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Enhanced Quality Service Assurance System: A Better Approach to Service Delivery

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Abstract

This work examines the need for enhancing the quality service assurance system of Servicom Nigeria and as well provides a model applicable in all area in quality service assurance. In other for customers report service failure to be reported just at the point of failure, we took advantage of the power of mobile application revolution, building a mobile complaint application that run on android. Data confidentiality, interactive feedback mechanism, easy complaint and transparency issues related to the old system are the major issues resolved by the new system using an android mobile application to interface between customers and the Servicom office. It also provides an administrative end for the Servicom office to receive and manage complaints from customers at different levels of offices in the Servicom Nigeria. These were done to enhance and improve the efficiency of customer complaints model and therefore enhancing the quality assurance system of Servicom Nigeria.

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1.0 Introduction

Every government is required to protect the interest of her citizens by providing the basic services to which her citizens are entitled in a timely, fair, honest, effective and transparent manner. To ensure this aim is met, a quality service assurance system is established. Through this, citizens can convey their feelings over a service failure at points of service. Service failures are always occurring – but what matters more are the actions taken to recover from the failure, which have multi-dimensional impacts on the company (Stefan Michel, 2008). Service is highly variable, and the quality depends on who provides it, when and where they are provided (Kotler and Lewis, 2010). The practice of quality service assurance enables service providers to identify faults and resolve issues to minimize service down time, diagnose and resolve service quality degradations.

1.1 Background to the Study

In 2004 the office of the Nigerian Presidency and Cabinet signed a Social Compact with All Nigerians called SERVICOM (Service Compact). The Compact declared "*We dedicate ourselves to providing the basic services to which citizens are entitled in a timely, fair, honest, effective and transparent manner*" (Servicom, 2009). SERVICOM office was established to operationalize the compact with key responsibilities. Coordination of efforts by Ministries, Departments, and Agencies (MDAs) to develop and implement service Charters in MDAs, as well as frequent monitoring and reporting on the progress made by each Ministry and Agency in carrying out their commitments under this Charter. To conduct independent surveys of the MDAs' services given to citizens, their adequacy, timeliness, and customer satisfaction, and to extensively broadcast the results in order to keep residents fully informed and raising public awareness of the negative impact of service failure on Nigerian society and social systems.

Over the years, this compact has been implemented in 52 Ministries, Departments and Agencies (MDAs) across the nation (Servicom, 2009). Each of these MDAs has a Service Window where citizens at the point of service report service failure. Citizens are to get feedback within 5 working days. Citizens unsatisfied with Service Window's feedback can contact the customer care office at the Servicom unit of the Ministerial Servicom Unit (MSU). Persisting issues can be taken up to the service point Nodal office at the same MSU. Nodal Offices across all MDAs forward service failure reports to the Servicom office. For the purpose of fulfilling the Service Compact, Servicom office channels all complaints to the Presidency through the office of the Secretary to the Government of the Federation (SGF). By this appropriate resources are deployed to affected points of service delivery. To ensure proper quality service assurance and delivery in a timely, fair, honest, effective and transparent manner as demanded by the signed compact, this study provides a computerized and enhanced system of Servicom Nigeria (Oketa C. K. *et al.*, 2019).. In the new system, the Servicom Window where citizens lay complaints will be replaced with a Virtual Service Window installed on citizens' mobile devices (Android Operating System). This is to instantly collect complaints at points of service failure and sent to the central database. The new system provides an independent Servicom web application which synchronizes with the central database to get complaints. The appropriate Servicom unit officer sends feedback to the database, which eventually gets synchronized with the complainants' mobile application.

1.2 Statement of the Problem

Lack of confidentiality of customer complaint data, resulting in a low turnout of expected complainants. There are no mechanisms for quick complaints at the point of failure of service. Data on customer complaints at any Ministerial Servicom Unit is not directly accessible to the Servicom headquarters.

1.3 Objectives of the Research

To improve oversight of the quality of services delivered by government Ministries,

Departments, and Agencies (MDAs). By introducing the Servicom Complaint Android Application, we hope to accelerate the speed with which data is collected and processed, to maintain the confidentiality and transparency of complaints in the Servicom system and deliver a quality service report to the presidency for proper decision making.

2.0 Literature Review

The ills of service failure in the past has given rise to organizations taking measures to ensure delivery of quality service to customers. Service failure is a major contribution to unproductivity in the efforts made by the government or private establishments to the public. Over the years, many organizations, countries and establishments have taken several decisions to prevent service failure. Most of these measures have become ineffective. The effectiveness of a quality service assurance measure depends on the model with which it operates. While some organizations believe solely on giving the right training to service point agents, some believe on providing the best tools for rendering service.

2.1.1 Theoretical Frameworks

According Baryeh (2009), two factors influence the quality service assurance provided by Higher Education Institutions in Nigeria. These include:

A. External Factors Versus Internal Factors

a. External Factors

These are external quality service assurance bodies responsible for setting standards in the education. These bodies oversee several countries and even an entire continent. Example of such is United Nations Education, Scientific and Cultural Organization (UNESCO).

b. Internal Factors

These are bodies local to a country, set up by the federation to set standards for measuring quality service in Education and to monitor it. In Nigeria, the major body overseeing Higher Education in is the National University Commission (UNC), others include Joint Admissions and Matriculation Board (JAMB), Nigeria Society of Engineers (NSE), Institute of Chartered Accountant of Nigeria (ICAN).

B. Models of Quality Assurance

1. The American Nurses' Association (ANA) Quality Assurance Model

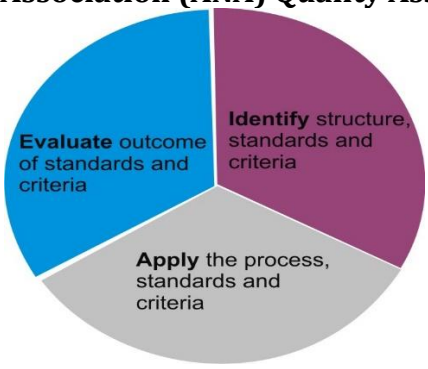

Figure 1: ANA Quality Assurance Model (Source: Hareesh, 2013)

The ANA model identifies with three major steps to assuring quality service which are Identify, Apply and Evaluate.

Identify: This identifies the standards that define what quality means in a given domain. This may involve developing a service chatter that will guide a qualitative rendering of service to customers.

Apply: The standards that define quality must be applied to the system to yield a quality result.

Evaluate: This tends to obtain feedback of the impact of this applied standards. It is most at times referred to as quality service monitoring. Several approach are used by different organizations to evaluate the productivity of their standards. The ability to properly infer using

diverse means will determine the next approach in upgrading quality. Customer feedback has ever been one of the best evaluation approach. These customers can tell how satisfactory or unsatisfactory the service rendered to them is.

2. Plan, Do, Check and Act Model

Figure 2: The plan, do, check and act model (Source: Hareesh, 2013)

This model also identifies the importance of "Check" (Evaluation) in rendering quality service to customers. After checking for the result of the effort, better decisions are made towards rendering a better service.

Hareesh (2013) noted some principles guiding quality assurance. These may be regarded as his model of quality assurance. These principles include: Customer focus, Leadership, Involvement of people, Process approach, System approach to management, Continual improvement, Factional approach to decision making and Manually beneficial supplier relationship

2.2 Technologies Used

With a focus on the quality of services rendered in government owned higher education institutions in Nigeria, service failure can be attributed to the level of technologies adapted by these institutions. These range from the Admission processes, Registration of new students, Registration of courses, Lecturing activities, Lecturer-student relationship, Examination invigilation, Result processing and publication, Academic planning and time-table planning

As at the early 90s, Nigerian higher institutions processed admissions manually, including the registration processes of the new students. The quality of such service was poor, as it was stressful for new students to complete their registration.

From the time POST Unified Tertiary and Matriculation Board (UTME) came into being, higher institutions sold physical forms to candidates. This warranted to long queues at the form purchase centers which was not only a stress to candidates but also to form vendors. As web technology revolutionized the industry, higher institutions adopted the concept of e-Registration and developed Admission Portals to help increase the quality of service during admission process. Online customer support telephone lines where provided alongside the Institutions portal to help candidates lay complaints and receive guidance during their registration.

2.2.1 Quality Assurance in Nigerian Education System

Education is not only regarded as a very important instrument of socialization and reform, but as a means of laying foundation for a strong and virile nation; it is regarded as the instrument for development and integration, hence concerted efforts are always made to ensure that the system is on course through effective monitoring and supervision (Ojo, 2008).

According to Babalola (2004) the quality of education refers to the worth of education (with reference to its input, the teaching- learning process and the output/outcome). To ensure quality service in Nigerian education he outline the following strategies:

Monitoring: This has to do with keeping a watchful eye on input, process, output and the environment of an education system to ensure that things keep going the right direction and

according to the set standards. For example, monitoring of pupils' progress from one class to another.

Evaluation: This involves assessment, appraisal, valuation and estimation of the worth of education inputs, process and outcome for the purposes making judgment and corrective criticism.

Supervision: This deals with overseeing those who are responsible for one thing or the other (teaching, learning, resource utilization, management, etc) in the process of educating a pupil.

Inspection: This is more penetrating and piercing than supervision. It is job – focused and scientific in approach. It involves close examination, check, scrutiny and assessment of available facilities and assessment of available resources in an institution with a view to establishing how far a particular institution has met prescribed standards.

According to Akerele (2011) agencies/bodies for quality assurance in Nigerian tertiary institutions include National Universities Commission (NUC). The NUC ensures Minimum Academic Standards and Subject Benchmarks, Accreditation of Undergraduate Programmes, Ranking of Universities, Postgraduate Accreditation, Programme Verification, Joint Admissions and Matriculations Board (JAMB), Professional bodies including, Nigeria Society of Engineers (NSE), Institute of Chartered Accountant of Nigeria (ICAN), Computer Professional Registration Council of Nigeria (CPN). According to Akpan (2017) accreditation in Nigerian universities by the NUC features as below

s/n	Criteria	Maximum score in percentage
a.	Staffing	32
b.	Academic content	23
c.	Physical Facilities	25
d.	Library	12
e.	Funding	5
f.	Employer's rating of graduates	3
	TOTAL	100

Table 1: NUC Accreditation Criteria.

According to Gundu (2011) SERVICOM (service compact with all Nigerians), established in 2004 has produced "charters" for its day-to-day operational implementation in all the Federal Government Agencies - the "charters" are the basis for customer expectations of quality service delivery, rights demand for good service, recourse when service delivery fails, and involvement in the service delivery programme. This he said it's one among other public enlightenment campaign which spans the "ethical revolution". The SERVICOM unit came into being as a result of the Federal Executive Council resolution of 10th March, 2005 that each Ministerial/Department/ Agency should establish a Ministerial SERVICOM Unit (MSU). The MSU spearheaded the service delivery initiative of the Ministry towards SERVICOM Compliance, thereby ensuring the promotion of quality assurance and best practices in the performance of its functions (Power.gov.ng, 2017). According to Anon (2017) the SERVICOM index (SI) is a set of business-relevant Key Performance Indicators (KPIs) that provide a standardised method for measuring and comparing performance against service standards defined by Ministerial/Departments/Agencies (MDAs). It is designed to become the standard method to help MDAs measure their performance in terms of customer satisfaction and improved service delivery. The Index measures the key influences on service delivery and customer satisfaction as well as the need for feedback and future development.

The SERVICOM Index consists of six (6) dimensions and weighted as follows:

Policy Commitment 10%

Service Delivery	25%
Customer	20%
Organizational Effectiveness	20%
Accountability	15%
Innovation	10%

This model of quality service measurement and assurance is employed in the education sector among other sectors owned by the Government. From an online survey taken over 6 Higher institutions in Nigeria the quality of service rendered can be estimated.

2.2.2 SERVICOM Unit Federal University Ndufu-Alike Ikwo, (FUNAI) Ebonyi State

The Servicom unit in this Educational Institution is operated using mail (funaiservicomdeskoffice@yahoo.com) or one can drop complaints in the **SERVICOM** boxes available all over campus (Nneka, 2017).

2.2.3 SERVICOM Unit University of Ibadan

Just like many government owned higher institutions in Nigeria, the SERVICOM unit of the University if Ibadan deployed some electronic means (emails and telephone calls) to track the customer complains in other to assure them quality service.

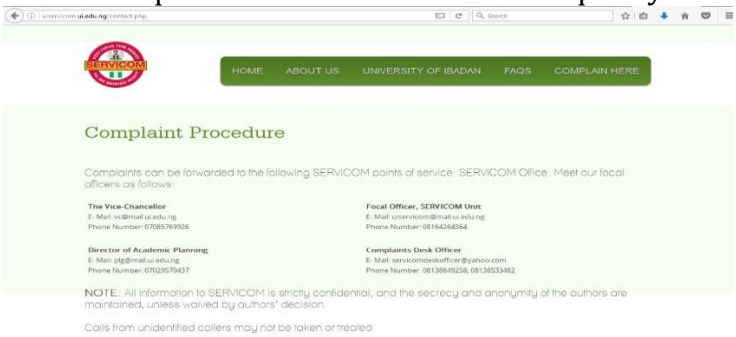

Figure. 2.3: The Servicom Website University of Ibadan (Source: uiservicom.ui.ed.ng/contact.php)

2.2.4 SERVICOM Unit Michael Okpara University of Agriculture Umudike (MOUAU)

The Servcom unit of MOUAU still adopts the use of telephone lines and email address to receive complaints from citizens.

Figure. 2.4: Michael Okpara University of Agriculture Servicom Website Page (Source: mouau.edu.ng/mouau-servicom-unit/complaints)

2.2.5 Quality Assurance in Ghanaian Education System

According to Baryeh (2009), The National Accreditation Board (NAB) is a public service institution under the Ministry of Education Youth and Sports (MOEYS), responsible among other things for the accreditation of both public and private tertiary institutions with regards to the contents and standard of their programmes and also to determined, in consultation with the appropriate institutions or body, the programme and requirements for the proper operation of their institutions and the maintenance of acceptable levels of academic or professional standards. He further stated that in Ghana, Quality assurance can have an internal and an external dimension. UNESCO (2007) defines external quality assurance as the actions

of an external body, which may be a quality assurance agency or anybody other than the institution that assesses its operations or that of its programmes, in order to determine whether it is meeting the agreed or predetermined standards. According to Seniwoliba (2014), internal quality assurance practices in Ghanaian universities include enactment of the NAB LAW 1993 (PNDCL 317): to contribute to the advancement of superior tertiary education administration as a Quality Assurance Agency, Student admissions: The admissions requirements are in accordance with the NAB's established standards., Quality Teaching and Learning: However, based on the monitoring strategies in place, the directorate of academic quality assurance notifies the University's management of these challenges so that appropriate actions can be taken to address them. Quality Graduate Output: To ensure quality, the university hires external examiners. These staff members are responsible for the moderation and standardization of exam questions. It is also a normal activity that before examinations, invigilators, supervisors, examination officers, and security staff are briefed on their roles and responsibilities during the examination. & Appointments and Promotions: The university has a standing committee on appointments and promotions that ensures that only eligible applicants who fulfill the selection criteria are hired and those who meet the waiting period are promoted.

2.3 The Weaknesses of Reviewed Works

Judging from the angle of effective quality assurance model and measure, several agencies established by different countries to monitor service failure do not employ the right approach. Though they have achieved better quality service assurance, but permitting the customers, directly involved with the service, to review the quality of service will be a better approach. Bodies such as Nigerian University Commission (NUC), the National Accreditation Board (NAB) Ghana, British Columbia Education Quality Assurance, amongst others deploy certain standards of quality service definition which hardly seek customer opinion as a yardstick for defining quality of service. SERVIOCM Nigeria frontlines customer complaints as the best measure of service failure in relative to the service charter of the service point. Meanwhile, from the review the highest electronic means for customers to lay complaints in SERVICOM are telephone calls/messaging and email, just few service points have an online form to get complaints. They lack the ability to collect complaints speedily at the point where service failed.

2.4 The Need to Enhance Servicom Nigeria

Based on experience as a Nigerian student, we often face challenges of service failure. Greater percentage of student who are aware of Servicom Nigeria in their respective schools consider it frustrating and ineffective visiting the Servicom unit to lay complaints. From oral interviews, students fear reporting some sensitive service failure to Servicom because of assumed lack of confidentiality. Therefore, this assumption made by students may hinder the turnout of complainants to the Servicom unit, making it difficult for Servicom to accurately review the quality of services rendered through customer complaint. Though the Servicom unit promises confidentiality of your complaints, to treat you without partiality, humans naturally develop fears for fellow humans based on experience. This will prevent the expected percentage of complaints from students. In a typical Nigerian university, students rather complain indoors than expose their identity while laying complaints. An accumulation of the suppressed depressions faced by the students may result in riots and violent agitation.

Therefore, to properly and effectively obtain customer feedback without fear of lack of confidentiality by customers, we interfaced the customers and Servicom using a mobile complaint application, a central database and a Servicom complaint management application. In addition, Servicom officials in a University is answerable to the Vice Chancellor and entire school authority. It will make more meaning to infer that the school authority has an overwhelming influence on the transparency of the Servicom unit under them. It is just like a

customer reporting my boss to me. The same boss that determines my salary and employment. Therefore, to some certain degree, the old Servicom system will undoubtedly lack transparency it ought to be. Critical complaints may not exceed the roof of the University in a bid to protect its corrupt interests from the Presidency. To prevent this, the enhanced servicom system sends a copy of customers' complaints to the national Servicom office. This will enable them have a view of the level of service failure in all ministries, departments and agencies of the federation. The new system will as well monitor the rate of customer feedback as a contributing factor to encouraging more customer complaints. This new model will be applicable to any system, irrespective of the scope and domain

High Level Model of the Proposed System

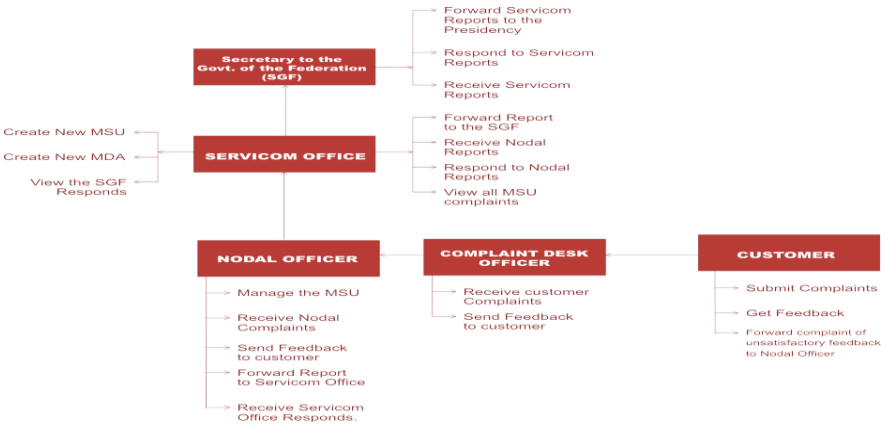

Figure 3.1: High Level Model of the Proposed System

3.3.1. Analysis of the Proposed System

The proposed system was developed to support easy collection of customer complaints at the point where service failed through the SERVICOM complaint android application. These complaints are instantly sent to a central databased from where they are accessed by a SERVICOM web application built to receive the appropriate complaints sent to a specific SERVICOM Unit. The screenshot of the android application shows the information collected from a customer at the point of complaints.

Figure 3.2: A Screenshot of the SERVIOM Complaint Android Application

The SERVICOM web application was developed to manage data collected from customers and as well manage the SERVICOM office. Based on the proposed system, the SERVICOM web application supports the following offices: The Complaint Desk Officer: Receives and replies customer complaints, Nodal Officer: Responds to unsatisfactory responds sent by a customer, Servicom Office: Forwards report periodically, to office of the Presidency through the Secretary to the Government of the Federation (SGF). The Office as well services as the Admin, of the System, having the privilege to create New Ministry, Department or Agency (MDA), New Ministerial Servicom Unit (MSU), Overview all complaints and responses by MDAs, Reply the

SGF, View and respond to Reports from all Nodal officers nationwide, Secretary to the Government of the Federation (SGF): Periodically receives Reports from SERVICOM office. According to the old system, these reports are to be forwarded to the office of the Presidency. These reports come in pdf format, docx format or plain text.

3.3.2. Justification of the Proposed System

Based on an online survey conducted over a sample population of 500 students of Federal University Ndufu-Alike, Ikwo (FUNAI), the following charts where generated.

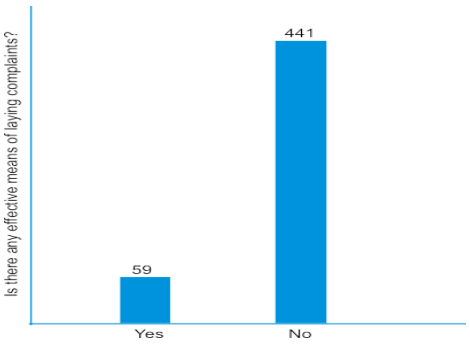

Figure 3.3: Complaint Effectiveness

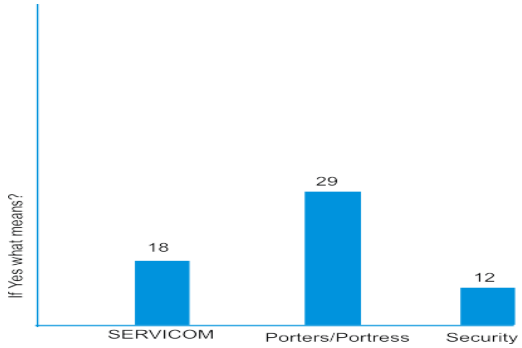

Figure 3.4: Means of Complaint

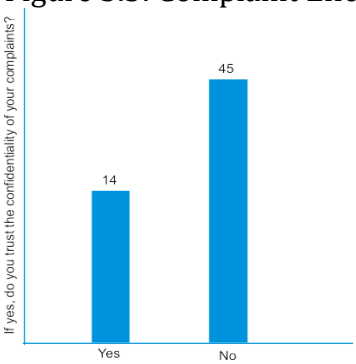

Figure 3.5: Complaints Confidentiality

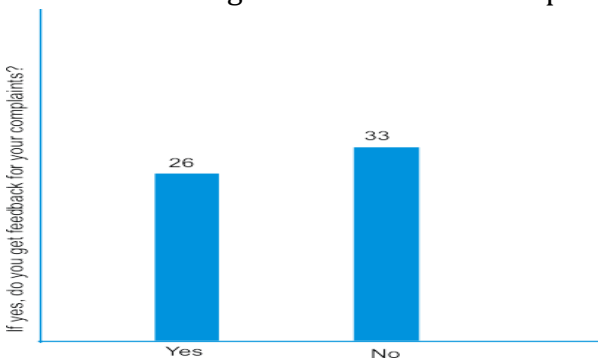

Figure 3.6: Complaints Feedback

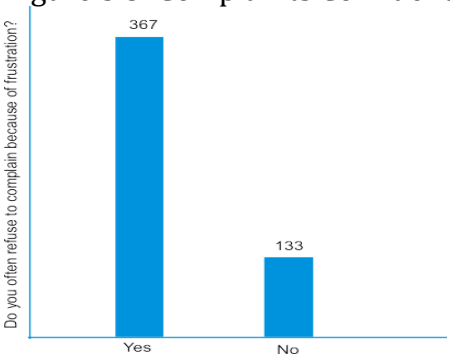

Figure 3.7: Complaints Frustration

This was conducted to know the loop-holes of the existing system and to further justify the proposed system.

At a glance on the chart, the following conclusions can easily be made:

a. 88% of the students do not believe on the effectiveness of the existing system.

b. 69% of the students who report do not report service failure to the existing system.

c. 76% of the students who lay complaints do not trust the confidentiality of their complaints, therefore may possibly cause the disbelieve on the effectiveness of the existing system.

d. 55% do not get feedback of their complaints while 45% get feedback.

e. 73% of the surveyed students refuse to lay complaints due to frustration.

The proposed system was developed to solve the problem of confidentiality. The fear of exposing the identity of complainant with some sensitive complaints will discourage trust on the system. The proposed system will protect the identity of complainants by interfacing them with a mobile application. This will stop face-to-face complaints. The proposed system provides a means of instantly responding to the complaints of a customer through the customer's email address provided at the point of complaint. Encouraging customers to report service failure to the system**.** Majority of the students channel complaints to the wrong domain, while some keep it to themselves. Therefore, to make accessing SERVICOM easy, the proposed system took advantage of the increasing growth of mobile application and its revolution. The availability of this android application on the smartphone of complainants will enhance easy access to Servicom. Typically, Servicom officials are subject to the Vice Chancellor. There is every possibility that the Servicom unit may not forward certain reports to the Servicom office nationwide due to influence from their boss. This is lack of transparency. The proposed system grants such privilege to the Servicom office nationwide to access all complaints and responds sent to complainants. This will grant the system transparency to a high degree.

4.1 System Architecture

Software application architecture is the process of defining a structured solution that meets all of the technical and operational requirements, while optimizing common quality attributes such as performance, security, and manageability. It involves a series of decisions based on a wide range of factors, and each of these decisions can have considerable impact on the quality, performance, maintainability, and overall success of the application.

4.2.1 System Architecture Diagram

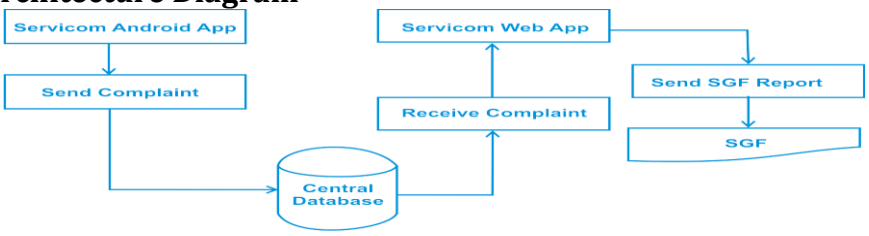

Figure 3: System Architecture Diagram of the Enhance Quality Service Assurance System

4.2.2 Use Case Diagram

Use case diagram is a behavior diagram that shows a set of actions which a system can perform with some set of external users called actors.

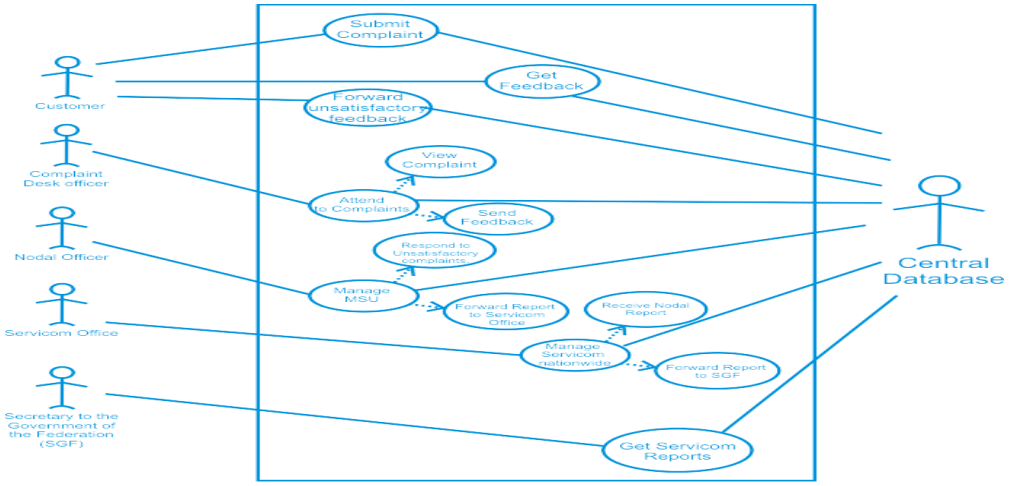

Figure 4: The Use Case Diagram of the System

4.2.3 Entity Relationship Diagram (ERD)

This is a diagram that summarizes the relationship among entities in a given system.

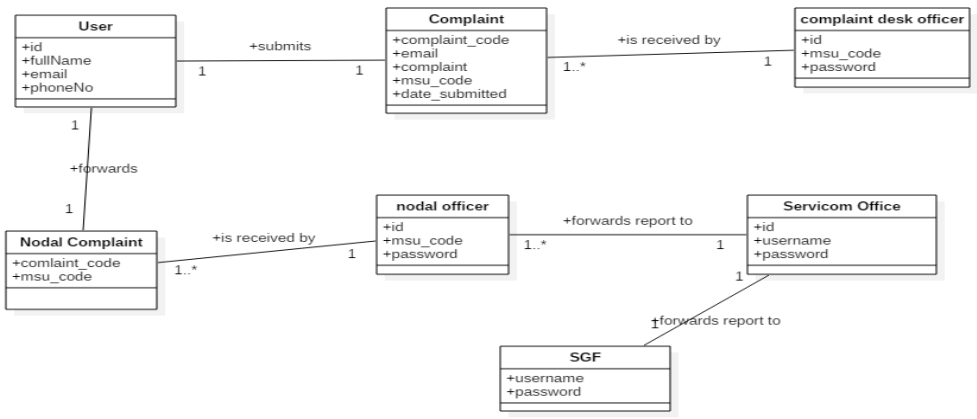

Figure 5: Entity Relationship Diagram (ERD) of the System

4.2.4 **Main Menu Design**

The main menu was designed as a framework of the system which provides access to the various subsystems of the entire system. Most of this main menu also provides access to some other submenus. This was designed to make the presentation of the functionality of the whole system easily accessible by a common user of the system without explicit directions.

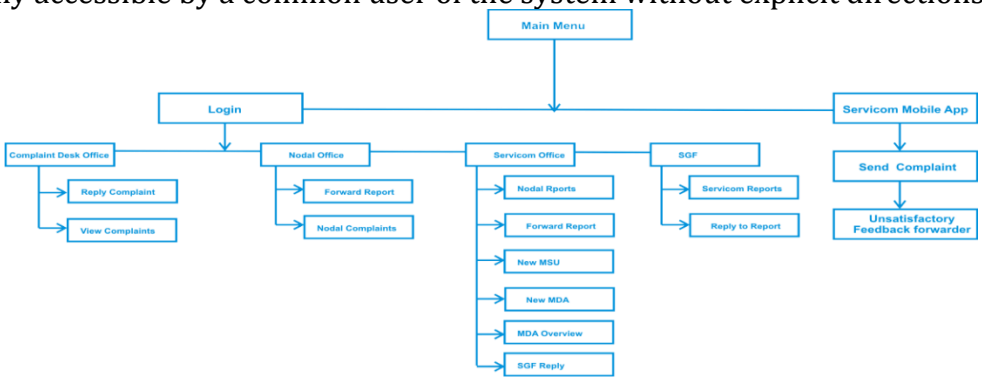

Figure 6: Main Menu Design

4.2.2 **Subsystem Design**

This wide system is made up of two basic subsystems that provide the various functionalities for the implementation of the entire system objectives. These sub systems include:

i. The Android Platform

This platform is built to get input data into the system in the form of customer complaints. It runs on the android Operating System.

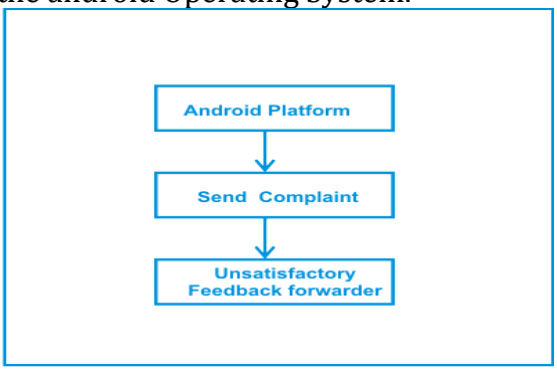

Figure 7: The Android Platform

ii. The Web Platform

This platform is built to receive input data from customers and utilize this data at various levels towards improving quality of service.

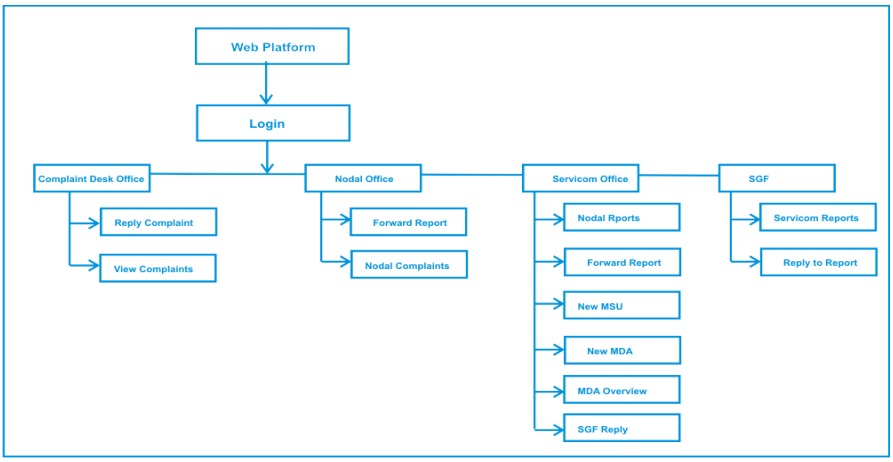

Figure 8: The Web Platform

4.2.3 **Program Module Design**

The entire proposed enhanced Servicom system is characterized by six modules which include: Login Module: This is a module that supports security and restricts unauthorized access into the Servicom web platform. This module permits access to the following offices: Complaint Desk Officer, Nodal Officer, Servicom Office and secretary to the Government of the Federation. Customer Complaint Module: This module found in the Android Platform obtains input from customers and complaints and forwards to the appropriate Ministerial Servicom Unit (MSU) in the central database. Complaint Desk Office Module: This module forms part of the Web platform and receives complaints from all customers. It as well helps this office respond to customers' complaints. Nodal Office Module: This module helps a Ministerial Servicom Unit to manage every activity in the unit such as attending to customers with unsatisfactory responds received from the Complaint Desk officer. Servicom Office Module: This module is aimed at managing all MSUs nationwide. It provides this office with the privilege to create new Ministry, Department or Agency (MDA), create new MSU, overview all MDAs and forward periodic report to the office of the presidency through the Secretary to the Government of the Federation (SGF). SGF Module: This module has its own separate login module due to the sensitivity of the data it contains. It supports the Secretary to the Government of the Federation to receive and respond to Servicom reports.

4.2.4 The Ministerial Servicom Unit (MSU) Code Generation Flowchart

As part of the architecture of the proposed system, every MSU is assigned a code called Msu Code. This enables customers forward complaints to the right complaint desk. An MSU code is in this format SNg/MDAtype/MdaID/MsuID eg. SNg/M/1/3. MDA type is the first alphabet of the MDA type which may be either Ministry, Department or Agency. The MDA ID is obtained from the database, while the MSU ID is the addition of 1 to the total number of MSUs in that MDA. The flowchart below shows how an msu code is generated at the point of creating a new MSU by the Servicom office.

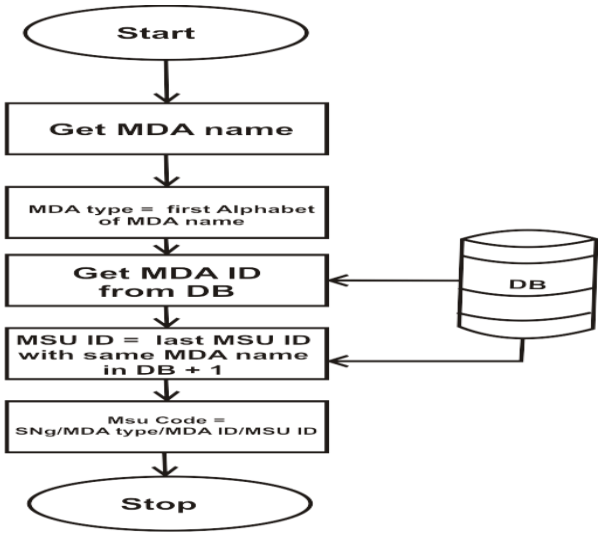

Figure 9: MSU Code Generation Flowchart

4.4 Main Menu Implementation

The main menu of the system includes all major options leading to the entire parts of the system. These include:

4.4.1 The Servicom Login Menu

This is menu is built to authenticate all Servicom Offices represented in the System. The following offices are authenticated at this menu:

a. Servicom Office
b. Nodal Office
c. Complaint Desk Office

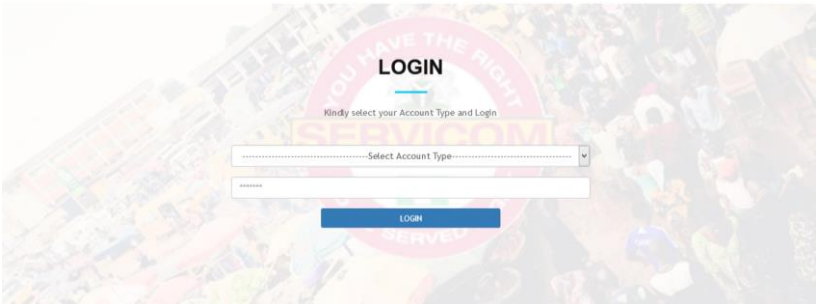

Figure 10: Servicom Login Menu Implementation

4.4.2 Secretary to the Government of the Federation Login Menu

This menu is specially designed for the SGF to manage reports from Servicom office.

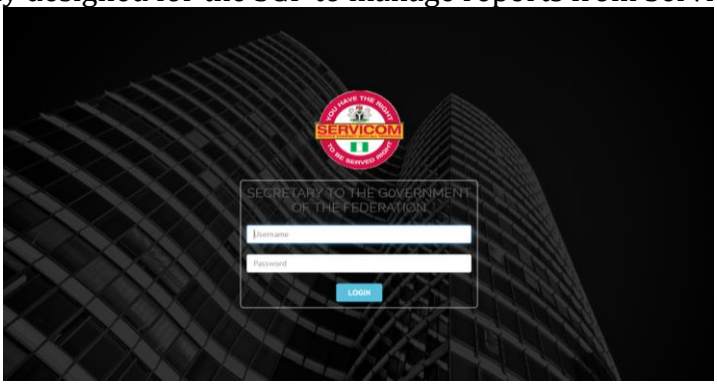

Figure 11: SGF Login Menu Implementation

4.4.3 **Servicom Office Menu**

This is a menu that enables the Servicom office navigate through the various functions it is aimed at performing.

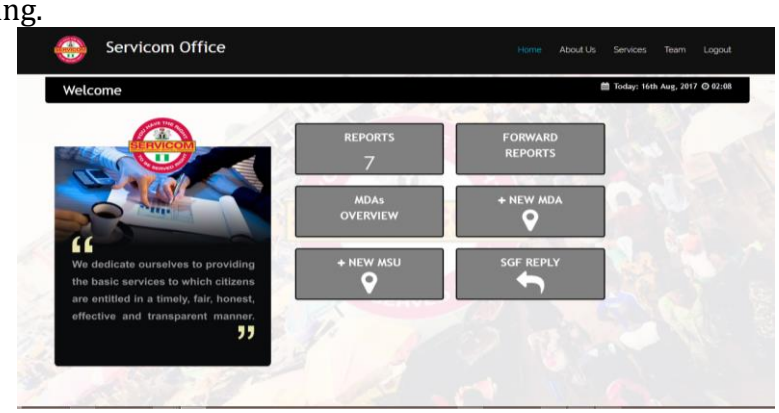

Figure 12: Servicom Office Main Menu Implementation

4.4.4 **Nodal Office Main Menu Implementation**

The Nodal office main menu is based on the various privilege given to this office. It helps it manage a given Ministerial Servicom Unit (MSU).

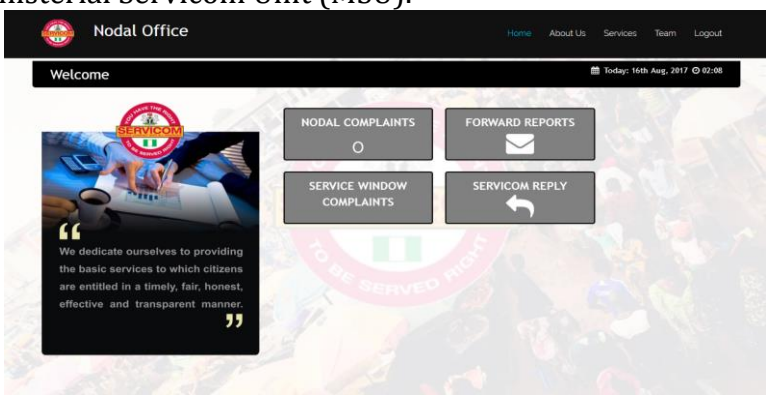

Figure 13: Nodal Office Menu Implementation

4.4.1 Subsystem Implementation

A. The Android Subsystem Implementation: The android subsystem was designed using XML and implemented with Java language.

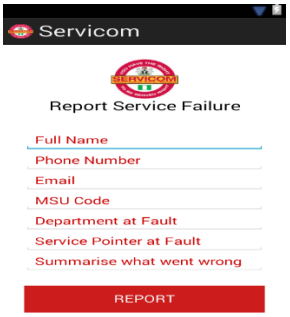

Figure 14: The Android Subsystem

When the "Report" button is clicked, the data inputted on the various fields are sent through a POST METHOD to a PHP file (insert_report.php) to receive the data and populate the central database.

```php
<?php
  define('HOST','localhost');
  define('USER','root');
  define('PASS','');
  define('DB','servicom');
  $con = mysqli_connect(HOST,USER,PASS,DB);

  include('class.php');
  $class = new main();

  $name = $_POST['full_name'];
  $MsuCode = $_POST['msu_code'];
  $DeptFault = $_POST['dept'];
  $FaultyPointer = $_POST['service_pointer'];
  $user_email = $_POST['e_mail'];
  $phone = $_POST['phone'];
  $complaint_code = $class->getComplaintCode();
  $mda_idd = explode("/", $MsuCode)[2];
  $mda_id = $mda_idd;
  $Summary = $_POST['summary'];

  //Check if Email already Exist
  $rrr = mysqli_query($con, "SELECT id FROM users WHERE email = '$user_email'");
  if(mysqli_num_rows($rrr) == 0){ //EMAIL DOES NOT EXIST
    //REGISTER USER
    mysqli_query($con, "INSERT INTO users (name, email, date_registered) VALUES(name', '$user_email', NOW())");
    //INSERT COMPLAINT
      $sql = "insert into complaints (MsuCode, mda_id, DeptFault, FaultyPointer,Summary,user_email, phoneNo, complaint_code,dat
      $r = mysqli_query($con,$sql) or die(mysqli_error($con));
      if($r == true){
        echo 'Complaint successfully sent!';
      }
      else{
        echo 'Error submitting your complaints. Please try again later.';
      }
  }elseif (mysqli_num_rows($rrr) > 0) { //EMAIL EXISTS
    //PROCEED TO INSERT COMPLAINT
      $sql = "insert into complaints (MsuCode, mda_id, DeptFault, FaultyPointer,Summary,user_email, phoneNo, complaint_code,dat
      $r = mysqli_query($con,$sql) or die(mysqli_error($con));
      if($r == true){
        echo 'Complaint successfully sent!';
      }
      else{
        echo 'Error submitting your complaints. Please try again later.';
      }
  }
```

Figure 15: The insert_report.php Source Code

B. The Web Subsystem Implementation: The web subsystem was implemented and designed using HTML, CSS, JavaScript, PHP and MYSQL.

4.4.2 Program Module Implementation

The Login module implementation: The login module as implemented using HTML and CSS (for form building) alongside with PHP. A Servicom official is expected to select account type to view the complete login form for that office. When login details are inputted and login button is clicked, the program gets the login details using POST method and queries the database using MYSQLi based on the account type. If authentication fails, an error message is displayed, else if successful, the user is directed to the dashboard based on the account type. Some security measures were taken programmatically, to prevent malicious users from performing Structured Query Language (SQL) injection on the login form. The Customer Complaint Implementation: This module was implemented on the android operating system. The user complaint form data were collected using the android findViewById(R.id.FORM ID). This data is converted to a string using the java toString() method. And passed to the doingInBackground() class which sends the data to our PHP file (insert_report.php) on a hosted server using the java httpUrlConnection. Responds message from the php file is returned snd displayed to the user using the android Toast.

The Complaint Desk Office Module Implementation: This module selects all complaint data addressed to a given MSU using mysqli query and displays on the dashboard. On clicking any complaint data, the full complaint is displayed with option to respond to complaint. Responds data is sent to the complainant's email address using the php mailto() method and a copy is populated to the database. The Nodal Office Module Implementation: This module receives notification of complaints with unsatisfied feedback. The nodal officer is provided a form to give a more satisfactory feedback to the complainant, while the feedback data is sent to the complainant's email address using the php mailto() method and a copy is populated to the database.The Servicom Office Module Implementation: This module provides the Servicom office with submodules that helps to manage the entire data on the Servicom database. The module is implemented using different myslqi queries to pull the appropriate data from all MSUs nationwide. In addition, it makes use of the php file management system to upload Servicom report to the Secretary to the Government of the Federation (SGF). The SGF Module Implementation: This module is simply implemented using mysqli queries to pull out all Servicom reports, presenting them in descending order. Its makes use of PHP and basic HTML hyperlink to the report file to enable the SGF initiate a download of the file.

4.5 System Testing

These are final actions taken to ensure proper functioning of the system. It required inputting real data and watching it flow through all the modules, to see if there are bugs and if it

implements the sole aim of the system. The following modules were tested: Login Module, Customer Complaint Module, Complaint Desk Office Module, Nodal Office Module, Serivom Office Module, SGF Module

4.5.1 Test Plan

A test plan documents the various methods that were used to verify and ensure that the system produces the right deliverables. On the Servicom android application the customer complaint form was properly tested to ensure it obtained the expected input. Form validation was carried out to ensure a user does not submit an empty field. The form submission was as well tested by the use of POST httpURLConnection which sends user data to a PHP file (insert_report.php). The insert_report.php file was properly tested to ensure that the MYSQL Queries where executed and the proper result were returned to the android application. On the Servicom web application, all the various modules where tested to ensure it process data correctly. Majorly, MYSQL Queries where tested to ensure transactions with the database where properly established.

4.5.2 Test Data

Customer complaints from the Servicom android application is the major input data for the testing of the entire system. The various data fields in the complaint form include: Full Name, Phone Number, Email, MSU Code, Department at Fault, Service Pointer at Fault and Summarize what went wrong.

4.5.3 Test Result

These are outcome of the input data in the enhanced Servicom system. The result can be found on the two platforms that make up the entire system. On the Servicom android application, when complaint is sent successfully, an android toast is made displaying a successful message. On the Servicom web application, the input data from the mobile application is displayed on the dashboard of the Complaint Desk Officer.

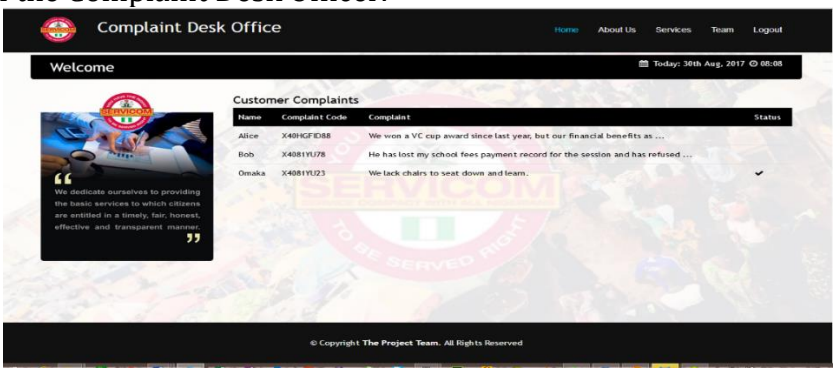

Figure 16: The Test Result of the Customer Complaint

4.6 System Integration

System integration shows how the various subsystems where brought together to form one big system which implements the aim of the system. The following are the various subsystems integrated to form the big system: Customer Complaint Subsystem, Complaint Desk Office Subsystem, Nodal Office Subsystem, Serivom Office Module Subsystem and SGF Subsystem. The above subsystems are carefully integrated as shown in Figure 5.2 below

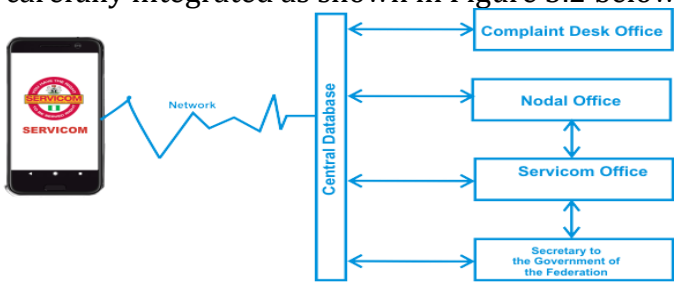

Figure 17: An integration of the System Subsystems

4.7 System Deployment

System deployment is all of the activities that make a software system available for use. The general deployment process consists of several interrelated activities with possible transitions between them. These activities can occur at the producer side or at the consumer side or both. Because every software system is unique, the precise processes or procedures within each activity can hardly be defined. (En.wikipedia.org, 2017). The best and most appropriate strategy to deploy the Enhanced Servciom System is side-by-side deployment. This strategy runs the two systems side-by-side to enable the organization find reasons to prefer the new system. Along the way, the old system will be kept aside while the new system keeps operating.

Summary and Achievements

Enhanced Quality Service Assurance System is an enhancement of the quality service assurance system of the Servicom Nigeria with a case study of the Education Sector of Nigeria, meanwhile this system is applicable to all other sectors in Nigeria. The following issues, which are limitations, associated with the old system lead to an enhancement of the system: Data Confidentiality Issues, Feedback Issues, transparency Issues, Channeling complaints to the wrong domain and stress of laying complaints. The major drive of the implementation of this system is the integration of a computing interface for customers to lay complaints. This integration provides answer to the above listed issues. By removing face-to-face complaints and replacing with computing interface, the system makes customers will feel secure with their identity when reporting some sensitive service failure. Feedback is instantly sent to the email address associated with a complaint. The system stores customers' complaints directly to a central database, giving privilege to the Servicom office nationwide to have overview of the complaints and the nature of responds given in any Ministerial Servicom Unit (MSU). Based on survey, most customers either refuse to complain or channel complaint to the wrong domain. Most reasons were due to stress to walk up to the MSU office to complain, or fear of facing frustration. Therefore, to enable customers report service failure just at the point service failed, we took advantage of the power of mobile application revolution, by building a mobile complaint application that run on android. The web platform supports all necessary administrative works of the Sericom Nigeria, ranging from viewing and responding to complaints, submitting periodic reports to the appropriate higher offices even to the office of the presidency through the Secretary to the Government of the Federation (SGF).

5.1 Conclusion

As a way of conclusion, it is worthwhile to recall the social compact signed by the office of the Presidency and the Cabinet with all Nigerians in 2004, to provide the basic services to which citizens are entitled in a timely, fair, honest, effective and transparent manner. As a means to implement this loyal compact, the customer complaint model of quality service assurance was adopted. This model still remains the most productive, as it will take a customer to best rate the level of quality of service they received. To facilitate the implementation of this social compact, mobile technology driving the market of the century was introduced into the system, for quicker and easier complaint capturing, data processing and better decision making, by the Servicom administrative body in ensuring better quality services are assured to customers. The incorporation of a computing interface for customers to lodge complaints is the primary driver of this system's implementation. This integration addresses the issues mentioned previously. By removing face-to-face complaints and substituting them with a computing interface, the solution ensures that consumers' identities are secure while reporting a sensitive service failure. Feedback is delivered immediately to the email address linked with a complaint.

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