

**ANALYSIS OF ICT COST EFFICIENCY AND CORPORATE PERFORMANCE: A
CASE STUDY OF BUSINESS UNITS OF UNIVERSITIES IN SOUTH WEST NIGERIA**

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ABSTRACT

Information and Communications Technology (ICT) is the fastest growing technology in the world today. The role of ICT in both the public and private sectors of the world economy has been widely discussed in the literature. The capital investment on ICT projects in both the public and private sectors of the world economy has been on the increase in the last ten years. However, most studies in this regard has been focused so extensively on assessment of influence of ICT on performance of manufacturing firms while a good number also focused on impact of ICT on performance of the service industry sub-sector. Very little attention has been devoted to the ICT cost efficiency and corporate performance with specific reference to business units of Universities in South West Nigeria. Hence, this study was undertaken to address this gap. Secondary data was used for this study. The entire population of Universities in South Western Nigeria comprising of seven Federal, ten state and twenty private Universities were sampled for the study. The secondary data were derived from the annual reports of each of the Universities covered by the study. The variables of interest from the secondary data were: ICT Investment (ICT Inv.), Return on Capital employed (ROCE), Net Profit Margin (NPM), and ICT Cost Efficiency (ICTCE). Multiple Regression analysis employing the use of model estimation revealed that ICT cost efficiency is weak for the three types of Universities covered with State Universities being the worst. This result indicated that ICT has not been optimally utilized by the Universities studied. The study recommends that, concerned Universities should endeavour to match their strategy with their structure to ensure optimal ICT cost efficiency.

Key Words: ICT, Adoption, Performance, ICT Cost Efficiency

1. INTRODUCTION

In this article, the authors examined the cost efficiency of ICT adoption by the Federal, State and Private Universities in South West Nigeria. We recognize that ICT is not a value per se, but only becomes a value in the interaction with the users of ICT. Therefore, many aspects of ICT need to be assessed in interaction with other parts and the organization itself to fully understand its utilization that influences firms' overall performance and profitability. Thus, using a case study research method and applying holistic/systemic approach we will try to answer the following questions:

- Has there been any significant investment in ICT by the business units of the Universities studied?
- How cost effective has ICT adoption being with respect to the following performance indicators: Return on Assets (ROA), Net Profit Margin (NPM), Return on Investment (ROI), Net Profit (NP), and ICT Investment (ICT Inv.)?

The units of analysis for this study were the federal, State and Private Universities in South West Nigeria. Criteria for choosing the Universities is their being on the Nigerian Universities Commission (NUC) approved list of accredited Universities in the geo-political zone covered by the study. The study relied heavily on secondary data generated from the available annual reports of the Universities studied spanning over a period of ten years (2001 – 2010) during which Universities concerned were found to progressively invest in ICT infrastructure.

Information and Communication Technology (ICT) “is a general term that describes any technology that helps to produce, manipulate process, store, communicate, and/or disseminate information” Sawyar(2005). Other researchers namely Shelly et al (2004) submitted that ICT includes hardware, software, databases, networks and other related components which are used to build information systems. As a need ICT progressed along with socio-economic development in developing countries. In a very short time ICT is on its way to becoming the back bone in modern industrial society and the major contributor to the progress of both developing and developed countries (Vasudevan, 2003; Long and Long 1999). Through declining cost, both in hardware and software, ICT has spread very rapidly now into virtually all industries of various countries of the world, in all fields.

2.0 LITERATURE REVIEW

Within the industrial sector, the use of ICT has tremendously increased in recent past (Thomas and Michael, 2001). Several software packages such as SAP, Oracle etc. are being commonly used in many manufacturing industries (Rizvi, 2005; Shahid, 2005). According to Wheelen and Hunger(2000) the organization performance is an accumulated end result of organizational process and activity. These are measured by organization's working and activity. The organizational management manages the organizational performance, control and customer value, as it impact reputation of organization. Commonly organizational work measures include organization effectiveness, productivity/efficiency and industry ranking (Wetherbe et.al., 1999).

Efficiency is defined as “minimum utilization of resources and getting maximum output” and effectiveness is “how well job gets done” (Robbin and Coulter, 2003).

Many researchers like Parthasamthy and Sethi(1993); Kelley(1994); Earls et al.; (1996); O’ Dell and Elliot (1999) etc. have investigated the impact of ICT on quantitative performance variable i.e. incomes/profits of the companies and founds positive impact. Whereas, Frankin (1997), Olalla (2000), Schmid et al. (2001), Zee and Han (2002), Shaukat and Zafrullah(2009) etc. have seen the increase/decrease in different qualitative performance indicators i.e. customer satisfaction, company image, job interest of employees, stake holders confidence, interoffice link etc. and also have found positive impact. This paper assesses the ICT cost efficiency as it relates to the operations of business units of Universities in South West Nigeria. The question of the impact of ICT can be looked upon from different perspectives. Parsons (1983) identified three different competitive levels of assessing ICT impact. These are: industry, environment and organization. At industry level, ICT can influence change of the product life cycle, change in the mode of distribution and affect economic bases of production. At the environment level, ICT can change the balance of forces between the company and its competitors, customers and suppliers; it can accelerate the rate of appearance of substitute products, reduce the magnitude of existing barriers and create new entry barriers. At the organizational level, he noted that the ICT can lead to improved implementation of activities of the value chain such as design, production, marketing, etc. Similarly, Ives and Learmonth (1984) submitted that companies can use ICT as a competitive weapon to improve performance and create a new advantage over competitors. In the opinion of Porter and Porter and Miller (1985) it was argued that ICT can improve coordination between the various activities of the value chain and ensure high degree of optimization and integration internally and externally, thus achieving cost reduction and product differentiation. In the 1980s and in the early 1990s, empirical research generally did not find relevant productivity improvements associated with ICT investments (Strassmann, 1990; Lovemann, 1988; Bender, 1986; Franke, 1987; Roach, 1989). The rationales for this position being: First, simple bivariate correlations between aggregate productivity and aggregate ICT capital stock do not take into account the impact of all controls which also affect aggregate productivity and are therefore likely to measure spurious effects (Lehr-Lichthemberg, 1999). Second, ICT investment has a positive effect on productive variety which may, in turn, negatively affect productivity (Brooke, 1991). Milgrom-Roberts (1988) show for instance that computer aided design (CAD) reduces costs of adjusting products to changing consumer tastes. This shifts productive organisation from the traditional rigid approach to a more flexible network approach which emphasizes economies of scope more than economies of scale. Since variety is hard to detect than quantity it is difficult to find trace of these changes in data. Third, productivity gains from ICT investment becomes obvious only after some time and depends significantly on network externalities and on changes in the complementary infrastructure (David, 1990). Fourth, output measurement errors may affect estimates of the impact of ICT investment on output as quality improvements in products and in services are not fully reflected in sales. Fifth, ICT accounts for a relatively small share of capital output so that its increase has only small effects on aggregate output. More recently, as new data were made available and new methodologies were applied, empirical investigations have found evidence that ICT is associated with improvements in productivity, in intermediate measures and in economic growth (Oliner and Sichel, 1994; Lehr-Lichthemberg, 1999; Sichel, 1997; Brynjolfsson and Hitt, 1996). An interpretation consistent with older and more recent results is that micro level data, by allowing

the use of more controls, succeed better than aggregate measures in isolating ICT effects on productivity from changes in other conditioning variables.

So, we therefore hypothesize that;

H₀₁: There is no significant relationship between ICT Investment and performance of business units of universities in South West Nigeria.

H₀₂: There is no significant relationship between ICT Cost Efficiency and performance of business units of Universities in South West Nigeria.

H₀₃: There is no joint significant relationship between ICT Investment and ICT Cost Efficiency and performance of business units of Universities in South West Nigeria.

The research questions that were addressed in this study are:

1. What is the relationship between ICT Investment and performance of business units of Universities in South West Nigeria?
2. To what extent has ICT Cost Efficiency influenced Performance of the business units of Universities in South West Nigeria?
3. To what extent have ICT Investment and ICT Cost Efficiency affected performance of the business units of Universities in South West Nigeria?

3.0 METHODOLOGY

The survey research design was adopted for this study. Secondary data was employed for the study. The population of the study covers all the thirty seven Universities accredited by the Nigerian Universities Commission. These comprise of seven Federal, ten State and twenty private Universities located in the South West zone of the country. Secondary were collected from the available Annual Reports and Accounts of the Universities covered by the study. Information of concern to the study from the secondary data collated were as follows: Net Profit Margin (NPM), Return on Capital Employed (ROCE), ICT Investment (ICT Inv.), Net Profit (NP) and ICT Cost Efficiency (ICTCE). These information were computed from the available annual reports and accounts of the Universities covered by the study over the period 2001 – 2010. The data so computed were analysed using regression method. One way ANOVA was used to investigate the relationship between each of the explanatory variable and the explained variable whereas, multiple classification ANOVA was used to analyse the joint effect of the explanatory variable on the explained variable. The study investigated the following equations separately for Federal, State and Private Universities respectively:

$$\text{NPM} = \alpha_0 + \alpha_1\text{ICTINV} + \alpha_2\text{ICTCE} + U_1 \text{-----} \quad (1)$$

$$\text{ROCE} = \alpha_3 + \alpha_4\text{ICTINV} + \alpha_5\text{ICTCE} + U_2 \text{-----} \quad (2)$$

$$\text{NP} = \alpha_6 + \alpha_7\text{ICTINV} + \alpha_8\text{ICTCE} + U_3 \text{-----} \quad (3)$$

$$\text{ROA} = \alpha_9 + \alpha_{10}\text{ICTINV} + \alpha_{11}\text{ICTCE} + U_4 \text{-----} \quad (4)$$

$$ICTCE = \alpha_{12} + \alpha_{13}ICTINV + U_5 \quad \text{-----} \quad (5)$$

4. RESULTS

INFERENTIAL STATISTICS

Table 4.1 SUMMARY OF ANALYSIS OF VARIANCE (ANOVA) AND COEFFICIENTS OF NET PROFIT MARGIN OF THE UNIVERSITIES STUDIED

UNIVERSITIES	R ²	F	α _i	α _j	t _i	t _j
FEDERAL	.759	11.031	1.19E-007	-.008	.92	-3.526
STATE	.574	4.724	.000	-14.429	.292	-1.129
PRIVATE	.934	49.699	-8.4E-010	.552	-.087	2.388

Source: Researchers' field survey, 2010

Table 4.2 SUMMARY OF ANALYSIS OF VARIANCE (ANOVA) AND COEFFICIENTS OF RETURN ON CAPITAL EMPLOYED (ROCE) OF THE UNIVERSITIES STUDIED

UNIVERSITIES	R ²	F	α _i	α _j	t _i	t _j
FEDERAL	.238	1.096	1.50E-008	1.81E-005	1.322	.087
STATE	.502	3.534	-2.8E006	-.060	-1.123	-2.094
PRIVATE	.995	668.873	1.58E-008	.38	4.232	4.271

Source: Researchers' field survey, 2010

Table 4.3 SUMMARY OF ANALYSIS OF VARIANCE (ANOVA) AND COEFFICIENTS OF NET PROFIT (NP) OF THE UNIVERSITIES STUDIED

UNIVERSITIES	R ²	F	α _i	α _j	t _i	t _j
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FEDERAL	.34	1.801	.000	-339.728	.031	-1.626
STATE	.836	17.807	9.1E002	-1E+007	1.249	-1.536
PRIVATE	.981	180.356	.591	.605	3.092	1.321

Source: Researchers' field survey, 2010

Table 4.4 SUMMARY OF ANALYSIS OF VARIANCE (ANOVA) AND COEFFICIENTS OF RETURN ON ASSET (ROA) OF THE UNIVERSITIES STUDIED

UNIVERSITIES	R ²	F	α_i	α_j	t _i	t _j
FEDERAL	.276	1.336	2.12E005	.000	.354	1.558
STATE	.662	6.848	9.46E-007	-.002	1.460	-.243
PRIVATE	.998	1936.793	8.4E-009	.142	8.517	5.96

Source: Researchers' field survey, 2010

Table 4.5 SUMMARY OF ANALYSIS OF VARIANCE (ANOVA) AND COEFFICIENTS OF ICT Cost Efficiency (ICTCE) OF THE UNIVERSITIES STUDIED

UNIVERSITIES	R ²	F	α_i	α_j	t _i	t _j
FEDERAL	.251	2.68	-2.7E005		-1.637	
STATE	.794	30.815	-7.6E-005		-5.551	
PRIVATE	.947	141.841	4.06E-008		11.910	

Source: Researchers' field survey, 2010

5. DISCUSSION

From Tables 4.1 – 4.5, it is evident that the Private Universities has the best values of ICT Cost Efficiency followed interestingly by Federal Universities and the least ICT Cost Efficiency is from the State Universities. This is apparently due to the fact that there is stricter monitoring of spending and accountability at the Private Universities compared to State and Federal Universities where accountability is not so much guarded comparatively speaking. The better performance of the Federal Universities over the State Universities is an indication that there is better coordinating machinery at the centre more than at the state level hence the dismal performance notable at the State level.

POLICY IMPLICATION, CONCLUSION AND RECOMMENDATION

This study has shown that ICT investment and ICT Cost Efficiency has a significant and positive relationship with performance of the business units of Universities in South West Nigeria though to remarkably varying degrees. This is considering the fact that ICT investment as well as ICT Cost Efficiency correlates positively with firm growth (Ojukwu, 2006).

The study recommended that relevant authorities should ensure appropriate ICT is put in place to enhance efficiency and effectiveness of the infrastructure through proper monitoring and implementation of the stated policy.

However, this study focused on the positive side of ICT. It does not mean that ICT has no negative sides after all. Further research could focus on the negative sides of ICT adoption to serve as a caveat for ICT users.

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