

DYNAMIC INFORMATION TECHNOLOGY CAPABILITIES (DITC) AND  
ORGANISATIONAL PERFORMANCE: THE MEDIATING EFFECTS OF  
PROCESS IMPROVEMENT IN KADUNA STATE

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DEPARTMENT OF BUSINESS ADMINISTRATION,  
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SEPTEMBER, 2016

## DECLARATION

I declare that the work in this dissertation entitled Dynamic Information Technology Capabilities (DITC) and Organisational Performance: the Mediating Effects of Process Improvement in Kaduna state has been performed by me in the Department of Business Administration. The information derived from the literature has been duly acknowledged in the text and a list of references provided. No section of this dissertation was previously presented for another degree or diploma at this or any other Institution.

Mohammed Aliyu DANTSOHO  
Name of Student

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Signature

-----  
Date

## CERTIFICATION

This dissertation entitled DYNAMIC INFORMATION TECHNOLOGY CAPABILITIES (DITC) AND ORGANISATIONAL PERFORMANCE: THE MEDIATING EFFECTS OF PROCESS IMPROVEMENT IN KADUNA STATE by Mohammed Aliyu DANTSOHO meets the regulations governing the award of Master of Science (M.Sc.) Degree in Business Administration of the Ahmadu Bello University, and is approved for its contribution to knowledge and literary presentation.

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## **DEDICATION**

This dissertation is dedicated to Almighty Allah (SWT) and his beloved Prophet (SAAW).

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## ABSTRACT

Since the aftermath of global financial crisis in 2008, and its subsequent effect on the Nigeria financial sector, relentless competition drive banks to constantly adapt, reconfigure and renew, their core processes and capabilities in responses to market changes so as to improve performance. These routine activities are in line with the notion of dynamic capabilities (DC) in both theory and practices. However, there are still arguments on the mechanisms to which DC relate to organisational performance. Some studies established no significant relationship between DC and organisational performance, others reported that such relationship only exist through a chain of intermediate variables. Consequent upon these, the objective of this study is to examine the relationship between Dynamic Information Technology Capabilities (DITC) and organisational performance, and the mediating effect of process improvement on the relationship between DITC and organisational performance of banks. Also, to determines the best DITC predictor variable on the relationship thereof. The study adopted descriptive and correlation research design. Data was collected from the respondents at a point in time using cross sectional survey research design. The data was analysed using descriptive statistics, and correlation. Multiple regressions was used to test the hypotheses formulated, and the findings revealed that there is a significant positive relationship between DITC and organisational performance of banks in terms of marketing and customer services delivery in branches. The most significant positive relationship was found between IT infrastructure flexibility, followed by IT personal expertise, and then IT management capability. On the mediation test this study revealed that process improvement significantly mediated the relationship between DITC and organisational performance. Individually this mediation is higher in terms of knowledge creation, IT personnel expertise and IT management capability. However, IT infrastructure flexibility did not mediate the relationship between DITC and organisational performance. It is recommended that bank managers should invest in terms of money, time,

and commitment to develop DITC to improve performance. For regulatory bodies, the goal of achieving IT standards within the banking sector should go beyond policy making. The process should include capacity building in partnership with academics where theories could be employed to detect the practices.

## CHAPTER ONE

### INTRODUCTION

#### 1.1 Background to the Study

Nigerian banking sector experienced significant disturbances over the period of time such as declining market share, changing customer preference and direct competition (KPGM, 2015). These disturbances did not only persist but continue to challenge their success and survival (Dantsoho, 2015). The industry is characterised by increasing environmental dynamisms due to rapid technological advancement, customer sophistication and changing regulations (Osisioma, Nzewi & Mgbemena, 2016). Recently, the Central Bank of Nigeria (CBN) has given three Deposit Money Banks (DMBs) until June 2016 to recapitalise after they failed to meet the minimum Capital Adequacy Ratio (CAR) of 10 percent (Nweze, 2015). The CAR's test was used to assess the resilience of the banking industry to liquidity and funding shocks in the event of unanticipated substantial withdrawal of deposits, as well as short-term wholesale and long-term funding over a five day and cumulative thirty day period (CBN, 2015).

The results of the CAR test showed a 6.5 % decrease of liquidity ratio of the Nigerian banking sector from 45.8% in 2014 and this indicates potential vulnerability to performance improvement in the event this scenario escalates. As at November, 2015, nine DMBs required recapitalisation to avert possibility of falling into distress (CBN, 2015). As some of these banks either losing ground or acquired by their competitors, managers must careful select, build, and deploy resources and capabilities capable of dealing with those unprecedented changes.

Prior studies had shown that Information Technology (IT) capability plays a vital role in the development of modern organisation (Bharadwaj, 2000). It is acknowledged as the backdrop of global competition, efficient resources utilisation and a catalyst of internationalisation of product and services (Chung, Byrd, Lewis & Ford, 2005; Lin, 2007). The need to match organizational performance to IT capability was also illustrated by the finding of Brynjolfsson and Hitt, (2000) by arguing that in addition to prior to IT investments firms are still need to make a much larger investments before they fully benefits from the IT. This indicates the need for building dynamic capabilities through IT so as to sustain performance over time.

Dynamic Information Technology Capabilities (DITC) has being subject of fundamental importance in the modern organisations due to various issues that can be better addressed through its use. The interconnectivity and integration of global financial markets and its subsequent effects on global competitions make DITC a prime enabler of daily banking

operations. In Nigeria, Ringim Razali and Hasanan (2012) revealed that innovative banking services and personalized portfolio management are evolving due to merger and consolidation of banks. The focus is no longer on cutting cost alone, but also on simultaneously improving customer service delivery and performance. It has been reported that, ability to produce unique goods and excellent services are the major concern of bank's customers in Nigeria (KPMG, 2015). In the same vein, since the aftermath of the 2008 global financial crisis and its subsequent effect on Nigerian banking sector, several changes forced banks to reengineer through the use of IT. But the role of IT in reengineering is not to automate the processes but to starts at a clean slate by identifying a powerful solution and then look at the problems to be solved (Panda, 2013). It is about innovations & exploiting the latest technological capabilities to achieve entirely new objectives (Hammer & Champy, 1993). The role of DITC in achieving firm performance improvement is dominant in this sector.

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 persist over time (Ross, Beath & Goodhue 1996; Bharadwaj, 2000). Wade and Hulland, (2004) confirmed the usefulness of RBV theory in IT research but equally recognised its limitations such as being static, neglecting the influence of market dynamism. Researchers extended RBV theory to Dynamic Capabilities (DCs) theory (Teece, Pisano & Shuen, 1997). Claiming that DCs will help to explain the mechanisms by which organisational resources contribute to firm performance (Eisenhardt & Martin, 2000), by resources building and reconfiguring in response to market changes (Teece et al., 1997). However, Macher and Mowery, (2009) argued that simply reconfiguration of the firm's resources per se does not ensure performance; the characteristics of DCs are what impact on firm performance. The focus is about understanding market dynamisms and technological capabilities relevant to markets changes.

Advocate of process improvement at firm process level also established that, the effect of IT within organisations is reflected by how IT renews existing ways of performing activities in the intermediate business processes (Mooney, Gurbaxani & Kraemer, 1996; Fink & Neumann, 2007; Karimi, Fox & Hietanen, 2007; Jeffers, Munna & Nault, 2008). However, understanding IT effects at the firm process level require some level of analysis and methodological approach as modern organizations operate under multiple or hierarchical processes. Therefore considering the entire firm processes in addition to specific processes such as customer service (Aduloju, 2014), would provide a better understanding of IT effect at firm process level.

## 1.2 Statement of the Problem

Despite the progress made on the relevance of DCs on organisational performance, few studies had so far provided a comprehensive explanation of their nature and relationship

(Xiao & Subhashish 2009; Ringim, 2012; Anand et al., 2013). There is still argument on the mechanisms to which DC affect firm performance (Protogerou, et al 2008). The difficulty in their clear meaning and domain are likely rooted from the different research approaches towards DC. It has been established that DCs are tautological, vague and not operational (Priem & Butler 2000; Protogerou, et al 2008). Eisenhardt and Martin, (2000) posited that DCs are neither vague nor tautological but a set of specific and identifiable processes such as product development, strategic decision making, and alliancing. This view suggests that, DCs are similar, equifinal, and substitutable than is usually assumed. In contrast, Wong and Ahmed (2007) argued that, DCs are not simply processes, but embedded processes and firm-specific which developed over time through complex interactions of the firm's resources (Amit & Schoemaker, 1993). According to Eisenhardt and Martin (2000), DCs can only be a source of competitive advantage if they are applied "sooner more astutely, and more fortuitously" than competitors.

On the other hand, Wang and Ahmed (2007: 11) argued that the ability to apply capabilities 'sooner, more astutely, and more fortuitously' is, indeed, at the heart of DCs which is costly for others to imitate and can be a source of sustained competitive advantage. In the same vein, empirical studies also emerged with three contradicting findings on the effect of DCs on organisational performance. First group are those that reported non-significant relationship (Barua et al. 1995; Olufemi, Banjo & Peter, 2014). The second group, are those that discovered a direct relationship with firm performance (Idroes, 2015; Dantsoho, 2016). A third group are those that come up with indirect relationship in their findings (Helfat & Peteraf, 2003; Protogerou, 2008; Ringim, Razalli & Hasnan, 2012). From the foregoing, the commonalities of DCs on firm performance have not been systematically identified in prior studies.

Therefore, a paradigm shift is needed to explain how performance improvement is gained and held over time. This study proposed that, whereas process improvements enable an organization to perform operational activities, DCs deal with changes (Collins, 1994). Some of the banks problems in Kaduna state and Nigeria are how to sustain market positioning by targeting changing customer preference, regulatory requirements and direct competition (KPMG, 2015). This study attempts to solve these problems through DITC by enabling bank discover where it is based at the market place through the use of IT knowledge creation and suggests where it should be through the use of IT management capability, thereby designing how it will get there by through the use of IT personnel expertise with vast IT skills and business experiences. DITC in the form of IT infrastructure flexibility would help a bank to effectively respond to technological changes with minimal penalty to current time, effort, cost, or performance. This study would thus shed more light on the mechanisms to which DITC affect firm performance.

In addition, existing studies on DITC and organisational performance are largely done in advanced countries and therefore risky for managers and other stakeholders to rely on those findings to decide in Nigeria. Simply because, our level of economic and social developments differed in terms of literacy level, information intensity and other supporting infrastructure. It is therefore a good attempt to investigate the relationship between DITC and firm performance in Nigeria at both firm process level and organisational level (CBN, 2015). In view of foregoing, this study seeks to investigate aggregated effect (the direct and indirect effects) of DITC on organisational performance of banks through the following research questions and objectives.

### 1.3 Research Questions

Based on the research problem, the following research questions are raised:

Does Dynamic IT Capabilities relate to organisational performance?

Is there a relationship between Process Improvement and organisational performance?

Does Process Improvement mediate the relationship between Dynamic IT Capabilities and organisational performance?

### 1.4 Research Objectives

The main objective of this study is to determine the effects of dynamic IT capability on banks performance in Nigeria. Other objectives include the following.

To examine the relationship between Dynamic IT Capabilities and organisational performance.

To examine the relationship between Process improvement and organisational performance.

To examine the mediating effect of Process improvement on the relationship between Dynamic IT capabilities and organisational performance.

### 1.5 Research Hypotheses

Based on the above research questions and objectives, the study therefore hypothesised the following.

Ho1 IT Knowledge creation is not significantly related to organisational performance.

Ho2 IT Management capabilities is not significantly related to organisational performance.

Ho3 IT Personnel expertise is not significantly related to organisational performance.

Ho4 IT Infrastructure flexibility is not significantly related to organisational performance.

Ho5 Process Improvement attributes are not significantly related to organisational performance.

Ho6 Process Improvement attributes does not mediate the relationship between IT Knowledge creation and organisational performance.

Ho7 Process Improvement attributes does not mediate the relationship between IT Management capabilities and organisational performance.

Ho8 Process Improvement attributes does not mediate the relationship between IT Personnel expertise and organisational performance.

Ho9 Process Improvement attributes does not mediate the relationship between IT Infrastructure flexibility and organisational performance.

## 1.6 Significance of the Study

The significance of this study to the field of business and management studies is in twofold as follows.

### 1.6.1 Theoretical Contributions

The contribution of this study to existing literature (knowledge) is by incorporating direct and indirect effect of DITC in one study. Because, most of the previous IT studies in Nigeria are limited to specific firm process improvement such as e-banking services, customer relationship management, etc. (Ojoshua & Philip, 2011; Aduloju, 2014; Aduloju et al., 2014; Oghojafor, Kuye & Olufemi, 2014), while neglecting IT effect at the entire organisational level. Secondly, recent studies on DITC and firm performance are largely done in advanced countries (Helfat & Peteraf, 2003; Paulous, 2004; Kwon & Watts, 2006; Xiao & Subhashish, 2009; Kim et al., 2011; Chen & Wu, 2011; Adroes, 2015). It is not clear whether similar result could be found in Nigeria, as Nigeria differs in terms of literacy level, information intensity and other supporting infrastructure. In addition, most of the existing studies utilized single variable such as IT management capability against firm performance (Aduloju, 2014). It should be noted that DITC dimensions in this study are interrelated and the synergy between them influences rapid changes in a firm's core process which lead to superior performance (Kim et al., 2011). Therefore, this study is expected to add value to existing knowledge by firstly combining direct effects of DITC against firm performance and secondly, by introducing process improvement as mediator to overall performance gain at organisational level.

### 1.6.2 Practical contributions

This study is expected to provide empirical evidence on the relationship between dynamic IT capabilities and firm performance, by establishing how relationship exists between DITC, process improvement and Organisational performance. This study would help managers to

better understand how and where to prioritize IT investments to improve performance. As managers face dilemma on ‘next technological investment in their organisations’, this study sheds more light on how building and deploying DITC can help organizations to redefine their strategies in response to external changes. Policy makers are at better position to effectively assess whether the anticipated benefits of IT investments outweigh its costs in Nigerian banking sector. Simply because as far as IT effects on organisational performance are concerned, what matter is not the amounts of dollar spent on IT, but the actual usage in the organisation. From the result of this study, policy makers are expected to do more in helping business to take advantages of technologies in building differential capabilities through IT.

### 1.7 Limitations of the study

One of the major limitations of this study is that it relies on perception measure to assess the bank performance and sometimes biasness might exist in the process. Although, effort has been made to minimize it, but such biasness cannot be eliminated completely in perception studies. Secondly, this study is cross-sectional in nature, it only collects data once at a time, different results might be established if data is collected over a long period of time. Thirdly, this study is limited to banks operating within Kaduna state, findings cannot be generalised to the national level as different result may be obtained by increasing the sample size to national level or different sector.

### 1.8 Scope of the Study

This study examines the effects of dynamic IT Capabilities on bank performance and the mediating effects of Process improvement capability of banks using banks in Kaduna state as case study. Organisational performance was measured in both financial and non-financial dimensions as dependent variables. DITC served as independent variable and process improvement as mediating variable. Banking industry was chosen due to several factors such as information intensity and other reforms mainly on e-banking systems which go along with intensive investments on IT capabilities to compliance with regulatory requirements and to overcome threats from both local and global competition. Banking industry is also among the early IT adopters in Nigeria (Ringim 2013). Initially, DMBs were the focus of this study; they are at the center when it comes to IT adoption in Nigeria. However, this argued, that one of the major issues confronting Nigeria is the state of economic development. It is therefore crucial to include both MFBs and DBs in this kind of study in order to see the level of agreement from their perceived experiences as they are at the heart of financing economic activities.

Similarly Kaduna state is suitable for this study since it has considerable number of banks and other financial institutions operating within the state (CBN, 2015). With over 7.1 million people living in Kaduna state (Kaduna Investment Guide, 2014) there are 47 banks operating

within Kaduna state. Out of these, 21 are commercial banks, 23 microfinance banks, and 3 development banks (KIG, 2014; CBN, 2015). DITC consist of IT management capability, IT personnel expertise and IT infrastructure flexibility. Process improvement consists of Automational effect, Informational effect and Transformational effect. Bank Managers and other IT staff at management cadre are in better position to rate perceived performance of their respective banks within the last three years. This study treats organisation as unit of analysis.

### 1.9 Definition of variables

The three major variables involved in this study are DITC, Process improvement and organisational performance. The definition of these variables is briefly presented Table: 1.1.

Table: 1.1.

Variable:      Operational definition

A. Dynamic IT capabilities      Operationalise as the firm's ability to focus on building integrating, and reconfiguring IT-based resources and competences to adjust to rapidly changing business environments.

1. IT knowledge Creation      Is operationalise in terms of organization ability to gather knowledge from the environment it operates through the use of IT resources.

2. IT management capability Refers to IT and management staff's ability to 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.

3. IT personnel expertise This refers to fundamental skills of IT elements and business experience that IT staff possesses in the organization. That helps firms to develop reliable and cost-effective information systems and anticipate business needs on IT sooner than competitors.

4. IT infrastructure flexibility This study defined IT infrastructure flexibility as the 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.

B. Process improvement This study operationalised process improvement as continuous changes in the business processes of an organisation from its current state to newest state.

1. Automational effect This refers to the efficiency derived from utilising IT to replace the human based in the organisation That helps organization to automate most of the routine processes.

2. Informational effect This refers to the extent to which IT capability helps to collect, store, process and disseminate information within and among organisations.

3. Transformational effect This refers to the ability of IT resources to facilitate and enable process innovation and transformation within organisation. This enhances quality of decision making within the firm.

C. Organisational performance Is operationalise as the ability for the organisation to achieve marketing, financial and administrative performance in order to sustain their positions in the market and industry.

1. Marketing performance This refers to organisation focus in creating value to customers in product and service offering. This improves customer satisfaction, through price reduction, new products offering, etc.

2. Financial performance This refers to firm's ability to achieve financial gain through profits, cost cutting, labor and budget reductions.

3. Administrative performance This refers to firm's ability and renewed control over resources and processes, and enhances coordination among departments.

Source: Author, (2016)

### 1.10 Plan of the Study

This dissertation is presented in five chapters as follows. Chapter one provides research background, statements of the problem, research questions, objectives of the study, research hypotheses, significance of the study, scope and plan of the study. Chapter two discussed related literature on organisational performance, Dynamic IT capabilities; concepts and measurements, Process improvement, theoretical framework and proposed research model. Chapter three discussed methodology adopted for the study. Chapter four consists of data analysis and presentation of the findings. Summary, conclusions, recommendations, and suggestion for future research are all presented in chapter five.

## CHAPTER TWO

## LITERATURE REVIEW

### 2.1 Introduction

This chapter focusses on the relevant literature on which the research is based. Specifically, it examined conceptual framework of IT capability that includes Value creation Capability and Dynamic capabilities as well as the relationship between them. Definition and Operationalisation of the research constructs, review of relevant studies, theoretical framework, performance measurement and proposed research model are all presented in this chapter.

### 2.2 Concept of Organisational Performance

Various measurement approaches were used to measure organisational performance at a particular point in time. However, organisational performance can be measured in terms of level of output (Luper & Kwanum, 2012). According to Ringim (2012) organisational performance refers to the actual output of an organization measure against its inputs, and this measurement allows a firm to focus its attention on areas that need improvement. In addition, organisational goal achievement should be the main yardstick of measuring the degree of organisational performance (Owosemi & Adeyeye, 2012). Therefore, a good measurement of organisational performance should be able to consider the goal of the owner or a policy designed to promote the sector (Marr & Schiuma, 2003), such as IT standard in the banking sector. Organizational performance is the most important criterion in evaluating organizations, their actions, and environments (Richard, Devinney & Yip, nd). This importance is reflected in the persistent use of organizational performance as a dependent variable (Richard et al., nd). In this study, organisational performance is operationalised as the level of bank performance increase or decrease in both financial and non-financial indicators.

#### 2.2.1 Concept of Bank Performance

Bank refers to an institution which accepts deposits from the public and advances loans by creating credit (Open University of Nigeria [NOUN], 2014). In a broader sense, bank is an institution that accepts, collects, transfers, pays, exchanges, lends, invests, or safe-guards money for its customers (NOUN, 2014). The role of banks in Nigeria cannot be overemphasized. Banks encourage saving and investment, provide capital needed for development; enhance domestic and international trade as well as providing managerial and financial advice in the nation's economy (NOUN, 2014), and IT is essential in facilitating this.

However, the challenge of financial markets require a change on the part of banks to move beyond product offering to more strategic organisation by reducing costs, increasing quality, speed, flexibility and dependability. According to Ringim (2012), banks are like other organisations that try to improve its operations and overall performance by comparing its effectiveness and efficiency over a period of time. Therefore, bank performance can be assessed in terms of profitability, market value, market share, productivity, innovation, quality of product and services, human resources and administrative performance (Dess & Robbinson, 1984).

Although financial performance has been the primary focused of measuring performance, however, in addition to financial performance, other Key Performance Indicators (KPI) such as customer service, resources control and coordination are critical to organisational success and survival in an unstable environment. In this regard, an aggregated organisational performance could be marketing performance, financial performance, and administrative performance. Banks often, rely on these KPI to assess and evaluate their effectiveness and efficiency over the period of time.

### 2.2.3 Dimensions of Organisational Performance

Performance can be examined at different stages in organisational setting. It can be at firm process level where process improvement is paramount, or at organisational level where overall performance gain is achieved. Performance improvement at process level refers to continue changes in business process of an organization from its previous to a newest state, whereas performance improvement at organisational level is referred to as the ability of the firm to achieve financial, marketing and administrative performance to sustain their position in competitive environment. This implies that performance can be measure objectively, subjectively or a combination of both. However, objective measures are less useful for research focusing on product, services (Richard et al., nd), at different organisational level. Furthermore, the reduction in the performance of Nigerian banks in terms of profitability and other operating cost requires managers to think, re-strategise and focus more on other performance indicators (CBN/BSD, 2008). Alternatively, subjective measures apparently ask informed respondents about organizational performance. In addition, frequent use of mix methods indicates that, these measures can easily be tailored to the dimensions of the researcher's interest which is to assess the overall performance of banks. Prevailing market conditions in the banking sector require comprehensive approach to ensure sustained performance.

### 2.2.4 Performance Measurement

Although financial performance has been a reference point in previous studies that examined IT effect on firm performance (Dehning & Stratopolous, 2000; Michael, 2007; Stoel &

Muhanna, 2009). Nevertheless, organisational performance has been measured differently by different researchers (Gregor, Martin, Stem & Vital, 2006; Ngai, Chau & Chan, 2011; Yoon 2011; Chen & Wuj, 2012). For example, a study by Tallon, Kraemer, and Gurbaxani (2000), identified four different types of performance that include market focused, operational focused, dual focused and unfocused based on the data from 304 organisations around the world. An operational focused of IT investment is to reduce operating cost while improving quality, speed and time to market (Anand et al., 2013). In market focused, firms utilize IT to create value and enhance value propositions for their customers (Fan & Zhang, 2012; Khallaf, 2012). This finding has opened up a new dimension in assessing IT effect on organisational performance at process level.

In another perspective Damanpour and Evan (1984) examined the linkage between technological innovations and administrative performance and emphasized that firms introduced changes in their structure and processes to improve administrative performance. Anand et al (2013), posited that while IT enable firms to improve financial and marketing performance it also helps them to achieve better control over their resources and enhance coordinating process among departments. This allows them to better plan for the future. This study measured organisational performance using three proxies that include marketing, financial and administrative performance as combined organisational performance of banks. This approach provides a comprehensive framework for evaluating IT effect on bank performance.

a. Financial performance is operationalized as bank's ability to attain financial gain through cost reduction, labor saving, budget reduction and enhancement in firm profitability.

b. Marketing performance is operationalized as banks focus towards creating value for their customers; in price reduction, providing new products and services and enhance customer satisfaction.

c. Administrative performance is operationalized in terms of firm renewed control over resources; enhance coordination among the departments and within the organisations.

The importance of these measures includes: to ensure proper and adequate treatment of customers in such a way that they feel satisfied and fulfilled (Kotler, 2003), to reinforce financial position of banks and enhance control and coordination over resources and capabilities of the organisation. While these are strategically important in modern organisations, it is also argued that we cannot evaluate organisational performance effectively

without taking organisational goals into considerations as modern organizations are multi-goal orientated (Ringim, 2012). This is because for any bank to operate efficiently the cost must be minimal, it has to be flexible, and customer service must be improved as well as speed and dependability. This is clearly relevant to researchers interested in both RBV and DC theory.

### 2.2.5 Review of Studies on Organisational Performance

Recently, IT has been identified as the driving forces that greatly improve bank performance in areas such as customer service, operation efficiency and organisational performance (Aboola, 2007). Before the commencement of e-banking service in Nigeria, customers spend hours in queues to make transactions of either cash deposit or withdrawal (Ringim, 2012) as transactions were manually processed (Ojeka & Ikepefan, 2011). Ringim (2012) established that introduction of e-banking services helped banks to reduce operational costs and expand their customer base. While Electronic banking has gained increasing popularity, Oladejo and Akanbi (2012) reported that bankers in Nigeria perceive electronic banking as tool for minimizing inconvenience, reducing transaction costs, altering customers queuing pattern and saving customers banking time as well as increasing the chances of government access to public data. However, this comes with increasing the chances of fraud as a result of lack of information security which brought the need for banks to go beyond computation to DITC to protect their assets and clients. It is agreed that IT capability facilitates efficient utilization of information (Bharadwaj, 2000) and enhances service delivery, reduces transaction error (Tippins & Sohi, 2003). IT also helps to understand the existing process, eliminate inefficiency and increase performance (Ringim, 2012). This author argued that assessment of organisational performance is essential for bank managers, regulators, customers and depositors as such will help them to decide whether to retain or withdraw their investment from the bank. Studies have shown significant positive correlation between IT capabilities and organisational performance (Mahmood & Mann, 2000; Lipton, 2002; Hadidi, 2003) as such, the application of IT concept and techniques in the strategies of banking operations has become a subject of fundamental importance and indeed a prerequisite for local and global competition (Salawu & Salawu, 2007; Oladejo & Adereti, 2010; Oladejo & Akanbi, 2012).

While these studies linked organisational performance to IT, others do not. They reported that IT did not have any significant impact on organisational performance (Roach, 1987; Strassmann, 1990; Aduloju et al., 2014). In his controversial article "IT doesn't Matter" Carr (2003: 1), argued that IT is ubiquitous, becoming increasingly inexpensive and accessible to all organisations and therefore cannot provide differential benefits to any organization because scarcity not ubiquity is the basis for sustained competitive advantage. Carr compares IT with other infrastructure technologies such as railroads, telegraph and electricity, and argued that the very core functions of IT such as data storage, data processing and disseminating becomes available, and accessible to all organisations, and thus their strategic

importance diminished. Slow (1987), posited that “you can see computer age everywhere but not in productivity paradox.” whereas firm spend a lot of money on IT but not tangible benefits.

In response to literature reporting negative relationship between IT investment and firm performance; Dehning and Stratopolous (2000) examined whether successful IT investments could solve productivity paradox. Their study operationalised firm performance into financial terms such as ROI, ROE & ROA. It is documented that successful IT users have superior financial performance relative to less successful users. Brynjolfsson and Hitt (1990) discovered a positive relationship between IT investment and firm productivity which were estimated to be 81% of gross marginal product of IT investment against productivity. These authors argued that their finding is more robust and empirically valid as it is drawn from a larger and current data. Brynjolfsson and Yang (1996) conducted another study within 150 firms and reported that “productivity paradox” was not valid since investigating the relationship between IT and firm performance in the late 80s to 90s were practically impossible due to insufficient data and rigorous methodology to support those findings. Other reasons such as the time it take to reflect organisational learning and mismanagement of IT could also led to those inaccurate findings (Brynjolfsson & Yang 1996), which lack theoretical grounding.

IT Capability theorem was introduced by Ross, Beath, and Goodhue (1996) to address the short comings of previous studies based on the Resources Based View (RBV) theory of competitive advantage. RBV theory posits that organisational resources are valuable, rare and inimitable can lead to the creation of competitive advantage, and that advantage can be sustained over longer time periods to the extent that the firm is able to protect against resource imitation, transfer, or substitution (Barney, 1991). Organisational resources refer “all assets, capabilities or competencies under the control of firm that makes the firm able to develop and implement strategic changes aimed at improving effectiveness and efficiency” (Barney, 1991: 101). This capability in questions is defined as the ability of firm of firm resources to perform specific task (Grant, 1991) and they are of the two types tangible; which includes physical, human and technological capabilities, and intangible resources in terms of knowledge, skills and expertise of employees in the organisations (Hitt, Ireland & Hoskisson, 2012). Ross et al. (1996), defined IT capability as “the ability to control IT-related costs, deliver systems when needed, and affect business objectives through IT implementations.” These authors argued that the success of firms cannot be assured by IT itself, but by a firm’s ability to apply IT capability to external changes. Table 2.1 shows some selected studies on IT capability concept and Organisational performance.

Table 2.1 Selected studies on IT capability concept and Organisational performance

Authors	Type of Research & IT Capabilities (IV)	Measurement (DV)	Findings
Bharadwaj, (2000)	Empirical study on IT capability	financial (profitability ratios)	Finding indicates that firms with higher IT capability were found to be larger than those with low capabilities.
Farooq, (2003)	Review	Various studies the structure and performance of Deposit Money banks measurements include Lorenz's curve, Gini Coefficient, etc.	His finding indicates the absence of competitive environment among the banks( all the variables were highly skewed), and profitability of banks weaken.
Agboola, (2006)	Empirical study on bank adoption of ITC	Measurements are Based on innovative technologies, degree of utilisation and impact on bank's operations.	Finding indicates that technology has been a driving force for competitive advantage and overall performance of bank.
Lin, (2007)	Empirical survey on IT capability	Financial ratios (ROI, ROA etc.)	Finding indicates that IT capabilities contributed to the total effectiveness of banks in terms of customer service and operational efficiency.
Akhtar, (2010)	Used data employment analysis efficiency and productivity indices of Saudi Arabian Banks	Measurements include change in total factors of productivity to improve performance over time.	His finding has shown improvement in the average performance of banks as a result of technological advancement in the banking sector.

Ringim et al, (2012) Empirical study on moderating effect of IT capability on Bank performance financial and nonfinancial (ROA, ROE & customer service)The result fully supported the relationship between IT Capability and bank performance in terms of profitability and customer service management.

Pebrianto & Djanhur, (2013) Empirical survey on IT capabilities and bank performance Nonfinancial (Market & Operational) Finding shows that IT capability influences bank performance in terms of operational and marketing performance.

Aduloju, Oluwokudejo &Obalola, (2014) Empirical study on IT investment and firm performance Non-financial (customer service) Finding indicates negative relationship between IT investment and customer service improvement.

Idroes, (2015) Empirical study on Financial ratios Finding has shown the relevance of distinctive capabilities on banks performance.

#### Distinctive capability of Banks

Sources: Author, (2016).

In her study, Bharadwaj (2000) defined IT capability as the firm's ability to mobilize and deploy IT based resources in combination with other resources and capabilities. This definition has some elements of DC theorem. For example, Bharadwaj (2000) study directly linked IT capability with organisational performance and found that a firm that developed and adopts IT capability benefits significantly in higher profit ratios and lower cost ratios. This finding highlights some important issues by concluding that; every IT leader (firm) contain IT infrastructure, but either includes IT human resources or IT enabled intangibles resources. This clearly indicates the importance of DITC to sustained competitive advantage. It is also argued that IT infrastructure capability is similar across firms due to open standards of software and hardware components (Bhatt & Grover, 2005). These authors proposed three types of IT capabilities and argued that one type could not be a source of sustained competitive advantage. Since then, many studies proposed multiple dimensions of IT capabilities that include human, physical and intangible capabilities (Byrd & Turner, 2001; Santanam & Hartono 2003; Tippins & Sohi, 2003; Lin 2007; Bharadwaj, 2010 Kim et al 2011). In the same vein, Wade & Hulland (2004) confirmed the usefulness of RBV theory for IS research but equally recognised its limitations to addressing sustainability in unstable business environment (Wade & Hulland, 2004).Those authors called for the inclusion of DC theory to address the shortcoming of RBV theory in unstable environment. They argued that

IT resources can acquire several characteristics of dynamic capabilities, such as speed, flexibility and dependability and innovation that are useful to firms operating in an unstable environment.

### 2.3 Concept of Dynamic Information Technology Capabilities (DITC)

Dynamic IT capability (DITC) is defined as the ability to integrate, build, and reconfigure IT-based resources and competences to adjust to rapidly changing environments (Xiao & Subhashish, 2009). This definition extends IT capability theorem by including dynamic capabilities. The concept of DITC offers promising hope in explaining a firm's sustainable competitive advantage and long term superior performance. Xiao and Subhashish (2009) posited that although successful firms may have followed RBV to obtain competitive advantage and superior firm performance, but it is not suffice to explain such achievement by them. They argued that firms with superior competitive advantage are those who can effectively respond to technology and market changes by developing and redeploying internal and external competencies (Teece et al., 1997). Attempts were made to distinguish between DCs and functional capabilities (FC). Collins (1994) operationalised functional competences, as the purposive combinations of resources that enable an organization to perform operational activities such as logistics, manufacturing, marketing and sales, whereas, DCs deal with changes. Eisenhardt and Martin (2000) examined the nature of DCs, and how those capabilities are influenced by market dynamism, and their development over time. These scholars have several observations about DCs such as specific strategic and organizational processes like product development, alliancing, and strategic decision making that create value for firms within dynamic markets by manipulating resources into new value-creating strategies. (2), these capabilities, which often have extensive empirical research streams associated with them, exhibit commonalities across effective firms and thus can be termed as "best practice." (3), the effective patterns of DCs vary with market dynamism. That is when markets are moderately dynamic such that change occurs in the context of stable industry; DCs resembles the traditional conception of routines (Nelson & Winter, 1982). In high-velocity markets where industry structure is blurring, DCs take on a different character such as being experiential, unstable processes that rely on quickly created new knowledge and interactive execution to produce adaptive, but unpredictable outcomes (Eisenhardt & Martin, 2000). The existing studies viewed on DC from different perspectives are shown in table 2.2.

Table 2.2 : Different views on the role of dynamic capabilities constructs

#### Author Position on dynamic capabilities

Teece, et al., (1997) In dynamic markets, DC by which firms integrate, build, and reconfigure internal and external competencies to quickly address these changing becomes source of sustained competitive advantage.

Priem & Butler, (2000) Viewed DC as tautological, vague, and not operational, which lack empirical grounding.

Eisenhardt & Martin, (2000) DC as neither vague nor tautological but a set of specific and identifiable processes that are similar, equifinal, and substitutable than is usually assumed. DC can only be a source of competitive advantage if they are applied “sooner more astutely, and more fortuitously” than competitors.

Wang & Ahmed, (2007) Ability to apply capabilities ‘sooner, more astutely, and more fortuitously’ is, indeed, at the heart of DC which is costly for others to imitate and therefore can be a source of sustained competitive advantage.

Zott, (2000) Even if DC are equifinal across firms, robust performance differences may arise across firms if the cost and timing of DC deployment differs.

Collins, (1994) Posits that higher-order organisational capabilities (DC) allows firm to overcome path dependence that led to imitability of lower-order capability.

Protogerou, et al (2008) Viewed DC and its underlying dimensions as a set of identifiable, measurable and thus managerially amenable options that can be used to address rapidly changing business environment through new technological capabilities.

Source: Author, (2016)

Teece (2007); Helfat et al (2007) posit that whereas functional or operational capabilities help to ensure day-to-day operational efficiency, dynamic capabilities help to sustain market position by enabling creation, extension, and modification of resources thereby achieving long-term competitive advantage (Protogerou, et al., 2008). Then, DC and FC are two sides of the coin in affecting organisational performance especially in an unstable business environment.

### 2.3.1 Importance of Dynamic IT Capabilities (DITC)

As business environment become unstable, a paradigm shift is needed to explain how competitive advantage is gained and held. In the banking sector, DITC is very vital for banks to gain and sustain performance over a long period of time. This is because as winners were able to demonstrate timely responses to market changes, losers are simply confused on the

aspect of strategies that best suit their situation. Therefore, the more turbulent times, the more DC are critical to organisational performance due to factors such as competitive strategies, technologies changes and the environment in which organizations operates. This capability in questions refers to firm's ability to excel in area of doing business (Idreos, 2015). According to Teece (2007) dynamic capabilities can be disaggregated into three forms. Firstly, to sense and shape opportunities and threats, and secondly, to seize identified opportunities. Thirdly, to maintain competitiveness through enhancing, combining, protecting, and whenever necessary reconfiguring organisational tangible and intangible resources (Teece, 2007). The need to match organizational processes to IT capability was illustrated by the finding of (Brynjolfsson & Hitt, 2000) when they argued that in addition to prior investments, firms still need to make a much larger investments before they fully benefits from IT. This clearly established that the impact of DITC is different from other types of capability that can be obtained at marketplace. Bhatt and Grover (2005) distinguished between three types of IT capabilities and argued that one type could not be a source of sustained competitive advantage. According to them IT capabilities can be categorized into value, heterogeneity, and imperfect mobility. The first two are necessary conditions for competitive advantage, whereas, the latter is necessary for sustained competitive advantage. The second category is dynamic IT capability which set to provide firms sustained competitive advantage. Dynamic capabilities allow companies to reviews their competitors over time and sustain competitive advantage thereby widening market shares and improving profit margins (Hayes, et al., 1996). Therefore, in order to beat competitors and maintain a competitive advantage, banks are required to have DITC (Idreos, 2015). These include IT business experience or IT personnel expertise (Bhatt & Grover, 2005). Other scholars consider IT management capability and IT infrastructure flexibility as part of firm IT capabilities that are valuable, rare and inimitable by competitors (Byrd & Turner, 2001; Anand, et al., 2013). For example, IT personnel expertise allows firms to integrate IT with business strategy, deployed assets and cost effective systems and facilitates business needs sooner than competitor (Sambamurthy & Zmud, 1997) whereas flexible IT infrastructure enhance response to make changes with less difficulties in terms of time and cost. Basically, if organizations can sense and monitor the internal and external changes, they would have certain expectations in their performance (Bhatt & Grover, 2005; Xiao & Subhashish, 2009; Kim et al 2011; Ringim, 2012). Table 2.3 shows some selected studies on IT capability, RBV and DC theory of competitive advantage.

Table 2.3 Some selected studies on IT Capability, RBV theory, and DC theory

Author(s)	Types of Research & IT capabilities (IV) Theory	Measurement/ DV	Findings
Ross et al (1995)	Conceptual/ IT capability	Competitive advantage	Has found that IT capabilities in terms of IT human resources, relationship assets, combined with IT processes lead to sustained competitive advantage.

#### RBV

Bharadwaj, (2000) Empirical/IT capability financial (profitability ratios) Firms with higher IT capability were found to be larger than those with low capabilities.

#### RBV

Santhanam & Hortono (2003) Empirical/IT capability financial performance Confirmed the works of Bharadwaj (2000) by establishing that firms with superior IT capability experience superior performance.

#### RBV

Chari, Deveraj, & David (2007)

IT investment Competitive advantage IT investment enhanced firm performance related to international diversification.

Clamens & Row (1991) Conceptual/ IT investment Competitive advantage It is found that IT by itself cannot provide a firm with sustained competitive advantage. But IT is essential for generating complementary effect when leverage with other resources.

#### RBV

Pebrianto & Djanhur, (2013) Empirical/IT capability Non-financial (Market & Operational) Finding shows that IT capability influence bank performance in terms of operational and marketing.

#### RBV

Zhu & Karaemer (2002) empirical e-commerce capability Performance improvement Finding has shown that traditional firms need to enhance their alignment between IT infrastructure and e-commerce capability in order to reap the benefit of IT investment.

#### RBV & DC

Aduloju, et al (2014) Empirical/ IT investment Customer service Finding indicates negative relationship between IT investment and customer service improvement.

Mata Fuerst, & Barney (1995)

Conceptual/IT investments    Sustained competitive advantage    Established that IT managerial skills are the only resources that lead to sustained competitive advantage.

Aduloju, (2014)    Empirical/IT capability    Customer service    IT investment is a necessity, but not sufficient condition for sustainable competitive advantage in customer service. But IT management capability significantly related to customer service improvement.

#### RBV

Zhu (2004)    Empirical/IT investments    The synergy between IT infrastructure and e-commerce capability affect firm performance in terms of sales per employee, cost reduction and inventory turnover.

Bhatt & Grover (2005)    Empirical/DITC    Sustained competitive advantage  
Finding has shown that IT infrastructure is a critical component to creating competitive advantage but emphasised on the need for IT personnel expertise as non-substitutable and non-transferable IT assets that lead to sustained competitive advantage.

#### RBV & DC

Wu, Yuniyurt, Kim & Cavusgil (2006)    Empirical/ IT capability/mediator    firm performance  
Examined the mediating role of IT enable supply chain capabilities on the relationship between IT investment and firm performance and found that this capability enabled firms to respond to market changes more quickly and effectively in turbulent times.

#### RBV

Lai, Li, Wang & Zhao (2008)

empirical/IT IT capability    Financial and marketing performance    Finding established that IT capability is significantly related to three dimensions of competitive advantage that include reducing costs, improving customer services and providing innovative and customised services.

#### RBV

Idroes, (2015) Empirical/Dynamic capabilities.    Firm performance.    Finding has shown the relevance of distinctive capabilities and their direct impact on banks performance.

## DC

Ringim et al (2012) Empirical/IT capability Financial and nonfinancial IT capability is significantly related to organization performance of banks based on resource based view (RBV) of organization performance.

## RBV

Wade & Hulland (2004) RBV theory and Informations systems research Organisational performance Reviewed RBV in IS research and its possible extension to make it more robust, their finding confirmed the application of RBV to IS research, and call for the inclusion of DC theory to address its shortcomings.

## RBV

Ringim et al (2012) Empirical/IT capability as moderator Financial and nonfinancial Findings showed that IT capability moderated the relationship between BPR factors such as customer focus, change management, management commitment and overall organizational performance of bank. It also moderated the relationship between IT investment, management commitment and customer service management performance of banks.

## RBV & DC

Protogerou, et al (2008) Empirical/Dynamic capabilities Competitive advantage Dynamic capabilities are antecedents to functional competences which in turn have a significant effect on performance. The direct effects of DC on performance are found to be insignificant, and similar effects seem to hold for both lower and higher levels of environmental dynamism.

## DC

Kim et al (2011) empirical/IT Capabilities Competitive advantage Identified IT management capability, IT personnel expertise, and IT Infrastructure flexibility as IT capabilities and claimed that these dimensions are interrelated and the synergy between them influence rapid change in business processes which lead to superior firm performance. DC

Sources: Author, (2016)

### 2.3.2 DITC Measurement

Prior studies conceptualised IT capability from different dimensions such as IT object, IT knowledge, IT operations, IT human as well as intangible IT enabled resources (Bharadwaj, 2000; Tippins & Sohi, 2003; Bhatt & Grover 2005; Bharadwaj et al., 2010). This study is based on Kim et al., (2011) model which consists of IT management capability, IT personnel expertise and IT infrastructure flexibility as a combination of dynamic IT capabilities.

According to Kim et al., (2011) these capabilities are interrelated in influencing changes in business processes leading to superior firm performance. They are among the highest IT capabilities in IT research (Byard & Turner, 2001). Their dimensions and measurements are briefly discussed as follows.

#### 2.3.2.1 IT Management Capability

IT Management Capability refers to skills, knowledge relating to IT capability that helps managers to configure, implement and apply IT across firms (Chen & Wu 2011), thereby integrating the IT functions with critical business processes (Weill, Subramani & Broadbent (2002). Anand et al (2013) conceptualized IT management capability as the management of all heterogeneous IT assets within the firm. Peppard (2007), refers to IT management capabilities as the ability of a firm's IT staff and management to administer IT resources and transform them for the creation of business value. IT management capability is noticeable in the areas of planning, investment decision making, coordination, and controlling (Bhatt & Grover, 2005).

There are two reasons why Managerial IT capability is likely to be sources of firm sustained competitive advantage. Firstly, they evolved over time; through history and "learning by doing" thereby making them heterogeneous across firms. Secondly, the relationship between IT staff, its managers and other employees developed over time; making it difficult to imitate by other competitors (Mata, Fuerst & Barney, 1995). Therefore, the stronger the relationship between IT and other business units, the more effective use IT resources will be (Tsou & Chen, 2012).

#### 2.3.2.2 IT Personnel expertise

IT Personnel expertise refers to the ability of a firm's IT personnel to understand business needs and create IT solutions that address the enduring business opportunities and challenges (Bhatt & Grover, 2005). In this context, the ability of a firm to leverage IT resources largely depends on the interaction of the IT personnel with the other business units (Bassellier, Horner & Benbasat, 2001). Sambamurthy and Zmud (1997) regards IT personnel expertise as the firm ability to integrate IT strategy and business strategy, develop reliable and cost-effective systems for the business, and anticipate business needs sooner than the competitors. Bhatt and Grover, (2005), argued that although physical assets and tangible resources can be replicated by competitors, strategic firms rely on IT personnel expertise to achieve sustainable competitive advantage. It is also suggested by Lin, (2007), that a firm's IT strategy should incorporate a human factor as a key determinant of IT success. According to Lin (2007), a firm cannot generate value without the ideas, skills and leadership of experienced personnel. Therefore, superior value is created by the excellent people who can proactively create a competitive advantage through imagination invention, innovation and linking firm's internal processes and structures with markets changes (Brockbank, 1999). This will facilitate learning and reflection to sustained competitive advantage in the dynamic environment.

#### 2.3.2.3 IT Infrastructure Flexibility

IT infrastructure flexibility is defined as the 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. It is firm's ability to develop, diffuse and maintain various information systems efficiently in the context of changing business environments, market needs and strategies Weill et al (Anand et al., 2013). Flexible IT infrastructure is categorised by connectivity, compatibility, and modularity (Saraf, Langdon & Gosain, 2007). Connectivity refers to the ability of IT components to connect with other components within the firm or with partners, whereas compatibility is the ability to share any type of information, such as data, image, text, audio video in and outside the firm boundaries. Modularity is the ability to add, remove or modify any elements of the IT components with ease and without negative effect on firm's performance (Chung, Rainer & Lewis, 2003; Fink & Neumann, 2009; Ngai, Chau, & Chan, 2011; Ployhart, Van, Iddekinge & Mackenzie, 2011).

#### 2.3.2.4 IT Knowledge Creation

IT knowledge creation refers to organization ability to gather knowledge from the environment; it operates through the use of IT enabled resources. According to Pei, (2008) knowledge creation is important in the sense that innovation is driven by the creation of knowledge. Therefore, to compete effectively, organisations must leverage their existing knowledge and create new knowledge that favorably positions them in their chosen markets. Nonaka (1994) argued that any organization that dynamically deals with a changing environment ought not only to process information efficiently but also create knowledge. It can be argued that the organization's interaction with its environment, and the means by which it creates and distributes knowledge are more important when it comes to building DC.

#### 2.4 Review of Previous Studies on DITC constructs

Among the early studies that examined IT capabilities, OseiBryson and Ko (2004) argued that IT capability has significant impact on firm performance only when it exceeds a threshold value. Aduloju (2014) seeks to find out whether IT investments and IT management capability can account for variations in customer service performance among insurance companies in Nigeria. This study established that IT investment is a necessity, but not sufficient condition for sustainable competitive advantage in customer service. But IT management capability has significantly influenced customer service improvement. To realize IT-business value; IT investments should be accompanied by building and developing IT management capability. In their study Yongmei, Hongjian and Junhua, (2008) reported the IT management capability moderates the link between IT investments and organisational performance.

Chen and Wu, (2011) empirically examined the impact of IT management capability on the performance of Chief Information Officer (CIO) and established that IT infrastructure and IT

management capability have positive significant impact on the performance of CIO. Kwon and Watts, (2006) employed data to empirically test IT infrastructure and IT management capability on firms performance on knowledge management and profitability in turbulence times. Their finding suggested that IT is an enabler in knowledge management efficiency and in increasing firm profitability. Similar study established that IT management capability plays a significant role in developing other capabilities for customer, process and performance improvement (Mithas, Ramasubbu & Sambamurthy, 2011). Prior studies on IT management capability were based on the premise that it was unclear on how managers deploy and manipulate IT assets in response to market changes (Kwon & Watts, 2006). Specifically, it examines how managers deploy IT when the environment is characterized by knowledge intensity, deregulation, volatility and global competition (Prahalad, 1998; El Sawy et al., 1999). Strategic management literature has long identifies the need for DITC to compete successfully in turbulence times. Sambamurthy, Bharadwaj and Grover (2003), posit that linking IT assets with business strategies is becoming more difficult and riskier than before. This means in addition to investment on IT infrastructure firms need experts' advice from the management in acquiring and deploying the best emerging technologies, to understand their potentials (Chen & Wu, 2011). However, real strategic changes cannot take place without competent IT personnel with combine IT knowledge and business experience in the organisation.

Kearns and Lederer (2003) established that, the degree to which the IT reflects strategic business plan is crucial to achieving competitive advantage. Some studies discovered that IT personnel expertise becomes firm's intangible assets when an IT staff understand business strategies and align it with IT skills (Ross et al., 1996; Feeny & Willcocks, 1998; Chen & Tsou, 2012). IT staff with sufficient business knowledge and experiences are able to provide IT solutions to prevailing market conditions (Anand et al., 2013). Since firm's competitive advantage largely depends on the business experience and technical skills of IT personnel, this directly determines the firm's ability to rapidly develop and deploy critical systems for sustainable competitive advantage (Clark, Cavanaugh, Brown & Sambamurthy, 1997). Wade and Cook (2007) explored the relationship between internal and external IT capabilities on the realization of IT effect on firm productivity. Their finding argued that although a firm may see tangible benefits by using external IT capabilities but these benefits are moderated by the level of IT internal capability. They argued that a firm with weak internal IT capabilities in the form of IT personnel expertise will find it difficult to benefits from the external IT capabilities.

Researchers believed that IT personnel expertise provides firm ability to integrate IT strategy and business strategy (Sambamurthy & Zmud, 1997; Bhatt & Grover, 2005). It is argued that when a firm solves problems through IT, it facilitates the development of IT knowledge and competence of IT personnel (Chen & Wu, 2012). This relationship and knowledge development enhance firm's ability to integrate IT functions into business functions and exploit IT resources (Chen & Wu, 2012). This type of capability cannot be supplemented by the external sources. Wade and Cook (2007) argued that external IT consultants may not

share the same norms and beliefs held by the internal staff and consequently their efforts in achieving organizational goals may be diluted or compromised. Researchers established that firms with highly IT personnel expertise will meet the demand of the changing business environment better than their competitors by aligning IT with business strategies (Bhatt & Grover, 2005; Kim, et al., 2011; Anand et al., 2013). Despite these assertions, empirical evidence on the role of IT personnel expertise on organisational performance remains sparse.

In the same vein, possession of IT management capability and IT personnel expertise alone will not provide banks a sustainable competitive advantage in Nigeria. This is because, despite competitive pressures and growing merger and acquisitions among banks in Nigeria, there is also growing concern for security breach and related frauds as a result of the adoption of in e-banking services in Nigeria. There were 2,478 fraud and forgery cases involving Nigerian banks valued at over N20 billion in 2013 alone, and this double to 200% in value from the previous (KPMG, 2014). Therefore, in the absence of IT infrastructure flexibility banks will find it difficult to effectively respond to market opportunities and threats. In other words, a competent IT personnel cannot do it alone but must rely on flexible IT infrastructure and management support to reengineer their core processes. Therefore, the stronger the relationship between these variables, the more effective the use of IT resources will be (Chen & Wu, 2012).

Khoshsima and Jafarnezhad (2011) employed data to investigate the effects of IT infrastructure flexibility on firm competitive advantage and organisational performance. Their finding shows that IT infrastructure flexibility is central to achieving competitive advantage in terms of time to markets, cost, product innovation, delivery and dependability as key performance improvement. Lim & Trimi (2014) also arrived with similar findings. It is reported that by having flexible IT infrastructure firms become more specialized and focused on their core competencies (Trimmi, Faja, & Rhee, 2009). Firms found it easier to combine their resources with that of other organizations and often enter into short term and long-term agreements with each other (Trimmi et al., 2009). Some studies also show that IT infrastructure flexibility was highly correlated with IT efficiency in areas such as transaction processing systems, management information systems, decision support systems, etc. (Chung, Byrd, Lewis & Ford 2005; Ness, 2005; Masrek, 2009). Several studies identified positive impact of IT infrastructure flexibility on firms' competitive advantage. For examples, Byrd and Turner (2001); Chung, Byrd, Lewis and Ford (2005), identified its positive impact on mass customization, innovativeness, difficulty to duplicate and market positioning. Weill, Subramani and Broadbent (2002); Planisamy and Sushil (2003) discoveries were on strategic agility and organisational flexibility. Gebauer and Schober (2006); Ngai, Chau and Chan, (2011) was cost efficiency and supply chain agility respectively. Chen and Nebraska, (2012) revealed that a firm with flexible IT infrastructure was able to sense and respond to market opportunities and challenges promptly. They concluded that IT infrastructure flexibility have strategic values for firm as they are significant sources of organizational agilities and

competitive advantages. This in turn significantly improves firm performance (Masrek, 2009), in terms of customer services, profitability (Liu, Kew, Wei & Hua, 2013), and the overall performance gain at organisational level.

While these studies acknowledged DITC impact. However, theoretical arguments have been advanced about their nature and their relationship with firm performance (Protogerou, et al., 2008). There are still arguments on whether DC directly or indirectly relate to firm performance. This relationship was examined by Protogerou et al (2008) study in particular, addresses the question of whether dynamic capabilities impact directly or indirectly on firm performance. It is established that dynamic capabilities are antecedents to functional competences which in turn have a significant effect on firm performance, and the direct effects of dynamic capability on firm performance was found to be insignificant. This was also confirmed by the findings of (Peteraf 2003; Protogerou, et al., 2008). Xiao and Dasgupta (2009); established that the relationship between dynamic IT capability and market performance depends on the organization's culture values in terms of involvement, adaptability, and mission. Idroes, (2015) has found the direct effects of dynamic capabilities on the organisational performance of banks. In their study Anand et al (2013) has found direct effects of IT capabilities on firm performance. Eisenhardt and Martin, (2000) argued that DC are similar by themselves across firms and therefore ineffective at providing sustainable competitive advantage. But this argument contradicts earlier submissions. This is because, dynamic capability theory was primarily introduced to address rapidly changing environments (Teece et al. 1997; Eisenhardt & Martin, 2000; Pavlou, 2004). In this case, this capability cannot be the same across firm, because ability to respond to market changes largely depends on the resources, skills and experiences of management and staff in the organization.

Building on the above findings, Protogerou, et al., (2008); Anand et al., (2013) studies throw more light on the concept of dynamic capabilities and their impact on firm performance. They both proposed and test a model which assumes that dynamic capabilities' influence on organisational performance is mediated by functional capabilities. Collins, (1994), operationalised functional capabilities as the purposive combinations of resources that enable an organization to perform functional activities such as logistics, manufacturing, marketing and sales whereas dynamic capabilities deal with changes. Therefore, whereas functional or operational competences help organization to succeed by ensuring its day-to-day operational efficiency, dynamic capabilities help to sustain strategic position by enabling creation, extension and modification of its resource base, and this in turn create long-term competitive advantage (Teece 2007; Helfat et al., 2007; Protogerou, et al., 2008). In other words, this is when performance improvement at firm process level reached the level of operational competencies and can be set to mediate the relationship between DITC and organisational performance. The mediating effect of functional competencies at process level is discussed below.

## 2.5 Concept of Process Improvement

It has been one of the primary research focuses in IT capabilities to find out whether or not IT investments can lead to greater organisational performance and achievement of sustainable competitive advantage (Brynjolfsson, 1993, Melville et al., 2004, Kohli & Grover, 2008). A related question inspired by this; is how IT investments contribute to organizational performance. This question leads IS researchers to shift their attention from the direct impact of IT on firm performance to the mechanisms through which IT contributes to firms performance (Piccoli & Ives 2005; Li, Chen, & Huang 2006; Ringim et al., 2012). A number of studies take a process-view approach, in which IT resources, in the form of IT assets and capabilities (Wade & Hulland, 2004), do not lead to greater firm performance directly but do so through intermediate organizational capabilities such as those in manufacturing, marketing, customer service etc. (Ray, et al., 2005, Banker, et al., 2006, Rai, Patnayakuni, & Seth, 2006). These studies assert that the effective use, management, and leverage of IT resources in fostering organizational capabilities can lead to value creation at process level.

Process improvement is an approach to keep pace with changing business environment, with respect to persistent technological, political and organisational changes to increase effectiveness and efficiency of business processes (Harrington, 1996). The main idea behind this process oriented methodology was based on the work of Zuboff (1988); Davenport (1993); Venkatraman (1994), and further developed by Mooney et al (1996). Zuboff (1988) argued that when firm IT is used to ‘informate’, a deeper level of transparency is provided through information generating, increasing speed to administrative processes through which organisational work is done (Fox & Hietanen 2007). Davenport (1993) classified business processes into operational and management processes. Mooney et al., (1996) adopted this classification and distinguished operational process from the management process. Automational effects on operational processes increase information content and availability to enhance decision making. An operational process is concerned with information processing, coordination, sharing and controlling, whereas transformational effects linked both operational and management processes concurrently (Mooney et al., 2005). On the basis of this, Pang, Lee and Delone, (2014) study aimed to identify the processes through which IT resources contribute to value creation in the public-sector organizations. Taking an interdisciplinary approach that combines the IS and the public administration literature, they proposed that the relationship between IT resources and organizational performance in the public sector is mediated by organizational capabilities such as public engagement capability, public service delivery capability, co-production capability, resource acquisition capability, and public-sector innovation capability. These authors argued that these five key capabilities are paramount to public-value creation (Moore, 1995, Stoker, 2006, Alford & Hughes, 2008, Alford & O’Flynn, 2009).

Earlier submissions on the mechanisms to which IT affect firm performance were based on the fact that measuring IT effect at organisational level could be misleading since it is difficult to separate any individual effect of IT on firm performance (Kelly, 1994). It is

argued that, any attempts to examine direct effect of IT investment on firm performance may suffer methodological weaknesses, as such would only provide limited view on how IT business value is created through IT (Mooney et al 1996; Kallaf, 2012). According to Ringim (2012), previous studies that focused on the direct relationship between IT and organisational performance failed to considered capabilities, that are improved by IT and which are true facilitator of performance improvement (Tippins & Sohi, 2003). Then, it is wrong to assume that simply adaptating of IT could lead to superior firms performance (Dewett & Jones, 2001), since the same technology can be adopted by other competing firms, thereby reducing differential benefits.

## 2.6 Types of Process Improvement

Performance improvement at firm process level through IT has long been identified in IS research. For example Zuboff, (1980) posits that IT value creation is achieved when a firm is able to automate, informate and transform operations. IT automation reduces cost and the amount of work that must be done by human beings. Zuboff, (1988) established that the effect of IT investment enable firms to automate, informate and transformate business processes which reduces cost and amount of work that must be done by labour. Zuboff, (1980) posits when firms use IT to ‘informate,’ a deeper level of transparency is provided through information sharing. Davenport, (1993) identifies nine alternatives (though related effects) such as automational effects, informational effects, analytical, tracking, intellectual and disseminating effects among others, that improve performance at firm process level. Thus, business value from IT is reflected through its impacts on intermediate processes (Mooney et al., 1996). According to Mooney et al., (2005) IT can have three separate but related effects on business operations, and through these effects IT creates value. These include automational effects, informational effects and transformational effects. Automational effects are the efficiency derived by substituting labor with IT components. Informational effects have to do with firm ability to collect, store, analyse and disseminate information for decision making and control. Transformational effects are the value derived from IT such as process innovation, etc. (Mooney et al 2005). The effects of these capabilities at firm process level are discussed below.

### 2.6.1 Automational effects

Automational effects refer to the efficiencies resulting from utilising IT, primarily by replacing human labour in the firm's business processes (Fox & Hietanen, 2007). That is efficiency captured by automating manual processes and substituting labour based activities (Mooney et al., 1996). Business value created is reflected in the form of labor saving, cost reduction and productivity improvement. Automational effect is associated with enhanced data captured, processing, and sharing that enable greater transparency and accountability.

### 2.6.2 Informational effects

Informational effects emerge from the firm's ability to collect, store, process and disseminate information (Mooney et al., 1996). Value derived from informational effect improves timeliness and quality of decisions, which is reflected by responsiveness, empowerment and effectiveness of resource utilisation (Bhatt & Grover 2005; Mooney et al., 2005; Anand et al., 2013). This support core business functions customer services, administrative procedures, etc.

### 2.6.3 Transformational effects

Transformational effects refer to the ability to facilitate and support process innovation and transformation (Sensele, 2006). Business value associated with transformational effect link operational and management processes concurrently which improve flexibility and responsiveness, to market changes in both service and product delivery (Fox & Hietanen 2007).

Advocate of process oriented methodology claimed that IT business value is achieved by the way IT renews existing way of performing business activities at firm process level (Mooney et al., 1996; McAfee & Brynjolfsson, 2008). Among researches that reports positive effect of IT at firm process level are the study of Jeffers et al (2008) which examined IT effect on customer service improvement. Sosota-Acosta and Merono-Cerdan (2008) also reported that IT effect create business value at online procurement process. Another study identified how the effects of Radio Frequency Identification (RFID) capability on firm performance was mediated through intermediates variables (Anand et al., 2013). Several studies arrived with similar findings which support significant IT effect at process level (Sensele, 2006; Karimi et al., 2007; Tarafdar & Gardon, 2007). Lin (2007) discovered that IT capability contributes directly to the overall value-creation of the organisational performance. Barua, Kriebel, and Mukhopadhyay, (1995) claimed that researchers that "relate IT expenditures directly to firm level output variables ignored the web of intermediate processes, where first order effects exist." To enrich understanding of the links between IT investment and firm performance, Mooney et al., (1996) adopted a process oriented methodology to examine the effects of IT on firms' performance. Their research model includes the mediating effects of IT on firms process such as firm value chain and management processes in terms of information processing and sharing. It is established that IT changes in the intermediate process is crucial to realising business value. A study by Kraemer, Gurbaxani and Dunkle, (2001) within 40 manufacturing firms covering 219 executives, ranked intermediate business processes as the basis of realising IT effect on firm performance in the area of customer relation, marketing supports, and production economy. Stanmark and Jadaan, (2010) argued that as the information being handled by firms increasingly becomes digital, the activities of the "boundary spanners" can be greatly enhanced and facilitated by IT (Yan & Lewis, 1999). Therefore, the inter-organisational systems such as electronic data interchange (EDI) and inter switch banking can be processed at higher pace (Ray, Muhanna, & Barney, 2005) Anand et al., (2013) was the first to hypothesised that IT capability can have significant effects at firm process level and that affect performance improvement at organisational level.

They also suggested for further empirical and analytical studies to validate their findings and improve literature in this direction.

Building on the above discussion, there is limited evidence on the role of IT effect on the process level improvement acting as mediator. Previous studies mostly focused on specific firm process (Aduloju, 2014) or technologies (Stenmark & Jadaan, 2010; Anand et al., 2013). In addition, some limitations were identified in Mooney et al., (1996) proposed model. Mooney's framework does not consider factors that affect changes in the "intermediate process." Neither does it account for inter-firm heterogeneity in carrying out changes in the intermediate processes (Anand et al., 2013) Protogerou, (2008) study, addresses the question of whether dynamic capabilities impact directly or indirectly on firm performance. It empirically tests the mediating role of marketing and IT competency (capability) on the relationship between dynamic capabilities and firm performance. It is documented that long-term competitive advantage lies in the functional competences that firms build and reshape using dynamic capabilities. This study argued that dynamic capabilities are the tools by which functional competences can be reconfigured and manipulated by managers so as to form new and innovative forms of competitive advantage. These authors also called for further inquiry on the relationship between dynamic capability and firm performance to confirm and enrich their findings (Collins 1996; Protogerou, et al., 2008; Anand et al., 2013).

## 2.7 IT Capability as Mediating Variable

MacKinnon, Coxe and Baraldi (2012) postulates that in investigating the relationship between independent variable and dependent variable, an additional third variable may fill one of several roles. This additional variable (third variable) can be coverite, moderator or mediator etc. Mediator examines the means by which the intervention affects outcomes variable, whereas moderator shows effect of the intervention on the outcome variable (Fairchild & MacKinnon 2008; MacKinnon 2011; MacKinnon et al., 2012). MacKinnon et al., (2012) defined mediator as a variable that transmits the effect of an independent variable to a dependent variable. This variable is also called the "intervening variable" because it intermediates between the independent and the dependent variables (MacKinnon et al., 2012).

However, prior study argued that IT capability is more of moderator than mediator since the definition of IT capability means ability to mobilise and deploy IT based resources which is not directly affected by the IT investment (Li, Chen, & Huang, 2006). This study argued that IT capabilities by themselves are ambiguous (eg. low order, high order capability, etc.), depending on way to which the researcher conceptualized or operationalized them toward organisational performance. Therefore, the characteristics which IT capability possesses, will determine the specific effect it may have on the organisational performance. Building on this, this study proposed that the effects of DITC on firms' performance can be transmitted

through process improvement capability (in terms of automational effect, informational effect and transformational effect). This is because the means to which IT knowledge creation, IT personnel expertise, IT infrastructure flexibility and IT management affect bank performance depend on the level that a bank reengineered its core processes through process improvement capability it possess and utilised. This study adopts alternative way of measuring the relationship between DITC and firm performance. DITC is the Independent Variables (X), Firm performance is the outcome variables (Y) and Process improvement is the Mediating variable (M). As seen in figure 2.1

Figure 2.1 Process shows improvement as a mediator

Figure 2.1: shows Process improvement as a mediator

### 2.7.1 Previous studies on Mediation effects

Mithas, Ramasubbu, Krishnan and Sambamurthy, (2004) examined the mediating effect of IT infrastructure capability on firm performance. They established that three dynamic capabilities mediate the links between IT infrastructure capability and firm performance. These include customer management capability, process management capability, and performance management capability. These authors argued that the mediated effects model has more validity than a model that posits direct impacts of IT infrastructure capabilities on firm performance. These authors emphasized on the need to study how IT management capability contributes to firm performance thorough firm processes. Barua et al., (1995) argued that the initial effects of IT investment occurred at the level of organizational processes that use the IT resources. These authors used “a theory of IT complementarities” to suggest ways on which IT influence firm performance. They therefore hypothesized that IT infrastructure capability enhances the quality and efficiency of organizational processes which in turn enhance performance improvement at organisational level (Barua et al., 2000). According to Mithas et al., (2004) several empirical studies also found a significant and positive relationship that support IT effect on the intermediate business processes, and how such processes affect performance at organisational level. According Liu, Hongjian & Junhua (2008) the relationship between IT investments and a firm performance can be explained by

taking factors that are directly affected by the IT investment as the mediator. Zuboff (1980; 1988) proposed that investment in quality IT infrastructure enabled firms to automate, informate and transform operations. This brings the firm with low order IT capability in the form of automational effects, transformational effects and transformational effects (Mooney et al., 1996). This in turn reduces cost and amount of work that must be done by the human beings, increases speed, information availability, accuracy and quality of decision making that must be done by bank managers and IT personnel to effectively respond to market changes. In other words, the actual effect of DITC on bank performance can be translated through the use of process improvement capability derived from the high quality IT infrastructure investment. In this study, process improvement capability was introduced because earlier studies showed there is no connection between IT investment and a firm's performance (Carr, 2003; Aduloju et al., 2014). Since it is established that, process improvement is an approach to keep pace with changing business environment; with respect to persistent technological and other environmental changes (Harrington, 1996), linking this with the DC theorem may suggest an interesting finding. This relationship is further explained below.

## 2.8 Theoretical framework

The philosophical foundation of this study is based the Resource-Based View (RBV) theory of competitive advantage. However, DCs theory was employed to address sustainability issues of performance as a result of the volatility of the Nigerian banking sector. RBV theory was first introduced by (Penrose, 1959), put forward by Wernerfelt, (1984) and subsequently popularised through the work of Barney's (1991). Several authors contribute to its development and grounding (Zahra & George, 2002; Winter, 2003; Wade & Hulland, 2004). RBV posits firms possess resources, a subset of which enables them to achieve competitive advantage, and a subset of those that lead to superior long-term performance (Wade & Hulland 2004). Resources that are valuable and rare can lead to the creation of competitive advantage and that advantage can be sustained over longer time period to the extent that the firm is able to protect itself against resource imitation, transfer, or substitution (Barney, 2002). Organisational resources refer to "all assets, capabilities, competence, organizational processes, firm attributes, information, knowledge, and others that are under the control of the company that makes the company able to develop and implement strategies aimed at improving the efficiency and effectiveness" (Barney, 2002). Empirical studies have strongly supported this view (Bharadwaj, 2000; Tippins & Sohi, 2003; Bhatt & Grover, 2005; Ringim 2012; Adolaju 2014; Adroes, 2015). However, one of the limitations of RBV theory is the assumption of static equilibrium. It failed to address firm sustained competitive advantage in unstable environment (Chan et al., 2004; Wade & Hulland 2004). It has also been criticised for ignoring factors surrounding resources accumulations by assuming simply they exist. Yet, considering how organisational resources are developed, integrated and released is central in achieving sustained competitive advantage (Wade & Hulland 2004). This is in line with notion of DCs theory.

DCs theory was developed to address the shortcomings of RBV theory. It is defined as "the ability to integrate, build, and reconfigure internal and external competencies to address

rapidly changing environments” (Teece, et al., 1997). DCs theory attempts to bridges the gaps by adopting process approach; acting as a buffer zone between firm resources and the changing business environment (Wade & Hulland, 2004). It has been argued that “even if IT resources do not directly lead the firm to a position of superior sustained competitive advantage, they may nonetheless be critical to the firm’s longer-term competitiveness especially in unstable environments when they help to build and release key resources over time (Wade & Hulland, 2004). RBV theory and DC theory were adopted to underpin this study. Therefore, while RBV emphasized on the selection of appropriate resources to improve performance, DCs emphasized on resources deployment and renewal to sustain performance. In other words, while RBV of the firm is critically important in improving performance, it is not sufficed to sustain performance in banks operating in unstable environment. Therefore, to sustain organisational performance, a bank, must be able to build, reconfigure and renew and deploy their assets and capabilities in response to market changes.

### 2.8.1 Relating RBV and DC theories to current study

When RBV theory is placed in banking sector, Barney, (1991) specifically described conditions for banks resources to be source of competitive advantage. When valuable resources are rare it means few banks have access to it. For example, in the early period of reengineering process, IT adoption in the form of resources such as computing platform, automative teller Machine (ATM), Point of Sale (POS) technology, etc. that help banks to provide real-time banking operations undoubtedly provide them with a provisional competitive advantage over the competing banks. However, as time goes on, many of these resources would likely become commoditized across almost all banks. This brings the need for banks to look for other resources that are inimitable and nontransferable. For example, when a bank is able to establish a strong IT management capability and IT personnel expertise it is expected that banks would continue to acquire and build as much as possible capabilities from the IT resources for the long term competitive advantage, survival and success.

As banks operate in a rapidly changing business environment they need to possess flexible IT infrastructure that can be added or modified to quickly in respond to markets changes. Strategically, existence of comprehensive DITC in the banks is assumed to help banks, not only to react to opportunities and threats but to also anticipate their likelihood and respond accordingly. Both RBV theory and DC theory are therefore employs to underpin the study.

### 2.9 Research model

The framework of this study is on the relationship between IT capability and firm performance. The independent variables in this study consists of IT management capability, IT personnel expertise and IT Infrastructure flexibility as a combination of dynamic IT

capability. The dependent variable (firm performance) which is in three dimensions consists of marketing performance, financial performance and administrative performance. However, since it is intended to measure direct and indirect effect of IT capability, IT process improvement was introduced as mediator between dynamic IT capability and bank performance. IT infrastructure capability creates value at firm process level through automational effects, informational effects and transformational effects. This in turn facilitates performance improvement at firm organisational level. This measurement in figure 2.2 is adopted from the previous studies (Mooney et al., 1996; Kim et al., 2011; Anand et al., 2013).

Figure 2.2: Research model

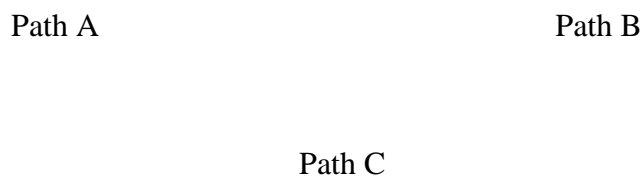


Figure 2.2 Adopted research model from: (Mooney et al., 1996; Kim et al 2011; Anand et al., 2013).

It should be note that the model assumed three variables system and such that there are two path (path AB, & path C) feeding into dependent variable. This indicates direct effect of independent variable (path C) and the effect of mediator (path B) on the dependent variable. There is also a path from independent variable to mediator (path A). Baron and Kenney (1986) established that a variable functions as a mediator when it meets the following conditions: (1) Variations in levels of the independent variable significantly account for variations in the presumed mediator (Path A). (2) Variations in the mediator significantly account for variations in the dependent variable (Path B), and (3) when Paths A and B are controlled, a previously significant relation between the independent and dependent variables is no longer significant. Full mediator exists when Path C appears to be zero. But if path C appears to be above zero, then the test indicates the existence of partial mediation. This relationship is based on the Resources Based View (RBV) theory of competitive advantage and firm performance. Dynamic Capability (DC) theory is introduced to address the shortcomings of RBV theory in rapidly changing business environment to sustain performance.

## CHAPTER THREE

### RESEARCH METHODOLOGY

#### 3.1 Introduction

This chapter focused on methodology employed in this study. It is organized in eight sections starting with research design, population of the study, sampling techniques and sample size of the study, target respondents, sources and method of data collection, variables measurement, validity and reliability of the research instrument, and method of data analysis are all explained.

### 3.2 Research design

This study which is correlation in nature, seeks to identify the relationship between dynamic IT capabilities and organisational performance through mediating effects of process improvement. Cross-sectional survey design was used to collect data once at a time to meet the research objectives (Sekaran, 2000). Cross-sectional survey design is economical; it does not take time to collect data from the respondents. It is also one of the most common research designs used in information systems (IS) research as seen in Bharadwaj, (2000); Bhatt and Grover, (2005); Lin, (2007); Kobelsky et al., (2008); Nevo and Wade, (2011); Ringim et al. (2012); Aduloju et al. (2014). Cross sectional survey research design is therefore suitable to this study.

### 3.3 Population of the study

The population of this study involves all Deposit Money Banks (DMBs), Microfinance Banks (MFBs), Development banks (DBs) operating within Kaduna state. Out of these, twenty two (22) are DMBs, twenty three (23) MFBs, and three (3) DBs, making a total of 48 banks. However, out of 22 MDBs; City bank, Standard Chartered bank and WEMA bank are no longer operating in Kaduna state, and Heritage bank merged with enterprise bank. This brings the total number to 44 banks. A sample size of 39 banks and 155 target respondents as seen below.

### 3.4 Sampling design

The sample size of the study is estimated using the formula developed by Dillma (2000; 2007) and Weaver (2006) for computing sample size, as follows.

$$n = \frac{N(P)(1-P)}{(N-P) + (B/C)(P)(1-P)}$$

Where:

n = is the computed sample size needed for desire level of precision

N = Population size

P = is proportion of population expected to be chosen. However, since the actual number of respondents who agree to participate is unknown 0.5 is used instead of 0.80 for homogenous

population. Although using higher level of precision (0.5) requires larger sample sizes (Westfall 2009), but it equally provides adequate sample size for the larger or smaller population of study (Bicmer & Lyberg 2003; Ringin 2012). Though, when the population is extremely heterogeneous a larger sample is needed for an accurate result (Westfall, 2009).

B = is the acceptable amount of sampling error which set to be 0.05 or (5%) of the true population.

C = is Z statistics associated with confidence level

Therefore where N = 172, P = 0.05, B = 0.05, C = 1.96.

$$n = \frac{(172)(0.5)(1-0.5)}{((172-0.5)(0.05/1.96)^2 + (0.5)(1-0.5))} = 155$$

Table 3.1 Selected sample size

Strata	Population	Sample size	No of Questionnaires	Required Sample size
DBMs	21	18	x4	72
DBS	3	2	x4	8
MFBS	22	18	x4	72
NIBs	1	1	x4	4
Total	47	39		156

Source: Author, (2016).

Research questionnaire was administered to respective banks which are similar in transaction processes and platforms. To achieve a required sample size, this study increased the sample size by 20% to improve the data collection. This is in line with the suggestion that a sample size can be added up to 30% in order to achieve the required response rate (Israel, 2013).

### 3.4.1 Sampling techniques

Probability sampling was used to select the most representation of the entire population. It first stratified the group into strata (MDBs, MFBs, and DBs), and then used simple random sampling to select the sample size. These techniques give each respondent an equal chance of being selected (Westfall 2009). It also ensured each group within strata was represented. It therefore eliminates the chance of the researcher being bias against the choice of another.

### 3.4.2 Estimating response rate

This is concerned with the number of responses the researcher must get back when conducting a survey. Dillma (2000) suggested that for a sample size below 20 the response rate required needs to be above 58%, whereas 47% responses rate is only adequate when the

sample size is above 30. This study set to achieve at least 60% responses of the target respondent (155). Babbie (2003) considers 50% response rate as adequate, a response of 60% as good, and 70% as very good. A follow up strategies are adopted until the satisfied response rate was achieved.

### 3.4.3 Target Respondents

Most of the existing studies on this direction collected data from managers and their IT professionals. This study also collected data from the respective bank managers and their IT professionals. These people can give a fair view of the organisational performance as regard to DITC.

## 3.5 Sources and method of Data collection

Primary data was employed in the study to guide the researcher in making meaningful findings and conclusions. This study obtained through administering questionnaires. The questionnaires were distributed using proportionate stratified sampling within respective banks.

In order to retrieve completed questionnaire as quickly as possible. This study relied on hand to hand delivery of the survey questionnaire to the respected banks with the help of research assistant and followed up to increase the response rate as much as possible. It is suggested in environment like Nigeria where research culture is not adequately developed, personal administered questionnaire with the help of research assistant shall be appropriate (Ringim, 2012). Previous literature has shown that the rate of return for mail survey in developing countries like Nigeria is less than 5% (Asika, 1999). Some of the advantages of this hand delivery is that, the researcher can have a preliminary session with respondents before participating in the survey, and explain some questions they may not understand. It will also help to collect all completed questionnaire within the shortest period of time. This study sets to deliver survey questionnaire to the main branch for each target bank or any other branch available.

### 3.5.1 Tools of data analysis

This study employed regressions method for data analysis using Statistical Package for Social Science (SPSS) version 20. One of the advantages of using SPSS in this study is that it provides straightforward output for correlation and regression analysis. It is thus appropriate for the study.

## 3.6 Variables measurement

DITC as independent variables was operationalised as organisational ability to focus on building integrating, and reconfiguring IT-based resources and competences to adjust to rapidly changing business environments. DITC consists of IT knowledge, IT management

capability, IT personnel expertise and IT infrastructure flexibility adopted from Tippins and Sohi (2003), Kim et al (2011). These variables consists of 33 measurable items extracted from Byrd & Tuner (2001); Ringim (2012); Anand et al (2013). Target respondents were required to answer questions on DITC factors as it is in their current organization on the scale of 1 to 6.

Performance improvement at firm process level is operationalized as continuous changes in business process of an organization from its previous state to a newer state. This measurement is adapted from Mooney et al (1996). Items for the measurement of this constructed, were extracted and modified from the study of Gregor, Martin, Fernandez, Stern & Vitale (2006). Bank managers were asked to rate their organization on the perceived performance improvement through IT at firm process level, on the scale of six with 1= strongly Disagree to 6 = strongly Agree. The dimensions of this construct consist of Automational effects, Informational effects and Transformational effects of IT at firm process level.

Organisational performance as dependent variable measured the extent to which bank manager's perceived organisational performance of their respective banks (either increase or decrease) within the last three years. It assessed both financial and non-financial indicators in terms of financial performance, marketing performance, and administrative performance. The financial indicators include financial growth and ratios; consist of 7 items adapted from Ringim (2012). Marketing performance and administrative performance consist of 13 items ranging from market share, price reduction, cost cutting, enhanced customer satisfaction, new products and services to coordinating and control on resources utilization adapted from various sources. Manager are asked to assess their organisations based on six point scale with 1 = Decrease significantly, 2 = Decreased, 3 = Slightly Decreased, 4 = Slightly Increased, 5 = Increased, 6 = Increased Significantly. A total of 20 items measured as organisational performance.

A structured questionnaire with closed ended questions (in the appendix) is adapted from (Ringim, 2012). To ensure a proper adaptation face and content validity, pilot tests were conducted, as suggested by scholars (Tourangeau et al., 2000; Bhatt & Grover, 2005). This study also took precautions in modifying the questionnaire by simplifying the items, avoids double-barreled questions and ambiguous terms. As the items targeted to the banks managers, all questions are specific enough, as such would help to reduce method variance in the process.

The questionnaire is divided into three sections, each section with clear heading and brief description of what the section intends to measure based on the respondents' perception. Respondents are asked to assess all the items (66) in the questionnaire based on the six points

scale, with six indicating strongly agreed, and one indicating strongly disagree. The uses of six points scale instead of four will help to detect slight differences which may not be identified when smaller scales are used. Krosnic & Fabrigar, (1997) argued that a scale 5 to 7 points is more reliable and valid than shorter or longer scales. The use of six point scale is considered to be appropriate in this study, because, Krosnic, (1991) argued that respondents demonstrate behavior of either survey optimizing or satisfying. In other words, a six point scale prevents respondents from answering a neutral point for easy choice as justified by (Ringim, et al., 2012).

Section one of the questionnaire assesses the effects of dynamic IT capability on organisational performance through IT management capability, IT personnel expertise and IT infrastructure flexibility adapted and modified from previous findings of Byrd & Tuner (2001); Kim et al., (2011); Anand et al., (2013). Section two consists of statements about IT capability attributes on performance improving at firm processes level through automational effects, informational effects and transformational effects adapted from Mooney et al (1996). Section three consists of instruments to measure an aggregated organisational performance of banks in three dimensions which includes marketing performance, financial performance, and administrative performance adapted and modified from Ringim et al (2012); and Anand et al (2013).

### 3.7 Validity and Reliability of the Instrument

The proposed research questionnaire has been used in several studies and proved to be useful in assessing the effects of IT on organisational performance. Several studies also used perceptual measure of both IT business value and overall performance at organisational level. However, Exploratory Factor Analysis (EFC) is generally used to discover the factor structure of a measure and to determine its internal reliability. But EFC is often used when researcher has no hypothesis to test (Ringim 2012). Alternatively, pilot study was conducted on targets respondents and the result was to be useful in adopting the questionnaire for the final survey.

Internal consistency was used to estimate reliability of the constructs (Litwin 1995). The most common measure of internal consistency is the Cronbach alpha coefficients (Hair , Andersen, Tathan 2010) The accepted lower value for Cronbach's alpha is 0.60, with 0.70 and above as good reliability (Hair et al 2010; Tabachnick & Fidell 2014). Thus, with value ranging from 0.768 to 0.919, this indicates that all the measures possess good reliability as shown table 3.2

Variable	Number of Items	Cronbach's Alpha
----------	-----------------	------------------

Dynamic IT capabilities:		
IT Management capability	8	.919
IT Personnel expertise <sup>9</sup>		.877
IT Infrastructure flexibility	8	.877
IT Knowledge creation	7	.859
Process Improvement	13	.887
Organisational performance	20	.988

Table 3.2 Reliability scores of variables

Source: SPSS output, version 20

Based on the above table, this measurement is deemed to have adequate reliability as recommended by (Litwin 1995, Hair et al 2010; Sekaran & Bougie 2010; Tabachnick & Fidell 2014).

### 3.8 Method of data analysis

The study was set to perform correlation analysis, multiple regression and test for mediation effect. Regression analysis was used to analyse the data. Regression results help to identify the most contributing variable among identified IT capabilities and the one that best predict organisational performance in terms of customer service delivery and zero operational practices. Among the previous studies that used regression analysis to investigate the relationship between IT capability and organisational performance are (Kim et al 2011; Ringim 2012; Anand 2013). Kim et al (2011) regresses data to examine how IT capability enables firm to innovates its business process and improve financial performance. Anand (2013) utilized multiple regressions to determine the effects of IT capability on firm performance. These studies arrived with invaluable findings which validates the usefulness of regression analysis.

#### 3.8.1 Correlation analysis

Correlation analysis helps to determine whether variables (DITC, process improvement and organisational performance) in the research model relate to each other. However, in this

situation where the research employed more than one independent variable to predict the dependent variable, correlation analysis alone does not suffice. Correlation analysis does not account for the size of the joint effects of independent variables on the dependent variable (Field 2009).

### 3.8.2 Multiple Regression Analysis

Multiple regressions link several independent variables with dependent variable. Therefore, this study used multiple regressions to determine the relationship between DITC and organisational performance of banks. This helped the researcher to assess the size of the joint effects of independent variables on the dependent variable. In this situation, a special case, for multiple regressions, is simple regression which involved one independent variable. This can be expressed mathematically as follows.  $Y=a+bX$ .....Equation (1). However, considering two independent variables (X1 and X2) the size of the effects on the dependent variable can be expressed as follows.  $Y= a + b_1X_1 + b_2X_2 + \text{error}$ .....Equation (2).

Where Y is the predicted score (Dynamic IT capabilities),

X is the ith of independent variable (Organisational performance),

a is the intercept, and

b is partial regression coefficients.

### 3.8.3 Testing mediation

The mediation model offers an explanation for how, or why, two variables are related. The research model developed in this study was set to tests the direct and indirect effect of DITC on organisational performance and to do this, mediation tests must be used. This test helped to understand whether improvement at firm process level can account for the variation of improvement at organisational level. Among the various methods of testing mediation, a series of regression models introduced by (Baron & Kenny, 1984) was used in this study due to its advantage over the others. For example, An ANOVA provides a limited test of mediational hypothesis as extensively discussed by (Fiske, Kenny & Taylor, 1982). A series of regressions analysis would help the researcher to examine the joint effects DITC on organisational performance. The procedure used for testing mediation required the researcher to perform three rounds of multiple regressions as follows.

- i. Regressing the mediator on the independent variable.
- ii. Regressing the dependent variable on the independent variable.
- iii. Regressing the dependent variable on both the independent variable and on the mediator.

Although these three regression equations provide the tests of the linkages of the mediational model to establish mediation, the following conditions must hold along with the first three equations.

- i. First, the independent variable must affect the mediator in the first equation.
- ii. Second, the independent variable must be shown to affect the dependent variable in the second equation.
- iii. Third, the mediator must affect the dependent variable in the third equation.

If these conditions all hold in the predicted direction, then for full mediation, the effect of independent variable on the dependent variable must be zero once mediator is controlled. When the effect is above zero or significantly smaller, the test indicates partial mediation. See figure 3.1

Path A

Path B

Path C

Figure 3.1 shows paths to test mediation

The idea concerning above model can be translated into equations suitable for estimating mediated effects and conducting statistical tests as for the single mediator model for X, M, and Y shown in Figure 3.1 and defined in Equation 1, Equations 2 and 3 below (MacKinnon, et al 2011).

$$Y=i_1+c X+e_1, \dots\dots\dots(1)$$

$$Y=i_2+c'X+b M+e_2, \dots\dots\dots(2)$$

$$M = i_3 + aX + e_3, \dots\dots\dots(3)$$

Where X is the independent variable,

Y is the outcome variable,

And M is the mediating variable.

The parameters  $i_1$ ,  $i_2$ , and  $i_3$  are intercepts in each equation; and  $e_1$ ,  $e_2$ , and  $e_3$  are residuals. This relationship was explained further by MacKinnon et al., (2011); in Equation 1, the coefficient  $c$  represents the total effect, that is, the total effect that DITC can have on organisational performance, the outcome variable. In Equation 2, the parameter  $c'$  denotes the relation between DITC and organisational performance controlling for mediator, representing the direct effect, the effect of DITC on organisational performance that is adjusted for mediator, the parameter  $b$  denotes the relation between mediator and organisational performance adjusted for DITC. Finally, in Equation 3, the coefficient  $a$  denotes the relation between X and M. Equations 2 and 3 are represented in Figure 2.3, which shows how the total effect of X on Y is separated into a direct effect relating X to Y and a mediated effect by which X indirectly affects Y through M. As discussed above, full mediation is the case where the total effect is completely explained by the mediator, that is, there is no direct effect. In this case, the total effect is equal to the mediated effect (i.e.,  $c = ab$ ). Partial mediation is the case where the relation between the independent and the outcome variable is not completely accounted for by the mediating variable.

Alternatively, Sobel (1986)'s test can be used to test for mediation. This test provides an approximate significance test for the indirect effect of the independent variable on the dependent variable via the mediator. As in Figure 3.1 the path from the independent variable to the mediator is denoted as  $a$  and its standard error is  $s_a$ . The path from the mediator to the dependent variable is denoted as  $b$  and its standard error is  $s_b$ . The exact formula, given multivariate normality for the standard error of the indirect effect or  $ab$ , is as follows.

$$\sqrt{(b^2 s_a^2 + a^2 s_b^2 + s_{ab})}$$

Where A is the path from the independents variable to mediator

B is the path from the mediator to dependent variable

Sa and Sb is standard errors of path A and B respectively.

## CHAPTER FOUR

### DATA PRESENTATION AND ANALYSIS

## 4.1 Introduction

This chapter aims to present and analyse the data which was gathered to answer key research questions and present the findings of the study. The central information gathered in this chapter is based on the data collected from the target respondents in respective banks. This chapter starts with analysis of the reliability and validity of the instrument, followed by correlation analysis to examine the strength of the relationship between independent and dependent variables. Multiple tests were then applied to test the direct effects, and indirect effects (the mediation effect) of process improvement on the relationship between DITC and organisational performance of banks. The result of this analysis will finally be presented and supported with discussion.

## 4.2 Diagnostic Tests

### 4.2.1 Response Rate

The data was collected from the bank managers and IT professionals that represent the respective banks in the study. Attempts were made to increase the response rate by frequent visits and phone calls to remind the respondents as suggested by (Sekaran, 2003; 2010). In total, 169 questionnaires were retrieved and out of these, 157 proved to be useful for the study. This makes the response rate to be 86.3% for further analysis and discussion of the finding. While Hair et al., (2010) considers 30% response rate as acceptable in survey studies, Pallant, (2001) suggested that for regressions type of analysis to be conducted, the sample size could fall between five and ten times of the number of independent variables. With four independent variables in the study (i.e. a sample size of about 40 respondents), satisfied the requirements for conducting multiple regressions analysis. The respondents represent their organisations.

### 4.2.2 Goodness of the measures

To establish goodness of the measure, the study used instrument that were administered by the other researchers. Given that, the sample size is above 100, this study achieved at least five times as many observations as possible for the variables that helped to conducted principle component analysis in order to check whether the constructs cluster together for the ease of interpretation (Cavana, Dalahaye, & Sekaran, 2001; Coakes, & Steed, 2003; Hair et al., 2010).

### 4.2.3 Factor analysis

Principal Component Analysis (PCA) was conducted for the items of the variables of this research work. The main aim of PCA is to reduce the dimensionality of the data set in which there is large number of interrelated variables, while retaining as much as possible of the variation in the set data. This helps to establish a new set of variables (principle components) which are uncorrelated, ordered and retain most of the variation present in all the original variables (Ringim, 2012). The following criteria for factor analysis suggested by Hair et al (2010) were employed by this study.

The sample size should be 150 plus and a ratio of five cases for variables.

Bartlett's test of Sphericity (present of correlation among variables) need to be significant are  $p < 0.05$  or smaller.

Kaiser-Meyer-Olkin (KMO) overall measured of sampling adequacy (MSA) should be at least 0.50 or above.

Commonalities gives information on how much of the variance in each item is explained. Under this low values (e.g.,  $< 0.50$ ) indicates that the items do not fit well with other items in the components and therefore deleted. Removing items with low commonalities values helps to increase the total variance explained.

Items for loading and cross-loading of 0.50 or greater on one factor and 0.30 or lower on the other factor have been set to assess the significant for this study. The items load less than 0.50 were deleted as suggested (Igbaria, Livaria & Maragahh, 1995).

To determine how many components to extract there is need to consider information provided by the output. Firstly, by using Kaiser;s criterion which is a component that has eigenvalue of more than one. Secondly, to determine how many components meet this criterion, we looked at the total variance explained in the table.

Naming of the factor was done based on the items with higher loading.

Discussion of factor analysis for the dependent, independent and mediation constructs are as follows.

#### 4.2.3.1 Dependent Variable: Organisational Performance

Table 4.1 shows the outcome of factor analysis for organisational performance as dependent variable measured in three dimensions namely financial, marketing and administrative performance. Organisational performance was initially measured by 33 items which was subjected to PCA using SPSS software version 20, and the factor loading of the items ranges from 708 to 796. In the process of getting these values 25 items and one construct (financial performance) were deleted due to reasons such as low communalities, low MSA, loading less than 0.50 and cross loading. Items deleted were those that failed to fit well with other items in their components and this reduction increased the total variance explained. The remaining two components were retained based on higher loadings. Correlation matrix indicates the presence of many coefficients of 0.3 and above. The KMO value of .705 also exceeded the

benchmark of .60, and Bartlett’s test of Sphericity which has been significant with p value .000 shows the adequacy of applying factorability. Overall PCA revealed the presence of three components with eigenvalue exceeding 1. The two components extracted were related to marketing and customer services performance the percentage of the variance was 55.894%, 39.030%, and 19.972% respectively. Table 4.1 shows detailed result of factor analysis.

Table 4.1 Rotated Component: Organisational Performance

Component		
H4	Zero error of operational processes in branches	.796
H2	Enhance coordination among departments	.732
F3	Customer service delivery in branches	.708
F4	Customer relationship management in branches	.688
Eigenvalue		1.711,
1.271		
Percentage of the variance (49.70%)		28.517,
21.183		
49.70%		
KMO		.565
Bartlett’s test of Sphericity		54333
Significance		0.000

From Table 4.1 above two components explained a total variance of 49.70%, to further explain these components varimax, rotation was performed. The first component was defined by the four items relating to performance in terms of customer services delivery, customer relationship management, enhanced coordination among departments and market share in retail banking services. Higher loadings influenced retaining of the factors as suggested by Hair et al., (2010). These components were related to operational performance of banks.

#### 4.2.3.2 Mediating Variable (Process Improvement)

Table 4.2 shows the results of factor loading of the mediating variable. Initially, mediating variable was measured by thirteen items in three dimensions which was subjected to PCA using SPSS. Factor loading of the items ranges from 855 to 751. Nine items were deleted due to low communalities, loadings and cross loadings which indicate a sign of non-fit with other items in the components. Observation of the correlation matrix indicates the presence of many coefficients of 3 and above. Removing the items with low communalities increased the total variance explained. The KMO value stood at .526 which is within the benchmark of .50 and therefore indicates the adequacy of the sample size for factor analysis. Bartlett's test of Sphericity was significant at .000 which is smaller than .050. This also indicates the adequacy of applying factor analysis. The retained components are automational effect and transformational effects representing process improvement capabilities. The percentage of the variance explained stood at 39.395% and 29.440% respectively and a total of 68.835%.

Table 4.2 Rotated Component Matrixa

Component		
1	2	
E3	Automational effects avoid the need to increase workforce	.855
E4	Automational effects establish useful links with other organizations.	.762
E11	Transformational effects expand organizational capabilities	.855
E8	Informational effect provides transactional savings.	.751
	Eigenvalue	1.576,
1.178		
	Percentage of the variance (68.835%)	39.395,
29.440		
	KMO	
.526		
	Bartlett's test of Sphericity	
118.271		
	Significance	
.0000		

Table 4.2 highlights the results of factor analysis of mediating variable where eigenvalue ration exceeded a benchmark of 1, total variance explained stood at 68.835%, KMO at .526 and Bartlett's test of Sphericity was significant at .0000. This indicates the adequacy of the sample size for factorability. All the assumptions of factorability have been met. Refer to appendix 3.

#### 4.2.3.3 Independent variable (DITC)

The independent variable in this study consists of IT management capabilities, IT personnel expertise and IT infrastructure flexibility as a form of DITC. These dimensions were measured with 33 items, that is, 11 items for each dimension. Using SPSS software the analysis produced four components. These components were retained based on higher loading as suggested by Hair et al., (2010). The result of this analysis is shown in Table 4.3

Table 4.3 Rotated Component Matrixa

	Component			
	1	2	3	4
B4 IT Personnel skilled in distributed processing and distributing and computing	.857			
D5 Information is shared seamlessly across the organisation regardless of the location.	.833			
D9 There are few identifiable bottlenecks within the systems				.876
D11 compared to competitors our organisation has the best available IT systems and connections		.799		
B2 IT personnel have knowledge about environmental constraints	.848			
A2 The Organisation prioritised IT investments				.775
A11 The organisation has sufficient budget for the purchase of an up to date IT materials for operational processes.		.951		
Eigenvalue	2.065,	1.229,		
1.122, 1.003				
Percentage of the variance (77.421%)	29.499,	17.556,		
16.034, 14.333				
KMO	.529			
Bartlett's test of Sphericity	120.042			
Significance	.0000			

From Table 4.3 above, the four components were retained from the factor analysis based on their higher loadings. The first component relate to IT personnel expertise. The second component related to IT infrastructure flexibility. The third component related IT knowledge creation. The fourth component related to management capability. It should be noted that none of the dimensions of the DITC was dropped after the factor analysis and this result confirms the initial assumption of creating Dynamic capabilities through IT enabled resources.

From the results it can be seen that the factor loadings of all the components ranges from .951 to .848. KMO value stood at .529 which is within the acceptable range. Bartlett's test of Sphericity was significant at .000 which is smaller than .050. The eigenvalue of all the components also exceeded 1.00 (2.065, 1.229, 1.122 and 1.003). The total variance explained was 77.421% which was in the range of 29.499, 17.556, 16.034, and 14.333 respectively.

#### 4.3 Measuring the reliability of the research instrument

This reliability is best described by the Cronbach's alpha statistic. Cronbach's alpha statistic helps to assess whether all items within the instrument measured the same thing. It varies between 0 and 1. The closer the alpha is to 1.00, the greater the internal consistency of the items in the research instrument. In the case of negative value, such indicates an instrument in which some of the items measured the opposite of what other items measured. The value 0.60 is generally agreed to be the lower limit of the Cronbach's alpha coefficient (Tabachnick & Fidell, 2014). An instrument with value above 0.60 is considered to be adequate (Hair et al., 2010).

The reliability of the instrument established after factor analysis was conducted. Table 4.4 shows the result of Cronbach's alpha coefficient index with values ranges from .771 to .859. Therefore, this instrument is considered to be adequate and reliable as far as internal consistency is concerned. Under similar methodology and measurement, this instrument would therefore give consistent results (over time) on the effect DITC on organisational performance in Nigeria.

Table 4.4 Reliability test after factor analysis

OPM DV

Cronbach's Alpha N of Items

.809 6

PRI M

Cronbach's Alpha    N of Items  
 .771    4

DITCs IV

Cronbach's Alpha    N of Items  
 .859    7

Source: SPSS output version 20

Table 4.4 shows reliability statistics of the main research constructs after factor analysis which were above the accepted lower value of 0.60, and therefore reliable for replication over time. Tables 4.5, 4.6 and 4.7 show a detailed reliability statistics of all the research components after factor analysis.

Table 4.5 Item-Total Statistics of Organisational Performance

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
F3 Marketing and	96.0853	52.250	.349	.802
F4 Customer services	95.9767	53.398	.327	.803
H2	96.1550	52.898	.269	.807
F6	95.7829	53.749	.315	.804
H4	96.1240	51.359	.432	.798
F7	96.0930	50.585	.465	.796

Source: SPSS output version 20

Table 4.6 Process Improvement

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
E3 Process Improvement.	63.3876	17.739	.219	.778
E4	63.2868	17.066	.428	.754

E8.	63.5504	16.484	.417	.755
E11	63.3798	16.597	.461	.750

Source: SPSS output version 20

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
B4 IT knowledge	161.5349	134.344	.468	.852
D5	161.4341	133.419	.512	.851
D9 IT flexibility	161.7907	136.417	.355	.855
D11	161.4961	135.189	.429	.853
B2 IT personnel	161.5504	139.296	.275	.857
A2	161.3023	140.134	.234	.858
A11 IT management	161.5039	143.439	.047	.862

Source: SPSS output version 20

#### 4.3.1 Construct reliability and validity

Attempt was made to assess the reliability and validity of the instrument by using Cronbach's alpha coefficient. However, Fornell and Larcker (1981) argued that composite reliability is more robust than Cronbach's alpha. Cronbach's coefficient may underestimate the reliability (Hair et al 2010). The values of Cronbach's alpha and composite reliability are shown in table 4.

From Table 4.5 to 4.7, it is obvious that each of the indexes of the reliability is greater than a threshold of .70 and the composite values ranging from .862 to .778. This suggested that the instrument has internal consistency and would thus represent the constructs over time. Tables 4.1 to 4.3 showed that factor loadings for all the items ranged from .708 to .876. This confirmed that all items are strongly related to their constructs and therefore good construct validity is established as supported by Sekaran and Bougie (2010); Tabachnick and Fidell, (2014).

#### 4.3.2 Convergent Validity

Convergent basically tests whether the items converge to measure the construct. Hair et al (2010) suggests the used of Average Variance Extracted (AVE) to examine construct and convergent validity of the instrument. AVE shows how items of the instrument converge and how they share common variance.

#### 4.3.3 Discriminant Validity

Discriminant validity assessed the extent to which a construct is truly different from the other constructs (Hair et al 2010). A high level of discriminant validity suggests that the construct is unique in capturing some phenomena that other constructs do not. Among the many ways of computing discriminant validity, a more rigorous method is to compare the AVE values of any two constructs and with the square of the correlation estimate between the two constructs (Ringim (2012). To establish discriminant validity, the average should be greater than square correlation constructs (Firnell & Larcker 1981; Hair et al., 2010). The square roots of the AVE ranged from .763 to .946 are greater than the values of the constructs in the corresponding matrices. This indicates that each construct share more variance with its items than with other constructs. This measurement therefore supports discriminant validity.

#### 4.3.4 Face Validity

Face validity assess the extent to which the items that are intended to measure the construct seem to have measured it (Sekaran, 2001; Sekaran & Bougie, 2010). The research instrument was subjected to rigorous observations by the experts in Management, IT Capability and Financial institutions in Ahmadu Bello University Zaria. Their observations and suggestions were noted and effected for the final survey. The use of Nomological validity was also considered for the meaningful understanding of the variables in the research model as discussed below.

#### 4.3.5 Nomological Validity

According to Hair et al., (2010) nomological validity is established to the extent to which a construct relates to other constructs in a theoretically consistent manner. To assess nomological validity, correlation matrix was used based on the suggestions by Hair et al. (2010); Tabachnick & Fidell, (2014). Prior studies also utilized correlation matrix to check nomological validity among the constructs in this study (Ringim et al., 2012; Ringim, 2012), which includes DCs and organisational performance. The result could be seen in table 4.11 which shows significant positive and non-harmful correlations among the research constructs.

### 4.4 Preliminary Analysis

This analysis includes descriptive statistics and inter-correlations for the variables in the study.

#### 4.4.1 Missing Data

Several strategies were employed to treat missing data issue. At a collection point of the completed questionnaires, the researcher checked to insure that all questions were answered. In the case of uncompleted questionnaires respondents attentions were called to rectify the issue. The researcher also makes every effort to answer or clarify all issues raised by the respondents in the process of completing the questionnaire at his presence. After collecting the questionnaires the researcher also key in the data in SSPS software to scientifically checked whether any missing data exists. Tabachnick and Fidell, (2014) suggested that any missing data should be deleted. Hair et al., (2010) also suggested that any case with not more than 15% missing data observed should be deleted as long as the sample size is adequate. These strategies help to cater for the number of unattended questions and to confirm whether any missing data exists.

#### 4.4.2 Assessment of outliers

This has to do with checking whether there are extreme case scores that might have significant effect on the results. That is either too low, too high or a combination of unique values across several variables was deleted (Hair et al., 2010) and therefore an important stage of data screening. Among the several approaches to detect outliers, the case wise diagnostic subcommand in SSPS was carried out and any cases of standardized residuals greater than 3 were eliminated. Outlier assessment was thus completed before further regression.

#### 4.4.3 Presentation of Descriptive Statistics for Independent Variables

This study utilized descriptive statistics technique to determine the maximum, minimum scores, mean and standard deviation of the key constructs in the research questionnaire using six-point Likert scale. The mean scores of all the variables were in the range of 4.9225 to 5.1395. The highest mean among DITC variables is 5.1395 and the lowest was 4.9225. The mean score of IT management capability was 5.1064 Standard deviation of .39823, the mean score of IT personnel expertise was 5.0331 and standard deviation of .41270. The mean value and standard deviation for IT infrastructure flexibility was 4.9984 and .49513 respectively. The overall mean for DITC was 5.0475, standard deviation of .36466, minimum scores of 3.03 and the maximum score of 5.7. Table 4.9 shows details of the key constructs in the research model.

Process improvement as mediation variable was assessed using six point scales, with one strongly disagree and six strongly agree. The mean value for process improvement was 5.2267 and standard deviation of .45869. Table 4.9 showed that all variables and dimensions had mean value of more than 4.00 which clearly indicate that the respondents agreed that process improvement mediate the relationship between DITC and organisational performance of banks in Nigeria.

#### 4.4.4 Presentation of Descriptive Statistics for Dependent Variables

The dependent variables in this study were equally using descriptive statistic techniques using six-point scale ranging from 1 to 6 with 1 decrease significantly and 6 increase significantly over the last three years. The result in table 4.9 showed that most of the participating banks have done well in terms of marketing and customer service performance with the mean value 5.1589 and standard deviation of .44518. The overall mean score of organisational performance stood at 5.1318 and standard deviation of .41702 respectively.

Table 4.8 Descriptive Statistics of the research constructs

	N	Minimum	Maximum	Mean	Std. Deviation
IT Knowledge	157	2.50	6.00	5.0814	.77508
ITInfrastructure Flex	157	2.00	6.00	4.9225	.76916
ITPersonnel Exp	157	2.00	6.00	5.1395	.61865
IT Management	157	3.00	6.00	5.0620	.73688
Process Improvement	157	3.75	6.00	5.2267	.45869
Org. Performance	157	3.83	6.00	5.1318	.41702
Valid N (listwise)	157				

Source: SPSS output, version 20

#### 4.4.5 Bivariate Relationship between DITC and Organisational Performance of Bank

As expected in this study, correlation analysis was conducted to determine the strength and direction of relationship between the two variables (DITC and organisational performance). This analysis helps to determine whether there is an extreme, medium or weak (positive or negative) relationship between the variables. A correlation of 0 indicates no relationship, correlation of -1.0 indicates a negative perfect relationship and a correlation of 1.0 signifies a positive perfect relationship between the variables (Sony 2012). To interpret the values ranging 0.00 to 1.00 in both directions (+/-), Cohen (1998) suggested the following guidelines. R=0.10 to R 0.29 or R= -0.10 to R -0.29 small, R=0.3 to 0.49 or R= -0.3 to -0.49 medium; R=0.50 to 1.0 or R= -0.50 to -1.0 large. The result of this analysis is presented in table 4.9.

Table 4.9 Correlations

	1	2	3	4	6	
1. ITKnowledge	1					
2. ITinfrastructure flex			.253**		1	
3. ITPersonnel	.225*	0.15			1	
4. ITManagement	-0.07	.248**	.259**		1	
5. Process improment	0.165	0.042	0.053	324**	1	
6 Organperform	-0.12	.248**	-0.024	0.029	.259**	1

\*\* Correlation is significant at the 0.01 level (2-tailed).

\* Correlation is significant at the 0.05 level (2-tailed).

#### 4.4.6 Multivariate Relationship between DITC, Process improvement and Organisational performance

This analysis was conducted to assess the relationship between process improvement (in terms of IT automational, and IT transformational) and organisational performance of banks. It is therefore aimed to provide answers to research objective 2 of the study. Correlation analysis was initially conducted to determine the strength of the relationship between the two variables. Multiple regression analysis was then carried out to answer the research objective stated above. Table 4.10 highlights the results of inter-correlation between the variables. This analysis was subjected to one tailed test at two different significant levels ( $p < 0.01$ ) and significant ( $p > 0.05$ ). The result shows that all the variables were significant at less than .050.

#### 4.5 Test for violation of multiple regression assumptions

Prior to regression analysis the variables in the study were checked for outliers, normality, linearity, multicollinearity, homoscedasticity and error term as suggested by the scholars (Hair et al., 2010; Sekaran & Bougie 2010). The assumptions for multiple regressions were met.

##### 4.5.1 Normality

Normality refers to the shape of data distribution for the individual continuous variable and its correspondents to normal distribution. Among the ways of checking normality assumptions is a histogram residuals plot. To establish this assumption the plot needs to appear normally distributed.

Figure 4.2 of histogram indicates that normality assumption was established since all the bars in the diagram were close to a normal curve. (i.e. moving toward the center of the histogram).

#### 4.5.2 Linearity

Linearity is another important assumption for multiple regressions analysis. The rule says that if the assumptions are met the residuals should scatter around zero (0) or most of the score should be centered at the zero point on the graph (Flury & Riedwyl, 1998). Figure 4.2 shows the scatter plot between DITC and organisational performance of banks and this suggests that linearity assumption was satisfied. Other variable in the study also did not violate linearity assumption.

#### 4.5.3 Multicollinearity

Multicollinearity was used to check if two of the independent variables are acting so closely together to the point you cannot tell which is doing what. The result is shown in table 4.10 below.

Table 4.10 Multicollinearity Diagnostic

Research Constructs	Tolerance	VIF
1 (Constant)		
IT personnel expertise	.895	1.118
IT infrastructure flexibility	.927	1.079
IT Knowledge Creation	.937	1.067
IT management capability	.992	1.008

Under this, when the tolerance values are close to 0, there is high multicollinearity and the standard error of the regression coefficients will be inflated. A variance inflation factor greater than 2 is usually considered problematic. The lowest tolerance is .895 and the highest VIF in the table is 1.118. Therefore, this table shows that there is no problem with multicollinearity.

#### 4.5.4 Homoscedasticity

According to Norusis (1999) homoscedasticity assumption is satisfied when there is no pattern to the data distribution and residuals are scattered randomly around horizontal line

though zero (0). This assumption requires that the variance of the dependent variables is the same at all values of the independent variable or constant variance of the error term (Hair et al 2010). This study does not violate this assumption. The result for homoscedasticity is presented in the appendix. In addition, Durbin-Watson was used to test the independence of the error term. The rule suggests that if the value ranges 1.50 to 2.50 the assumption of independence on the error term was not violated (Norusis, 1999). Durbin-Watson value of 1.783 suggested that the assumption of independence error term was not violated in the study. From the foregoing, the assumptions of normality, linearity, multicollinearity, independence of error term and homoscedasticity have been met. It is therefore suitable to proceed with regressions analysis.

#### 4.6 Test of hypotheses

Multiple regression analysis was conducted between DITC (independent variable) and organisational performance (dependent variable) in terms of marketing and customer service delivery in branches. It further examined the relationship between Process improvement (as mediator variable) and organisational performance. This analysis also examined relationship between mediator and organisational performance. This helped to provide answer to research objective one, two and three of the study. In this process, multiple correlation (R), squared multiple correlation (R<sup>2</sup>) and adjusted R<sup>2</sup> helped to explain the relationship between variables.

##### 4.6.1 DITC Constructs and organisational performance.

Multiple regression analysis was conducted to check whether DITC directly affect organisational performance. This analysis also helped to found out the most contributing variables among DITC dimensions that best predict organisational performance in terms of marketing and customer service delivery performance. The results in Tables 2 & 3 in appendix iii indicated that direct relationship between DITC and organization performance was significant but fairly smaller with  $R=.598$ ,  $R^2=.0.271$  and adjusted  $R^2=.0.254$ . The  $F=15.567$  with  $p$  value  $.000$ . This result indicates that if the model is applied to another set of data it can give similar result because  $R^2$  was  $.271$  and only dropped to  $.254$  in adjusted  $R^2=$  indicating a good cross validity of the model.  $F$  test also indicated that the relationship between DITC and organisational performance of banks is linear and significant but very small. This result revealed that if DITC as independent variable used is in isolation, it would only explain 27.1% variation in the overall performance of banks in Nigeria. However, this result did not provide information about the role of each DITC construct on organisational performance. To establish this, multiple regressions was conducted and the result is shown in Table 4.11

Table 4.13 Regression Result DITC and Organisational performance

Model	Unstandardized Coefficients	Standardized Coefficients	t	Sig.		
	B	Std. Error	Beta			
1	(Constant)	4.862	.758	6.416	.000	
	ITKnowledge	-.176	.082	-.194	-.2148	.034
	ITInfrastructure Flex	.275	.081	.300	3.387	.001
	ITPersonnel Expertise	.144	.052	.248	2.767	.007
	ITManagement			.117	.049	.215
2.393		.018				

Dependent variable: Organisational performance

#### 4.6.2 Test of hypothesis one:

Ho1 IT Knowledge creation is not significantly related to organisational performance. Table 4.11 finding established that IT knowledge creation is significantly related organisational performance. Hypothesis one was thus rejected. This implies that to sustain performance organisations most possess IT knowledge creation capability to create and reconfigure knowledge towards market changes. Knowledge creation capability is important as innovation is driven by the knowledge creation (Pei, 2008), which in turn improve performance.

#### 4.6.3 Test of hypothesis two:

Ho2 IT Management capability is not significantly related to organisational performance. Regression result in Table 4.11 has shown that IT management capability is significantly related to organisational performance and therefore hypothesis two was rejected. This means that as far as DITC is concern, IT management capability is the source of firm sustains performance. The stronger the relationship between IT and other business units, the more effective use IT resources will be (Tsou & Chen, 2012). IT management is an integral part of this.

#### 4.6.4 Test of hypothesis three:

Ho3 IT Personnel expertise is not significantly related to organisational performance. The finding in Table 4.11 established that IT personnel expertise is significantly related to organisational performance and therefore make the study to reject the null hypothesis three.

This finding suggests that as far as superior performance is concern, IT personnel have a better role to play. According to Lin (2007), a firm cannot generate value without the ideas, skills and leadership of experienced personnel. Therefore, superior value is created by the excellent people who can proactively create a competitive advantage through imagination invention, innovation and linking firm’s internal processes and structures with markets changes (Brockbank, 1999). This capability cannot be easily supplemented by the external sources.

#### 4.6.5 Test of hypothesis four:

Ho4 IT Infrastructure flexibility is not significantly related to organisational performance. The result in Table 4.11 revealed that IT infrastructure flexibility is significantly related to organisational performance. Based on this finding, the null hypothesis four was thus rejected. This implies ability to implement incremental and revolutionary changes in the business or business process with minimal penalty to current time, effort, and cost is crucial to improving performance. It is already established that IT infrastructure flexibility is at the centre of achieving this (Chung, Rainer & Lewis, 2003; Fink & Neumann, 2009; Ngai, Chau, & Chan, 2011).

Overall, Table 4.11 shows the contribution of each independent variable to the dependent variable. Among the four independent variables IT infrastructure flexibility has the highest beta coefficient of .215 suggesting that IT infrastructure flexibility is the most important variable in predicting overall organisational performance, followed by IT personnel expertise .110. IT management capability is the third most important variable in the research model -.044, and lastly, IT knowledge creation .019. Therefore hypotheses H01 and H01a, b, c, d, were all rejected.

#### 4.6.6 Test of hypothesis five:

Ho5 Process Improvement does not significantly affect organisational performance. The result of this test could be seen in table 4.14

Table 4.14 PRI and Organisaationa performance Coefficientsa

Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.	
	B	Std. Error				
1	(Constant)	3.316	.391	8.478	.000	
	PRI	.347	.075	.382	4.659	.000

a. Dependent Variable:Organisational performance

In Table 4.14, multiple regression analysis was conducted to determine the relationship between process improvement and organisational performance. The result explained the dimension in which this variable accounts for variation in organisational performance.  $R=382$ ,  $R^2=.14.6$  and adjusted  $R^2=.13.9$ . The  $F=21.703$  with p value .000. The relationship between Process improvement and organisational performance was linear and significant as it accounts for 14.6% of the variance in organisational performance. The value of  $R^2$  dropped only to less than 5%. This result indicates the generalizability of this model in another population. F test also indicated a good cross validity of the model. However, this relationship is higher on marketing and customer services delivery performance (p value .000). The implication of this finding is that for banks to achieved superior marketing and customer services delivery most continues to improve their processes through the use of IT. This in line with the finding that effect of IT within a firm is reflected by how IT renews existing ways of performing activities in the intermediate business processes (Mooney, et al., 1996). Based on regressions results in table 4.14 hypothesis five was rejected.

#### 4.6.7 Mediation Tests

This section test hypotheses 6 to 9 which has to do with mediation effects of process improvement relationship between Dynamic IT Capabilities constructs and organisational performance. Baron and Kenny (1986) series of multiple regression approach required the researcher to estimate each of the paths in the model and then ascertain whether a variable functions as a mediator by seeing if certain statistical criteria are met. For example, if both A and B paths in a model are statistically significant and C is closer to zero, then, process improvement is deemed to mediate of the effect DITC on organisational performance (MacKinnon, 2008).

In other words, the variable can be considered as a mediator when the following conditions are met. 1) Variation of the dependent variable (DITC) accounts significantly accounts for the variation in the mediator variable. 2) Variation in the mediator variable (PRI) significantly accounts for the variation in the dependent variable (OrgPerf). 3) When these two conditions are controlled, previous significant relationship between independent and dependent variables no longer exists (Baron & Kenny 1986). This requires three regression to be tested as stated in chapter three.

To do this, mediating effects required a significant relationship between each construct of DITC as independent variable and process improvement as dependent variable. All DITC constructs seem to have significant relationship with process improvement as seen in appendix. The second condition related to the relationship between mediator (PRI) and dependent variable (Organ. Performance) was met. Lastly, appendix iii shows regression result of dependent variable on both independent variables (DITCs constructs) and mediator.

The following section discussed the result of mediation test. Table 4.20 summarized the result.

Table 4.17 Summary of the Mediation Test Result

Predictors	PRI	DITC without PRI		DITC with PRI		Sig.	Result
ITKnowledge	0.177	.019	-0.051	0.554			Mediation
ITInfrastructure		0.338	.215	0.166	0.01		No Mediation
ITPersonnel	0.247	.110	0.108	0.192			Mediation
ITManagement		0.184	-.044	-0.117	0.153		Mediation
R2	0.105	0.271	0.358				
Adj. R2	0.098	0.254	0.336				
F test	21.703	15.567	17.262				

Hypothesis 6: the table (second column) shows that IT knowledge creation was significantly related to organisational performance (Std.  $\beta= 0.019$ ,  $P <0.5$ ). However, when including the mediator the Std. B value was increased and the relationship become insignificant as shown in third column (Std.  $\beta= -0.051$ ,  $P >0.5$ ). This result indicated that process improvement fully mediate the relationship between IT knowledge creation and organisational performance. Hypothesis was rejected. The implication of the finding is that to sustain performance organisations most possess IT capability capable of creating, developing and disseminating knowledge towards market changes. It is has been argued that knowledge creation is important in the sense that innovation is driven by the knowledge creation capability (Pei, 2008).

Hypothesis 7: table (second column) shows that IT infrastructure flexibility was significantly related to organisational performance (Std.  $\beta= 0.215$ ,  $P <0.5$ ). However, when including the mediator, the Std. B value was reduced and the relationship become significant as shown in third column (Std.  $\beta= 0.166$ ,  $P <0.5$ ). Therefore, it can be stated that process improvement did not mediate the relationship between IT infrastructure flexibility and organisational performance. Hypothesis 7 was accepted. This finding suggested that flexible IT infrastructure by themselves can influence organisational performance even without

mediation. Byrd and Tuner, (2001) also consider them as the highest IT capability in IS research.

Hypothesis 8: table (second column) shows that IT personnel expertise was significantly related to organisational performance (Std.  $\beta= 0.110$ ,  $P <0.5$ ). However, when including the mediator the Std. B value was reduced (Std.  $\beta= 0.108$ ,  $P >0.5$ ) and the relationship became insignificant. Therefore, it can be stated that process improvement mediate the relationship between IT personnel expertise and organisational performance. Hypothesis 8 was thus rejected. This finding implies that competent IT personnel relies on process improvement at firm process level to develop IT solutions and capabilities in order to deal with markets changes.

Hypothesis 9: table (second column) shows that IT management was significantly related to organisational performance (Std.  $\beta= -.044$ ,  $P <0.5$ ). However, when including the mediator the Std. B value was increased and the relationship became insignificant as shown in third column (Std.  $\beta= -0.117$ ,  $P >0.5$ ). It can be stated that process improvement mediate the relationship between IT management capability and organisational performance. Hypothesis 9 was rejected too. This finding established that for IT management capability to effective there must be improvement at firm process level so as to achieve deeper level of transparency and coordination.

#### 4.6.6 Summary of the overall Mediation tests

To examine the mediation effect of process improvement on the relationship between DITCs constructs and organisational performance Baron and Kenny (1986) procedure was followed. The result can be seen in table 4.18.

Table 4.18: Summary of the overall Mediation test on DITC Constructs

Variable	A		B		C		ci			
	Std. Beta	T-value	Std. Beta	T-value	Std. Beta	T-value	Std. Beta	T-value		
	Std. Beta	T-value	Sig.	Decision						
DITCs	0.315	3.735	0.426	5.301	0.219	2.526	0.355	4.319	0.54	Mediation

Source: SPSS Output, 2016

From Table 4.18, the first step (path a) was assessed through the use of regression analysis and the results revealed an  $R^2 = .358$ ,  $P < .000$ . In the first requirement, a significant relationship was established between DITCs and organisational performance with ( $\beta$  value = .219,  $t = 2.526$ ). The second requirement (path a) DITCs to process improvement was assessed through a regression analysis and the output reported a significant relationship ( $\beta$  value = .315,  $t = 3.735$ ). In the third requirement (path b), that is process improvement to independent variable, the regression output indicated a significant relationship with ( $\beta$  value = .426,  $t = 5.301$ ). The last requirement for testing mediation under this procedure is about regressing both the independent variable and the mediating variable against the dependent variable. DITC and process improvement were regressed together against organisational performance and the result indicated a significant relationship ( $\beta$  value = .355,  $t = 4.319$ ). See appendix IV.

To further validate the result Sobel's test procedure (Sobel, 1986) was employed in one inferential technique is the use of product of coefficients approach, most well known as the Sobel test (Sobel, 1982, 1986). This test requires an estimate of the standard error of paths A, and B (Preacher & Hayes, 2004). The ratio of AB to its standard error is used as a test statistic for testing the null hypothesis that the "true" indirect effect is zero, with the p-value derived from the standard normal distribution. Table 4.19 indicated the results of this computation.

Table 4.19 Regression Result of the Mediation analysis using Sobel's Test

Inputs

N	129 (Sample size)
A	0.3150 (Path coefficient calculated by WarpPLS)
B	0.4260 (Path coefficient calculated by WarpPLS)
Sa	0.0790 (Standard error calculated by WarpPLS)
Sb	0.0890 (Standard error calculated by WarpPLS)

Outputs

Sab	0.0301 (Sobel's standard error for mediating effect)
Ab	0.1342 (Product path coefficient for mediating effect)
Tab	4.4612 (T value for mediating effect)
Pab	0.0015 (P value for mediating effect, one-tailed)
Pab'	0.0030 (P value for mediating effect, two-tailed)

Source: Sobel's test output

From the table 4.19, in the output section the T value for mediating effect was 4.4612, P value for mediating effect, at both one-tailed and two-tailed tests is less than .0001. This clearly shows that process improvement fully mediates the relationship between DITCs constructs and organisational performance. This made us to reject null hypotheses 6 to 9 of the study. Hence, research objective three which set to examine the mediating effect of process improvement on the relationship between DITC and organisational performance was achieved. This implies that simply automating business process would not provide differential benefit to adopting organisations. To sustain performance the entire IT systems needs to be transformed.

#### 4.7 Discussion of the findings

The main objective of this study is to investigate the relationship between DITC, process improvement and organisational performance of banks. It is therefore had two broad objectives as follows: Firstly, to determine the extent to which DITC affect organisational performance in banks. Secondly, to examines the intervention level of process improvement on the relationship between DITC and organisational performance of bank. Building from the works of Mooney et al (1996); Bhatt & Grover (2005); Kim et al (2011); and Anand et al (2013), this study proposed that IT capability at process level that enhance organizational information needs, is derived from the quality of IT infrastructural investment in the organization which enables firm to automate and transform the processes. If this capability managed well, will transmit the effects of other IT enabled resources such as IT management capability, IT personnel expertise and IT infrastructure flexibility to wider organisational performance. That is, banks shall be able to improve performance by enhancing resources possession, utilization and controlling. It has been argued that firms can outperform their rivals by pursuing two types of competitive strategies: advantage-creating [RBV] (Barney 2001) and advantage-enhancing [DCs] (Teece, et al., 1997), which are usually combined to increase performance.

IT capabilities have long been identified as a source of gaining competitive advantages that enhance organisational performance (Bharadwaj 2000; Bhatt & Grover 2005; Lin 2007; Khallaf 2012, Ringim et al 2012). However this submission has not been consistent in Nigeria. Whereas Ringim et al., (2012) established a significant positive relationship between IT investment and customer service management, Aduloju et al., (2014) reported that IT investment does not account for variation in customer service performance in Nigeria. This may be due to different methodological approach toward assessing IT effect on firm performance. It is argued that studies that focused on the direct relationship between IT and

organisational performance failed to consider other capabilities, that are improved by IT Ringim (2012), and which are true facilitators of performance improvement (Tippins & Sohi, 2003). Furthermore a large number of studies shift their attention from the direct effect of IT on firm performance to the mechanisms through which IT contributes to firm performance (Piccoli & Ives 2005; Li, Chen, & Huang 2006; Ringim et al., 2012). Process improvement approach predicted that the anticipated benefits from the IT depend on the quality of organisation's IT infrastructure investment that enables such organization to automate and transform its entire processes. The higher the organization automation and transformation capabilities it possessed, the more the expected benefits from the IT investments. However, to achieve sustainable competitive advantage IT resources must be difficult to imitate and hard to substitute (Wade & Hulland, 2004).

Therefore automation and transformation capabilities if used in isolation may only provide a temporary competitive advantage that might be eroded when the environment changed. That is, either most of the competitors possess the same type of technology or prevailing market conditions brought opportunities and challenges that cannot confront using such capability. To sustain performance, IT resources must be difficult to imitate and hard to substitute (Wade & Hulland, 2004).

Similarly, since the aftermath of global financial crisis in 2008, and its subsequent effect in Nigerian financial sector relentless competition has driven banks to constantly adapt, renew, reconfigure and re-create their resources and capabilities in line with the markets changes. This routine activity is in line with the notion of DC as argued by (Wang & Ahmed, 2007). Which researchers refer (DC) to a wide range of resources, processes and capabilities. A bank with DC in the form of IT knowledge, IT personnel expertise, IT infrastructure flexibility and IT management would be able to respond to markets changes and regulatory requirements better than competitors that do not. Empirical evidence suggested that differential benefits are much expected when DC is combined with process improvement capability. This is an issue of concern to practitioners and regulators in the banking industry and Nigeria at large. This is because whereas process improvement focus on functional competency, DC deals with changes. Therefore, to the author's knowledge, this study is first of its kinds in Nigeria.

#### 4.7.1 Theoretical Contributions and Policy implications

This study successfully linked theoretical relationship between DITC, process improvement and organisational performance of bank using survey questionnaire as the means of data collection. Wang & Ahmed (2007) posited that absorptive capability, adaptive capability, and innovative capability are the most important component factors of DC that underpin a firm's ability to integrate, reconfigure, renew and recreate its resources and capabilities in line with external changes.

This study argued that IT knowledge creation, IT management capabilities, IT personnel expertise and IT infrastructure flexibility can complement absorptive, adaptive and innovative capabilities in rapidly changing environment. Firstly, absorptive capability highlights the importance of in-taking external knowledge, combining it with internal knowledge and absorbing it for internal use. IT management capabilities refer to the ability of a firm to administer IT resources and transform them for the creation of business value (Peppard, 2007). Firms that are involved in such knowledgeable activities have greater absorptive capacity (Bhatt & Grover, 2005). Secondly, adaptive capability stresses a firm's ability to adapt itself in a timely fashion through flexibility of resources and aligning resources and capabilities with environmental changes. IT infrastructure flexibility is defined as firm's ability to develop, diffuse and maintain various information systems efficiently in the context of changing business environments. Both focused on aligning internal organisational factors with external environmental changes. Thirdly, IT business experience refers to the ability of a firm's IT personnel to understand business needs and create IT solutions that address the enduring business opportunities and challenges. Likewise innovative capability effectively links a firm's inherent innovativeness to marketplace-based advantage in terms of new products and services development. This too explains the linkages between a firm's resources and capabilities (Wang & Ahmed, 2007), in response to market changes. Even though previous studies acknowledged the influence of IT on process innovation, these studies focused on the effects of different technologies such as customer relationship system, supply chain management system, e-ordering and e-payment systems, and simulation software. This study adds more weight by considering entire organisational processes.

This study argued that IT professionals, IT flexible infrastructure and managerial capability are needed for successful process innovation, especially in unstable environment where the emphasis is less on resource acquisition but more on firm's ability to utilise these resources in response to markets changes. This study has successfully linked IT knowledge creation, IT infrastructure flexibility IT personnel expertise, and IT management to the concept of DC.

It further clarifies the link between DC and firm performance by establishing direct and indirect effect. It thus notes that the linkage between DC and firm performance is more complex than a simple bivariate relationship. For example Spanos and Lioukas's (2001) have found that the direct effect of DC (i.e. firm assets) on market performance is statistically significant but fairly small 0.277 ( $p < 0.01$ ). This was also acknowledged in this finding 0.271, with p value .000. Several studies also revealed that capability development appears to be a mediator of the effect of DC on firm performance (Figueiredo 2003; Zott 2003; Brady & Davies 2004; Athreye 2005; Protogerou, et al., 2008). This encouraged us to consider the

mediating effect of process improvement on the relationship between DITC and firm performance. This is because prior studies have shown that, the first order effect of IT capability can be seen at firm process level (Zuboff 1988; Mooney et al 1996; Brynjolfsson & Hitt 2000; Anand et al., 2013,). Yet, only few studies focused on process level improvement (Sensele 2006; Jeffers et al 2008; Aduloju, 2014). Even among these, only Anand et al (2013) study considered IT effect at aggregated firm process level and called for further inquiry to validate and enrich their findings. In response to this call, this study established the mediating effect of process improvement on the effect of DITC on organisational performance of banks in Nigeria. It therefore contributed to literature on the relationship between DC and firm performance.

This finding is in line with earlier submission that IT capabilities influence performance improvement at the process level, and that improvement at firm process level mediated performance improvement at organisational level (Anand et al., 2013). However, it contradicts that finding by establishing direct effect of DITC on firm performance. It is therefore confirms the direct effect of DC on firm performance (Spanos & Lioukas 2001; Idroes, 2015). When these two results are combined together this study is unique of its kinds.

This empirical finding suggests that firm performance is influence by the level of its internal resources and this supports the concept of resources based view theory of firm competitive advantage. But recent study in Nigeria showed that IT investment has not improved firm performance (Aduloju et al., 2014). This study is therefore consistent with the findings that IT investment affect firm performance through high quality IT infrastructure that enables value creation capability (Bhatt & Grover, 2005), at firm process level. In other words, the influence of DITC is explained by the high quality IT infrastructure investment that enables banks to automate and transform their core processes in response to markets changes and regulatory requirements.

To the author's knowledge, this is first of its kind to study the mediation effect of process improvement on the relationship between DITC and organisational performance of banks in Nigeria.

## CHAPTER FIVE

### SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

#### Summary

This study was set to examine the effects of DITC on organisational performance in Nigeria. It specifically examined the relationship between DITC and organisational performance, the effect of Process Improvement on organisational performance and the mediating effect of Process Improvement on the relationship between DITC and organisational performance.

Literature was reviewed based on the research constructs which consists of IT knowledge creation, IT Infrastructure flexibility, IT personnel expertise, and IT management capability as independent variables. The dependent variables (organisational performance) is in three dimensions consists of marketing performance, financial performance and administrative performance. On the indirect effect, process improvement was used to mediate the relationship. From the review it appears that most existing studies (Byrd & Tuner, 2001; Aduloju, 2014) use single variable to measure effect of IT capability on organisational performance, while several others (Bhatt & Grover, 2005; Kim et al., 2011, Ringim et al., 2012), did not considered the role of process improvement on the relationship. This study therefore contributed to literature in this direction. Firstly, by incorporating IT knowledge

creation, IT Infrastructure flexibility, IT personnel expertise, and IT management capability as DITC constructs, and secondly, by examining their direct and indirect effects in one study.

Cross sectional survey design was employed through which 191 research questionnaires were distributed to the targets respondents with help of research assistance. 169 questionnaires were retrieved. After screening the returned questionnaires, 157 responses found to be useful in the final data analysis. Factor analysis was conducted for all variables and the result produced eight major variables. Descriptive statistics were used to determine characteristics of the respondents. Series of multiple regressions analysis were conducted to answer research questions and objectives. Hypotheses were tested and produced significant findings with respect to the research objectives.

## 5.2 Conclusions

This study concludes that DITC are critical to organisational performance in Nigeria particularly the banking sector where performance improvement has been a primary focal point of decision making by shareholders, customers, regulating bodies and potential investors. In organisational context, this empirical finding is in line with Teece (2007) assertions that dynamic capabilities can be disaggregated into three forms; firstly, to sense and shape opportunities and threats, and secondly to seize identified opportunities and thirdly, to maintain competitiveness through enhancing, combining, protecting, and whenever necessary reconfiguring organisational tangible and intangible resources. Therefore, in order to beat competitors and improve performance, banks are required to have DITC in combination with other capabilities that are valuable, rare and inimitable to sustain performance.

This finding established that each of the four variables of DITC plays an important role in long-term organisational performance and therefore critical to managerial decision on IT in Nigeria. Traditionally, Nigerian banks heavily customized IT applications and systems believing such would give them sustainable competitive advantage. However, with so much deregulation and emergence of internet and other e-banking services, it appears that each bank would have to create capabilities that specifically supported its own perceived unique procedures. One of the major DC of bank in turbulence times is the ability of banks to market their products and services directly to customers. Increase speed, quality flexibility and dependability. Therefore, given the pace of technological advancement within the banking sector, and ever-increasing customer demands for website, mobile and other digital banking services, decision to reduce DITC could be risky and portends danger even in difficult times (Bhatt & Grover, 2005). Therefore, a bank that failed to build and develop DITC in response to market changes could find it difficult to improve performance. This is because, the case of managing contradictions caused by unprecedented changes within the banking sector entail

going beyond selecting the most recent IT resources but a combination of IT capabilities that enabled banks to sense opportunities and code IT solutions capable of sustaining performance.

As arguments on the mechanisms to which DC affects firm performance remain unresolved (Wang & Ahmed, 2007). This study contributed to literature by establishing the direct and indirect effect of DITC on bank performance. It also confirmed that simply reconfiguration of the firm's resources per se does not ensure performance but the characteristics of DC are what impact on firm performance (Macher & Mowery, 2009). This is because Olufemi, Banjo and Peter, (2014), findings found a negative relationship between DCs and bank performance in Nigeria. This implies that IT management capability, IT personnel expertise and IT infrastructure flexibility combined together possess the characteristics of organisational capabilities which are necessary for sustained competitive advantage (Bhatt & Grover, 2005; Kim et al., 2011). Thus even, if firms possessed capabilities that are valuable and heterogeneous, they still need DITC that are imperfect movable or non-transferable to sustain competitive advantage (Teece, 1997). This is in line with findings of Coombs and Bierly, (2006) that IT capabilities are the most important elements in achieving sustainable competitive advantage over direct and indirect competitors. It also contradicts Olufemi et al., (2014) finding that the ability of a firm to produce unique and creative goods and services does not guarantee the organization competitive advantage in the industry. Customer satisfaction surveys (KPMG, 2012; 2013; and 2014) has shown that ability to produce unique goods and services are the major concern of bank's customers in Nigeria and thus central to sustain performance.

### 5.3 Recommendations

Bank managers are thus encouraged to invest in terms of money, time, and commitment to building and developing DITC capable of providing sustained competitive advantage thereby improving performance. This has to do with linking IT with business strategy at first place, and then followed by recruiting skilled full IT personnel capable of linking IT solutions with business experience, and then possession and deploying high quality and flexible IT infrastructure. As regards to DITC constructs this study specifically recommend the following.

For IT knowledge creation there is need for organization;s IT resources to be configure in such a way that generate and disseminate market and industry knowledge simultaneously. This would give organization ability to better prepare and respond to market and industry changes better competitors that do not have this capability.

To sustain performance, managers should develop relevant skill and experience in managing heterogeneous IT assets within organization. This managerial IT capability would

help organisation to better plan and decides on the next IT strategic investment in response to market changes. There are two reasons why IT capability management is likely to be sources of sustain performance. Firstly, they evolved over time; through history and ‘learning by doing’ and therefore heterogeneous across firms.

Finding from this study established that the ability of a firm to leverage IT resources for sustain performance within organisations largely depends on the skills and experience of IT personnel. It is therefore recommended that IT strategy should incorporate a human factor (IT personnel expertise) as a key determinant of IT success. This is because; superior value is created by the excellent people in organisation who can proactively create a competitive advantage through the use of IT resources.

IT infrastructure flexibility is perhaps one of the most strategic IT assets in turbulence times. It is therefore recommended that organisations should ensure their IT infrastructures are flexible in nature as such would help the organization to adopt both radical and incremental changes over time with minimal cost and penalty. This capability in question enhances organisation’s ability to add, remove or modify any element of its strategic IT assets with ease and without negative effect on performance.

As regard to process improvement at firm process level, there is need to ensure that IT resources are transform in such a way to take care of both operational and management processes concurrently. This would give way to better mediation between DITC and organisational performance so as to remain competitive over time.

In a nutshell, the management should commit itself to building and managing differential capabilities through IT at both firm process and organisational level. For example, top management has a role to play in linking IT assets with business strategies to facilitates possessing and developing most appropriate IT resources and knowledge development through the use of IT personnel expertise. This in turn will help to develop IT solutions to deal with both current and anticipated environmental changes to superior performance over time.

Regulatory bodies need to do more in terms of enlightening banks on the need to build dynamic IT capabilities in addition to IT investment to achieve some degree of sustainability over time. The campaign on IT adoption in the banking sector should include training and capacity development. The goal of achieving global benchmark on the aspect of IT standard in the banking sector should go beyond policy making. The process should include capacity building in partnership with academics where theories could be employed to complement the practices.

#### 5.4 Suggestion for future research

Future research should consider longitudinal studies in different industries as well as at the national level to enrich the findings. This would help to further generalize the finding on the relationship between DITC, process improvement and organisational performance in Nigeria. Future research may use different sources and type of data to provide useful insights on the problem under study. Furthermore, the result from the study may be more robust if both qualitative and quantitative techniques are employed to complement each other in the future research.

#### References

- Aduloju, K., Olowokudejo, F., & Obalola, M. (2014). Information Technology and Customer Service Performance among Insurance Companies in Nigeria, *European Journal of Business and Management*, 6(20), 80–88. ISSN 2222-2839 (Online)
- Aduloju, S. K. (2014). Information Technology Managerial Capabilities and Customer Service Performance among Insurance Firms in Nigeria, *SAGE Journals*, 2232-2245. 1177/2158244014561198
- Agboola, A. (2006). Information and communication technology (ICT) in banking operations in Nigeria: An evaluation of recent experiences, viewed 10
- Amit, R., & Schoemaker, P. J. H. (1993). Strategic Assets and Organisational rent. *Strategic Management Journal*, 14 (1), 33-46.
- Anand, A., Wamba, S. F., & Sharma, R. (2013). The Effects of Firm IT Capabilities on Firm Performance: the Mediating Effects of Process Improvement. 24th Australasian Conference on Information Systems, by University of Wollongong Australia.
- Akhtar, M. H. (2010). Technical Efficiency and Productivity Growth of Saudi BanksA Data Envelopment Analysis Approach, *Global Business Review* 11(2):119-133, DOI: 10.1177/097215091001100201
- Aral, S., & Weill, P. (2007). IT Assets, Organizational Capabilities and Firm Performance: How resource allocations and organizational differences explain performance variations. *Organization Science*, 18(5), 763–780.

- Asika, L. (1999). *Research Methodology in Behavioural sciences*. Lagos: Longman Nigeria Plc, Nigeria.
- Athreye, S. S. (2005). The Indian Software Industry and its Evolving Service Capability. *Industrial and Corporate Change*, 14(3), 393-418.
- Brady, T., & Davies, A. (2004). Building Project Capabilities: from Exploratory to Exploitative Learning. *Organization Studies*, 25 (9), 1601-1621.
- Bacon, C. J. (1992). The use of Decision Criteria in Selecting Information Systems/information Technology Investments, *MIS Quarterly*, 16(3), 335–353.
- Banker, R. D., Bardhan, I. R., Chang, H., & Lin, S. (2006). Plant Information Systems, Manufacturing Capabilities, and Plant Performance, *MIS Quarterly* 30(2), 315–337.
- Barney, J. (1991). Firm Resources and Sustained Competitive Advantage, *Journal of Management* 17(1): 99-120.
- Barney, J. B. (2002). *Gaining and Sustaining Competitive Advantage*, International Edition, published by Prentice Hall, Upper Saddle River, NJ.
- Barua, A., Kriebel, C., & Mukhopadhyay, T. (1995). Information Technology and Business Value: an Analytic and Empirical Investigation, *Information Systems Research*, 6(1) 3-23.
- Barua, A., & Whinston, A. B. (1998). Complementarity based decision support for managing organizational design dynamics. *Decision Support Systems*, 22(1): 45-58.
- Bharadwaj, A. S. (2000). A Resource-based Perspective on Information Technology Capability and Firm Performance: an Empirical Investigation, *MIS Quarterly* 24(1) 169–96.
- Bharadwaj, S. S., Saxena, K. B. C., & Halemane, M. D. (2010). Building a Successful in Business Process Outsourcing: an Exploratory Study. *European Journal of Information Systems*, 19, 168-180.

- Bhatt, G. D., & Grover, V. (2005). Types of Information Technology Capabilities and their Role in Competitive Advantage: an Empirical Study, *Journal of Management Information Systems* 22 (2) 253–277.
- Baron, R. M., & Kenny, D. A. (1986). The Moderator-Mediator Variable Distinction in Social Psychological Research: Conceptual, Strategic, and Statistical Considerations. *Journal of Personality and Social Psychology*, 51(6), 1173–1182. <http://doi.org/10.1037/0022-3514.51.6.1173>
- Brockbank, W. (1999). If HR were really strategically proactive: present and future directions in HR's contribution to competitive advantage, *Journal of Human Resources Management*, 38(4) 337–52.
- Brown, R. M., Gatian, A. W., & Hicks, J. O. (1995). Strategic Information Systems and Financial Performance, *Journal of Management Information System*, 11(4) 215–48.
- Brynjolfsson, E., & Hitt, L. M. (2000). Beyond Computation: Information Technology, Organizational Transformation and Business Performance, *Journal of Economic Perspectives*, 14(4), 23-48.
- Bassellier, G., Horner, B., & Benbasat, I., (2001). Information Technology Competence of Business Managers: A Definition and Research model, *Journal of Management Information Systems*, 77(4) 159-182.
- Bustinza, O. F., & Molina, L. M. (2010). Organizational learning and performance : Relationship between the dynamic and the operational capabilities of the firm, 4(18), 4067–4078.
- Byrd, T. A., & Turner, D. E. (2001). An Exploratory Examination of the Relationship between Flexible IT Infrastructure and Competitive Advantage, *Information Management*, 39, 41–52.
- Carr, N. G. (2003). IT Doesn't Matter. *Harvard Business Review*, 81 (5), 41-49.
- Central Bank of Nigerian, (2010). CBN Scope, Conditions & Minimum Standards for Commercial Banks regulations No.01, 2010
- CBN/NDIC (1995). Collaborative study of Distress in Nigerian Financial Service Industry. Lagos: Nigerian Deposit Insurance Corporation and Central Bank of Nigeria.
- CBN (2016). Financial Stability Report, December 2015, URL: <https://www.cbn.gov.ng/Out/2016/FPRD/FSR%20December%202015.pdf>, accessed on 15th September, 2016
- Chen, J. L. (2012). The Synergistic Effects of IT-enabled Resources on Organizational Capabilities and Firm Performance. *Information and Management*, 49(3-4), 142–150. <http://doi.org/10.1016/j.im.2012.01.005>

- Chen, J. S., & Tsou, H. T. (2012). Performance Effects of IT Capability, Service Innovation, and the Mediating Role of Customer Service. *Journal of Engineering and Technology Management - JET-M*, 29(1), 71–94. <http://doi.org/10.1016/j.jengtecman.2011.09.007>
- Chen, X. (2012). Impact of Business Intelligence and IT Infrastructure Flexibility on Competitive Advantage : An Organizational Agility Perspective.
- Chen, Y., Wang, Y., Nevo, S., Jin, J., Wang, L., & Chow, W. S. (2014). Empirical Research IT Capability and Organizational Performance : the Roles of Business Process Agility and Environmental Factors, (January 2012), 326–342. <http://doi.org/10.1057/ejis.2013.4>
- Chen, Y., & Wu, J. (2011). Information & Management IT Management Capability and its Impact on the Performance of a CIO, 48, 145–156. <http://doi.org/10.1016/j.im.2011.04.001>
- Clark, T., Zmud, R., & McCray, G., (1998). The Outsourcing of Information Services: Transforming the Nature of Business in the Information Industry. In: Willcocks, L.P., Lacity, M.C. (Eds.), *Strategic Sourcing of Information Systems*. Wiley, Chichester, 45–78.
- Clemons, E. K., & Row, M. C., 1991. Sustaining IT advantage: the Role of Structural Difference. *MIS Quarterly* 15(3), 275–292.
- Clemons, E. K., Thatcher, M. E., & Row, M. C. (1995). Identifying sources of reengineering failures: A study of the behavioral factors contributing to reengineering risks. *Journal of Management Information Systems*, 12(2): 9-36.
- Cohen, W. M., & Levinthal, D. A. (1990). Absorptive Capacity: A New Perspective on Learning and Innovation. *Administrative Science Quarterly*, 35(1), 128. <http://doi.org/10.2307/2393553>
- Collis, D.J., 1994. Research note: how valuable are Organizational capabilities? *Strategic Management Journal* 15, 143–152.
- Collis, D.J., (1996). Organisational Capability as a Source of Profit. In: Moingeon, B., Edmonston, A. (Eds.), *Organisational Learning and Competitive Advantage*. Sage, London.
- Chircu, A. M., & Kauffman R. J. (2000). Limits to value in electronic commerce-related IT investments.
- Chung, S. Rainer, R., & Lewis, B. (2003). The Impact of Information technology Infrastructure Flexibility on Strategic Alignment and Applications Implementation, *Communications of the Association for Information Systems* 11 (11) 1–31.
- Chung, S. H., Byrd, T. A., Lewis, B. R., & Ford, F. N., (2015). An Empirical study of the Relationships between IT Infrastructure Flexibility, Mass Customization, and Business Performance, *The Database for Advances in Information Systems*, 36(3) 26-44

- Clark, C. E., Cavanaugh, N. C., Brown, C. V., & Sambamurthy, V. (1997). Building Change-Readiness Capabilities in the IS Organization: Insights from the Bell Atlantic Experience. *MIS Quarterly*, 21(4)425-455
- Cohen, W. M. & Cohen, P. (1983). *Applied Multiple Regression/correlation Analysis for Behavioural science* (2nd ed.). Erlbaum.
- Cordes-Berszinn, P. (2013). *Dynamic Capabilities: How Organisational Structures Affect Knowledge Processes*. Palgrave Macmillan. Retrieved 16th September 2014
- Crocker, L., & Algina, J. (1986). *Introduction to Classical and Modern Test Theory*. FL: Harcourt Brace Jovanovich; Orlando
- Damanpour, F., & Evan, W. M. (1984). Organisational Innovation and Performance: the Problem of Organisational Lag, *Administrative Science Quarterly*, 29, 392-409
- Dantsoho, M. A. (2015). Effect of Dynamic Information Technology Capabilities on Organisational Performance, Seminar Proceeding presented at the Department of Business Administration, Ahmadu Bello University, Zaria
- Dantsoho, M. A., & Ringim, K. J. (2016). Dynamic Information Technology Capabilities (DITC) and Organisational performance of Banks in Kaduna State, Presented at National Conference on Economic Development and Challenges, Federal University Dutsinma, Katsina
- Davenport, H. T. (1993). *Process Innovation: Reengineering Work through Information Technology*. Harvard Business School Press.
- Dehning, B., & Stratopoulos, T., (2003). Determinants of Sustainable Competitive Advantage due to an IT-enabled Strategy. *Journal of Strategic Information Systems* 12(1), 7–28.
- Dehning, B., Richardson, V. J., & Stratopoulos, T. (2005). Information Technology Investments and Firm Value, 42, 989–1008. <http://doi.org/10.1016/j.im.2004.11.003>
- DeMarrais, K., Lapan, S. D., Tisdale, K. Rousmaniere, K. Kain, D. L. Kleiber, P. B., & Kramp, M. K. (2004). *Foundations for Research Methods of Inquiry in Education and the Social Sciences*, Lawrence Erlbaum Associates, Publishers Mahwah, New Jersey
- Dess, G. G., & Robinson, R. B. (1984). Measuring Organizational Performance in the Absence of Objective Measures: The case of the Privately-held Firm and Conglomerate Business Unit. *Strategic Management Journal*, 5, 265-273
- DeLone, W. H. (2014). IT Resources, Organizational Capabilities, and Value Creation in Public-sector Organizations: A Public-value Management Perspective, *Journal of Information Technology* 29, 187–205

- Dewett, T., & Jones, G. (2001). The Role of Information Technology in the Organization: A Review, Model and Assessment. *Journal of Management*, 27: 313-346.
- Devaraj, S., & Kohli, R. (2003) Performance Impacts of Information Technology: Is Actual Usage the Missing Link, *Journal of Management Sciences* 49(3) 273-28.
- Dillma, D. A. (2000). *Mail and Interview Surveys: the Tailored Design Methods* (2nd & 4th ed.) New York: John Wiley and Sons.
- Dillma, D. A. (2007). *Mail and Interview Surveys: the tailored design Methods* (2nd & 4th ed.) New York: John Wiley and Sons.
- Edward, F. R. (1984). *Strategic Management: A stakeholder approach*, Boston: Pitman. ISBN 0-273-01913-9
- Eisenhardt, K. M., & Martin, J. A. (2000). Dynamic Capabilities: what are they? *Strategic Management Journal*, 21(10-11), 1105–1121. [http://doi.org/10.1002/1097-0266\(200010/11\)21:10/11<1105::AID-SMJ133>3.0.CO;2-E](http://doi.org/10.1002/1097-0266(200010/11)21:10/11<1105::AID-SMJ133>3.0.CO;2-E)
- Enendu, C. I., Abba, M. A., Fagge, A. I., Nakorji, M., Kure, E. U., Bewaji, P. N., ... & Ukeje, N. H. (2013). Bank Intermediation in Nigeria: Growth, Competition and Performance of the Banking Industry, 1990 – 2010, Occasional Paper No. 48, published by Central Bank of Nigeria.
- Figueiredo, P. N. (2003). Learning, capability accumulation and firms differences: evidence from latecomer steel, *Industrial and Corporate Change*, 12 (3), 607-643.
- Fan, K. (2011). The Effect of IT Capability on Firm Performance, *Advanced Research on Computer Education, Simulation and Modeling Communications in Computer and Information Science* (176), 149-154
- Fairchild, A. J., & MacKinnon, D. P. (2009). A General model for Testing Mediation and Moderation effects. *Prevention Science*, 10(2), 87–99. <http://doi.org/10.1007/s11121-008-0109-6>
- Farooq, A. M. (2003). Structure and performance of commercial Banks in Pakistan, Munich personal from Omani Commercial Banks. *International Research Journal of Finance and Economics*, 2, 150-174
- Feeny, D. F., & Willcocks, L. P. (1998) Core IS Capabilities for Exploiting Information Technology, *Sloan Management Review*, 39(3), 9-21
- Fink, L., & Neumann, S. (2007). Gaining Agility through IT Personnel Capabilities: The Mediating Role of IT Infrastructure Capabilities, *Journal of the Association for Information Systems* 8(8), 440-462.

- Fink, L., & Neumann, S. (2009). Exploring the Perceived Business Value of the Flexibility Enabled by Information Technology Infrastructure, *Information & Management* 46, 90–99
- Flury, B., & Riedwyl, H. (1988). *Multiple Statistics: A Practical Approach*. London: Chapman and Hall.
- Fornell, C., & Larcker, D.F. (1981). Evaluating Structural Equation Models with Unobservable Variables and Measurement Error, *Journal of Marketing Research*, 18(1), 39-50
- Fox, S., & Hietanen, J. (2007). Interorganizational Use of Building Information Models : potential for Automational , Informational and Transformational Effects, (March), 289–296. <http://doi.org/10.1080/01446190600892995>
- Fritz, M. S., & MacKinnon, D. P. (2008). Asymptotic and Resampling Strategies for Assessing and Comparing Indirect Effects in Multiple Mediator Models, *Behavior Research Methods*, 40(3), 879–891
- Fritz, M. S., & MacKinnon, D. P. (2007). Required Sample Size to Detect the Mediated Effect, *Psychology Science*, 18(3) 233–239. DOI: 10.1111/j.1467-9280.2007.01882.x
- Galbreath, J. (2005). Which Resources matter the most to firm success? An Exploratory Study of Resource-based Theory. *Technovation*, 25(9), 979–987. <http://doi.org/10.1016/j.technovation.2004.02.008>
- Gold, A. H., Malhotra, A., & Segars, A. H. (2001). Knowledge management: an organizational capabilities perspective, *Journal of Management Information Systems*, 18(1), 185-214
- Grant, R. M. (1991). The Resource-based View of Competitive Advantage: Implications for Strategic Formulation, *California Management Review*, University of California.
- Gregor, S., Martin, M., Fernandez, W., Stern, S., & Vitale, M. (2006). The Transformational Dimension in the Realization of Business value from Information Technology. *Journal of Strategic Information Systems*, 15(3), 249–270. <http://doi.org/10.1016/j.jsis.2006.04.001>
- Hadidi, R. (2003): The status of E-finance in Developing Countries, *Electronic Journal of Information Systems in Developing Countries*, 145- 156
- Hair, J. F., Anderson, R. E. & Tatham. R. L. (2010). *Multivariate data analysis (7th ed)*. Upper Saddle River, NJ: Pearson Prentice Hall.
- Hammer, M., & Champy, J. (1993). *Business Process Reengineering: a manifesto for business revolution*, New York,

- Hayes, A. F., & Hayes, A. F. (2009). Beyond Baron and Kenny : Statistical Mediation Analysis in the New Millennium Beyond Baron and Kenny : Statistical Mediation Analysis in the New Millennium, (December 2012), 37–41. <http://doi.org/10.1080/03637750903310360>
- Hayes, A. F. (2009). Beyond Baron and Kenny: Statistical Mediation Analysis in the New Millennium, *Communication Monographs*, 76(4), 408-420
- Helfat, C. E. (1997). Know-how and Asset Complementarity and Dynamic Capability Accumulation: the case of R&D. *Strategic Management Journal*, 18 (5), 339-360.
- Helfat, C. E., & Peteraf M. A. (2003). The Dynamic Resource-based View: Capability lifecycles. *Strategic Management Journal* 24 (10): 997-1010.
- Helfat, C. E. Finkelstein, S., Mitchell, W., Peteraf, M. A., Singh, H. Teece, D.J. & Winter, S. G. (2007). *Dynamic capabilities: Foundations in Dynamic Capabilities: Understanding* (eds). Blackwell Publishing: Malden MA; 1-18.
- Hitt, M., & Ireland, R. D. (1985). Corporate distinctive competence, strategy, industry and performance. *Strategic Management Journal* 6, 273–295.
- Hitt, L. M., & Brynjolfsson, E. (1996). Productivity, Business Profitability, and Consumer Surplus: Three Different Measures of Information Technology Value. *MIS Quarterly*, 121-142.
- Hitt, M A., Ireland, R. D., & Hoskisson, R. E. (2001). *Strategic Management: Competitiveness and globalization. (4th ed. Concepts and and cases)*. Singapore: South-Western College Publishing.
- Huang, Y. H., Li, E. Y., & Chen, J. S. (2009). Information Synergy as the Catalyst between Information Technology Capability and Innovativeness: Empirical Evidence from the Financial Service Sector. *Information systems. Research*, 14(1) 1-23.
- Idroes, F. N. (2015). *Distinctive Capabilities of Banking Industry*, Proceedings of 8th Asia-Pacific Business Research Conference, Kuala Lumpur, Malaysia, ISBN: 978- 1-922069-71-9
- Igbaria, M., Livari, J. & Maragahh, H. (1995) Why do Individual Used Computer Technology? A Finnish Case study. *Information and Management*, 29(5), 227-238
- Ikpefan, O. A. (2013). The Impact of Marketing of Financial Services in the Nigerian banking Industry, *Journal of Business Administration and Management Sciences Research*, 2(6), 148-162
- Israel, G. D. (2013). Determining Sampling Size 1. *Journal of Business Research*, 1(1), 1-5.

- Jacob, C., Patricia, C., Aiken, L. S., & Stephen, H. W. (2003). *Applied Multiple Regression/correlation Analysis for the Behavioral Sciences*, Hillsdale, N.J: L. Erlbaum Associates
- Jeffers, P. I., Muhanna, W. A., & Nault, B. R. (2008). Information Technology and Process Performance: An Empirical Investigation of the Interaction between IT and Non-IT Resources, *Decision Sciences* 39(4)703-735.
- Judd, C. M. & Kenny, D. A. (1981a). *Estimating the Effects of Social Interventions*. New York: Cambridge University Press.
- Judd, C. M., & Kenny, D. A. (1981b). Process Analysis: Estimating Mediation in treatment Evaluations. *Evaluation Review*, (5) 602–619.
- Karimi, J., Somers, T. M., & Bhattacharjee, A. (2007). The Role of Information Systems Resources in ERP Capability building and Business Process Outcomes, *Journal of Management Information Systems* 24 (2), 221-260.
- Kearns, G. S., & Lederer, A. L. (2003). A Resource-based View of Strategic IT Alignment: How knowledge sharing creates competitive advantage, *Journal of Decision Sciences*, 34, 11- 30.
- Khoshsima, G., & Jafarnezhad, A. ( 2011). Effect Of Information Technology Infrastructure Flexibility On Competitive Advantage And Organizational performance, *Journal of business strategies*, 1(47) 69-92
- Kohli, R., & Hoadley, E. (2006). Towards Developing a Framework for Measuring Organisationa Impact IT-Enabled BPR: Case studies of three Firms, *SIGMIS Database*, 34, 40-58
- Kimberlin, C. L., & Winterstein, A. G. (2008). Research Fundamentals: Validity and reliability of measurement instruments used in research, *American Journal of Health-Systems Pharmacy*, 65(1), 2276-2284
- Kim, J. K., Xiang, J. Y., & Lee, S. (2009). The Impact of IT investment on Firm Performance in China: An Empirical Investigation of the Chinese Electronics Industry, *Journal of Technological Forecasting & Social Change* 76 (2009) 678–687
- Kim, G., Shin, B., Kim, K. K. L., & Ho, G. (2011). IT Capabilities, Process-Oriented Dynamic Capabilities, and Firm Financial Performance, *Journal of the Association for Information Systems*, 12(7)
- KPMG, (2012). *Nigeria Banking Industry Customer Satisfaction Survey*, available at <https://www.kpmg.com/NG/en/IssuesAndInsights/ArticlesPublications/Documents/2012%20KPMG%20Nigeria%20Banking%20Industry%20Customer%20Satisfaction%20Survey%20Report.pdf>, accessed on November, 2015.

- KPMG, (2013). Nigeria Banking Industry Customer Satisfaction Survey, available at <https://www.kpmg.com/NG/en/IssuesAndInsights/ArticlesPublications/Documents/2013%20KPMG%20Nigeria%20Banking%20Industry%20Customer%20Satisfaction%20Survey%20Final.pdf>, accessed on December, 2015
- KPMG, (2014). Nigeria Banking Industry Customer Satisfaction Survey, available at <https://home.kpmg.com/content/dam/kpmg/pdf/2015/01/2014-Banking-Industry-Customer-Satisfaction-Survey-Final.pdf>, accessed on December, 2015
- KPMG, (2015). Annual Banking Industry Customer Satisfaction Survey (BICSS), 9th Edition <http://www.kpmg.com/NG/en/Documents/2015%20BICSS%20Survey%20report.pdf>, accessed on September, 2016
- Lado, A., & Wilson, M. (1994). Human Resource Systems and Sustained Competitive Advantage: a Competency-based Perspective, *Academy of Management Review*, (19), 699–727.
- Li, E. Y., Chen, J. S., & Huang, Y. H. (2006). A Framework for Investigating the Impact of IT Capability and Organizational Capability on Firm Performance in the late industrializing context, *International Journal of Management of Firm Performance*, Tsinghua Science Technology, 13(3), 329-336.
- Lidija, D. B., & Robert, H. (2014). Dynamic Capabilities vs. Innovation Capability: are they related? *Journal of Small Business and Enterprise Development*, 21(3), 368-384
- Lim, S., & Trimi, S. (2014) Impact of Information Technology Infrastructure Flexibility on the Competitive Advantage of Small and Medium Sized-Enterprises, *Journal of Business & Management*, 3(1), 01-12
- Lin, B. (2007). Information Technology Capability and Value Creation: Evidence from the US Banking Industry, *Technology in Society*, 29, 93–106
- Lipton, J. D. (2002). Financing E-Commerce; Legal and Practical Risks; *Journal of Information, Law and Technology*.
- Litwin, M. S. (1995). *How to Measure Survey Reliability and Validity*. Thousand Oaks, California: Sage Publication
- Luper, I., & Kwanum, I. M. (2012). An Assessment of risk Management of Small and Medium Scale Enterprises in Nigeria. *Research Journal of Finance and Accounting*, 3(5), 151-158.
- MacKinnon, D. P., Krull J. L., & Lockwood, C. M. (2000). Equivalence of the Mediation, Confounding, and Suppression effect, *Journal of Prevention Science*, 1, 173–181, DOI:10.1023/A:1026595011371
- MacKinnon, D. P. (2008). *Introduction to Statistical Mediation Analysis*, New York: Erlbaum

- MacKinnon, D. P., Coxé, S., & Baraldi, A. N. (2012). Guidelines for the Investigation of Mediating Variables in Business Research, *Journal of Business Psychology*, 27(1) 1–14. DOI: 10.1007/s10869-011-9248-z
- Macher, J. T., & Mowery, D. C. (2009). Measuring Dynamic Capabilities : Practices and Performance in Semiconductor Manufacturing, *British Journal of Management*, 20(1), 41 – 62
- Mahmood, M. A., & Mann, G. J. (2000). Impact of Information Technology on Organizational Performance, Special Issue, 16 (4),3-10.,
- Marr, B., & Schiuma, G. (2003). Business Performance Measurement–past, Present and Future. *Management Decision*, 41(8), 680-687.
- Masrek, M. N. (2009). The Effect of Information Technology Infrastructure Flexibility on Intranet Effectiveness, *Computer and Information Science*, 2(2), 57–67.
- Mata, F. J., Fuerst, W. L., & Barney, J. B. (1995). Information Technology and Sustained Competitive Advantage: A Resource-Based Perspective, *MIS Quarterly*, 19, 487-505
- McAfee, A. & Brynjolfsson, E. (2008). Investing in the IT that makes a competitive Difference, *Harvard Business Review*, 86(7/8) 98-107
- Melville, N., Kraemer, K., & Gurbaxani, V. (2004). Review: Information technology and Organisational Performance: an Integrative Model of IT Business value. *MIS Quarterly*, 28 (2), 283-322.
- Mithas, S., Ramasubbu, N., Krishnan, M. S., & Sambamurthy, V. (2005). Information Technology Infrastructure Capability and Firm Performance: An Empirical Analysis. Online article, retrieved on November, 2014.
- Mitra, S., & Chaya, A. K. (1996). Analyzing Cost-effectiveness of Organizations: the impact of Information Technology Spending, *Journal of Management Information Systems*, 13(2) 29–57
- Mooney, J. G., Gurbaxani, V., & Kraemer, K. L. (1996). A Process Oriented Framework for Assessing the Business Value of Information Technology, published by Department of Management Information Systems, Smurfit Graduate School of Business, University College Dublin, Belfield, Dublin 4, Ireland.
- Ngai, E. W. T., Chau, D. C. K., & Chan, T. L. A. (2011). Information technology operational and management competencies for supply chain agility : Findings from case studies, *Journal of Strategic Information Systems*, 20, 232–249.  
<http://doi.org/10.1016/j.jsis.2010.11.002>

- Nonaka , I. (1994). Dynamic Theory of Organizational Knowledge Creation, *Journal of Organisation science*, 5(1) 14-37
- Nunnally, J. C., & Bernstein, I. H. (1994). *Psychometric Theory*. 3rd (ed) McGraw-Hill New York.
- Norusis, M. J. (1999). *Guide to Data Analysis*. New Jersey: Prentice Hall.
- Nweze, C. (2015). CBN: Three banks fail capital adequacy test, retrieved from <http://thenationonlineng.net/cbn-three-banks-fail-capital-adequacy-test/>, accessed on 26th November, 2015
- Obasan K. A. (2011). Information and Communication Technology and Banks Profitability in Nigeria, *Australian Journal of Business and Management Research*, 1(4 ),102-107
- Odunayo, F., & Frank, K. (2013). Approach to Cyber Security Issues in Nigeria: Challenges and Solution, *International Journal of Cognitive Research in science, engineering and education*, 1(1). 456-472
- Oghojafor, B. E., Kuye, L. O., Ogunkoya, O. ., & Byrd, S. P. (2014). Competitive Strategies , Technological Capabilities and Organizational Performance : Evidence from Nigerian Manufacturing Industry *Arabian Journal of Business and Management Review (Nigerian Chapter)*, 2(1), 11–22.
- OJoshua, A., & Philip, A. (2011). The Impact of Information Technology in Nigeria’s Banking Industry, *Journal of Computer Science and Engineering*, 7(20) 63-67
- Oke, M. O. (2012) Marketing Strategies and Bank Performance in Nigeria: A Post-Consolidation Analysis, *Global Journal of Management and Business Research*, 12 Issue 12(1) Type: Double Blind Peer Reviewed; *International Research Journal*, Publisher: Global Journals Inc. (USA) Online ISSN: 2249-4588.
- Oladejo, M. O. O., & Adereti, A. S. (2010). The Impact of Information Technology on the Performance of Micro finance Institutions in Nigeria, *Journal of Economic Development and Managerial Studies*, 1(1).
- Oladejo, M., & Akanbi, T. (2012) .Bankers Perceptions of Electronic banking in Nigeria: A Review of Post Consolidation Experience, *Research Journal of Finance and Accounting*, 3(2) 1 – 11, ISSN 2222-2847 (Online)
- Olufemi, O. Banjo, H., & Peter, S. (2014). Dynamic Capabilities And Competitive Advantage: An Analysis of The Nigerian Banking Sector, *Journal of accounting and management*, 1(2) 29-36

- Olovsson F., & Nilsson, K. (2010). *Dynamic Capabilities a multiple case study on successful entrepreneurs in South Africa*, published online by UMEA University South Africa.
- Pallant, J. (2001). *SPSS Survival manual: A Step by Step Guide to Data Analysis using SPSS for windows (3rd ed.)*. England: McGraw Hill Open University Press.
- Panda, M. (2013). *IT Enabled Business Process Reengineering*, *International journal of information technology & management information systems (IJTMIS)* 3(4), 85-95
- Park, Y. W. (2004). *Outsourcing of Information system and Core Competence in Small and Medium-sized Enterprises: A Case Study of a Japanese company compared with a South Korean company*. *The Japan Association for Social Informatics*, 16, 31–44
- Pavlou, P. A. (2002). *IT-Enabled Competitive Advantage: The Strategic Role of IT on Dynamic Capabilities in Collaborative Product Development Partnerships Dissertation Summary*. Retrieved from <http://citeseerx.ist.psu.edu/viewdoc/summary?doi=10.1.1.201.6178>
- Pavlou, P. A. (2004). *IT enabled dynamic capabilities in new product development: Building competitive advantage in turbulence environments*. Unpublished Dissertation, University of Southern California.
- Pebrianto, A., & Djanhur, J. (2013). *The Influence of IT Capability Organisational Learning and Knowledge Management Capability on Organisational Performance*, *Journal of Information and knowledge management*, 260-269
- Pei, N. S. (2008). *Enhancing Knowledge Creation in Organizations*, Faculty of Business & Law, Multimedia University, Jalan Ayer Keroh Lama, 75450 Melaka, Malaysia, *Communications of the IBIMA* 3,
- Penrose, E. T. (1959). *The Theory of the Growth of the Firm*, New York: John Wiley.
- Phama, L., & Jordan, E. (2007). *Information Technology Capability, the Effects on Organisational Performance*. *Proceedings of the 13th Asia Pacific Management Conference*, Melbourne, Australia, 261-269
- Ployhart R. E., Van C. H., Iddekinge W. I., & Mackenzie J. R. (2011) *Acquiring and Developing Human capital in Service Contexts: the Interconnectedness of Human Capital Resources*, *Academy of Management Journal*, 54 (2) 353–368.
- Preacher, K. J., & Hayes, A. F. (2004). *SPSS and SAS procedures for estimating indirect effects in simple mediation models*. *Behavior Research Methods, Instruments and Computers*, 36, 717731.

- Preacher, K. J., Rucker, D. D. & Hayes, A. F. (2007). Assessing Moderated Mediation Hypotheses: Strategies, Methods, and Prescriptions. *Multivariate Behavioral Research*, 42, 185–227.
- Priem, R. L., & Butler J. E. (2000). Is the Resource-based ‘view’ a Useful Perspective for Strategic Management Research? *Academy of Management Review*.
- Protogerou, A., Caloghirou, Y., & Lioukas, S. (2008). Dynamic Capabilities and their Indirect Impact on Firm Performance, Entrepreneurship and Innovation - Organizations, Institutions, Systems and Regions Copenhagen, CBS, Denmark, June 17 – 20
- Rai, A., Patnayakuni, R., & Seth, N. (2006). Firm Performance Impacts of Digitally Enabled Supply Chain Integration Capabilities, *MIS Quarterly* 30(2): 225–246.
- Rangan, V., & Bell. M. (1999). Harvard Business School Case Study 9, 59-116. Author: Roach, Stephen S. 1987. "America's Technology Dilemma: A Profile of the Information Economy." Morgan Stanley Special Economic Study.
- Richard, P. J., Devinney, T. M., & Yip, G. S. (nd). Measuring Organizational Performance as a Dependent Variable: Towards Methodological Best Practice, Published by Australian School of Business, UNSW Sydney NSW 2052, Australia
- Ringim, K. J., Razalli M. R. & Hasnan N. (2011). Effect of Business Process Reengineering Factors on Organizational Performance of Nigerian banks: Information Technology Capability as the Moderating Factor. *International Journal of Business and Social Science*, 2(13), [Special Issue]
- Ringim, K. J., Razalli, M. R., & Hasnan, N. (2012). The Moderating Effect of IT Capability on the Relationship between Business Process Reengineering Factors and Organizational Performance of Banks, *Journal of Internet Banking and Commerce*, 17(2) 1-21
- Ringim, K. J., Razalli M. R. & Hasnan N. (2012). The Relationship between Information Technology Capability and Organizational Performance in Nigerian Banks, *International Journal of Technology and Management*, (1)1, 1-10 ISSN 1927-9000
- Roach, S. S., Stanley, M., & Co S. (1987). America's Technology Dilemma: A Profile of the Information Economy, Morgan Stanley.
- Roberts, N. Galluch, P. S. Dinger, M., & Grover, V. (2012). Absorptive Capacity and Information Systems Search: Review, Synthesis, and Directions for future Research, *MIS Quarterly* 36 (2), 625–626

- Ross, J., Beath, C. & Goodhue, D. (1996). Develop Long-term Competitiveness through IT Assets, *Sloan Management Review*, 38(1) 31-42.
- Ray, G., Muhanna, W. A. & Barney, J. B. (2005). Information Technology and the Performance of the Customer Service Process: a resource-based analysis, *MIS Quarterly* 29(4) 625–652
- Sager, M. (1998), Competitive Information Systems in Australian retail Banking, *Information and Management*, 15, p59-67
- Santhanam, R., & Hartono, A. (2003). Issues in Linking Information Technology Capability to Firm Performance. *MIS Quarterly*, 27 (1), 125-153.
- Sekaran, U. (2000). *Research methods for business* (3ed). New York: New York: John Wiley & Sons, Inc.
- Sekaran, U. & Bougie, R. (2010). *Research methods for business: A Skills Building Approach* (2th ed) Chischester:John Willey and Sons Ltd.
- Sahara, R. (2015). Skye Bank Tops Nine Nigerian Commercial Banks Experiencing Stress, available at <http://saharareporters.com/2015/11/26/skye-bank-tops-nine-nigerian-commercial-banks-experiencing-stress>, accessed on 26th November, 2015
- Sher, J., & Lee, V. C. (2004), Information technology as a Facilitator for Enhancing dynamic capabilities through knowledge management. *Journal of Information & Management*, 41, 933–945
- Salawu, R. O., & Salawu, M. K. (2007). The Emergence of Internet Banking in Nigeria: an Appraisal, *Journal of Information Technology*, 6(4), 490 - 496.
- Sambamurthy, V. Bharadwaj, A., & Grover, V. (2003). Shaping Agility through Digital options: reconceptualizing the role of IT in contemporary firms, *MIS Quarterly* 27 (2), 237–263.
- Saraf, N. Langdon, C. S., & Gosain, S. (2007). IS Application Capabilities and Relational Value in Interfirm Partnerships, *Information Systems Research* 18 (3) 320–339.
- Sobel, M. E. (1986). Some new results on indirect effects and their standard errors in covariance structure models. In N. Tuma (Ed.), *Sociological methodology* 59-186. Washington, DC: American Sociological Association.

- Song, M., Nason R.W., & Benedetto, A. D. (2008) Distinctive Marketing and Information Technology Capabilities and Strategic Types: A Cross- National Investigation, *Journal of International Marketing*, 16(1), 4-38
- Spanos, Y. E., & Lioukas, S. (2001). An Examination into the Causal Logic of Rentgeneration: contrasting Porter's competitive strategy framework and the resource-based perspective, *Strategic Management Journal*, 22, 907-934.
- Stoel, M. D. & Muhanna, W. A. (2009) IT Capabilities and Firm Performance: A Contingency Analysis of the Role of Industry and IT Capability type, *Information & Management* 46, 181–189.
- Strassmann, P. (1990). *The Business Value of Computers: An Executive's Guide*, The Information Economic Press, New Canaan, Connecticut.
- Strassmann, P. (1997). *The Squandered Computer: Evaluating the Business Alignment of Information Technologies*, Information Economics Press, New Canaan, Connecticut, 1997.
- Strassmann, P. (1997). Will big spending on computers guarantee profitability? *Datamation*,
- Stratopoulou, T. & Dehning, B. (2000). Does Successful Investment in Information Technology Solve the Productivity Paradox? *Journal of Information & Management* , 38, 103-117
- Stenmark, D. & Jadaan T. (2010). Enabling Process Innovation through Sensor Technology: A Multiple case study of RFID deployment, in *Proceedings of the 18th ECIS*, Pretoria, South Africa, 7-9
- Tabachnick, B. G., & Fidell, L. S. (2014). *Using Multivariate Statistics* (6th ed). Boston: Pearson Education Limited.
- Tallon, P. P., Kraemer, K. L., & Gurbaxani, V. (2000). Executive's Perception of Business value of Information Technology: A Process Oriented Approach, *Journal of Management Information Systems*, 16, 145-173.
- Tam, K.Y. (1998). The Impact of Information Technology Investments on Firm Performance and Evaluation: Evidence from Newly Industrialized economies, *Information Systems Research*, 9(1) 85–98
- Teece, D. J., Pisano, G., & Shuen, A. (1997). Dynamic Capabilities and Strategic Management. *Strategic Management Journal*, 18(7), 509–533
- Teece, D. J. (2007). Explicating Dynamic Capabilities: The Nature and Microfoundations of (sustainable) Enterprise Performance. *Strategic Management Journal*, 28(13), 1319–1350.

- Teece, D. J. (2010). Business Models, Business Strategy and Innovation. *Long Range Planning*, 43(2-3), 172–194.
- Tippins, M. J., & Sohi, R. S. (2003). IT Competency and Firm Performance: is Organizational learning a missing link? *Strategic Management Journal* 24: 745-761.
- Venkatraman, N. (1994). I.T-enabled Business Transformation: from Automation to Business Scope Redefinition. *Sloan Management Review*, 35(2), 73-87.
- Wade, M., & Hulland, J. (2004). The Resource-Based View and Information Systems Research: Review, Extension and Suggestions for Future Research, *MIS Quarterly*, 28(1), 107-138
- Weill, P., Subramani, M., & Broadbent, M. (2002). Building IT Infrastructure for Strategic Agility, *MIT Sloan Management Review*, 44(1) 57-65
- Westfall, L. (2009). *Sampling Methods*, ASQ Quality Press, retrieved from [www.westfallteam.com](http://www.westfallteam.com)
- Winter, S. G. (2003). Understanding Dynamic Capabilities. *Strategic Management Journal*, 24, 991-995.
- Wang, C. L., & Ahmed, P. K. (2007). Dynamic Capabilities: a Review and Research Agenda. *The International Journal of Management Reviews*, 9(1): 31-51.
- Xiao, L., & Dasgupta, S. (2009). The Effects of Dynamic IT Capability and Organizational Culture on Firm Performance: An Empirical Study, *International Conference on Information Systems (ICIS) 2009 Proceedings*. Paper170.
- Yongmei, L., Hongjian, L., & Junhua, H. (2008). Information technology capability as moderator between information technology investment and firm's performance. *Tsinghua Science and Technology*, 13, 1007-021412/26 329-336)
- Yoo, Y., Boland, R. J., Lyytinen, K., & Majchrzak, A. (2009). Call for Papers - Special Issue: Organizing for Innovation in the Digitized World, *Organization Science*, 20 (1), 278-279.
- Zahra, S. A. and George, G. (2002) Absorptive Capacity: a Review, Reconceptualization, and Extension. *Academy of Management Review*, 27 (2), 185-203.
- Zahra, S. A, Sapienza, H. J., & Davidsson, P. (2006). Entrepreneurship and Dynamic Capabilities: a Review, Model and Research Agenda. *Journal of Management Studies* 43 (4): 918- 955.
- Zuboff, S. (1988). *In the age of the Smart Machine*, Basic Book, NY.

Zhu, K., & Kraemer, K. L. (2002). E-commerce Metrics for Net-enhanced Organizations: Assessing the Value of e-commerce to Firm Performance in the Manufacturing Sector, *Information Systems Research*, 13 (3) 275–295

Zhu, K., Kraemer K. L. Xu, S., & Dedrick, J. (2004). Information Technology payoff in e-Business Environments: an International Perspective on Value Creation of e-business in the financial services industry, *Journal of Management Information Systems*, 21 (1) 17–54

Zott, C. (2000). Dynamic Capabilities and Emergence of Intra-industry Differential Firm Performance: insight from simulation study, By Boulevard de Constance, France.

Appendix I: Research Questionnaire

DEPARTMENT OF BUSINESS ADMINISTRATION,  
AHMADU BELLO UNIVERSITY, ZARIA

SURVEY ON MANAGERS' PERCEPTION OF THE "DYNAMIC INFORMATION TECHNOLOGY CAPABILITIES (DITC) AND ORGANISATIONAL PERFORMANCE: THE MEDIATING EFFECTS OF PROCESS IMPROVEMENT IN KADUNA STATE"

Dear Sir/Madam,

TO WHOM IT MAY CONCERN

This questionnaire is purely for academic purpose. It is specifically designed for an MSc Degree Research Programme in the Department of Business Administration, Ahmadu Bello University, Zaria. The topic of the dissertation is “Dynamic Information Technology Capabilities (DITC) and Organisational Performance: the Mediating Effects of Process Improvement in Kaduna State” Kindly, help by completing this survey questionnaire as accurately as possible.

Please note that, your response shall be treated with utmost sense of responsibility, respect and confidentiality.

I thank you most sincerely, in anticipation of your valued response.

Yours sincerely,

Mohammed Aliyu Dantsoho

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### General Guidelines for the Survey

The questionnaire is divided into 3 sections. You are kindly requested to answer the questions in all the sections. Kindly tick [  ] your response to all the statement in each of the sections.

### Section One: IT Capability Attributes (Performance Improvement at Organisational level)

Direction:

The following statements assess the performance of IT Capability in banks. You are required to rate your organization in terms of I.T Management Capability, I.T Personnel expertise and IT Infrastructure Flexibility. Please indicate your extent on perceived performance to the statements based on the scale provided.

Strongly disagree      Disagree      Slightly disagree      Slightly agree      Agree      Strongly agree

1      2      3      4      5      6

Statements      Level of Agreement

A1. The organization has the best automating processes.      1      2      3      4      5  
6

A2. The organisation prioritizes technology investments.      1      2      3      4      5  
6

A3. The organization trains and educates employees in the newly introduced operational processes.      1      2      3      4      5      6

A4. The organization has a better planning and decision making process.      1      2      3  
4      5      6

A5. There is control of activities between and among the units.      1      2      3      4  
5      6

A6. There is collaboration between IT and none IT functions      1      2      3      4  
5      6

A7. The organisation balances information technology demand and resource requirements  
1      2      3      4      5      6

A8. The organization aligns IT infrastructure with business operations.      1      2      3  
4      5      6

A9. The organization has flexible structure that empowers employees and core process for effective service delivery.      1      2      3      4      5      6

A10. The organization builds an effective IT infrastructure. 1 2 3 4 5  
6

A11. The organization has sufficient budget for a purchase of an up to date IT materials for operational processes. 1 2 3 4 5 6

B1. IT Personnel are able to interpret business problems & develops solutions. 1 2  
3 4 5 6

B2. IT Personnel have knowledge about environmental constraints. 1 2 3 4  
5 6

B3. IT Personnel understand the business they support 1 2 3 4 5  
6

B4. IT Personnel are skilled in distributed processing, distributing & computing. 1 2  
3 4 5 6

B5. IT Personnel closely follow the trend in current technologies. 1 2 3 4  
5 6

B6. IT Personnel are skilled in network management & maintenance. 1 2 3  
4 5 6

B7. IT Personnel have ability to accomplish multitask 1 2 3 4 5  
6

B8. IT Personnel have ability to work closely with client & customers. 1 2 3  
4 5 6

B9. IT Personnel are knowledgeable of success factors in the organization. 1 2 3  
4 5 6

B10. IT Personnel work well in cross-functional teams addressing business problems. 1  
2 3 4 5 6

B11. IT Personnel are self-directed and proactive in e-banking innovation. 1 2 3  
4 5 6

D1. Data captured in one part of the organization are immediately available to everyone. 1  
2 3 4 5 6

D2. All remote branches & mobile offices are connected to the central office. 1 2  
3 4 5 6

- D3. The organization provides multiple interfaces or entry points for external users. 1  
2 3 4 5 6
- D4. Mobile users have access to the same data used in the desktop. 1 2 3 4  
5 6
- D5. Information is shared seamlessly across the organization regardless with location. 1  
2 3 4 5 6
- D6. The organization offers variety types of information to end users. 1 2 3  
4 5 6
- D7. The organization easily adapts to various database management protocols & standards.  
1 2 3 4 5 6
- D8. The organization utilizes a common operating system. 1 2 3 4 5  
6
- D9. There are very few identifiable communication bottlenecks within our systems. 1  
2 3 4 5 6
- D10. Hardware & software components can be modified with very few problems. 1 2  
3 4 5 6
- D11. Compared to competitors our organisation has the best available IT systems &  
connections. 1 2 3 4 5 6

## Section Two: I.T Capability Attributes (Performance Improvement at Firm Process Level)

Direction:

The following statements assess the performance of IT Capability in creating Business Value at Process Level. You are required to rate your organization in terms of Automational effects, Informational effects and Transformational effects. Please indicate your extent on perceived performance to the statements based on the scale provided.

Strongly disagree      Disagree      Slightly disagree      Slightly agree      Agree      Strongly agree

1      2      3      4      5      6

Statements      Level of Agreement

E1. Automational effects reduce operating costs      1      2      3      4      5      6

E2. Automational effects reduce communication costs      1      2      3      4      5  
6

E3. Automational effects avoid the need to increase workforce      1      2      3      4  
5      6

E4. Automational effects establish useful links with other organizations.      1      2      3  
4      5      6

E5. Informational effects enable easier access to information      1      2      3      4  
5      6

E6. Informational effects enable faster access to information.      1      2      3      4  
5      6

E7. Informational effects improve information accuracy      1      2      3      4      5  
6

E8. Informational effect provides transactional savings.      1      2      3      4      5  
6

E9. Transformational effects enable quicker response to change.      1      2      3      4  
5      6

E10. Transformational effects provide better products and services to customers.      1      2  
3      4      5      6

E11. Transformational effects expand organizational capabilities      1      2      3      4  
5      6

E12. Transformational effects Improve organizational structure and processes      1      2  
3      4      5      6

E13. Transformational effects establish useful links with other organizations      1      2  
3      4      5      6

### Section Three: Organizational Performance of Banks

Direction:

Section 3: The following statements assess the Financial & Non-Financial Performance of banks in terms of Marketing, Financial, and Administrative Performance. You are required to rate your organization in the last three years. Please indicate your extent on perceived performance to the statements based on the scale provided.

	Decrease Significantly			Decrease		Slightly Decrease		Slightly Increase	
	Increase		Increase Significantly						
	1	2	3	4	5	6			
F1. Level of customer satisfaction in our branches	1	2	3	4	5	6			
F2. Reactivation of inactive account records in our branches.							1	2	
	5	6					3	4	
F3. Level of customer service delivery in branches	1	2	3	4	5	6			
F4. Level of good customer relationship management in branches.							1	2	
	5	6					3	4	
F5. Level of best transaction cycle time in branches.	1	2	3	4	5	6			
F6. Level of market share in retail banking services							1	2	
	6						3	4	
F7. Level of market share of public sector business	1	2	3	4	5	6			
G1. Acceptable number of performing loans in branches.							1	2	
	6						3	4	
							5		

G2. Level of yearly profit before tax performance.	1	2	3	4	5	6
G3. Number of non-performing loans in branches.	1	2	3	4	5	6
G4. Number of recovered bad loans in branches.	1	2	3	4	5	6
G5. Level of fee based income on transaction services	1	2	3	4	5	6
G6. The number of current and saving account customers.	1	2	3	4	5	6
G7. The volumes of tenured fund/ fixed deposit in branches.	1	2	3	4	5	6
H1. Level of improve planning & decision making process.	1	2	3	4	5	6
H2. Level of enhance coordination among departments.	1	2	3	4	5	6
H3. Level of better control of resources & processes in branches.	1	2	3	4	5	6
H4. Level of zero error of operational processes in branches.	1	2	3	4	5	6
H5. Level of reduced financial budget for operational process.	1	2	3	4	5	6
H6. Level of reduced operating cost of doing business in branches.	1	2	3	4	5	6

Appendix: ii Reliability results after factor analysis

Reliability: DITC

Case Processing Summary

	N	%
Cases Valid	129	100.0
Excludeda	0	.0
Total	157	100.0

a. Listwise deletion based on all variables in the procedure.

#### Reliability Statistics

Cronbach's Alpha	N of Items
.859	7

#### Reliability: Process Improvement

##### Case Processing Summary

	N	%
Cases Valid	157	100.0
Excludeda	0	.0
Total	157	100.0

a. Listwise deletion based on all variables in the procedure.

#### Reliability Statistics

Cronbach's Alpha	N of Items
.771	4

#### Reliability: Organisational performance

##### Case Processing Summary

	N	%
Cases Valid	157	100.0
Excludeda	0	.0
Total	157	100.0

a. Listwise deletion based on all variables in the procedure.

Appendix: iii Factor Analysis

Dependent Variable: Organisational performance

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy. .565

Bartlett's Test of Sphericity Approx. Chi-Square 54.333

Df 15

Sig. .000

Anti-image Matrices

	F3	F4	F6	F7	H2	H4				
Anti-image Covariance				F3	.805	-.283	-.107	-.137	-.038	.059
	F4	-.283	.826	-.066	-.077	-.066	.019			
	F6	-.107	-.066	.926	.038	-.171	-.060			
	F7	-.137	-.077	.038	.867	-.086	-.257			
	H2	-.038	-.066	-.171	-.086	.913	.150			
	H4	.059	.019	-.060	-.257	.150	.894			
Anti-image Correlation				F3	.593a	-.347	-.124	-.164	-.044	.069
	F4	-.347	.615a	-.075	-.091	-.076	.022			
	F6	-.124	-.075	.612a	.043	-.186	-.066			
	F7	-.164	-.091	.043	.526a	-.096	-.292			
	H2	-.044	-.076	-.186	-.096	.576a	.166			
	H4	.069	.022	-.066	-.292	.166	.430a			

a. Measures of Sampling Adequacy(MSA)

### Communalities

	Initial	Extraction
F3	1.000	.537
F4	1.000	.501
F6	1.000	.280
F7	1.000	.606
H2	1.000	.388
H4	1.000	.669

Extraction Method: Principal Component Analysis.

### Total Variance Explained

Component	Initial Eigenvalues		Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings			
	Total of Variance	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	%	
1	1.711	28.517	28.517	1.711	28.517	28.517	1.676	27.935	27.935
2	1.271	21.183	49.700	1.271	21.183	49.700	1.306	21.765	49.700
3	.956	15.940	65.640						
4	.847	14.121	79.761						
5	.639	10.650	90.411						
6	.575	9.589	100.000						

Extraction Method: Principal Component Analysis.

### Component Matrixa

Component

	1	2
F3	.733	
F4	.707	
F6	.489	
H2	.470	-.410
H4		.817
F7	.460	.628

Extraction Method: Principal Component Analysis.

a. 2 components extracted.

#### Rotated Component Matrixa

	Component	
	1	2
F3	.708	
F4	.688	
F7	.566	
F6	.526	
H4		.796
H2		.732

Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalization.

a. Rotation converged in 3 iterations.

#### Process Improvement

##### KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy. .529

Bartlett's Test of Sphericity Approx. Chi-Square 120.042

Df 21  
 Sig. .000

Anti-image Matrices

	A2	A11	B2	B4	D5	D9	D11				
Anti-image Covariance				A2	.777	-.122	-.296	-.089	-.069	.168	-.118
	A11	-.122	.961	.068	.102	-.022	.026	-.047			
	B2	-.296	.068	.804	.002	-.014	-.194	.058			
	B4	-.089	.102	.002	.696	-.330	.023	-.128			
	D5	-.069	-.022	-.014	-.330	.717	-.115	.038			
	D9	.168	.026	-.194	.023	-.115	.693	-.330			
	D11	-.118	-.047	.058	-.128	.038	-.330	.727			
Anti-image Correlation				A2	.474a	-.141	-.375	-.121	-.092	.229	-.157
	A11	-.141	.377a	.077	.125	-.026	.031	-.056			
	B2	-.375	.077	.500a	.003	-.018	-.259	.076			
	B4	-.121	.125	.003	.587a	-.467	.033	-.180			
	D5	-.092	-.026	-.018	-.467	.592a	-.164	.052			
	D9	.229	.031	-.259	.033	-.164	.481a	-.465			
	D11	-.157	-.056	.076	-.180	.052	-.465	.537a			

a. Measures of Sampling Adequacy(MSA)

Communalities

	Initial	Extraction
A2	1.000	.747
A11	1.000	.912
B2	1.000	.801
B4	1.000	.759

D5 1.000 .714  
 D9 1.000 .790  
 D11 1.000 .698

Extraction Method: Principal Component Analysis.

Total Variance Explained

Component	Initial Eigenvalues		Extraction Sums of Squared Loadings				Rotation		
	Total	% of Variance	Total	% of Variance	Cumulative % Total	% of Variance	Cumulative % Total	%	
1	2.065	29.499	2.065	29.499	29.499	29.499	1.537	21.958	21.958
2	1.229	17.556	1.229	17.556	47.055	47.055	1.489	21.268	43.226
3	1.122	16.034	1.122	16.034	63.088	63.088	1.339	19.122	62.349
4	1.003	14.333	1.003	14.333	77.421	77.421	1.055	15.073	77.421
5	.704	10.061			87.482				
6	.483	6.898			94.379				
7	.393	5.621			100.000				

Extraction Method: Principal Component Analysis.

Component Matrixa

	Component			
	1	2	3	4
B4	.681		-.504	
D5	.665		-.457	
D11	.610	-.416	.344	
A2	.457	.701		
D9	.576	-.582	.336	
A11		.305	.504	.749
B2	.494	.341	.363	-.556

Extraction Method: Principal Component Analysis.

a. 4 components extracted.

#### Rotated Component Matrixa

	Component			
	1	2	3	4
B4	.857			
D5	.833			
D9		.876		
D11		.799		
B2			.848	
A2			.775	
A11				.951

Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalization.

a. Rotation converged in 5 iterations.

#### Component Matrixa

	Component		
	1	2	3
G1	.731		
F3	.648		-.371
F7	.604	.533	
F4	.595		-.336
F6	.434		.425
H4		.719	
H2	.396	-.458	.323

G6 .311 .695

Extraction Method: Principal Component Analysis.

a. 3 components extracted.

Rotated Component Matrixa

	Component		
	1	2	3
F3	.773		
F4	.718		
F7		.764	
H4		.687	
G1		.503	
F6			.642
H2			.608
G6			.572

Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalization.

a. Rotation converged in 4 iterations.

Independent Variable: DITC

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy. .529

Bartlett's Test of Sphericity Approx. Chi-Square 120.042

Df 21

Sig. .000

Anti-image Matrices

	A2	A11	B2	B4	D5	D9	D11				
Anti-image Covariance				A2	.777	-.122	-.296	-.089	-.069	.168	-.118
	A11	-.122	.961	.068	.102	-.022	.026	-.047			
	B2	-.296	.068	.804	.002	-.014	-.194	.058			
	B4	-.089	.102	.002	.696	-.330	.023	-.128			
	D5	-.069	-.022	-.014	-.330	.717	-.115	.038			
	D9	.168	.026	-.194	.023	-.115	.693	-.330			
	D11	-.118	-.047	.058	-.128	.038	-.330	.727			
Anti-image Correlation				A2	.474a	-.141	-.375	-.121	-.092	.229	-.157
	A11	-.141	.377a	.077	.125	-.026	.031	-.056			
	B2	-.375	.077	.500a	.003	-.018	-.259	.076			
	B4	-.121	.125	.003	.587a	-.467	.033	-.180			
	D5	-.092	-.026	-.018	-.467	.592a	-.164	.052			
	D9	.229	.031	-.259	.033	-.164	.481a	-.465			
	D11	-.157	-.056	.076	-.180	.052	-.465	.537a			

a. Measures of Sampling Adequacy(MSA)

Communalities

Initial Extraction

A2	1.000	.747
A11	1.000	.912
B2	1.000	.801
B4	1.000	.759
D5	1.000	.714
D9	1.000	.790
D11	1.000	.698

Extraction Method: Principal Component Analysis.

#### Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total of Variance	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	2.065	29.499	29.499	2.065	29.499	29.499	1.537	21.958	21.958
2	1.229	17.556	47.055	1.229	17.556	47.055	1.489	21.268	43.226
3	1.122	16.034	63.088	1.122	16.034	63.088	1.339	19.122	62.349
4	1.003	14.333	77.421	1.003	14.333	77.421	1.055	15.073	77.421
5	.704	10.061	87.482						
6	.483	6.898	94.379						
7	.393	5.621	100.000						

Extraction Method: Principal Component Analysis.

#### Component Matrixa

	Component			
	1	2	3	4
B4	.681		-.504	

D5	.665			-.457
D11	.610	-.416	.344	
A2	.457	.701		
D9	.576	-.582	.336	
A11		.305	.504	.749
B2	.494	.341	.363	-.556

Extraction Method: Principal Component Analysis.

a. 4 components extracted.

#### Rotated Component Matrixa

	Component			
	1	2	3	4
B4	.857			
D5	.833			
D9		.876		
D11		.799		
B2			.848	
A2			.775	
A11				.951

Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalization.

a. Rotation converged in 5 iterations.

#### Appendix IV: Regression Results

##### Model Summaryb

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.598a	.271	.254	.30799	1.687

a. Predictors: (Constant), ITKnowledge, ITPersonnel ,ITinfrastructure, , ITManagementa

b. Dependent Variable: Organ Performance

ANOVAa

Model	Sum of Squares	Df	Mean Square	F	Sig.	
1	Regression	6.550	4	1.637	15.572	.000b
	Residual	11.762	124	.095		
	Total	18.312	128			

a. Dependent Variable: Organisational performance

b. Predictors: (Constant), ITKnowledge, ITPersonnel ,ITinfrastructure, , ITManagementa,

Table 4.13 Regression Result DITC and Organisational performance

Model	Unstandardized Coefficients		Standardized Coefficients		T	Sig.
	B	Std. Error	Beta			
1	(Constant)	4.862	.758		6.416	.000
	ITKnowledge	-.176	.082	-.194	-2.148	.034
	ITInfrastructure Flex	.275	.081	.300	3.387	.001
	ITPersonnel Expertise	.144	.052	.248	2.767	.007
	ITManagement			.117	.049	.215
2.393		.018				

a. Dependent Variable: Organ Performance

ANOVAa

Model	Sum of Squares	Df	Mean Square	F	Sig.
-------	----------------	----	-------------	---	------

1	Regression	3.930	1	3.930	21.703	.000b
	Residual	23.000	127	.181		
	Total	26.930	128			

a. Dependent Variable: Organ Performance

b. Predictors: (Constant), PRI

#### Coefficientsa

Model	Unstandardized Coefficients	Standardized Coefficients	T	Sig.		
	B	Std. Error	Beta			
1	(Constant)	3.316	.391	8.478	.000	
	PRI	.347	.075	.382	4.659	.000

Dependent Variable: Organ Performance

#### Variables Entered/Removeda

Model	Variables Entered	Variables Removed	Method
1	PRI		
	ITKnowledge		
	ITInfrastructure		
	ITPersonnel		
	ITManagementb		Enter

a. Dependent Variable: OrganPerformance

b. All requested variables entered.

Variables Entered/Removed<sup>a</sup>

Model	Variables Entered	Variables Removed	Method
1	PRI <sup>b</sup>	.	Enter

- a. Dependent Variable: OrganPerformance
- b. All requested variables entered.

Model Summary<sup>b</sup>

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.324 <sup>a</sup>	.105	.098	.42277	1.742

- a. Predictors: (Constant), PRI
- b. Dependent Variable: OrganPerformance

ANOVA<sup>a</sup>

Model	Sum of Squares	Df	Mean Square	F	Sig.	
1	Regression	2.668	1	2.668	14.928	.000 <sup>b</sup>
	Residual	22.699	127	.179		
	Total	25.367	128			

- a. Dependent Variable: OrganPerformance
- b. Predictors: (Constant), PRI

Coefficients<sup>a</sup>

Model	Unstandardized Coefficients	Standardized Coefficients	t	Sig.
	B	Std. Error	Beta	
1				

1	(Constant)	3.514	.427		8.221	.000
	PRI	.315	.081	.324	3.864	.000

a. Dependent Variable: OrganPerformance

Variables Entered/Removed<sup>a</sup>

Model	Variables Entered	Variables Removed	Method
1	ITManagement, ITInfrastructure, ITPersonnel, ITKnowledgeb	.	Enter

a. Dependent Variable: PRI

b. All requested variables entered.

Model Summary<sup>b</sup>

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.247a	.061	.054	.45159	1.780

a. Predictors: (Constant), ITManagement, ITInfrastructure, ITPersonnel, ITKnowledge

b. Dependent Variable: PRI

ANOVA<sup>a</sup>

Model	Sum of Squares	df	Mean Square	F	Sig.	
1	Regression	1.450	4	.483	4.458	.005b
	Residual	25.288	124	.204		
	Total	26.930	128			

a. Dependent Variable: PRI

b. Predictors: (Constant), ITManagement, ITInfrastructure, ITPersonnel, ITKnowledge

Coefficients<sup>a</sup>

Model	Unstandardized Coefficients		Standardized Coefficients		T	Sig.
	B	Std. Error	Beta			
1	(Constant)	4.097	.504		8.131	.000
	ITKnowledge	.105	.054	.177	1.921	.057
	ITInfrastructure	.258	.081	.338	3.189	.002
	ITPersonnel	.226	.094	.247	2.418	.017
	ITManagement	.115	.054	.184	2.106	.037

a. Dependent Variable: PRI

#### Variables Entered/Removed<sup>a</sup>

Model	Variables Entered	Variables Removed	Method
1	OverallProcessImp, ITCompatibility, ITBusinessExperience, ITManagement, ITKnowledgeb	.	Enter

a. Dependent Variable: Organ performance

b. All requested variables entered.

#### Model Summary<sup>b</sup>

R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
.598a	.358	.337	.30799	1.687

a. Predictors: (Constant), ITManagement, ITInfrastructure, ITPersonnel, ITKnowledgea

b. Dependent Variable: Organ Performance

#### ANOVA<sup>a</sup>

Model	Sum of Squares	Df	Mean Square	F	Sig.	
1	Regression	6.550	4	1.637	17.262	.000b
	Residual	11.762	124	.095		

Total 18.312 128

a. Dependent Variable: Organisational performance

b. Predictors: (Constant),PRI, ITManagement, ITInfrastructure, ITPersonnel, ITKnowledge,

Coefficientsa

Model	Unstandardized Coefficients		Standardized Coefficients		t	Sig.	
	B	Std. Error	Beta				
1	(Constant)	2.775	.520		5.340	.000	
	ITKnowledge	-.027	.046	-.051	-.594	.554	
	ITInfrastructure		.117	.045	.216	2.605	.010
	ITPersonnel	.073	.056	.108	1.312	.192	
	ITManagement		-.066	.046	-.117	-1.438	.153
	PRI	.360	.075	.396	4.810	.000	

a. Dependent Variable: Organ performance

Variables Entered/Removeda

Model	Variables Entered	Variables Removed	Method
1	DITCb.		Enter

a. Dependent Variable: Org Performance

b. All requested variables entered.

Model Summaryb

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.219a	.048	.040	.40852	1.810

a. Predictors: (Constant), DITC

b. Dependent Variable: Org Performance

ANOVAa

Model	Sum of Squares	df	Mean Square	F	Sig.	
1	Regression	1.065	1	1.065	6.381	.013b
	Residual	21.195	127	.167		
	Total	22.260	128			

a. Dependent Variable: Org Performance

b. Predictors: (Constant), DITC

Coefficientsa

Model	Unstandardized Coefficients	Standardized Coefficients	T	Sig.		
	B	Std. Error	Beta			
1	(Constant)	4.078	.419	9.745	.000	
	DITC	.209	.083	.219	2.526	.013

a. Dependent Variable: Org Performance

Variables Entered/Removeda

Model	Variables Entered	Variables Removed	Method
1	DITCb.		Enter

a. Dependent Variable: PRI

b. All requested variables entered.

Model Summary<sup>b</sup>

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.315 <sup>a</sup>	.099	.092	.32629	1.971

a. Predictors: (Constant), DITC

b. Dependent Variable: PRI

ANOVA<sup>a</sup>

Model	Sum of Squares	Df	Mean Square	F	Sig.	
1	Regression	1.485	1	1.485	13.953	.000 <sup>b</sup>
	Residual	13.521	127	.106		
	Total	15.007	128			

a. Dependent Variable: PRI

b. Predictors: (Constant), DITC

Coefficients<sup>a</sup>

Model	Unstandardized Coefficients		Standardized Coefficients		t	Sig.
	B	Std. Error	Beta			
1	(Constant)	3.788	.400		9.464	.000
	DITC	.295	.079	.315	3.735	.000

a. Dependent Variable: PRI

Variables Entered/Removed<sup>a</sup>

Model	Variables Entered	Variables Removed	Method
1	PRI <sup>b</sup>	.	Enter

a. Dependent Variable: Org Performance

b. All requested variables entered.

Model Summary<sup>b</sup>

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.426 <sup>a</sup>	.181	.175	.34360	1.686

a. Predictors: (Constant), PRI

b. Dependent Variable: Org Performance

ANOVA<sup>a</sup>

Model	Sum of Squares	Df	Mean Square	F	Sig.	
1	Regression	3.318	1	3.318	28.105	.000 <sup>b</sup>
	Residual	14.994	127	.118		
	Total	18.312	128			

a. Dependent Variable: Ogn. Performance

b. Predictors: (Constant), PRI

Coefficients<sup>a</sup>

Model	Unstandardized Coefficients		Standardized Coefficients		t	Sig.
	B	Std. Error	Beta			
1	(Constant)	2.578	.469		5.494	.000
	PRI	.470	.089	.426	5.301	.000

a. Dependent Variable: Org Performance

Model Summary<sup>b</sup>

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.413 <sup>a</sup>	.171	.157	.38278	1.783

- a. Predictors: (Constant), PRI, DITC
- b. Dependent Variable: Org Performance

ANOVAa

Model	Sum of Squares	df	Mean Square	F	Sig.	
1	Regression	3.798	2	1.899	12.960	.000b
	Residual	18.462	126	.147		
	Total	22.260	128			

- a. Dependent Variable: Org Performance
- b. Predictors: (Constant), PRI, DITC

Coefficientsa

Model	Unstandardized Coefficients		Standardized Coefficients		t	Sig.	
	B	Std. Error	Beta	Tolerance			
1	(Constant)	2.676	.509	5.255	.000		
	DITC	.152	.078	.159	1.936	.054	.972
	PRI	.323	.075	.355	4.319	.000	.972

- a. Dependent Variable: Org Performance