

THE IT ADMINISTRATION AND MANAGEMENT: GUIDING PRINCIPLES FOR HIGHER EDUCATION SYSTEM (HES) AND IN GOVERNMENT BUSINESSES

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Abstract - This research paper reviews the present Higher Education System (HES)'s IT Administration and Management, examines the constraints for the production of quality and globally competitive graduates turn out to the labor market and aim at repositioning the administrative conveniences for managing IT and Management Services in Education with emphasis on Nigerian University System (NUS), Role based Theory, Hierarchical Line Manager modelling, comparing 5 (five) types of Universities (i.e. Federal, State, Private Universities in Nigeria and one African University and one European University) involving 5 Universities and 25 respondents using Desk research methodology, Content analysis tool for measuring the relationship and reporting the analytics with a view of standardizing the guiding principles and creating uniformity in Structure for managing the IT activities in the HES. The research work highly contributed to the knowledge in the IT Administration and electronic Management Services, Career cadre and Progression, Structure, Leadership, Behavioral architecture for uniformity and production of employable graduates. Also, this guiding principles can be adopted and replicated in Government.

Index Terms - Hierarchical line Manager modelling, IT and Management Services, Leadership Style, Content analysis, Role based Theory and System review.

I. INTRODUCTION

The best way to reform Nigeria University System[3] is to integrate IT into mass education delivery by providing a structured IT Administration, Management Services, Guiding Principles, Standard and Uniformity of purpose in HES. If any Organization is incorporating IT into their businesses without a structured and organized system, it is extremely abnormal. The introduction of enterprise resources planning (ERP) Thibodeau[8], solution in the Academic and Government businesses has risen to a pedagogic situation, where the Information Technology (IT) activities in Nigeria Higher Education System (HES) should be reorganized to contain innovative ideas in the environment for the advancement, achievement and successes of the set goals, targets and objectives. To inculcate that, the enforcing role should be attributed to a body in which National Universities Commission (NUC) is occupying. Part of the NUC's mandate is to ensure "validating status of all existing leakages in Nigerian University System (NUS) through the Commission/Federal Ministry of Education and other Public sectors/Institutions and donor agencies"[5] (NUC website, as downloaded on April, 2018). It has been identified that endemic falling standard in Higher Education

System and other Government Sectors (GS), were due to the loss of focus, inadequate integration and penetration of IT activities, administrative and culture disorder syndrome etc. This had degenerated into poor production level, inefficiency, ineptitude, lack of skill and global competitiveness in the part of HES and GS. The visible effects of this inadequate deployment of IT in teaching, research vocational education and community development has resulted to fusty leadership style, corruption, plagiarism and poor performance however these required reforms. To revitalize the NUS, this paper **aim** to reposition the IT Administration to embrace the electronic Management Services (eMS) and the use of a Principal Officer as University System Administrator in the Higher Education System and Government businesses. The **objectives** of this research work are:

1. To adequately integrate IT in teaching, learning research and Community development in order to reduce the challenges facing the mass delivery issues in Education thereby removing the mixed-up questions in the IT Administration & Management Services.
2. To restructure the IT activities in Higher Education System and in Government Businesses.
3. To Professionalize the IT staff Administration & Management Services.
4. To standardize the IT Division Management Structure, Career cadre, the Line Managers and Progression for the Nigerian University System and Government.
5. To separate academic functions from Management Services and state the clear distinction between the Academic Programmes, Cyber Security

Centre/Computer Centre and IT Management Services by proposing the use of 3 Arms of the IT activities in the Nigerian University Systems.

Information Technology (IT) innovations in an academic enterprise demands using technology in new ways to create more efficient and effective organization and improve alignment between technology initiatives and academic business. In the past, majorly HES has been Academic mainstream (i.e. Regular Undergraduate and Postgraduate) Programmes and the Administration & Management Services only. The Management perspective is based on the two concepts which stood at learning culture and Leadership. See the illustration below in Fig.1:

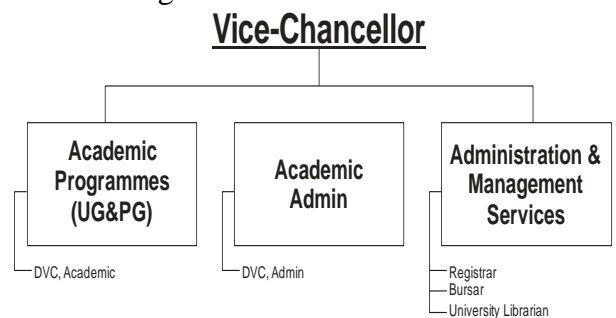


Fig. 1: Previous Nigerian Higher Education System (HES) and Management

Source: NUC but graphically presented by Onakoya et. al., (2020)

Today, Higher Education System include four cardinal pillars comprises of 2 functions that is, Academic and Administration & Management Services which Information Technology should be seen as a mandatory driven force for both Academic & Management Services for the vast education delivery.

The Higher Education System's four cardinal pillars is as shown below in Fig. 2:

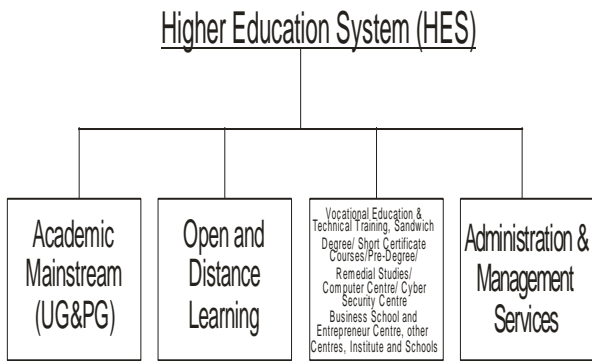


Fig. 2: Higher Education System (HES)
Source: NUC but collated by Onakoya et. al., (2020) in graphic presentation.

In view of the above and a consistent review of Higher Education system and the use of IT in deploying huge Education Services, we have observed that, there were shortcomings such as inefficient flow of communications, low development, redundancy, duplication of authority and responsibility in the art of delegation therefore, managing for rapid growth, liquidity events and massive deployment of IT in HES would require a major reforms, reorganization and restructuring, enlarge Academic structure and separation of authority and responsibility as demonstrated underneath as in Fig. 3 below:

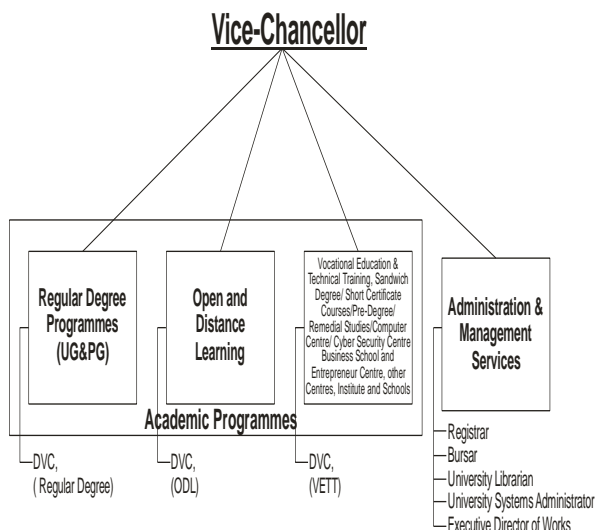


Fig. 3: Proposed Reformed Higher Education System (HES) & Management
Source: NUC but collated in graphic presentation and modified by Onakoya et. al., (2020).

From the above, DVC Administration have been disregarded because of redundancy and duplication of duties noticed on the part of the Registrar. The deployment of IT Innovations in these perspectives have shifted focus from conventional ways of teaching and learning to electronic means therefore this require a **Principal (University Systems Administrator)** for flexibility in Administration & Management.

Furthermore, IT innovations in education are based on three schools of taught:

- i) **The design of the learning process and support for teaching process with focus on Students' future roles in Nation building:** such as IT skill acquisition, occupational practice, competences for solving problems, aspire to be a Professional on the subject matter etc.
- ii) **The role of Teachers as key factor in arranging learning processes:** such as contents and curriculum, counselling, subject matter knowledge, the new learning environment etc.
- iii) **Non-Teaching and Support Staff are the synergy between top-down and bottom-up processes:** such as administrative activities and application possibilities of modern educational tools, structuring guiding processes, and establish the best learning activities.

For all of the above to happen, there must be a 3 Arms of the IT Division in every Nigerian University as in Fig. 6 below.

A. Background of the Study

The history of Data Administration and Management in the Higher Education System in Nigeria is dated back to the year 1987[5] when the Department of Records and Statistics was converted into an idea of a Management Information System (MIS) at the instance of a British Council/ODA conference equally organized by the NUC to create the Nigerian Universities Management Information System (NUMIS) and it was operational in the Federal Universities in 1993, where students and staff data were captured for the use of Senate and the NUC. Shortly after 2007 restructuring exercise, MIS was transformed to the Data Management Department (DMD) and later developed to Directorate of Information and Communications Technology (DICT) where MIS was a division and rename as Data & Information Management. Lately, in the year 2010, NUC understood that without Data and ICT driven forces, no meaningful educational services delivery can be achieved, our graduates cannot compete globally and Researchers will not have access to modern tools to produce dependable research statistics and development.

In the year 2011[5], NUC restructured ICT Department to include Data & Information Management Unit as a Division with other 5 sub-Departments i.e.:

- i) Database Administration & Management
- ii) System Analysis and Design
- iii) Database Development and Maintenance
- iv) Personnel Records
- v) Inventory Systems and Automation of other Internal Processes, and the creation of Learning Resources Unit.

There is a clear distinction between the Computer Centre and Management

Information System (MIS) [2]. It is imperative to note here that all this innovations were made in the administration not in the academic set up. Therefore, Computer Centre is a Teaching support Centre not an administrative hub.

Therefore **the Statement of the problem** is that, in the year 2014[5], another significant event occurred in NUC. The ICT Department was reformed to Research, Innovation and IT Department (RIID) in order to expand the IT functionalities. Nigerian University System was not carried along by the NUC with all these innovative ideas as they were metamorphosis in the NUC hence, the need for restructuring of the IT activities, Career cadre, Professional progression and Staff development is appropriate in order to build standard and uniformity in the Nigerian University System. This will ensure regulating the essentials of National aspirations, global significance and competitiveness.

We cannot adequately discussed IT in the Higher Education System without clearly mentioning how the Line Managers were structured. Traditionally, the Line Managers is as below:

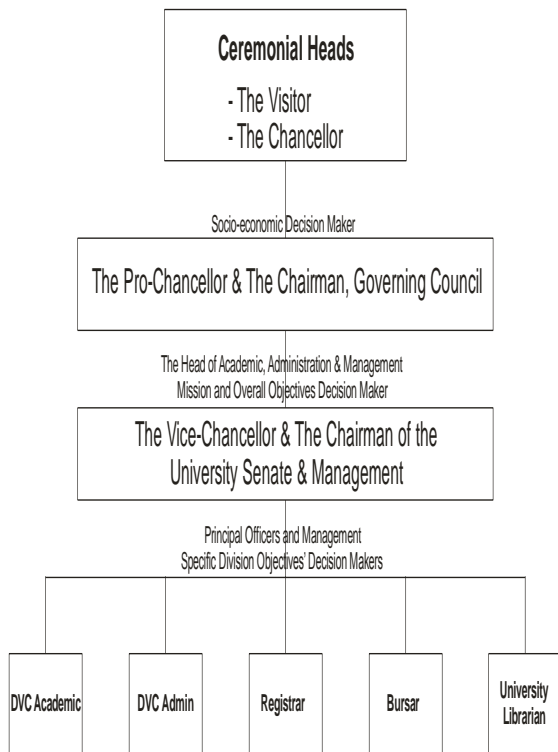


Fig. 4: Nigerian University System (NUS) Line Managers

Source: NUC but graphically arranged by Onakoya et. al., (2020)

The **justification** for this paper is in view of the fore going and from the above Line Managers, unlike the Government Sector where all Divisions have Principals as Director General, there is a structural defects in the above Line Mangers because there was no Principal Officer for the Information Technology and Electronic Management Services (ITMS), Works & Services, Open and Distance Learning, “Technical and Vocational Education and Training (TVET)” [6]. These are very important roles where the top Line Managers should also be a Principal for effective communication and development. Hence, this structural defects calls for reforms to take in DVC (ODL), DVC (TVET), the **University Systems Administrator (USA)**, and the Executive Director of Works and Services as the members of the Management in the Nigerian University System to ease the work of the Vice-Chancellor as thus:

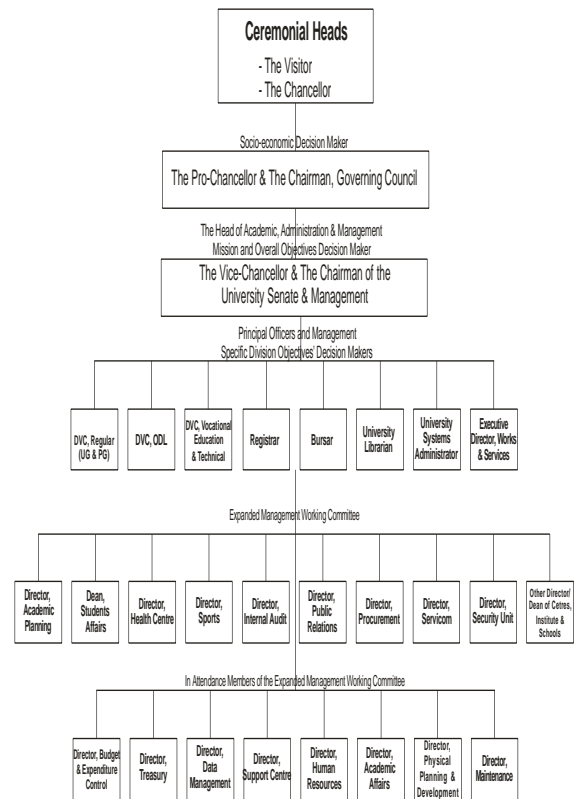


Fig. 5: Reformed Line Managers for Nigerian University System

Source: NUC but modified by Onakoya et. al., (2020)

In the Government setup, the Vice-Chancellor is equivalent of a Permanent Secretary. Under Permanent Secretary there are Director Generals. The equivalent of a Director General (DG) in the Nigerian University System are the Principal Officers such as the Deputy Vice-Chancellors, Registrar, Bursar, University Librarian, University Systems Administrator, `Executive Director of Works and Services etc. And under these Principals there are Directors who coordinates the affairs of the Divisions under their portfolio for the ease of the administrative convenience and performance of their major tasks. Therefore, the Management comprises of the Director Generals i.e. the Principal Officers only. For the sake of the flexibility in the Administration and Management, there can be an Extended Management Committee comprising of the Management and the Directors, to hear the views of the Directors and subsequently

contributing their own quota to the development of the system.

B. The Management of the IT activities in the University

The IT activities of a University encompasses Academic Programmes, Research and Development, IT teaching support, IT short-term courses and Professional training, Students and staff data services, IT Security, Networking, Web possibilities, Automation of Office processes, Educational and Teaching aids, Media Services, Development of software and hardware maintenance. This is a large activities in the University. It spans from the first day of a student/staff in the University to graduation/exit. Therefore it has to be systematically handle to avoid complications and complaint. Presently, we have noticed administrative disorder, mixed-up, role clash and conflict among the staff of the IT Services Centre and the Staff supposed to be for Research Centre due to the lack of guidelines, standards and leadership style governing the Information Technology and electronic Management Services (ITMS) in the Academics and Government. The IT activities is a developing innovative ideas in the Academics. So, it must be structured into the 3 Arms i.e. Academic Department, Research and Development Centre, and IT Management Services. See the diagram below for clarity:

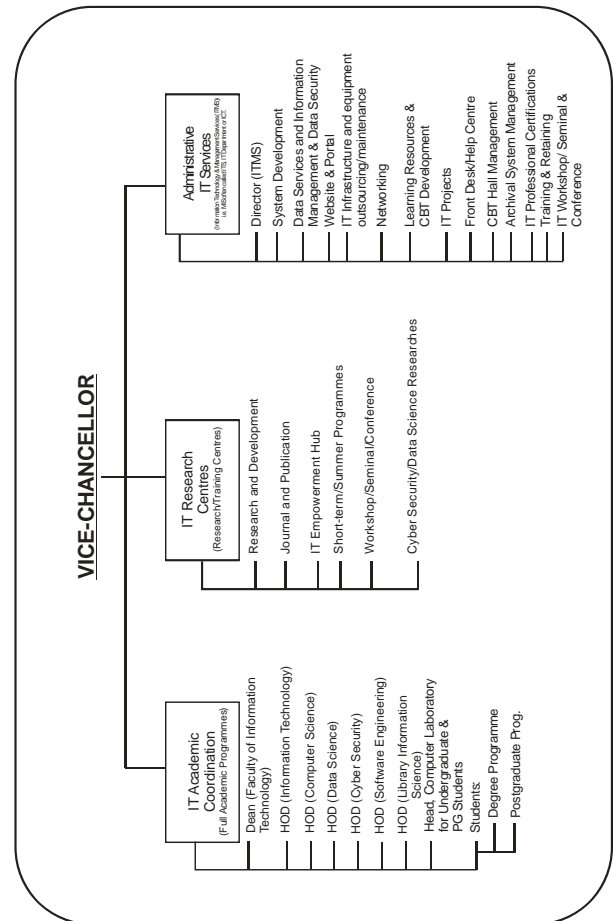


Fig. 6: The 3 Arms of the IT activities in the University System

Source: NUC but collated and modified by Onakoya et al., (2020)

C. Academic Programmes

Academic Programmes is the academic Department. The academic Department is the one that provide full academic programmes that leads to a degree in Computer Sciences, Information Technology, Information System, Business Information Management or its equivalents. It is headed by a lecturer called the Head of Department (HOD). The HOD is responsible to the Vice-Chancellor through the Dean of the Faculty or Provost of the College for the academic work in the department. The main functions of the Academic Department is to teach, research and examine the students. These functions are carried out by the lecturers and researchers in the Department. The lecturers and researchers are provided with a

laboratory for the students to practice. The laboratory is headed by an IT Technologist. The Academic staff learns, researches also, conducts Community development.

D. Teaching Support/Research/Training Centre

The teaching support or Research Centre is a typical Institute or Research Centre for the Publication of Journals, Certifications, training of the Academics, Professionals and Technicians. The Centre is partially academic centre but for the Professionals and Training the Trainers. It is often called Cyber Security Centre or Computer Centre or Institute of Computing. The training Centre is created to supplement the Academic Degree Courses headed by an Academics from Computer Science or its equivalents in the Academic Department. The Centre engages in Professional training, Short-time Courses/programmes, Conference, workshop and Seminal. Also, the Centre conducts General Studies’ Courses on IT, Computer and Cyber Security Appreciation for the Undergraduate, Postgraduate Students and General Public. See fig.7 for more clarity:

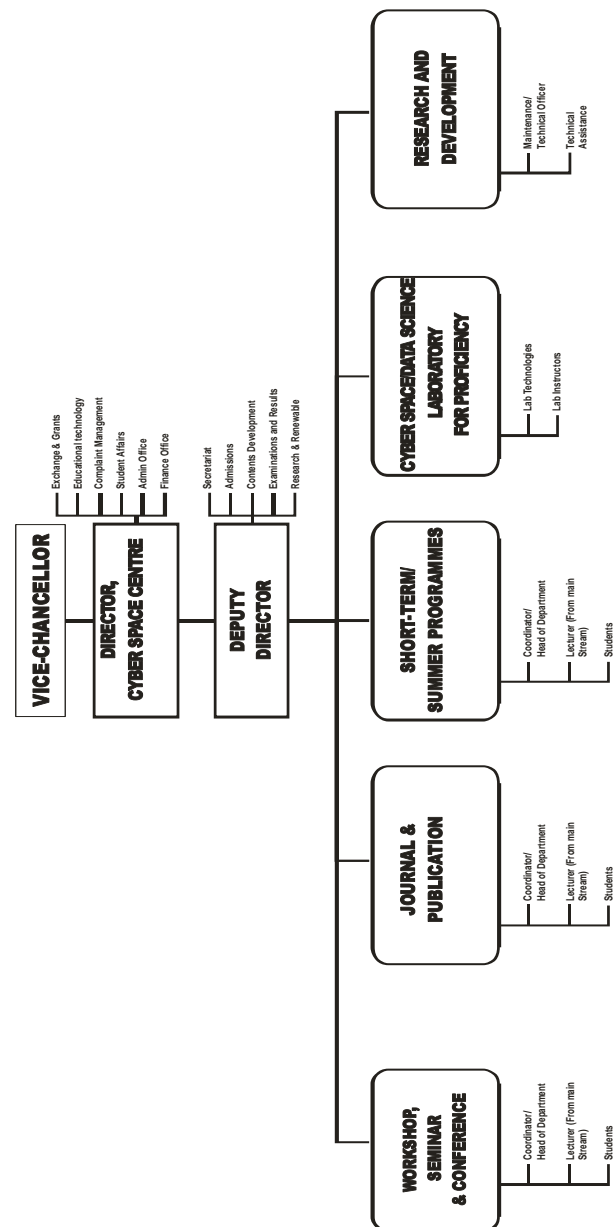


Fig. 7: The IT Research Centre Organogram
Source: NUC but modified by Onakoya et. al., (2020)

E. Management Services

Management Services are the specific administrative functions, objectives, ad-hoc/special task and decision making as grouped in a department directed to assist/towards the development of an organization. It has become imperative to un-bundle IT activities in line with the National Universities Commission (NUC)

specifications so that the University could make available a wide range of IT Services to the University Community. As a result of that, most of the University IT challenges would be overwhelmed and therefore reforms its Human resources, Administrative framework and Structure, based on the existing posture to create ITMS from the former MIS. Out of these 3 Arms of the IT activities in the University, our main concern is the Management Services. Management Services is an Administrative Hub for the electronic Management Services. Management Services comprises of the Office of the University Systems Administrator (a top and Principal Officer), 5 Directorate offices, namely Software Department, MIS & Data Services Department, Networking and Technical Department, Help Desk Department, IT Security, Research & Innovations Department,. This can be replicated and adopted in Government. The diagram below (Fig. 8) best illustrate the ITMS Organization:

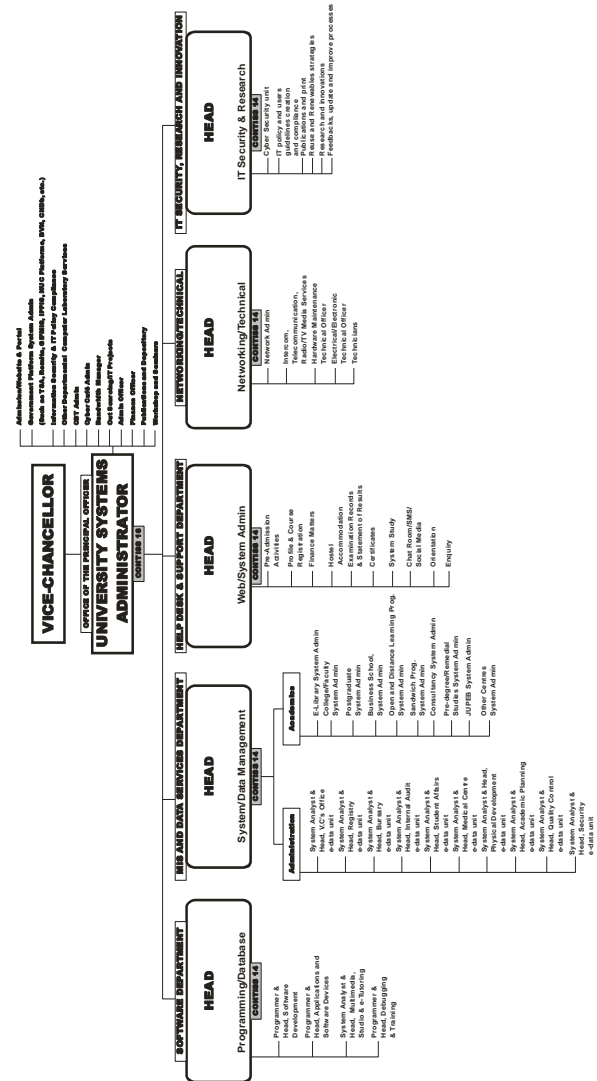


Fig. 8: The University IT and electronic Management Services (ITMS) Organogram
 Source: The Proposed ITMS Organogram for the Nigerian University System by Onakoya et. al., (2020)

F. Functions of the University ITMS Division

The University ITMS division is made up of 6 (six) main departments namely Office of the University Systems Administrator and 5 (five) other departments. Their functions are listed below:

Office of the University Systems Administrator

- In charge of the Admission(s) Uploading and Registration.
- Administration and Management of Web Portal and Websites.

- Integration and collaboration of other external bodies
- Administration of Government e-Platforms/Plug-in API
- Information Security and the IT Policy Creation and Compliance Management
- Learning Resources and CBT Administration & Management
- Bandwidth Administration & Management
- Outsourcing and IT Projects
- Workshop, Training and Seminal Administration
- Administering facilities layout and Professional and Ancillary workers
- Overseeing and Management of all Departmental Computer Laboratories
- Overseeing the smooth running of the ITMS Division, Directorates and units.

G. ITMS Directorates and Functions

ITMS Division is for the coordination of all Professional functions of the IT Management Services. The division is subdivided into 5 (five) Departments apart from the Offices of the USA. The Departments include Software & Web Development, MIS and Data Services, Help Desk & Support, Networking/ Technical, Teaching Support, Cyber and IT Security, Research and Innovations Departments. The Sub-Departments are headed by the Deputy Directors in the Specific fields just like the counterparts, the Deputy Registrar and Deputy Bursar. For smooth amalgamation and merger, the former MIS or ICT Director (in the Non-Teaching Staff Category) have to be elevated to the Position of the University Systems Administrator if all things being equal. On the contrary, the Director of MIS should be placed as the Director of MIS & Data Services while the University appoints a core Professional as the Principal Officer as it contained in Tables

1 and 2: the proposed IT Career Cadre and Progression below:.

Software Department

- Analysis and Systems Design
- Database Development
- Programming and Web Development
- Mobile Applications and devices
- **Learning Resources Development:**
 - e-Tutoring, Studio and Multimedia
 - e-books, Publications and Journal depository
 - Development of CBT Platform
 - Production of Electronic Educational Aids/Materials
- Development of Robotic and Artificial devices

MIS and Data Services Department

- e-Data and Management Services
- Management of Students and Staff Data
- Management of Maintenance of Web Portal and mobile Applications
- Database Administration and Management
- Students and Staff complaint and Management.
- Learning Resources and CBT uploading and Maintenance
- Automation and maintenance of other Internal Processes such as:
 1. Personnel Records
 2. Identification System
 3. Mail distribution system
 4. Academic and Examination Records
 5. Transcript Management
 6. Statistical Digest
 7. Certificate dispensing
 8. Hostel Accommodation Management

9. E-Collection and Payment System
10. Merchant Account and Payment Gateway
11. Salaries, wages and other claims
12. Inventory Systems
13. Accounting System
14. Audit System
15. Management of CBT/Educational aids/Materials
16. Press and Media coverage
17. Alumni Records

- Cyber Security unit
- IT policy and users guidelines creation and compliance
- Publications and print
- Reuse and Renewables strategies
- Marketing and consuming Research and innovations
- Feedbacks, update and improve processes

Help Desk Department

- Website update and maintenance
- Help desk and Public Complaints/Enquiry
- IT Policy update and Compliance
- Press and Mass media coverage (Radio/TV Dept.) services.
- Creation of Social Media, Reacts and Maintenance
- Production of Student orientation programmes
- Workshop, Training and Seminal Organization

Networking and Technical Department

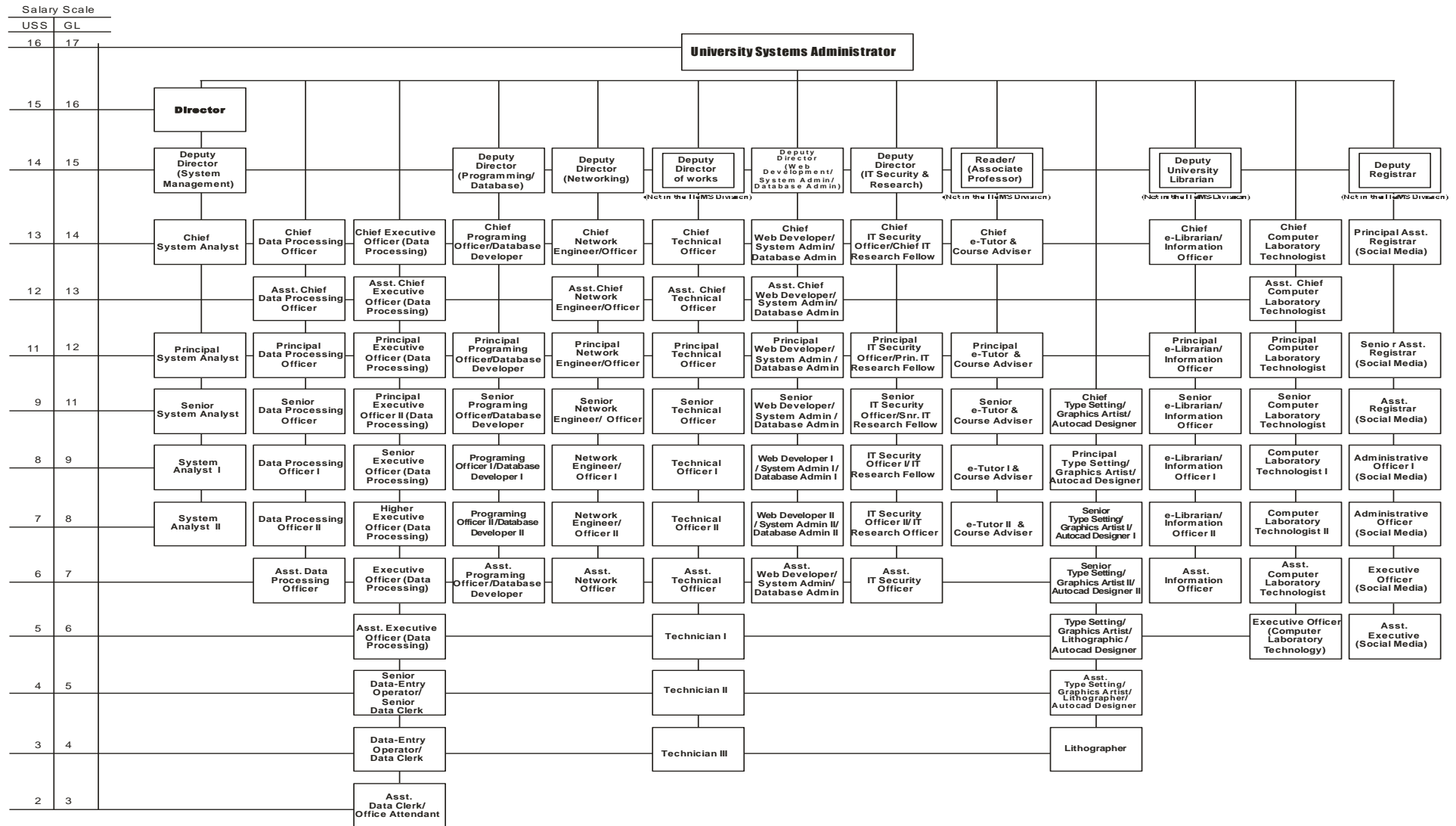
- Networking Infrastructure and Equipment Maintenance
- Networking Administration
- Intercom, Telecommunications, Radio/TV; media maintenance
- Hardware Maintenance
- Electrical/Electronic fittings and Maintenance
- Cloud Networking Services
- Robotics and Artificial Devices maintenance

IT Security, Research and Innovations Department

H. The Career Cadre and Progression

The University System structure is an act of duty separation. Activities are group according to specialization and skill therefore responsibility and authority are depleted into tasks and jobs towards the achievement of the system's set goals. Why do we work? The main goal for working is reward. Absolutely, to get reward from any job, a career cadre and progression will comes into play. Career cadre and progression is the description of jobs, personnel, line of authority and information between the office holder and specialization evaluation criteria, coordination and financial consideration. Career cadre is an instrument used to indicate relationship between the personnel, the division and how they are interwoven to become an entity. Tables 1 and 2 below concisely explains what Career Cadre, entry qualifications is, and how Career Progression is arranged and completed. The diagrams below shows how personnel are interwoven to become the Staff of the ITMS:

Table 1 - IT Career Cadre for the Nigerian University System



Source: The Proposed Career Cadre for the Nigerian University System ITMS by Onakoya et. al., (2020)

TABLE 2 - IT Career Progression and entry qualification(s) for the Nigerian University System.

| Core Professional Staff (Non-Teaching Staff) | | | | Other Support and Technical Staff | | | | | | | |
|---|---|------------------------------------|---|-----------------------------------|---------------------------------------|------------------------------------|--|-----|--|------------------------------------|---|
| S/N | Professional Cadre | Promotion Avenue & Grade (CONTISS) | Minimum Entry Qualification(s) | S/N | Support Cadre | Promotion Avenue & Grade (CONTISS) | Minimum Entry Qualification(s) | S/N | Technical Cadre | Promotion Avenue & Grade (CONTISS) | Minimum Entry Qualification(s) |
| 1. | University Systems Administrator | 16 | A degree and M.Sc in IT or Computer Science or its equivalent in the relevant field & a minimum of 15 yrs post-qualification experience and must be a Deputy Director in any of the IT field in the University. | 1. | e-Librarian/Information Officer | 7-13 | A degree in Library and Information Science, Information Science, IT, Information System or Computer Science or its equivalent in the relevant field is required | 1. | IT Security Technician | 6-13 | A degree, HND/OND in IT or Computer Science or its equivalent in the relevant field is required. |
| 2. | Director | 15 | A degree and M.Sc in IT or Computer Science or its equivalent in the relevant field & a minimum of 12 yrs post-qualification experience and must be a Deputy Director in any of the IT field in the University. | 2. | e-Tutor/Course Adviser | 7-13 | A degree based on the Tutorial Course or its equivalent in the relevant field with a good command of English Language is required. | 2. | System Admin (Technician)/ Database Developer (Technician) Database Admin (Technician) | 6-13 | A degree, HND/OND in IT or Computer Science or its equivalent in the relevant field is required. |
| 3. | System Analyst/Autocad Design | 7-14 | A degree in IT or Computer Science or its equivalent in the relevant field. And M.Sc Degree is required for Promotion to Grade level 14 | 3. | Administrative Officer (Social Media) | 7-13 | A degree in any field or its equivalent with a good command of English Language is required. | 3. | Network Officer | 6-13 | A degree, HND/OND in Networking or Telecommunications Science or its equivalent in the relevant field is required. |
| 4. | Programmer | 7-14 | A degree in IT or Computer Science or its equivalent in the relevant field. And M.Sc Degree is required for Promotion to Grade level 14 | 4. | Technical Officer | 7-13 | A degree /HND in Electrical/Electronics /Telecommunications or its equivalent in the relevant field is required. | 4. | Data Processing Officer (Professional) | 6-13 | A degree, HND/OND in IT or Computer Science or Data Processing or its equivalent in the relevant field is required. |
| 5. | Network Engineer/Administrator | 7-14 | A degree in IT or Computer Science or its equivalent in the relevant field. And M.Sc Degree is required for Promotion to Grade level 14 | 5. | Technician | 3-8 | Diploma/NCE/Grade II/ Trade Test I, II, III Certificate or 5 Credits in O'Level result or its equivalent in the relevant field is required. | 5. | Data Processing Technician | 6-8 | Diploma, NCE, Grade II, Data Processing or its equivalent in the relevant field is required. |
| 6. | Web Developer/Database Developer/System Administrator/ Database Administrator | 7-14 | A degree in IT or Computer Science or its equivalent in the relevant field. And M.Sc Degree is required for Promotion to Grade level 14 | 6. | Executive Officer | 5-8 | Diploma/NCE/Grade II Certificate or 5 Credits in O'Level result or its equivalent in the relevant field. | 6. | Computer Laboratory Technologist | 5-13 | A degree/HND/OND/ Diploma, NCE, Grade II, Data Processing or its equivalent in the relevant field is required. |
| 7. | IT/Cyber Security Officer/ IT Research Officer | 7-14 | A degree in IT or Computer Science or its equivalent in the relevant field. And M.Sc Degree is required for Promotion to Grade level 14 | 7. | Data Clerk | 3-7 | 5 Credits in O'Level result. | 7. | Typesetting/Graphic Artist/ Autocad Design Technician | 3-9 | Diploma, NCE, Grade II, Typewriting Grade I, II, III Certificate or 5 Credits in O'Level result or its equivalent in the relevant field. |
| | | | | 8. | Office Attendant | 1-5 | Attempted O'Level Result or Junior Secondary School Certificate. | 8. | Data Entry Operator | 3-8 | Typewriting Grade I, II, III / Diploma, NCE, Grade II Certificate or 5 Credits in O'Level result or its equivalent in the relevant field. |
| | | | | | | | | 9. | Video & Camcorder Technician | 3-8 | Attempted O'Level Result or Junior Secondary School Certificate. |
| | | | | | | | | 10. | Photographer | 3-8 | Attempted O'Level Result or Junior Secondary School Certificate. |
| | | | | | | | | 11. | Studio Attendant | 3-8 | Attempted O'Level Result or Junior Secondary School Certificate. |

Note: The Core Professionals are Non-Teaching positions and they must belong to two professional bodies Computer Professional Registration Council of Nigeria (CPN) and Nigeria Computer Society (NCS) except for the University Systems Administrator and the Director who should belong to one International relevant Professional Association in addition to the CPN and NCS.

Source: NUC but collated and modified by Onakoya et. al., (2020)

I. The Career Cadre Conversion Issues

The Career cadre conversion is a technical issue. It means moving a personnel from one cadre to the other. The Career cadre conversion require relevant minimum entry qualification(s) and years of experience for the employee to be converted from one class of worker to the other (see Table 2 for more details). This is not automatic but subject to vacancy. The fundamental movement is as shown in Fig. 9 below:

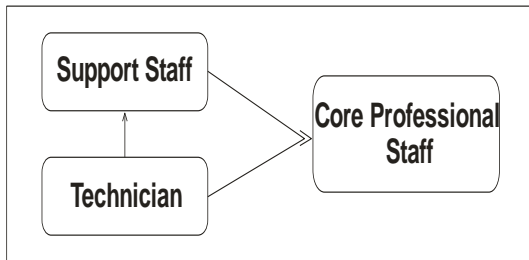


Fig. 9: IT Career Cadre for the Nigerian University System

Source: The Proposed IT Career Cadre Conversion pattern for the Nigerian University System ITMS by Onakoya et. al., (2020)

II. LITERATURE

Let us quickly correct a common mistake of usurping Information Technology (IT) for Information and Communication Technology (ICT) whereas, Communications is a subdivision of Information Technology. Therefore going by international standard, ICT is a Press modification wrongly used for Information Technology (IT) and the example of this can be found in the world class Universities in America and United Kingdom such as Harvard University, Oxford University and even in Nigeria, Joint Admissions and Matriculation Board (JAMB). However from this instance, we want to advise that the Nigerian University Systems should discard the use of ICT for IT because we believe that University must add value to knowledge by aligning to the world class acronym i.e. IT. The University authorities should take notice when metamorphosing MIS or ICT to ITMS. Information Technology (IT) and electronic Management Services (eMS) innovations in an academic enterprise entails using technology in new ways to create more efficient and effective organization, improved alignment between technology initiatives and academic business.

Taylor [7] had identify Administration and Management being an Art and Science. We have seen that Administration and Management being an Art and Science is subject to effective Leadership.

The IT Administration and Management is a guiding principles for managing the Information Technology Centre, Division, Department and Unit. Information Technology (IT) installation can be described as a Centre, Division, Department and Unit depending on the size and the type of the organization. The University System is a large organization. Therefore its IT Administration and Management should be seen as a Division of the University containing, Department and Unit for conveniences of the administration and integration of the IT into the System.

Information Technology (IT) is the live wire of any Organization. It provides information about the Organization for the internal and external consumption and development. Such information brands the Organization such that today's businesses depend solely on IT to survive. Government and Education are not exempted. Therefore the quest for Data has been credited to development. The development of IT administration and Management is an essential part of the System for competitiveness.

Every business must have its own objectives. The objectives of Higher Education System is to produce quality graduates/skills for a Nation development through teaching, learning, community development and research. This is obvious in various sectors of the economy ranging from the "specialized positions, advancement of scientific efforts, Technology, Agriculture, Mining and exploration of natural resources" [6]. Therefore there must be a coordination in the HES to achieve its goals and objectives through times and innovations around the world. In Nigeria,

coordination of the Higher Education System is the duty of National Universities Commission and Federal Ministry of Education. Ifeawu [4], perceived the mandate of the IT Department in Education as coordination of Strategic planning and Implementation of IT in Education, setting minimum IT standards, guidelines and Policy, Creating global visibility, Developing IT capacity and stimulate interest on IT among staff and students. On this note, The National Universities Commission and Federal Ministry of Education have regulatory functions on all Universities in Nigeria including Federal, State and Privately owned Universities’ activities and their set goals. Undoubtedly, according to the NUC Executive Secretary, Professor Rasheed [1] view the challenges of Nigerian Higher Education System to include very poor performance, distorted academic calendar, outdated curricula that were unable to meet the requirements of industry, non-availability of deployment of IT in teaching, learning and research. Also, noted lack of attention to Technical and Vocational Education and Training (TVET), corruption and plagiarism by some students and academics to mention but at a few. On this note, he therefore recommended the reforms of our higher education system (HES). However, the major part of the reforms aspiration is to re-organize the use and integration of IT in the University.

Foremost, Nigerian University System must have perceived IT driving forces as a block of progress in the wheel of the HES reforms. To this end, the IT Organization in the University and in Government require a standard and uniformity. The Administration and Management of the IT Services (ITS) should be acknowledged as an Art and Science where Administration is Art (which could also, mean talents) and Management is a Science (meaning knowledge). Like any other organization, IT Administration and Management must have standard and structure. So, what is obtainable in the University A, must be practicable in the University B be it Federal, State or privately owned University comparable to the other

Professional counterparts in the Community. For instance, a Bursar performs same duties as a Principal Officer in any University i.e. What a Bursar does in the University A is what another Bursar does in the University B, that is standard and uniformity. In a similar veins, IT Services (ITS)’ Administration and Management should be streamlined in the Nigerian University System to have **an arrow head as a Principal who could be called University Systems Administrator (USA)**. The USA should be overwhelm with the holistic view and control of the ITS in the University since every bit of the University activities is driven by the IT forces comprises of the Academic, Administrative Services, Press and the Media services. Because of the vital roles and huge investment attached to the IT Services/Centre, the USA should be an automatic member of the Council, Senate and Management also, responsible to the Chief Executive i.e. the Vice-Chancellor for day-to-day running of the administration of the IT Services/Centre.

III. METHODS AND MATERIALS

Yin [9], recommended a Case study for comprehensive study of this nature therefore, We have studied5 (five) types of Universities (i.e. 3 from Nigeria: Federally, State, Privately own Universities in Nigeria and one African University and one European University) as a Case Study see table 3 below. Surveys and review was conducted comprising 5 Universities and 25 respondents using Desk research methodology, Content analysis tool for measuring the relationship and reporting the analytics with a view of standardizing the guiding principles and creating uniformity in Structure for managing the IT activities in the HES and in Government.

TABLE 3 – Case Study

| SN | Type of University | Name |
|----|------------------------------------|--|
| 1 | Nigeria: Federal University | University of Abuja, Abuja |
| 2 | Nigeria: State University | Olabisi Onabanjo University, Ago-Iwoye |
| 3 | Nigeria: Private University | Covenant University, Otta |
| 4 | One African University | University of Cape-Town, South Africa |
| 5 | One European University | Oxford University |

Source: Onakoya et. al., (2020)

IV. RESULT AND DISSCUSSIONS

We have compared 5 different Universities in terms of IT strength and capacity using Content analysis as stated below to form our outcome as indicated in the Data analysis. U1 represents Federally own University, U2 represents State own University, U3 denotes Privately own University, U1-U3 represent Nigeria Universities while U4 represents African Universities and U5 represents European Universities.

TABLE 4 - COMPARATIVE ANALYSIS

| SN | Strength and Capacity | U1 | U2 | U3 | U4 | U5 |
|----|------------------------------|----|----|----|----|----|
| 1 | Numbers of Respondents | 5 | 5 | 5 | 5 | 5 |
| 2 | Respondent Qualifications | 4 | 4 | 4 | 4 | 4 |
| 3 | University Management Team | 3 | 4 | 3 | 4 | 4 |
| 4 | IT Staff (Professional) | 2 | 3 | 4 | 5 | 5 |
| 5 | Structured Organogram | 1 | 3 | 2 | 3 | 5 |
| 6 | Critical IT Infrastructure | 2 | 3 | 4 | 4 | 5 |
| 7 | IT Principal Officer | 1 | 1 | 1 | 4 | 5 |
| 8 | Professionalized Directorate | 2 | 4 | 3 | 4 | 5 |
| 9 | Career Cadre & Progression | 3 | 3 | 3 | 3 | 3 |
| 10 | Training/Workshop | 2 | 2 | 3 | 3 | 5 |
| 11 | Motivation | 3 | 3 | 3 | 3 | 4 |
| 12 | Web-Portal Robustness | 2 | 2 | 3 | 3 | 5 |
| | Total Points (2-12) | 25 | 32 | 33 | 40 | 50 |

Key:

| Rep. | Category | Point |
|------|------------------------|----------|
| 1 | International Standard | 5 Points |
| 2 | Sufficient | 4 Points |
| 3 | Average | 3 Points |
| 4 | Low | 2 Points |
| 5 | Not sure | 1 Point |

Source: Onakoya et. al., (2020)

TABLE 5 – PERCENTAGE OF IT ADMINISTRATIVE PENETRATION, STRENGTH AND CAPACITY

| SN | Type of University | Percentage of IT Administrative Penetration, Strength and Capacity |
|----|--|--|
| 1 | University of Abuja, Abuja | 45% |
| 2 | Olabisi Onabanjo University, Ago-Iwoye | 58% |
| 3 | Covenant University, Otta | 60% |
| 4 | University of Cape-Town, South Africa | 73% |
| 5 | Oxford University | 91% |

Source: Onakoya et. al., (2020)

From the above tables 3-5, it is indicated that, all Federal Universities in Nigeria lacks IT Administration and Management, the State Universities in Nigeria deployed IT critical infrastructure but lacks highly skilled IT experts and privately own Universities in Nigeria penetrating averagely to provide competitive edge in patronage. We have established that IT administration in Nigeria Universities required reforms in order to achieve mass IT integration and delivery into the HES and in the Government. Therefore, following objectives have been achieved according to our proof:

1. We have adequately integrate IT Management Services in teaching, learning research and Community development by reducing the challenges facing with the delivery of issues in Education whereby removing the mixed-up questions in the IT Administration & Management Services.
2. We have proven evidence that IT Management Services requires a major reforms that will reposition the HES and proffers solution to the enormous challenges facing the HES and Government.
3. We have exposed the need for restructuring the IT activities in Higher Education System and Government.
4. We have brought out the reasons for Professionalizing the IT Administration & electronic Management Services.

5. We have indicated the need for standardizing the IT Administration, the use of organized Structure, Career cadre, Job performance & progression and the need for Top Line Manager as Principal Officer for IT Administration & Management in Nigerian University System and Government.
6. We have proved the benefit of the need to reform of the Management of Higher Education System and expand learning culture and the leadership.
7. We have clearly demonstrated the ability of selecting good and relevant skilled worker during recruitment of IT Staff for Higher Education System and in Government.
8. This research paper have standardized the use of IT Division, Career Cadre and Progression in Nigerian University System for the National Universities Commission to enforce in the Federal, State and privately owned Universities in Nigeria.
9. Duties of the ITMS division have been depleted considering overall IT activities in the University Systems into a smaller group or individual work for administrative convenience.
10. We have been able to state the clear distinction between the Academic Programmes, Computer Centre (Teaching Support) and Management of IT Services.
Services and to recommend the use of the 3 Arms of the IT activities in the Nigerian University Systems.
11. This paper have clearly separated Academic functions from IT Administrative Services by removing MIS from Computer Centre and collapse all form of MIS, ICT, ITS e.t.c. to create the **Division of Information Technology and electronic Management Services (ITMS) in the University System** where former MIS Department should be renamed as MIS & Data Services Department under ITMS as shown in Fig. 6 above.
12. We have seen that this research work will aid promotion of collaboration and team work.
13. Our model of IT Administration and Management has resolved the role clash, conflicts among the Staff of the Computer Centre and IT Management Services.

V. CONCLUSIONS

We are concluding based on the achieved objectives of this paper to say that if our model of the IT Administration & Management is adopted, we would have reformed the IT Activities in Nigeria Higher Education System. Also, we are imploring the Tertiary Education Trust Fund [TetFund] to fund the integration and Management of IT critical infrastructure in the University system to conform with international standard. The researchers compared 2 International Universities IT Setup, Administration and Management therefore highlighting these recommendations below on how to integrate and manage IT in Nigerian University system:

1. NUC should enforce the Reforms of IT activities and the implementation of the 3 Arms of the University IT activities in all Nigerian University.
2. All University in Nigeria be it Federal, State or Privately owned Universities should separate IT Academic programmes from IT Teaching Support/Training Centre and IT Management Services for full integration of IT in the NUS.
3. NUC should enforce and ensure that all the Universities' Principal Officers including the Pro-Chancellors are IT literates.
4. That, the Nigerian University Systems should discard the use of ICT for IT because we believe that University must add value to knowledge by aligning to the world class acronym i.e. IT.
5. All Universities in Nigeria should embrace development of Information Technology, Web-Portal and creation of Virtual classes and therefore provide these compulsory courses as General Studies in the NUC Bench mark for all Undergraduates Programmes. Also, for Other Professional Institutes out there:

TABLE 6 – IT MANDATORY COURSES

| Course Code | Title | Units | Status | Recommended levels | Semester |
|-------------|---|-------|------------|--------------------|----------|
| GNS 100A | Computer and Cyber Security Appreciation | 2 | Compulsory | 100 level | First |
| GNS 100B | Office Productivities and Internet of Things | 2 | Compulsory | 100 level | Second |
| GNS 200 | e-Commerce and Central National Database Management | 2 | Compulsory | 200 level | First |

Source: Onakoya et. al., (2020)

- NUC should enforce Bench Marks Contents, review the Curriculum to include the today's development. Standardize the Curriculum's Course Codes, Course Unit, Status, levels and Semester for uniformity purpose. So that, all Universities teaches the same Contents.
- NUC should enforce all Universities including, Federal, State and privately owned Universities to professionalize their IT activities and the division.
- Every Universities should collapse their MIS or ICT outfit to create ITMS, Structure, Standard and guideline, Career Cadre and Staff progression that IT activities in the Nigerian Universities System can be Uniform and standardized.
- All University should appoint a University Systems Administrator as the arrow head and the Principal Officer in charge of Information Technology and electronic Management Services (ITMS) to coordinates the affairs of the 5 Directorates under the ITMS Portfolio.
- Also, each University should appoint their University Systems Administrator as a Principal Officer for IT Administration & Management with the 5 Directorates Offices to impact wealth of experience, setting up and for full propagation of the integration of IT activities into the University system.

VI. REFERENCES

- Abubakar A. Rasheed (2018) A paper delivered at an official function in Abuja.
- Adeoti-Adekeye, W. B. (1997) "The importance of management information systems" Library Review, vol. 46 No. 5 pp. 318-327 @ MCB University Press 0024-2535.
- Eneh, Onyenekenwa Cyprian* and Owo, Ngozi Josephine (2015): "Education Reforms in the Nigerian University System: A Critique and Suggested Strategies" <https://www.researchgate.net/publication/281275658> Downloaded 7-3-2020.
- Ifegwu Kalu Oji (2015) <http://www.education.gov.ng/index.php/articles/information-and-communication-technology> "BRIEF ON Information and Communications Technology (ICT) Department 2015"
- <http://www.nuc.edu.ng/pages.asp?id=176> "ABOUT ICT DEPARTMENT" National Universities Commission (NUC) September, 2010
- Onakoya, Johnson Rotimi (2014) "Transforming Nigeria Universities towards International and World Class University Education: Using University of Abuja as a Transformation periscope" Journal of Education and Practice, ISSN 2222-1735 (Paper), ISSN 2222-288X (Online) Vol.5 No. 39 (2014). Published by International Institute for Science, Technology & Education (IISTE)
- Taylor, F (1911) The Principles of Scientific Management, New York: Norton.
- Thibodeau Patrick (2018) a Report Titled: "ERP security is weak, vulnerable and under attack" https://searcherp.techtarget.com/news/252445956/Report-ERP-security-is-weak-vulnerable-and-under-attack?track=NL-1815&ad=922277&src=922277&asrc=EM_NLN_98337045&utm_medium=EM&utm_source=NLN&utm_campaign=20180731_Why%20ERP%20security%20is%20weak,%20vulnerable%20and%20under%20attack Downloaded on 31 July, 2018.
- Yin (2003) Case Study Paper delivered. Downloaded on 31 July, 2018.

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