

Automation of the Box and the Counter Section Services of Nigerian Postal Services (NIPOST): A Case Study of Okada Post Office

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Abstract: This study was undertaken to improve the services rendered by NIPOST at their box and counter sections by automating the business processes undertaken by these sections. The study was conducted for a period of three months and within this period we used personal interviews, observations and on the spot questions to extract and to comprehend the proper mode of operation of these box and counter sections. Based on the knowledge acquired, we drew up a requirement specification using some appropriate UML diagrams while data dictionary was used for the data type definition. C# (ASP.Net) contained in Microsoft Visual Studios 2005, interfaced with Microsoft Structured Query Language Server was used to implement the system.

Key words: Automate, box section, counter section, processes, NIPOST

INTRODUCTION

Postal and courier business services continue to flourish worldwide. Ordinarily, the internet was touted by many as a potential threat to that line of business and service, but rather it has had a positive effect on the industry. Online shopping and ordering of goods have created lucrative business opportunities for this line of business. And the use of cheap goods or products tracking facilities has equally enhanced the services provided by these businesses. In Nigeria, besides the well recognized international courier outfits, most transport businesses and even individuals are thriving perfectly well in the business.

The Nigerian Postal Services (NIPOST) is the national designated agency to carry out postal services and going by the infrastructure at its disposal, it should be among the top contenders in this business locally and globally. But for several reasons, its share of business has been substantially taken over by international and local agencies in the industry. And the reasons for this are numerous. But one of them readily comes to mind and this has to do with inefficient back end processes or activities such as noticed in the Box Section and the Counter Section of the agency. In the light of this study that we embarked on the study to automate the box and the counter sections of the establishment using NIPOST Okada as a case study.

BRIEF RELATED LITERATURE

From present study, diverse studies and application of technology in the evolution of postal services abound. For example, in rural mid and White *et al.* (1998) studied the changes in a key service sector post office services. They assessed and analyzed observed changes in relation to the development of socio-demographic profile of the underlying population using a Geographic Information System (GIS) approach. In another study that had a direct bearing with the strategic information management of Post Offices, Fuller-Love and Cooper (2002) noted that direct marketing; computer and electronic mail have increased the amount of business for the Post Office. From their evaluation of the strategies being devised to cope with this increased research, they observed that strategies were rather emergent rather than deliberate. They advised that Post Offices should adopt a planned Information Technology strategy because of its several advantages. Vern (2005) studied the changes occasioned by the mechanization and automation of mail processing in the United States Postal Services. Although, his focus was on the impact of technology on authority structures in public organizations but he did acknowledge the fact that the automation of mail processing brought substantial improvements in productivity.

While, the focus of most studies was on information storage and retrieval, some others were concerned with

automating the mail sorting process. Notable studies in this regard are those of Ying *et al.* (2007). They studied a recognition system for handwritten Bangla numerals and how it can be applied to automatic letter sorting for Bangladesh Post Office.

Another is that of Dedeke and Hung (2008) who conducted a simulation to determine the consequences of replacing manual-keying processes with bar code technology in the existing parcel sorting process at the Post Office Processing and Distribution Centre in Massachusetts. Their simulation was based on the model of operational data and configurations gathered from same centre. Their result showed that bar code technology significantly reduced parcel sorting cost and time.

A different Post Office function was the focus of Nagabhusa *et al.* (2009). They devised a soft computing model that could map postal addresses to mail delivery points in a three phased strategy. Phase one entails the processing of a machine readable postal address using a novel fuzzy symbolic similarity analysis. The second phase had to do with organizing labeled components into symbolic postal address objects. And finally, these postal address objects are then further processed using the devised fuzzy symbolic methodology to map the address to mail delivery points.

SYSTEMS ANALYSIS AND DESIGN

We undertook an evaluation of the existing system processes using a combination of information extracting tools. This was followed by the articulation of the observations and findings.

We then proceeded to specify and designed a new system that substantially automated most of the manual processes of the old system.

Information gathering: We gathered all the pertinent information we used for this study via the following fact-finding and data gathering techniques.

Planned discussion and interviews: We booked interview sessions and in the course of the interview, some structured and specific questions were used to elicit required information.

Observation: On the couple of planned visits, we watched the staff carry out their tasks during which we had a firsthand knowledge of the processes involved. We also got some explanations and clarifications from the staff engaged in the transactions.

Internet: We used the Internet to gather some information on NIPOST and the improvements it has recorded over time as well as garner some information on the studies already undertaken in this realm.

Articulation of observations, findings and shortcomings:

The interaction via interviews and observation with some staff of NIPOST Okada, especially those at the Box and the Counter sections provided the following insights into the processes entailed in the day to day running of these studies.

Counter section service: In the course of the study, we observed that designated staff of the counter section provided only two of the services listed under counter services operations. These two services are sales of postage stamps and Nigeria postal orders.

Postage stamps: In respect of postage stamps, most customers come straight to request for any denomination of stamps which they simply affix to their mails and then drop the mails without recourse to the attendant on duty. While, some customers usually approach the counter with requests to send a mail. For this category, the NIPOST counter staff on duty would request for the destination of the mail and sometimes provide help in case the client is not sure of the destination. Usually, the staff would access the weight of the mail and checks the internal circular carrying postage rates and then determine the postage stamp costs for the destination based on the weight of the mail. The customer is then asked to buy the postage stamp required to send the mail.

Nigeria postal orders: For Nigeria postal orders, prospective buyers or customers would approach the counter and requests to buy money orders. The staff on duty would provide a form to be filled in triplicates. Thereafter, money is collected from the customer and an equivalent representation of postal orders is issued. The distribution of the forms filled prior to issue of postal orders is as follows: One of the forms goes to the customer, one for NIPOST and the third is the destination copy. The NIPOST staff then proceeds to enter the transactions into a sales book or a ledger.

Counter section shortcomings: From the description, it is evident that a lot of time is wasted when cross checking the destination/weight of the mail. Also, because records are usually stored in files and ledger books that are not easily accessible additional time is wasted in accessing them and documenting the

transactions therein. These processes therefore, requires a lot of effort and it is also error prone because some destinations may be omitted from the circular and the staff on duty may be constraint to make approximations which may translate into miscalculations of postage stamp required. To compound the tasks of the staff on duty, some circulars only contain a range of weights. This implies that after weighing the mail, the staff would be required to calculate again under which range the weight falls before cross checking the required postage rate.

The first noticeable fall out of this process is that the discretion of the operator is paramount. Thus, his level of consciousness, his disposition or mood at any material point in time and his expertise level will substantially impact on the rates he may deem applicable.

Box section services: The primary transaction at the box section is the payment for post office box and private mailbags, which are normally supplied through a local post office of interest and it is renewed on a yearly basis with a fixed amount determined by the federal government.

Customers or clients are normally given forms at the box section and completed forms are also returned to the box section. But bill for payment is issued at the counter and then the names of those who have fully settled their bills are recorded in a big ledger book. This book is used to keep all the records pertaining to the system.

Box section shortcomings: Just like the counter system, the box service system is manual. It is prone to errors and access to records is very slow. A lot of problems are encountered when cross checking clients that have paid their annual rent and when trying to determine outstanding debts due. Sometimes, some records are incomplete due to loss of some pages of the ledger book containing names and records. Another major source of problem is the use of a multiplicity of paper files to store records. Retrieving these files and the documents contained in them is intricate, tortuous, error prone and time consuming.

Systems specification and design: The bulk of the specification and design task was on the box section and we used some Unified Modeling Language (UML) notations and Data Dictionary.

And the functions or processes and logic of the existing system adopted and modeled in the new system were:

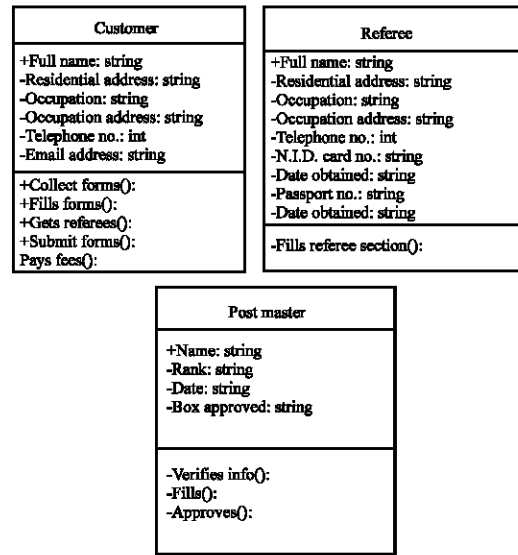


Fig. 1: Class diagram showing the relationship between staff and customers

- When a transaction is to be undertaken with a customer, the customer’s Identification number (ID) is checked and confirmed to be valid by searching for and checking the customers file
- If the ID exists, transaction proceeds
- Otherwise, the new customer is registered and her data entered into a new file, stored in the cabinet
- Customers may request that their data be updated; in this case a new form is picked and filled for the customer. The new form is authenticated and stored in the customer’s file. Meanwhile, the old form is destroyed

The UML notations we actually used were class diagrams, use case diagrams and collaboration diagrams. And they are exhibited next.

Class diagram: The class diagram shown represents the different underlying pieces (classes), their relationship to each other and their subsystem. The class diagram includes attributes, operations, the different types of rules and associations. The Fig. 1 shows the relationships between staff and customers.

Use case diagrams: The use case diagrams below further serves to show the relationships among the actors of the system. The actors of the system are customers, referee and post master. These actors and the relationship among them are as shows in Fig. 2.

Collaboration diagram: The collaboration diagram represents interaction and the relationship between the objects created in the earlier step of the modeling process as well as the movement of messages among them (Fig. 3).

Database design: The database contains a Table 1 with customer records. The fields in the Table 1 and their respective properties are as follows:

- Customer ID: int
- Customer name: varchar (50)
- Resident address: varchar (100)
- Occupation: varchar (50)
- Company address: varchar (100)
- Phone no.: varchar (50)
- Email address: varchar (50)
- Reference name: varchar (50)
- N.I.D. card no.: int
- Date issued: datetime
- Passport no.: int
- Post master name: varchar (50)
- Position: varchar (50)
- Date: date time
- Box approved: varchar (50)

The database comprised of Table 1. Table 1 (File A) was used for post office boxes and private mailbags while, the (File B) was for registration of I.D card.

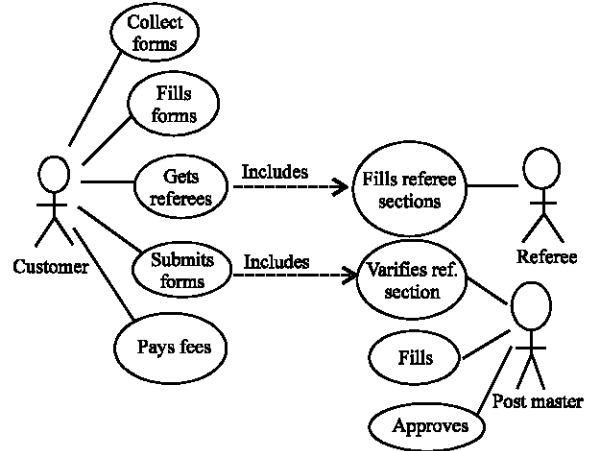


Fig. 2: Use case diagram showing the relationships among the actor of the system

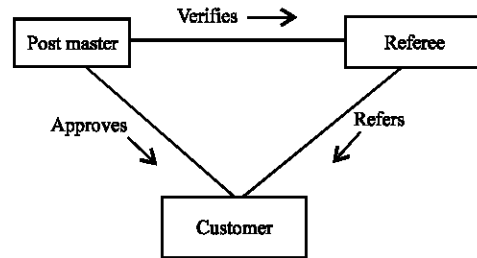


Fig. 3: Collaboration diagram representing interactions and relationships among objects of the system

Table 1: Data dictionary specification of these files A and B

Field name	Field type	Field length
File A		
Full name	Alphabetic, numeric and special character	20
Occupation/Career	Alphabetic	15
Occupation/Career Address	Alphabetic, numeric and special character	35
Telephone no.	Numeric	15
Email address	Alphabetic, numeric and special character	20
Residential address	Alphabetic, numeric and special character	35
If box, where is it required	Alphabetic, numeric and special character	15
If bag, referee1 name	Alphabetic, numeric and special character	20
Ref1 occupation/Career	Alphabetic	15
Ref1 occupation/Career address	Alphabetic, numeric and special character	35
Ref1 telephone no.	Numeric	15
Ref1 residential address	Alphabetic, numeric and special character	35
Ref2 name	Alphabetic, numeric and special character	20
Ref2 occupation/Career	Alphabetic	15
Ref2 occupation/Career address	Alphabetic, numeric and special character	35
Ref2 telephone no.	Numeric	15
Ref2 residential address	Alphabetic, numeric and special character	35
National I.D card no.	Alphabetic and numeric	11
Date obtained	Numeric and special character	10
International passport no.	Alphabetic and numeric	8
Date obtained	Numeric and special character	10
Issuing officer name	Alphabetic, numeric and special character	20
Rank	Alphabetic, numeric and special character	15
Date	Numeric and special character	10
Box allocation approved by	Alphabetic, numeric and special character	20
Name	Alphabetic, numeric and special character	20
Rank	Alphabetic, numeric and special character	15
Date	Numeric and special character	10
If unapproved, no. on waiting list	Numeric	5

Table 1: Continued

Field name	Field type	Field length
File B		
Full name	Alphabetic, numeric and special character	20
Occupation/Career	Alphabetic	15
Occupation/Career Address	Alphabetic, numeric and special character	35
Telephone no.	Numeric	15
Email address	Alphabetic, numeric and special character	20
Residential address	Alphabetic, numeric and special character	35
Choose reference		
If bag, referee1 name	Alphabetic, numeric and special character	20
Ref1 occupation/career	Alphabetic	15
Ref1 occupation/career address	Alphabetic, numeric and special character	35
Ref1 telephone no.	Numeric	15
Ref1 residential address	Alphabetic, numeric and special character	35
Date	Numeric and special character	10
National I.D card no.	Alphabetic and numeric	11
Date obtained	Numeric and special character	
International passport no.	Alphabetic and numeric	8
Date obtained	Numeric and special character	10
Desired subscriber's post office I.D. card (New, Renewal, Loss)	Alphabetic	7
If renewal, previous post office I.D card	Numeric and special character	10
If loss, previous post office I.D card	Numeric and special character	10
I.D card application date	Numeric and special character	10
No of cards issued	Numeric	2
Date issued	Numeric and special character	10
Approved by	Alphabetic, numeric and special character	20
Date	Numeric and special character	10

IMPLEMENTATION

The implementation of the system was done using C# (ASP.Net) as part of Microsoft Visual Studio 2005 Integrated Development Environment (IDE) interfaced with a Relational Database Management System (RDBMS) implemented with Microsoft Structured Query Language (MS SQL) Server 2005. The database implementation was based on the Entity-Relationship Model.

We provided some security measure, which requires that users of the system must login in using a pair of username and password to prevent unauthorized user from gaining access to the system.

The sessions following describes the outputs captured from the implementation in the following sequence:

- Homepage
- Customer registration page
- Customer update page
- Card registration page
- Card renewal page
- Postal rates page
- Customer search page

Homepage: The homepage is the start-up page of the application. On this page, authorized staff from both the Box Office and Counter Section can login using their usernames and passwords. The username and password

is compared with the existing username and password columns of the Admin table. If both the username and password are valid he/she is granted access else such agent is denied access. It is only after a successful Login that the task page is enabled (Fig. 4).

Customer registration page: The customer registration page enables the registration of new customers by an authorized staff of the Box Section. The customer information is captured and stored in the database through this page. Such information include: Customer Name, Residential Address, Occupation, Company Address, Phone Number, Email, Reference Name, NID Card Number, Date Issued, Passport Number, Post master Name, Position, Date and Box Approved (Fig. 5).

Customer update page: The customer registration page enables the update of customer information by an administrator of the Box Office Section. The customer information updated is the fields that are subjected to changes. They include: Customer ID, Residential address, Occupation, Company address, Phone number and Email (Fig. 6).

Card registration page: The card registration page is used to process customers' post office card. A customer card is processed upon registration and the customer's information required include Customer name, Residential address, Occupation, Company address, Phone number, Email, NID card number, Passport number and License period (Fig. 7).

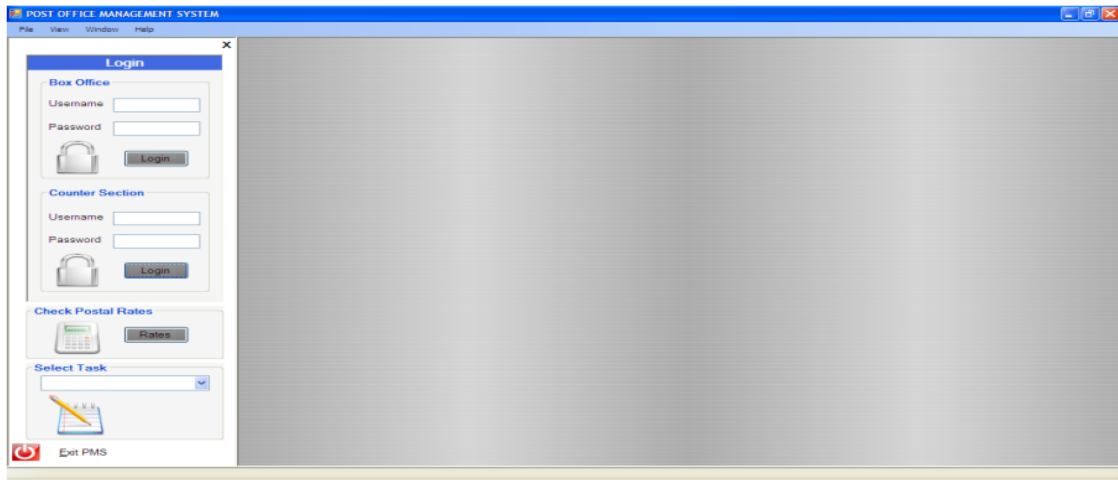


Fig. 4: Startup screen

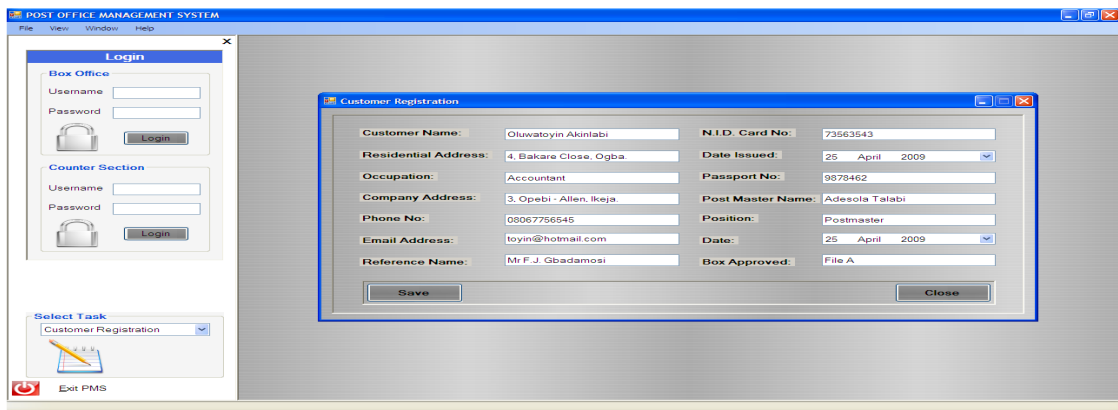


Fig. 5: Customer registration screen

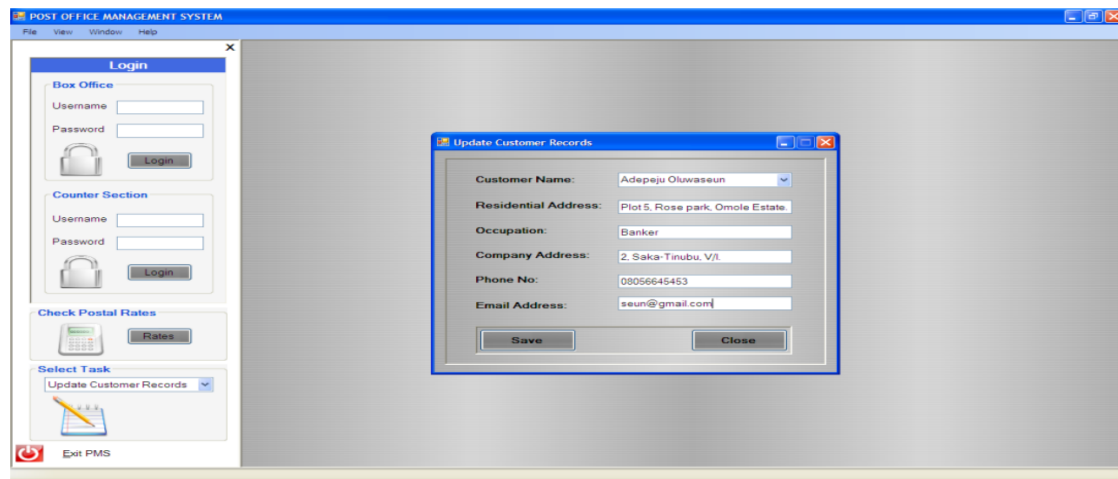


Fig. 6: Customers update screen

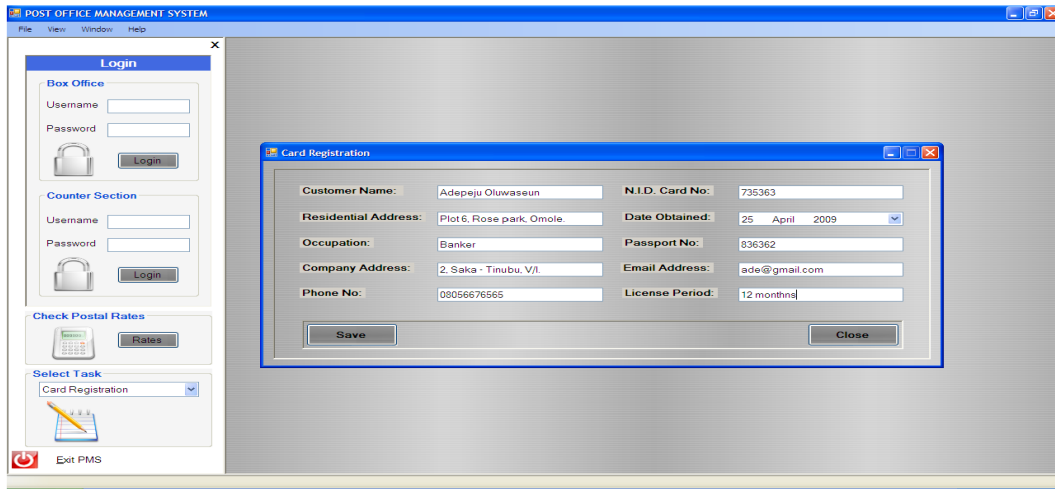


Fig. 7: Card registration screen

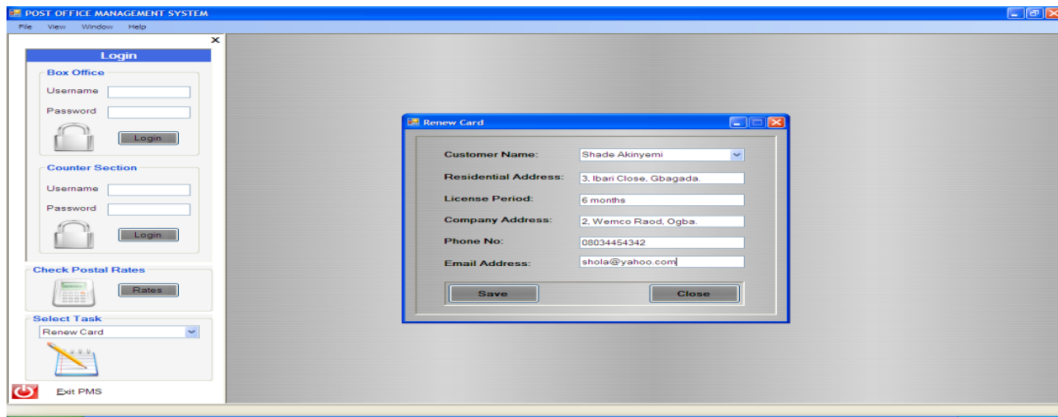


Fig. 8: Card renewal screen

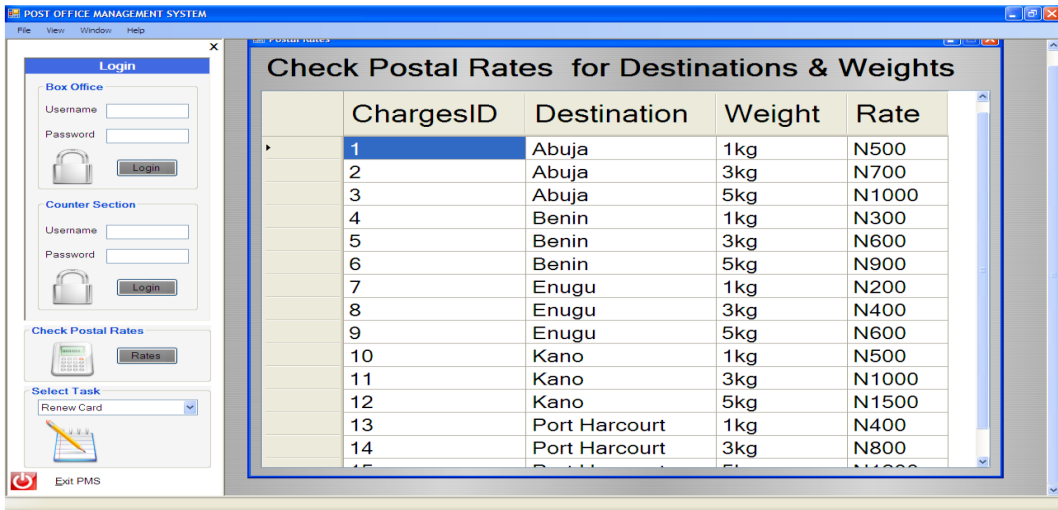


Fig. 9: Postage rate display screen

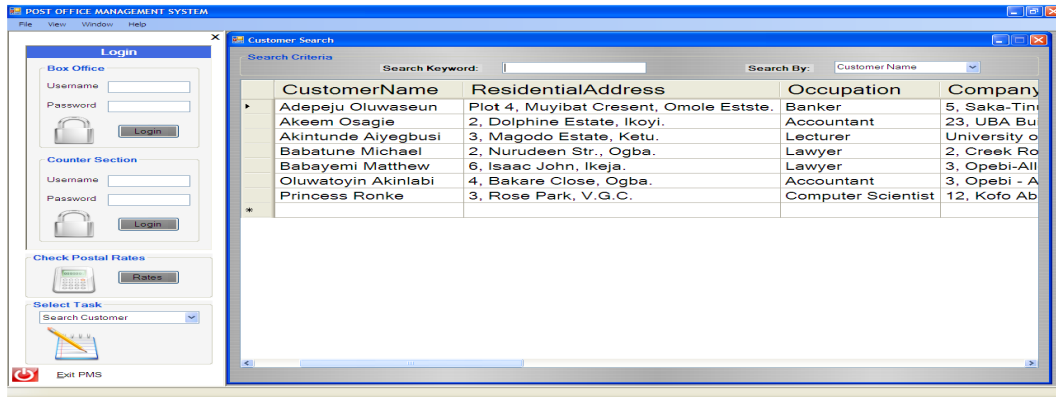


Fig. 10: Customers search screen

Card renewal page: The card renewal page is used to process customers whose card validation date has expired. This page captures basic card information for extending the card's validation. Such information include: Customer ID, Residential address, License period, Company address, Phone number and Email (Fig. 8).

Postal rates page: The postal rates page enables administrators from the Counter Section to instantly check for postal rates through the click of the-rates-button. Postal rates information retrieved include: Charges ID, Destination, Weight and Rate (Fig. 9).

Customer search page: The customer search page enables administrators of the Box Office Section to search for existing or registered customers through the customer search/query. The search result details include the following columns: Customer name, Residential address, Occupation, Company address, Phone number, Email, Reference name, NID card number, Date issued, Passport number, Post master name, Position, date and Box approved (Fig. 10).

CONCLUSION

One major reason for the dwindling patronage of NIPOST is their inefficient manual operations at their counter and the box sections. Incidentally, these are the sessions that handle the bulk of their operations. The strategy that has been evolved over time to improve efficiency in these sections have yielded minimal results because the focus has been on recruitment of more personnel and retraining of both these fresh and existing personnel.

Incidentally, investment in the design and deployment of Information Technology (IT) infrastructures in the entire operations of the outfit has been receiving serious attention going by some facts that we gleaned in the course of the interaction with some staff of NIPOST, Okada in the course of the investigation.

For example, some indicated that the trainings they have undergone at one time or the other had computer appreciation contents.

On the own part, we have identified that the major areas of the business that required urgent attention were the box and the counter sections because these sections are more or less the enterprise interface with its customers who desire prompt attention. And this prompt attention can only be achieved if the processes incidental to the operations of these sections are automated.

It is against this backdrop that the study derives its significance. Thus, deployment of the developed solution will to a large extent automate substantial operations performed at both the Box and Counter sections of Nigerian Postal Service (NIPOST), Okada.

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