Effect of Dynamic Information Technology Capabilities on Organizational Performance of Deposits Money Banks in Nigeria

Kabiru Jinjiri Ringim
Department of Management Teknologi,
School of Business, Universiti Teknologi Brunei, Darussalam
Kabiru.ringim@utb.edu.bn; kabirujinjiri@yahoo.com, Tel: 673-8323566

Mohammed Aliyu Dantsoho
Department of Business Administration, Faculty of Administrations,
Ahmadu Bello University Zaria, Nigeria
aliyudantinoho@yahoo.com, Tel: 234-8038304040

Hanmaikyur Tyoapine John
Federal University of Agriculture, Makurdi, Nigeria.
tyoapine@yahoo.com; Tel: +2347031059281

Abstract - The objective of this paper to examined the effects of Dynamic Information Technology Capabilities (DITCs) on organizational performance using data from the Nigerian banking sector. The DITC dimensions include Information Technology (I.T) Knowledge, IT Management, IT Personnel Expertise and IT Infrastructures. Cross-sectional survey research design was used in the study. Population of the study consists of 191 employees of deposit money banks and 155 employees were drawn as sample size for the study. The sample size was selected using simple random technique. Data was collected by means of hand delivery using Research Assistant from the employees at management cadre representing the respective banks in the study. The data was processed using Statistical Package of Social Science (SPSS). Regression analysis was conducted to test the hypothesis and determine the best DITC predictor’s in the relationship between DITC and organizational performance of DMB in Nigeria. Also, factor analysis was done to reduce the dimensionality of a data set in which there are a large number of interrelated variables, while retaining as much as possible of the variation present in the data set. The result reveals that there is significant positive relationship between DITCs and organizational performance in terms of marketing and financial performance. However, this relationship is higher in terms of IT infrastructure flexibility followed by IT personnel expertise, then IT management capability and lastly IT knowledge creation. The outcome of this study provides important insights to both managers and researchers for further understanding on the effects of DITC factors on organisational performance. It is therefore recommended that, managers should pay attention on building, re-configuring, renewal and deploying of DITCs so as to deal with environmental changes effectively.

Keywords: Dynamic Information Technology Capabilities, Deposits Money Banks, Organisational Performance, Nigeria.
I. INTRODUCTION

Studies that relate IT capabilities to organisational performance based on Resource Based View (RBV) theory assumed that firms possess bundles of resources, and those are heterogeneously distributed across firms, and that heterogeneity persisted over time [35]. However, the concept of capability infers that, simply because, a capability may have reached some level of reliability does not entails that such capability has reached the highest possible level of functionality. Past study distinguished between three types of IT capabilities in the terms of value, heterogeneity, and imperfect mobility, and argued that one type could not be a source of sustained competitive advantage [2]. According to these authors the first two types are necessary conditions for achieving competitive advantage, whereas, the latter (imperfect mobility) is necessary for sustained competitive advantage. The second category is the Dynamic IT Capabilities (DITCs). This capability in question refers to firm’s ability to excel in area of doing business through use of information technology [10]. DITC is defined as the firm’s ability to integrate, build, and reconfigure IT-based resources and competences to adjust to rapidly changing business environments [46]. In this study, IT knowledge creation, IT Management capability, IT Personal expertise, and IT infrastructure flexibility are the combined DITCs constructs [12].

At the same time, before deregulation of the financial sector, first generation banks dictated the pace of products and services offer in Nigeria [33; 34]. But with advent of internet and other e-banking services those banks could no longer decides in the market. The industry is now characterises as very dynamic due to rapid technological advancements, customer sophistications and changing regulations [31]. As a result, banks must carefully select, build and deploy resources and capabilities capable of dealing with those unprecedented changes. The organisations with strong Dynamic Capabilities (DC) are intensely entrepreneurial [43]. They do not only adapt to business environments; they do shape them through innovation, collaboration, learning, and involvement which set to increase performance.

Although several studies supported the impact of DITC on organizational performance [2]; [46] but the mechanism to which DITC affect firm performance has not been unresolved [45]. There is still argument on whether DITC directly relate to organizational performance. While, some few studies discovered positive but weak relationship between dynamic capability and organizational performance [40]. Others studies reported that DCs are antecedent to functional competencies hence, there is no significant relationship between DCs and organizational performance in Nigeria [30]. Therefore, the communality of DCs effect on performance has not been identified in previous studies [45]. This paper seeks to examine the effect of DTCs on organizational performance of banks in Nigeria. Thus the study will determine to what extent does Dynamic IT Capabilities (IT Knowledge, IT Management, IT Personnel Expertise and IT Infrastructures.) affect organizational performance?
II. LITERATURE REVIEW

The study that examined linkage between IT capability and organizational performance found that a firm that developed and adopts IT capability benefits better than competitors in terms of profit and lower cost ratios. She further claimed that every IT leader (firm) contain IT infrastructure, but either includes IT human resources or IT enabled intangibles. This clearly indicates the need for DITC so as to sustain performance over time [16].

The need to match organizational performance to dynamic IT capabilities was also illustrated by the finding of [40] when they argued that in addition to prior investments, firms are still need to make a much larger investments before they fully benefits from IT. Studies that relate IT capabilities to organizational performance based on Resource Based View (RBV) theory assumed that firms possess bundles of resources, and those are heterogeneously distributed across firms, and that heterogeneity persisted over time [35]; [16]; [2]. The usefulness of RBV theory in IT research but equally recognized it limitations indicating that, RBV neglects the influence of market dynamism, which could erode existing capabilities [44]. When market situation changed. Researchers have extended RBV to dynamic capabilities (DC) theory [43]. This is in line with claim that DC will help to explain the mechanisms by which organizational resources contribute to sustain firm performance [15]. The main advantage of DITC over RBV theory is that the DC theory focuses more on the issue of competitive survival rather than achievement of sustainable competitive advantage. This approach appears to be closer to current business realities in the Nigerian banking sector. For instance, the interconnectivity and integration of global financial markets and its subsequent effects on global competition as well as the ever changing customers’ preferences on internet and other e-banking services make Dynamic Information Technology Capabilities (DITC) an integral part of daily banking operations in Nigeria

Building on that, this study proposed that IT knowledge Creation (ITKC), IT personal expertise (ITPE), IT management capabilities (ITMC), and IT infrastructure flexibility (ITIF) are the DITC constructs. These variables are the most cited and operationalized among the higher order IT capabilities in previous studies [6]; [2]; [21]; [34]. For example, [21] considered ITIF as the highest IT capability. [2] considered ITMC and ITPE (or IT business experience) as Dynamic. [21] posited that IT personal expertise, IT management capabilities, and IT infrastructure flexibility (though) distinct but related in affecting organizational performance. ITKC is perhaps the most strategic assets of modern organizations. This is because, ability to improve performance would largely depend on the knowledge that organization possessed and utilized in response to market changes. It is operationalized as the organization’s ability to gathered knowledge from the environment it operates through the use of IT resources. ITMC is operationalized as the ability of a firm’s IT staff and management to possessed and administer IT resources and transform them for the creation of business value for organization sustainability. It is noticeable in the areas of planning, investment, decision making and controlling. ITPE refers to fundamental skills and business experience that IT staff possesses in the organization. That helps him develop reliable and cost-effective systems and anticipate business needs sooner than the competitors. ITIF refers to ability of IT infrastructure to adapt to both incremental and revolutionary changes in the business or business process with minimal penalty to current time, effort, cost, or performance.
III  REVIEW OF EMPIRICAL STUDIES

The previous study argued that linking IT assets with business strategies is becoming more difficult and riskier [38] than before, [39] employed data to empirically test whether IT infrastructure and IT management capability significantly affect organisational performance on knowledge management and profitability in turbulence times. It is documented that IT these capabilities are enabler in knowledge management efficiency and increasing profitability. Similar study established that IT management capability play a significant role in developing other capabilities for customer, process and performance improvement [28]. On the effect in improving service delivery performance, [1] posited that to realise business value, IT investment should include building and deploying IT management capability.

Several studies examined the relationship between IT infrastructure flexibility and organisational performance. These studies established that IT infrastructure flexibility is central to achieving competitive advantage in terms of time to markets, cost, product innovation, delivery and dependability [23]; [24]. Some studies also established that IT infrastructure flexibility was highly correlated with IT efficiency in areas such transaction processing systems, management information systems, decision support systems etc. [9] [25]; [26]. The strategic value of IT infrastructure flexibility to organisational performance was also found in areas such as mass customisation, organisational agility [7]. This in turn improves firm’s performance [26], in terms of customer services, profitability [25], operational stability [33]; and overall performance over time [32].

Previous studies discovered that IT personnel expertise becomes firm’s intangible assets when an IT staff understand business strategies and align it with IT skills [35]; [27]; [8]. IT staff with sufficient business knowledge and experiences are able to provide IT solutions to prevailing market conditions [3]. IT personnel expertise provides firm ability to integrate IT strategy and business strategy [38]. It is argued that when a firm solves problems through IT, it facilitates the development of IT knowledge and competence of IT personnel [7]. This relationship and knowledge development enhance firm’s ability to integrate IT functions into business functions and exploit IT resources [7]. We argued that this type of capability cannot be supplement by the external sources and the synergy between them enhances firm’s ability to improve performance over time. This relationship is presented in the proposed research model of the study, in Figure 2.1.

![Figure 2.1 proposed research model](image)

Based on the core research question, broad objective, and research model shown in Figure 2.1. The following hypotheses were tested:

- $H_{01}$ IT Knowledge creation does not significantly affect organizational performance.
- $H_{02}$ IT Management capabilities does not significantly affect organizational performance.
- $H_{03}$ IT Personnel expertise does not significantly affect organizational performance.
- $H_{04}$ IT Infrastructure flexibility does not significantly affect organizational performance.
IV. UNDERPINNING THEORIES

In this research, RBV theory and DC theory were employed to underpin the study. RBV theory emphasized the importance of selecting and acquisition appropriate resources to improve performance [4]; [5]. However, RBV neglects the influence of market dynamic in rapidly changing business environment [44]. DC theory was thus employed to bridge the gap between resources acquisition, configuration and renewal in response to market changes [42]; [17]. This is because, changing the entire resources based is practically impossible. But, ignoring external changes all together invites failure. Therefore both RBV theory and DC theory can be employed to explain the mechanisms to which resources and capabilities influence organizational performance over time. As RBV approach is critical in improving organisational performance, it is not sufficed to sustain performance in banks operating in unstable environment. To sustain performance, banks must be able to build, reconfigure, renew and deploy resources and capabilities in response to market changes.

V. METHODOLOGY

Cross sectional survey research design was employed to collect data at a particular point on time. The Population of the study consists of 191 employees of deposit money banks and 155 employees’ were drawn as sample size for the study using formula developed for computing for small and large sample size [13]. The sample size was selected using simple random technique. 169 questionnaires were administered to the targets respondents with help of research assistance and 157 responses were found useful in the final data analysis. Target respondents consist of bank managers, IT and other staff at management cadre.

Data was processed using Statistical Package of Social Science (SPSS). Descriptive and inferential statistics were used to analyses the data collected for the study. Factor analysis was conducted to reduce the dimensionality of the data set. Multiple regression analysis was used to test the hypothesis formulated for the study. Prior to Factor analysis the suitability of the data set was assessed using Kaiser-Meyer-Olkin (KMO) overall measured of sampling adequacy (MSA) which was 0.565 the accepted level of 0.50. Bartlett’s Test of Sphericity was also significant (P.000). This indicates the adequacy of the sample size for factorability.

The instrument used in this study was adapted from the previous study [6]; [32]. It was therefore subjected to reliability and validity tests to ensure error free and validity of the instrument. Cronbach alpha coefficients were used to assess the internal consistencies of the instrument as suggested by [18]. The result produced value ranging from .809 to .859 which is above the benchmark of .60, with .70 and above as a good reliability [41]; [18].Therefore, all the items in the measures possessed a good reliability and can be consistent over time.

The data was collected (by means of hand delivery) from the bank managers, I.T and other staff at management cadre representing the respective banks in the study. After collecting the questionnaires the researchers also key in the data in SSPS software to scientifically check whether any missing data exists. These strategies help to reduce the number of unattended questions and to confirm whether any missing data exists. Results of factor analysis helped to explain a total variance of 49.70%, and 77.421% of dependent and independent variables respectively. Prior to regression analysis the normality of the data set, linearity, multicollinearity, homoscedasticity and error term were checked as suggested by the scholars [18]; [36]. Thus assumptions for multiple regressions were met.
VI. RESULT AND DISCUSSIONS

Multiple regression analysis was conducted whether DITC directly affect organisational performance and the result reveals \( R = .598, R^2 = .271 \) and adjusted \( R^2 = .254 \). The \( F = 15.567 \) with \( p \) value \( .000 \). The \( R^2 \) of 271 implies that DITCs explains a variation of up to 27.1% on the dependent variable. A changed in adjusted \( R^2 \) of less than 2% indicates that if the model is applied to another set of data it can give similar result. This also indicates a good cross validity of the model. The \( F \) statistic of 15.567 shows the model fitness and also reveals that, the relationship between DITC constructs and organisational performance is linear and significant. The contribution of each independent variable on organisational performance is shown in Table 4.1a, b & c.

### Table 4.1a: Model Summary

<table>
<thead>
<tr>
<th>Model</th>
<th>R</th>
<th>( R^2 )</th>
<th>Adjusted ( R^2 )</th>
<th>Std. Error of the Estimate</th>
<th>Durbin-Watson</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>.598</td>
<td>.271</td>
<td>.254</td>
<td>.30799</td>
<td>1.687</td>
</tr>
</tbody>
</table>

a. Predictors: (Constant), IT Knowledge, IT Personnel ,IT infrastructure, ITManagement, 
b. Dependent Variable: Organ Performance

d. Dependent Variable: Organisational performance

e. Predictors: (Constant), ITKnowledge, IT Personnel ,IT infrastructure, ITManagement,
TABLE 4.1c: Regression Result Dynamic Information Technology Capability and Organisational Performance

<table>
<thead>
<tr>
<th>Model</th>
<th>Unstandardized Coefficients</th>
<th>Standardized Coefficients</th>
<th>T</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>B</td>
<td>Std. Error</td>
<td>Beta</td>
<td></td>
</tr>
<tr>
<td>(Constant)</td>
<td>4.862</td>
<td>.758</td>
<td>6.416</td>
<td>.000</td>
</tr>
<tr>
<td>IT Knowledge creation</td>
<td>-.176</td>
<td>.082</td>
<td>-.194</td>
<td>-2.148</td>
</tr>
<tr>
<td>IT Infrastructure Flexibility</td>
<td>.275</td>
<td>.081</td>
<td>.300</td>
<td>3.387</td>
</tr>
<tr>
<td>IT Personnel Expertise</td>
<td>.144</td>
<td>.052</td>
<td>.248</td>
<td>2.767</td>
</tr>
<tr>
<td>IT Management capability</td>
<td>.117</td>
<td>.049</td>
<td>.215</td>
<td>2.393</td>
</tr>
</tbody>
</table>

Dependent variable: Organizational performance

From the Table 4.1c, it is clear that all the independent variables are significantly related to organizational performance. However, IT infrastructure flexibility is the highest contributing variable (p.001), followed by IT personnel expertise (p.007), IT management capability (p.018), and IT knowledge creation (p.034). Therefore, null hypotheses 1, 2, 3 and 4 were rejected.

The objective of this study was to examine whether DITCs are directly related to organizational performance. The finding of this study was therefore consistent with that of few studies that established significant and positive relationship between DCs and organizational performance of bank [20]; [31]; [14]. [6] have found a positive relationship between IT infrastructure flexibility and organizational performance. [1] discovered that IT management capability accounts for variation in customer service performance improvement in Nigerian insurance sector. However, the outcome of this study contradicted the findings of [30] that established a non-significant positive relationship between DCs and organizational performance of banks in Nigeria. Nevertheless, [10] revealed a positive relationship between ITMC, ITIF and ITPE and organizational performance in Nigeria and also established the mediating effect of process improvement on the relationship between DITCs and organizational performance in Kaduna state [12].

As regards to managerial implications, the finding suggested that each of the four DITC constructs plays a significant role in long-term organizational performance and therefore critical to managerial decisions on IT. As can be seen there is need for continuous building and deploying IT resources and capabilities in response to market changes to sustain performance over time. Therefore, to the best of authors’ knowledge, this study is unique of its kinds.

VII. CONCLUSIONS AND RECOMMENDATIONS

This study concludes that DITCs are critical to organisational performance in Nigeria. This is because, one of the major problem with banks performance in Nigerian does not only relied on the ability of banks to market their products and services directly to customers but also to provide excellent services [22] by reducing cost, increasing speed, quality, flexibility and dependability which is in line with notion of DITC. [10]; and [12] had the view that the case of managing contradictions caused by unprecedented changes within the Nigerian banking sector, entail going beyond selecting the most recent IT resources but a combination of capabilities that enabled banks to sense and seized opportunities thereby coding IT solutions capable of providing sustain performance over time.
It is recommended that managers should pay attention on building and deploying DITCs in form of ITKC, ITMC, ITPE, and ITIF capable of dealing with environmental changes. That is to say that with increasing environmental dynamisms banks must focus on matching market uncertainties [37] with the new or improved organisational capabilities to improve performance [47]. However, the potential values of IT capabilities depend on the future imagination of the business owners/managers and their employees. Policy making should thus include public enlightenment on building capabilities through I.T.

VIII. REFERENCE


