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Measuring the Value of ICT in the Nigerian Service Industry

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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 value index of the Nigerian service industry has to be measured. The value of ICT to selected service firms listed in the Nigerian Stock Exchange (NSE) has been measured using the Value Added Intellectual Coefficient (VAIC) model. The result showed that the Nigerian service industry's ICT value index is 4.60, an indication that the potentials of ICT are poorly utilized for service delivery in the Nigerian service industry.

Keywords: Service industry, Nigeria, VAIC, and ICT value index.

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 investments on ICT. The expansion of the services sector, globalization, deregulation, and the emergence of new information technologies have brought to the fore the issue of how ICT value is created, disseminated, retained and used to obtain service returns [1].The value of ICT to service industry in both context and perspective could be used as a basis for exploring its service systems [2] as well as to uncover the contribution of ICT to the tripod goal of service organization(s): profitability, staff productivity and customer satisfaction [1]. Besides, "Measuring this value will help improve management control over ICT driven organization" [1]. The most common reason for measuring is to improve internal performance, i.e. management control. The idea is founded on one of the most quoted management slogans; what is not measured, cannot be effectively managed [3].

The traditional measuring system which basically deals with tangibles is heavily regulated by governing bodies and audit and with heavy penalties imposed on offenders but still suffers from regular manipulation. Imagine the abuse an intangible measurement system is opened to; there is no standard, no audit and it is only voluntary.

Tangible value are those that have a physical substance capable of being appraised at an actual or approximate value while intangible value lacks physical substance which represents the knowledge and skill sets of the organization. Intangible value can be seen as the vehicle for integrating knowledge into a service department or processes in an organization. Bhasin [4] sees intangible value as a static concept (e.g. resources – intellectual capital; innovation; employees' capabilities and competencies, and customer's satisfaction) and also as a dynamic concept (e.g. growth and renewal, efficiency and stability).

Measuring tangible value like profit is an established practice in management and finance but measuring intangible value though strange is critical to the survival and competitiveness of modern day service industry. Several intangible value measurement models abound (see Figure 1) and are usually scattered across different literatures [5 – 20]. Ekuobase [1] gave a comprehensive review and classification of existing ICT value measurement models providing a one stop shop description of ICT value measurement models.

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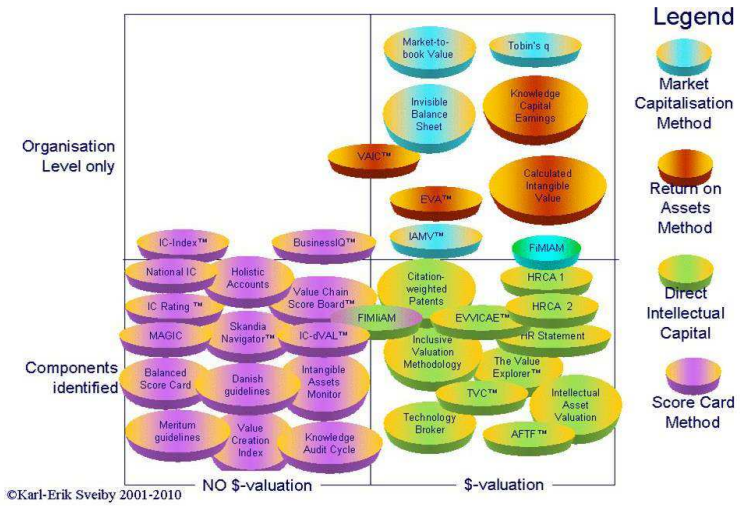

Figure 1: Intangible Value Measurement Models [9].

2.0 Research Methodology

The VAIC model was adopted for this research. The VAIC model also known as the Value Creation Efficiency Analysis model was adopted as a result of the following advantages:

Firstly, VAIC provides a standardized and consistent basis of measure thereby, better enabling the effective conduct of an international comparative analysis using a large sample size across various industrial sectors. Alternative ICT value models are limited in that they: (a) utilize information associated with only a selected group of company; (b) involve unique financial and non-financial indicators that can be readily combined into a single comprehensive measure; and/or (c) are customized to fit the profile of individual company.

Secondly, all data used in the VAIC calculation is based on audited information; therefore, calculations can be considered objective and verifiable. Additionally, concerns have been raised about difficulties in verifying information used in calculating indicators comprising other ICT measures.

Also, VAIC is a straightforward technique that enhances cognitive understanding and enables ease of calculation by various internal and external stakeholders. Ease of calculation is a feature that has enhanced the universal acceptance of many traditional measures of corporate performance. Also, alternative ICT measures are limited as they can only be calculated by internal parties or rely upon sophisticated models, analysis and principals. Finally, the VAIC methodology is utilized in more and more studies as it is receiving increasing research attention [14].

The Value Added Intellectual Coefficient (VAIC) as used in this study is a basic methodology to measure the ICT value particularly to service firms was introduced by Pulic [21]. The core concept of VAIC is that the human capital is mainly responsible for overall value creation performance of the firm. Pulic [21] considers VAIC as universal indicator which shows value creation ability of a company in quantitative terms and represents as measure of business efficiency in knowledge based economy. VAIC is based on the following six calculations [1, 14, 20, 21].

The model considers company's ability to add value through:

VA = OUT – IN ---------- (1)

Where, VA is the value addition from current year resources,

OUT = Total Sales (revenue from sale of goods and services), and

IN = Cost of bought in materials, components and services/inputs

The input (IN) includes all expenses incurred in earning the above revenue except employee cost.

Alternatively, the value added can be calculated as:

VA = OP + EC + D + A ---------- (2)

Where OP = Operating Profit, EC = Employee Cost, D = Depreciation and A = Amortization

The first measure of the model is "value added efficiency through capital employed" and is calculated as:

VACA = VA/CA ---------- (3)

Where VACA is the efficiency of physical capital employed by the firm. It is obtained by dividing value added by the capital employed.

Alternatively, CA can also be calculated as:

CA = Common Stock + Preferred Stock + Retained Earnings + Company Reserves + Long Term Debts

That is,

CA = Capital Employed (net book value of total assets)

The model gives central role to human capital therefore, employee expenses are not treated as cost. This calculation of the model shows how much VA is created by each unit of currency spent on employees. Pulic [21] argued that salary of an employee is usually determined on the basis of their performance by market forces. So, it is logical to measure human capital on the same criteria.

Second measure of the model which shows the ability of human resources in creating value is given by VAHU and is calculated as:

VAHU = VA/HC ---------- (4)

VAHU represents the Human Capital Efficiency of a firm, where value addition is divided by cost of Human Capital (HC). The cost of human capital is treated as investment rather than expense and calculated as:

HC = Total salaries and wages (Direct labour + Indirect labour + Administrative + Marketing and Selling salaries).

The third measure of the model is Structural Capital (SC) efficiency which shows the contribution of SC in value creation.

STVA = ST/VA ---------- (5)

Where STVA is the structural capital efficiency of the firm and is calculated through dividing cost of structural capital by value added (VA). The ST is calculated by subtracting HC from the VA.

ST = VA – HC ---------- (6)

Finally, the cumulative IC efficiency of all three components of VAIC is calculated by adding capital employed, human capital and structural capital efficiencies:

VAIC = VACA+VAHU+STVA ---------- (7)

VAIC calculated by Equation (7) indicates the overall corporate value creation efficiency of a firm. VAIC does not provide money value of Intellectual Coefficient (IC). It simply adds the three efficiency factors of IC and calculates efficiency index that shows how IC of a company contributes towards value addition. As an index, the higher the VAIC the better will be the efficiency and value creation ability of the firm.

The VAIC model makes use of Audited Financial Report (AFR).A total of fourteen firmslisted in the Nigeria Stock Exchange (NSE) who had their AFR online were used for this research. The AFR used was that of the year 2013 since the research was conducted in January, 2015; most AFR for 2014 were not available. From these AFRs, the required VAIC data were extracted and the ICT value indexes for the respective firms were calculated using Equation (1) to Equation (7) on the Microsoft Excel Spreadsheet.

3.0 Results and Discussion

The VAIC parameters as extracted from the AFR of selected firms are captured in Table 1.

Table 1: Extracted VAIC Data and Value Added for Service Firms in Nigeria

S/N	SERVICE FIRMS	OP	EC	A	D	CA	VA
1	F11	64548	15113		68267	541462	147928
2	F10	42707	8670	2820	16458	119771	70655
3	F8	100462	19625		9273	328073	129360
4	F9	634176	215273	6410	86763	8192348	942622
5	F14	8399595	5149391	809093	3798455	49592696	18156534
6	F17	94108	56864	844	9015	472622	160831
7	F4	570017	1083424	29086	732418	3009111	2414945
8	F13	31365396	25937818		7780207	245181997	65083421
9	F1	10555989	9218987		1725640	69374870	21500616
10	F5	52528	54264	1082	8517	373572	116391
11	F7	632099	1243327	39827	398147	5275047	2313400
12	F16	132922	322023	14420	54234	892342	523599
13	F15	1306728	14269510	441150	3762196	36012845	19779584
14	F2	4201	38519		3060	187784	45780

It should be noted that some firms grouped both amortization (A) and Depreciation (D) under depreciation and thus had the amortization cell empty. Employing the VAIC equations, Table 2 was realized. Table2 shows that the value creation efficiency or capability of Nigerian service firms ranges from as low as 1.6 to 11.0. The higher a firm's ICT value index the more effective the firm utilizes ICT for service delivery. The average VAIC value for the service firms is 4.60. It is therefore safe to conclude that the value of ICT in the Nigerian Service Industry is about 4.60. The implication of this is that the contribution of ICT to the service delivery efficiency and value creation abilities of the Nigerian service industry is very poor. If it is this bad for service firms that is almost entirely dependent on ICT for service delivery, it will be pathetic in the other sectors of the Nigerian economy. The higher the value, the more effective ICT is put to use in firms. Efforts should be channeled therefore to a more effective use of ICT in Nigeria by way of staff training and retraining, innovative management strategies and mass literacy of her citizenry with rich ICT proficiency curriculum.

Table 2: Calculation of VAIC Value for Nigerian Service Industry

S/N	ServiceFirms	VA	SC	VACA	VAHU	STVA	VAIC
1	F11	147928	132815	0.273201	9.788129	0.8978354	10.9591659
2	F10	70655	61985	0.589917	8.149366	0.8772911	9.61657412
3	F8	129360	109735	0.394302	6.591592	0.8482916	7.83418643
4	F9	942622	727349	0.115061	4.378728	0.7716232	5.26541288
5	F14	18156534	13007143	0.366113	3.525958	0.7163891	4.6084597
6	F17	160831	103967	0.340295	2.828345	0.6464363	3.81507635
7	F4	2414945	1331521	0.802544	2.228993	0.551367	3.5829048
8	F13	65083421	39145603	0.265449	2.50921	0.6014681	3.37612711
9	F1	21500616	12281629	0.309919	2.33221	0.5712222	3.21335181
10	F5	116391	62127	0.311562	2.144903	0.5337784	2.99024351
11	F7	2313400	1070073	0.438555	1.860653	0.4625542	2.76176249
12	F16	523599	201576	0.586769	1.625968	0.3849816	2.59771877
13	F15	19779584	5510074	0.549237	1.386143	0.2785738	2.21395391
14	F2	45780	7261	0.243791	1.188504	0.1586064	1.59090149
NATIONAL ICT VALUE INDEX>>>							**4.60**

4.0 Conclusion

A critical corporate performance and investment policy index – ICT value index, hitherto not existing, for the Nigerian Service industry has been estimated.The ICT value index of the Nigerian Service Industry was estimated to be about 4.60, an indication that ICT'spotentials are not effectively utilized in Nigeria for service delivery. Managers of the Nigerian service industry are now certain of value generation from investments on ICT and thus better positioned towards a sustainableimprovement of ICT based service delivery in Nigeria.

5.0 Acknowledgement

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6.0 References

[1] Ekuobase G.O. A comparative Study of ICT Value Measurement Models. International Journal of Electronics Communication and Computer Engineering 4(2):497- 501 (2013)

[2] Vargo S.L, Maglio, P.P, Akaka M.A. On Value and Value Co-Creation: A Service System and Service Logic Perspective. European Management Journal 26:145-55 (2008)

[3] Skyrme, D. and Associates. Measuring intellectual capital – A plethora of methods. Available online at http://www.skyrme.com/insights/24kmeas.html(2005) Retrieved 13th July, 2014

[4] BhasinML. Intellectual Capital reporting study of it-sector corporations in India. Australian Journal of Business and Management Research(AJBMR) 1(1): 16 – 28 (2011)

[5] Tobin J. Liquidity Preference as behavior Towards Risk. Review of Economic Studies 25:65-68 (1958)

[6] Brooking A. On the Importance of Managing Intangible Assets as Part of Corporate Strategy Electronic Journal of Knowledge Management 8(2):217-224 (1996)

[7] Stewart T. A. The wealth of knowledge: intellectual capital and the twenty-first Century organization. Currency Doubleday (2002).

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