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Data Mining and Organizational Performance of Deposit Money Banks in Rivers State, Nigeria

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Abstract: This study examined the relationship between data mining and organizational performance of Deposit Money Banks in Rivers State. The study utilized a cross-sectional research survey design. Primar source was sourced through structured questionnaire. The population for this study was the 22 depose money 22 banks in Port Harcourt. Preliminary investigations revealed that all the Deposit Money Bank have at least four (4) managers who are responsible for carrying different tasks. The entire populatio (census) of the 22 Deposit Money Banks in Rivers State. However, the study had 88 managers as the stude respondents from the 22 deposit money banks. The reliability of the instrument was achieved by the use of the Cronbach Alpha coefficient with all the items scoring above 0.70. The hypotheses were tested using the Spearman's Rank Order Correlation Statistics. The findings revealed that there is a significant relationship between data mining and organizational performance of Deposit Money Banks in Rivers State. The stude the structure of Deposit Money Banks in Rivers State. The stude that data mining significantly influences organizational performance of Deposit Money Banks in Rivers State. The stude that banks need to deploy data mining extensively in the processes, considering that banks have huge financial data on millions of customers.

Keywords: Data Mining, Organizational Performance, Growth, Market Share

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INTRODUCTION

Increasing and intense competitiveness in the market has made performance the most important issue for profit and non-profit organizations for businesses. It comprises of three specific areas of firm outcome which includes financial performance, product market performance and shareholder return (Richard, Simon & Brut, 2009). It is very vital for managers to know which factors influence an organization's performance in order for them to take appropriate steps to initiate them. Performance guarantees the continuity of the organization to be competitive in a global market place. Organizational performance can be seen as a multi-dimensional construct consisting of more than simply financial performance (Baker & Sinkula, 2005). It describes the extent to which the organization is able to meet the needs of its stakeholders and its own needs for survival (Griffin, 2003). In this sense, performance depicts that an organization is achieving its mission and goals.

According to Tangen (2005), performance can be described as an umbrella term for all concepts that consider the success of a firm and its activities. Performance can refer to actual results/outputs of certain activities, how an activity is carried out, or an ability to achieve results. Atkinson (2012) defined performance as the achievement of results ensuring the delivery of desirable outcomes for a firm's stakeholders. Awino (2011) asserts that for an organization to be successful it has to record high returns and identify performance drivers from the top to the bottom of the organization. Njihia, Obara and Mauti (2003) highlight performance measurement as one of the tools which help firms in monitoring performance, identifying the areas that need attention, enhancing motivation, improving communication and strengthening accountability.

Performance is equivalent to the famous 3Es, that is, economy, efficiency, and effectiveness of a certain program or activity (Perotti & Javier, 2007). Daft (2010) defined organizational performance as the organization's ability to attain its goals by using resources in an efficient and effective manner. Organizational performance is the ability of the organization to achieve its goals and objectives (Sok, O'Cass & Sok, 2013) Performance can be assessed based on information obtained through primary resources or secondary resources. In general, performance can be measured taking into consideration two types of performance: financial performance and non-financial performance (Abu-Jarad, Yusof & Nikbin, 2010).

Increased globalization and fluidity of boundaries driven by the advent of technological advances has altered the economic definition of borders and distances (Audretsch, 2007). In the present age commonly referred to as the knowledge age, organizations are increasingly witnessing dynamic environments with change and evolution amongst the challenging contexts. Organizations are making every effort to achieve economic supremacy in addition to their endeavour to remain competitive in the global market through increased efficiencies and lean production (Forghani &Tavasoli, 2017). The advent of technology has availed unlimited sources of knowledge to practitioners and academia with pundits signalling the dawn of the knowledge age supplanting the industrial era. Organizations survive not based on the number of resources they have decided to engage to work for them but based on how productive those resources engaged are in the course of pursuing the organizational goals. Resources that are productive are said to be efficient. Efficient material and human resources create values. Values are created by surmounting challenges and solving problems (Bestman & Elekwachi, 2019). This has necessitated the need for data mining as a technique of business intelligence in enhancing firm performance and success.

Data mining is a powerful tool that can help to find patterns and relationships within our data. Data mining discovers hidden information from large databases (Vedanayaki, 2014). The overall goal of the data mining process is to extract information from a data set and transform it into an understandable structure for further use. Social networks can be used in many business activities like increasing word-of-mouth marketing, marketing research, general marketing, idea generation & new product development, co-innovation, customer service, public relations, employee communications and in reputation management (Esmaeil, 2015).

Previous studies have attempted to solve the problem of organizational performance using different variables. Ouma and Kombo (2016) examined the influence of Organizational Learning on Performance of Food Manufacturing Firms in Nairobi County, Kenya. Also,

Karamat (2013) examined the relationship between Leadership and Organizational Performance a Case Study of D&R Cambric Communication. Eletu, Ukoha and Nwuche (2017) examined human capital development and corporate performance: a study of food and beverages firms in Port Harcourt. Furthermore, Tamunomiebi, Adim and Adubasim (2018) carried out a study on Telecommuting and Organizational Performance of Mobile (GSM) Telecommunication Companies in Port Harcourt, Nigeria. Uchendu, Anijaobi-Idem and Odigwe (2013) examined the relationship that exists between principals' conflict management and organizational performance in Cross River State, Nigeria.

Despite a large stream of empirical research that examined the concept of performance using various predictor variables, there has been relatively little empirical research re port that details how firms can strategically achieve performance using knowledge integration hence a knowledge gap exist. There, a knowledge gap exists and this study intends to empirically fill that gap by investigating the relationship between data mining and performance of Deposit Money Banks in Rivers State. The purpose of this study therefore was to examine the relationship between data mining and performance of Deposit Money Banks in Rivers State. The study was guided by the following research questions:

- i. What is the relationship between data mining and growth of Deposit Money Banks in Rivers State?
- ii. What is the relationship between data mining and market share of Deposit Money Banks in Rivers State?



Figure 1: conceptual model for the relationship between data mining and organizational performance.

Source: Desk Research (2022)

LITERATURE REVIEW

Theoretical Foundation Technology Acceptance Model

This theory was advanced by Davis (1989) who showed the relationship between the user's acceptances of new information system and their perception of the ease of use and the significance of using information system. It consists of two beliefs. These are the perceived

utilities and the perceived ease of application, and these two concepts determine the attitudes to adopt modern technology. These include the user's behaviour and their perception about the use of business intelligence systems.

Kim (2006) posit that Technology Acceptance Model (TAM) holds that there are a myriad of factors that affect and influence the decision by users on how and when they use information technology. TAM is aimed at determining the behaviors of users towards specific technologies by utilizing two factors namely perceived usefulness and perceived ease of use. The exponents of this theory have argued over two beliefs, which are the (perceived usefulness and perceived ease of use. Attitudes influence the intended use of business intelligence systems. In line with this study, the use of business intelligence systems has an influence on the way in which the firm manages its customers. Perceived usefulness is the degree to which an organization thinks that the adoption of business intelligence system will impact positively on organizational performance. Perceived ease of use is the effort that is expected of the organization to implement business intelligence systems.

Data Mining

According to Han and Kamber (2000) data mining refers to extracting of mining knowledge from large amounts of data. The term is actually misnomer. Remember that the mining of gold from rocks or sand referred to as gold mining rather than rock or sand mining. Thus, the data mining should have more appropriately named knowledge mining from data, which is unfortunately somewhat long. Knowledge mining, a shorter term may not reflect the emphasis on mining from large amounts of data. Nevertheless, mining is a vivid term characterizing the process that finds a small set of precious nuggets from a great deal of raw material.

Han and Kamber (2000) maintained that the major reason data mining has attracted a great deal of attention in information industry in recent years is due to the wide availability of huge amounts of data and the imminent need for turning data into useful information and knowledge. The information and knowledge gained can be used for applications ranging from business management, production control and market to analysis, to engineering design, medical and science exploration.

Data mining technique are designed to establish relationships and rules in a data warehouse and then create a report of these relationships and rules (Hevner & March, 2005). The process of data mining involves ascertaining the patterns, regularities and rules and generalizations of data resources. Knowledge from mining of data might be utilized to project an outcome of a decision or to describe a reality. The prediction that is produced by data mining utilize variables to forecast the outcome of a situation which is determined by graphing, tabling and developing formulas in line with the available data (Olszak & Ziemba, 2007).

The first concept associated with a large amount of data is "Data Mining". Data Mining (DM) is a process which discovers the patterns and relations within data by using many analysis tools and uses such patterns and relations for making valid estimations. The purpose of data mining is to create decision making models related with estimation of the future conducts based on the analysis of the past activities (Koyuncugil & Özgülbaş, 2009). DM can also be evaluated as the outcome of the natural development process of the information technologies. Very large scale data may be considered as a data mine which accommodates valuable data within their large scale databases in different fields. Data mining is defined as the process of producing meaningful information, which was unknown previously, based on such data (Albayrak & Yılmaz, 2009). Data mining is the process of revealing the previously undiscovered information based on various data maintained in data storages and using them for realizing the action plan. At this point, it is not a solution alone but is a tool which supports the decision making process to reach to the solution and which provides information required for solving the specific problem (Akgöbek & Çakır, 2009).

Applications of Data Mining

Data mining techniques have been successfully used for a wide range of real-world applications. Data mining applications are growing rapidly. The general wide range application of data mining in business functions of an organization includes the following;

Profiling Population: Developing profiles of high-value customers, credit risks, and credit card fraud. In-depth knowledge of customers and business partners helps an organization build a healthy business to business or business to customer relationship

Analysis of business trends: involves identifying the growth trend in the market. Understanding the trends of goods and services (either below or above average) will help an organization remain competitive.

Target Marketing: involves identifying customers (or customers segments) for promotional activity. Having a good relationship with a particular market segment will help boost the organization's productivity.

Customer retention and Churn Analysis: examining the behaviour of customers who have left for competitors to prevent remaining customers from leaving. Organizations, especially Telecommunication companies are interested in predicting the churning behaviour of their customers beforehand so that selective marketing strategies can be developed towards these groups to reduce churning rate (Berry and Linoff 2004).

Oluigbo *et al.* (2014) in their study aimed at reviewing the role that data mining plays on organization's growth or its level of productivity. Firstly, an introduction and the threefold goals of Data Mining are presented. Then we reviewed the kind of data that can be mined in an organization and the various techniques an organization can use in mining such data. The work was concluded with how and where data mining can be applied to boost productivity and growth, and the various advantages attached to implementing data mining projects in an organization.

Organizational Performance

The management of many firms are faced with the challenge to improve their performance and deal with the changing competitive arena (Waithaka, 2016). Firms have an important role in our daily lives, and successful firms are a key ingredient for developing nations like Nigeria. Academics and practitioners endeavor to understand and explain the differences in firm performance in the face of the complexity of the market, competitive pressures and uncertainties. Firms must be able to cope with the increasingly number of challenges from the business

environment, in order to increase their ability to adapt (Gavrea, Ilies & Stegerean, 2011). The concept of performance of a business firm is based upon the idea that an organization is the voluntary association of productive assets, including human, physical, and capital resources, for the purpose of achieving a shared purpose (Alchian & Demsetz, 1972; Barney, 1995; Carton, 2004).

Firm performance is one of the most relevant constructs in the field of strategic management; a construct commonly used as the final dependent variable in various fields (Cho & Pucik, 2005; Richard, Derinney, Yip, & Johnson 2009). It is believed that the essence of performance is the creation of value, therefore, value creation, as defined by the resource provider, is the essential overall performance criteria for any organization (Monday, et al., 2015). Continuous performance is the focus of any organization because only through performances are organizations able to grow and survive (Gavrea, et al., 2011). A business organization could measure its performance using the financial and non-financial measures.

Organizational performance is defined as an analysis of a company's performance as compared to goals and objectives (Jamrog, 2002). Within corporate organizations, there are three primary outcomes analysed, financial performance, market performance and shareholder value performance (Adler, 2005). The concept of organizational performance is based upon the idea that an organization is the voluntary association of productive assets, including human, physical, and capital resources, for the purpose of achieving a shared purpose (Carton, 2004). Organizational performance comprises the actual output or results of an organization as measured against its intended outputs. According to Richard, Devinney, Yip & Johnson (2009) organizational performance encompasses three specific areas of firm outcomes, financial performance such as profits, return on assets and return on investment), product market performance such as sales, market share and shareholder return measure through total shareholder return and economic value added.

Organizational performance reflects how the organization understands the needs and expectation of customers (Slater & Naval, 1995 in Kabiru, Mocid & Norlena, 2012). Suleiman (2011) sees performance as the reflection of how the organization uses its resources in such a way that will ensure the achievement of its set objectives. While Stephen and Edith (2012) assert that performance determines the existence of an organization in the economy, Mackier (2008) in Stephen and Edith (2012) sees organizational performance as the effectiveness of the organization in fulfilling its purpose.

Measures of Employee Performance Growth

The goal of most organization is profit maximization (Niresh & Velnampy, 2014). Profitability and growth involves the capacity to make benefits from all the business operations of an organization, firm or company (Muya & Gathogo, 2016). Growth usually acts as the entrepreneur's reward for his/her investment. As a matter of fact, growth is the main motivator of an entrepreneur for doing business. Growth is also used as an index for performance measuring of a business (Ogbadu, 2009). Growth portrays the efficiency of the management in converting the firm's resources to profits (Muya & Gathogo, 2016). Thus, firms are likely to gain a lot of benefits related increased profitability (Niresh & Velnampy, 2014). One important precondition for any long-term survival and success of a firm is growth. It is growth that attracts investors and the business is likely to survive for a long period of time (Farah & Nina, 2016). Many firms strive to improve their growth and profitability and they do spend countless hours on meetings trying to come up with a way of reducing operating costs as well as on how to increase their sales (Schreibfeder, 2006).

Market Share

Market share refers to the percentage of sales a company has in a specific market within a specific time period. Higher market share translates into higher profits. Gaining or building market share is an offensive or attack strategy to improve the company's standing in the market (Sarkissian & Schill, 2010). Market share is a measure of the consumers' preference for a product over other similar products. A higher market share usually means greater sales, lesser effort to sell more and a strong barrier to entry for other competitors. A higher market share also means that if the market expands, the leader gains more than the others. By the same token, a market leader - as defined by its market share also has to expand the market, for its own growth (Schnaars, 1998).

Most organizations measure growth based on the strength of its market share position it occupy in the industry. Accordingly, Koontz and Donnell (2003) viewed market share as a key indicator of the organizational growth. Hence, due to globalization Apple inc., a leading telecommunication company with branches all over the world has taken advantage of the trend to increase their market share by introducing and sales of sophisticated phones and gadgets. Market share of any organization is its portion of total sales as it relates to the industry it operates. For instance, if Apple inc. make a sales of 1 million worth of phone in a given year and the total worth of phones sold by telecommunication industry is 2 million; this implies that Apple inc. market share in the phone industry would be 50% of the total.

Furthermore, market share increases will enable firms to achieve greater economic of scale in product and service innovation, firm's revenue and improve its operations. Thus, shareholders are keen in monitoring the fluctuation of market share, because they are precursor of competitiveness of the firm's growth. In addition, Wikipedia attribute market share as representing the percentage of an industry or market's total sales that is earned by a particular company over a specified time period.

There are many different ways to increase market share; companies usually use a combination of strategies. Sometimes something as basic as increasing advertising can have huge effects, as can adjusting pricing. Breaking products into groups and targeting them at specific demographics can also increase this percentage, as can making of complementary products. Another strategy is improving the product or service itself, which can attract customers from competitors, though this can be difficult, so many companies try to grow along with a growing market rather than trying to take business from the competition (Sliden, 2014).

Market share is a key indicator of market competitiveness; how well a firm is doing against its competitors. This metric, supplemented by changes in sales revenue, helps managers evaluate

both primary and selective demand in their market. It enables them to judge not only total market growth or decline but also trends in customers' selections among competitors. Generally, sales growth resulting from primary demand (total market growth) is less costly and more profitable than that achieved by capturing share from competitors. Conversely, losses in market share can signal serious long-term problems that require strategic adjustments. Firms with market shares below a certain level may not be viable. Similarly, within a firm's product line, market share trends for individual products are considered early indicators of future opportunities or problems (Armstrong and Greene, 2007).

Business Intelligence and Organizational Performance

According to Wehrmann (2006) business intelligence system allows business activities to be a two-way communication between the organizations and its customers. Communication is based on the interests between both sides; companies seek to achieve profits, survive and grow while clients want value addition in goods and services offered. Success companies are those that integrate their business processes with the expectations of the customers. This is consistent to Kak (2008) who argues that organizations that adopt modern technologies easily win customers since they can be able to provide products and services that meet the needs of the customers.

Wehrmann (2006) found that business intelligence improves efficiency and operational performance, provides a platform where customers can share their experiences about the product and service offerings. Hannula and Pirttimaki (2003) posit that adoption and use of modern technology improves mutual relations between the customers and the organization. This is because technology is a powerful medium of establishing better contacts between the company's personnel and the clients as well as efficient management of the organization. Moldovan (2011) indicates that the possibility of direct and targeted relationship between the organizations and the customers leads to personalization. This built and strengthens relationships between the organizations and the customers.

Ranjan (2010) contends that multi-channel form of communication provides for the establishment of more sophisticated and a two-way relationship making it more difficult to integrate data and create unique images of customers. Tanev and Bailetti (2008) opine that organizations that fail to integrate customer information do not know their customers hence are unable to tailor customer products and services to their needs. This is consistent to a study by who indicated that most firms that met customers' satisfaction invested highly in integrated customer information systems which assisted them to gather information about the customer needs. Williamson (2010) insists that failure to integrate data between the firm and the customer expectations. This makes customers to feel ignored and irrelevant to the company. For this reason, it is important that information about the customers to be stored in one place and made available to everyone in the organization (Reynolds, 2005).

From the foregoing discourse, the study hypothesized thus:

Ho1: There is no significant relationship between data mining and growth of Deposit Money Banks in Rivers State.

Ho₂: There is no significant relationship between data mining and market share of work of Deposit Money Banks in Rivers State.

METHODOLOGY

The study utilized a cross-sectional research survey design. Primary data was sourced through a structured questionnaire. The population for this study was the 22 deposit money 22 banks in Port Harcourt. Preliminary investigations revealed that all the Deposit Money Banks have at least four (4) managers who are responsible for carrying different tasks. The entire population (census) of the 22 Deposit Money Banks in Rivers State. However, the study had 88 managers as the study respondents from the 22 deposit money banks. The reliability of the instrument was achieved by the use of the Cronbach Alpha coefficient with all the items scoring above 0.70. The hypotheses were tested using the Spearman's Rank Order Correlation Statistics.

DATA ANALYSIS AND RESULTS

	Correlations Mutrix for Dute Mining and Ferformance Measures				
			Data		Market
			Mining	Growth	Share
Spearman' s rho	Data Mining	Correlation Coefficient	1.000	.786**	.629**
		Sig. (2-tailed)		.000	.000
		Ν	75	75	75
	Task Accomplishment	Correlation Coefficient	.786***	1.000	.544**
		Sig. (2-tailed)	.000		.000
		Ν	75	75	75
	Timeliness of Work	Correlation Coefficient	.629**	.544**	1.000
		Sig. (2-tailed)	.000	.000	•
		Ν	75	75	75

 Table 1
 Correlations Matrix for Data Mining and Performance Measures

**. Correlation is significant at the 0.01 level (2-tailed). *Source: SPSS 23.0 data Output, 2021*

Table 1 illustrates the test for the two previously postulated hypotheses:

Ho₁: There is no significant relationship between data mining and growth of Deposit Money Banks in Rivers State.

From the result in table 1, it is shown that a strong positive relationship exists between data mining and growth of Deposit Money Banks in Rivers State. The *rho* value 0.786 indicates the strength and magnitude of this relationship which answers the research question one. Also, the relationship is significant at p=0.000 < 0.01, therefore, based on these empirical findings, the previously stated bivariate null hypothetical statement is hereby rejected and the alternate is accepted as the study finds that: There is a significant relationship between data mining and profitability in Deposit Money Banks in Rivers State.

Ho₂: There is no significant relationship between data mining and Market share in Deposit Money Banks in Rivers State.

From the result in table 1, it is shown that a strong positive relationship exists between data mining and Market share in Deposit Money Banks in Rivers State. The *rho* value 0.629 indicates the strength and magnitude of this relationship which answers the research question two. Also, the relationship is significant at p=0.000 < 0.01, therefore, based on these empirical findings, the previously stated bivariate null hypothetical statement is hereby rejected and the alternate is accepted as the study finds that: There is a significant relationship between data mining and Market share in Deposit Money Banks in Rivers State.

DISCUSSION

This study using descriptive and inferential statistical methods investigated the relationship between Business Intelligence and Performance in Deposit Money Banks in Rivers State, as well as the moderating role of Business knowledge. The findings revealed a positive significant relationship between Business Intelligence and Performance using the Spearman Rank Order Correlation tool and at a 95% confidence interval. The findings of this study confirmed that Business Intelligence has a positive and significant relationship with Performance. This reinforces previous studies by Wehrmann (2006) who found that business intelligence improves efficiency and operational performance, provides a platform where customers can share their experiences about the product and service offerings. This also is supported by the work of Hannula and Pirttimaki (2003) who posited that adoption and use of modern technology improves mutual relations between the customers and the organization. This is because technology is a powerful medium of establishing better contacts between the company's personnel and the clients as well as efficient management of the organization.

The first and second hypothesis sought to examine the relationship Data mining and Performance. Hence it was hypothesized that there is no significant relationship between Data mining and Performance. These hypotheses were tested using the Spearman rank order correlation technique. Data analysis revealed that there is a positive and significant relationship between Data mining and Performance. This finding is in line with earlier study by Oluigbo, *et al.* (2014) in their study aimed at reviewing the role that data mining plays on organization's growth or its level of productivity. Firstly, an introduction and the threefold goals of Data Mining are presented. Then we reviewed the kind of data that can be mined in an organization and the various techniques an organization can use in mining such data. The work was concluded with how and where data mining can be applied to boost productivity and growth, and the various advantages attached to implementing data mining projects in an organization.

Also, this study agrees with the works of Ceren, (2014), who took a study with 120 manufacturing business operations and 109 financial organizations acting in Istanbul Stock Exchange. In their study we obtained 142 questionnaires. Said questionnaires were answered by the accounting/financial managers of said organizations. The findings obtained in this study which aims to determine the levels of using data mining in financial information processes of the business operation active in Istanbul Stock Exchange manufacturing industry and financial organization sectors can be summarized as follows. As a result of the examination, it is found out that the awareness level of the data mining technology is low despite being prepared for such

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technology. The results indicate that data mining technology may have a positive effect on FIS performance. It is concluded that the ability to use data mining is an important criteria for a good FIS.

CONCLUSION

The idea which necessitated this study was to examine the relationship between business intelligence and performance of Deposit Money Banks in Rivers State. From the data generated and analyzed, it was empirically discovered that there is a strong positive and significant relationship between business intelligence and performance of Deposit Money Banks in Rivers State. Based on results and the findings of the present study, our study revealed that as data mining, data warehouse and online analytical processing increases, it increases the performance of deposit money banks in Rivers State.

RECOMMENDATIONS

i. Banks need to deploy data mining extensively in their processes, considering that banks have huge financial data on millions of customers. This prevents the volatility of having to rely on the structure of a file to present financial data to customers.

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