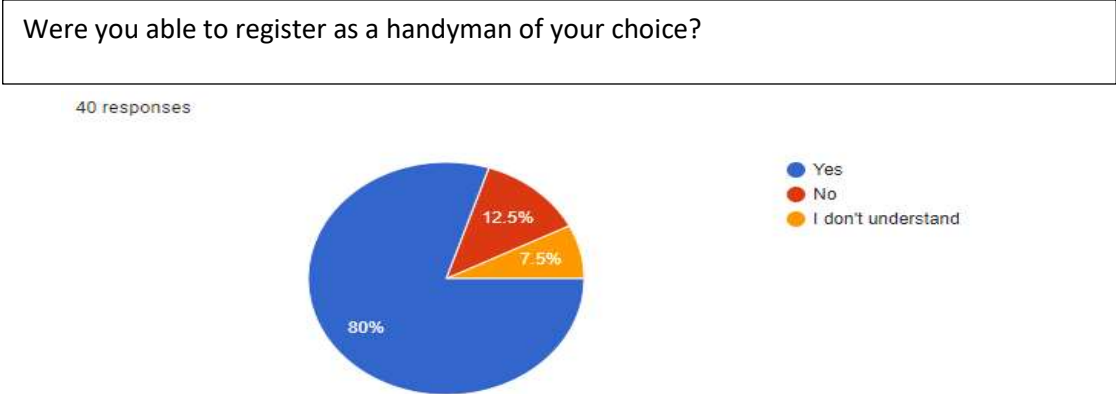Were you able to register as a handyman of your choice?

Figure 15: Handyman Registration assessment chart

The chart in Figure 15 shows the response from 40 random people after using the system, and the chart shows that 80% of people were able to book a handyman while 12.5% couldn't, and the other 7.5% didn't understand the question.

6.0   CONCLUSION

Based on the problem associated with the existing handyman service providers' platform, it is apparent that there is a need for a new system that will solve the inadequacies of the current system and provide better services to users in the Osun state and environs. Consumers wanted a system that would provide them with contact information for a handyman and some certainty that they were in safe hands. According to the findings, current systems do not provide clients with sufficient trust in the quality of service offered by handypersons. The developed system incorporates public trust and service quality by providing the association-approved means of identification and works history information to measure service quality. The new system is exceptionally interactive, easy to use, and suitable for on-demand services, increasing its relevance and adoption potential. The system is especially relevant and vital to the informal sector, as it makes getting handypersons easier in light of the current surge in demand.

7.0   FUTURE WORK

Further work can enhance the system by implementing an android or iOS version of the application. This would make the system compatible with all devices and smartphones. Integrating other payment gateways to aid in the activation of a handyman is another way to improve the system. System adoption and integration into the Osun e-governance system is crucial and should extend nationwide later. Support other common languages, such as French and Yoruba, to increase its usability and target more users.

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