Information Technology Governance (ITG) in Nigeria
A Case Study at University of Nigeria, Nsukka

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ABSTRACT—*This work studied the performance of Information Technology Governance (ITG) at University of Nigeria, Nsukka (UNN), by comparing the state of its Information Technology(IT) Infrastructure, Available Human resources and Management Structure to that of University of Queensland, Australia (USQ), which is taken to be operating at International standard. By means of data collection and statistical simulation, these three fundamental aspects of Information Technology were measured and the results obtained were weighted alongside with those of University of Queensland. The results show that at UNN; IT Infrastructure, Management Structure and available Human resources rated 23.03%, 50.31% and 25.9% respectively as against University of Queensland. Using these values, the performance of IT governance at UNN was cumulatively found to be 24.61% of the International standard. This rating based on international performance rating scale showed that the performance of ITG at UNN is yet at a poor state*.

Keywords- Information Technology Governance, Performance Index, Statistical Simulation, Control Objectives for Information Technology (Cobit),
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1. INTRODUCTION

Information Technology Governance (ITG) has been defined as the management process which measures delivery of the expected benefits of IT in a controlled way to enhance the long term success of the enterprise [5].
IT governance can also be described as the responsibility of executives and the board of directors, and consists of the leadership, organizational structures and processes that ensure that the enterprise's IT sustains and extends the organization's strategies and objectives [6].

Higher education system is a major consumer of IT products and services as well as a major provider of services using ICT. IT has helped in the improving range of activities which includes research, teaching, learning and administration in the higher education environment [11].

Information Technology Governance (ITG), has increasingly becoming a key area of concern under the umbrella of corporate governance because of the pervasive influence of information systems and the associated technology infrastructure in every area of an organization's activities [7]. It is the set of responsibilities and practices exercised by senior management of an organization designed to establish and communicate strategic direction, ensure realization of goals and objectives, mitigate risks, and verify that assigned resources are used in an effective and efficient manner [4].
There are three principal schools of thought on IT governance in literature:
(i) IT governance as a framework or an audit process
(ii) IT governance as IT decision-making
(iii) IT governance as a branch of corporate governance

Measuring IT contribution to an organization's business involves measuring the performance of such organization's ITG. The IT balanced scorecard (ITBSC) model is used for such measurement. It is adapted from the Balanced Scorecard introduced by Kaplan and Norton [8]. It has four perspectives: (i) the "User Orientation" perspective which represents the user evaluation of IT; (ii) the "Operational Excellence" perspective which represents the IT processes employed to develop and deliver the applications; (iii) the "Future Orientation" perspective which represents the human and technology resources needed by IT to deliver its services over time; and (iv) the "Business Contribution" perspective which captures the business value created from the IT investments. Each of these perspectives has to be translated into corresponding metrics and measures that assess the current situation.

In this study, the case study universities are:

University of Nigeria, Nsukka (UNN) and University of Southern Queensland, Australia (USQ). The latter will be used as a standard to which the former will be compared. As one of leading Universities in Australia (USQ), offers the latest world – class facilities across several campus locations.

Students have access to high-tech and comprehensive libraries personal computer networking and some of the world's finest research centers operating at the cutting edge [1]. USQ also provides wide range of academic, administrative and personal computer service on all campuses, as well as access to a variety of recreation sporting and social activities. USQ recognizes IT is an integral part of the study and provides students with a range of IT and online services [1]. University of Queensland, Australia has ICT facilities that can be rated as being of international standard. Out of 25,000 students' enrollments, 21,238 studied on campus. The university has a complex network infrastructure which operates on a high-speed optic fiber backbone servicing approximately 2600 personal computer and 200 Macintosh systems. Also, there are laboratory servers numbering 250 which access the network through 190 network devices.

- Free natural dial-up through USQ connect with USQ transmission's own Information Service Provider (ISP). This allows a dial up access to the internet from anywhere in Australia for the cost of a local call.
- Free e-mail with all students receiving official USQ e-mail
- On campus internet access available throughout all USQ campuses via one of the fastest information networks in the world
- Discounted internet with students receiving
- Significantly disconnected rates for full service
- My USQ a personalized portal, to online – student services. This portal can be useful to check e-mail and personal student records; study resources and calendar.
- MySF-net available resources enabling students to enroll in courses recording information such as lecture materials, tutorial notes discussion groups and class time-table.
- Infrastructures at USQ are one of the most advanced. Network in Australia connecting more than 18,000 on campus computers [1].

UNN is emerging as a major consumer of IT products and services. Its student population stands at about 40,000 students while its staff population is approximately 8,000. Its wireless network presently covers greater section of the campus while the only optic fiber network available is the single link which provides the university with internet connectivity. The UNN ICT management structure has the office of Vice Chancellor as the overall manager and controller of ICT and Deputy Vice Chancellor (Academic) as the second manager. The ICT management has one overall Director and three other Deputy Directors in charge of the Management Information System (MIS), [10] the Computing Centre and the Communication and Innovation Centre, respectively. There are five other sections which include: Administration Section, Software Development and Website Management, Central Records, Cyber Café Facility, Internet Laboratory, System Maintenance and Assembly units. Right now there is no standard ITG framework being implemented in the university.

The present ranking of Nigeria Universities which ranked University of Nigeria Nsukka the 54th in Africa [11] motivated me to measure and assess its level of growth in IT Governance using University of Queensland Australia (USQ}as a reference model. The three measuring metrics used for the analysis include: Management Structure, IT Infrastructure and available Human Resources.
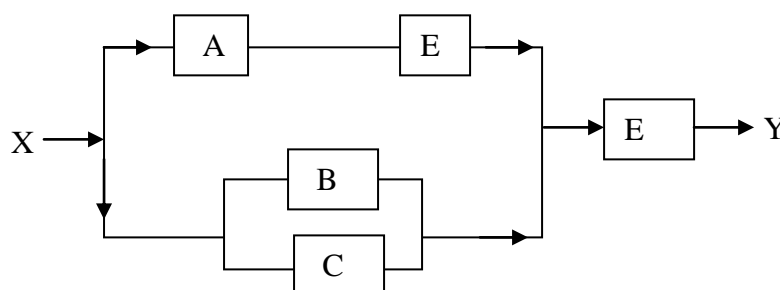
2. MATERIALS AND METHOD

Figure 1: The Analytical model of IT Governance.

The parameters used for measuring IT Governance in our universities are defined as follows:

A = (strategic plan)
B = IT Infrastructure
C = Human Resources
D = Management Structure
E = IT policy, X = Input, Y = Output.

In the above analytical model, the combination of the five input variables namely strategic plan, IT Infrastructure, Human Resources, Management Structure and IT policy will produce high output provided all the constraints are considered.

The Measurement Metrics
Due to complexity nature of Information Technology Governance, this research is restricted to three metrics namely; Information Technology Infrastructure (B), Human resources (C) and Management Structure [D].
The three metrics used for measuring IT governance at UNN

ICT Infrastructures Subsystem
One of the metrics used to measure Information Technology Governance globally in any University is the availability of the Information Technology Infrastructure that can be utilized to promote learning, research and teaching. The Information Technology Infrastructures are categorized into system level and component level.

The system level includes the type of backbone used in the network whether fiber optic or not, the type of network existing in the institution whether wired Local Area Network LAN or wireless Local Area Network, the Access Points available, the number of routers available in the particular network, if there is segmentation within the network or not, the bandwidth in use by the University, the number of channels that can provide service in case of eventuality, the number of students per computer, the presence or absence of faculty or department computer laboratory, the alternative power supply, the type of cables used, available Software/Hardware components, available backup devices in the university, solar panel present, etc.

The Management Structure Subsystem
The management positions in ICT services/organizational structure according to the international standard include; the Chief Technology Officer (CTO) who is the director of the ICT services in any university. He must have a minimum of PHD in computer science or ICT related discipline in addition to at least ten years work experience plus professional certificate in ICT discipline.

The Chief Technology Officer is responsible for providing leadership in developing and maintaining standardized ICT architecture and solutions for the University's ICT infrastructure, to support the achievement of the University's vision, mission, goals and business objectives. The CTO provides technical input on ICT infrastructure and architecture for the University's ICT strategic and operational plans and identifies future trend in technology and provide expert advice on the suitability of these technologies in addressing University business needs. The CTO also reports to the chief information officer whose role has been integrated with the Deputy Vice chancellor.

Other human resources involved in standard ICT services of any University are given in figure 3 below.

Human Resources Subsystem
The Management Structure of the Information Technology Governance of any University includes the Chief Technical Officer who is the director of ICT in the University. He must have a minimum of PhD in computer or ICT discipline plus a professional certificate and prove of at least ten years of work experience.

Also, there are Principal Managers who control different sections of ICT management. They include: Performance measurement, services delivery, infrastructure and systems, learning and teaching, research principal managers/advisors. The Principle Manager for Performance measurement for instance must have a minimum of PHD in computer science or ICT plus a professional certificate and ten years work experience in his area. Also, the Principal Manager for service delivery and the one for infrastructure systems must each possess a minimum of M.SC in computer or ICT plus a professional certificate and good proved work experience. These qualifications requirements apply to other principal managers as well.

The sectional heads for service desk, service and delivery, training, and other essential services must each possess a minimum of M.SC in ICT or computer science plus a professional certificate. Any Organization/University which fails to address the issue of management very seriously will not have a vibrant information supported academic activities. In Information Technology Governance of any university the management structure plays a primary role in sustaining and enhancing qualitative teaching, learning and research. It is the management that controls the Information Technology Infrastructure, and Human resources that boost the strength of any Information Technology Governance in any University.

In most practical cases the reliability of system is determined through use of a reliability block diagram of the system. We are concerned here with a system where input is moved from the source X to produce output at another point Y. This must involved the, combination of B, C and D subsystems. The combination involves series of arrangements. Each entity is assumed to be in one of several discrete states which are mutually exclusive and exhaust all possibilities. When an

entity operates satisfactorily it is taken to be in a good state i.e. P (A) = 1. The same entity, on the other hand, can be in one of several bad states when it malfunctions in some manner. Therefore, for all possibilities,

$$\bar{A} + A = 1 \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots 1$$

where $\bar{A}$ ranges from 0.00 to 0.39 for bad states (table 1).

The first method assumes that the system may be described analytically.. For simplicity let us consider the model above where D is driving both B and C and the subsystems can be connected in eight possible ways. When the blocks operate satisfactorily it is in state A (i.e. 0.5 to 0.9) and when it fails it is in state $\bar{A}$. In any case the state must be one of the following eight states:

$S_0, S_1, S_2, S_3, S_4, S_5 \dots S_7$.

Using general probability theory it holds that the combination of B, C and D can only produce a maximum value of 1. That is,

$$P(D(B+C)) \leq 1 \text{---}2$$

or

$$P(DB) + P(DC) \leq 1\text{--}3$$

Based on equation (2) or (3) the eight states can be illustrated as in table 1 below.

Table 1: Showing the probability functions

STATES	BINARY VALUES	CODING	PROBABILITY DERIVATION
S_0	000	$\bar{d}\ \bar{b}\ \bar{c}$	Prob. $\bar{d}\ (\bar{b} + \bar{c}) \leq 1$
S_1	001	$\bar{d}\ \bar{b}\ c$	Prob. $\bar{d}\ (\bar{b} + c) \leq 1$
S_2	010	$\bar{d}\ b\ \bar{c}$	Prob. $\bar{d}\ (b + \bar{c}) \leq 1$
S_3	011	$\bar{d}\ bc$	Prob. $\bar{d}\ (b+c) \leq 1$
S_4	100	$D\bar{b}\ \bar{c}$	Prob. $d(\bar{b} + \bar{c}) \leq 1$
S_5	101	$d\bar{b}\ c$	Prob. $d(\bar{b} + c) \leq 1$
S_6	110	$db\ \bar{c}$	Prob. $d(b + \bar{c}) \leq 1$
S_7	111	dbc	Prob. $d(b + c) \leq 1$

From this table 0.0 to 0.4 represent 0 or $\bar{d}$ or $\bar{b}$ or $\bar{c}$ while 0.5 to 0.9 represent 1 or d or b or c.

Computation of B, C and D for the subsystem

The expressions for the computation of available Human Resources, Management structure and IT Infrastructure are derived as follows:

(i) In evaluating for Human Resources (C), there are 22 prominent positions in IT governance with 71 entry points, each position weighted based on qualification and work experience. The mathematical expression for C is:

$$C = {}^{0.5}/_{71}\ x\ \textstyle\sum n \text{ -- } 4$$

Where $0 \leq C \leq 0.5$; where 0.5 is the standard weighted value

For ideal state where $\sum n = 71$ (i.e. the sum of entry points scored under human resources)

$$C = 0.5\text{---}5$$

For a unit weighting factor,

$C = {}^{0.5}/_{71}\ x\ 1 = 0.007$

$$\text{Generally, } C = 0.007\ x\ \textstyle\sum n \text{ --}.6$$

Where, $\sum n$ is calculated from the data collected..

(ii) To compute for Management, D, the expression $0 \leq D \leq 1$ holds. There are 21 prominent positions with 77 entry points. Each position in the management structure can take any of the values within the range $5 < n < 0$

For a unit weighting factor,

$$D = {}^{1}/_{77}\ x\ 1 = 0.0129 \text{ --}7$$

Where $0 \leq D \leq 1$; and 1 is the standard value for D.

For ideal state where $\sum n = 77$

$$D = {}^{1}/_{77}\ x\ 77 = 1\text{---}8$$

Therefore, generally for computing other values for management,

$$D = 0.0129 \text{ x } \sum n \text{ ---9}$$

$\sum n$ is the sum of data collected..

(iii) Computing for Information Technology Infrastructure, B, the expression $0 \leq B \leq 0.5$ holds. There are a total of 51 entry points.
Therefore, for a unit weighting factor:

$$B = {}^{0.5}/_{51} \text{ x } 1 = 0.0098 \text{ --10}$$

Where $0 \leq B \leq 0.5$; and 0.5 is the standard rating value for available IT infrastructure.
For ideal state, i.e. $\sum n = 51$

$$B = {}^{0.5}/_{51} \text{ x } 51 = 0.5 \text{ --11}$$

Therefore generally for computing other values for available Infrastructure,

$$B = 0.0098 \text{ x } \sum n \text{ --12}$$

Where, $\sum n$ is the sum of collected data.

Based on equations (6), (9) and (12), a university's information Technology Governance, ITG, can be assessed using Human Resources, Management structure and IT infrastructure as measurement metrics.

The general performance rating index based on international standard to be used is shown in table 3.2 below.

Table 2: Performance Scale [11].

S/NO	PERFORMANCE SCALE	GRADE OR SIGNIFICANT
1	0.9	Excellent
2	0.8	Very good
3	0.7	Better
4	0.6	Good
5	0.5	Very Fair
6	0.4	Fair
7	0.3	Very bad
8	0.2	Poor
9	0.1	Very Poor
10	0.0	Does not exist

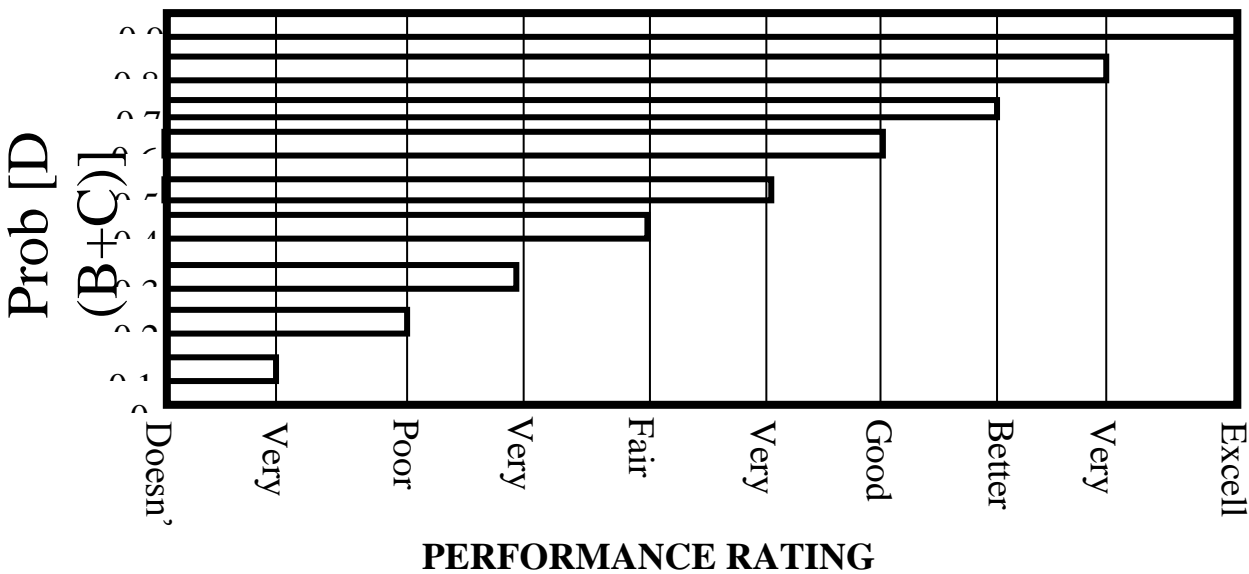The Table 2 can be represented in a bar chart as shown below.

Figure 2: Bar Chart of Performance Rating of ICT Governance

The management positions in divisions of ICT services at USQ as shown in figure 3 below
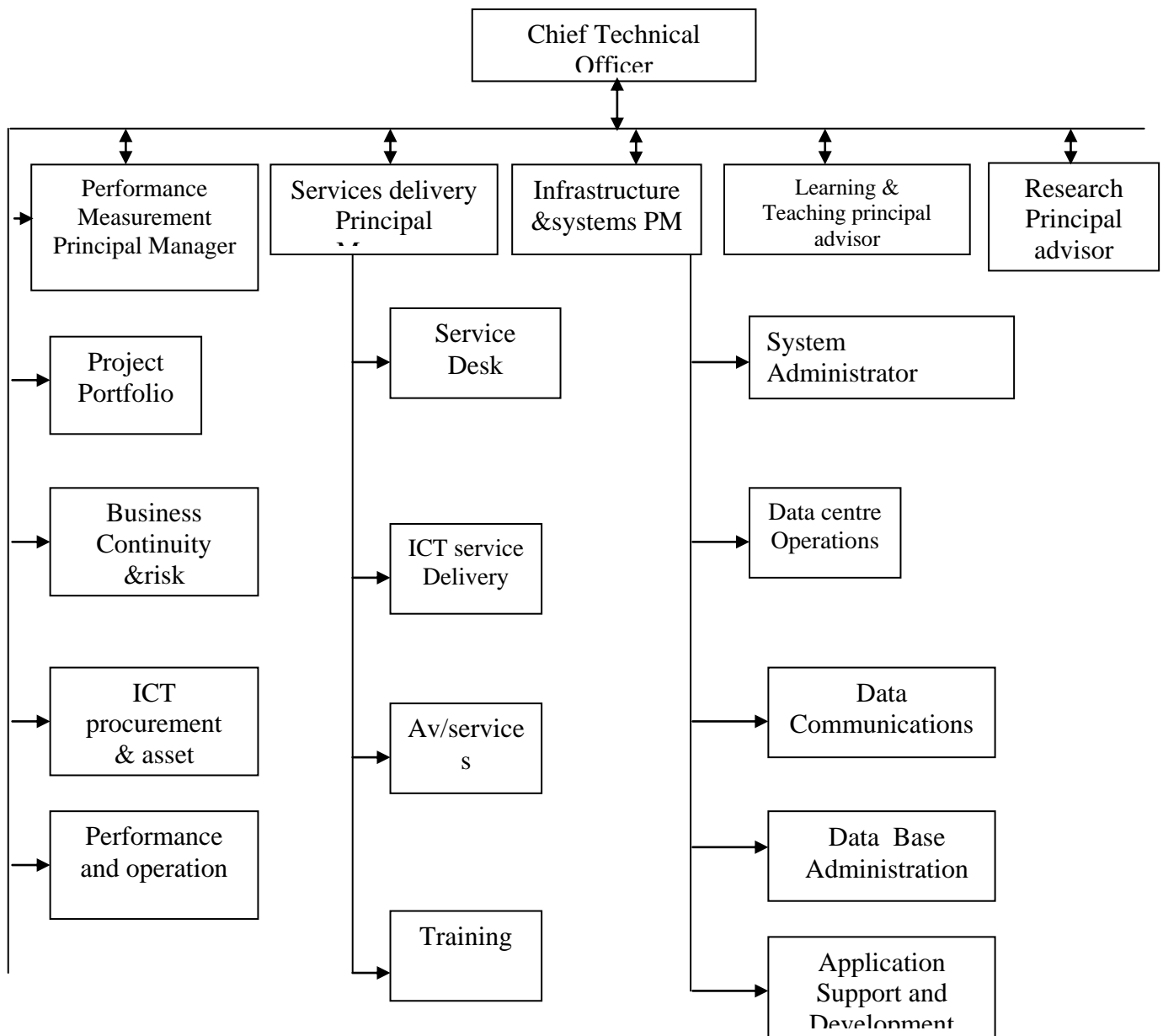

Figure 3: Management positions in divisions of ICT services [9]

The ICT services have 5 major arms namely; performance measurement chaired by a principal manager, the services delivery chaired by a principal manager, infrastructure and systems chaired by a principal manager, the learning and teaching positions chaired by a principal advisor and; research chaired by a principal advisor. The performance measurement has four arms with subunits notably project portfolio, business continuity and risk management, ICT procurement and performance, and reporting divisor.

The service delivery has the service desk, ICT service delivery, other services and training. The infrastructure and systems division has the following sub-unit:; system administration, data centre operations, data communication, data base Administration and Application support and development while the remaining arms (i.e. learning and teaching research unit) have no subunits but each is chaired by a principal advisor each.
The hierarchical project structure for the University's IT governance is shown in figure 4 below.
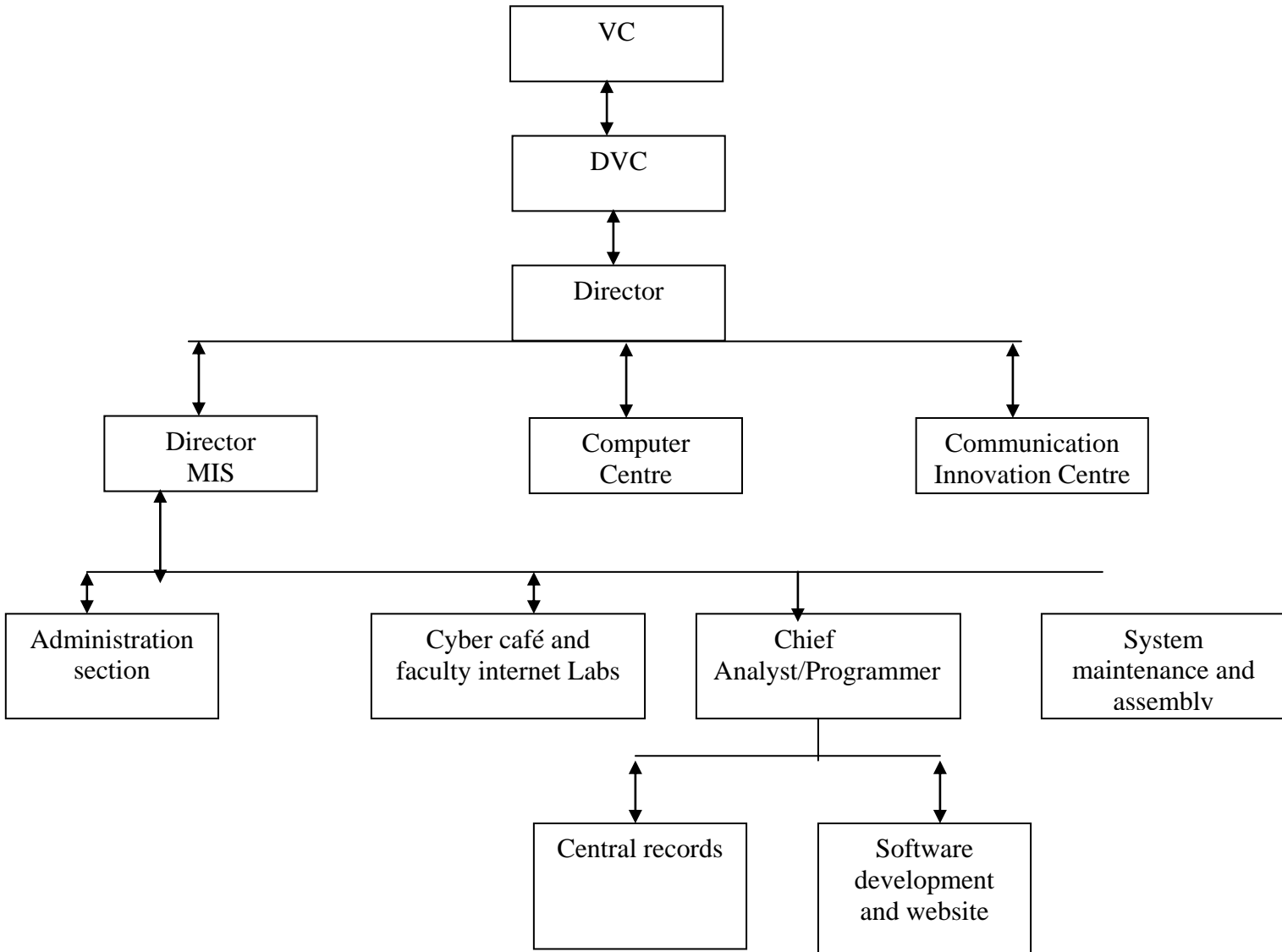
Figure 4: University of Nigeria, Nsukka, IT Management Structure [10]

3. DATA COLLECTION AND ANALYSIS

Data was generated from the staff of ICT Management which included Director of MIS and Director of ICT, (40) ICT staff members, (50) academic staff members, (50) non-academic staff members, and (50) students from UNN and the data available from the USQ Network. The collected data was weighted and Simulated in C++ programming language.
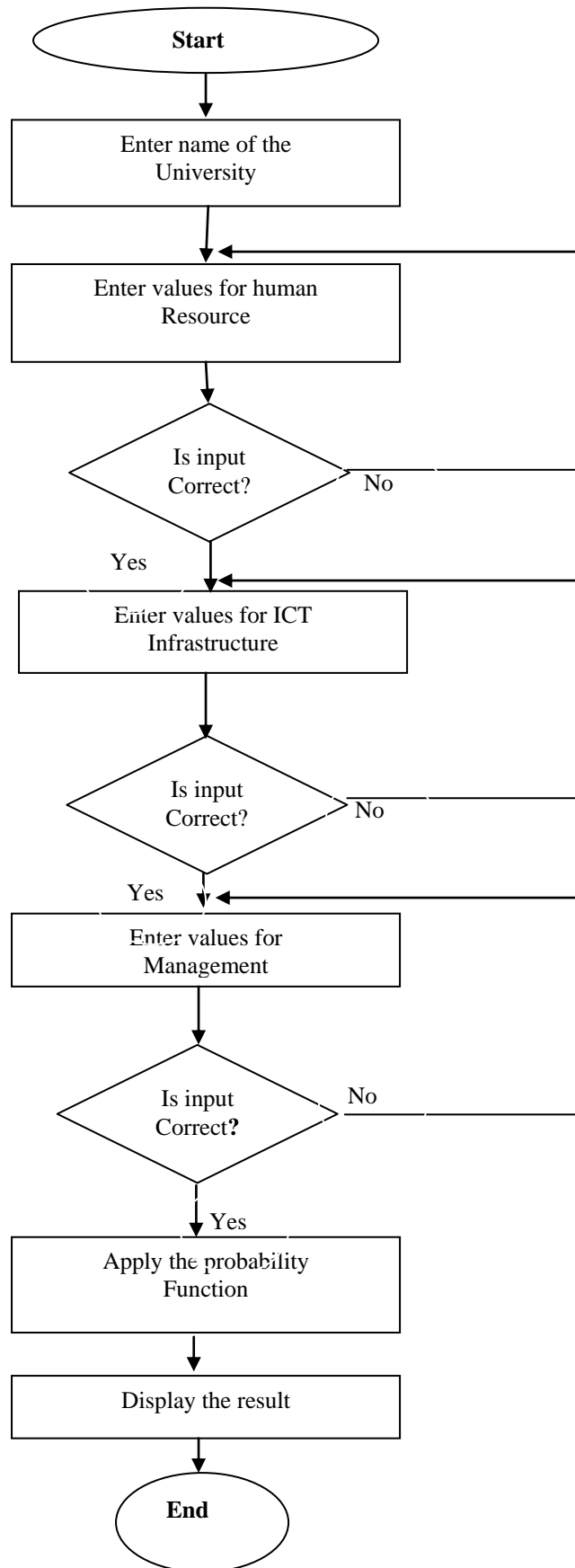
Fig 5: Flow chart to show how IT governance program runs.

4. ILLUSTRATIVE EXAMPLES

UNN ICT governance was measured based on the available IT infrastructure, Human Resources and Management Structure using University of Southern Queensland, Australia as standard. The secondary data obtained were weighted and analyzed as given below:

MANAGEMENT STRUCTURE WEIGHTING FOR IDEAL STATE (USQ)

Table 3: Management Structure rating

Position	Qualification	Performance Scale (N)	N(Weighting Factor) =N(0.0129)
Chief Technical Officer	Min. PHD in computer or relevant discipline + professional certificate + work experience	5	5(0.0129) = 0.0645
Vice Chancellor and Deputy Vice Chancellor	Professor + professional skill in ICT discipline	10	10(0.0129) = 0.129
Principal Manager for performance measurement	Min. PHD in computer or relevant discipline + professional certificate + work experience	5	5(0.0129) = 0.0645
Principal Manager each for services delivery and infrastructure system	Min M.Sc in computer + professional certificate e + work experience	10	10(0.0129) = 0.129
Principal Adviser for learning and teaching	Min M.Sc in computer + professional certificate + work experience	4	4(0.0129) = 0.0516
Principal advisor for research	Min M.Sc in computer + professional certificate + work experience	4	4(0.0129) = 0.0516
4 sectional Heads for each project portfolio, 1 for risk management and business continuity, 1 for ICT procurement and asset management 1 for performance and reporting	Min M.Sc in ICT management, or risk management or in ICT performance + professional Certificate	3X4=12	12(0.0129) = 0.1548
4 sectional heads; 1 for services desk, 1 for ICT service and delivery, 1 for services, 1 for training	Min M.Sc in ICT or relevant discipline + professional certificate	3X4=12	12(0.0129) = 0.1548
5 sectional heads for IT infrastructure, 1 for system administrator, 1 for system administrator, 1 for data centre, 1 for data comm.,, 1 for data base admin, 1 for application support and development	Min M.Sc ICT or computer services + professional certificate	3X5=15	15(0.0129) = 0.1935
TOTAL		**N=77**	**0.9933**

From Table 3 the management structure is N=77, which has the weighted value of 0.9933.

IT INFRASTRUCTURE WEIGHTING FOR IDEAL STATE

Table 4: IT Infrastructure rating

S/N	Infrastructures	Performance Scale (N)	N(Weighting Factor) = N(0.0098)
i.	Optic fiber back bone	5	5(0.0098) = 0.049
ii.	WLAN OR LAN	4	4(0.0098) =0.0392
iii.	Assess points	3	3(0.0098) =0.0294
iv.	Base stations	3	3(0.0098) =0.0294
	Component level		
v.	Switches	3	3(0.0098) =0.0294
vi.	Servers	3	3(0.0098) =0.0294
vii.	High bandwidth	4	4(0.0098) =0.0392
viii.	Medium bandwidth	3	3(0.0098) =0.0294
ix.	Low bandwidth	2	2(0.0098) =0.0196
x.	Router	3	3(0.0098) =0.0294
Xi	Generators	3	3(0.0098) =0.0294
xii.	Radio frequency	2	2(0.0098) = 0.0196
xiii.	Ratio of computer to students (1:6)	4	4(0.0098) = 0392
xiv.	Moderate ratio	3	3(0.0098) = 0.0294
xv.	Low ratio	2	2(0.0098) = 0.0196
xvi.	Very low ratio	1	1(0.0098) = 0.0098
xvii.	Cart cables	1	1(0.0098) = 0.0098
Xviii	Soft wares	1	1(0.0098) = 0.0098
xix.	Others	1	1(0.0098) = 0.0098
xx.		∑n = 51	**0.4998**

From the table 4, **∑n = 51** and the rating of ICT infrastructure is **0.4998**

HUMAN RESOURCES WEIGHTING FOR USQ

Table 5: Human resource Rating

Positions	Performance Scale (N)	N(Weighting Factor) = N(0.0141)
Chief Technical Officer based on qualification	5	5(0.007)= 0.035
Principal manager for performance measurement	5	5(0.007)= 0.035
Principal manager for 4 services delivery and IT Infrastructure	10	10(0.007)= 0.07
Principal adviser for learning and teaching	4	4(0.007)= 0.028
Principal Advisor for research	4	4(0.007)=0.028
1. Sectional head each for project portfolio 2. risk management 3. asset management and ICT procurement 4. performance and reporting	3 3 3 3	3(0.007)=0.021 3(0.007)=0.021 3(0.007)=0.021 3(0.007)=0.021 3(0.007)=0.021
1. sectional head each for service desk 2. ICT service delivery 3. other services 4. Training	3 3 3 3	3(0.007)=0.021 3(0.007)=0.021 3(0.007)=0.021 3(0.007)=0.021

1. sectional head each for system administrator 2. data centre operations 3. data communication 4. data base administration 5. application support and development	3 3 3 3 2	3(0.007)=0.021 3(0.007)=0.021 3(0.007)=0.021 3(0.007)=0.021 2(0.007)=0.014
Computer operators	1	1(0.007)= 0.007
Lab. Technician	2	2(0.007)= 0.014
Other	1	1(0.007)= 0.007
	∑n =70	0.4918

From the Table 5, ∑**n = 70** and the weighting value of ICT infrastructure is **0.4918**

MANAGEMENT STRUCTURE WEIGHTING FOR UNN

Table 6: Management Structure rating for UNN

Position	Qualification	Performance Scale (N)	N(Weighting Factor) = N(0.0129)
Chief Technical Officer	Min. PHD in computer or relevant discipline + professional certificate + work experience e	3	3(0.0129) = 0.0387
Vice Chancellor and Deputy Vice Chancellor	Professor + professional skill in ICT discipline	8	8(0.0129) = 0.1032
Principal Manager for performance measurement	Min. PHD in computer or relevant discipline + professional certificate + work experience	0	0(0.0129) = 0
Principal Manager each for services delivery and infrastructure system	Min M.Sc in computer + professional certificate e + work experience	0	0(0.0129) = 0
Principal Adviser for learning and teaching	Min M.Sc in computer + professional certificate + work experience	2	2(0.0129) = 0.0258
Principal advisor for research	Min M.Sc in computer + professional certificate + work experience	2	2(0.0129) = 0.0258
4 sectional Heads for each project portfolio, 1 for risk management and business continuity, 1 for ICT procurement and asset management 1 for performance and reporting	Min M.Sc in ICT management, or risk management or in ICT performance + professional Certificate	0	0(0.0129) = 0
4 sectional heads; 1 for services desk, 1 for ICT service and delivery, 1 for services, 1 for training	Min M.Sc in ICT or relevant discipline + professional certificate	9	9(0.0129) = 0.1161
5 secional heads for IT infrastructure, 1 for system administrator, 1 for system administrator, 1 for data centre, 1 for data comm.,, 1 for data base admin, 1 for application support and development	Min M.Sc ICT or computer services + professional certificate	15	15(0.0129) = 0.1935
Total		39	**0.5031**

From the analysis of the management structure above, ∑**n = 39** and the rating 0f UNN when compared to University of Queensland, Australia is **0.5031**

IT INFRASTRUCTURE WEIGHTING FOR UNN

Table 7: Infrastructure rating for UNN

S/N	Infrastructures	Performance Scale (N)	N(Weighting Factor) = N(0.0098)
i.	Optic fiber back bone	0	0
ii.	WLAN OR LAN	3	3(0.0098)= 0.0294
iii.	Assess pints	2	2(0.0098)= 0.0196
iv.	Base stations	2	2(0.0098)= 0.0196
	Component level		
v.	Switches	2	2(0.0098)=0.0196
vi.	Servers	1.5	1.5(0.0098)=0.0147
vii.	High bandwidth	0	0
viii.	Moderate bandwidth	0	0
ix.	Low bandwidth	2	2(0.0098)=0.0196
x.	Router	2	2(0.0098)=0.0196
Xi	Generators	3	3(0.0098)=0.0294
xii.	Radio frequency	2	2(0.0098)=0.0196
xiii.	Ratio of computer to student: high; 1:6	0	0
xiv.	Moderate ratio	0	0
xv.	Low ratio	0	0
xvi.	Very low ratio	1	1(0.0098)=0.0098
xvii.	Cart cables	1	1(0.0098)=0.0098
Xviii	Soft wares	1	1(0.0098)=0.0098
xix.	Others	1	1(0.0098)=0.0098
xx.		∑n = 23.5	0.2303

From the analysis of the IT Infrastructure above **∑n = 23.5** and the rating 0f UNN when compared to University of Queensland, Australia is **0.2303**

HUMAN RESOURCES WEIGHTING FOR UNN

Table 8: Human Resources Rating for UNN

Positions	Performance Scale (N)	N(Weighting Factor) = N(0.007)
Chief Technical Officer based on qualification	3	3(0.007)=0.021
Principal manager for performance measurement	0	0
Principal manager for 4 services delivery and IT Infrastructure	0	0
Principal adviser for learning and teaching	2	2(0.007)=0.014
Principal Advisor for research	3	3(0.007)=0.021
1.Sectional head each for project portfolio 2. Risk management 3. Asset management and ICT procurement 4. Performance and reporting	0 0 0 0	0 0 0 0
1. Sectional head each for service desk 2. ICT service delivery 3. other services 4.Training	2 2 2 3	2(0.007)=0.014 2(0.007)=0.014 2(0.007)=0.014 3(0.007)=0.021
1. Sectional head each for system administrator 2. Data centre operations 3. Data communication 4.. Data base administration 5. Application support and development	 3 3 2 3 2	 3(0.007)=0.021 3(0.007)=0.021 2(0.007)=0.014 3(0.007)=0.021

		2(0.007)=0.014
Computer operators	0.5	0.5(0.007)= 0.035
Lab. Technician	1	1(0.007)= 0.007
Other	1	1(0.007)=0.007
	∑n =32.5	0.259

From the table (8) of the Human Resources is ∑**n = 32.5** and the weighted value for UNN is **0.259**

6. SUMMARY AND CONCLUSION

In this work, different IT governance subsystems namely ICT Infrastructure, Management Structure, and Human Resources were used as metrics for estimating IT governance performance at University of Nigeria, Nsukka. The results obtained from the analysis of data collected can be deduced as follows:

(i)   The Management Structure of USQ rated **0.9933** while that of UNN rated **0.5031.** This shows that the management structure of UNN is at about **50%** of what is obtainable at University of Queensland.

(ii)   The ICT Infrastructure of USQ rated **0.4998** while that of UNN rated **0.2303**. This translates to fact that ICT infrastructure in UNN is about **23.03%** of what is obtainable in Queensland which is used as standard.

(iii)   The Human Resources of USQ was rated **0.4918** while that of UNN rated **0.2590**. This shows that the rating of human resources in is just **25.9%** of what is obtainable in Queensland University.

The general performance rating of IT governance at UNN as against USQ (which as a standard rates **0.9702** was found to be **0.2461**, this actually means that IT governance performance in UNN is just **24.61%** of the standard.

The Information Technology Governance at University of Nigeria, Nsukka is at a very poor stage when compared to that of University of Queensland, Australia, whose IT governance is taken to be performing at international standard. This is numerically shown by the fact that while the Information Technology Governance of University of Queensland is approximately **97%** while that of University of Nigeria, Nsukka is 24.61**%,** this is far below the average of the former. From the findings, it shows that at UNN, the performances of Management Structure, ICT Infrastructure and Human Resources are **50%**, **23.03%** and **25.9%** respectively as against those of University of Queensland (USQ).

7. ACKNOWLEDGMENT

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