



EFFECT OF STRATEGIC INFORMATION SYSTEMS SUPPORT ON COMPETITIVE ADVANTAGE IN ORGANIZATION IN NIGERIA

ADEOTI O. Johnson (PhD)¹;

BALOGUN Sodiq A.²;

and

OLAWALE Yinusa A.¹

¹Department of Business Administration

University of Ilorin, Ilorin, Nigeria

²c/o Department of Business Administration

University of Ilorin, Ilorin

ABSTRACT

This study examines the impact of information systems support on organization performance in Lagos State. The specific objective was to: examine the strategic use of information systems support for competitive advantage in organization. In an attempt to achieve the objective, two hundred and fifty-eight (258) respondents at managerial level were sampled from Nigerian Breweries, Guinness Nigeria, Nigeria Bottling Company Ltd, PZ Cussons Plc, Flour Mills of Nigeria Plc, Cadbury Nigeria Plc, and Unilever Nigeria Plc. The primary method of data collection used to collect relevant data was structured questionnaires. Descriptive statistical tools such as frequency count, percentage and charts was used in analyzing the demographic data of respondents, while inferential statistics such as multiple regression analysis and correlation analysis was used to analyze the research hypotheses. Findings from the study revealed that strategic use of information systems support contributed 71.5% to gaining competitive advantage ($R^2=0.715$), and it was captured under innovative applications that provide direct strategic advantage to organizations ($B=0.478$, $p<0.05$) with 47.8% prediction; business process effectiveness ($B=0.181$, $p<0.05$) with 18.1% prediction; cost reduction ($B=0.181$, $p>0.05$) with 18.1% prediction; and linking company with its business partners effectively and efficiently ($B=0.194$, $p>0.05$) with 19.4% prediction. Finally, the study recommended that organizations must establish all aspects of their planning structures based on strategic planning and they have to continue being innovative and investing in information systems support to stay ahead of the competition and stay afloat in the market.

Keywords: ICT, Technology Transfer, Capital Market, Economics.

JEL Classifications: O30; O31; O32; O33 O34.

1. INTRODUCTION

Today's world of business is characterized by the wave of information technology and seeking information about business environments and competitors is vital for business survival. Information systems form an integral part of modern organizations and businesses and are designed to support management activities for better decision making. Information system is universally regarded as an essential tool for enhancing the competitiveness of the economy of a country. Oliveira and Martins (2011) argued that it is commonly accepted today that information system has significant effects on the productivity of firms. These effects will only be fully realized if, and when, information systems are widely spread and used. It is crucial, therefore, to understand the determinants of information systems adoption and the theoretical models that address information systems adoption.

Manufacturing organizations, especially of Fast Moving Consumer Goods in Nigeria are in the race for enhancing their capability in order to survive in the competitions of the new century global market (Ezekiel, Eze, & Anyadighibe, 2013). Failure to understand the nature of the changing environment and the associated consequences slow down decision-making to meet the challenges of the global market. This creates a strategic disadvantage for the organizations who fail to adapt to these changes. Innovative managers must not only understand the role of information system in corporate governance and corporate strategy formulation, but how the accepted norms of this role are changing over time. Therefore, Fast Moving Consumer Goods companies in Nigeria are attempting to advance their operational level by improving the decision making process to be more efficient and highly effective to meet the successive fluctuations of the market and improve their performance.

Ravichandran and Chalermsak (2005) argued that organizations that do not have strong information system functional capabilities might find it difficult to initiate and sustain innovative projects targeted at enhancing the firm's core competencies and performance, or in providing reliable information system services that might be critical for smooth business operations. Thus firms that target information system initiatives toward their core competencies are likely to realize greater value from their information system assets than those that are less focused in the deployment. This study is therefore established to examine strategic effect of information systems support on competitive advantage in organization in Lagos State, using Nigerian Breweries, Guinness Nigeria, Nigeria Bottling Company Ltd, PZ Cussons Plc, Flour Mills of Nigeria Plc, Cadbury Nigeria Plc, and Unilever Nigeria Plc as a case study.

2. LITERATURE REVIEW

(a) Concept of Information System

Every business organization in this era needs an information system (IS) to keep track of all business activities, right from business planning, until the product delivery via manufacturing and quality cycles (Nowduri1 and Al-Dossary, 2012). An information system can be defined technically as a set of interrelated components that collect (or retrieve), process, store, and distribute information to support decision making, coordination and control in an organization. In addition to supporting decision making, coordination, and control, information systems may also help managers and workers analyze problems, visualize complex subjects, and create new products (Laudon and Laudon, 2006).

According to O'Brien & Marakas (2007) the applications of information systems that are implemented in today's business world can be classified in several different ways. For example, several types of information systems can be classified as either supporting of business operation or supporting of managerial decision making. Support of business operation such as transaction processing systems, process control systems and enterprise collaboration

systems (office automation system). Support of managerial decision making such as management information system, decision support system and executive information systems. According to Patterson (2005) there are several categories of information system such as Data Processing Systems, Management Information Systems, Decision Support Systems and Executive Information System.

(b) The Role of Information systems in Strategic Management

A strategic information system has been defined as "the information system to support or change enterprise's strategy". Strategic management is the technique that an organization can plans the strategy of its future operations; in other words, a strategic information system is a system to manage information and assist in strategic decision making. The term strategic points to the long-term nature of this mapping exercise and to the large magnitude of advantage the exercise is expected to give an organization (Turban, King, Viehland, & Lee, 2006). Four critical factors in developing and strategic information systems are initiation, data collection, strategy formulation and short-term development. These factors are used to prioritize proposed information systems, so that those giving competitive advantage to the organization can be highlighted for immediate development (Karababas et al, 1994). Information systems contribute to strategic management in many ways (for addition information see Kemerer, 1997, and Callon, 1996). Turban et al (2006) introduce eight factors, these eight factors are: innovative applications, competitive weapons, changes in processes, links with business partners, cost reductions, relationships with suppliers and customers, new products and competitive intelligence.

(c) Using Information Systems to Achieve Competitive Advantage

Gaining competitive advantage is critical for organizations. Baltzan and Phillips (2010) define competitive advantage as 'a product or service that an organization's customers value more highly than similar offerings from its competitors', in other words, you have something useful (i.e. products, services, capabilities) that your competitors do not have. Competitive advantages are typically temporary as competitors often seek ways to duplicate the competitive advantage (Baltzan & Phillips 2010). In order to stay ahead of competition, organizations have to continually develop new competitive advantages.

Turban et al (2006) believes information systems enable companies to gain competitive advantage and to benefit greatly at the expense of those that are subject to competitive disadvantage. They said Competitive advantage in the digital economy is even more important than in the old economy. For some businesses the impact of the digital economy is revolutionary. Frequent changes in technologies and markets and the appearance of new business models can introduce radical changes in industry structure (Diez & McIntosh, 2010) and the nature of competition can shift rapidly (Afuah and Tucci, 2003, and Choi and Whinston, 2000). At the same time, the digital economy has not changed the core business of most firms. For most businesses, internet technologies simply offer the tools, sometimes very powerful tools, which can increase their success through their traditional sources of competitive advantage – be that low cost, excellent customer service, or superior supply chain management.

3. THEORETICAL FRAMEWORK

From the stream of research on information systems, many theories have been proposed to explain the relevance of information system in enhancing competitive advantages and the factors that would determine the information system success. The most common

factors are user attitudes, perceptions, beliefs, and actual system use. Frameworks such as the theory of planned behaviour (TPB) (Fishbein & Ajzen, 1985), diffusion of innovation (Rogers, 1995), the unified theory of acceptance and use of technology (UTAUT) (Venkatesh, Thong & Xu, 2012; Venkatesh, Morris, Davis & Davis, 2003), the DeLone and McLean model of IS success (DeLone & McLean, 2003), Task-Technology Fit Model (Goodhue, 1988; Goodhue, 1995; Goodhue and Thompson, 1995; Goodhue, 1997; Goodhue, 1998) and measurement and analysis of computer user satisfaction (Bailey & Pearson, 2003; Doll & Torkzadeh, 1998) are popular models used in the context of technology acceptance. This study considers Technology Acceptance Model, Task-Technology Fit Model, DeLone and McLean model of IS success which is considered, according to Sanghee, Terence and Suresh (2012) to be the three most frequently used.

Fidelis (2012) investigates the impact of information communication technology (ICT) on corporate performance, using cement manufacturing firms in Nigeria as a case study of. The study was motivated by observational sought to show the impact of ICT on corporate performance focusing on six (6) cement plants in Nigeria. Research questions and objectives were stated and literature massively red from other empirical work on contributions of ICT to organizational performance in Nigeria. The population for the study comprised of staffs (6,080) of six cement industries where 375 were selected using Yaro Yamane's formula as sample size for the study, however, only 300 questionnaires were successfully completed and returned and they were used for descriptive statistics, in order to ensure validity of the instrument (questionnaire), experts and friends were given the study for assessment and a pilot study was carved out on two cement industries not selected for the study. Responses, rate of responses and simple percentage (%) were presented in tabular form for critical analysis. The conclusion was drawn that ICT has positively contributed to corporate performance, recommendation on improved investment and control in ICT were given and finally the researchers proposed future grey areas for research such as the impact of ICT investment on revenue and market share, and optimal level of investments for firm's ICT.

4. MATERIALS AND METHOD

This study followed an exploratory research design through a cross-sectional survey to establish: the relationship between strategic use of information systems support and competitive advantage in organization. This design is considered appropriate because it makes it possible to gain basic insights about occurrence of a phenomena, situation, problem, attitude or issue (Creswell, 2013 and Kumar, 2011). The study was cross-sectional or "snapshot" because the phenomenon, impact of information systems support on organization performance was studied at one particular time and not over several years.

The target population comprised of all managerial staff currently employed at Nigerian Breweries, Guinness Nigeria, Nigeria Bottling Company Ltd, PZ Cussons Plc, Flour Mills of Nigeria Plc, Cadbury Nigeria Plc, and Unilever Nigeria Plc. According to KPMG (2015), these companies are some of the most well-known Fast Moving Consumer Goods (FMCG) companies in the world and they are the key drivers in fast moving consumer goods in Nigeria. The study ensures that the manufacturing companies considered for the study are companies that produce a large variety of products, with some of the most important categories being food, beverages, personal care products, and home care products. The state chosen for this study was Lagos State, and the state was chosen based on its high level of commercial activities judged against other states in the region (Uchegbulam, Akinyele, Ibidunni, 2015). A total of one thousand and twenty-one (1021) employees were identified as potential respondents.

In choosing the sampling size and securing representative responses, the size of the sample was based on statistical estimation theory considering degree of confidence that is expected from this type of research. There are different models in the literature developed to determine sample size from a given population, but this study adopted the formula developed by Yamane (1967) for determining the minimum returned sample size for any given population.

Bottling Company Ltd, PZ Cussons Plc, Flour Mills of Nigeria Plc, Cadbury Nigeria Plc, and Unilever Nigeria Plc are considered relevant for the study. This study employed stratified and purposive sampling methods to select the individual members of the sample. Stratified sampling was used to determine the proportionate sizes of employees from each company that was included in the sample. Stratified sampling is used to ensure that each stratum was represented in the sample, and that the subgroup differences were accounted for. For each company, the sub-sample size was determined as (sub-population size/total population) x required sample size. that is $n_h = (N_h/N) \times n$ where n_h is the sample size for stratum h , N_h is the population size for stratum, N is total population size, n is total sample size (Anthony, 2003). For example, the size of employees from Cadbury Nigeria Plc in the sample was determined as $(17/126) \times 35 = 40$. The same procedure was followed for all the bank's branches.

4.1 Research Instrumentation

This study adapted information systems success questionnaire by Bailey and Pearson (2007) used for collecting responses from the subject selected for the study. Also considered in the questionnaire was ideas obtained from earlier studies on impact of information systems on organization performance. A measuring scale of 5-points summated rating scale (Likert scale) was used with calibration of Strongly Agree (SA), Agree (A), Undecided (U), Disagree (D), and Strongly Disagree (SD). Values of 5, 4, 3, 2 and 1 respectively were assigned in a descending order to each calibration in measuring the responses. Likert scale was used so as to enable the study compare easily responses among individual respondents on one hand, and responses between groups on the other hand.

4.2 Methods of Data Analysis and Presentation

Both descriptive and inferential statistical techniques were used to analyze the data. Descriptive statistics such as frequency counts, percentage rates and charts were employed to present the responses obtained from the respondents. Statistical Product and Service Solution (SPSS) (formerly known as Statistical Package for Social Sciences) version 20.0 was employed to further analyze the data. Correlation analyses among the variables were first performed to test for multicollinearity among the variables. Indicators such as tolerance and the variance inflation factor (VIF) are typically used to judge the multicollinearity of variables:

$$Tolerance = 1 - R^2, \quad VIF = \frac{1}{Tolerance}$$

A tolerance of less than 0.20 – 0.10 or a VIF greater than 5–10 indicates a multicollinearity problem. In this study, it was decided that the variables have multicollinearity if $VIF > 10$ (Farrar and Glauber, 1967; O'Brien 2007). Finally, logistic regression was employed to test the hypotheses. The researcher sets a rejection level of “no effect,” such as $p = 0.05$, and then assesses whether the test statistic falls into this level of rejection.

4.3 Data Analysis and Discussion

A total of two hundred and eighty-seven (287) questionnaires were issued out. Of the two hundred and eighty-seven (287) questionnaires issued out, only two hundred and fifty-eight (258) were completely filled and returned. This represented a response rate of 89.9% and this was considered satisfactory for the analysis. The response rate achieved in this study is reasonably much higher than that of earlier studies on information systems. For instance, the response rate reported in the study by Cheng, Lam and Yeung (2006) was 20.3 per cent, Wu (2008) received 10.5 per cent, Abeka (2009) had 25% response rate, Laitinen (2012) reported 10.8 per cent, and Podder (2005) had 15.7 per cent of usable responses.

Hypothesis

H₀₁: Strategic use of information systems support is not statistically significant for competitive advantage in organization.

For the purpose of this hypothesis, strategic use of information systems was considered as the independent variables (IVs) and sustaining competitive advantage is considered the dependent variable (DV). In order to quantify and analyze the possible relations between the set of IVs and the DV, a multiple regression analysis was performed. Multiple regression analysis is a multivariate statistical technique used to examine the extent of relationship between a single dependent variable and a set of independent variables (Hair et al., 2010). The main objective of the multiple regression analysis, in this context, was to examine the strategic use of information systems support for competitive advantage in organization.

A very important assumption in a regression analysis is the independence amongst the predictor variables. Collinearity is the term used to describe the correlation between 2 independent variables whereas, multicollinearity is the term used for the correlation amongst 3 or more variables (Hair et al., 2010). Whilst multicollinearity is a problem that stems from the nature of the data, it can affect an impact on the execution of linear regression. The variance of the regression estimators will be erratically higher and incorrect signs for regression coefficients can be calculated (Farrar and Glauber, 1967; O'Brien, 2007). Indicators such as tolerance and the variance inflation factor (VIF) are typically used to judge the multicollinearity of variables.

The correlations between the variables are provided in table 4.3.1.1 which demonstrates that all the independent variables showed a positive relationship with the dependant variable. The correlations among the independent variables were within the acceptable range of $r < 0.8$ (Bryman and Cramer, 1994; Hasan & Ahmed, 2007). Collinearity tests were performed by SPSS. These could identify multi-collinearity problems that could not be evident in the correlation matrix. Two values were measured: Tolerance and VIF. As already discussed, tolerance is the indicator of the amount of the variability that is not explained by the other interdependent factors in the model and is calculated as $1 - R^2$ for each variable. To avoid multicollinearity this value should be higher than 0.1 (Hair et al. 2010). The other value measure is VIF (Variance Inflator factor) which is actually the inverse of tolerance ($1/\text{tolerance}$) with a cut-off point of 10. In our collinearity diagnostics these values were accepted as tolerance and VIF were always within the accepted range.

Table 1: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.756 ^a	.715	.713	.04389

a. Predictors: (Constant), innovative applications that provide direct strategic advantage to organizations, business processes effectiveness, cost reductions, linking company with its business partners effectively and efficiently

From the regression analysis result shown in table 1, it was found that: R value is (0.756), R-square (0.715), adjusted R-square (0.713) and the standard error of estimate is (0.04389). The value of R-square (R^2) indicates a strong relationship between the observed and predicted values of the variables. In other words, the R^2 value (0.715) means that 71.5% of the variation in gaining competitive advantage was explained by strategic use of information system. More so, the value of adjusted R^2 (71.3%) showed that the value of R-square (R^2) closely reflected the goodness-of-fit of the data to the regression line.

Table 2: ANOVA^a

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	71.381	4	17.845	234.292	.000 ^b
	Residual	19.270	253	.076		
	Total	90.651	257			

a. Dependent Variable: gaining competitive advantage

b. Predictors: (Constant), innovative applications that provide direct strategic advantage to organizations, business processes effectiveness, cost reductions, linking company with its business partners effectively and efficiently

In table 2, F-statistics shows that the model is useful in determining the sustainability of competitive advantage by strategic use of information systems support, as the computed F-statistics which is 234.292 is greater than the tabulated F-statistics value at 4.17, with p-value 0.000 less than the critical value 0.05. This validates the rejection of the null hypothesis that “strategic use of information systems support is not statistically significant for competitive advantage in organization”.

Table 3: Coefficients^a

Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.	Collinearity Statistics	
	B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	1.101	.228	4.831	.000		
	Inno. Appl	.327	.074	.478	.000	.271	3.690
	Bus. Pros E	.151	.074	.181	.040	.212	4.717
	Cost Red.	.145	.077	.181	.002	.202	4.905
	Link Comp	.257	.062	.194	.000	.388	2.579

a. Dependent Variable: sustaining competitive advantage

Based on Table 3, the relationship between innovative applications that provide direct strategic advantage to organizations and sustaining competitive advantage in organization was significant and positive ($B=0.478$, $p<0.05$) with 47.8% prediction. In addition, the relationship between business process effectiveness and sustaining competitive advantage was significant ($B=0.181$, $p<0.05$) with 18.1% prediction. The relationship between cost reduction and sustaining competitive advantage was significant ($B=0.181$, $p>0.05$) with 18.1% prediction.

Furthermore, the relationship between linking company with its business partners effectively and efficiently and sustaining competitive advantage was significant ($B=0.194$, $p>0.05$) with 19.4% prediction. This analysis suggests that strategic use of information systems support is statistically significant for competitive advantage, when it is targeted toward innovative applications that provide direct strategic advantage to organizations, business process effectiveness, cost reductions, linking company with its business partners effectively and efficiently.

Bhatnagar (2006) believes that, the advances in information systems have affected the lives of most of the human beings in their day-to-day lives, but the information systems may deliver a product or service that is at a lower cost, that is differentiated, that focuses on a particular market segment, or is innovative. With the passage of time, the technology has evolved immensely and so have the opportunities is being used in the business activities for improving the efficiency and effectiveness of the people and the business on the whole. Mahmood, Mahdi, Ferdowsi and Marziyeh (2010) asserted that information systems is different from other comparable systems as it changes the way the firm competes, it has an external (outward looking) focus, it is associated with higher project risk, and it ensures firms are innovative and not easily copied.

5. CONCLUSION AND RECOMMENDATION

For the hypothesis which stated that strategic use of information systems support is not statistically significant for competitive advantage in organization. The study discovered that strategic use of information systems support is critical for gaining and sustaining competitive advantage, especially when it is targeted toward innovative applications that provide direct strategic advantage to organizations, change business effectiveness, cost reductions and linking company with its business partners effectively and efficiently.

In today's global business environment, no business organization can survive without information systems. One reason for this is the recognition that information systems plays different roles in organizations and businesses and help managers reduce uncertainty in decision making. Therefore, information systems should be viewed as an asset rather than a cost to the organization and must be managed judiciously as other organizational assets. This study provided empirical evidence that information system supports have significant effect on organization performance. The result shows that companies are using information systems as a strategic weapon to gain competitive advantages and many business processes are redesigned to take advantages through innovative applications that provide direct strategic advantage to organizations, change business effectiveness, cost reductions and linking company with its business partners effectively and efficiently.

Having discussed the outcome of the study, it is thereby recommended that information has emerged as an agent of integration and the enabler of new competitiveness for today's enterprise in the global marketplace and because strategic information systems supports or shapes competitive strategies, the concepts of information systems is so important; it can be used to support a variety of strategic objectives, including creation of innovative applications, changes in business processes, links with business partners, reduction of costs, acquiring competitive intelligence, and linking company with its business partners effectively and efficiently. For achieving successfulness, organizations must establish all aspects of their planning structures based on strategic planning and they have to continue being innovative and investing in information systems support to stay ahead of the competition and survive in the market.

REFERENCES

- Baltzan, P. and Phillips, A. (2010), *Business Driven Technology*, 4th edn, McGraw-Hill Irwin, Boston, USA.
- DeLone, W. H. and McLean, E. R. (2002), "Information Systems Success Revisited", *Proceedings of the 35th Hawaii International Conference on System Sciences*, Hawaii, 2002, U.S.A.
- DeLone, W.H. and McLean, E.R. (2003) 'The DeLone and McLean Model of Information Systems Success: A ten-Year Update', *Journal of Management Information Systems*, 19(4), pp.9-30.
- Diez, E. and McIntosh. B.S (2010). A review of the factors which influence the use and usefulness of information systems. *Environmental Modelling & Software*, Vol.24, No. 5, pp. 588-602.
- Ezekiel, M.S, Eze, J.F and Anyadighibe, J.A (2013). A Study of Marketing Information System (MIS) as a Contributory Factor in the Performance of Selected Transport Companies In Calabar Metropolis. *American Journal of Tourism Research* Vol. 2, No. 2, *University Of Calabar, Calabar, Cross River State, Nigeria*.
- Goodhue, D.L. (1995) 'Understanding User Evaluations of Information Systems', *Management Science*, 41(12), pp.1827-1844.
- Goodhue, D.L. and Thompson, R.L. (1995) 'Task-technology fit and individual performance', *MIS Quarterly*, 19(2), June, pp.213-236.
- Karababas, S. & Cather, H. (1994). Developing Strategic Information Systems. *Integrated Manufacturing Systems*, pp. 4-11.
- Mahmood, H., Mahdi, S., & Marziyeh, B. (2010), "Competitive Advantages and Strategic Information Systems" *International Journal of Business and Management* Vol. 5, No. 7
- O'Brien, J. A. & Marakas, G. M. (2011). *Management Information Systems*, 10th Edition, McGraw-Hill, New York, USA.
- Oliveira, T and Martins, M, F. "Literature Review of Information Technology Adoption Models at Firm Level" *The Electronic Journal Information Systems Evaluation* Volume 14 Issue 1 2011, (pp110- 121)
- Ravinchandran T. and Lertwongsatien C. (2005) 'Effect of Information Systems Resources and Capabilities on Firm Performance: A Resource-Based Perspective', *Journal of Management Information Systems*, [serial online] 21(4), Spring, pp.237-276.
- Turban, E., King, D., Viehland, D. & Lee, J. 2006, *Electronic Commerce 2006: A Managerial Perspective*, International edn, Prentice Hall, Upper Saddle River, NJ.
- Yaser, H. A., Alina, S., & Nor A. (2014). The Role of Different Types of Information Systems In Business Organizations: A Review. *International Journal of Research (IJR)* Vol-1, Issue-7, August 2014 ISSN 2348-6848

©2010-2016 Sacha & Diamond Academic Publishers,

Meridian Centre, 258 Kingsland Road, Hackney, London E8 4DG, England, United Kingdom.

In Compliance with the Standards Approved by the UK Arts and Humanities Research Council
Abstracting and Indexing in:

GIGA - The Electronic Journals Library of the German Institute of Global and Area Studies, Information Centre, Hamburg; Google Scholar; Global Development Network (GDNet); Social Science Research Network (SSRN); Econlit - The American Economic Association's Index; EBSCO; IndexCopernicus USA; British International Libraries; Anton's Weekly Digest;

Econlit (USA); International Abstracts in Operations Research; Environmental Science and Pollution Management; Research Alert

For the Advancement of Knowledge to the World. www.sachajournals.com