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Measuring ICT Maturity of Nigerian Service Firms Using ICT Maturity Model of SMEs and the Analytical Hierarchical Process Model

Godspower O. Ekuobase[1] and Victor A. Olutayo[2]

[1]Department of Computer Science, University of Benin, Benin City, Nigeria.
[2]Department of Computer Science, Joseph Ayo Babalola University, Osun State, Nigeria.

Abstract

A key challenge within the service industry is how the benefits from ICT adoption and diffusion (ICT value) relate to the degree of adoption and diffusion of ICT (ICT maturity). This has resulted in the uncertainty of value generation from investments on ICT leading to ICT mis-planning and disaster. For sustainable improvement of ICT based service delivery in Nigeria therefore, the ICT maturity index of the Nigerian service industry has to be measured. The ICT maturity of selected service firms listed in the Nigerian Stock Exchange (NSE) has been measured adapting the ICT Maturity model of Small-and-Medium Enterprises (SMEs) by using the Analytical Hierarchical Process (AHP) model was used to determine the weights of the four main factors that constitute the ICT maturity model against the original equal weighting of the factors. The results showed that the Nigerian service industry is web based in ICT maturity with an index of about 0.78, an implication that ICT penetration and usage in the Nigerian service industry has reached an advanced stage.

Keywords: Service industry, Nigeria, ICT maturity, ICT maturity model and AHP.

1.0 Introduction

A key challenge within the service industry is to improve the understanding of how managers actually perceive the benefits from ICT adoption and diffusion (ICT value),and how this relates to the actual level of ICT adoption and diffusion (ICT maturity) reminiscent of the productive investments on ICT. This research work addressed this challenge. This is particularly important considering the fact that as with the developed nations of the world; the service industry is the largest contributor to the wealth of the Nigeria economy; presently the largest in Africa and 26th largest in the world. It accounts for about 51% of Nigeria's gross domestic product – GDP [1].

ICT maturity models are increasingly being applied within the field of service science, both as an informed approach for continuous improvement and as a means of self or third-party assessment of service organization [2]. ICT maturity models when applied to service department(s) can show how structured, ordered and focused they are towards the provision of service(s) to their customer(s); using ICT facilities [3]. Furthermore, it can guide in the continuous improvement of ICT facilities and services of a service department(s) [4,5]. To this end, using the ICT maturity model of SMEs, this paper measured the ICT maturity of the Nigerian Service Industry as a possible panacea towards unravelling the uncertainty of value generation from investments on ICT. Pham [6] did a similar work for some Vietnamese SMEs while Chan et al. [7] did also for selected companies in mainland China.

This ICT maturity model as implemented by Pham [6] and Chan et al. [7], is very easy to implement but assign equal weights to the criteria involved in the decision making process (see equation 3). These weights play a vital role in decision making process and extremely affect the final decision [8]. In reality however, some criteria are more important than others towards determining the maturity of ICT in firms. Consequently, this paper uses the Analytical Hierarchical Process (AHP) model to determine the criteria weights as against the use of equal weights as in Pham [6] and Chan et al. [7].

Corresponding author: Godspower O. Ekuobase, E-mail: godspower.ekuobase@uniben.edu, Tel.: +2348064951845

2.0 Analytic Hierarchical Process (AHP) Model

Analytic Hierarchy Process (AHP) model was introduced by Saaty [9] to solve complicated multi-criteria decision problem. Besides, AHP is appropriate whenever a target is obviously declared and a set of relevant criteria and alternatives are offered [10]. AHP is an ideal method for ranking alternatives when multiple criteria and sub-criteria are present in the decision-making process [11]. AHP is a popular model to aggregate multiple criteria for decision making [12]. AHP allows the decision-maker to structure complicated problems in the form of a decision hierarchy. The hierarchy usually consists of three different levels, which include goals, criteria, and alternatives as depicted in Figure 1.

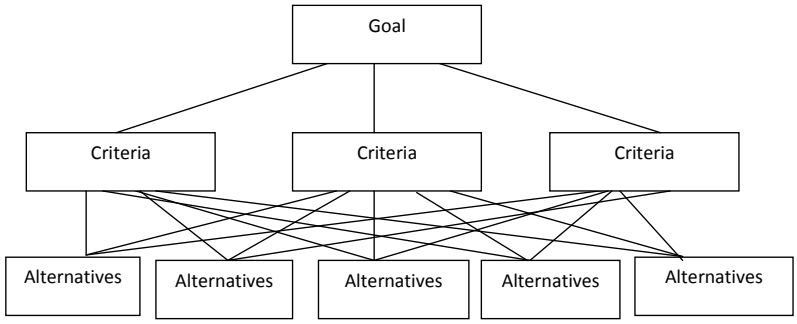

Figure 1: Structure of AHP

The AHP process begins by determining the relative importance of the criteria in meeting the goals. Next, the focus shifts to measuring the extent to which the alternatives achieve each of the criteria. Finally, the results of the two analyses are synthesized to compute the relative importance of the alternatives in meeting the goal. Managerial judgments are used to drive the AHP approach [13]. These judgments are expressed in terms of pair-wise comparisons of items on a given level of the hierarchy with respect to their impact on the next higher level. Pair-wise comparisons express the relative importance of one item versus another in meeting a goal or a criterion. Each of the pair-wise comparisons represents an estimate of the ratio of the weights of the two criteria being compared. Because AHP utilizes a ratio scale for human judgments, the alternatives weights reflect the relative importance of the criteria in achieving the goal of the hierarchy [14].

The use of the AHP approach offers a number of benefits. One important advantage of AHP is its stability and flexibility regarding changes within, and additions, to the hierarchy. In spite of the benefit of AHP, it also has some weak points. One of these is the complexity of this method which makes its implementation quite inconvenient. A further disadvantage of this method is that it does not consider risks and uncertainties [13].

To make a decision in an organized way to generate priorities we need to decompose the decision into the following steps as proposed by Saaty [9]:

1. Define the problem and determine the kind of knowledge sought.
2. Structure the decision hierarchy from the top with the goal of the decision, then the objectives from a broad perspective, through the intermediate levels (criteria on which subsequent elements depend) to the lowest level (which usually is a set of the alternatives).
3. Construct a set of pair-wise comparison matrices. Each element in an upper level is used to compare the elements in the level immediately below with respect to it.
4. Use the priorities obtained from the comparisons to weigh the priorities in the level immediately below. Do this for every element. Then for each element in the level below add its weighed values and obtain its overall or global priority. Continue this process of weighing and adding until the final priorities of the alternatives in the bottom most level are obtained.

A succinct implementation of this whole process as given by Aladeselu et al. [15]was adopted.

In the services science domain, ICT maturity is measured using standard models called ICT maturity models. The first ICT maturity model introduced was the Nolan's model [16,17] and since it was introduced in the 1970's, several ICT maturity models are now in use. They include: (i)Nolan ICT Maturity Model; (ii) UNESCO'S Model of ICT Maturity; (iii) Cloud ICT Maturity Model; (iv) Organization Interoperability ICT Maturity Model; (v) TOBI Maturity Model; (vi) Sustainable ICTCapability Maturity Framework (SICT-CMF);(vii) Accessibility Maturity Model; (viii) Green ICT Maturity Model; (ix) Knowledge Maturity Model and (x) the ICT Maturity Model of SMEs. Due to limited paper size and to keep the paper in focus, a detailed review of existing ICT maturity models is reported separately.

3.0 Materials and Methods

The quasi-experimental research methodology was adopted. After a critical review and consultation, some 23 service firms listed in the NSE and a model each for ICT maturity and value measurement, were selected. The research then took two independent paths which later coalesced into the third and final part of the research.

After a successful informal consultation with several service firms listed in the NSE to seek for permission to use their firms as a research case study, a total of 28 service firms gave consent but only 28 of them was actually accessible for the field work exercise which took place during the periods of 14th of April through 15th of May, 2015. The 23 firms are: Expert Edge Software, Main Street Bank, Bank of Industry, Skye Bank PLC, Zenith Bank PLC, Keystone Bank Limited, Access Bank PLC, Guaranteed Trust Bank PLC, First Bank Nigeria PLC, Union Bank PLC, Fast Credit Limited, Information Technology Transfer, Petrodata Management Services, Digital Communication Company, CHAMS PLC, Computer Warehouse Limited, ETISALAT Nigeria, Visaphone Communications Limited, Airtel Nigeria, MTN Nigeria, SMILE Communications, STACO Insurance PLC and Zenith Insurance

The field work exercise was a questionnaire survey meant to capture the necessary data to measure the ICT maturity of these firms. The questionnaires were given to the protocol officers of the various firms for distribution. As a result of the very busy schedule of the respondents, the questionnaires could not be filled and collected immediately on distribution; it sometimes took several days of series of attempts to get the distributed questionnaires back. A total of 252 questionnaires were distributed, nine questionnaires per firm. The firms were specifically instructed that the nine questionnaires should be distributed three each per levels of management namely operational, middle and top management levels. This is to avoid a possible pitfall of a related research by Chan et al. [7] for companies in mainland China where one questionnaire per firm was administered which may be to prejudice by the respondent's position.

Distributing three questionnaires per managerial level did not only degrade the effect of position prejudice but also weakened bias within a managerial level. The average time a respondent spent on the questionnaire was about 15 to 20 minutes. Due to administrative protocols and the high traffic in Lagos, Nigeria, we could hardly visit five firms in a day. The second researcher carried out the questionnaire survey under the strict monitoring of the research leader via mobile phone calls and location tracking. A total of 156 questionnaires were validly returned.

The questionnaire modelled after the ICT Maturity Model of SMEs [6] is a three part document. The first part introduced and contained demographic data (name and type) of firm and respondents managerial position. The second part consist of 50 indicator questions grouped under the four major factors of observable capabilities of SMEs: Infrastructure (eleven indicator questions), Application (thirteen indicator questions), Human Resource (twelve indicator questions) and Policy (fourteen indicator questions). In addition, the last part of the questionnaire captured the respondents contact (mobile phone and e-mail address). Although questionnaires with similar connotations and indicator value have been used by Pham [6] and Pham et al. [18], the research leader validated and approved this questionnaire for the research. Appendix A contains a sample questionnaire.

The questionnaires was then sorted and coded using the indicator stage value as proposed by Pham [6]. The ICT maturity index (ICTMI) was calculated using the formula in equation (1) as proposed by Pham [6].

$$ICTMI = \alpha I + \beta A + \gamma H + \theta P \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \quad (1)$$

Where $0 \leq I, A, H, P, ICTMI \leq 1$ and $\alpha + \beta + \gamma + \theta = 1$; and

$$I=\frac{\sum_{t=1}^{4}(\frac{\sum_{t=1}^{nl} Ilt}{nl})}{4},\ A=\frac{\sum_{t=1}^{4}(\frac{\sum_{t=1}^{ml} Alt}{ml})}{4},\ H=\frac{\sum_{t=1}^{4}(\frac{\sum_{t=1}^{pl} Hlt}{pl})}{4},\ P=\frac{\sum_{t=1}^{4}(\frac{\sum_{t=1}^{ql} Plt}{ql})}{4} \ldots\ldots \quad (2)$$

Where Ilt, Alt, Hlt and Plt are indicators of stage l; nl, ml, pl and ql are number of respective indicators of stage l.

Since no information of weighting I, A, H, P, Pham (2010) let

$$\alpha = \beta = \gamma = \theta = 0.25 \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \quad (3)$$

This research frowns seriously at this use of equal weighting but instead used the AHP [15] to determine the value of α, β, γ and θ.A Step by step procedure for implementing AHP as given by Aladeselu et al. [15] is presented as follows:

Given the indicator factor values of firms which is in the form A = n X m matrix where n denotes the number of criterion and m the number of firms. In our case, n = 4 and m = 23. Perform the following steps:

Step1: Perform column operation on each University column of matrix A.

For example, to obtain a column operation matrix for firm F1, we carry out the following column operation:

$$\begin{bmatrix} a11 = \frac{a11}{a11} & a12 = \frac{a11}{a21} & a13 = \frac{a11}{a31} & \ldots & a123 = \frac{a11}{a231} \\ a21 = \frac{21}{a11} & a22 = \frac{a21}{a21} & a23 = \frac{a21}{a31} & \ldots & a223 = \frac{a21}{a231} \\ a31 = \frac{31}{a11} & a32 = \frac{31}{a21} & a33 = \frac{a31}{a31} & \ldots & a323 = \frac{a31}{a231} \\ & & \vdots & & \\ a41 = \frac{41}{a11} & a42 = \frac{41}{a21} & a43 = \frac{41}{a31} & \ldots & a423 = \frac{a41}{a231} \end{bmatrix}$$

From the above operation, the result of the column operation will be of the form:

$$Ak = \begin{bmatrix} a11 & a12 & a13 \ldots & a123 \\ a21 & a22 & a23 \ldots & a223 \\ a31 & a32 & a33 \ldots & a323 \\ & & \vdots & \\ & & \vdots & \\ a41 & a42 & a43 \ldots & a423 \end{bmatrix} \quad (4)$$

The above process is repeated for each of the firms.

Step2: Obtain a judgement matrix $A_{i,j}^{M}$ based on pair-wise comparison of all Ak

$$A_{i,j}^{M} = \sqrt{A_{i,j}^{L} * A_{i,j}^{H}} \forall \text{ Ak and i} \neq \text{j otherwise } A_{i,j}^{M} = 1 \quad (5)$$

where

$$A_{i,j}^{L} = \min (Ak_{i,j}) \quad \forall \text{ Ak} \quad (6)$$

$$A_{i,j}^{H} = \max (Ak_{i,j}) \quad \forall \text{ Ak} \quad (7)$$

Step3: Normalize each column of $A_{i,j}^{M}$ to get a new judgement matrix A^N

$$A^N = \begin{bmatrix} a11 & a12 & a13 \ldots & a1n \\ a21 & a22 & a23 \ldots & a2n \\ a31 & a32 & a33 \ldots & a3n \\ & & . & \\ & & . & \\ & & . & \\ a41 & a42 & a43 \ldots & ann \end{bmatrix} = \begin{bmatrix} \frac{a11}{\sum_{i=1}^{n} i1} & \frac{a12}{\sum_{i=1}^{n} i2} & \frac{a13}{\sum_{i=1}^{n} i3} & \frac{a1n}{\sum_{i=1}^{n} in} \\ \frac{a21}{\sum_{i=1}^{n} i1} & \frac{a22}{\sum_{i=1}^{n} i2} & \frac{a23}{\sum_{i=1}^{n} i3} & \frac{a2n}{\sum_{i=1}^{n} in} \\ \frac{a31}{\sum_{i=1}^{n} i1} & \frac{a32}{\sum_{i=1}^{n} i2} & \frac{a33}{\sum_{i=1}^{n} i3} & \frac{a3n}{\sum_{i=1}^{n} in} \\ & & \vdots & \\ & & . & \\ & & . & \\ \frac{an1}{\sum_{i=1}^{n} i1} & \frac{an2}{\sum_{i=1}^{n} i2} & \frac{an3}{\sum_{i=1}^{n} i3} & \frac{ann}{\sum_{i=1}^{n} in} \end{bmatrix} \quad (8)$$

Step3: Sum up each row of normalized judgment matrix A^N to get weight vector V.

$$V = \begin{bmatrix} v1 \\ v2 \\ v3 \\ . \\ . \\ . \\ vn \end{bmatrix} = \begin{bmatrix} \sum_{j=1}^{n} 1j \\ \sum_{j=1}^{n} 2j \\ \sum_{j=1}^{n} 3j \\ . \\ . \\ . \\ \sum_{j=1}^{n} nj \end{bmatrix} \quad (9)$$

Step4: Define the final normalization weight vector W.

$$W = \begin{bmatrix} w1 \\ w2 \\ w3 \\ . \\ . \\ . \\ wn \end{bmatrix} = \begin{bmatrix} \frac{v1}{\sum_{i=1}^{n} vi} \\ \frac{v2}{\sum_{i=1}^{n} vi} \\ \frac{v3}{\sum_{i=1}^{n} vi} \\ \vdots \\ \frac{vn}{\sum_{i=1}^{n} vi} \end{bmatrix} \quad (10)$$

Step 5: For each i = 1 (1) n, compute matrix A' = Wi $*$ Aij$\forall$ j = 1(1) m (11)

Step 6: Compute vector $P_j = \sqrt[4]{\prod_{i=1}^{n} A'} \forall$ j = 1(1) m (12)

Step 7: Compute vector $R_j = Pj / \sum_{j=1}^{m} Pj \forall$ j = 1(1) m (13)

Step8: R_j defines the ranking of the firms

It should however be noted that for the purpose of getting the weights, it suffix to stop at step4. Thereafter, the computed weights will now be used to get the resultant ICTMI. The results for ICTMI were then calculated using Microsoft Excel spreadsheet. Thereafter, the results of ICTMIs were mapped to the ICT maturity levels using the stratification proposed by Pham (2010) as follows: Inactive (0.0 – 0.2), Basic (0.2 – 0.4), Substantial (0.4 – 0.6), Web based (0.6 – 0.8) and Knowledge oriented (0.8 – 1.0).

This study made use of ICT maturity model of SMEs not only because it has been improved to be able to handle any category of enterprises but because it is simple, generic, quantifiable, popular, strongly aligned with modern business enterprises and yet powerful [6,7].

The model was designed by Australian Communication Authority in 2008. It is based on four main factors: Infrastructure, Application, Human Resource and Policy. It originally consists of four phases namely: (i) Inactive; (ii) Basic; (iii) Substantial and; (iv) Sophisticated. However, based on the above classification of ICT development in SMEs, Pham [6]in consideration of recent development trends as well as conditions for knowledge management maturity, the 'Sophisticated' phase is suggested to be divided into two stages: Web-based and Knowledge-oriented. Thus, we now describe this model as consisting of five phases as highlighted:

1 Inactive – no current use of ICT in company.
2 Basic – including word processing and other desktop packages.
3 Substantial – extending into the networking of PCs and several applications.
4 Web-based – extending to e-commerce with many web-based services.
5 Knowledge-oriented – integration of applications and using ICT tools for innovation and knowledge management.

Each of the maturity levels is characterized by certain observable capabilities of four major factors: Policy, Infrastructure, Application and Human Resource. Based on trend analysis of ICT use in SMEs, Table1 maps the above five stages of ICT maturity in SMEs with its specific features.

Table 1: ICT Maturity Stages and Its Features

	Maturity level	**Level 1**	**Level 2**	**Level 3**	**Level 4**	**Level 5**
	Development Trend	**Inactive**	**Basic**	**Substantial**	**Web based**	**Knowledge Oriented**
Infrastructure	Connectivity & Mobility	Telephone	PC, laptop	Network	Internet	Wireless
ICT HR	Sophisticated & Innovation	Unskilled	Business skills	Technology skills	MIS skills	Learning skills
Application	Integrated applications	No application	Office, E-mail	MIS applications	E-commerce	E-business
Policy	Flexibility & Mobility	No policy	Standardize	Modernize	Cooperation	Outsourcing

In general, it is very difficult for an enterprise to build up a knowledge system without appropriate ICT infrastructure and previous ICT applications. Moreover, to strengthen the competitive capability of SMEs, it is very important to apply appropriate ICT applications at the right time rather than adopting latest information systems. Therefore, the SMEs model allows a plan for improving ICT maturity towards Knowledge-oriented in order to use the knowledge resource effectively for future development.

4.0 Results and Discussion

Table 2 captures the firms' type and managerial level of the respondents in the respective firms' type that took part in the questionnaire survey for measuring the ICT maturity of the Nigeria Service Industry.

Table 2: Summary of Service Firms' Type and Operational Levels of Respondents

Type of Firm	**Operational level**	**Middle Management**	**Senior Management**	**Total Type**	**% Type**
CONSULTANCY AND SERVICES	3	3	3	9	**5.77%**
BANKING	31	24	16	71	**45.51%**
TECHNOLOGY	18	8	7	33	**21.15%**
TELECOMMUNICATIONS SERVICES	12	11	7	30	**19.23%**
INSURANCE	4	4	5	13	**8.33%**
TOTAL	68	50	38	156	100.00%
% of Managerial Level>>>>	**43.59%**	**32.05%**	**24.36%**	100.00%	

Table 2 shows the spread of respondents across managerial levels and firms' type. Most of the respondents are from the Banking sector (45.51%) and the respondents had a good spread across the three managerial levels with the operational level accounting for 43.59% of the respondents.

Table 3 captures the ICTMI of the various firms of the 23 service firms denoted as F_i, i=1(i)23; using equation (1) to equation (3). The average of these ICTMI is also captured in the table. The result in Table 3 shows that F1, for instance, has a total of 2.115162 of the maximum ICTMI index of 2.5. To map these ICTMIs indexes to the ICT maturity levels of SMEs, they were quantized by a factor of 2.5 to realize Table 4. From Table 4, it easy to see that the average maturity of service firms in Nigeria is 0.763256 which by Pham [6] stratification is web based. Thus, we can state that the ICT maturity of the Nigerian Service Industry is 0.76 i.e. web based.

Table 3: ICTMI of Selected Service Firms in Nigeria

F1	F2	F3	F4	F5	F6	F7	F8
2.115162	2.21875	1.521205	1.675347	1.927083	1.989583	2.284375	1.888021
F9	F10	F11	F12	F13	F14	F16	F17
1.651042	1.413411	1.99375	1.895544	2.167245	2.155382	1.828451	2.209491
F18	F19	F19	F20	F21	F22	F23	AVERAGE
2.13831	1.466146	1.467708	1.957465	2.06033	2.243634	1.619792	1.90814

Table 4: The Quantized ICTMI of Selected Service Firms in Nigeria

F1	F2	F3	F4	F5	F6	F7	F8
0.846065	0.8875	0.608482	0.670139	0.770833	0.795833	0.91375	0.755208
F9	F10	F11	F12	F13	F14	F16	F17
0.660417	0.565365	0.7975	0.758218	0.866898	0.862153	0.73138	0.883796
F18	F19	F19	F20	F21	F22	F23	AVERAGE
0.855324	0.586458	0.587083	0.782986	0.824132	0.897454	0.647917	0.763256

Since, in reality however, some criteria are more important than others towards determining the maturity of ICT in firms, the AHP implementation steps as presented by Aladeselu et al. [15] were faithfully implemented to get a more reliable weighting value: α, β, γ, θ as against the equal weighting of 0.25 each used to realize the ICTMI in Table 4. The resulting weighting values are as captured in Table 5.

Table5: ICTMI weighting Coefficient using AHP

Weighting	**AHP**
α	0.247755
β	0.307304
γ	0.163918
θ	0.281023
Total	1

Observe that weighting values for AHP also added up to 1. Table 5 shows that the various weighting values were not equally distributed using AHP which is actually more reasonable. These weighting values were now used to compute the ICTMIs for the various firms under investigation. The resultant ICTMI indexes are captured in Table 6.

Table 6: The Quantized ICTMI of Selected Service Firms in Nigeria using AHP Weighting

F1	F2	F3	F4	F5	F6	F7	F8
0.867061	0.90342	0.612412	0.681663	0.794196	0.830778	0.931617	0.77924
F9	F10	F11	F12	F13	F14	F15	F16
0.676662	0.607526	0.816806	0.794533	0.888103	0.880936	0.745393	0.90093
F17	F18	F19	F20	F21	F22	F23	AVERAGE
0.346824	0.361368	0.244965	0.272665	0.317678	0.332311	0.372647	0.784938099

Observe the minor variations between the ICTMI in Table 4 and that of Table 6 which altered the ranking of the various firms by ICTMI and puts the ICTMI of the Nigerian service industry at 0.78 against 0.76 estimated using the original equal weightings for α, β, γ and θ.

5.0 Conclusion

A critical corporate performance and investment policy index – ICT maturity index, hitherto not existing, for the Nigeria Service industry has been estimated. The ICT maturity index of the Nigerian Service Industry was estimated to be about 0.78 i.e. the Nigerian Service Industry is Web based in ICT maturity; a reasonably advanced stage of ICT penetration and usage in the Nigerian service industry. Managers of the Nigerian service industry are now better positioned towards a sustainable improvement of ICT based service delivery in Nigeria.

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APPENDIX A
Information and Communication Technology (ICT) Maturity Assessment Questionnaire
GENERAL INSTRUCTIONS
Please answer the questions by drawing a circle around an appropriate number or alphabet in the space provided.
Please use the code where appropriate: Yes definitely (Y); Yes, but not **S**ignificantly (S);
No, but **P**robably within the next 5years (P); **N**o (N).
Unless specifically instructed otherwise, please answer all questions, one answer per item.

1. What is the name of the organization on whose behalf you are answering this Questionnaire?

2. What is the type of organization being assessed?

Automobiles/ Transport	1
Banks	2
Capital Goods	3
Chemicals	4
Construction ,Building, Materials and Steel	5
Consumer Goods	6
Insurance	7
Consultancy and Services	8
Oil and Gas	9
Pharmaceuticals	10
Technology	11
Telecommunications Services	12
Utilities	13
Retailers and Distributors	14
Other (please specify below)	15

3. Please specify the level of management being assessed?

Operational level	1
Middle management	2
Senior management	3

Section 1: ICT Infrastructure Information

1.1 Number of fixed telephone. (a) 1 – 10 (b) 11 – 50 (c) 51 – 100 (d) 101 – 200 (e) over 200
1.2 Number of business mobile devices (a) 1 – 10 (b) 11 – 50 (c) 51 – 100 (d) 101 – 200 (e) over 200
1.3 Number of computers (a) 1 – 10 (b) 11 – 50 (c) 51 – 100 (d) 101 – 200 (e) over 200
1.4 Type of Internet access. (a) No Internet (b) Dial up (c) ADSL (d) ISDN (e) cable modem (f) Leased line (g) Satellite (h) Others _____
1.5. Have Local area network (LAN). Y; S; P; N
1.6. Internet bandwidth (mbps). (a) Unknown (b) < 8mbps (c) < 16mbps (d) < 32mbps (e) >= 32mbps
1.7. Secure Internet Server/ Hosting. Y; S; P; N
1.8. Security & backup system. Y; S; P; N
1.9. Wide area network (WAN). Y; S; P; N
1.10 Wireless LAN/wifi Internet. Y; S; P; N
1.11. Company information/services could be accessed through WAP/ i-mode access.
Y; S; P; N

Section 2: ICT Application Information

2.1. Standard application software. (a) Not use (b) Office software (c) CAD/CAM (d) Database (e) others _____
2.2. Using Internet for getting information. Y; S; P; N
2.3. Website presence……. Y; S; P; N
2.4. Internet Services which is used or provided (a) No service (b) Searching (c) Ordering (d) Purchasing (e) Marketing & sale (f) Customer support (g) intra-communications (h)inter-communications (i) Others_____
2.5. Online payment system. Y; S; P; N
2.6. Customer understanding/e-Marketing. Y; S; P; N
2.7. E-mail/ IM for communication. Y; S; P; N
2.8. Forum/ Social Network for cooperate use Y; S; P; N
2.9. Remote Meeting/ Voice Conference. Y; S; P; N
2.10 Using services through Intranet/ Extranet. Y; S; P; N
2.11. Management Information Systems. (a) No use (b) Finance-Accounting (c)Human Resource Management (d) Document Management (e)Assets Management (f) Inventory Management (g) Decision Support System (DSS)
2.12. Integrated Information Systems. (a) SCM (b) ERP (c) CRM (d) others_____
2.13. Knowledge Systems (a) Business Intelligent (b)Knowledge Base/KMS (c) Expert systems (d) other_____

Section 3: ICT Human Resource Information

3.1 ICT training. (a) Usually (b) Sometime (c) Rarely (d) Never
3.2 Number of employees using a computer. (a) 1 – 10 (b) 11 – 50 (c) 51 – 100 (d) 101 – 200 (e) over 200
3.3 Number of employees using the Internet. (a) 1 – 10 (b) 11 – 50 (c) 51 – 100 (d) 101 – 200 (e) over 200
3.4 Royalty payment & receipt. (a) No (b) The total amount is (NGN)_____
3.5 Patent/license application. (a)No (b) Number of application is_____
3.6 Company spending on R&D (NGN/year): _____
3.7 Capacity for innovation. Y; S; P; N
3.8 Number of IT specified employee. (a) 1 – 10 (b) 11 – 50 (c) 51 – 100 (d) 101 – 200 (e) over 200
3.9 Separate IT department with Asst. Director/Director. Y; S; P; N
3.10 Number of Business specified employee (a) 1 – 10 (b) 11 – 50 (c) 51 – 100 (d) 101 – 200 (e) over 200
3.11 Employees with self-learning skill (a) 1 – 10 (b) 11 – 50 (c) 51 – 100 (d) 101 – 200 (e) over 200
3.12. Capacity for Expertise Reuse. Y; S; P; N

Section 4: ICT Policy Information

4.1 ICT investment budget/development budget (NGN/year): (a) 5% (b) 5% – 15% (c) 16% - 30% (d) over 30%
4.2 Quality policy. (a) No quality policy (b) ISO (c) CMMI (d) Others _____
4.3 Privacy policy. Y; S; P; N
4.4 Regulatory quality. (a) Good(b) Fair (c) Not Good (d) Bad
4.5 Security policy. Y; S; P; N
4.6 Piracy policy. Y; S; P; N
4.7 Upgrade ICT hardware/ software. (a) Annually (b) 2-year period (c) 3-year period (d) No policy
4.8 Assessment effectiveness. (a) Good (b) Fair (c) Not Good (d) Bad

4.9 ICT policy in company strategy. Y; S; P; N

4.10. Your organization regards ICT and the management thereof as… (a)An enabler of knowledge management (b) Knowledge management

4.11. In your organization, the following Information management tools and services have been institutionalized:

1	Inventory of information entities	Y SPN
2	Information management systems	Y SPN
3	Databases	Y SPN
4	Information service / Library	Y SPN

4.12. Knowledge Management based on ICT use is a priority. Y; S; P; N

Contact Name / Position _____

Contact e-mail (to get survey result) _____

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