BUSINESS INTELLIGENCE SYSTEM AND OPERATIONAL PERFORMANCE OF SELECTED TELECOMMUNICATION COMPANIES IN THE FEDERAL CAPITAL TERRITORY

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Abstract

The study investigates Business intelligence system and operational performance of selected telecommunication companies in the Federal Capital Territory. The objective of the study is to ascertain the relation between business intelligence system and operational performance in telecommunication companies. The study adopted descriptive and causal research designs were questionnaires are administered to respondents to get information about the subject matter. Purposive sampling was used to select twenty (20) BI experts which were used as the sample size. The study used E-view and other statistical tools was used for analysis and to test the formulated hypotheses in line with the objectives of the study and the result revealed that there is significant correlation and effect between business intelligence system and operational performance in telecommunication companies. The study concluded that that business intelligence system implementation in telecommunication companies will enhance strategic operational performance at sustainability and it is backbone of operational performance. The study recommended that Telecommunication companies should set up Business Intelligence (BI) architecture adequately to attract every new technology invention in their product and service innovation from the competitive market environment in order to attain sustainable operational performance.

Key word: *Business Intelligence System, Operational Performance, Decision Making, Sustainability, Profitability*

Introduction

Business intelligence (BI) was a concept restructured and reshaped from Decision Support System (DSS) emanated from the concept of Marketing Information System (MIS) connected to data extracted and refined from marketing research and market research in decays to enhance effective business decision making process in organizations. BI was a system and approach to effectively and efficiently manage business decision making process from evidence based information to enhance operational performance respectively (Mohamad, Jayakrishnan & Yusof, 2022; Di Vaio, Rohail, & Alavoine, 2022; Biagi , Patriarca & Di Gravio, 2022; Seddigh, Shokouhyar & Loghmani, 2022; Sumera & Miskon 2021; Nur et al . 2021; Dahish 2021).

Business intelligence is a remedy and strategy that strengthen the modern business leaders to have access and attain adequate stores of extracted data and refined information for every business decision making process in organizations. BI system enhances business leaders to align and integrate every business decision with sufficient data backup. BI is a highly dependent technological based structure that is adapted to extracts and refines business and customers' data into reliable business based information to enhance sustainable and profitable business performance. Business intelligence is a structured business setting that involves in concrete analysis and

interpretation of competitive strengths, strategic capabilities and knowledge management in order to make sustainable business decision and performance in relation with the trending business environment. BI Systematic structure of technological driving business tools for data and information analysis from the business context (internal and external information) for meaningful business decision making strategically to attain sustainable business performance. Several scholars have described BI in different perspective based on their philosophical tenets. Dahish (2021) and Alnoukari and Hanano (2017) described BI as strength in the modern knowledge economy base that has persistent impact to modern business and economic growth. It is a system that adapts and applies technological architecture to ascertain, warehouse and mine relevant and irrelevant business data to meaningful business information for effective decision making and to enhance business operational performance in the mixed of uncertain business situations. This BI application and practice involves the use of data base, online analytical processing (OLAP), data warehouse, data mining, statistical analysis and forecasting and predictions. Mohamad, et al. (2022) described BI as strategic tool modern businesses adopt and implement to enhance effectiveness in strategic management. Di Vaio, et al. (2022) opined that business intelligence is a strategic technological driving implant that helps modern business settings to attain supportive management decisions effectiveness.

Recently, Biagi et al. (2022); Seddigh, et al. (2022); Dahish (2021); Yassine and Kohtamäki (2020); Sophian and Bentz (2017) and other scholars have addressed issues deeply on BI in many other industrial operations but they have not actually address the issue of business intelligence system in telecommunication companies in Nigeria measuring their operational performance and these recent studies have conceptual, theoretical and empirically gaps different from this study respectively. In recent years, organizational with business intelligence system were able to address several issues generating from the business environment especially the dramatic changes in technology, new markets for new and existing products, competitive information, organization strategic planning and implementation. To maintain sustainable market position in telecommunication industry in Nigeria, it requires having adequate application and practices various business intelligence systems in place and will help to adapt suitable strategies to business situational changes and forecast and exploit new technologies that support the attainment of suitable business positions in competitive markets. In the nutshell business intelligence system help the organizations to strengthen their holistic operational performance and aid the firms to attain and attract competitive advantage.

Operational performance can be described as the periodic assessment of critical operational activities and strategies in modern business settings. It involves the periodic review of strategic management implementation, competitive strengths and position and review of technological impact and growth of a firm in particular industry in order to ascertain the level of operational growth and sustainability. In the nutshell, suitable operational performance can be used as an instrument to assess the level of customer satisfaction and will direct the company to adopt needed strategies to increase customer retention and royalty. The study addressed and discussed how business intelligence system in modern business settings can enhance continuous and dramatic change in operational performance in the current harsh business contexts faced by telecommunication companies in Abuja, specifically MTN and GLO telecom firms. One critical rationale for conducting this study is to expose the contributing role of business intelligence system in holistic business and operational performances in telecommunication industry and other competitive industries. The study will be significant to industries on how business intelligence system can help to attain and

maintain competitive advantage and position in many industries; how business intelligence system can help to attain sustainable and profitable strategic management implementation in modern business settings and how business intelligence system can adopted in business to reduce business risk and other risk and uncertainty. Increase customers satisfaction is a tremendous strength for every company to attain and maintain its profitability and this study will be significant to many industries on how to attain sustainable customer satisfaction, customers retention and customer royalty.

1.1 Statement of the Problem

Inconsistent operational performance among listed manufacturing companies in Nigeria has being critical bane that has affected their operational sustainability and profitability from preliminary survey conducted in the middle of 2021. Complex changes in business cycle, inadequate financial backup and consistent changes in business contexts have draw back telecommunication companies in Abuja Nigeria to ensure sustainable operational performances. Telecommunication companies in Abuja Nigeria including MTN and GLO face the challenges of addressing sustainable strategic implementation engagement, attractive competitiveness; improve customer satisfaction and reduced business risk as a result of changes in business contexts and financial complexity which the study intend to adopt business intelligence system as strategic tool to address these operational challenges in the selected telecommunication companies. Specifically the consistence dynamism and complexities of technological and economic variables were critical recent banes that causes misshape and disintegration in operational performance in terms of slow pace of strategic implementation engagement, competitive advantage, and customer satisfaction and business risk of the selected telecommunication companies in Nigeria from pilot survey and preliminary study conducted in 2021. It is on this premise that the study focused to investigate business intelligence system and operational performance in telecommunication companies in FCT, Abuja. Specifically the study will employ business intelligence system to investigate and analyze key operational performance variables of competitive advantage, strategic improvement, customer satisfaction and business risk in telecommunication companies in Abuja.

1.2 Objective of the Study

The main objective of this study is to investigate the correlation between business intelligence system and operational performance in telecommunication companies in FCT Abuja. The other specific objectives of the study are is to:

i. Ascertain the extent of business intelligence system enhances competitive advantage in telecommunication companies in FCT, Abuja.
ii. Determine the extent business intelligence system contributes on strategic improvement of telecommunication companies in CFT, Abuja**.**
iii. Ascertain the extent business intelligence system impact on customer satisfaction of telecommunication companies in FCT, Abuja.
iv. Determine the extent business intelligence system reduces business risk of telecommunication companies in FCT, Abuja**.**

1.3 Statement of Hypotheses

With strict connection and alignment from the objectives and the research questions of this study, the following null hypotheses were formulated and tested as follows;

H_{O1}: Business intelligence system has no significant effect on competitive advantage in telecommunication companies in FCT, Abuja.

H_{O2}: Business intelligence system has no significant impact on strategic improvement of telecommunication companies in FCT, Abuja**.**
H_{O3}: Business intelligence system has no significant impact on customer satisfaction in telecommunication companies in FCT, Abuja.
H_{O4}: Business intelligence system has no significant effect to reduce business risk of telecommunication companies in FCT, Abuja**.**

II. Literature Review

2.1 Concept of Business Intelligence (BI) System

It is necessary strategic point of view for modern business settings to create alignment between business intelligence system and strategic planning process and management in order to have successful and excellent business performance business, BI system has the capacity to enhance businesses to make informative and reliable business decisions that are uplifting and upgrading with the current business trends (Mohamad,et al. 2022; Di Vaio, et al. 2022; Biagi, et al. 2022; Seddigh, et al. 2022; Sumera & Miskon 2021; Nur et al. 2021). Also these scholars and studies have discussed critically and reliably raised stringent ideas that have naturally selected and supported deep explanation of business intelligence in relation to the current need of operational performance in modern business settings (Mohamad, et al. 2022; Di Vaio, et al. 2022; Biagi, et al. 2022; Seddigh, et al. 2022). Biagi, et al. (2022) opined that BI system is a quantitative data presentation and prediction that is express in financial and economic terms to governance business decisions. Seddigh, et al. (2022) described BI as electronic systematic tool help to address varieties of business problems and attain high competitive strengths in competitive markets. Bentley (2017) defined BI as technical tools used to channel data flow and refine data into reliable business information for analysis to make sustainable business decisions and reports. He described BI critical role as data surfacing which is use to identify substantial business opportunities in harsh business contexts. To Bentley (2017) BI technologies is critically use to group and configure data that are ungroup into meaningful structure of information that assist in making reliable business decisions in modern business settings. That is data sourcing, data analysis and business analytics gives critical support and balance to BI competence and implementation in order to thrive and enhances the manipulation and exploitation of large data volume that will ensure consistency in every business decision in modern business settings. Farhad et al. (2021) and Egham (2019) disclosed that business intelligence system is a wide group of information technology equipments to collate, collect and analyze data into reportable business information to measures business performance in alignment with the environmental contexts. From this definition above BI system is refers to as the manipulation of IT solution tools in data processing to ascertain and extract concrete business information that will harmonize effective business decisions in the various strategic business units and corporate unit in modern business organizations. BI System was also described as group of technological driving forces used to access, process and analyze data to ascertain relevant business information in modern business settings (Maurer, 2021). This definition hammered on technological tools as the driving forces of BI and people effort in information report and interpretation to enhance sustainable strategic management implementation in all of level of business garages. BI system involves the stringent application and installation of computer gadgets and packages of software to process relevant business data into information chain functions that form holistic information system in the organization.

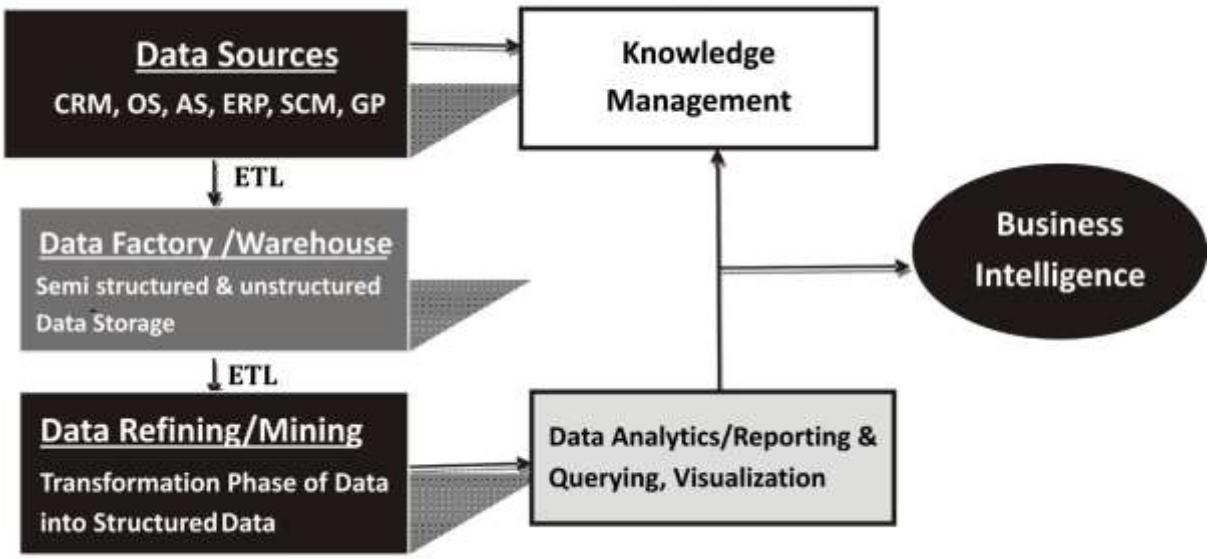


Fig.1: *Chart of Business Intelligence System formation for modern business settings (Researcher, 2022)*

The diagram above (Fig.1) shows how BI ensure the refining of internal and external business data sources from Customer Relationship Management (CRM), Operational System (OS), Accounting System (AS), Enterprise Resources Planning (ERP) and Supply Chain Management (SCM) into the data warehouse/factory through a systematic process refers to as Extract, Transform and Load (ETL) and critical analysis and evaluation will be carried out effectively on the refined data and querying put into effect and meaningful business information will trace from the data analytics conducted and effective knowledge management structure will be in place. Having a data factory and data warehouse is critically vital in organizations as it help to refine data for effective data analysis with other relevant BI tools and reporting and BI awake unstructured and semi-structure data into relevant structured data that will enhances informative business decisions and help the firms to meet up with business objectives.

2.2 Categories Business Intelligence

Business activities raised the hope of having an organization and markets where the business product and services will be rendered at profitability that brings the hope of facing competitors and competition. Business leaders become strategic thinkers who are thinking on how to exploit new technology in production and processes system, when they have holistic knowledge about business intelligence system and categories that give holistic business operational data and information to run the company strategic decisions. It as a result of this study categorizes business intelligence system for modern digital business settings:

i. Strategic intelligence
ii. Competitive intelligence
iii. Customer intelligence
iv. Risk intelligence

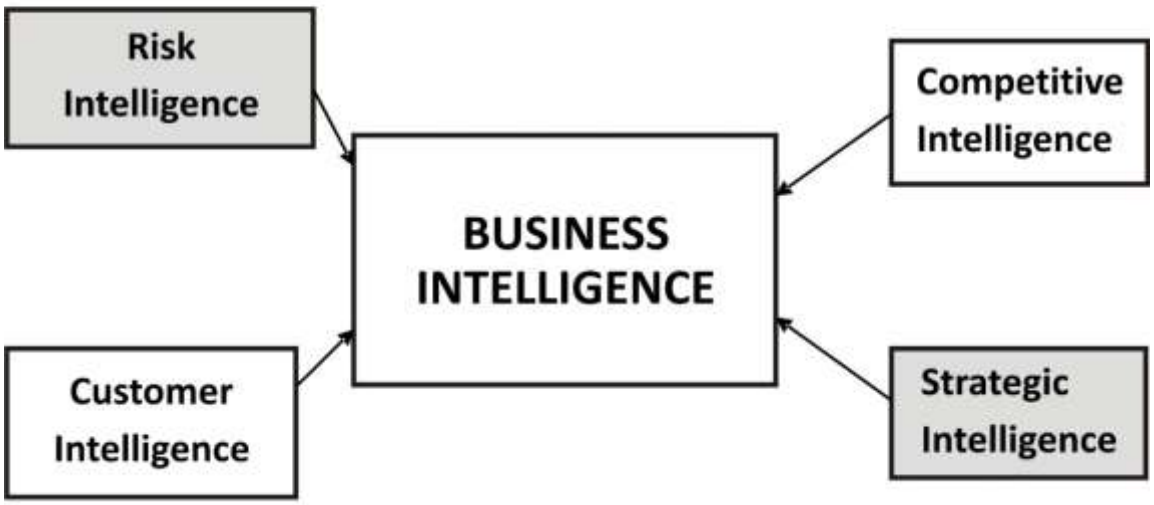


Fig.2: Chart Showing Categories of Business Intelligence (Researcher, 2022)

Strategic intelligence (SI): Critically business empires cannot survive in the current business competitive environment without adequate strategic purpose and strategic planning for sustainability. SI can be described as the process of gathering refined pools of strategic purpose and options to enhance the organization to make effective and sustainable strategic business decisions and boost business performance. Strategic intelligence helps to strengthen the strategic marketing management and strategic planning decisions effectively to attain high business performance in harsh competitive industries and markets.

Competitive intelligence (CI): This category of business intelligence relies on competitive information gathering that strengthen the company decisions on competitive environment and business opportunities drives. Some studies refer CI as BI and others refer to CI as critical component of BI that helps to address the issues of external environment (de las et al.2021; López-Robles et al.2020). Effective and sustainable CI gathering help the company to attain and maintain high level of competitive position and competitive advantage in competitive markets.

Customer Intelligence (CUI): BI is a verse vessel for business to grow tremendously in modern business settings. Developing and enhancing customer intelligence gives strengths for business to heal the gap that exist between customer satisfaction and the product development strategies of the companies. Customer intelligence as part of business intelligence strengthens the company to identify and satisfy the very customers need and reduce unhealthy customer complaints. It is the component of BI that develops the strength of company to seal the vacuum of handling customers' behavioural changes and enhances customer retention and loyalty.

Risk Intelligence (RI): Risk and uncertainty are critical part of business cycle that needs harmonious attention in order to improve business growth and sustainability. Risk intelligence is a strategic component of BI to enhance incremental business growth and to put firms in safety net. Analysis and reporting of risk is very prone to every business model to be in safety net and reduce business trauma. RI architecture in place free and reduces the trauma of losing business opportunity if applicable in modern business settings. It is intelligence that measure and calculates every risk on every investment and business opportunity.

2.3 Concept of Operational Performance

Performance assessment and measurement are critically important steps taking to ascertain the viability and sustainability of every business in industries. Performance evaluation is deeply important to ascertain operational sustainability and profitability of every business settings because it helps the organizational to attain and sustain their operational objectives and goals. This is why operational key performance measurement become vital in telecommunication industry and other industries to ascertain whether there is growth and improvement in profitability. Operational performance can be described as the periodic assessment of critical operational activities and strategies in modern business settings ranging from competitive advantage assessment business risk assessment, customer satisfaction evaluation and strategic implementation strengths assessment. It involves the periodic assessment and review of strategic management implementation, competitive strengths and position and review of technological impact and growth of a firm in particular industry in order to ascertain the level of operational growth and sustainability. In the nutshell, suitable operational performance can be used as an instrument to assess the level of customer satisfaction and will direct the company to adopt needed strategies to increase customer retention and royalty.

Strategic Improvement: Specifically, in telecommunication companies globally one major critical performance assessment corner is how effective and sustainable the strategic formulation and implementation adopted have improve the operational sustainability and profitability of the organization holistically. The strategic choices and strategic options have strategic strengths and capabilities in every operational performance at large in every industry performance bench mark from pilot survey conducted and from literature reviewed.

Competitive Advantage: Competitive advantage is the driving force that enhances the operational performance of most telecommunication companies. The length and breadth of innovation and innovativeness in terms of product and process innovativeness and the holistic organizational innovativeness are driving force that enhances and foster organizational competitiveness, pull out competitive strengths and capabilities of the organizational and holistically drives suitable and sustainable competitive position for the company.

Customer Satisfaction: Another operational performance strength and competent for globally telecommunication companies is the rise in customers satisfaction, retention and customers royalty. The critical strategic strength and capability that can build sustainable customers satisfaction and retention in recent observed pilot survey are innovation and innovativeness of the companies. The strength of company's technological driving forces that enhance innovations to customers tends to increases and improves customer satisfaction and strategically enhances their operational performance in the industry.

Business Risk Reduction: Another Key strength of sustainable operational performance in telecommunication industry is the reduction in al related risk that can affect the operational sustainability and in turn affect the corporate objectives of the organization. Operating such huge companies with harmonious business risk tends to bring out sustainable and profitable operational performance at large.

2.4 Business Intelligence system and Operational Performance in organizations

The main reason for the application and practices of BI architectural implementation in modern business enterprises is to enhance and foster operational performance at all levels and segments of the business operational activities into stringent and functionality profitability and sustainability improvement. Experiencing drastic positive business changes, business intelligence system are needed in modern business operational activities to taste sustainable and profitable business performance especially in the current business contexts that are operationally harsh and complex to manage. Business intelligence system can strengthens business sustainability and functionality in different perspectives and at all level of businesses whether small or big businesses if put into application and practice.

BI system by definition and analysis holistically give strength for effective and correlated business decision making processes that enhance with wide business directions to sustainable and profitable operational performance. Wide range of BI structure in organization push business decisions making strengths in alignment and directions with missions and strategic objectives of the organization. Putting BI structure in place support effective and efficient implementation of strategic planning and management in all strategic business units of the organization and this will have encouraging effect in attainment of the organizational corporate planning and strategy at the wanted time length. Effective flows of communication and information system in modern business enterprises are attainable with the effect of BI system through the fast track of business and data analytics operations. Changes in the phases of performance and increases the strength of business sustainability in current business trends can be attainable from the impact of business intelligence system. Positive and profitable market trends have shown on the increase globally with those business enterprises that put BI structure in their business empires. Business intelligence system in recent time has enhances the adequate knowledge management of competitive business environment and CI gathering has changes the phases of competitive structure. Many global business settings have used the application and practice of CI to maintain sustainable competitive business position in many industries and help to edge out worrying competitors and create business opportunities. Putting BI and CI architectural structures in place help to monitor and sustain incoming and existing competitors of various kinds and the changes that may occur in the competitive marketing environment.

2.5 Theoretical Framework and Theoretical Bases for the Study

Intelligence Volatility Assessment Theory (IVA Theory)

Intelligence Volatility Assessment Theory (IVA Theory) was built to improve on the Technology, Organization and Environment framework (TOE model) by Torbatzky and Fleisher (1990). The TOE model focused on three crucial elements accessibility, analysis and evaluation to enhance sustainability in organizations but IVA theory sees the need to create attention to newer consistent change in environmental behaviours that effect change in intelligence gathering that lead to change in operational performance in modern business settings. IVA theory centered and was built around the simultaneous complexity and dynamism in business situations and radical changes in variation of data and information in modern business world. The theory believed in fortuitous business herculean misshapes in intelligence gathering, assessment and analysis alignment with survival of business operations. IVA theory is a modern theory propounded by Ovivi (2020). The theory posits that fortuitous change in behaviour of business contexts lead to change in behaviour of intelligence system which variably changes the behaviour in operational performances. It stated that continuous variation

in business contexts and intelligence analyses are the root for the flow of business sustainability. The theory predicts that SMARTER intelligence is a huge resource for SMARTER sustainability in operational performance. IVA theory believed that simultaneous variations in business contexts and intelligence trends are pillars that matter to business future. From the perspective of this theory, change behaviour in environmental issues creates and invents opportunity and core values to the existing business through intelligence gathering. Many global businesses trends with profitability and sustainability during the COVID-19 Pandemic despite the harsh and changed business situations and many engaged different diversification operations positively. The Assumptions of IVA theory is that:

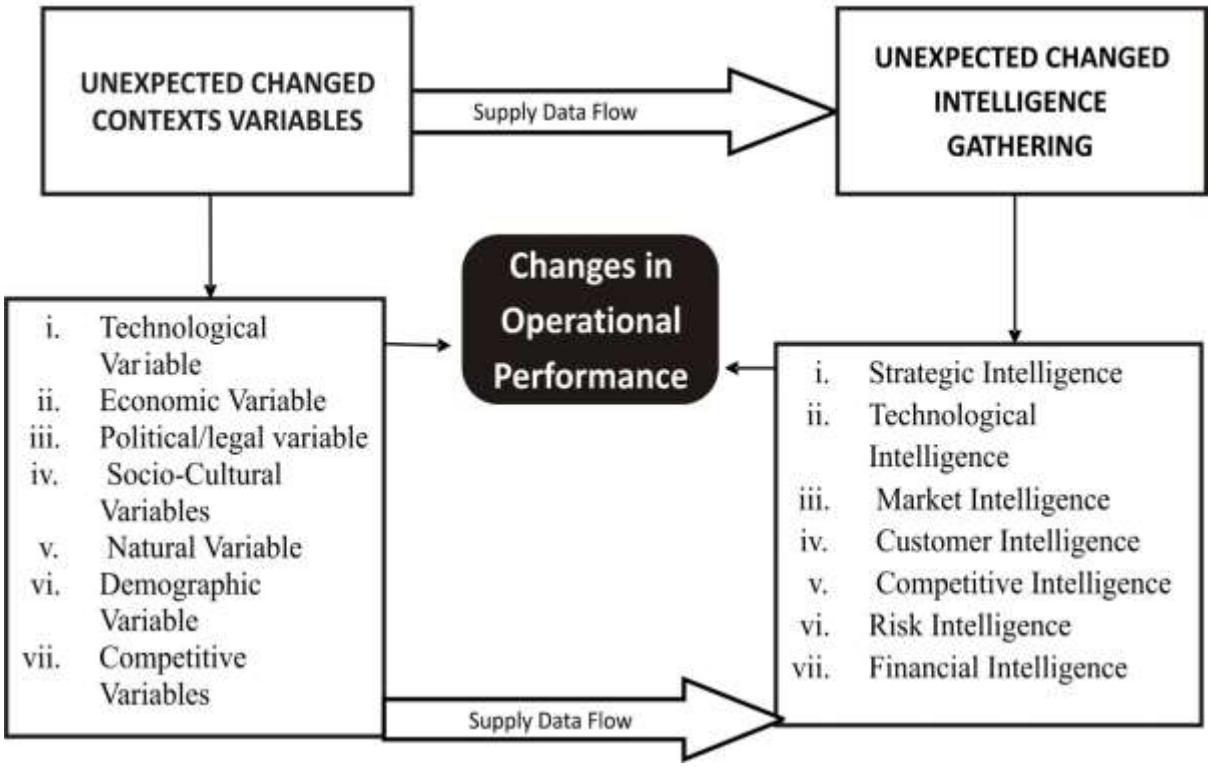
i. Environmental issues are fortuitous consistence, dynamic and complex
ii. Intelligences are not constant but dynamic and complex
iii. SMARTER Intelligence management predict future business strength
iv. Business expectation and opportunity rely on Intelligence
v. Intelligence is an immune booster of SMARTER business sustainability

IVA Model

IVA model give more details on how the variations in business contexts give more strengths to intelligence gathering and enhance business operational performance in modern business settings

IVA Model = Change BC + Change IS + Change OP

BC= Business Contexts
IS= Intelligence System
OP= Operational Performance



The IVA model expresses the correlation between versatile business contexts and intelligence versatility and how business operational performance can be attain. This model explains chain of correlation between business contexts, business intelligence system effectiveness and efficiency to operational performance in modern business settings.

Business intelligence is a strategic business resources and the main purpose of BI implementation in modern business enterprises to harness, harmonize and align with the harsh and soft business environmental variables to improve and sustainable business operational performance holistically. From this perspective in the study, it shows that the theories of Intelligence Volatility Assessment have supported that BI system has impact on operational performance in telecommunication companies and other global businesses at large. This expose that BI is a tangible strategic business resource that enhances harmonious relationship with the complex business contexts in order to improve long term operational performance, competitive advantage and position, strategic improvement and customer satisfaction via technological innovation growth. In the nutshell as backed by the theory of dynamic capabilities, BI is strategic business asset uses to address complex business situations from internal and external business contexts for the purpose of enhancing sustainable growth in operational performance holistically.

2.6 Empirical Review

Recently similar studies have empirically shows correlation of contributing impacts between business intelligence and operational performances in modern business enterprises. Di Vaio, et al. (2022) conducted a study on Data intelligence and analytics: A bibliometric analysis of human–Artificial intelligence in public sector decision-making effectiveness and the main objective was to investigate the increment in adoption and implementation of business intelligence system to haste sustainable business decisions. The carried out a bibliometric analysis on 161 published articles between 2017-2021 writing in English language and the revealed that there is significant increment in the adoption and implementation of business intelligence system to enhance business decisions now and in the future respectively. Mohamad et al. (2022) studied on the thriving information system through business intelligence knowledge management excellence framework and the study aimed to investigate the intensity of business intelligence influence on learning and knowledge management impact on organizational effectiveness in current industry 5.0. The study used 331 sample sizes where data were collected from academic and administrative staff of University X through survey method on draft questionnaire. Study concluded from their result that business intelligence has significant on learning and knowledge management to enhance business decisions in modern organizations. Emad et al. (2021) conducted a study on the moderating effect of entrepreneurial marketing in the relationship between business intelligence systems and competitive advantage in Jordanian commercial banks and the objective was to investigate and analyze the correlative effect of BI system on competitive advantage of Jordanian money deposit banks. The study adopted survey technique to accessed and analyzed data from 300 structured questionnaires and adopting Partial Least Square (PLS 2.0) software for deep analysis. The result shows that there is a significant relationship between BI system and competitive advantage through entrepreneurial marketing in Jordanian money deposit banks.

III. Methodology

The study used both descriptive and causal research designs to express the correlation between dependent and independent variables from the study and the influential description between the variables from the study to arrive at concrete findings. Descriptive research was used in this study to describe the contributing effect of business intelligence system on various operational performances in telecommunication companies. The causal research design was used because the study wants to ascertain the correlation that exists between business intelligence system and operational performance in modern telecommunication companies. This study was conducted in the federal capital territory Abuja Nigeria and it was conducted in selected telecommunication companies within Abuja. The study selected two (2) giant telecommunication companies within the federal capital territory and they are; MTN and GLO all have regional offices in FCT, Abuja and the target respondents from each selected firm were strategic thinkers in charge of business intelligence architectural planning, executing and key experts in technological enforcement teams from each firm. Both companies have a population of thirty six (36) experts in BI system from their regional offices in Abuja, where 17 were experts from GLO and 19 were expert from MTN. The top management of these companies was unable to participate in this study due current pandemic period (Covid-19). The study adopted purposive sampling to select ten (10) key experts in charge of BI architectural planning and implementation from each companies and the sample size comprises twenty (20) prospective respondents for the study. This sampling technique was used due to the effect of the current pandemic period (Covid-19) that has limited having access to more participants in the studied organizations. Primary data was source directly from the selected sampled size respondents through structured closed ended questionnaires that was adequately and efficiently administered by researcher and other experts in the field of business intelligence system. Secondary data was sourced through several theses, publications, journal articles publication, magazines, textbooks and many other reliable papers in relation to the field on BI system and operational performance.

3.1 Validity and Reliability of Instruments

Content validity was used to assess the credibility and believability of the study as the items in questionnaires was systematically drawn from the research objectives, questions and the hypotheses and were accurately was vetted and administered critically by experts in the field of business intelligence system in academic environment and went through statistical concluded test based on critical analysis of cause and effect of business intelligence system and operational performance. Most studies previously have used questionnaires in the field of business intelligence system and operational performance consistently that yield them dependable findings and conclusions which made the same instruments used in this study reliable to attain creditability and acceptability. The study also used Cronbach's Alpha to ascertain the reliability of the items and variables in the study that the result also proved internal consistency and creditability in the study in a nearby call centers of MTN and GLO in Abuja and the result shown in the table below.

Table 1.1 Scale Reliability of Variables

Items	**Number Items**	**Pre-Test**	**Cronbach's Alpha**
Business Intelligence System	**2**	**0.62**	**0.88**
Strategic Intelligence	2	0.61	0.74
Competitive Intelligence	2	0.55	0.75

Customer Intelligence	2	0.58	0.73
Risk Intelligence	2	0.61	0.83
Operational Performance	**2**	**0.62**	**0.86**
Strategic Decisions	2	0.55	0.77
Competitive Advantage	2	0.57	0.74
Customer retention	2	0.61	0.75
Reduced Business Risk	2	0.56	0.76

Source: Researcher's Computation (2021)

Table 1.1 shows the test for reliability by Cronbach's Alpha has positivity and consistency on the selected items and variables for the study because all the alpha values tested on each item is greater than 0.7. That is the independent and dependent items with Alpha value are greater than 0.7 which show adequacy of the items for the study (Sekaran & Bougie, 2016).

3.2 Method of Data Analyses

Descriptive statistic was used in this study instruments such tables, percentage, frequencies, and correlation for the analysis of the questions from this study. Simple regression technique was used via E-view statistical software to analysis the data and this will ensure ascertain the correlation and alignment of the variables from the study and to attain reliable findings and conclusions for the study. The research hypothesis and the null hypothesis will show their effects in findings and conclusions statistically significant from the study.

IV. Data Analysis and Discussion of Findings

4.1 Test of Hypothesis

Ho_1: There is no significant effect of business intelligence system in attaining competitive advantage in telecommunication companies in FCT, Abuja.

Table 4.1: Ordinary Least Square Method of Regression.
E-view Statistical Software Package, 23.00 Editions.

Dependent Variable: CA
Method: Least Squares
Date: 03/08/21 Time: 05:50
Sample (adjusted): 1 20
Included observations: 0 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.363814	0.163171	6.140705	0.0001
BIS	0.252605	0.041156	5.345319	0.0000
R-squared	0.521586	Mean dependent var		1.320000
Adjusted R-squared	0.513344	S.D. dependent var		0.471212
S.E. of regression	0.373792	Akaike info criterion		0.908944
Sum squared resid	6.706587	Schwarz criterion		0.985425
Log likelihood	-20.72361	Hannan-Quinn criter.		0.938069
F-statistic	31.86971	Durbin-Watson stat		0.232396
Prob(F-statistic)	0.000002			

Source: *Computed by the Author Using E-view Statistical Software (Version 23)*

1% level of significance, 5% level of significance and 10% level of significance

Table 4.1 show the regression result for hypothesis one indicates that the performance of in telecommunication companies in FCT, Abuja in form of competitive advantage will increase by 25% for every 1% increase in level of business intelligence system. The coefficient (0.252) of business intelligence system is positive and significant at 5% with p- value of (0.00) in attaining the performance of telecommunication companies in FCT, Abuja with three years period of study. This implies that business intelligence system contributes significantly to competitive advantage of telecommunication companies in FCT, Abuja. Therefore, the null hypothesis is rejected and we accept the alternative hypothesis that there is a positive relationship between business intelligence system and competitive advantage of telecommunication companies in FCT, Abuja.

Ho_2: There is no significant contributing impact of business intelligence system on strategic management of telecommunication companies in FCT, Abuja**.**

Table 4.2: Ordinary Least Square Method of Regression.
E-view Statistical Software package, 23.00 Editions.

Dependent Variable: SM
Method: Least Squares
Date: 03/08/21 Time: 05:55
Sample (adjusted): 1 20
Included observations: 20 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.437293	0.211292	8.896203	0.0000
BIS	0.412236	0.044223	9.261214	0.0000
R-squared	0.711175	Mean dependent var		3.120000
Adjusted R-squared	0.703700	S.D. dependent var		1.154229
S.E. of regression	0.698571	Akaike info criterion		2.159618
Sum squared resid	23.42407	Schwarz criterion		2.236099
Log likelihood	-51.99046	Hannan-Quinn criter.		2.188743
F-statistic	72.77008	Durbin-Watson stat		0.166073
Prob(F-statistic)	0.000000			

Source: *Computed by the Author Using E-view Statistical Software (Version 23)*

1% level of significance, 5% level of significance and 10% level of significance

Table 4.2 show the regression result for hypothesis two indicates that the performance of in telecommunication companies in FCT, Abuja in form of strategic management will increase by 41% for every 1% increase in level of business intelligence system. The coefficient (0.412) of business intelligence system is positive and significant at 5% with p- value of (0.00) in attaining the performance of telecommunication companies in FCT, Abuja with three years period of study. This implies that business intelligence system contributes significantly to strategic improvement of telecommunication companies in FCT, Abuja. Therefore, the null hypothesis is rejected and we accept the alternative hypothesis that there is a positive relationship between business intelligence system and strategic management of telecommunication companies in FCT, Abuja.

H_{O3}: There is no significant impact of business intelligence system on customer satisfaction in telecommunication companies in FCT, Abuja.

Table 4.3: Ordinary Least Square Method of Regression.
E-view Statistical Software Package, 23.00 Editions.

Dependent Variable: CS
Method: Least Squares
Date: 03/08/21 Time: 06:00
Sample (adjusted): 1 20
Included observations: 20 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.162397	0.229536	0.723863	05.029
BIS	0.141922	0.064057	5.545510	0.0000

R-squared	0.745224	Mean dependent var	1.840000
Adjusted R-squared	0.742083	S.D. dependent var	0.976458
S.E. of regression	0.653510	Akaike info criterion	2.026260
Sum squared resid	20.49962	Schwarz criterion	2.102741
Log likelihood	-48.65650	Hannan-Quinn criter.	2.055385
F-statistic	59.39522	Durbin-Watson stat	0.2535501
Prob(F-statistic)	0.000000		

Source: *Computed by the Author Using E-view Statistical Software (Version 23)*

1% level of significance, 5% level of significance and 10% level of significance

Table 4.13 show the regression result for hypothesis three indicates that the performance of in telecommunication companies in FCT, Abuja in form of customer satisfaction will increase by 14% for every 1% increase in level of business intelligence system. The coefficient (0.142) of customer intelligence is positive and significant at 5% with p- value of (0.00) in attaining the performance of telecommunication companies in FCT, Abuja with three years period of study. This implies that business intelligence system contributes significantly to customer satisfaction of telecommunication companies in FCT, Abuja. Therefore, the null hypothesis is rejected and we accept the alternative hypothesis that there is a positive relationship between business intelligence system and customer satisfaction of telecommunication companies in FCT, Abuja.

H_{O4}: There is no significant effect of business intelligence system on reduce business risk of telecommunication companies in FCT, Abuja**.**

Table 4.4: Ordinary Least Square Method of Regression.
E-view Statistical Software Package, 23.00 Editions.

Dependent Variable: TP
Method: Least Squares
Date: 03/08/21 Time: 06:05
Sample (adjusted): 1 20
Included observations: 20 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.054175	0.145278	-0.349618	0.6182
BIS	0.314716	0.071365	10.95685	0.0000
R-squared	0.821375	Mean dependent var		1.840000
Adjusted R-squared	0.811425	S.D. dependent var		0.976458
S.E. of regression	0.527265	Akaike info criterion		1.596951
Sum squared resid	13.34440	Schwarz criterion		1.673432
Log likelihood	-37.92377	Hannan-Quinn criter.		1.626075
F-statistic	117.0526	Durbin-Watson stat		0.272296
Prob(F-statistic)	0.000000			

Source: *Computed by the Author Using E-view Statistical Software (Version 23)*

1% level of significance, 5% level of significance and 10% level of significance

Table 4.4 show the regression result for hypothesis one indicates that the performance of in telecommunication companies in FCT, Abuja in form of technological performance will increase by 31% for every 1% increase in level of business intelligence system. The coefficient (0.313) of risk intelligence is positive and significant at 5% with p- value of (0.00) in attaining the performance of telecommunication companies in FCT, Abuja with three years period of study. This implies that business intelligence system contributes significantly to reduce business risk of telecommunication companies in FCT, Abuja. Therefore, the null hypothesis is rejected and we accept the alternative hypothesis that there is a positive relationship between business intelligence systems and reduce business risk of telecommunication companies in FCT, Abuja.

4.2 Discussion of Findings

The analysis from the findings show that their significant correlation and effect between business intelligence system and operational performance in telecommunication companies with three years period of study and this have been supported by the findings from Di Vaio, et al. (2022); Sarfraz (2019) which stated that business intelligence system is an instrument for organizational operational changes in term of strategic management at sustainability and profitability. The analysis of hypothesis one show that there is a positive relationship between business intelligence system and competitive advantage of telecommunication companies in Abuja. The finding was supported by the findings and literature reviewed of Mohamad,et al. (2022); de las et al. (2021); Emad et al. (2021); Kusmantini et al. (2021) that business

intelligence system is a competitive advantage for SMEs and telecommunication companies to operate smoothly in their variable locations. The second hypothesis analyzed agrees with a finding that there is a positive relationship between business intelligence system and strategic management and improvement of telecommunication companies in Abuja and this finding was also supported by the findings of Otmane Azeroual, and Horst Theel (2018) that effective implementation of BI architecture in modern business setting will smooth attainment of strategic management changes and effective business decision making processes. The third finding from the study agreed that there is a positive relationship between business intelligence system and customer satisfaction of telecommunication companies in Abuja with three years period of study. And The finding agreed with the findings of Hendar et al. (2020) that marketing intelligence as component of BI helps to attain long term effective marketing capabilities and the has impact market demand, supply chain management and enhances effective customer relationship and satisfaction improvement (Biagi, et al. 2022;Tavera et al., 2021; Negro & Mesia 2020). The last hypothesis analysis agreed that there is a positive relationship between business intelligence system and reduce business risk of telecommunication companies in Abuja with three years period of study. This finding agrees with empirical reviews that business intelligence have significant impact in improved risk management in modern business settings (Seddigh, et al. 2022; Gottfried et al., 2021).

V. Conclusion and Recommendation

5.1 Conclusions

The effective implementations of business intelligence system in the last three years of business operations in telecommunication companies have improved positively the holistic operational performance to sustainability. Generally, business intelligence is imperative to attaining and sustaining operational performance in telecommunication companies in Nigeria. Business intelligence system implementation has positively and increasable impacted on competitive advantage and strategic improvement in recent time in telecommunication companies in FCT, Abuja. The perceived increases in the level of customer satisfaction and growth in customer relationship management which has increases customer retention and royalty in telecommunication companies can be traced to the effect of business and customer intelligence gathering. Reduced business risk and effective business decisions have gone increases and improve operational performance in current business trend of telecommunication companies due to the sustainable implementation business intelligence system.

Most of the findings of the research are consistent with previous normative and empirical works as it has provided empirical evidence pertaining to the perception of business intelligence system and operational performance of telecommunication companies in Nigeria and globally. Therefore, the study concluded that business intelligence system is vital and critically effective for modern business settings operational performance and to ascertain suitable business model in harsh business contexts. This connotes that sustainable business and operational performances cannot be attainable without business intelligence system because it a suitable resources that businesses can use to sustain and adapt to changes from business contexts. Therefore, business intelligence system is the life wire and backbone of operational performance to paradigm shift in term business sustainability and profitability in modern telecommunication companies globally.

5.2 Recommendations

From the research findings and conclusions drawn from the study, the following recommendations were ascertained:

i. Telecommunication companies should set up more effective and efficient Business Intelligence System (BIS) architectures to attract every new technology invention in their product and service innovation from the competitive market environment in order to attain sustainable operational performance.

ii. More financial budget and resources structure should be set aside to invest in business intelligence system in order to modify the organization structure and adequate technology infrastructure should be in place to enhance BI system implementation in order to enjoy competitive advantage.

iii. Knowledge management and capabilities should be attained in organization as it is a tool to drive organizational capabilities that will enhances the strengths and opportunities of business intelligence system to boost effectiveness of customer satisfaction in telecommunication companies.

iv. Leadership style and organization structure matters to attain successful implementation of BI system implementation in telecommunication companies. The leadership style and strategy should be design in alignment with new thinking that will attract new technologies, new market, new strategies and new customers through implementation of BI architecture in telecommunication companies.

v. Adopting Artificial Intelligence (AI), big data and data science in alignment BI can adoptable strategic tools to attract systematic and adequate information sharing culture and mechanism in telecommunication companies to enhance intelligence based decisions.

5.3 Contribution to Further Studies

Further studies can be trace from the major findings of this study as the case study has pave ways for more research to be continuous in the field of business intelligence system and operational performance in telecommunication industry and other industries that are profit oriented. New study from this research work can emanated from comparative investigation and analysis of strategic intelligence and business performance between MTN and GLO or within other industrial operations.

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