Evaluation of Property Management System in Owerri Municipal Imo State, South East Nigeria (E-property)

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ABSTRACT

Property management system is a complete end to end solution to cover all aspects of Estate day to day activity and property buying and selling procedure for large and small organization. The objective of this work is to develop and design an e-property management system that will automate all processes of property management with the aim of making information concerning properties available on demand. I was motivated by the problems associated with the manual property management such as: loss of property documents, sales of property with fake property documents, conspiracy of fraudsters with staff of ministry of lands as well as the numerous litigations and other violent acts associated with manual property management. The software engineering methodology adopted is structured system analysis and design methodology. The expected result is to develop a property management software that will guarantee the effective and efficient management of properties that can reduce illegal practices associated with property management.

Keywords: Property, Agent, Software, Documents, Imo

INTRODUCTION

Property management is the process of managingproperty that is available for lease by maintaining and handling all the day-to-day activities that are centered around the piece of real estate. Property management typically involves the managing of property that is owned by another party or entity. The property manager acts on behalf of the owner to preserve the value of the property while generating income. Esben, (2012). Property managers are typically paid a fee and/or a percentage of the rent brought in for the property

while under management. Property management may involve seeking out tenants to occupy the space, collecting monthly rental payment to maintain the property. If you have just purchased an investment property, you'll want to be sure that it is properly managed. A property manager handles the array of responsibilities that come along with this field, preventing vacancies in rental properties and ensuring that investors receive the maximum financial return.

Many real estate agencies have property management departments that cannot provide an array of services to help the rental process run more smoothly. Yet you will want to be sure that you choose an agent who has the right qualifications and experience to perform these tasks adequately. Property management system are computerized systems that facilitate the management of properties, personal property, equipment, including maintenance, legalities and personnel all through a single piece of software.Oyetunji, Ojo, & Oyetunji-Olakunmi (2018).

Imo state with its high population and few urban cities are faced with challenges of accommodation for her citizens and visitors. Property management in Owerri municipal is the sole responsibility of the ministry of lands and urban development. This responsibility is carried out by naming streets, plots numbering ; such that card records are kept depicting the street, plot number, owner of plot, data on plot number, government properties, open spaces, roads built and unbuilt, markets, hospitals, residential areas.Apulu and Latham, (2011).This ministry manages the allocation of spaces in such a way that marked areas are not abused by members of the society. Sales of properties are also controlled as information verification on properties is carried out at the ministry. When a property is sold, the transfer of ownership is registered and the new card replaces the old. Information concerning the status of open lands, government properties are verified by ministry using cards for all plots.

Due to the problems possess by the manual system such as, Keeping records on all properties and lands in Owerri on cards result in stacks of cards and cabinets filled with files, Searching through these files is no mean job, There is possibility of altering information since files are exposed to unauthorized members and Information may be destroyed by fire, water or rodents, Misplacement of card or theft is also possible. The research tails to address the above challenges.

LITERATURE REVIEW

Database Management System

A database management system (DBMS) is a set of computer programs that controls the creation, maintenance, and the use of the database with computer as a platform or of an organization and its end users. It allows organizations to place control of organization wide database development in the hands of database administrations (DBA) and other specialists.

A DBMS is a system software package that helps the use of integrated collection of data records and files known as databases. It allows different users application programs to easily access the same database.DBMS may use any of a variety of database models, such as the network model or relational model.

In large systems, a DBMS allows users and other software to store and retrieve data in a structured way. Instead of having to write computer programs to extract information user can ask simple questions in a query language. Thus many DBMS packages provide fourth generation programming language (4GLS) and other application development features. It helps to specify the logical organization for a database and access and use of the information within a database. It provides facilities for controlling data access enforcing data integrity, managing concurrency controlled, restoring database.

Types of Database

Database can be differentiated according to function;

a. **Analytical Database:** this is also known as On-line Analytical Processing (OLAP). They are primary static, read-only database which store archived, historical data used for analysis. For example, a company might store sales records over the last ten years in an analytical database and use that database to analyze marketing strategies in relationship to demographics. They are often seen as inventory catalogues which hold descriptive information about all available products in an inventory.

b. **Operational database:** also known as On-line transaction Processing (OLTP). This is used to manage more dynamic bits of data. It allows one to view and modify (add, change or delete) data. It is also used to track real time information. For example, a company might have an operational database used to track warehouse or stock quantities. As customers order products from an online web store, an operational database can be

used to keep track of how many items have been sold and when the company will need to reorder stock.
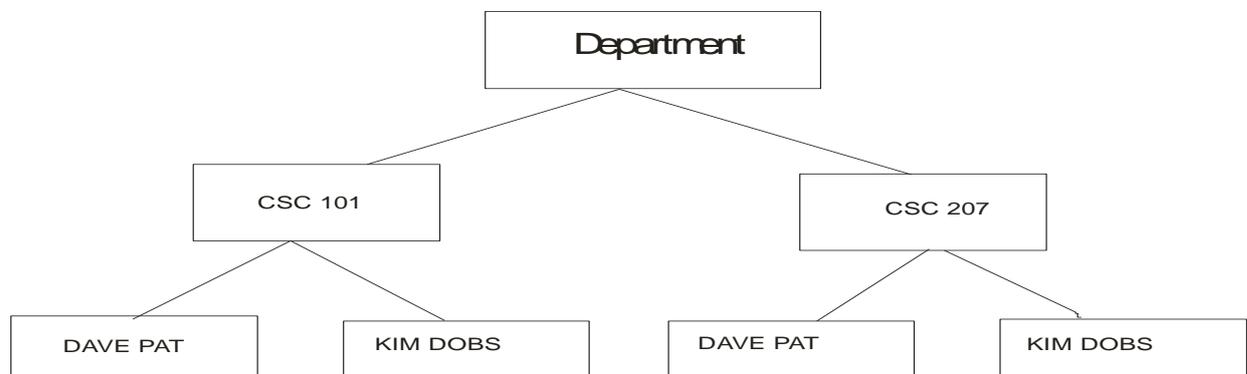
Database Models

Database can also be differentiated according to how they model the data. A DATABASE model is a description of both a container for data and a methodology for storing and retrieving data from that container. They are abstractions, mathematical algorithms and concepts. The analysis and design of data models have been the corner stone of the evolution of databases. As models have advanced, so has data efficiency.

Between the periods of 1969-1980, the era was called the era of non-relational database by the article "learning computing history" (2004). The two most commonly used database models at this period were the hierarchical and network models. For these models, the keys that represented links between tables had to be specified when the tables are defined.

a.   **Hierarchical Databases**This type of database defines hierarchically arranged data relationships. The data relationships are thought of in terms of children and parents tied together by links called pointers which make the data systematically accessible. To access a low-level table, one gets to the root and works the way down through the tree until the target is reached. The method of data access brings about the major problem of this system. The user must know how the tree is structured in order to find anything. Also, the problem of data redundancy came up because it handles one-to-many relationships well, but does not handle many-to-many relationships.

Due to these problems, the network database model was created.

Fig 1:Hierarchical Database

b. Network Databases This model solves the problem of data redundancy by representing relationships in terms of sets rather than hierarchy. It originated in the Conference on Data Systems Languages (CODASYL) which had created the database task group to explore and design a method to replace the hierarchical model which is a subset of the Network model.

The Network uses set theory to provide a tree-like hierarchy with the exception that the "child" tables were allowed to have more than one parent enabling the Network Model support many-to-many relationships.The following diagram emphasises these models.
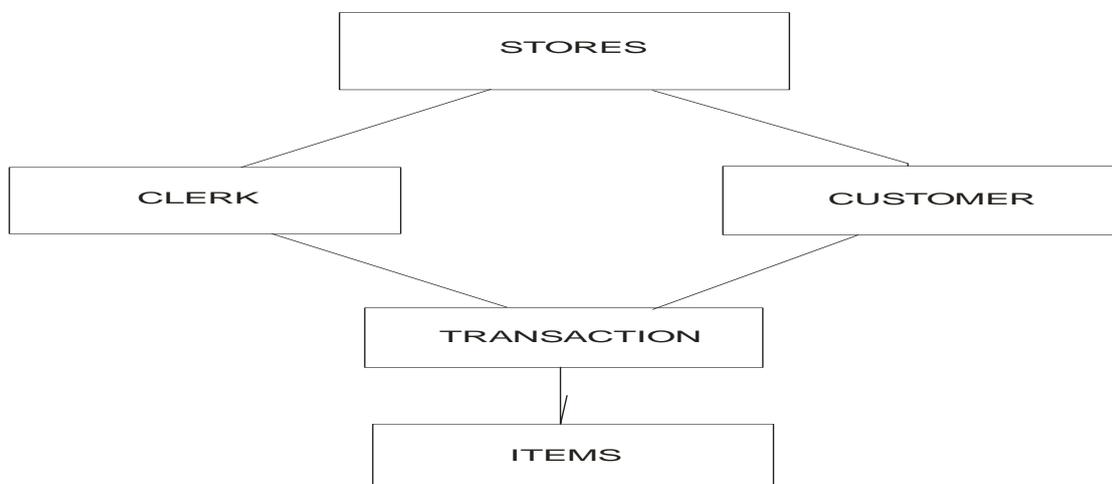
Fig 2: Network Database

Gitau (2014) carried out a study to examine the impact of information technology and the extent of applications and implementation within real estate firms in Kenya. The study further examined the variations in firms' responses, and how increasing use of ICTs impact on firms' operational activities. Primary data was collected using a questionnaire survey conducted on 153 firms randomly selected from office buildings located in the Central Business District (CBD) of Nairobi and other key submarkets on the fringe of the CBD. Findings revealed that ICTs have a significant, positive impact on the way real estate firms carry out their activities.

Adeyemo et al. (2015) explored the motivating factors influencing the use of Information Communication Technology in real estate practice in Minna. Survey data was collected to examine the relationship that existed between internal and external motivating factors. The study categorised the motivating factors into external and internal categories and used a

sample of 15 estate firms, which are limiting barriers to the effective use of factor analysis. The result indicated an increased productivity of staff, enhanced quality of customer services, knowledge sharing, information accessibility, improved decision making, and time-saving as internal motivating factors. The external motivating factors which influence firms, alongside competitors' pressure, also depend on the availability of Information Communication Technology infrastructure, management, business size and overall cost. The study also revealed that there is a negative correlation between internal and external motivating factors.

Empirical studies on design and development of Property Management Systemalongside Information Communication Technology adoption have yielded ambiguous results. While some studies found a positive relationship between property firm size and the adoption of Information Technology through the Property Management System (PMS) (Arduin, Nascia and Zanfei, 2010; BenYoussef, Hadhri and M'Henni, 2010; Gallego et al., 2011), other studies have shown an insignificant or a negative correlation between them (Bayo-Moriones and Lera-Lopez, 2007; Bocquet and Brossard, 2007). Furthermore, Hollestein (2004) maintains that the relationship is non-linear by asserting that firm size has a positive impact on the adoption and use of Information Technology. Despite these studies, no logical conclusion has been reached as to the inherent factors that have motivated the use of a well design property management system in the Nigerian real estate sector. The findings of most research on property management system usage and its application have not identified the major factors that can be said to influence the adoption of Information Technology in real estate practice in Nigeria and particularly the study area, Imo. This gap in the literature is therefore the basis for this study.

The factors utilised for investigation were extracted from the literature review. The need tokeep an updatable information management system were adopted and modified from Sawyer and Crowston (1999). Increasing competition level among practitioners, attracting more clients, and changing trends in technology were taken from Oladapo (2006). Factors such as the need to prevent illegal property sales and other fraudulent property activities, to create more opportunities and to portray the firm image were modified and sourced from Asgarkhani and Young (2010). The need to eliminate the cumbersome manual process of record keeping, to eliminate the incidents of information loss or alteration by unauthorized personswere selected from Spanos, Prastacos, and Poulymenakou (2002)

METHODOLOGY AND SYSTEMS ANALYSIS

During the research work, data needed was gathered from various sources. In gathering and collecting necessary data and information needed for system analysis, two major fact-finding techniques were used in this work and they are:

(a) Primary Source

This refers to the sources of collecting original data in which the researcher made use of empirical approach such as personal interview and questionnaires.

(b) Secondary Source

The secondary data were obtained by the researcher from written documents such as magazines, Journal, Newspapers, Library source and Internet downloads.

Written document, for any work to be successfully achieved, a research could be made to know what writers and scientists observed in retrospect to the research topic. In the process of this research/project, past documents are consulted which serve as a secondary source of information and act as an addictive, pave a way for a researcher to understand or know a little about the project topic.

EXPECTED TOOLS

I will use database replication strategy which includes mirroring of database content so as to increase availability and fault tolerance

A SEQUENTIAL METHODOLOGY

In a sequential methodology, informally known as the waterfall, the analysis phase comes first, then the design phase, followed by the implementation phase, and finally by testing phase. The team that does each phase may be different, and there may be a management decision point at each phase transition.

A sequential methodology is successful when the complexity of the system in low and requirement are static. A sequential methodology simply states that first one should think about what is being built, and then build it with quality. It allows for a software engineering methodology which is in alignment with hardware engineering methodology methods and practices and it forces a discipline process to avoid the pressures of writing code long before it is known what is going to be built.

Many times, an implementation team is under pressure to build some code before the analysis is completed only to later discover that the code is not needed or will contribute

little to the end product. Unfortunately, this early code becomes a costly legacy: difficult to abandon and difficult to change. A sequential methodology forces analysis and planning before implementation. This is good advice in many software engineering situations and the process forces the analysis team to precisely define the requirements. It is much easier to build something if it is known what that something is, A sequential methodology might fail for many reasons. A sequential methodology requires the analysis team to be nearly clairvoyant, they must define ALL detail up front, there is no room for mistakes and no process for correcting errors after the final requirements are released. there is no feedback about the complexity of delivering code corresponding to each one of the implementation, and it may not be even be possible to be implemented with today's technology. Had the requirement team known that a particular requirement could not be implemented, they could have subtitled a slightly different requirement that met most of their needs and could have been easier to achieve.

a. Communication between teams becomes a gating item. Traditionally, the four teams may be different and cross-team communication may be limited. The main mode of communication is the documents that are completed by one team and then passed to another team with little feedback.

b. The sequential methodology puts so much emphasis on planning, that in a fast-moving target arena, it cannot respond fast enough to change. There is no early feedback from the customer and customers may change their requirements. Frequently, once the customers see a prototype of the system, the customers change their requirements.

A CYCLICAL METHODOLOGY

A cyclical (spiral) methodology, informally known as the spiral, fixes some of the problems introduced by a sequential (waterfall) methodology. A cyclical methodology still has the four phases. A little time is initially spent in each phases, following by several iterations over all phases. Simply, the methodology iterates over processes of think a little, plan a little, implement a little, and then test a little. The document structure and deliverable types from each phase incrementally change in structure and content with each cycle or iteration. More detail in generated as the methodology progresses. Finally, after several iterations, the product is complete and ready to ship. The cyclical methodology may continue shipping multiple versions of the product. Ideally, each phase is given equal attention.

THE CYCLICAL METHODOLOGY

A   ____   Analysis

D   ____   Design

I   ____   Implementation

T   ____   Testing

A cyclical methodology is an incremental improvement on a sequential methodology. It allows for feedback from each team about the complexity of each requirement, there are stages where mistakes in the requirement can be corrected. The customer gets a peck at the results and can feedback information especially important before final product release, the implementation team can feed performance and viability information back to the requirement team and the design team, the product can track technology better. As new advances are made and the design team can incorporate them into the architecture.

A cyclical methodology has no governors to control oscillations from one cycle to another cycle. Without governors, each cycle generates more work for the next cycle leading to time schedule ships, missing features, or poor quality. More often than not, the length of number of cycles may grow.

a. There are no constraints on the requirement team to "get things right the first time" this leads to sloppy thinking from requirement team, which gives the implementation team many tasks that eventually get thrown out.

b. The architecture team is never given a complete picture of the product and hence may not complete a global architecture which scales to full size.

c. There are no firm deadlines. Cycles continue with no clear termination condition. The implementation team may be chasing a continuously changing architecture and changing product requirement.

CHOICE OF SOFTWARE ENGINEERING

I intend to follow the sequential rule of software engineering. This is because my objective is well defined and front loading terms will not pose any challenge. Also my project is scalable and applying the rules of the sequential methodology will directly address frontloaded problem since there will be no room for analysis, design and implementation errors.

FUNCTIONAL REQUIREMENTS

This e-property application is a desktop based application, which means it has a console based platform. Visual C# has been used as the technology in developing this application, the purpose of this choice of programming language is shown below.

- Popularity: The language has a C++ syntax which most programmers are familiar with. This accounts for the technology's popularity and preferred choice amongst programmers.

- Popular Platform: This technology supports one of the most popular operating systems, Windows, thus, makes it a potential suitor for virtually all clients.

- Error Detection: The errors of the programming language can be detected and located easily through Visual Studio's strong debugging engine. Commercial debuggers can also be downloaded to detect the syntax errors in the code.

- Simple to use: The simple to use syntax of C# makes error resolution quick.

The database query language used in this application is the Structured Query Language (SQL).

a. Non-functional requirements

Any software application is expected to have certain properties which would ensure its productivity; amongst these properties are reliability, consistency and accuracy. This application has been tested to pass these requirements.System Architecture
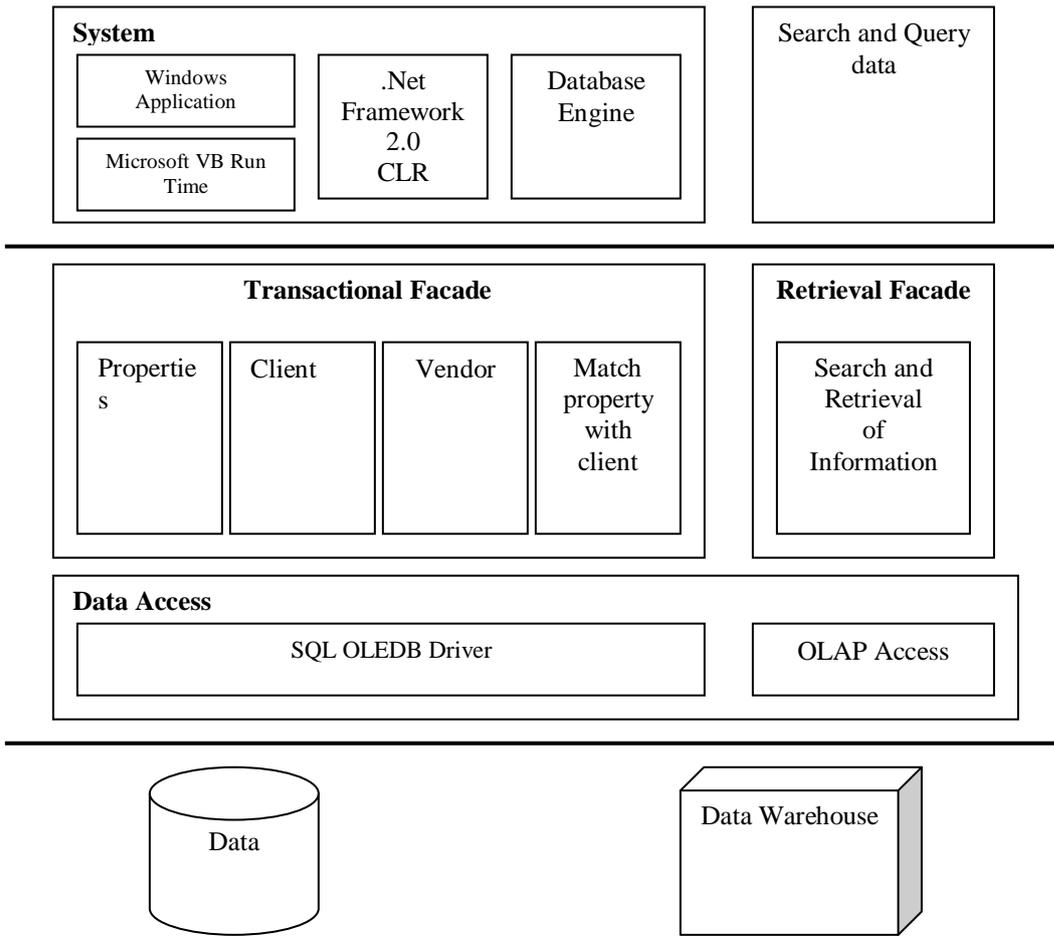
High Level Solution Architecture

USAGE SUMMARY/ INFORMATION DIAGRAM

Property Management System Version 1.0 will address the following use cases. Selected use cases will be expanded into usage scenarios and features that are derived from both use cases and the usage scenarios, as represented in the following diagram:

Usage summary use case

Property Management System

Search property

View Property Details

User

View Client

Property Details

Supervisor

Match Property

Update Property

Manage Transaction

Generate Letters

Vendor Details

Administrator

Manage Users
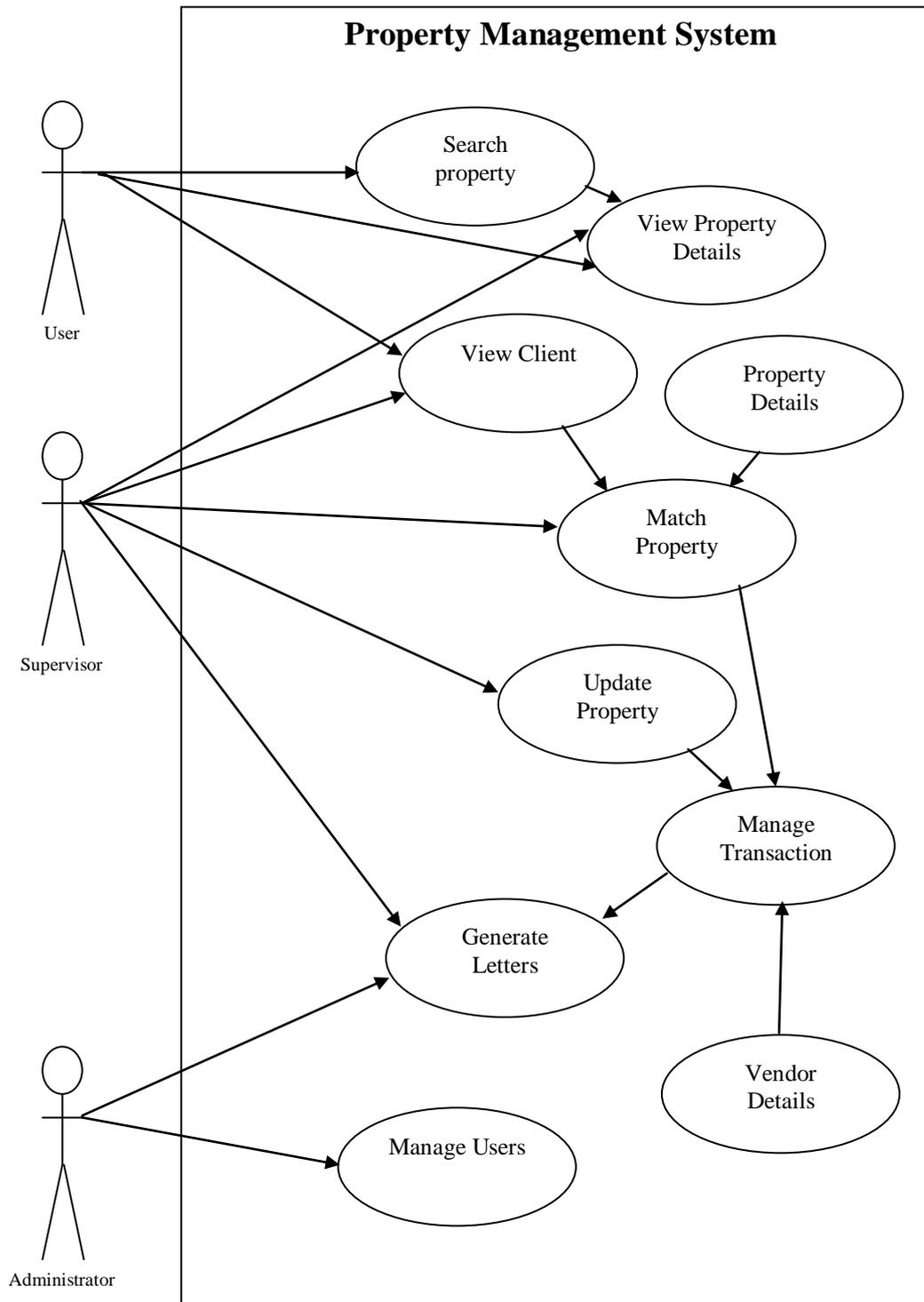
HIGH LEVEL MODEL

SYSTEMS DESIGN AND PRESENTATIONS

SOFTWARE REQUIREMENT

a. DEVELOPMENT TOOLS AND TECHNOLOGIES

1) VISUAL C#

Visual C# is built on the Windows Server System to take major advantage of the OS and which comes with a host of different servers which allows for building, deploying, managing and maintaining Windows Based solutions. The Windows Server System is designed with performance as priority and it provides scalability, reliability.

The advantage of Visual C# includes: Rapid Application Development (RAD) Support, Powerful Windows-based Applications, Simplified Deployment, Powerful, Flexible, Simplified Data Access, Improved Coding, Direct Access to the OS Platform, Object-Oriented Constructs and COM Interoperability

2)   SQL   Server.

When we choose a backend for an enterprise level application we have so many options, like Oracle, Sybase, MySQL, however we choose Microsoft SQL Server 2000 as our database, and it has so many features which is ideal for our dot net based application. Includes: Support for Multiple Platforms, Integration with Windows 2000, Integration with Microsoft .NET Enterprise Servers, Scalability, Replication, Centralized Management and Reliability

DESIGN GOALS AND CONSTRAINTS

Performance

No more than a 5-percent degradation in average query response is allowed while all concurrent user are using the system.

Processor utilization should not exceed 80 percent during all concurrent users are using the system.

Availability

Because the system is accessed by more than one concurrent users so there should not be any single point of failure.

Security

Every resource in the system are defined by the role and privileged. System administrator assigned user role and privileged for their access rights.

Setup/Installation

Setup and installation must not interrupt the system user's daily tasks and work flow.

HARDWARE REQUIREMENT

The recommended memory requirement for this application would be a system with a minimum of 1GB RAM, this is to enable smooth running of the browser which would load this dynamic and media enabled page, this page would also include scripts which would not normally run on systems with low memory space.

This application also requires a system with minimum storage space of 50GB, but in a situation whereby the user of this application may download resources from this application's interface, a minimum storage space of 120GB is required. This much space is needed to accommodate as much documents as needed by the user of this application.

The peripherals needed for this application would depend on the user of this application. For example, a printer would be a necessity if the user intends to print out invoices, reports or books downloaded through the application.

GENERAL REQUIREMENT FOR SERVER/CLIENT:

The server used for this application is the MySQL server which is bundled with the PHPMyAdmin. Any web server that is capable of web hosting can run this application sufficiently. The database structure for this application has been reproduced below.

The testing server used for this application is Wamp server. This server comes in handy when the application is to be used or tested locally.

Type	Software	Hardware
Work Station/ Node	1. Windows XP 2. .NET Framework 2.0	1. P-4 2. RAM -256 MB 3.Hard Disk-40GB
Database Server	1.Win2000 Advance Server 2. SQL Server 2005	1.P-4 2.RAM- 1GB 3.Hard Disk-40GB
Application Server	1.Win 2000 Advance Server	1.P-4 2.RAM- 1GB 3.Hard Disk-40GB

Design of interface for output

Based on the expected output by all operators of the application, Visual C# was chosen to present details to all units in a very pleasing, user-friendly and efficient manner. With Visual C#, various elements and tools from the Visual Studio Toolbox containing Property Management details are presented to the users in a sophisticated format.

The various interfaces available in the e-Property Application are reviewed and discussed in detail.

The interfaces discussed are;

1. The basic User and Authentication Interface(or the Sign-in form)
2. The Administrator's management Interface
3. The Property Search Interface
4. User Management Interface (Add)
5. The Purchase Interface

THE BASIC USER AND AUTHENTICATION INTERFACE (or the visitor's page)

Basic User Interface (Sign-in Form)

The basic user interface demonstrates the design of the first page that the potential system operators as well as the casual visitors would see. This page allows for the authentication of operators (members and administrators).

THE ADMINISTRATOR'S MANAGEMENT INTERFACE

Administration Management Interface

This interface provides tools to manage properties, staffs, clients, reports data.

THE PROPERTY SEARCH INTERFACE

This interface provides a search module where properties can be easily filtered based on user-input criteria's for quicker reach and management.

USER MANAGEMENT INTERFACE

This module enables new more than one user have access to the application based on their levels in the company, either Administrators or lower-level Operators.

PURCHASE INTERFACE

SECURITY ISSUES

An important feature of the system, which is the authentication and authorization mechanisms, is built into the application. Using the form-based mechanism, no user can have direct access to any of the modules without being authenticated and possessing the privileges required to do so
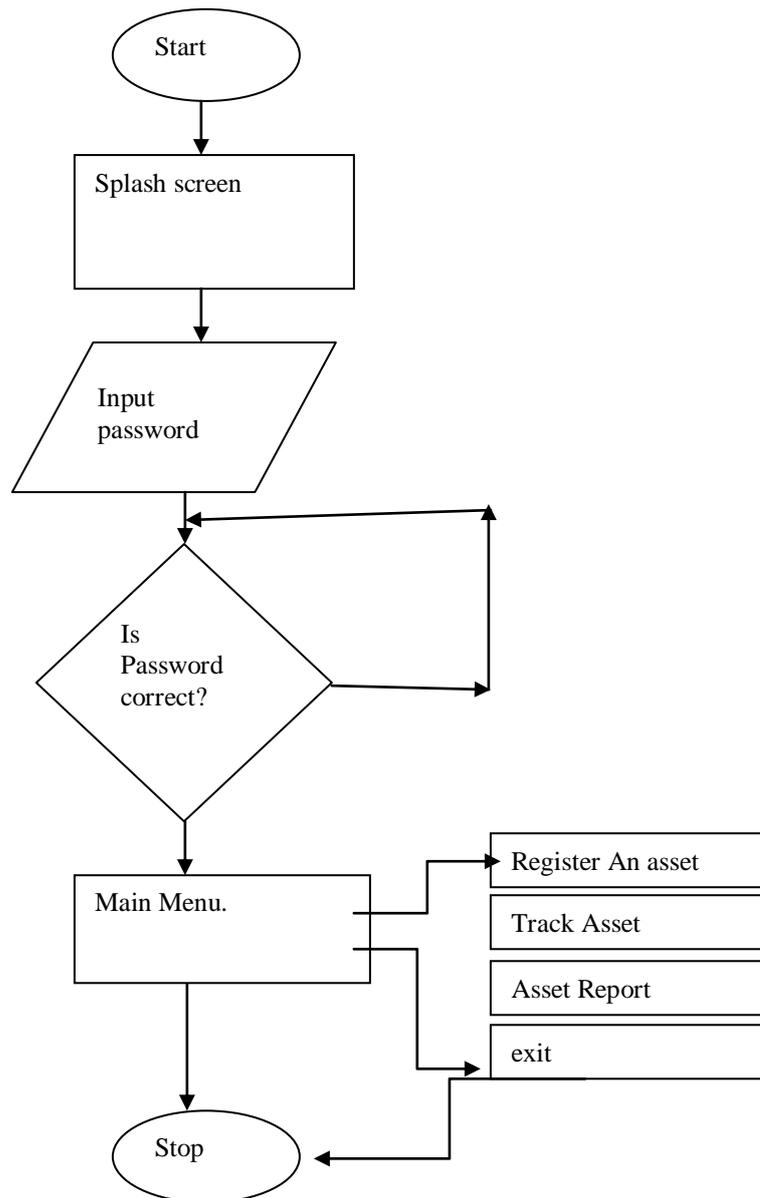
FLOWCHART

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                          ┌─────────┐
                          │  Start  │
                          └─────────┘
                               │
                               ▼
                    ┌──────────────────┐
                    │  Splash screen   │
                    │                  │
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                    │                  │      ├──────────────────────┤
                    │                  │      │  Track Asset         │
                    │                  │      ├──────────────────────┤
                    │                  │      │  Asset Report        │
                    └──────────────────┘      ├──────────────────────┤
                               │              │  exit                │
                               ▼              └──────────────────────┘
                          ┌─────────┐
                          │  Stop   │
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Fig 3: Flowchart

TESTING

UNIT TESTING DURING DEVELOPMENT

Testing during development was carried out on a personal computer, running on MS Windows. The project code was run using the Wamp server installed on the machine. With the Wamp server, the project code was archived into a single web archive file and deployed on the Tomcat server installed on the machine. The web application was accessed from various browsers to ensure there were no compatibility issues. All modules were accessed and operated under various conditions to discover faults that could render the application inefficient. Testing during development was informal – simply running the

applications, trying to test each area of functionality. Problems encountered were recorded in a list of issues to be investigated.

This type of testing is purely evaluating software performance, checking that there are no bugs and that any data entered into the database is correct. It ensures no anomalies occurred and the system does not crash whilst being used on a day-to-day basis. Throughout the implementation of the system, unit testing has been continually performed to guarantee the end testing is relatively straightforward and the final system is as error free as it can be.

In order to make this type of testing complete, a systematic approach is used so that every part of the system is checked. The testing encompasses different ways of trying to break it through procedures that a user might try to carry out when using the system. Consequently, when the system is in proper use, there is less likely to be any continuous errors or future maintenance needed. The test design was based upon evaluating every aspect of the system, from the initial main screen and updating assets details, to updating application configuration details (components, locations, staffs, login details).

Criteria

Evaluating a system means focusing on its 'organizational' impact rather than just physical performance. It needs to be related to the requirements of the individual organization and its users (Angell et al, 1994). From this analysis, the first evaluative aspect should be whether the system has met and exceeded the user requirements of the project.

In addition, the system has to be evaluated as to how successful these solutions are. Some of the evaluation has to be based around quantifiable measures in order to make it as objective as possible.

There are many choices regarding the judgment of exactly what to evaluate in this way. The most appropriate key concepts and measures for the complete evaluation of this system have been assessed, from which the quantifiable evaluation criteria have been based.

These are:

- **Effectiveness:** This evaluates the levels of user performance, measured in terms of speed or accuracy, proportion of tasks and probability in completing a given task.
- **Learnability:** This refers to the ease with which new or occasional users may accomplish a given task.

Finally, there is a need to assess the current system in relation to the previous system in terms of comparative advantages and disadvantages. This will hopefully demonstrate the overall usability of the system in terms of the original criteria.

As discussed in the design of the report, due to time constriction not every requirement that the users desired has been successfully implemented. In a real project situation, this tends to happen frequently, but what has been successful in this project is that the system is extremely useable without these few extra enhancements. Future proofing has also been added to the system so the ease to which they can be added in the future has increased.

Quantifiable Criteria

When using quantifiable criteria, a decision has to be made when to carry them out. It seemed most appropriate to carry out this evaluation after the user-acceptance testing, since the user would be familiar with the system and able to be more objective. The only problem with carrying out the evaluation at this point is that the users are at the start of their learning curve of the system and are bound to find the system slightly strange and awkward. It is also necessary to note that this type of criteria is usually based on several users; this evaluation has been carried out on just one user, (a coursemate) as the time constraint could not allow evaluation on the intended users; and so the result could be seen as being slightly subjective.

a. Effectiveness

This is deemed to be evaluating a required range of tasks, which are to be completed at a specified level of performance within a certain time. It is necessary to measure effectiveness because if the functionality is there to do a task but it takes twice as long a previous method to do the same tasks, the actual system could be looked upon as a failure. Consequently, it has been decided to quantify it in terms of time, as the users need the system to be as simple and intuitive as possible:

b. Learnability

This can be seen as a user being able to use the system within a specified time based upon some specified amount of training and support. Again this is to make sure that the system is intuitive. But also, with the nature of the system, there is not likely to be 'on-hand support' for the users of the system for any difficulties they might have. It is necessary that the users do not require any after-support help. From this, the quantifiable statement is:

Overall Advantages over the manual procedure

The main advantages are as follows: Web based - can be accessed from anywhere using any device that support Javascripts: Centralized data storage – All modules operate on a single data source enabling totally agreeable statistical data across all modules, Real time updates – Updates made by each module are instantly reflected across other modules automatically and Concurrent access – All modules can operate on the system at the same time.

The only disadvantage was seen to be some functionality such as the calendar selection for dates was lost but this is something that can be added in the future but does not cause any problems in the actual usage of the system at the present time.

CONCLUSIONS AND RECOMMENDATIONS

In conclusion, this paper was a success. It is a major step forward in the process of managing estate agent and property. The solution created is a successful way of monitoring the status of estate agents. The most appropriate method from a number of possible solutions was selected, and used ideas from Model-View-Architecture to produce a solution that is appropriate and well devised. Careful planning has ensured that at each stage decisions were based on producing the most user friendly outcome rather than, what would technically be the best solution.

The findings in this study agreed with that of Alam and Moh'd Kamal (2007) and Adeyemo et al., (2015). Both suggest that the increased productivity of staff, enhanced quality of customer services, knowledge sharing factor and information accessibility, improved decision making, and time-saving are the most highly motivating factors influencing the design and development of Technology s in real estate practice. The findings are also in tandem with that of Hamdi (2013), who notes that technology will continue to improve various aspects of the construction industry including the services provided, the enhancement of efficiency, performance and consequently the productivity of the firms involved. Hence, the results also support the view of Peansupap and Walker (2005), who state that new technologies have resulted in cost reduction of communications through computerisation. The implication of the findings to the Nigerian real estate practice will appreciate the role of Information Technology as a tool of enhancement for their mode of operation. Furthermore, it highlights the inherent benefits that arise with maximum utilisation of Information Technologye-property in this national sector. This will help in building Nigerian real estate databases and clients' satisfaction.

The application at this stage of development works satisfactorily and meets its requirements. However, there are many more advancements that can be considered in order to improve its functionality.

Obviously, there was not enough time during the life span of this project but these points may be considered by anyone who wishes to improve upon this software in the future. I would recommend that a mobile application written in java would enhance user access to the Management System, it would make access more mobile and bring ease to its users.

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