

WEB-BASED PENSION FUND MANAGEMENT SYSTEM

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ABSTRACT

Given the discouraging record of the traditional pension system and the limited coverage of the private-sector pension schemes, there is need for robust web-based pension fund management system that can handle the pension process efficiently. This work focus on the design and implementation of a web-based pension fund management application to replace the manual system, thus getting rid of the hurdles involved in the traditional pension management process.

General Terms

Software Engineering, Management, and Web design

Keywords

pension management, robust, application, web-based, schemes.

1. INTRODUCTION

Pension is an arrangement of providing people with an income when they are no longer earning a regular income from employment. However, pensions should not be confused with severance pay; the former is paid in regular installments, while the latter is paid in one lump sum. The terms 'retirement plan' or 'superannuation' refer to a pension granted upon retirement. Retirement plans may be set up by employers, insurance companies, the government or other institutions such as employer associations or trade unions. Retirement pension is referred to as retirement plans in the United States, as pension schemes in the United Kingdom and Ireland but in Nigeria, it is popularly known to as pension. Retirement pensions are typically in the form of a guaranteed life annuity, thus insuring against the risk of longevity. In general, the common use of the term pension is to describe the payments a person receives upon retirement, usually under pre-determined legal and/or contractual terms. A recipient of a retirement pension is known as a pensioner or retiree. Pension fund is any plan, fund, or scheme which provides retirement income.

The manual method of pension fund management maintains or keeps records in a filing cabinet about each employee/pensioner that is registered with a Pension Fund Administrator (PFA). When an employee decides to open an account with a PFA for the purpose of retirement savings, the former (pensioner) has to go to the physical location of the PFA to obtain and fill a registration form. Upon returning the form, the PFA clerk opens a file for the employee where the filled form and other vital documents as required or that relate to the employee are stored. The file is then passed on to the next PFA personnel to verify the employee's registration which may take some days if not weeks as the case may be.

Using the manual method, the employee is unaware of his/her account balance except if he visits the PFA's office. So, in case of financial impropriety in the employee's account, there is no way he/she can track this. In the manual method, it is a bit cumbersome for the PFA to maintain an up-to-date record of employees/pensioners. When an employee switches job or

changes location probably from one state to another, it takes time before these changes can be effected in the employee's record. All these manual processes have resulted in problems such as:

1. Theft and fraudulent practices in the process of investing pension funds and the return on investments
2. Human errors i.e. in crediting of a pensioner's account
3. Wastage of materials such as paper, files and so on,
4. Lack of adequate information flow among PFA personnels .i.e. PFA's are unable to give their customers clear information as to what their balance is and what is the estimated amount of money they will be collecting if they retire.
5. The stress of pensioners having to go to PFA's office.

A web-based pension fund management system is a system designed to manage pension activities both on the customers and Pension Fund Administrators (PFA) ends. The pension management activities on the part of PFAs include regular update of customers' information, crediting of customers' account if the customer is retired etc while customers' activities include checking their balance online, making enquiries by sending mails, etc. Every customer has a Retirement Savings Account (RSA) with a Pension Fund Administrator (PFA) and each customer accesses his or her account from a browser: software that runs internet pension management system that is hosted on the PFA's World Wide Web server. It provides a variety of attractive possibilities for remote access such as:

1. Availability of enquiry service at all time
2. Accessibility anywhere in the world
3. Availability of information to customers on the fly

This work focus on designing a web-based pension fund management application to replace the manual system, thus getting rid of the hurdles involved in the traditional pension management process. The objectives are: to automate the pension fund management process such as opening of Retirement Savings Account, calculating the pension that each client is going to get after retirement using the RSA calculator; to manage pension fund investment activities; the money given to the PFA's are invested so it will appreciate with time; to reduce human congestion in pension administrative offices; to make vital information available to pensioners and also keep proper record of the pensioners; to eliminate errors in the preparation of pension; to ensure prompt payment of pensioners' pension; and to minimize the use of paper in record keeping.

The web-based pension management system will increase the efficiency of PFAs in responding to the needs of their clients in time and also increase communication flow between both parties.

2. RELATED WORKS

2.1 CPAS v5

Among many unique features of CPAS v5 is its ability to offer a complete solution for the administration of defined benefit and defined contribution pension and insured benefits for employees and retirees. The CPAS v5 browser-based software provides the functionality and flexibility necessary to accept, manage and deliver all the information needed for members, employers, and administrators over the web. The CPAS v5 solution provides extensive integrated pension and benefit plan administration functionality, business workflow processes, and data management capabilities designed to reduce users' time interacting with the system and increase users' available time to serve the plan members.

CPAS Solutions

- CPAS v5 for Defined Benefit: for multi-employer, single plan sponsor organizations, and third party administrators for defined benefit pension plans.
- CPAS v5 for Defined Contribution: used to administer defined contribution retirement and savings plans.
- CPAS v5 for Group Benefits: offers employers and third-party administrators a simple and flexible way to combine record keeping for benefit plan participants with premium billing administration for health and welfare benefits.

2.2 Scottish Widows

The Scottish Widows software is a Group Pension Scheme provider aimed at making pension fund administration hassle-free and enjoyable. Facilities available in the software to administer the scheme include:

- Making payments to your scheme
- Adding new entrants
- Processing leavers, and
- Changing member details.

These facilities should help you save time doing the administration of your scheme and therefore allow you to concentrate on core aspects of your business. Extensive tools have also been developed for the members of your scheme. Members can project their income at retirement and identify how it might be affected by various factors by accessing the "What if?" calculator. In addition, existing investments can be switched and future investments re-directed to different funds online. (Figure 1)

3. SYSTEM DESIGN

System design specifies how the system will accomplish the set objectives. This stage comprises design activities that produce system specifications satisfying all the functional requirements. Activity Diagrams, Data Flow Diagram, Entity Relationship Diagrams (Figures 2-5) were adopted to model various activities and scenarios in the proposed system. The programming tool used for the design and implementation are Hypertext Markup Language (HTML), the authority language for writing static document to the web, Hypertext Preprocessor (PHP) for designing web applications, MySQL Database, a relational database management system for collection and storage of data, Cascading Style Sheet (CSS), for styling the look and feel of the web page and Apache web server for running the system as a web application.

The database being used by this application is named pension. It consists of seven tables namely: Admin table, Employee table, Employer table, Pensioner table, Fund table, Transaction table, and mail table/message table.

3.1 Overview of Existing System

The manual method of pension fund management maintains or keeps records in a filing cabinet about each employee/pensioner that is registered with a Pension Fund Administrator (PFA). When an employee decides to open an account with a PFA for the purpose of retirement savings, the former has to go to the physical location of the PFA to obtain and fill a registration form. On returning the form, the PFA clerk opens a file for the employee where the filled form and other vital documents as required and or that relate to the employee are stored. The file is then passed on to the next PFA personnel to verify the employee's registration which may take some days if not weeks as the case may be.

In the manual method, the employee is unaware of his/her account balance except if he visits the PFA's office. So, if there's a financial impropriety in the employee's account, there's no way he/she can track this.

In the manual method, it is a bit cumbersome for the PFA to maintain an up-to-date record of employees/pensioners. When an employee switches job or changes location probably from one state to another, it takes time before these changes can be effected in the employee's record.

All these manual processes have resulted in problems such as:

- Missing record of investment details or pensioners
- Theft and fraudulent practices in the process of investing pension funds and the return on investments
- Errors
- Wastage of materials and
- Lack of adequate information flow among PFA personnel.

3.2 Proposed System

As a result of the problems encountered in the existing system of operations in pension fund administration which include too many people involved in the administrative process and unnecessary paper work, an improved web-based pension-fund administration developed eradicates the shortcomings of the existing system.

The proposed system is being designed to be beneficial to such an organization as a Pension Fund Administrator (PFA) because it minimizes the time required for manual pension fund management since it requires performing wide range of activities such as recording employee/pensioner information, preparing forms and making calculations, etc. The system keeps track of employees/pensioners registered with the PFA, the account balances of the various employees/pensioners, provides employees/pensioners access to their account balance and statements on demand.

The web-based pension fund management system can accurately open a Retirement Savings Account(RSA) for an employee with a Personal Identification Number(PIN) attached, maintain books of account on all transactions relating to pension funds managed by the PFA using it, provides a structured way for the payment of retirement benefits to pensioners, etc. The system ensures that incomes earned from investments of pension funds are credited into the individual RSA holders after deducting clearly defined and reasonable fees, charges, costs and expenses of transactions made by the PFA.

Some of the benefits of a web-based pension fund management system are undoubtedly speed and accuracy. The system provides employees/pensioners prompt access to their

account balance without visiting the PFA's office. Apart from time saving and accuracy already mentioned, other advantages include:

- Reduced administration time by automating retirement benefit calculation and printing of paychecks
- Eliminated tax penalties for inaccurate returns or late payments of amounts withheld
- Improved pension management accuracy with automatic tax and deduction calculations
- Easily credits employees/pensioners account with returns from investments of pension funds
- Improved organization with consolidation of all pension fund related records and reports
- Increased speed in adjusting to regulations by receiving periodic updates and effortlessly produce the required governmental reporting
- Reduction of administrative overhead
- Automation of several manual processes
- Provides timely retirement benefit processing

4. IMPLEMENTATION

This section focuses on delivering complete functioning pension fund management software. It discusses in detail the mode of operation of the Web-Based Pension Fund Management System. It states the navigation links from page to page and what each page contains as well as what it is supposed to do. Appendix (Figures 1-19)

- The Home Page. This page welcomes visitors to the site, displaying some welcome messages including links to other pages.
- About us Page. This page displays the "About US" information about our fictitious company called Starlite Pensions to our visitors.
- FAQs. The FAQs (Frequently Asked Questions) page displays a list of questions that visitors frequently want to enquire about. It contains links to other pages.
- Enquiries. This page lets visitors send email to us in case they have things they want to find out which are not listed on the FAQ page. It contains fields such as the name, email-id and message-body fields.
- Login. This page lets registered employees/pensioners in our scheme to login to the system to access their account balance and other details. They are required to enter their valid RSA Number and Password.
- Account Detail. This page displays to employees/pensioners, the details of their account balance.
- Admin Login. This page is meant for the pension fund administrators to login to perform administrative functions such as managing employees/pensioners, funds, investments, etc.
- View Employee. This page displays the list of members of the scheme who are currently employees with vital information about each of them.
- Add Employee. This page lets the admin personnel create a record for new employees who want to join the scheme. The details of the employee should be supplied in the provided form fields.
- Update Balance. This page lets the admin credit the account of employees in the scheme. The admin is expected to input the RSA Number of the employee whose account is to be credited including the amount.
- View Pensioners. This page displays the list of members of the scheme who are pensioners with vital information about each of them.

- Update Employee. This page lets the admin perform some updates on employees' data as required.
- View Client. This page displays the list of clients who patronize our scheme. The clients are the various companies that employ our services as the pension fund administrators of their employees.
- Add New Client. This page lets the admin personnel create a record for new clients who want to join our scheme. The details of the clients should be supplied in the provided form fields.
- View Investment. This page displays the list of investments that the company has made over time. The details about each investment such as type of investment, source of fund, description of investment, etc are included in the display.
- Add New Investment. This page lets the admin personnel create a record for new investments as embarked upon by the company. The details of the investment should be supplied in the provided form fields.
- View Fund. This page displays the list of pension funds that the company generates. The funds are obtained from the pension contribution of employees which in most times are remitted through their employers except in situations where we have individuals who have us their Pension Fund Administrator.
- Add New Fund. This page lets the admin personnel create a record for new funds as remitted by our client companies who private individuals. The details of the fund should be supplied in the provided form fields.
- Process Pension. This page lets the admin personnel process an employee to become a pensioner provided the employee is qualified. Checks have been put in place to disallow processing an employee to become a pensioner if the employee is not yet due.

5. CONCLUSION AND RECOMMENDATION FOR FURTHER WORKS

A Web-based Pension Fund Management System is a system that is designed to manage pension activities for both customers and Pension Fund Administrators (PFA). A web-based pension fund management system is beneficial to a pension fund management company because it minimizes the time required for manual pension fund management processing since it requires performing wide range of activities such as recording employee/pensioner information, managing funds, managing fund investments, etc. The system keeps track of employees/pensioners registered with the Pension Fund Administrator (PFA), the account balances of the various employees/pensioners, provides employees/pensioners access to their account balance and statements on demand. Thus, the basic aim of carrying out this research project is to integrate technology tools in developing a solution that will largely, help in the aspect of pension fund management which would help eliminate the problems associated with the manual process. This has been consequently developed.

In conclusion, the introduction of the new system to replace the existing one is definitely a way of maintaining a good management practice.

On successful implementation, the system will correct the limitations identified in the existing system as previously stated. It is important to know that for the web-based system to work effectively;

- Good environment.
- Good maintenance practices.
- Good administration should be provided.

The use of an effective Web-Based Pension Fund Management System infrastructure will provide efficient and accurate way of collecting and organizing relevant information and documents such as employees' data, company details, etc. from interested private individuals and companies.

With regards to the introduction of the new system to the organization, there is need for review and maintenance as well as adequate provision to ensure that the following are taken into consideration.

- There should be a regular and constant measurement of the system performance. Hence, there is a need to regularly see that the operation of the new system is not hindered in any way.

- Training of staff who will serve as admin personnel in operating the new system is also recommended for proper and effective use of the system in the organization.
- Constant system testing should be carried out and constant use of the system will serve as a way of testing the continuous perfect working condition of the system.
- Unauthorized and untrained personnel should not be permitted by the departmental head to work with the new system. This help to reduce the risk of introducing viruses, which are delicate into the system, and to avoid these viruses from destroying the entire system, this will also avoid intruders which might want to engage in any form of fraudulent practice.

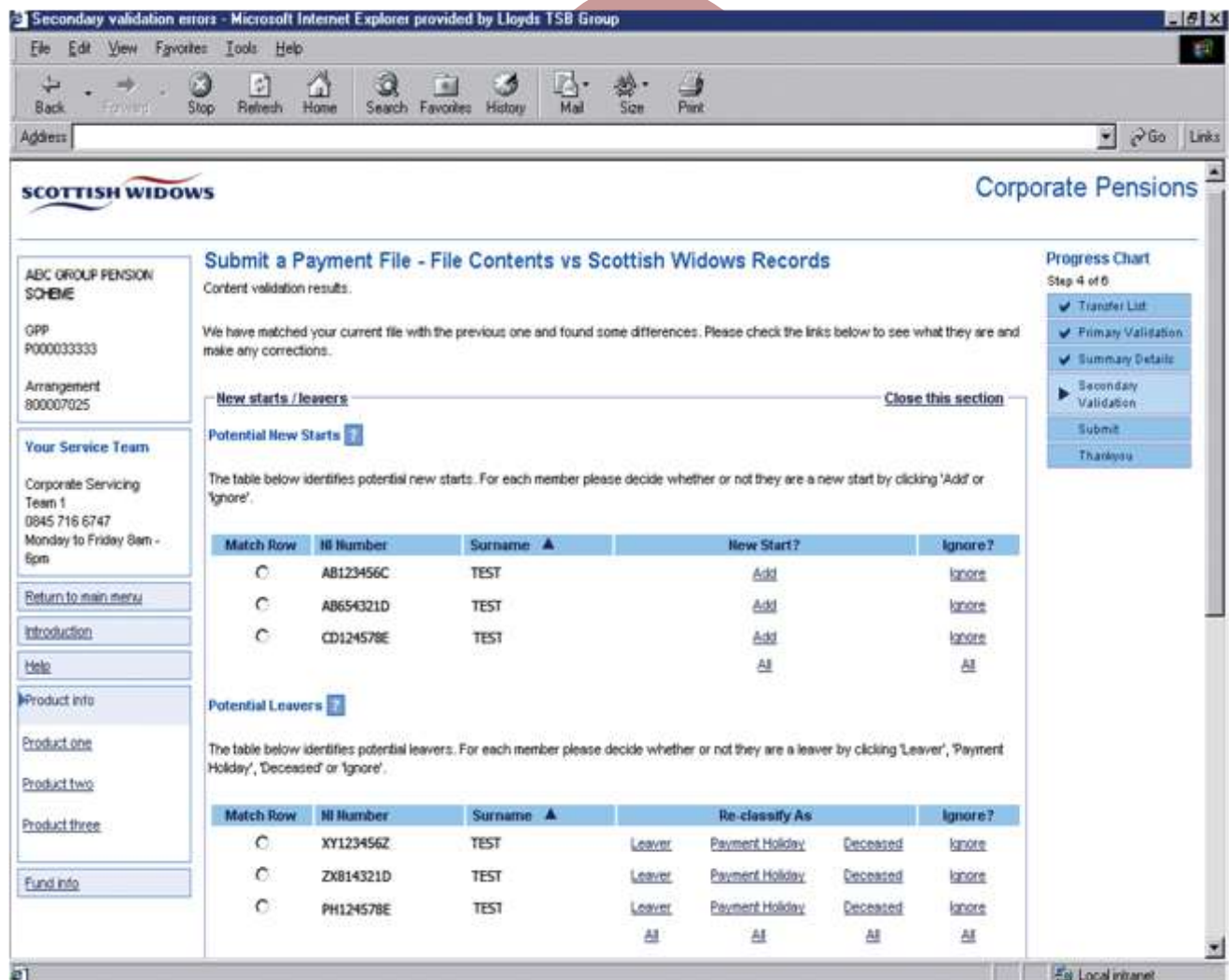


Fig 1: Screenshot of Scottish Widows

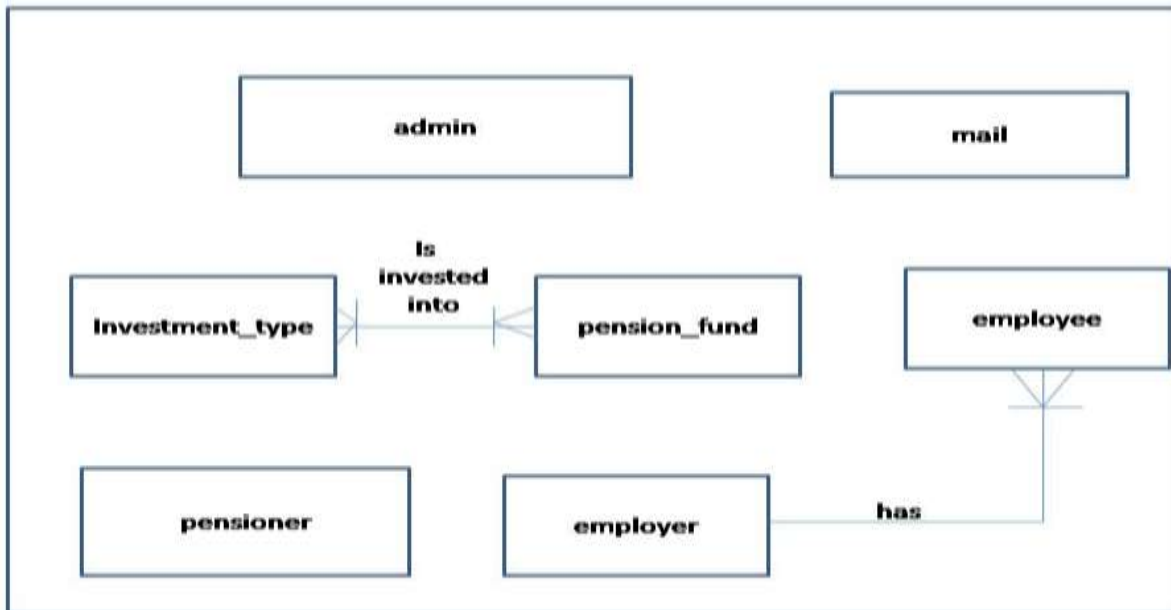


Fig 2: Entity Relationship Diagram of the Proposed System

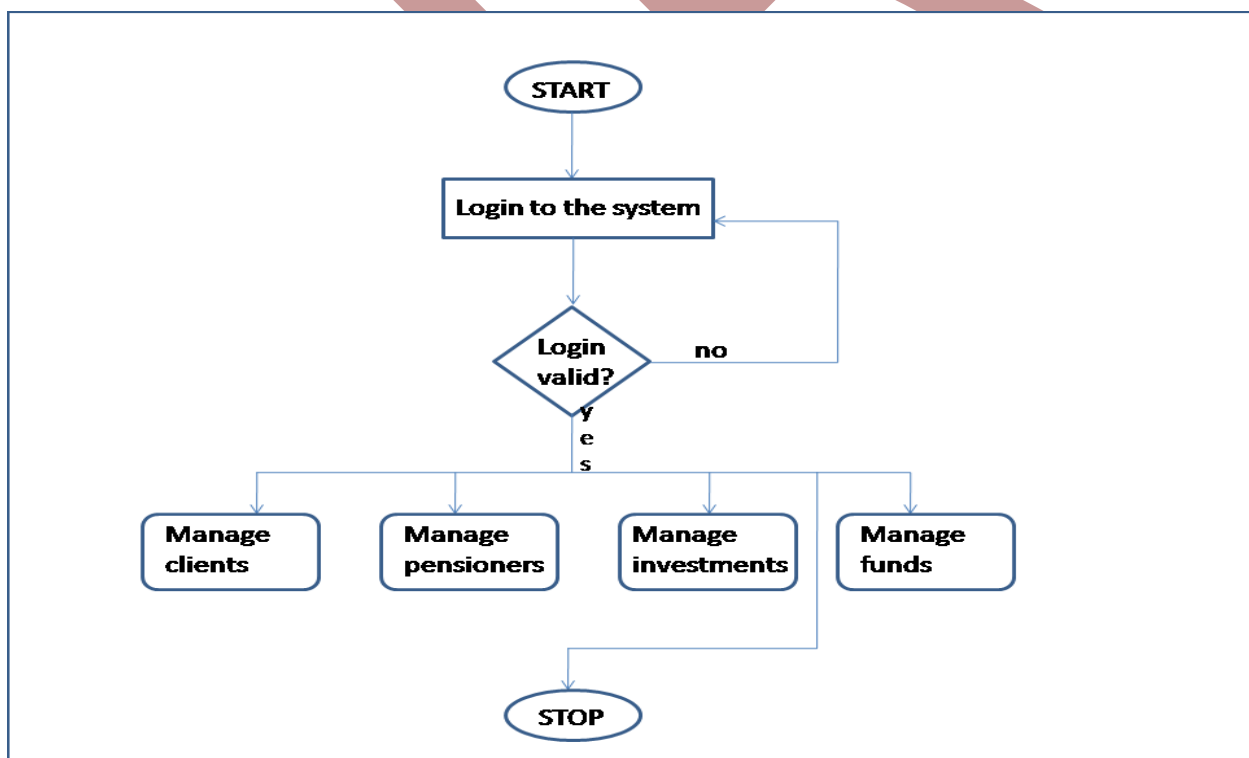


Fig 3: Flowchart of the Proposed System

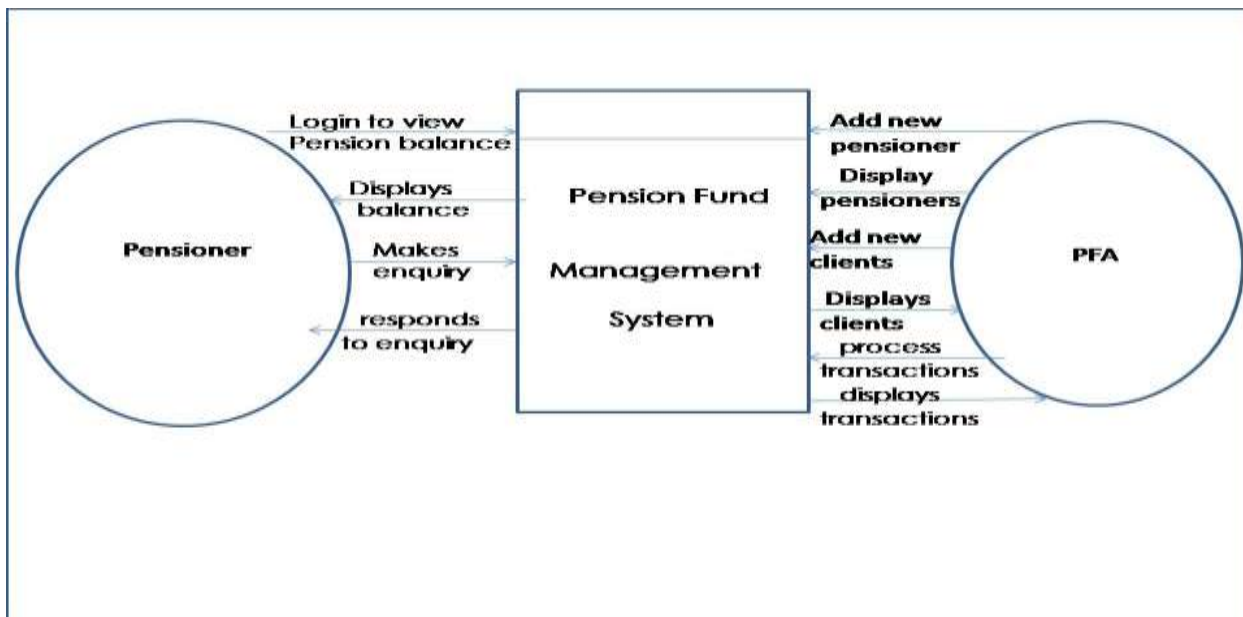


Fig 4: Data Flow Diagram of the Proposed System

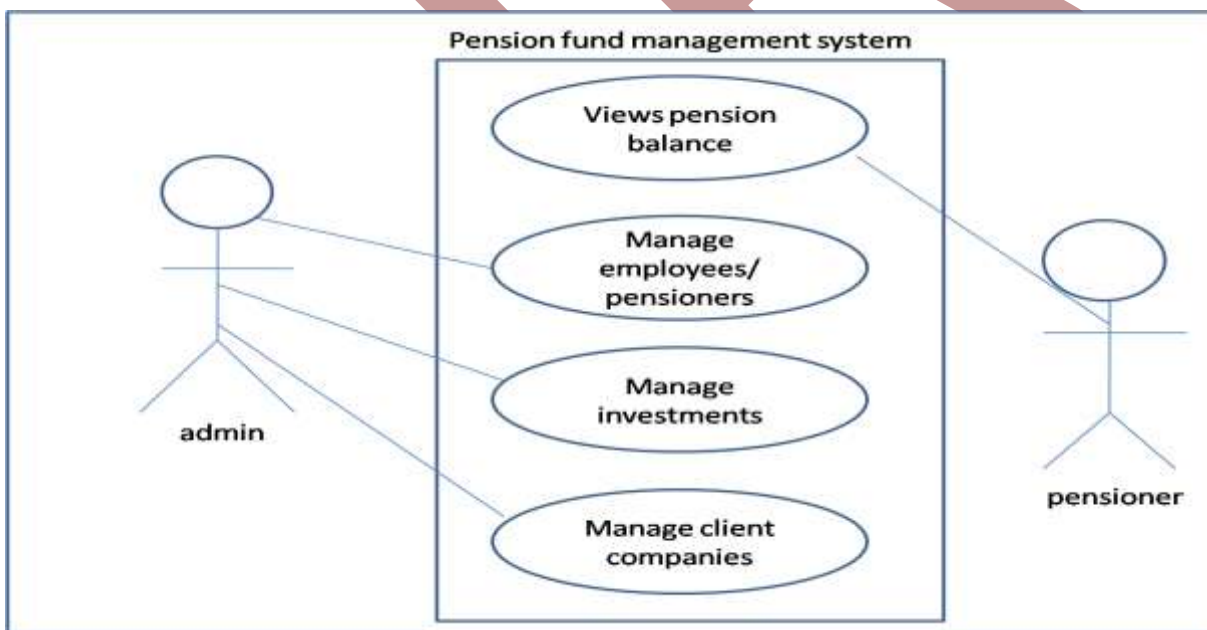


Fig 5: Use Case Diagram of the Proposed System

6. REFERENCES

- [1] Barr, N. (1995), "Comment on 'Government Provision and Regulation of Economic Support in Old Age'", World Bank Conference on Development Economics (ABCDE).
- [2] Diamond, P. (1995), "Government Provision and Regulation of Economic Support in Old Age", (ABCDE). Pp. 83-103.
- [3] Federal Government Printer (2004), The Pension Reform Act, 2004
- [4] Garry, B; Thomas, J; Harry, J; System Analysis and Design. (4th Edition). Thomas Learning
- [5] Orszag, J M & P R Orszag (2000), "The Benefits of Flexible Funding: Implications for Pension Reform in an Uncertain World", ABCDE, pp.373-391.
- [6] PenCom (2004), Circular GUID/01/TRANS.
- [7] Software Engineering Lecture Note by Sunday Idowu (Babcock University)
- [8] World Bank (1994), Averting the Old Age Crisis. New York: Oxford University Press.
- [9] <http://www.freetutes.com>

7. APPENDIX



Figure 1: The Home Page



Figure 3: The FAQs Page



Figure 2: About US Page



Figure 4: Enquiries Page

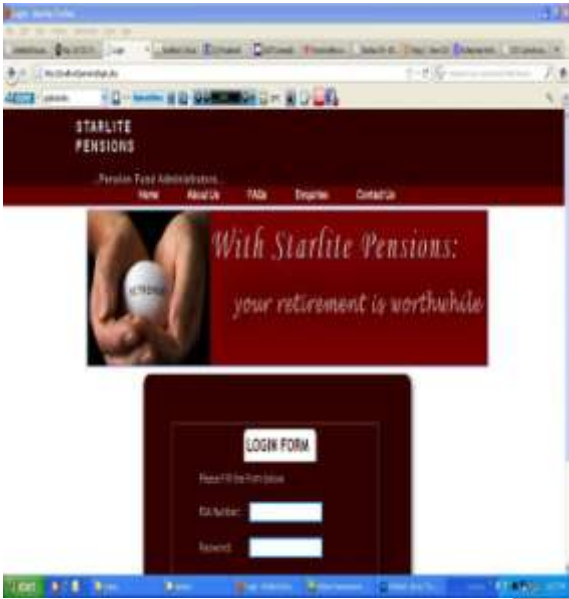


Figure 5: The Login Page



Figure 7: Admin Login



Figure 6: Account Detail



Figure 8: View Employee Page



Figure 9 Add Employee Page

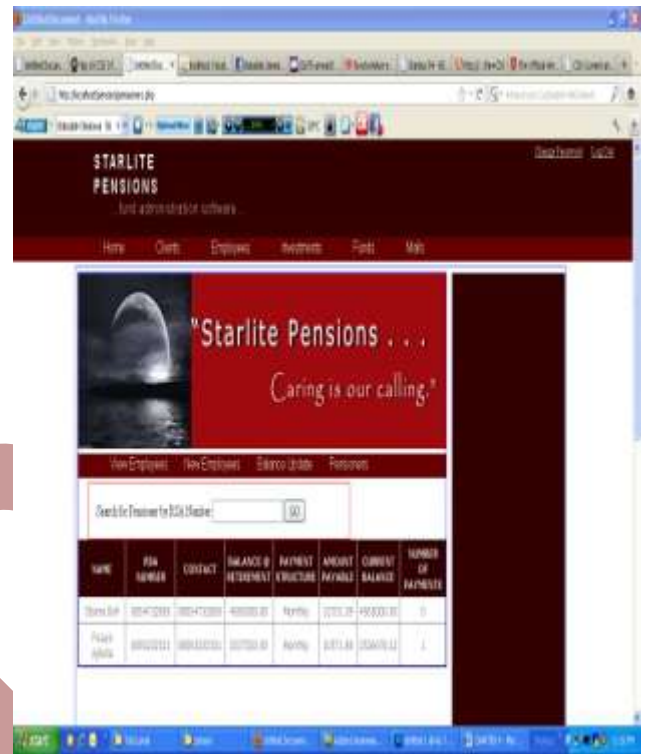


Figure 11: View Pensioners Page

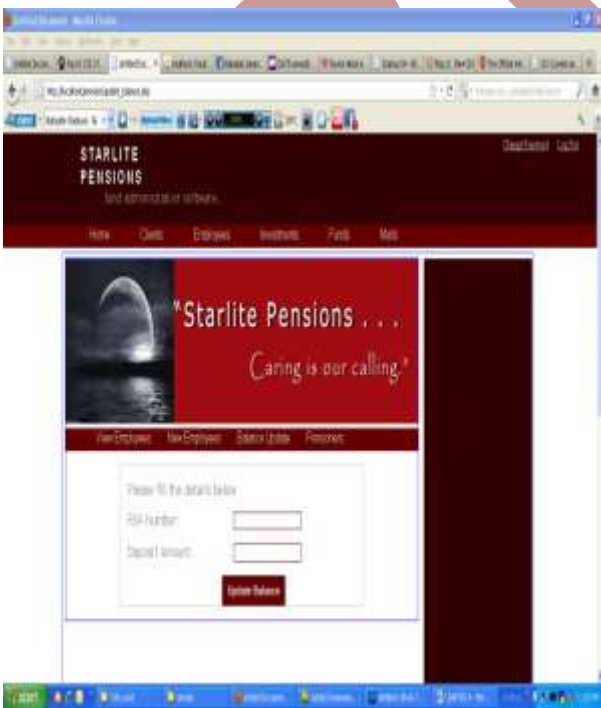


Figure 10 Update Balance Page



Figure 12: Update Employee Page



Figure 13 View Client Page



Figure 15: View Investments Page



Figure 14 Add New Client Page



Figure 16: Add New Investment Page



Figure 17 View Fund Page



Figure 19: Process Pension Page



Figure 18 Add New Fund Page