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## Full Empirical Research Paper

# Evaluating the Impact of Critical Success Factors of Business Intelligence on Firm Performance- An Empirical Study

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Fabiyi, Olawale  
Olanipekun, W. Damilola (PhD)

College of Management &  
Information Technology,  
American International University,  
West Africa, The Gambia



### E-mail

o.fabiyi@aiu.edu.gm  
w.olanipekun@aiu.edu.gm

### Phones

+2203612785  
+2207026523

### ABSTRACT

The paper examined the arguments and counterarguments within the scientific discussion on business intelligence and organisation performance. Today's market place and space is one that is always evolving, revolving and the case of unpredictability which can be seen from the view of economic downturn from time to time. Based on this, organizations look for ways to improve the way they do business to keep ahead of the competition and increase revenue. Specifically, more insight can be gained, and even better decisions made, by coupling business relevant information with an easy-to-use predictive analytics/ business solution. The main objective of this study is to evaluate the impact of business intelligence on performance. The data came from the primary source with the aid of a structured questionnaire that was administered to the respondents. Quantitative analysis was carried out on the data related to the 115 organizations. Descriptive and inferential statistics was employed in analyzing the data. A systematic literary approach to data analysis is Pearson Product Moment Correlation Coefficient which was used to test the hypotheses at 5% level of significance. The results of the analysis show that business intelligence actually has a positive impact on the overall performance outcome of the organizations. however, a detailed analysis suggests that the impact of the success factors is stronger with business analysis and analytics, which shows that business intelligence is not just tools or software as seen by many but includes other processes and methodologies which at the end of the day is more important for making better business decisions and providing higher value of outcome for the organization. The study therefore recommends that strategic management must demonstrate their commitment to business intelligence with resources, action, guidelines, and activities. It is also important for management to support continuous knowledge management, data analysis, data warehousing, data mining while also fostering a culture that constantly ensures the enshrinement of business intelligence practices.

**Keywords:** Business Intelligence, Data Mining, Data Warehouse, Knowledge Management, Business Analytics

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## 1. INTRODUCTION

Technology is changing rapidly, and IT is becoming a more integrated part of businesses' strategies and vision. The world we live in today is characterized by complexity and a fast changing global business environment. The continuous technological development is a major contributor to this and also leads to more and more data being produced as well as stored (Fabiya, 2010). As businesses are becoming more and more competitive, there is a need for technology that can assist businesses in reaching their goals and to be able to compete in a rougher market. In order to do that, decisions have to be made at a fast pace, with sufficient and reliable data (Turban, Sharda, & Delen, 2011). Companies in today's world compete on analytics. The conscious management of information has gained more managerial focus than ever because the bottleneck of organizational success is no longer financial capital or raw materials or other physical resources, but knowledge assets (Pirttimäki 2007). Furthermore, the sheer speed whereby a global economy operates today necessitates a fast and easy access of the management to operative information, which can be used to evaluate performance metrics, understand customer behavior and forecast market trends (Hedgebeth 2007).

Companies that are able to effectively harness the copious amounts of information IT systems generate will have the inside track on the competition: Gaining better understanding of customer needs, identifying trends earlier, and using the resulting lead time to capitalize on opportunities. (Tapscott, 2008). Globalization, the internationalization of markets, the knowledge economy, and e-commerce are some numerous challenges facing all organizations, regardless of size. If organizations will survive and be competitive in their new environment, they must use information systems (IS) and information technologies (IT). Successful organizations are differentiated by their ability to make accurate, timely, and effective decisions at all levels to address their customers' preferences and priorities (Bose, 2009).

Lately, cost of acquiring and storing data has declined significantly and consequently the willingness of businesses to gather large volumes of data in order to gain a competitive edge over competitors has increased (Chaudhuri, Dayal, & Narasayya, 2011). Organizations have realized the potential value that resides in the data and hence, they search for ways of how to utilize this valuable asset. It is here Business Intelligence (BI) has become an important concept (Agarwal & Dhar 2014), providing useful insights, supporting decision making and improving performance (Ramakrishnan, Jones & Sidorova, 2012).

Watson and Wixom (2010) chose to define business intelligence (BI) as an umbrella term that is commonly used to describe the technologies, applications, and processes for gathering, storing, accessing, and analyzing data to help users make better decisions (Sun, Sun, & Strang, 2018). Thus, somewhat simplified, BI can be described as a decision support system for firms to improve their businesses and in the end, increase their competitiveness. Currently, the umbrella term "business intelligence" (BI) is used widely to describe IT-based analytic and report tools that support managerial decision-making (Fink, Yogev, Even, 2017). The powerful improvements in capacity and analytic power of BI permit organizations to achieve a broader community of users than its predecessors.



Industry surveys have shown that senior managers from worldwide companies view BI as a top priority for enhancing their organization's performance (Sun, & Wang, 2017).

## 2.0 LITERATURE REVIEW

### A. Conceptual Review

#### Business Intelligence

Moss and Atre (2003) defined business intelligence as an architecture and a collection of integrated operational as well as decision-support applications and databases that provide the business community easy access to business data. From the information systems (IS) research perspective, business intelligence provides the latest technological foundation for data collection, integration, and analysis of unprecedented volumes and types of data to improve available information quality in decision-making (Chen, Chiang, & Storey, 2012; Wixom & Watson, 2010; Chaudhuri et al., 2011).

Yoon, Ghosh and Bong (2014) define business intelligence as innovative tools for data analysis, query, and reporting that enables interactive access and manipulation of data in order to gain valuable insights and to support management decision making process across a broad range of business activities. Hannula and Pirttimäki (2003) define the intelligence concept as organized and systematic processes, which are used to acquire, analyze, and disseminate information significant to their business activities. Companies then use the information and knowledge generated to support their operative and strategic decision-making.

Business Intelligence makes enterprise data actionable. It is the spice for any successful business. It uncovers trends and patterns that might otherwise go undetected (Anthony, Mueck, Shockley, 2015; Arnott, Lizama, & Song, 2017). Business Intelligence (BI) is a broad category of technologies, applications, and processes for gathering, storing, accessing, and analyzing data to help its users make better decisions. (Wixom & Watson 2010) Managing a business on intuition, educated guesses or averages isn't good enough anymore. To be successful, a company needs a foundation of accurate, current and complete information and only Business intelligence can get this to work (Netezza, 2004).

The rapid pace of today's business environment has made business intelligence indispensable to any organization. Now organizations are increasingly using Business Intelligence to analyze customer behavior, understand market trends, and search for new opportunities. So they see it as a tool rather than a set of components coming together to achieve the main purpose of business (Sun, 2005). Business intelligence covers functions and tasks of data collecting, processing and analyzing a wide volume of them from internal systems and external resources (Pirttimäki, Lönnqvist, & Karjaluo, 2007; Wieder, Ossimitz, & Chamoni, 2012).



## **Elements of Business Intelligence Knowledge Management**

Knowledge is a fluid mix of framed experiences, values, contextual information, and expert insight that provides a framework for evaluating and incorporating new experiences and information. It originates and is applied in the minds of professionals in the field. In organizations, it often becomes embedded not only in documents or repositories but also in organizational routines, processes and norms (Davenport and Prusak, 1998). Knowledge is the most paramount asset any organization will be willing to have at their disposal and the way it is gotten and used actually help maintain a higher competitive edge. This can be seen from the way they improvise creation of knowledge, sharing of knowledge, usage of knowledge and management of knowledge into their business processes (Davenport, 2006).

In today's business environment knowledge management is considered as the main source of competitive advantage for organizations. Knowledge is recognized as a key economic resource and thus organizations should possess the right knowledge in the desired form and content under all circumstances in order to be successful. It is clear that knowledge is an important asset in organizations in the knowledge economy. Knowledge is associated with people, money, leverage, learning, flexibility, power and competitive advantage. (Brimah, Olanipekun, Bamidele, Ibrahim, 2020). In addition, Knowledge Management is a discipline that promotes an integrated approach to identifying, managing and sharing all of an enterprise's information assets. It is the discipline applied to the management of intellectual capital (Gartner, 2011; Gartner, 2019).  
Business Analysis and Analytics

Business analysis is discipline of identifying business needs and determining solutions to business problems. Solutions often include a systems development component, but may also consist of process improvement or organizational change or strategic planning and policy development." These two definitions may explain why the IT and business views of analysis sometimes differ. IT often defines data analysis as covering the complete information life cycle from cleaning and transforming source data making it ready for analysis, to analyzing the transformed data and creating analytics (Popovic , Turk & Jaklic, 2010; Popescu, 2012).

Analytics can also be known as metrics, measurements, and indicators which could also be defined in different forms. It is Note-worthy that analytics is more often defined as "the science of analysis" rather than the "results of analytical processing." Since Business Intelligence is about providing business users with intelligence about the business, Business analysis can be said to be the process of analyzing trusted data with the goal of highlighting useful information, supporting decision making, suggesting solutions to business problems, and improving business processes. (Hass, Horst & Ziemski, 2008)

In the late 2000s, business analytics rose to prominence in analysis (Arnott and Pervan, 2014). Business analytics is defined as "the extensive use of data, statistical and quantitative analysis, explanatory and predictive models, and fact-based management to drive decisions and action (Davenport and Harris, 2017). The term business analytics also represented the key analytical component in business intelligence (Chen et al., 2012). Thus, the term business intelligence and analytics is proposed (Chen et al., 2012) to describe information-intensive concepts and methods to improve business decision-making.



Chiang et al. (2012) opined that business analysis and analytics main objective is to improve the timeliness and quality of information available for decision-making. Actionable information must be delivered correctly to the right place at the right time (Negash, 2004).

### **Data Warehousing**

A data warehouse is a collection of data where all transactional information of an organization is stored, but it is not the same as a database; The main difference is that databases are designed and optimized to store data, whereas data warehouses are designed and optimized to respond to analysis questions that are critical for business”(Turban & Volonino, 2010). A data warehouse is a subject-oriented, integrated, time-variant and non-volatile collection of data in support of management's decision making process (Ponniah, 2001). Data warehousing is a foundational practice that supports enterprise reporting, business Intelligence and decision support (Turban, Sharda, & Delen, 2011).

Data warehouses are considered to be powerful problem-solving tools that enable easy access to information. The information that is stored in a data warehouse is static, and cannot change (Turban & Volonino, 2010). Data warehousing is seen as an important enabler for business intelligence, because . Business intelligence is used to analyze data that is stored in the warehouse (Turban & Volonino, 2010). Data warehouse is the core component of a business intelligence infrastructure foundation, and it contains all transactional data that the organization holds, which is specified for querying and reporting. This is mainly because information stored in a data warehouse is used to analyze the organization, which is difficult to do if the information stored continues to change (Turban & Volonino, 2010)

### **Data Mining**

Data mining is the process of extracting hidden knowledge from large volumes of raw data. It can also be defined as the process of extracting hidden predictive information from large databases (Fabiya, 2010). Data mining is not an “intelligence” tool or framework but a data concept which business intelligence depends on. Business intelligence, typically drawn from an enterprise data warehouse, is used to analyze and uncover information about past performance on an aggregate level. Data warehousing and Business Intelligence provide a method for users to anticipate future trends from analyzing past patterns in organizational data. Data mining is more intuitive, allowing for increased insight beyond data warehousing. An implementation of data mining in an organization will serve as a guide to uncovering inherent trends and tendencies in historical information. It will also allow for statistical predictions, groupings and classifications of data. (Mladenec, Lavrac, Bohanec & Moyle, 2003)

Most companies collect, refine and deduce massive quantities of data. Data mining techniques can be implemented rapidly on existing software and hardware platforms to enhance the value of existing information resources, and can be integrated with new products and systems as they become part of the system. When implemented on high performance client/server or parallel processing computers, data mining tools can analyze massive databases to deliver answers to many different types of predictive questions



## B. Empirical Review

Wieder and Ossimitz (2015) conducted a study on the Impact of Business Intelligence on the Quality of Decision Making – A Mediation Model. The paper investigated the direct and indirect effects of BI management quality on the quality of managerial decision making using PLS analysis of survey responses of senior IT managers in Australia. The results confirm this overall relationship (total effect), but also reveal mediating effects of data/information quality and BI solution scope. The study contributes to both academia and industry by providing first time evidence of direct and indirect determinants of managerial decision support improvements related to BI solutions scope and active management of BI.

Peters, Wieder, Sutton and Wakefield (2016) conducted a study on "Business intelligence systems use in performance measurement capabilities: Implications for enhanced competitive advantage." The purpose of this study was to better understand how the quality of a Business Intelligence (BI) system improves the diagnostic and interactive dimensions of management control systems (MCS), thereby enhancing performance measurement capabilities, which in turn are positively associated with competitive advantage. Integrating theory from performance measurement, organizational learning and the knowledge-based view of the firm, a theoretical model is developed that considers three concepts of BI quality (infrastructure integration, functionality, and self-service) and the roles they play in enhancing diagnostic and interactive performance measurement capabilities. Data collected via survey from 324 CEOs and CFOs provides support for the theorized effects of BI quality on performance measurement capabilities. These capabilities in turn are positively associated with competitive advantage.

Owusu (2017) conducted a study on Business intelligence systems and bank performance in Ghana: The balanced scorecard approach. The main aim of the study was to empirically evaluate the impacts of adopting BI systems on organisational performance of banks. A conceptual model was developed using the balanced scorecard. Data were collected through hand-administered survey questionnaires from the universal banks in Ghana where 130 samples from executives were analysed through partial least squares structural equation modelling (PLS-SEM). The results indicate that BI Systems indeed have a positive significant effect on the learning and growth, internal process and customer performances of the banks. However, the findings proved that the adoption of BI systems does not directly lead to the financial performance of the banks, but rather through the indirect effects of learning and growth, internal process and customer performances thus confirming the core premise of the balanced scorecard.

Erik (2017) conducted a study on Business Intelligence and its impact on the decision-making process at higher education institutions: A case study at Karlstad University Jacob Persson. The purpose of the study was to understand how Business Intelligence (BI) influences the decision-making process (DMP) at higher education institutions (HEIs). Furthermore, this study aims to identify success factors of BI adoption (gathered from previous research) that are difficult for HEIs to fulfill. The study applied a qualitative research strategy and was conducted as a single case study at Karlstad University (KaU), a Swedish public HEI with approximately 16 000 enrolled undergraduate students and 1 200 employees. Regarding the data collection process, empirical data was collected through eight semi-structured interviews, all held with users of KaU's BI tool.



The thesis' findings show that BI affects the DMP at HEIs by increasing the quality of information, reducing time, and increasing the efficiency for the user. The findings also show that for a HEI, most key components that increase an organization's chance of a successful BI implementation are difficult to fulfill completely.

Lizama (2018) conducted a study on Understanding the Nature of Business Intelligence Systems Use and Outcomes. The research approach employed in the study comprised the development of a conceptual framework based on richer conceptualizations of systems' use, task-technology fit elements, and representation theory components and principles. The conceptual framework guided an exploratory case study conducted in a large government authority in Australia. As a result of the analysis of documentation and interviews with 25 business intelligence users in the exploratory case study, two models were developed. The first model accounts for a direct method of use of a business intelligence system, where the decision maker directly accesses the business intelligence system. The second model accounts for an indirect method of use of a business intelligence system, where a "chauffeur" accesses the business intelligence system to support a decision maker. The two models were evaluated and refined using a follow-up case study in a large insurance company in Australia. Using semi-structured interview protocols, seven direct users (decision makers) and seven pairs of decision makers and intermediaries were interviewed. While the analysis of the follow-up case study data supported the propositions arising from the two models, it also provided insights into the nature of the associations among the models' constructs. As a result, a new construct emerged and two existing constructs were clarified.

Djerdjouri (2019) conducted a study on Data and Business Intelligence Systems for Competitive Advantage: prospects, challenges, and real-world applications. The main aim of the paper was to raise awareness of organizations in the developing world, about the benefits of these technologies and the crucial role they play in the survival and competitiveness of the firm in the complex and turbulent global market. For many years, many small and medium-sized businesses (SMBs) have not followed large organizations in the implementation of BI technologies. The main reason stated by SMBs is the complexity and high cost of deploying and managing BI systems. However, according to recent IT industry survey of SMBs executives, they now realize the crucial role BI systems play in the company's performance, and competitiveness and they are now increasingly investing in and implementing BI technologies.

Llave (2020) conducted a study on business intelligence and analytics in Small and Medium-Sized Enterprises (SMEs). This research investigated and explored business intelligence and analytics adoption in SMEs. The research used a combination of a literature review, a qualitative exploratory approach, and a ranking-type Delphi study with a grounded Delphi approach. The empirical part included interviews with 38 experts and Delphi surveys with 39 experts from various Norwegian industries. The research strategy investigated the factors influencing BI&A adoption in SMEs. The study examined the investment, implementation, utilization, and value creation of BI&A technologies in SMEs. A thematic analysis was adopted to collate the qualitative expert interview data and search for potential themes. The Delphi survey findings were further examined using the grounded Delphi method. The findings revealed that business intelligence and analytics impacted on performance of SMEs



Aditi, Jyoti and Sunil (2020) conducted a study on Emerging trends and impact of business intelligence & analytics in organizations: Case studies from India. The purpose of the study was to discover patterns in the usage and effectiveness of Business Intelligence and Analytics (BI&A) across organizations which are at different levels of BI&A maturity. In the first phase of the study, the data sample was taken from 145 organizations in India. It was analyzed using the data mining technique – k-means clustering. The organizations were grouped into six clusters based on factors influencing BI&A capability maturity. In the second phase of the study, one case organization is taken from each cluster to gain deeper insights. In-depth interviews were conducted with a respondent from each case organization to understand the state of BI&A, the usage and effectiveness of BI&A. The interviews were analyzed using thematic analysis method in NVIVO 12 plus. The study identified the key characteristics which represented the state of BI&A capability maturity in the organization cluster. Findings show that groups of organization which had higher maturity of BI&A capability were using BI&A across larger number of functional areas and also experiencing the effectiveness of BI&A in more areas than the organizations which had lower maturity of BI&A capability.

### **C. Theoretical Review**

Dynamic capability is a theory of competitive advantage in rapidly changing environments. The concept was defined by David Teece, Gary Pisano and Amy Shuen, in their 1997 paper *Dynamic Capabilities and Strategic Management*, as "the firm's ability to integrate, build, and reconfigure both the internal and external competences in order to address speedily dynamic environments. Dynamic capabilities have been proposed to deal with rapidly changing environments and consider the evolving nature of a firm's resources and capabilities to adapt to change (Teece, Pisano, & Shuen, 1997). Teece et al. (1997) conjectured the more rapid the technological change, the more dynamic capabilities are the source of sustained competitive advantage. Dynamic capabilities suggest using management strategies to renew competencies according to environmental changes. This also means firms must develop a dynamic capabilities view to identify new opportunities and respond quickly to them (Teece et al., 1997). The dynamic capabilities view urges scholars to focus on how firms develop and renew their capabilities to respond to rapidly evolving environmental changes

To compete in conditions of rapid innovation and global competition, firms cannot rely on traditional sources of advantage such as industry structures and strategic positions (scale economies, vertical integration, and product differentiation); baseline capabilities in product development, manufacturing, or marketing; or the efficiencies of learned routines and standard operating procedures. Only by building a super-capability for change itself the capacity to sense, seize, and shape new market opportunities could firms thrive in the market volatility and technological dynamism so prevalent in twenty-first-century global competition. The basic assumption of the dynamic capability's framework is that core competencies should be used to modify short-term competitive positions that can be used to build longer-term competitive advantage. Teece et al. (1997) define dynamic capabilities as 'the ability to integrate, build, and reconfigure internal and external competencies to address rapidly-changing environments. From an analytical perspective, dynamic capabilities can be disaggregated into three classes namely sensing capability, seizing capability and reconfiguring capability (Teece & Pisano, 2003)





### 3.0 METHODOLOGY

Descriptive survey research design was adopted for this study; this method was considered appropriate for this study because it will help the researcher to discover relative incidence and distribution on the population. Population of the study comprises of one hundred and fifteen selected medium sized firms that adopts business intelligence practices in Nigerian and Malaysia. Data was gathered using primary source of data, a well-structured five -points scale questionnaire was used as an instrument of data collection. Descriptive statistics of simple percentages, mean would be used while inferential statistics of Pearson Product Moment Correlation Coefficient (PPMCC) was used to test the formulated hypotheses.

### 4.0 RESULTS AND DISCUSSION OF FINDINGS

#### Test of Hypothesis

##### Hypothesis One

H<sub>01</sub>: - Business Intelligence does not have significant impact on organizational performance

##### Sub-Hypotheses One

H1a: There is no significant relationship between knowledge management and performance

H1b: There is no significant relationship between business analytics and performance

H1c: There is no significant relationship between data warehouse and performance

H1d: There is no significant relationship between data mining and performance

**Table 1: Descriptive Statistics**

	N	Minimum	Maximum	Mean	Std. Deviation
Knowledge Management (KMQs)	115	1.00	4.00	2.3652	.65495
Business Analysis & Analytics (BAAQs)	115	1.00	3.40	1.9357	.51813
Data Warehousing (DWQs)	115	1.20	4.60	2.4991	.68486
Data Mining (DMQs)	115	1.00	4.40	2.3217	.67262
Performance Measurement & Outcome (PMOQs)	115	1.00	3.00	2.0098	.43116
Valid N (listwise)	115				

The table above shows the descriptive statistics or analysis conducted on the variables that affect the success in implementation of Business Intelligence. There are five variables in all, four independent variables (KM, BAA, DW, DM) which are dependent on one dependent variable (PMO) .From above, N represents the number of respondents in total who answered each section or questions for all the variables for each question which is 115. Minimum represents the likert scale value selected, while maximum represents the maximum likert scale value selected.



We take into consideration the mean values and the values of standard deviation of all the five variables where the Mean value provides the idea about the central tendency or affinity of the values of each variable. So with that, we can easily assess the average response rate of the respondents and conclude that the mean of Knowledge Management (KMQs) is 2.3652, Business Analysis & Analytics (BAAQs) 1.9357, Data Warehousing (DWQs) 2.4991, Data Mining (DMQs) 2.3217, Performance Measurement & Outcome (PMOQs) which is the dependent variable is 2.0098. On the other hand, the Standard deviation projects the rate of dispersion of the values of a variable from its mean value. So, if we observe from the standard deviation that all the variables are over average which is 0.5, but at the same time, we can see that the response rate for the variable Business Analysis & Analytics (BAAQs) value of standard deviation is 0.51813 which is the lowest value as compare to other independent variables value and Data Warehousing (DWQs) which is 0.68486 is (1.11) which is quite high as compare to other independent variable. These values also represent what will be used in the conclusion and will be touched there.

**Table 2 : Correlations**

		KMQs	BAAQs	DWQs	DMQs	PMOQs
KMQs	Pearson Correlation	1	.463**	.465**	.561**	.180
	Sig. (2-tailed)		.000	.000	.000	.054
	N	115	115	115	115	115
BAAQs	Pearson Correlation	.463**	1	.424**	.485**	.329**
	Sig. (2-tailed)	.000		.000	.000	.000
	N	115	115	115	115	115
DWQs	Pearson Correlation	.465**	.424**	1	.682**	.190*
	Sig. (2-tailed)	.000	.000		.000	.042
	N	115	115	115	115	115
DMQs	Pearson Correlation	.561**	.485**	.682**	1	.326**
	Sig. (2-tailed)	.000	.000	.000		.000
	N	115	115	115	115	115
PMOQs	Pearson Correlation	.180	.329**	.190*	.326**	1
	Sig. (2-tailed)	.054	.000	.042	.000	
	N	115	115	115	115	115

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

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

To interpret the correlation coefficient, we examine the coefficient and its associated significance value (p). The output confirms the results of the scatter plot in that a significant positive relationship exists between all the variables but they are within moderate correlation and low correlation.



There is a significant correlation between independent and dependent variables, indicating that dependent decreases as independent increases. Given that we stated a directional hypothesis, a one-tailed probability was appropriate.

According to this table 2 above, we can take into consideration to see how the independent variables are correlated to the dependent variables. We analyze BAAQs and PMQs and the value given is  $r = 0.329$  which shows the Correlation is significant at the 0.01 level and the value of  $p = 0.000$ . So it means the relationship between both the variables is significant even though a weak relationship between BAA and PMO. is shown based on strength of relationship table. Hence, Business Analytics is significantly related with performance

Moving to the next variable, KMQs and PMOQs, value given is  $r = 0.180$  which shows a positive correlation and the value of  $p = 0.054$  which doesn't show any form of correlation. This means that there is no relationship between knowledge management and organization performance. Moving to the next variable, DWQs and PMOQs, value given is  $r = 0.190$  which shows a positive Correlation which is significant at the 0.05 level (2-tailed) and the value of  $p = 0.042$ .

This means that there is relationship between data warehouse and organization performance even though it is very low. Moving to the next variable, DMQs and PMOQs, value given is  $r = 0.326$  which shows a positive Correlation is significant at the 0.01 level (2-tailed) and the value of  $p = 0.000$ . This means that there no relationship between data mining and organization performance.

**Table 3 : Model Summary**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.390 <sup>a</sup>	.152	.122	.40408

a. Predictors: (Constant), DMQs, BAAQs, KMQs, DWQs

In above table we can see the change in dependent variable due to change in independent variable. We can calculate this change easily by multiplying the value of Adjusted R square with 100 the result shown in % is the change ratio. For this case value of R square is  $.152 \times 100 = 15.2$  which means the 15.2% change in Performance Outcome because of independent variable



**Table 4 : ANOVA<sup>b</sup>**

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	3.231	4	.808	4.7947	.001 <sup>a</sup>
	Residual	17.961	110	.163		
	Total	21.192	114			

a. Predictors: (Constant), DMQs, BAAQs, KMQs, DWQs

b. Dependent Variable: PMOQs

To analyze how business intelligence success factors affect performance outcome on organizations, it is necessary to use multiple regression. The above table shows the value of F value which is 4.79 and the value of P = .001. This shows that relationship is statistically significant.

## 5.0 CONCLUSION AND RECOMMENDATIONS

The business environment is becoming more complex while undergoing constant change. Organizations are responding to pressure through being innovative in the way they operate, which involves adapting and making decisions quickly in regard to strategy, tactics and operations. To be able to make informed decisions of this nature, organizations need to be able to access and interpret considerable amounts of relevant information. Business intelligence is essential for the firm's growth and decision-making. It gives companies a more structured way to look at data while providing in-depth interpretations. It aids decision making via real-time, interactive access to and analysis of vital corporate information.

Today's data-driven business culture has given organizations new resources and competitive advantages through the integration of data into everyday operations and strategic business decisions. However, the managerial culture should change to adopt more a data-driven decision-making process. Organizations should realize the importance of collecting, storing, and analyzing internal as well as external data to harness the information obtained from BI systems and Analytics to improve business processes, uncover insights into customer buying patterns, internal costs, revenues, and profitability trends and of other critical business issues.



Managers have a key role in facilitating business intelligence. Their role extends from identifying the needed knowledge to being leaders and mentors. It is important for strategic management managers to demonstrate their commitment to its investment with resources, action, guidelines, and activities. Organization must continually foster a culture that constantly ensures the enshrinement of policies directed at promoting business intelligence. The culture must be one that sees business intelligence as a vital element of business strategy and to recognize knowledge as the basis of a company's competitive position. Organizations must continually deploy various technologies to enhance communication and facilitate the management of knowledge based on their needs and requirements. It is important that information is available to the right people at the right time. It is important to have organizations' policies, standards, and manuals stored in databases and made available to employees.

## REFERENCES

1. Aditi S.D., Jyoti, T., Sunil , L. (2020). Emerging trends and impact of business intelligence & analytics in organizations: Case studies from India *38(1)*, 40-52
2. Agarwal, R. & Dhar, V. (2014). Big data, data science, and analytics: The opportunity and challenge for IS research. *Information System Research*, 25(3), 443-44
3. Anthony, M, Mueck, S, Shockley, R (2015) How leading organizations use big data and analytics to innovate. *Strategy & Leadership* 43(5): 32–39.
4. Arnott, D., Lizama, F., & Song, Y. (2017). Patterns of business intelligence systems use in organizations. *Decision Support Systems*, 97, 58-68.
5. Brimah, B. A., Olanipekun, W. D., Bamidele, A. G., Ibrahim, M. (2020). Knowledge Management and its Effects on Financial Performance: Evidence from Dangote Flour Mills, Ilorin. *Financial Markets, Institutions and Risks*, 4(2), 34-42.
6. Chaudhuri, S., Dayal, U., & Narasayya, V. (2011). An overview of business intelligence technology. *Communications of the ACM*, 54(8), 88-98.
7. Chen, H., Chiang, R. H. L., & Storey, V. C. (2012). Business Intelligence and Analytics: From Big Data to Big Impact. *MIS Quarterly*, 36(4), 1165-1188.
8. Chiang, R. H., Grover, V., Liang, T.-P., & Zhang, D. (2018). Special Issue: Strategic Value of Big Data and Business Analytics. *Journal of Management Information Systems*, 35, 383-387
9. Clark, T.D., Jones, M.C., Armstrong C.P. (2007). The dynamic structure of management support systems: theory development, research focus, and direction, *MIS Quarterly*, Vol. 31, No. 3, p. 579-615
10. Davenport T.H. (2006) Competing on analytics, *Harvard Business Review*, Vol. 84, No 1, p. 98-107
11. Davenport ,T. & Prusak, L (1998). Working Knowledge: How Organisations Manage What They Know, (Harvard Business School Press, Boston, Massachussettes, 1998), page 5.



12. Djerdjouri, M (2020). Data and Business Intelligence Systems for Competitive Advantage: prospects, challenges, and real-world Applications. *Mercados y Negocios*, no. 41, Universidad de Guadalajara, México
13. Fabiyi, O.A (2010). Evaluating The Impact Of Critical Success Factors Of Business Intelligence On Business Performance And Its Outcomes In An Organization. Unpublished Masters Thesis, UCSI University, Kuala Lumpur, Malaysia
14. Fink, L, Yogev, N, Even, A (2017) Business intelligence and organizational learning: an empirical investigation of value creation processes. *Information & Management* 54(1): 38-56.
15. Gartner. (2011). Magic Quadrant for Business Intelligence Platforms. Core Research Note G00210036. Gartner.
16. Gartner. (2019). Gartner market trends report: how to win as wan edge and security converge into secure access serviceedge. Core Research Note G0035476. Gartner
17. Hannula, M. & Pirttimäki, V. (2003). Business intelligence empirical study on the top 50 Finnish companies. *Journal of American Academy of Business*. Cambridge, 2(2), 593-599.
18. Hass, K.B. Horst, R.A.,& Ziemski, K (2008). From Analyst to Leader: Elevating the Role of the Business Analyst Management Concepts, 2008. ISBN 1567262139. p94: "As the discipline of business analysis becomes professionalized"
19. Hedgebeth, D. (2007). Data-driven decision making for the enterprise: an overview of business intelligence applications. *Journal of information and knowledge management systems*, 37(4), 414-420.
20. Kaario K. and Peltola T. (2008) Tiedonha Ilinta : avain tietotyön tuottavuuteen. WS Bookwell, Porvoo, Finland
21. Lizama, F.(2018). Understanding the Nature of Business Intelligence Systems Use and Outcomes. Doctor of Philosophy at Monash University in 2019 Caulfield School of Information Technology, Faculty of Information Technology
22. Llave, M (2020) Business Intelligence and Analytics in Small and Medium-Sized Enterprises Unpublished PhD Thesis, University of Agder Faculty of Social Sciences
23. Mladenic, D., Lavrac, N., Bohanec, M. and Moyle, S. (2003). Data Mining and Decision Support: Integration and Collaboration, *Journal of Documentation*, 61(3), 443-445.
24. Moss, L.T & Atre, S (2002). Business Intelligence Roadmap: The Complete Project Lifecycle for Decision-Support Applications. Addison-Wesley Longman Publishing Co., Inc., Boston, MA, USA.
25. Negash, S (2004). "Business Intelligence", *Communications of the Association for Information Systems*, 13(1), Organization, San Jose, CA, 2004, pp. 177-195.
26. Netezza, I (2004) 'Business Intelligence in a Real-Time World', *White Paper*, 1(1), 1-2.
27. Owusu, A. (2017) Business intelligence systems and bank performance in Ghana: The balanced scorecard approach. *Cogent Business & Management*. 4(1), 1-11



28. Peters, M.D & Wieder, B., & Sutton, S.G., & Wakefield, J. (2016). Business intelligence systems use in performance measurement capabilities: Implications for enhanced competitive advantage, *International Journal of Accounting Information Systems*, 21(C), 1-17
29. Pirttimäki, V., Lönnqvist, A & Karjaluo, A (2007). BI a Finnish Telecommunications Company', *Measurement of Business Intelligence*, 3(1),3-6.
30. Pirttimäki V. (2007) Business intelligence as a managerial tool in large Finnish companies, Dissertation presented on 12<sup>th</sup> of January 2007 Tampere University of Technology, Publication 646
31. Ponniah, P. (2001) Data warehousing fundamentals: a comprehensive guide for IT professionals, A Wiley -Interscience Publication
32. Popovic A., Turk T. and Jaklic J. (2010) Conceptual model of business value of business intelligence systems, *Journal of Contemporary Management Issues*, Vol. 15, No. 1, p. 5-29
34. Popescu, S (2012) Business intelligence solutions – a way of general improvement of efficiency and effectiveness. *Review of International Comparative Management/Revista de Management Comparat International* 13(1): 88–95.
35. Ramakrishnan, T. , Jones M.C. and Sidorova A. (2012) Factors influencing business intelligence (BI) data collection strategies: An empirical investigation, *Decision Support Systems*, 52(2),486-496
36. Wieder B, Ossimitz M.-L. and Chamoni P. (2012) The impact of business intelligence tools on performance: a user satisfaction paradox?, *International Journal of Economic Sciences & Applied Research*, 5(3), 7-32
37. Watson, H.J., Fuller C. and Ariyachandra T. (2004) Data warehouse governance: best practices at Blue Cross and Blue Shield of North Carolina, *Decision Support Systems*, 38(3), 435-450
38. Sun, Z. (2005). Business Intelligence and Data Warehousing., Transform raw data into business results, *Journal of New Mathematics and Natural Computation* 1(1), 1-5
39. Sun, Z., & Wang, P. (2017). Big data, analytics and intelligence: an editorial perspective. *Journal of New Mathematics and Natural Computation*, 13 (2), 75-81.
40. Sun, Z., Sun, L., & Strang, K. (2018). Big data analytics services for enhancing business intelligence. *Journal of Computer Information Systems*, 58 (2), 162-169.
41. Tapscott D, (2008). Business Intelligence for the Health Care Industry: Actionable Insights for Business Decision Makers. Information Builders, Everyone Sells: The Value of Business Intelligence in Retail.
42. Teece, D. J., Pisano, G., & Shuen, A. (1997). Dynamic capabilities and strategic management. *Strategic Management Journal*, 18(7), 509-533.
43. Teece, D., & Pisano, G. (2003).The dynamic capabilities of firms. In *Handbook on knowledge management* (pp. 195-213). Berlin, Heidelberg, Springer.
44. Tapscott, D. (2008). Business Intelligence: Actionable Insights for Business Decision Makers. New Paradigm Learning Corporation



45. Turban, E., Sharda, R., & Delen, D. (2011). *Decision Support and Business Intelligence Systems* (9th ed.): Pearson Education, Inc.
46. Turban, E., & Volonino, L. (2010). *Information Technology for Management*. New Jersey: John Wiley & Sons.
47. Wieder, B. & Ossimitz, M. (2015). The Impact of Business Intelligence on the Quality of Decision Making –A Mediation Model. *Procedia Computer Science*, 64, Conference on Enterprise Information Systems/CENTERIS October 7-9,1163-1171
48. Wixom, B. & Watson, H. (2010). The BI-based Organization. *International Journal of Business Intelligence Research*. 1(1), 13-28.
49. Yoon, T., Ghosh, B. & Bong, Keun, J. (2014) User Acceptance of Business Intelligence (BI) Application: Technology, Individual Difference, Social Influence, and Situational Constraints. 47th Hawaii International Conference on System Sciences (Hicss), Hawaii, 2014.