

Development of Sales and Inventory Workflow Management Information System Web Portal for Petrospan Integrated Services, Eket, Akwa Ibom State, Nigeria

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Abstract

In this paper, the development of Sales and Inventory Workflow Management Information System (SIWfMS) web portal for Petrospan Integrated Services, Eket, Akwa Ibom state, Nigeria was presented. Rapid Application Development (RAP) methodology is used in the web application development. Three-tier architecture based on WAMP server configuration was adopted. The WAMP server was made up of Windows Operating system; Apache web server; MySQL database system and PHP server-side scripting language. The SIWfMS web application developed had five modules, namely, the Administrator Module, the Inventory Module, the Sales Officer Module, the Customer Module and the About Us. The system included activity or transaction log that enabled the implementation of audit trail mechanism. The SIWfMS web application was hosted locally and tested with some sample users and user-generated contents.

Keywords: Web Portal; Workflow; Sales Process; Inventory Process; Process Map; Workflow Management System

1. Introduction

In recent years, more people and businesses are increasingly depending on Information and communication Technology (ICT) for their day-to-day lives and transactions [1,2,3]. Particularly, ICT enable organizations to automate their business process as well as provide timely, relevant information to customers, employees and partners anywhere in the world in order to meet today's business requirements [4,5,6,7]. In recent years, the trend among business enterprises has been the use of a kind of web application otherwise known as web portal to create and deliver highly relevant content accessible to all their stakeholders across the globe. According to Tyndale [8], a web portal is a website, usually with little content, providing links to many other sites that can either be accessed directly by clicking on a designated part of a browser screen, or can be found by following an organized sequence of related categories [8].

According to Ibrahim [9] web portals can be used to improve document management, communication and collaboration, information access, sharing, and reporting [9,10]. Also, a portal is a gateway to the Web that allows organized information to the users through a single entry point [10]. The e-portal is designed to present only the information and tools that each user needs, without the clutter of information and tools he/she does not use. It is designed to be easily incorporated into a corporate website thereby enabling company's data to be accessed by the public. They can be personalized for different types of users, such as students, teachers, parent, government agencies, and other sectors of business. A good e-portal knows the individual using it and it changes with the individual [10]. It acts as an individual's personal assistant, ready to act on his behalf. Portal system is now being incorporated in business, making it easier for both employees and stakeholders to conduct their businesses efficiently to meet the global changes in ICT. Big and corporate organizations have these facilities with sophisticated audit software to track their businesses.

Consequently, this paper presents the development for Sales and Inventory Workflow Management Information System (SIWfMS) web portal for Petrospan Integrated Services (PIS), Eket, Akwa Ibom state, Nigeria is presented. Petrospan Integrated Services is a medium scale biscuit distribution company operating at Eket in Akwa Ibom state, Nigeria. PIS Eket has been using paper-based manual approach to conduct its day-to-day business transaction. However, given the challenges of inefficiencies and inaccuracies of transaction records and lack of effective audit trail mechanism for the paper cum manual approach, PIS has opted for Web Portal automated transaction process. Rapid Application Development (RAP) methodology is used in the web application development [11,12,13]. It is built using 3-tier architecture based on WAMP server configuration that consists of Windows Operating system, Apache web server, MySQL database system and PHP server-side scripting language [14,15,16].

2. Methodology

The work presented in this paper is the development of Sales and Inventory Workflow Management Information System (SIWfMS) Web Portal for Petrospan Integrated Services, Eket, Akwa Ibom state, Nigeria. Rapid Application Development (RAP) methodology is used in the web application development. RAD methodology is increment, allows parallel development and testing of small prototype modules and also allows user involvement in the application development process. In the RAD methodology, the initial user and system requirements elicitation was done through observations and study of the present system, interview, low fidelity prototyping, and focused group discussions to identify the lapses and the bottlenecks inherent in the "as-is" sales and inventory workflow management system at Petrospan Integrated Services.

After the requirement engineering phase, the functional decomposition of the web application is done, Figure 1. According to the functional decomposition in Fig 1 the SIWfMS is made up of five modules: the Administrator Module, the Inventory Module, the Sales Officer Module, the Customer Module and the About Us. These modules are also broken down to their different sub-modules. Figure 2 shows the functionalities associated with the SIWfMS web application Administrator. Figure 3 shows the application process for the Administrator Module. He is responsible for creating new users, adding new prices/items and changing information on the SIWfMS. When a new user is created, the Administrator assigns the new user category and the user default password. The user category can be sales officer, inventory manager, and customer and gives them.

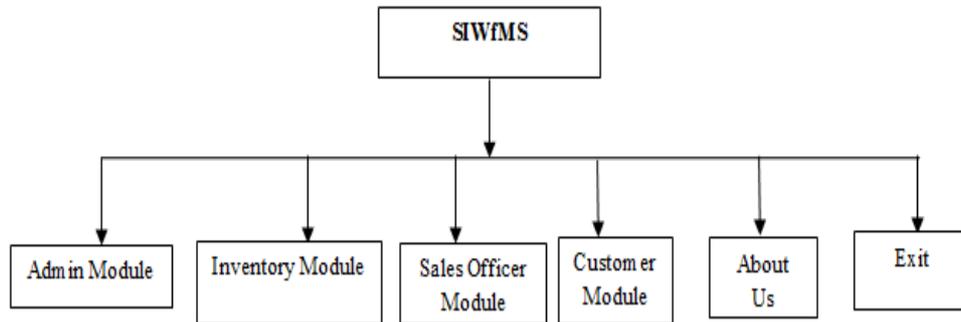


Figure 1. *Functional Decomposition of the proposed SIWfMS*

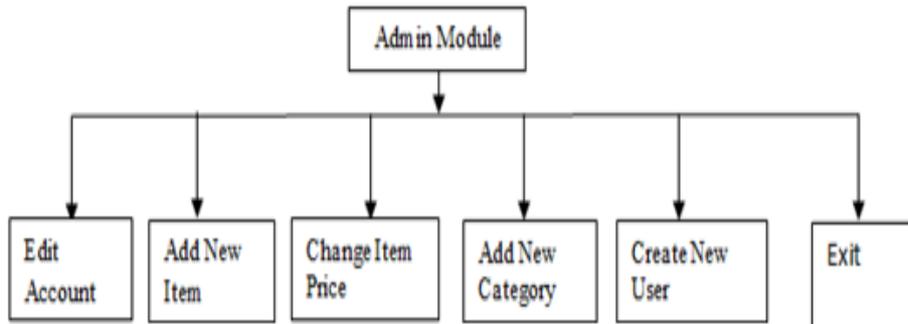


Figure 2. *Functional Decomposition of Administrator Module*

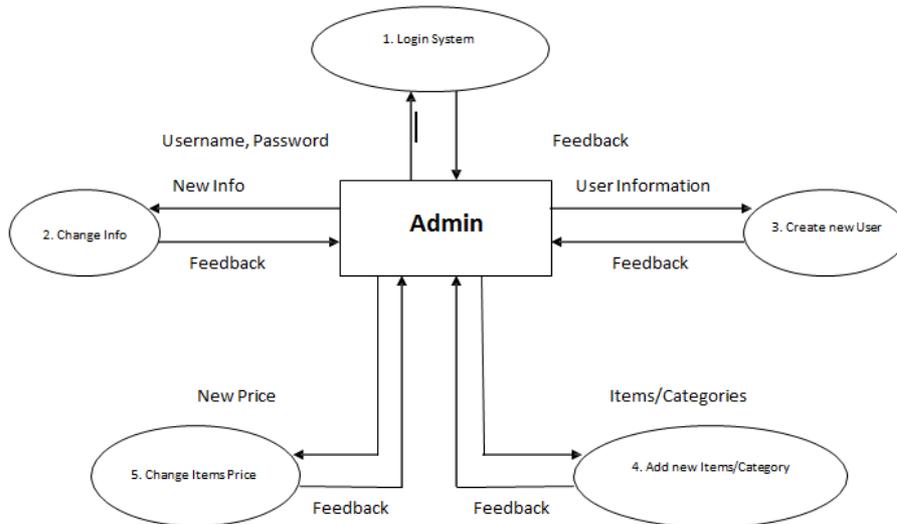


Figure 3. *Activity Flow Diagram for Administrator Module.*

Figure 4a shows the flowchart for the system user's creation by the Administrator whereas figure 4b shows the flowchart of how the system Administrator changes or updates the price of an item.

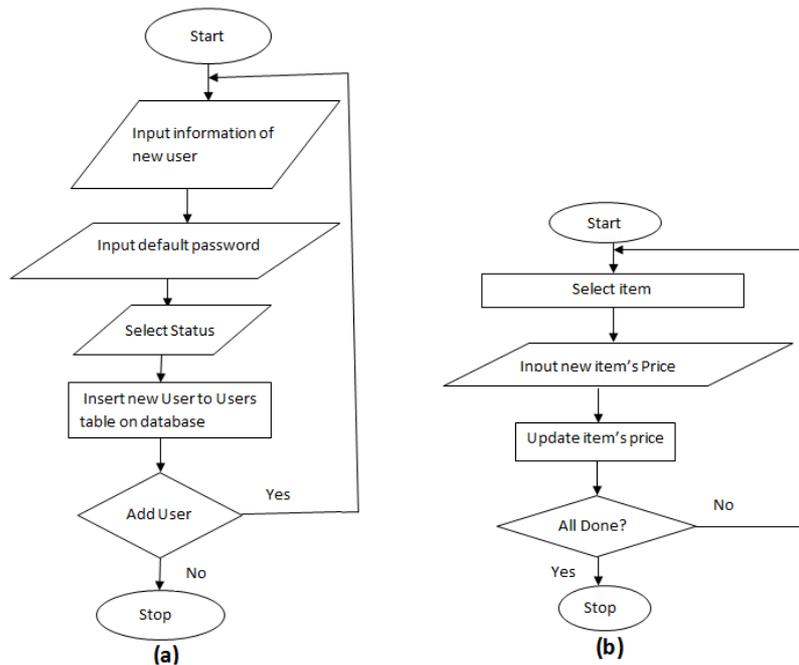


Figure 4. Flowchart for (a) the Add new User (b) Change Items' Price.

The functional decomposition of the Sales Officer Module is given in figure 5. According to figure 5 the Sales officer's module includes among other tasks; creating new customer, viewing items sold, viewing items in stock, inputting daily sales, printing invoice or receipt, etc.

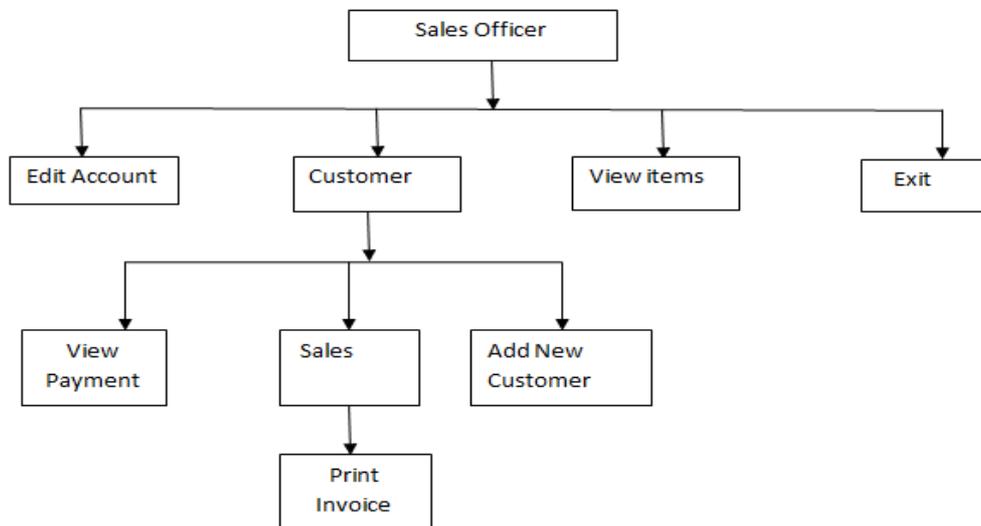


Figure 5. Functional Decomposition of the Sales Officer Module

Figure 6 shows the activity flow diagram for the Sales Officer Module. It highlights the roles played by the Sales officer.

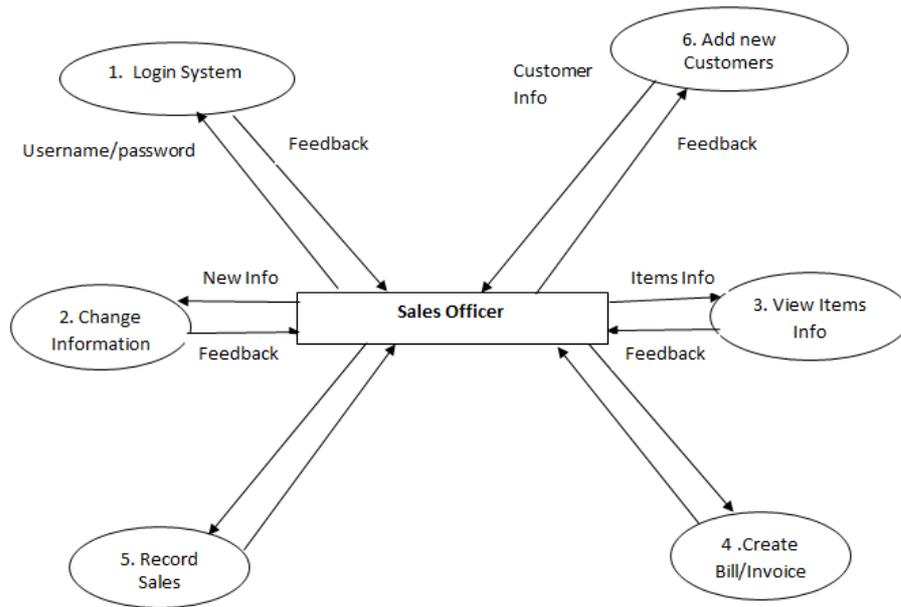


Figure 6. Activity Flow Diagram of the Sales Officer Module.

Figure 7 shows the flowchart of the daily sales performed by the sales officer. The sales officer inputs customer's name checks his order and confirms if he is a debit customer (D) or not. If so, he records his order, else he collects money; send the order to the inventory manager. The sales officer packages the ordered goods from the inventory unit and prints invoice for the customer.

The functional decomposition of the inventory module is shown in figure 8. Importantly, figure 8 shows the processes handled by the Inventory Manager. This includes, being able to view/add new customers, view items being stocked, check the sales history, run/check the inventory/stock level of items in the warehouse, and lastly run the audit trail that captures the actions performed by users of the system. The activity log used in the audit trail can also be used to reconstruct past events, clear doubts and prepare accurate and reliable audit report. Figure 9 shows the activity flow diagram for the inventory manager.

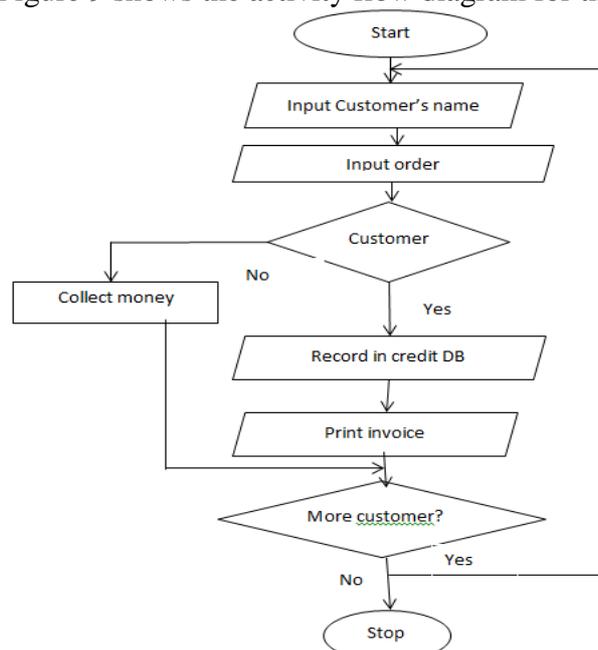


Figure 7. Flowchart for daily sales.

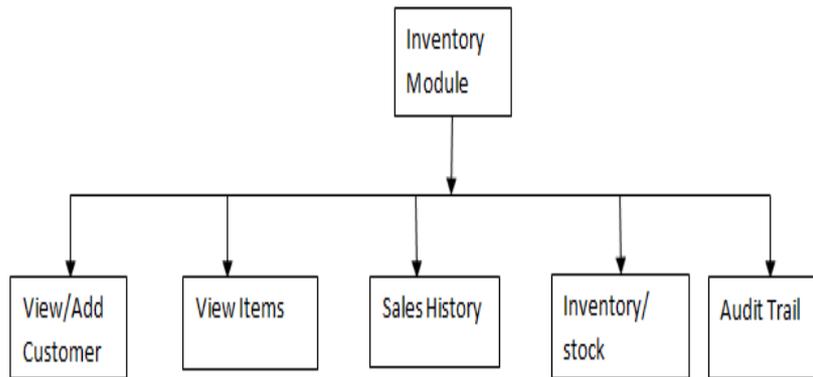


Figure 8. Functional Decomposition of the Inventory Module.

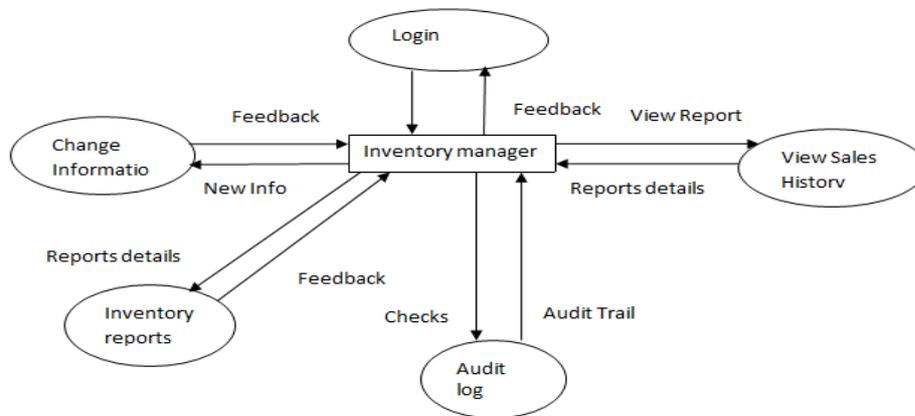


Figure 9. Activity Flow Diagram of the Inventory Module.

3. Results and Discussion

The user login page screenshot is shown in Figure 10. The login page allows system users that have been created by the Administrator user to log on access the system. Each user is entitled to have access only to those system functionalities he has the user privilege to access or base on his user status such as sales officer, inventory manager, etc.

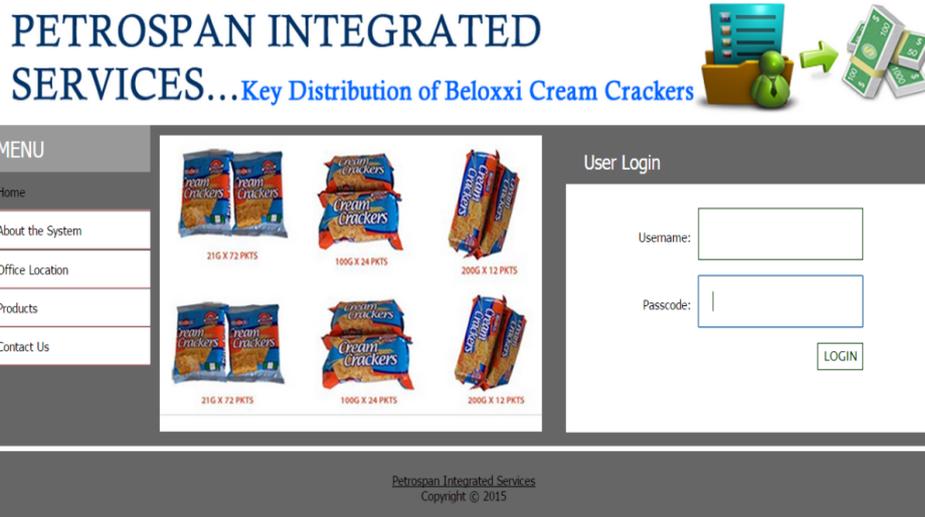


Figure 10. The screenshot for user logon.

Figure 11, shows the input form used by the Administrator to create system users. The Administrator inputs the first name, the last name, the user name, the default password and confirmation of the password, corresponding email address and then assign the status to the particular user, which may be, sales office, Administrator, inventory manager and customer.

The screenshot shows a web interface with a dark header containing the text 'Home' and 'Welcome to the Admin area.'. Below the header is a sub-header 'Add New User'. The main content area contains a form with the following fields: 'First Name', 'Last Name', 'Username', 'Password', 'Confirm Password', 'Email Address', and 'Status'. Each field has a yellow rectangular placeholder. The 'Status' field is a dropdown menu that is currently open, displaying a list of options: 'Admin', 'SalesOfficer', 'InventoryManager', and 'Admin'.

Figure 11. *The screenshot of Create System Users form.*

Figure 12 is the input form used by Administrator user to update any changes to the items or goods in terms of new order or price change. The Administrator user calls up the product name, puts the new price or item quantity.

The screenshot shows a web interface with a dark header containing the text 'Home' and 'Welcome to the Admin area.'. Below the header is a sub-header 'Update Item'. The main content area contains a form with the following fields: 'Name', 'Description', 'Price', and 'Quantity'. Each field has a yellow rectangular placeholder. At the bottom right of the form is a button labeled 'Update Item'.

Figure 12. *The screenshot showing item/goods update form.*

Figure 13 is the input form used by the sales officer to input daily sales. The sales officer calls up the customer and then inputs, or selects from the dropdown menus, each item, the quantity and the price is displayed. After selecting for all the items ordered by the customer, the sales officer then proceeds to print the invoice and then proceeds to another sale if any.

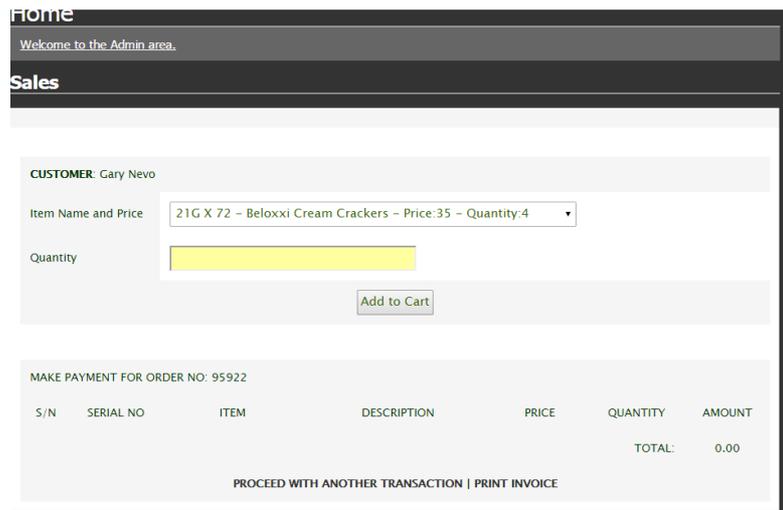


Figure 13. Screenshot input of sales by the sales officer

Figure 14 is the screenshot showing invoice ready to be printed by the sales officer. It contains information about the customer, the specific products bought along with their quantities and amount (cost) and a unique number invoice number automatically generated by the system.

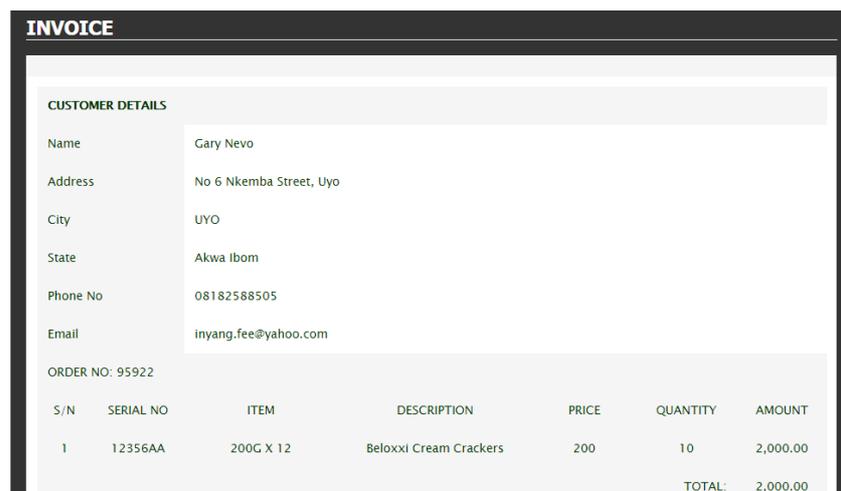


Figure 14. Screenshot showing invoice for sales ready to be printed and issued to customer

Figure 15 is the screenshot of transaction log or activity log for audit trail functionality in the system. It captures the activities carried out by the system users; it has the date, the description of the item changed and the system user that effected the change. This can be used to track any transaction that has taken place in the system.

4. Conclusion and Recommendation

4.1. Conclusion

In this paper, the development of Sales and Inventory Workflow Management Information System (SIWfMS) Web Portal for Petrospan Integrated Services, Eket, Akwa Ibom state, Nigeria is presented. Rapid Application Development (RAP) methodology is used in the web application development. It is built using 3-tier architecture based on WAMP server configuration that consists of Windows Operating system, Apache web server, MySQL database system and PHP server-side scripting language. The web application developed

consists of five modules: the Administrator Module, the Inventory Module, the Sales Officer Module, the Customer Module and the About Us. These modules are also broken down to their different sub-modules and then developed, tested as well as integrated to for the complete system. Some design details and output screenshots of the functional SIWfMS are presented.

The screenshot shows a web application interface with a dark header. Below the header, there is a navigation bar with the text "Welcome to the Admin area." and a "Product Log" link. The main content area displays an "AUDIT LOG" table with the following data:

S/N	DATE	DESCRIPTION	STAFF
1	24-Jun-2015	Product Bought: 21G X 72 :Quantity - 2	Uche
2	22-Jun-2015	New Product Added: 21G X 72 :Quantity - 150	Administrator
3	22-Jun-2015	Product Bought: 21G X 72 :Quantity - 3	Uche
4	21-Jun-2015	Product Bought: 10g Beloxxi Sweets: Quantity - 10	Eduop
5	21-Jun-2015	Price Change to 5: 10g Beloxxi Sweets: Quantity - 100	Administrator
6	21-Jun-2015	New Product Added: 10g Beloxxi Sweets :Quantity - 100	Administrator
7	21-Jun-2015	Price Change to 10: 10g Beloxxi Sweets :Quantity - 100	Administrator
8	21-Jun-2015	Product Bought: 10g Beloxxi Sweets :Quantity - 40	Eduop
9	07-Jul-2015	Product Bought: 200G X 12 :Quantity - 10	chi
10	03-Jul-2015	Product Bought: 21G X 72 :Quantity - 1	chi

Figure 15. Screenshot showing system activity log for audit trail

4.2. Recommendation for Further Studies

The research work focuses on the use of web application with transaction log for audit trail for SMBs in handling their daily sales and inventory activities hosted on the web for the biscuit distributor company in Eke, Nigeria. Further work is needed to design the mobile application version of the mobile system. This will make the accessibility of the system to be at the user's convenience. Also the use of POS (Point Of Service) in paying for goods can also be incorporated in future works.

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