

Role of Information and Communication Technology Investment on the Profitability of Small Medium Scale Industries – A Case of Sachet Water Companies in Oyo State, Nigeria

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Abstract

The research aims at evaluating the effects of Information and Communication Technology investment on profitability of sachet water companies in Nigeria. The study was carried out on sixty (60) randomly selected sachet water companies that registered with National Agency for Food and Drug Administration and Control (NAFDAC) and Association of Table Water Association Producers (ATWAP). Both primary and secondary data were used in the study. Secondary data was obtained from the book of accounts of the selected sachet water companies while primary data was collected with the aid of questionnaires and scheduled interviews conducted to managers, data management officers, staff and customers of the selected sachet water companies. The data collected were analyzed using both descriptive and inferential statistics. The descriptive statistics used included frequencies, percentages and tables and determination of profitability was assessed using Return on Equity (ROE) and Return on Capital Employee (ROCE). The study revealed that years of existence of the companies, capital base and educational level of the manager have significant effects on the extent of ICT usage with an adjusted R² of 0.6274. The paired sample 't' test value of 1.809 and which is significant (P<0.1) also implies that there is significant relationship between ICT investment and the profitability of the companies. The study therefore concluded that ICT investment had positive effects on the profitability of selected sachet water companies in Nigeria. Based on these findings it was recommended that sachet water companies should be ICT compliance.

Keywords: information and communication technology, smes, sachet water companies, return on equity, return on capital employee, profitability

INTRODUCTION

The role of ICT is redefined as a fundamental enabler in creating and maintaining a flexible business network of inter-organizational arrangements such as joint ventures, alliances and partnerships, long term contracts, technology licensing, and marketing agreement (Jaiswal, 2009). ICT is a complex and heterogeneous set of goods, applications and services used to produce, distribute, process and transform information. It can improve information sharing, decision-making, coordination, product quality, responsiveness and distribution (Al-Mudimigh *et al.*, 2001) as well as differentiation of the products and reduction of the cost of their products or services. It also provides products innovation or services and support growth of the firm. Adetayo *et al.* (1999) and Boyett and Boyett (1995), emphasized the effect of ICT on business and the effect of business on ICT. It was maintained that in order to succeed (or even survive) in this dynamic world, companies must take not only traditional actions such as lowering cost but also keep pace with ever changing capabilities of ICT. Sachet water companies in Nigeria have continue to invest numerous sum of money into

acquisition of ICT, so there is need to justify this huge sum of money invested on its procurement. Many years of neglect by government and inadequate investment has left the public drinking water supply in Nigeria in an unsafe state thereby exposing Nigerians to water borne disease. Entrepreneur took advantages of this to go into production of Sachet water. Sachet water companies form a major part of Small and Medium Scale Factories (SMIs) in Nigeria (Akunyili, 2003). They played very important role in creating employment opportunity. In an attempt to identify sector that are likely to be responsive to technological changes and promise high returns on investment, sachet water companies have evolved as one potential target sector to harness ICT for development.

The role of ICT in advancing the growth of national economies through enhanced efficiency and profitability, and expanded market reach is both undisputed and irreversible. It is to this vein that adequate and strategic attention be placed so that these new opportunities provided by ICT are not limited and accessible only to the larger corporations

within national economies (APCICT; 2007). In the 1990s, many sachet water companies in Nigeria have embraced information technology on limited scale. In recent times, the increased use of ICT in enterprises lead to a substitution of such equipment for other forms of capital and labour and generate substantial returns for enterprises that invested in ICT, (UNDP, 2007). In spite of that, the sachet water companies are operating at maximum capacity they still not meet their customer demand. Information Technology can play an important role in bringing about sustainable economic development. Richardsson et al., (2006) outlined five main areas of ICT applications in support of firm and rural development. These are: - Economic development of product, Community development, Research and Education, small and medium enterprises development, and - media networks. Sachet water companies make use of ICT in the following ways: online services for information, monitoring and consultation and transaction and processing; e-commerce.

Investment in ICT has become an important component strategy for sachet water companies to compete adequately. However, whether investments on ICT actually bring real benefits to the organizations is still a matter of debate in the academy; this question is of particular relevance in the context of Oyo state sachet water companies. As a result of increasing use of ICT by sachet water companies, there is a need to justify the huge sum of money invested on its procurement. It is from this that the present study examined the effect of ICT investment on the profitability of sachet water companies.

STATEMENT OF THE PROBLEM

The decision to deploy ICT tools and devices belongs to top management, who must have adequate understanding of the benefits accruable from such huge investment. The extent to which sachet water companies adopt ICT device varies from one company to another, some may be of ICT compliance while others may not. Those that adopt ICT device have been able to identified different problems militating against usage; notable among these factors are inadequate power supply, breaking down and malfunctioning of computer, poor awareness of ICT application and fund to invest more on ICT device. Despite all these problems, to what extent has sachet water companies uses ICT device is a question that remained unsolved. Most of the results conducted on ICT investment and firm performance are majorly on large company and in the content of developed country (OECD 2003, Melville et al., 2004), in their findings some asserted positive impact and others considered it insignificant while some even assume negative impact (Stratopolous 2000). The performance of this sachet water company has become worrisome that one felt it deserve a thorough

investigation. Non-adoption or low level of adoption of ICT device by the SMEs is affecting their profitability. That was why it becomes imperative to conduct this research in developing country like Nigeria and on small and medium enterprise (sachet water company). This present study had it as objective to elucidate whether ICT investment has any effect on the profitability of SMES in Nigeria with emphasis on sachet water companies in Oyo State, Nigeria.

Research Questions

In order to evaluate the impact of ICT investment on the profitability of selected sachet water companies in Oyo State, Nigeria the following research questions were generated:

1. What are the extent of usage and the constraints militating against the application of ICT in the selected sachet water companies?
2. What are the effects of ICT investments on profitability of selected sachet water companies?

OBJECTIVES OF THE STUDY

The main objective of the study was to assess the role of ICT investment on profitability of selected sachet water companies in Oyo State Nigeria. The specific objectives were to:

1. Evaluate the extent of usage and the constraints militating against the application of ICT in the selected sachet water companies
2. Evaluate the effect of ICT investments on profitability of the selected sachet water companies.

Hypotheses of the Study

The following hypotheses were formulated for the study:

1. Operational characteristics of the sachet water companies' do not have significant effect on ICT usage.
2. There is no significant relationship between ICT investment and companies' profitability.

LITERATURE REVIEW AND CONCEPTUAL FRAMEWORK

Before the advent of the sachet water, people have been taken water from various sources that were not hygienic to their body. Sachet water popularly known as pure water served as a good means of relieving thirsty and also a good means of reducing poverty among populace. Again, a number of people are involved the chain of wholesale and retail that generate income from selling packaged water products (Akunyili, 2003). Sachet water popularly called "pure water" has come to stay and it is the highest selling consumable goods in the Nigerian Market today (Freedrinkingwater.com; 2009). There are a lot of problems presently militating against the development of the SMEs sector in Nigeria. These according to Ugwushi (2009) and Adelaja (2004)

include:-obsolete technologies and machineries, lack of access to modern technology, lack or limited access to management support and technical advisory services, poor access to information on raw materials, infrastructure inadequacy and lack of social support, production development, financial problems, disabling business environment (i.e. poor infrastructure, multiple taxation, etc), and poor economic condition. Some of the problems found to be confronting SMEs can be resolved by the application of ICT. Information Technology can play an important role in bringing about sustainable economic development.

Richardsson et al., (2006) outlined five main areas of ICT applications in support of firm and rural development. These are: - economic development of product, community development, research and education, small and medium enterprises development, and - media networks. Sachet water companies make use of ICT in the following ways: online services for information, monitoring and consultation and transaction and processing; e-commerce. The empirical evidence of the impact of ICT on enterprise performance is at best mixed. In fact in the industrial countries, it is only in 1990s that the empirical evidence has shown ICT to have a substantial effect on firms' profitability levels (Brynjolfsson and Hitt, 1996). It is noted that majority of work done so far focused on the application of ICT investment are on multinational and some large companies. It is in no doubt that there is paucity of research into application of ICT investment on small scale industries talk less of sachet water company – a sub sector of small scale industry in Nigeria.

An important characteristic of ICT is that they are mostly scale neutral and available to small firms and poor countries as well, although their access is restricted by poor infrastructure and high cost of procuring them. The increase of ICT in enterprises leads to a substitution of IT equipment for other forms of capital and labour and may generate substantial returns for the enterprises that invest in IT and restructure their organization. Extensive research has been conducted in the last 20 years on the business benefits and value generated by ICT investments, and their impact on business performance. From the mid 1980s until the mid 1990s, little empirical evidence of a positive and statistically significant relation between ICT investment and business performance. However, though ICT has high return potentials, they may erode a firm's profitability by integrating markets and exposing sachet water companies to competition. Particularly, sachet water companies in rural areas serve the local market niche and are protected against competition from bigger enterprises because of high information and communication costs, they are

expected to face more competition and hence a reduction in monopoly rents. The existing literature has shown an increasing interest toward the influence of information technologies (ICT) on business performance. Although this theme has been widely investigated, very different results have been achieved up till now. Some researchers assert a positive impact of ICT use on business performance (Stratopoulos 2000), others considered it insignificant (Yosri, 1992) or even assume a negative impact (Holland and Lockett 1997). In any case, it is still not clear which factors influence or determine this contribution (Weill 1992; Mukhopadhyay *et al.*, 1995; Broadbent *et al.*, 1996). Loveman (1994) examined the benefits of IT investment in 60 business units of 20 manufacturing firms between 1978 and 1984 using production function estimates. He found no evidence of a positive contribution of IT investment to firm output; however he found that non-IT inputs are contributing positively to firm output. Studies of the direct relationship between ICT and business performance concluded that higher levels of ICT do not necessarily yield better business performance than lower levels of ICT investments. Dehning and Richardson (2002) identified contextual factors (e.g. strategic alignment, size, ICT intensity, financial health, and companies) that when included in the analysis of the link between the IT invested amounts and business performance, higher positive correlations are expected.

In the context of Nigeria, there is paucity of research work on the impact of ICT investment on the performance of sachet water companies. But in the field of banking a reasonable number of researches have been carried out on Impact of Information Technology Investments on Banking Operations in Nigeria. Adewoye (2007) in a study title "Performance Impacts of Information Technology (IT) investments on banking operations in South-western Nigeria" stated that while investments in IT infrastructures make positive and significant contributions to productivity, such investments make zero or no contributions to profitability. Adeosun (2006) research into the effects of IT on Employees in Nigerian Banking industries while Agboola (2006) also studied the Information Technology in Banking Operations in Nigeria with all the above cited research in Banking industries in Nigeria. This research focused on the Impact of ICT investment on performance of selected sachet water companies.

CONCEPTUAL FRAMEWORK

Therefore, profitability-oriented studies are concerned with the question of whether IT investments have contributed to firm profits or stock market value. However the competitive environment in which firm operates has significant effects on the returns from IT investments. Porter (1985) posited that in a free market, firms cannot gain sustainable

competitive advantages from technologies that are available to every firm. It is only when technology creates significant barriers to entry that it becomes profitable to invest in. From this point of view, information and communication technology freely available to all firms as it is, does not provide any sustainable competitive advantage to the firm and, in such an environment, ICT investment becomes more of a 'strategic necessity' rather than a provider of competitive advantage (Clemons and Row 1991). Thus the firm's investments in ICT should not be associated with supra normal profits. This leads to the profitability-oriented hypothesis suggested by Hitt and Brynjolfson (1996).

MATERIALS AND METHODS

The study was carried out in Oyo State, South West Nigeria. The choice of Oyo state is not unconnected with fact that it has a high degree of socio-economic activities and serve as a settlement state that accommodate a lot of people from other parts of the country which consequently lead to its rapid market expansion. Emphasis was on 60 selected sachet water companies out of those (300) that are registered with NAFDAC and ATWAP (NATIONAL Population Commission, NPC, 2006), and are still in existence. This made up of 20% of the total population. They were selected randomly from the Ibadan and Ogbomoso geopolitical zones of Oyo State. The sample size was based on the statistical assumption that where a small sample is selected randomly from a large population the result reflects a true representation of the area. Similarly, previous researchers Olorunfemi (2003) used 3%, while Somuyiwa (2006) used 5%. Based on all these, this study adopted 30% of the entire registered sachet water factory in Oyo state. The judgmental sampling technique that was adopted considered the following parameters: years of operation, location, accuracy of record keeping and a relatively organized setting.

SOURCES OF DATA

Data for this study were sourced from both primary and secondary sources. While primary data were from administration of questionnaires to sachet water companies staff and customers. The Secondary data was obtained from the books of account (from 2006 - 2009) of the selected Sachet water companies, annual report from Manufacturers Association of Nigeria Oyo State Branch, newspapers reports and journals, etc. The data were restricted to ICT expenditure for two years before (2006 - 2007) and two years after (2008 - 2009) ICT acquisition. Two research instruments were used in this study to generate primary data and they were questionnaire administration and interview schedules. Three sets of questionnaires were designed for the company manager, company computer Engineer or data management officer, and sachet water companies' customers. Interview is intended to elicit more

information that may hitherto be difficult to get through the use of questionnaires. Oral interview was conducted to corroborate and augment information generated from the questionnaire. An interview schedule listing the questions and noting their order of importance was prepared. This really helped to streamline the pattern of questions. Interview was organized for the selected sachet water companies managers, computer engineer/operator or data management officer, employee and customers. This was required to get information about effect of ICT investment on business performance, budget for ICT investment, relationship that exist between ICT capital and ICT labour, year of acquisition of ICT devices, types and extent of usage of ICT devices, customer perspective of ICT devices, likely problems associated with usage of ICT devices and some other important information.

METHODS OF DATA ANALYSIS

The data collected were analyzed using both descriptive and inferential statistics. The descriptive statistics used includes frequencies, percentages and tables. This was used to categorize and catalogue the respondents' characteristics. Measurement of central tendencies like mean, mode, standard deviation and variance was also employed. For the profitability analysis, this study employed two measures of profitability. These are Return on Equity (ROE) and Return on Capital Employed (ROCE) and both were computed as follows:

$$\begin{aligned} \text{ROE} &= \frac{\text{Net Profit After Taxes} \times 100}{\text{Net worth (share holders' funds)}} \quad 1 \\ &\dots\dots\dots(1.) \\ \text{ROCE} &= \frac{\text{Earning Before Interest \& taxes} \times 100}{\text{Total Assets}} \quad 1 \quad (2) \end{aligned}$$

Regression Analysis

This is an econometric method that can be used to derive estimates of the parameters of economic relationships from statistical observations. The study used regression analysis to measure objective 2 and hypotheses 2. The ordinary least square regression model used. The mathematical expression for the least square regression for objective 2 and hypotheses 3 is stated below:

$$\begin{aligned} C &= f(X_1, X_2, X_3, X_4) \\ C &= a + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + e \end{aligned} \quad (3)$$

Where

C = Extent of Usage; a = Constant; e = error terms, b₁-b₄ = are the parameter or coefficients

X₁ to X₄ = are the independent variables,

X₁ = Company's years of existence

X₂ = Ownership Type

X₃ = Capital Base of the Company

X₄ = Managers' Educational level

Descriptive Statistics

Descriptive statistic such as frequency counts, table, percentages and measure of central tendencies (mean, mode and standard deviation) were also employed to present the results.

Extent of ICT Usage

Data on the extent of ICT Usage among the surveyed sachet pure water producing companies in the study area was gathered using 5-point Likert Scale questionnaire. The result is as presented in Table 1 below.

RESULTS AND DISCUSSION

Table 1: Manager Responses on the Extent of ICT usage

<i>ICT Usage Index</i>	<i>SA</i>	<i>A</i>	<i>U</i>	<i>D</i>	<i>SD</i>
The firm uses mobile phone to communicate with customers?	54(90.0)	6 (10.0)	0(0.0)	0(0.0)	0(0.0)
The firm uses mobile phone to order supplies?	54(90.0)	6 (10.0)	0(0.0)	0(0.0)	0(0.0)
The firm uses post box to communicate with customers?	16(26.7)	6(10)	4(6.7)	7(11.7)	27(45.0)
The firm uses post box to order supplies?	15(25.0)	6(10.0)	6(10.0)	6(10.0)	27(45.0)
The firm uses the internet to communicate with customers?	16(26.7)	5(8.3)	9(15.0)	8(13.3)	22(36.7)
The firm uses the internet to order supplies of RM?	14(23.3)	8(13.3)	12(20.0)	10(16.7)	16(26.7)
The firm sends SMS or text message for business purposes?	35(58.3)	9(15.0)	5(8.3)	7(11.7)	4(6.7)
The firm receives SMS or text message for business purposes?	38(63.3)	7(11.7)	6(10.0)	5(8.3)	4(6.7)
The firm use ICT devices for inventory control	17(28.3)	13(21.7)	17(28.3)	3(5.0)	10(16.7)
the use of Koyo machine for production	54(90.0)	6 (10.0)	0(0.0)	0(0.0)	0(0.0)

Figure in parenthesis are the percentage responses

Source: Field Survey, 2009

The table reveals that there is a homogenous response as regards the first, second and last statements as shown in the table. Most of the respondents (90.0 percent) strongly agreed that “the firm used mobile phone to communicate with customers, the use of mobile phone to order supplies and the use of koyo machines from production. However, a strongly disagreed response was given by 45.0 percent of the response as regards use of fax machine to communicate with customers, 53.3 percent as regards responses to the use of fax to other supplies. Percentages were used to adequately categorize the respondent observation.

Category of ICT Usage

The distribution of the companies into three levels of ICT use categories based on their responses in Table 4.1 is shown in Table 4.2 below.

Table 2: Category of Manager Respondents based on Extent of ICT Usage

<i>Category of ICT Usage</i>	<i>Frequency</i>	<i>Percentage</i>
Upper Category	16	26.7
Medium Category	34	56.7
Lower Category	10	16.7
Total	60	100

Source: Field Survey, 2009

This is achieved using a composite score obtained from twelve different statements. Table 2 reveal that medium category of manager (56.7 percent) are the best and highest users of ICT device, follow by the

upper category of manager with 26.7 percent while Lower category of manager are the least users of ICT device with 16.7 percent. This implies that majority of the pure water producing companies in the study area were in the medium category of ICT use.

Constraints Militating Against ICT Usage

Further analysis on the constraints militating against ICT use among the sachet pure water companies was also investigated with the Yes or No, responses by the computer engineers/ managers of the companies to twelve statement problems as shown in Table 3 below.

The Table shows that all the respondents unanimously responded in affirmative to “breakdown and malfunctioning of ICT devices” which probably calls for more expertise in the area. However, a well above average of the respondents confirmed the “problem of irregular electric power supply” (96.7 percent), network / signal problem (90 percent), threat from cyber criminals and insecurity of network (82.7 percent), Non-availability of ICT devices in remote areas (86.7 percent), and the problem of lack of fund to invest in ICT devices by the factories (70 percent). The implication of the responses in the Table is that several reasons were responsible as constraints hindering the use of ICT in the area as indicated by the respondents.

Table 3: Distribution of Constraints Militating Against ICT Usage among the Companies

Problems	Yes	No	Total
(1) Inadequate electric power supply hinder usage of ICT	58(96.7)	2(3.3)	60(100)
(2) Breakdown and malfunction of computer in the office affect adoption of ICT	60(100)	0(0.0)	60(100)
(3) Network /signal problems hinder adoption of ICT devices	54(90)	6(10)	60(100)
(4) Threats from cyber criminals and Insecurity of network affect usage of ICT devices in the manufacturing factories	52(86.7)	8(13.3)	60(100)
(5) Poor awareness of ICT application affects effective use of ICT devices	46(76.7)	14(23.3)	60(100)
(6) Non availability of ICT devices in remote/local areas affects its usage	52(86.7)	8(13.3)	60(100)
(7) The current economic recession is not in favour of adoption of ICT devices	14(23.3)	46(76.7)	60(100)
(8) Meeting the need of workers takes priority over investment in ICT device	19(31.7)	41(68.3)	60(100)
(9) The government policy on investment of ICT device is not in favour of enterprises	51(85.0)	9(15.0)	60(100)
(10) Adoption of ICT devices require expertise to train the workers	45(75.0)	15(25.0)	60(100)
(11) The result of investment in ICT has not measure up to the regulated standard for the factories	29(48.3)	31(51.7)	60(100)
(12) There is no enough fund to invest more on ICT devices by the factories	42(70.0)	18(30.0)	60(100)

Source: Field Survey, 2009

Effect of ICT Investments on Profitability of the Companies

The effect of ICT investment among the sachet pure water companies was also considered in the study as spelt out in the listed objectives. Certain performance indicators of the companies were critically examined before ICT adoption and after ICT adoption. Table 4 presents these indicators as shown below. The overall inference in the Table is that adoption of ICT jacked-up the cost of production given labour requirement and the corresponding salary involved when especially ICT labours are skill ones hence could attract more remuneration than other skills. In essence; labour requirement, salary and the capital invested increased after ICT adoption. However, corresponding returns were achieved when one considers the number of bags of sachet water produced and the corresponding net profit. Thus the ROE and ROCE after ICT adoption were more than before adoption which further justifies investment in ICT.

Table 4: Average Performance of the Companies Before and After IT Adoption

Indicators	Before IT Adoption	After IT Adoption
Capital (Millions in Naira)	4.78	6.34
Labour (Number of Workers)	18	25
Salary (Millions in Naira)	1.8	2.7
Number of Bag Produced (Millions of Bags)	600.00	841.07
Net Profit (Millions in Naira)	1.8	2.5
Net Profit After Tax (Millions in Naira)	1.65	2.38
Earnings Before Interest and Taxes (Millions in Naira)	7.1	9.64
Total Asset (Millions in Naira)	11.3	13.9
Equity (Millions of Naira)	2.3	2.8
ROE (Percentage)	71.74	85.00
ROCE (Percentage)	63.54	69.33

Source: Field Survey, 2009

Effect of ICT Investment on Company's Profitability

In line with another cardinal objective research, and to achieve the test of hypothesis two; a paired sample 't' test statistics was employed and the result is as shown in Table 5 below: The hypothesis, which states that "There is no significant relationship between ICT investment and companies' profitability is rejected given the t value of 1.809 and which is significant ($P < 0.1$). This therefore implies that there is significant relationship between ICT investment and the profitability of the companies.

Table 5: Paired Sample 't' Test Statistics

Variables	Degree of Freedom	't' value	P(Value)	Remark
ICT investments and Companies' Profitability	57	1.809	0.076	Significant

Source: Field Survey, 2009

CONCLUSION AND RECOMMENDATIONS

Investment in ICT has become strategic tool adopted by sachet water companies to compete adequately. However, whether investments on ICT actually bring real benefits to the organizations is still a matter of debate in the academia. This question is of particular relevance in the context of Oyo state sachet water companies. The study reported a significant benefit of ICT investment on the company profitability. The paired sample 't' test value of 1.809 which is significant ($P < 0.1$) also implies that there is significant relationship between ICT investment and profitability of the companies. This negates findings of many previous studies. The results of the study also shows that labour requirement, salary and capital invested increased after ICT adoption. Corresponding returns were achieved with the total numbers of bags of sachet water produced and the increase in the net

profit. ROE and ROCE was affected positively after ICT adoption which further justifies positive impact of ICT investment on company profitability.

RECOMMENDATIONS

In line with the findings of this research, it was recommended that sachet Water Company should adopt ICT devices to enhance their performance. The expertise should be mandated to train the existing worker (especially those at the lower level) on the nitty-gritty of the job for maximum productivity and also to face the challenges of new technology. Also, companies should make available fund to accommodate latest technology. While Government should ensure prompt and adequate electricity supply, thereby reducing cost of production and thereby increasing profitability. Sachet water company should also invest more on ICT capital and ICT labour in order to enhance their profitability.

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