INFORMATION AUDIT STRATEGIES: A PANACEA FOR DECISION MAKING SUCCESS

ERNEST, LEKEBARI NWIDEBOM and PROF. P. NWINYOKPUGI
Department of Office & Information Management,
Faculty of Management Sciences, Rivers State University, Port Harcourt
nkiineb@yahoo.com

ABSTRACT

This study examined information audit strategies and decision making success of tertiary institutions in Rivers State, Nigeria. The study adopted cross-sectional field survey. The population of the study consisted of five (5) tertiary institutions in Rivers state which include 279 principal officers. The study used Census method, hence the 279 principal officers drawn from the five institutions under study. Structured questionnaire was used as instrument for collection from the respondents. Spearman Rank Order Correlation analysis was used to test the hypotheses at 0.7 coefficient. The findings revealed that a strong positive relationship exists between data authentication and measures of decision making success on service quality, vision accomplished and valued added. The study also found that a strong positive relationship exist between Information application and measure of decision making success on service quality, vision accomplished and valued. Also it was discovered that there exist a relationship between data infrastructure and services quality of tertiary institutions in Rivers state. Finally, the findings revealed that there exists a strong positive relationship between Data Source and measures of decision making success on service quality, vision accomplished and value added. Based on the findings, it was concluded that information audit strategies positively enhance decision making success of tertiary institutions in Rivers State. Nigeria. The results clearly indicate that there is a significant relationship between these two variables. Based on this conclusion, it was recommended that all tertiary institutions should adopt information audit strategies dimensions: data authentication, information application, data infrastructure and data source identified in this study be utilized as it enhances decision making success measures, service quality, vision accomplished and value added.

Keywords: Information Audit, Data Authentication, Data Infrastructure, Informat5ion Application, Data source, Service Quality, Value added

INTRODUCTION

Information is recognized as the vital and most strategic business asset (Tieto, 2013). Prior to 21st century, information was not seen as an essential asset or factors of production in an organization such as land, labour and capital. Over the last few decades, it has been shown that the information revolution has begun to change the very source of wealth for given countries. Wealth is perceived as information to create value. The quest for wealth is now the quest for information and its relevance in business. Information is used to drive business models. Information in modern economies describes how the paradigm of production, distribution and consumption of products and services is dramatically altered by big data and predictive analytics (Blase´ and Rao, 2013). Exploiting information-driven in an organization results in good feedback, increases customer's knowledge with better information, assists them learn how to rapidly adjust risk management and safety programmes to mitigate hazards. Information informs how organizations can improve decision-making by systematically building analytics and information capabilities to monetize more of their data assets. Information is any piece of text or data, document, report, book collection, knowledge, market intelligence, link, association, perception, hunch or simple idea held in any medium (Corrall, 2008).

An information asset is a body of information that can be used to meet the organization objectives. Examples of information assets in organizations are documentation of previous information audit (IA), registers, configuration management databases or softwares, emails, spreadsheets, images, records, books, journals, dictionary, directory, almanacs and year books, handbooks and manuals, serials/periodicals, Manuscripts, audio tapes or cassettes, financial

data, backup and archive data, system software, policies and procedures, emails, encrypted data and so on. All these can be grouped together and treated as an information asset. These information assets can be in print or electronic format. Information asset could be in the form of structured, semi-structured or unstructured data that is physically stored not only in computer systems but also in paper records, drawings, photographs, libraries and so on (Borek et al, 2013). The key elements of an organization are its people, structure, business processes, politics and culture (Laudon and Laudon, 2015). Because of the proliferation of information products and delivery methods, information users within organizations are suffering from information overload (Henczel, 2001). Organizations having too much data, information, these lead to information overload. It is too easy for people to get a lot of information and too difficult for them to find the right information at the right time, in the right place in their organizations. Some of the information assets may not be the most appropriate for their needs because of super abundance of information. It overwhelms an organization's ability to sift through, organize and act on them.

In many tertiary institutions, information is often siloed or restricted to specific departments or individuals. This can lead to communication gaps, duplication of efforts, and missed opportunities. However, outdated or inaccurate data can result in flawed decisions. Also, with the increasing digitization of information, tertiary institutions face security risks, including data breaches, unauthorized access, and cyber threats. Furthermore, without a clear information governance framework, tertiary institutions are facing challenges in managing data, ensuring compliance with relevant regulations, and establishing accountability. By addressing these problems through an information audit strategy, tertiary institutions can make more informed decisions, improve operational efficiency, enhance collaboration, and foster a data-driven culture. Therefore, Information Audit strategy is a process that will effectively determine the current information environment by identifying what information is required, to meet the needs of the organization. It establishes what information is currently supplied and allows matching of the two to identify gaps, inconsistencies and duplications. It is a process and an analysis of information for the accuracy, suitability and validity. Several Scholars have done research on information audit strategies and decision making success in other sectors and geographic areas but none had carried out research on information audit strategies and decision making success in tertiary institutions in Rivers State. Hence, this study seeks to investigate information audit strategy and decision making success of tertiary institutions in Port Harcourt, Rivers State.

LITERATURE REVIEW

The nature of this study is that which explored the information fit index of organisation, this study therefore stands on the philosophical pivot of the cognitive fit theory. Vassey and Galletta (1991) define cognitive fit theory as the match between task, problem representation and individual problem solving skills. Goodhue (1995) defines it as the "extent that technology functionality matches task requirements and individual capabilities." Cognitive fit theory provides a guideline for the best way to present information that is relevant for solving a given problem. It suggests that any information pertaining to the organization must be well presented in order to affect the task performance of the organization positively. Buchanan and Gibb (1998) defines IA as discovering, monitoring and evaluating an organization's information resources in order to implement, maintain or improve the organization's management of information. Sharma and Singh (2012) describe IA as a process and an analysis of information for the accuracy, suitability and validity. It is a systematic process through which organizations understand its knowledge and information needs, what are knowledge, the information flows and gaps. Kilzer (2012) defined an IA as a tool that can be used to discover and identify patterns and changes of information in an organization. Frost and Choo (2017) IA encompasses all the methods and tools

needed to catalogue, model, evaluate, quality-control, and analyse an organization's information assets and IM. Henczel (2017) asserted that the findings of 1A are used to develop measurement processes to determine market penetration, satisfaction, service levels and value or benefit of the services and products provided. As the organizational structure, nature and circumstances changes dramatically, there is no universally accepted method for information audit in which they are conducted. Henczel (2001) developed a model as a result of examining the methodologies used in extracting the components necessary to achieve the objective of an information audit. This is known as 'Seven stage information audit model' which includes the seven stage of information audit process and the order in which they are conducted. This model is similar in approach to both Orna (1999) and Buchanan and Gibb (1998), drawing from both.

There are seven stages: ***Stage 1***: *Planning* - As with any major project, the planning stage is critical as it can determine the project's success or failure. To plan properly for an information audit there are five steps to work through. These are: Understanding your organisation and develop clear objectives, determine the scope and resource allocation, choose a methodology, develop a communication strategies and enlist management support Steps. ***Stage 2***: *Data collection* - This stage involves collecting the data you need to achieve your objectives. Data can be collected by questionnaire, personal interview or focus group interview. Whether you create a questionnaire or conduct interviews it is critical that the right people are asked the right questions. It is critical that the questions you ask result in a dataset that is usable, in terms of its volume, its content and its format. It is usual to collect three types of data – 1. data relating to information required to perform tasks and activities 2. data relating to the 'level of criticality' of information resources, tasks and activities 3. data relating to information transfer This stage also involves the creation of an information resources database that is used as the tool to establish the strategic significance of resources. Records must be created for all business units/sections/departments that include their objectives, critical success factors and tasks and activities. The data collection process will gather the data relating to the information resources that enable and support the tasks and activities. ***Stage 3***. *Data analysis*. - This embraces the identification of gaps, duplications and over provisions and the use of sub-standard or inappropriate resources. It will enable a level of strategic significance to be assigned to tasks and activities that can then be used to determine where critical knowledge is being produced and stored and where it is required for re-use. There are three types of analysis carried out on the data collected – (a) general analysis, (b) strategic significance analysis and (c)information flow mapping. General analysis: data collected by any open questions is analysed generally using common spreadsheet or database programs or specialist analysis tools. Significance analysis is done using the information resources database. The database can be used to develop an 'information and knowledge inventory' and to enable the matching of resources and knowledge development with business unit or organisational objectives. This allows a measure of strategic significance to be assigned to resources used and to knowledge generated. ***Stage 4***: *Data evaluation* - Once the data has been analysed, problems and opportunities can be identified and then interpreted and evaluated within the context of the organisation. Not every problem will need to be addressed and some will be unable to be addressed due to organisational constraints such as insufficient resources (people, money, technical or physical resources). Many of the problems that are identified are opportunities to improve the provision of information, extend information services and improve the quality of knowledge created. They can include: information hoarding, biased distribution of resources, use of sub-standard resources, gaps in the provision of resources, information overload issues, lack of transparency and accountability, lack of traceability. ***Stage 5:*** *Communicating recommendations* - Communication strategies are important throughout the entire information audit process, however it is critical that once the recommendations have been formulated, they are communicated to the people who are integral

to them being implemented. Because many of the recommendations will represent an element of change to the resources and services available in the organisation they may affect the daily work processes of some, if not many, employees. It is critical that the changes are communicated in a positive way, and in a way that guarantees management support for their implementation. ***Stage 6:*** *Implementing recommendations*- Once the findings of the information audit have been developed into strategies, and the recommendations that have been formulated from the strategies have been successfully communicated to management and throughout the organisation, plans must be made for the implementation of the recommendations. The way in which the implementation program is developed will depend on what the recommendations are and to what extent they will impact on the individuals and groups that are affected. ***Stage Seven*** - *The Continuum* - constantly reviewing audit actions to ensure sustainability of implementation of recommendations as times advances. This continuous process is critical for consistency and currency.

Data Authentication- Data authentication is the process of confirming the origin and integrity of data. The term is typically related to communication, messaging and integration. Data authentication has two elements: authenticating that you are getting data from the correct entity and validating the integrity of that data. Any data sent over a properly authenticated secure channel is considered authenticated. It is also a good practice to confirm data integrity at the same. This is typically done by matching checksums. If data is somehow corrupted in transit, it cannot be considered authenticated (John, 2016). Data authentication has two purposes: certify the origin of the data and convince the user that the data has not been modified or fabricated. Data authentication is a critical mechanism to maintain data integrity and nonrepudiation. Data authentication may be achieved either using conventional encryption algorithms or using public-key cryptography. Purpose of data authentication is to make sure the data is not changed in transit. To achieve this goal, the transmitter accompanies the frame with a specific code known as the Message Integrity Code (MIC). The MIC is generated by a method known to both receiver and transmitter. An unauthorized device will not be able to create this MIC. The receiver of the frame will repeat the same procedure and if the MIC calculated by the receiver matches the MIC provided by the transmitter, the data will be considered authentic. The level of data authenticity is increased by increasing the number of bits in the MIC. Because of this risk, some identification technology (authentication), which can distinguish between registered legitimate users and imposters, is now generating interest. Unerring user authentication is imperative to thwart illicit access to personal computing devices (e.g., smartphones, watches, and glasses) and online accounts (e.g., e-banking, emails), and smart handheld devices. Various authentication techniques can achieve the authenticity of a user. Some of them are: i. Password-based authentication, ii. Multi-Factor Authentication, iii. Certificate based authentication, iv. Biometric Authentication and v. Tokenbased Authentication. Authentication Mechanism is generally categorized into three categories based on the factor they use for authentication. 1. Knowledge-based authentication (Depending upon something the legitimate User knows) 2. Inherence-based authentication (Depending on something integral to an individual) 3. Possession-based authentication (depending on something a legitimate user possesses). The performance of any authentication system is evaluated based on specific characteristics like Accuracy, Execution time or Efficiency, Security, Privacy, Usability (Acceptability), and Memory requirements.

Information Applications - This refers to the process of utilizing data and knowledge to solve problems, make informed decisions, and achieve desired outcomes. With the proliferation of digital technologies and the increasing availability of data, information application has become a crucial aspect of various fields, including business, healthcare, education, and government.(Laudon & Laudon, 2019). Information application empowers individuals to address complex problems by leveraging data-driven approaches. Through techniques such as predictive modeling and machine learning algorithms, organizations can identify underlying

patterns, uncover hidden trends, and develop effective solutions (Davenport & Harris, 2017). By analyzing individual preferences, behaviors, and demographics, organizations can tailor their offerings, leading to higher customer satisfaction and loyalty (Chen & Zhang, 2018). Information application plays a pivotal role in enabling organizations and individuals to make data-driven decisions, solve complex problems, and deliver personalized experiences. However, it is essential to recognize and address the challenges associated with privacy, data quality, and the overreliance on technology. By implementing robust safeguards, ensuring data accuracy, and maintaining a balance between human judgment and automated systems, the potential of information application can be harnessed effectively, leading to positive outcomes across various domains. The different types of information systems are as follows: *Knowledge Work System:* There are different knowledge management systems that an organization implements to ensure a continuous flow of new and updated knowledge into the company and its processes. A knowledge work system (KWS) is one of the knowledge management systems that ease the integration of new information or knowledge into the business process. Furthermore, KWS also offers support and resources to various knowledge creation techniques, artificial intelligence applications, and group collaboration systems for knowledge sharing, among others. It also uses graphics, visuals, etc., to disseminate new information. Below are some of the applications that work on the core fundamentals of KWS.

Designers often use computer-aided design systems (CAD) to automate their design process; Financial workstations are used to analyze huge amounts of financial data with the help of new technologies; Virtual reality systems are found in the scientific, education, and business fields for using graphics and different systems to present data. Management Information System: The management information system provides aid to managers by automating different processes that were initially done manually. Business activities like business performance tracking and analysis, making business decisions, making a business plan, and defining workflow. It also provides feedback to the managers by analyzing the roles and responsibilities. It provides a clear picture of the organization's performance; It adds value to the existing products, introduces innovation and improves product development; It assists in communication and planning for business processes; It helps the organization provide a competitive advantage. Decision Support System: A decision support system is an information system that analyses business data and other information related to the enterprise to offer automation in decision-making or problem-solving. A manager uses it in times of adversities arising during the operation of the business. Generally, the decision support system is used to collect information regarding revenue, sales figures or inventory. It is used across different industries, and the decision support system is a popular information system. Office Automation System: An office automation system is an information system that automates different administrative processes like documenting, recording data, and office transactions, among others. The office automation system is divided into managerial and clerical activities. Here are some of the business activities that are done under this type of information system: Email, Voice mail and Word processing

Transaction Processing System: The transaction processing system automates the transaction collection, modification, and retrieval process. The peculiar characteristic of this type of information system is that it increases the performance, reliability and consistency of business transactions. It helps businesses perform daily operations smoothly without hassle. Once you are well-versed with different types of information systems, understanding the application of these systems becomes easy to comprehend. Therefore, in the last part of the article, we will look into applying information systems. *Executive Support System:* An Executive Support System or ESS helps top-level executives to plan and control workflow and make business decisions. It provides great telecommunication, better computing capabilities, and effective display options to executives; it enables them with information through static reports, graphs, and textual

information on demand; it helps monitor performances, track competitors' strategies, and forecast future trends, among others.

Data Infrastructure - Data infrastructure refers to the foundational set of technologies, systems, and processes that enable the collection, storage, processing, and analysis of data within an organization or a broader context (Datla & Reddy, 2019). It encompasses various components such as databases, data warehouses, data lakes, data pipelines, data governance frameworks, and data management tools. The primary goal of data infrastructure is to provide a robust and scalable framework for handling and making sense of large volumes of data. At its core, data infrastructure involves the integration of hardware, software, and networking components to create a cohesive ecosystem that supports data operations. This includes data storage solutions like relational databases, NoSQL databases, distributed file systems, and cloud-based storage services, which allow data to be stored securely and accessed efficiently.
Data warehouses are another essential component of data infrastructure. They serve as centralized repositories that consolidate data from different sources, making it easier for analysts and data scientists to perform complex queries and extract insights. Data warehouses also often support Extract, Transform, Load (ETL) processes to clean, transform, and load data from diverse sources into a consistent format. Data lakes are complementary to data warehouses, offering a scalable and cost-effective solution for storing raw and unstructured data. Data lakes allow organizations to store vast amounts of data in its native format, enabling flexible analysis and exploration, but they require proper data governance to avoid becoming data swamps with unregulated and unreliable information. Data infrastructure also involves data pipelines, which are responsible for the efficient and automated movement of data between various systems and components. These pipelines help streamline data ingestion, transformation, and distribution, ensuring data is delivered to the right place at the right time. Data governance defines policies, processes, and responsibilities to ensure data quality, compliance, and privacy. Security measures, such as encryption, access controls, and authentication, are implemented to protect sensitive data from unauthorized access and breaches (Chen & Zhang, 2020). In addition to the components mentioned earlier, data infrastructure also involves various data management tools and technologies that aid in data processing, analysis, and visualization (Smith & Johnson, 2021). Some of these tools include: Data Integration Tools: These tools facilitate the process of combining data from different sources and formats into a unified view, which is vital for data analysis and decision-making. Examples of data integration tools include Talend, Informatica, and Microsoft SQL Server Integration Services (SSIS). *Business Intelligence (BI) Tools*: BI tools enable users to create interactive reports, dashboards, and data visualizations to gain insights from data. Popular BI tools include Tableau, Power BI, QlikView, and MicroStrategy. *Data Analytics Platforms*: Data analytics platforms provide advanced analytics capabilities, such as predictive analytics and machine learning, to derive deeper insights and make data-driven predictions. Examples include Apache Spark, Python's pandas library, and Google Cloud's BigQuery ML. *Data Governance Solutions*: Data governance tools assist organizations in managing data quality, ensuring data compliance with regulations, and establishing data stewardship. Collibra, Alation, and Informatica Axon are examples of data governance platforms.

Data Catalogs: Data catalogs help users discover and understand available data assets within an organization. They provide metadata management and search functionalities, enhancing data accessibility and promoting data collaboration. Examples include AWS Glue Data Catalog and Collibra Data Catalog. *Data Monitoring and Management Tools*: These tools monitor data infrastructure components, track performance, and manage resources to ensure optimal data operations. Tools like Nagios and Datadog are commonly used for monitoring data systems. *Data Security Solutions:* Data security tools focus on protecting data from unauthorized access,

ensuring data privacy, and preventing data breaches. Examples include data encryption tools like HashiCorp Vault and database security solutions like Imperva SecureSphere. *Cloud Services:* Cloud providers offer a range of data-related services, including managed databases, storage solutions, data processing platforms, and machine learning services. AWS, Google Cloud Platform, and Microsoft Azure are popular cloud providers. These data management tools and technologies work in tandem to form a comprehensive data infrastructure that empowers organizations to harness the full potential of their data, drive insights, and support data-driven decision-making.

Data Source - In today's data-driven world, organizations heavily rely on data to make informed decisions and gain a competitive edge. However, the success of decision-making processes is highly contingent upon the quality and reliability of the data sources utilized. One of the primary factors influencing decision-making success is the quality and reliability of the data sources used. Reliable data sources ensure that decision-makers have access to accurate and up-to-date information, enabling them to make well-informed judgments. A study conducted by Smith and Johnson (2019) found that organizations with access to high-quality data sources experienced significantly better decision-making outcomes compared to those relying on inadequate or unreliable data. Therefore, it is crucial for organizations to carefully evaluate the credibility and reliability of their data sources before making critical decisions. Data alone is not sufficient for effective decision-making; it must also be relevant to the problem at hand and interpreted within the appropriate context. Decision-makers should possess a comprehensive understanding of the data's limitations, biases, and potential implications. Thompson et al. (2020) emphasized the importance of contextual understanding, stating that decision-makers need to critically evaluate the data sources in light of their organization's unique requirements and objectives. Neglecting to consider the relevance and context of the data can lead to misguided decisions that may harm the organization's performance. Validating and verifying data is an essential step in ensuring its accuracy and reliability. By utilizing multiple data sources and cross-referencing information, decision-makers can mitigate the risk of relying on erroneous or incomplete data. A study by Chen et al. (2021) highlighted the significance of data validation techniques, such as data auditing and verification procedures, in enhancing decision-making success. Organizations should invest in robust data validation processes to maintain data integrity and reduce the likelihood of making flawed decisions based on faulty information. Patel and Williams (2022) demonstrated that organizations that incorporated diverse data sources and employed advanced data analytics techniques experienced superior decision-making outcomes. Diverse data sources provide decision-makers with valuable insights and a more accurate representation of the complex business environment.

The process of gathering and measuring information on variables of interest, in an established systematic fashion that enables one to answer stated research questions, test hypotheses, and evaluate outcomes is called data collection (Kabir 2016).

METHODS

The study adopted a cross-sectional survey design so as to ensure accurate and well-detailed information that led to the discovery of major characteristics of variables associated with the case under study. The population of this study consist of five public owned tertiary institutions in Rivers State. Thus, the study adopted a census of 279 principal officers which include Deans, Directors and Heads of Departments from the five tertiary institutions. Data were gathered from the respondents through the use of self-constructed (closed ended) questionnaire. This instrument was tested for reliability. Reliability, therefore, refers to whether a test that is repeated on or about a study would give the same results or not (Ritchie, Lewis, Nicholls & Ormston, 2014). The reliability of the instrument variables will be the 0.7 threshold of Cronbach alpha.

Table 1: Internal Reliability of the Instrument

S/No	Dimensions/Measures of the study variable	Number of items	Number of cases	Cronbach's Alpha
1.	Data Authentication	4	20	0.709
2.	Information Application	4	20	0.799
3.	Data Infrastructure	4	20	0.765
4.	Data Source	4	20	0.711
5.	Service Quality	4	20	0.850
6.	Vision Accomplished	4	20	0.934
7.	Value Added	4	20	0.852

Source: Research Data output, 2023

The table above 1 illustrates the efficiency results for the study with each variable operationalized and assessed based on the Efficiency of the dimensions and measures. The result indicates that the instruments for the variables (Information Audit Strategies and Decision Making Success) are well reliable and can be considered as replicable across the units measured.

Data Analysis - The null hypotheses formulated for this study was subjected to statistical testing for the purpose of either accepting or rejecting them. Spearman Rank Order Correlation statistics was used to ascertain the strength of relationship that exist among the variables, to determine the extent to which the independent variable accounted for change on the dependent variable, as well as to test the statistical significance that exists among variables respectively. Partial correlation was used for multivariate analysis. A scatter plot was fitted to describe the relationship between the independent variable information audit strategies and decision making success. The results of the scatter plot below in Figure 1. indicated that there is a positive linear relationship between the independent variable and the dependent variable, which implies that the variable of information audit strategies positively contributes to decision making success.

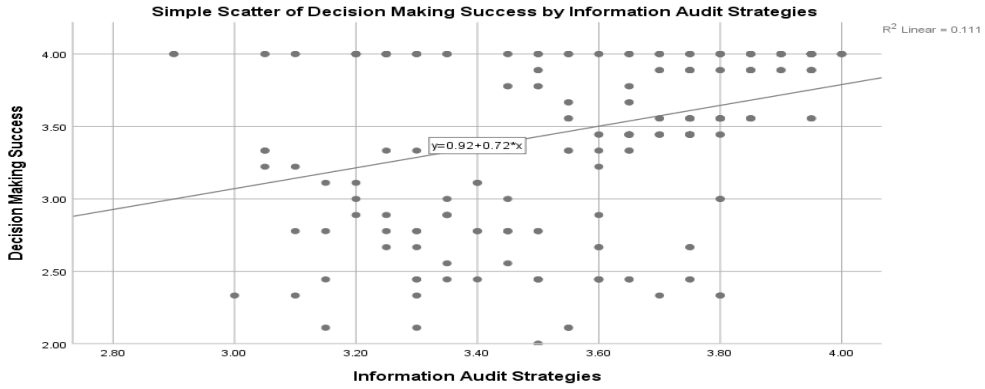

Figure 1 shows a very strong relationship between information audit strategies (independent variable) and decision making success (dependent variable). The scatter plot graph shows that at it linear value of (0.92) depicting a very strong and positive relationship between the two constructs. The implication is that an increase in information audit strategies simultaneously brings about an increase in the level of decision making success.

Table 3. Correlation matrix of Data authentication and measures of decision making success

			Data authentic	Service quality	Vision accomplished	Value added
Spearman's rho	Data authentication	Correlation Coefficient	1.000	.756**	.546**	.826**
		Sig. (2-tailed)	.	.000	.000	.000
		N	270	270	270	270
	Service quality	Correlation Coefficient	.756**	1.000	.771**	.090
		Sig. (2-tailed)	.000	.	.000	.139
		N	270	270	270	270
	Vision accomplished	Correlation Coefficient	.546**	.771**	1.000	-.137*
		Sig. (2-tailed)	.000	.000	.	.024
		N	270	270	270	270
	Value added	Correlation Coefficient	.826**	.090	-.137*	1.000
		Sig. (2-tailed)	.000	.139	.024	.
		N	270	270	270	270

**. Correlation is significant at the 0.01 level (2-tailed).
*. Correlation is significant at the 0.05 level (2-tailed).

The correlation coefficient (r) result in table 3 was used to answer the research question 1 stated in the chapter one of this study. This shows a Spearman rank order Correlation Coefficient (r) of 0.756 on the relationship between data authentication and service quality. Similarly, it shows a Spearman rank order Correlation Coefficient (r) of 0.546 on the relationship between data authentication and vision accomplishment. This value implies that a moderate relationship exists between the variables. The direction of the relationship indicates that the correlation is positive; implying that an increase in vision accomplished was as a result of the adoption of data authentication. Therefore, there is a moderate positive correlation between data authentication and vision accomplished of tertiary institutions in Port Harcourt, Rivers State, Nigeria. Also, the table shows a Spearman rank order Correlation Coefficient (r) of 0.826 on the relationship between data authentication and value added. This value implies that a very strong relationship exists between the variables. The direction of the relationship indicates that the correlation is positive; implying that an increase in value added was as a result of the adoption of data authentication. Therefore, there is a strong positive correlation between data authentication and value added in tertiary institutions in Port Harcourt, Rivers State, Nigeria.

Table 4: Correlation matrix of information application and decision making success

			Information application	Service quality	Vision accomplished	Value added
Spearman's rho	Information application	Correlation Coefficient	1.000	.619**	.756**	.546**
		Sig. (2-tailed)	.	.000	.000	.000
		N	270	270	270	270
	Service quality	Correlation Coefficient	.619**	1.000	.420**	.178**
		Sig. (2-tailed)	.000	.	.000	.003
		N	270	270	270	270
	Vision accomplished	Correlation Coefficient	.756**	.420**	1.000	.771**
		Sig. (2-tailed)	.000	.000	.	.000
		N	270	270	270	270
	Value added	Correlation	.546**	.178**	.771**	1.000

	Coefficient				
	Sig. (2-tailed)	.000	.003	.000	.
	N	270	270	270	270

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

The correlation coefficient (r) result in table 4 was used to answer the research question 2 stated in the chapter one of this study. Table 4 shows a Spearman rank order Correlation Coefficient (r) of 0.619 on the relationship between information application and service quality. This value implies that strong relationship exists between the variables. The direction of the relationship indicates that the correlation is positive; implying that an increase in service quality was as a result of the adoption of information application. Therefore, there is a strong positive correlation between information application and service of tertiary institutions in Rivers State, Nigeria. Similarly, Table 4 shows a Spearman rank order Correlation Coefficient (r) of 0.756 on the relationship between information application and vision accomplished. This value implies that a strong relationship exists between the variables. The direction of the relationship indicates that the correlation is positive; implying that an increase in vision accomplished was as a result of the adoption of information application. Therefore, there is a strong positive correlation between information application and vision accomplished in tertiary institutions in Rivers State, Nigeria.
Also, Table 4 shows a Spearman rank order Correlation Coefficient (r) of 0.546 on the relationship between information application and value added. This value implies that a strong relationship exists between the variables. The direction of the relationship indicates that the correlation is positive; implying that an increase in value added was as a result of the adoption of information application. Therefore, there is a strong positive correlation between information application and value added tertiary institutions in Rivers State, Nigeria. Equally displayed in the Table 4 is the statistical test of significance (p-value) which makes possible the generalization of our findings to the study population. From the result obtained from Table 4.17, the sig- calculated is less than significant level ($p = 0.000 < 0.05$). Therefore, based on this finding the null hypothesis earlier stated is hereby rejected and the alternate upheld. Thus, there is a significant relationship between information application and service quality in the tertiary institutions in Rivers State, Nigeria.

Further displayed in the Table 4 is the statistical test of significance (p-value) which makes possible the generalization of our findings to the study population. From the result obtained from Table 4.17, the sig- calculated is less than significant level ($p = 0.000 < 0.05$). Therefore, based on this finding the null hypothesis earlier stated is hereby rejected and the alternate upheld. Thus, there is a significant relationship between information application and vision accomplished in the tertiary institutions in Rivers State, Nigeria. Further displayed in the Table 4 is the statistical test of significance (p-value) which makes possible the generalization of our findings to the study population. From the result obtained from Table 4.17, the sig- calculated is less than significant level ($p = 0.000 < 0.05$). Therefore, based on this finding the null hypothesis earlier stated is hereby rejected and the alternate upheld. Thus, there is a significant relationship between information application and value added in the tertiary institutions in Rivers State, Nigeria.

Table 5: Correlation matrix of Data infrastructure and measures of decision making success

			Data infrastructure	Service quality	Vision accomplished	Value added
Spearman's rho	Data infrastructure	Correlation Coefficient	1.000	.826**	.756**	.646**
		Sig. (2-tailed)	.	.000	.000	.000
		N	270	270	270	270
	Service quality	Correlation Coefficient	.826**	1.000	.032	-.226**
		Sig. (2-tailed)	.000	.	.602	.000
		N	270	270	270	270
	Vision accomplished	Correlation Coefficient	.756**	.032	1.000	.771**
		Sig. (2-tailed)	.000	.602	.	.000
		N	270	270	270	270
	Value added	Correlation Coefficient	.646**	-.226**	.771**	1.000
		Sig. (2-tailed)	.000	.000	.000	.
		N	270	270	270	270

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

The correlation coefficient (r) result in table 5 was used to answer the research question 3 stated in the chapter one of this study. Table 4.18 shows a spearman rank order Correlation Coefficient (r) of 0.826 on the relationship between data infrastructure and service quality. This value implies that strong relationship exists between the variables. The direction of the relationship indicates that the correlation is positive; implying that an increase in service quality was as a result of the adoption of data infrastructure. Therefore, there is a strong positive correlation between data infrastructure and service quality in tertiary institutions in, Rivers State, Nigeria. Similarly, Table 5 shows a Spearman rank order Correlation Coefficient (r) of 0.756 on the relationship between data infrastructure and vision accomplished. This value implies that a strong relationship exists between the variables. The direction of the relationship indicates that the correlation is positive; implying that an increase in vision accomplished was as a result of the adoption of data infrastructure. Therefore, there is a strong positive correlation between data infrastructure and vision accomplished in tertiary institutions in Rivers State, Nigeria. Also, Table 5 shows a Spearman rank order Correlation Coefficient (r) of 0.640 on the relationship between data infrastructure and value added. This value implies that a strong relationship exists between the variables. The direction of the relationship indicates that the correlation is positive; implying that an increase in value added was as a result of the adoption of data infrastructure. Therefore, there is a strong positive correlation between data infrastructure and value added in tertiary institutions in Rivers State, Nigeria. Further displayed in the Table 5 is the statistical test of significance (p-value) which makes possible the generalization of our findings to the study population. From the result obtained from Table 4.18, the sig- calculated is less than significant level ($p = 0.000 < 0.05$). Therefore, based on this finding the null hypothesis earlier stated is hereby rejected and the alternate upheld. Thus, there is a significant relationship between data infrastructure and service quality in the tertiary institutions in Rivers State, Nigeria.

Further displayed in the Table 5 is the statistical test of significance (p-value) which makes possible the generalization of our findings to the study population. From the result obtained from Table 4.18, the sig- calculated is less than significant level ($p = 0.000 < 0.05$). Therefore, based on this finding the null hypothesis earlier stated is hereby rejected and the alternate upheld. Thus, there is a significant relationship between data infrastructure and vision accomplished oriented in the tertiary institutions in Rivers State, Nigeria. Further displayed in the Table 5 is the statistical test of significance (p-value) which makes possible the generalization of our findings to the study population. From the result obtained from Table 4.18, the sig- calculated is

less than significant level (p = 0.000 < 0.05). Therefore, based on this finding the null hypothesis earlier stated is hereby rejected and the alternate upheld. Thus, there is a significant relationship between data infrastructure and value added in the tertiary institutions in Rivers State, Nigeria.

Table 6: Correlation matrix of Data source and measures of decision making success

			Data source	Service quality	Vision accomplished	Value added
Spearman's rho	Data source	Correlation Coefficient	1.000	.925**	.868**	.608**
		Sig. (2-tailed)	.	.000	.000	.000
		N	270	270	270	270
	Service quality	Correlation Coefficient	.925**	1.000	.756**	.546**
		Sig. (2-tailed)	.000	.	.000	.000
		N	270	270	270	270
	Vision accomplished	Correlation Coefficient	.868**	.756**	1.000	.771**
		Sig. (2-tailed)	.000	.000	.	.000
		N	270	270	270	270
	Value added	Correlation Coefficient	.608**	.546**	.771**	1.000
		Sig. (2-tailed)	.000	.000	.000	.
		N	270	270	270	270

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

The correlation coefficient (r) result in table 6 was used to answer the research question 3 stated in the chapter one of this study. Table 6 shows a spearman rank order Correlation Coefficient (r) of 0.925 on the relationship between data source and service quality. This value implies that very strong relationship exists between the variables. The direction of the relationship indicates that the correlation is positive; implying that an increase in service quality was as a result of the adoption of data source. Therefore, there is a strong positive correlation between data source and service quality in tertiary institutions in, Rivers State, Nigeria.

Similarly, Table 6 shows a Spearman rank order Correlation Coefficient (r) of 0.858 on the relationship between data source and vision accomplished. This value implies that a very strong relationship exists between the variables. The direction of the relationship indicates that the correlation is positive; implying that an increase in vision accomplished was as a result of the adoption of data source. Therefore, there is a strong positive correlation between data source and vision accomplished in tertiary institutions in Rivers State, Nigeria. Also, Table 7 shows a Spearman rank order Correlation Coefficient (r) of 0.608 on the relationship between data source and value added. This value implies that a strong relationship exists between the variables. The direction of the relationship indicates that the correlation is positive; implying that an increase in value added was as a result of the adoption of data source. Therefore, there is a strong positive correlation between data source and value added in tertiary institutions in Rivers State, Nigeria.

Further displayed in the Table 4.19 is the statistical test of significance (p-value) which makes possible the generalization of our findings to the study population. From the result obtained from Table 4.19, the sig- calculated is less than significant level (p = 0.000 < 0.05). Therefore, based on this finding the null hypothesis earlier stated is hereby rejected and the alternate upheld. Thus, there is a significant relationship between data source and service quality in the tertiary institutions in Rivers State, Nigeria. Further displayed in the Table 4.19 is the statistical test of significance (p-value) which makes possible the generalization of our findings to the study population. From the result obtained from Table 4.19, the sig- calculated is less than significant

level (p = 0.000 < 0.05). Therefore, based on this finding the null hypothesis earlier stated is hereby rejected and the alternate upheld. Thus, there is a significant relationship between data source and vision accomplished in the tertiary institutions in Rivers State, Nigeria. Further displayed in the Table 4.19 is the statistical test of significance (p-value) which makes possible the generalization of our findings to the study population. From the result obtained from Table 4.19, the sig- calculated is less than significant level (p = 0.000 < 0.05). Therefore, based on this finding the null hypothesis earlier stated is hereby rejected and the alternate upheld. Thus, there is a significant relationship between data source and value added in the tertiary institutions in Rivers State, Nigeria.

The multivariate analysis examines the role of information culture as a moderator in the relationship between Information audit strategies and decision making success in tertiary institutions in Rivers State, Nigeria. The Decision rule is that if the difference between the zero-order correlation and the controlled correlation < 0.01, then there is no significant difference, and the null hypothesis is accepted.

Table 8 Correlation matrix of the moderating effect of information culture and decision making Success

Control Variables			Information Audit Strategies	Decision Making Success	Information culture
-none-[a]	Information Audit Strategies	Correlation	1.000	.833	.575
		Significance (2-tailed)	.	.000	.000
		Df	0	268	268
	Decision Making Success	Correlation	.833	1.000	-.032
		Significance (2-tailed)	.000	.	.596
		Df	268	0	268
	Information culture	Correlation	.575	-.032	1.000
		Significance (2-tailed)	.000	.596	.
		Df	268	268	0
Information culture	Information Audit Strategies	Correlation	1.000	.630	
		Significance (2-tailed)	.	.000	
		Df	0	267	
	Decision Making Success	Correlation	.630	1.000	
		Significance (2-tailed)	.000	.	
		Df	267	0	

a. Cells contain zero-order (Pearson) correlations.

With respect to research question 5, table 4.20 depicts the zero-order correlation between information audit strategies and decision making success shows the correlation coefficient as positive and strong at 0.833. The partial correlation controlling for information culture, however, is also moderate with r value of 0.630. The observed positive "relationship" between information audit strategies and decision making success is due to the underlying relationships between each of those variables and formalization. Therefore, information culture has a positive and strong effect on the relationship between information audit strategies and decision making success in tertiary institutions in Rivers State, Nigeria. From a critical look at the zero partial correlation, we found that the relationship both between information audit strategies and decision making success are positively correlated with information culture as the control variable. Removing the effect of this control variable reduced the correlation between the other two variables to be 0.630 and significant at $\alpha = 0.05$. Since the difference between the zero-order correlation and the controlled correlation (0.833 - 0.630) = 0.203 > 0.01; hence from the decision rule, there is a significant difference and thus the null hypothesis is rejected. Therefore, it is concluded that Information culture do significantly moderate the relationship between information audit strategies and decision making success of tertiary institutions in Rivers State, Nigeria.

DISCUSSION OF THE FINDINGS

The overall objective of the study was to examine the relationship between information audit strategies and decision making success of tertiary institutions in Rivers State. Nigeria. The data collection for this study was done through the distribution of structured closed ended questionnaire. The questionnaire was categorised into four sections. The first section was to collect the respondent demographic information. Section two was the designed questionnaire that seeks information from the respondents based on the study variables regard the independent variable. Section three was the questionnaire on the measures of the dependent variable and the last section four was on the moderating variables of the study.

Our analysis was carryout on the two hundred and seventy (270) retrieved questionnaires from the study target respondents. The research design of the study involved the use of quasi-experimental research design as the study intends to examine the relationship between the study construct. Descriptive statistics was used to analyse data on the information of the demographic of the study respondents and the univariate analysis of the study variable, while inferential statistics used to analyse collected data for the study bivariate analysis of the study variables. As stated earlier in the chapter three of the study the Spearman rank order Correlation Coefficient formula was used as the study statistical tool to test the study formulated hypotheses stated in chapter one of this research study to validate if there is relationship between the independent variable (information audit strategies) dimensions and the measures of the dependent variable (decision making success), and presented with aid of SPSS version 25.0 for interpretation of the study data analysis. The study findings showed a significance positive relationship between information audit strategies and decision making success. The findings support the study of Gabriel and Obara, (2013) according to them Information has become an essential resource for managing modern organizations. This is so because today's business environment is volatile, dynamic, turbulent and necessitates the burgeoning demand for accurate, relevant, complete, timely and economical information needed to drive the decision-making process in order to accentuate organizational abilities to manage opportunities and threats. This study was a reflection of amassed discourse available in literature concerning the nexus between management information systems – MIS and corporate decision- making. The paper suggested that a painstaking development and management of MIS in organizations is capable of triggering decisions that would not only be fast and accurate but would be in line with industry best practices and ultimately result in organizational efficiency and effectiveness.

The analysis of the collected data of the test of hypothesis one, two and three showed a strong positive relationship between data authentication and measure of decision making success on service quality, vision accomplished and valued added of which the significant is based on r=0.756; p= 0.000 <0.05., r=0.546; p= 0.000 <0.05 and r=0.826; p= 0.000 <0.05., both at 95% confidence interval leading to the rejection of the null hypothesis ($H_{0:1}$), ($H_{0:2}$) and ($H_{0:3}$), stated in the chapter one, and upheld the alternate and restated thus; there is a significant relationship between data authentication and service quality, vision accomplished and valued added. This finding correlates with the study of John (2016) who opined that Data authentication is the process of confirming the origin and integrity of data. The term is typically related to communication, messaging and integration. Data authentication has two elements: authenticating that you are getting data from the correct entity and validating the integrity of that data. Any data sent over a properly authenticated secure channel is considered authenticated. It is also a good practice to confirm data integrity at the same. This is typically done by matching checksums. If data is somehow corrupted in transit, it cannot be considered authenticated.

The analysis of the collected data of the test of hypothesis four, five and six showed a strong positive relationship between Information application and measure of decision making success on service quality, vision accomplished and valued added of which the significant is based on r=0.619; p= 0.000 <0.05., r=0.756; p= 0.000 <0.05 and r=0.546; p= 0.000 <0.05., both at 95% confidence interval leading to the rejection of the null hypothesis ($H_{0:4}$), ($H_{0:5}$) and ($H_{0:6}$), stated in the chapter one, and upheld the alternate and restated thus; there is a significant relationship between Information application and service quality, vision accomplished and valued added.
Analysis of the collected data of the test of hypotheses seven, eight and nine showed a strong positive relationship between Data infrastructure and measure of decision making success on service quality, vision accomplished and valued added of which the significant is based on r=0.826; p= 0.000 <0.05., r=0.726; p= 0.000 <0.05 and r=0.646; p= 0.000 <0.05., both at 95% confidence interval leading to the rejection of the null hypothesis ($H_{0:7}$), ($H_{0:8}$) and ($H_{0:9}$), stated in the chapter one, and upheld the alternate and restated thus; there is a significant relationship between Data infrastructure and service quality, vision accomplished and valued added. Ts of data.

The analysis of the collected data of the test of hypothesis ten, eleven and twelve showed a strong positive relationship between Data Source and measure of decision making success on service quality, vision accomplished and valued added of which the significant is based on r=0.925; p= 0.000 <0.05., r=0.868; p= 0.000 <0.05 and r=0.608; p= 0.000 <0.05., both at 95% confidence interval leading to the rejection of the null hypothesis ($H_{0:10}$), ($H_{0:11}$) and ($H_{0:12}$), stated in the chapter one, and upheld the alternate and restated thus; there is a significant relationship between Data source and service quality, vision accomplished and valued added. This study finding supports a study conducted by Smith and Johnson (2019) which found that organizations with access to high-quality data sources experienced significantly better decision-making outcomes compared to those relying on inadequate or unreliable data. Therefore, it is crucial for organizations to carefully evaluate the credibility and reliability of their data sources before making critical decisions. Data alone is not sufficient for effective decision-making; it must also be relevant to the problem at hand and interpreted within the appropriate context. Decision-makers should possess a comprehensive understanding of the data's limitations, biases, and potential implications. Thompson et al. (2020) emphasized the importance of contextual understanding, stating that decision-makers need to critically evaluate the data sources in light of their organization's unique requirements and objectives. Neglecting to consider the relevance and context of the data can lead to misguided decisions that may harm the organization's performance.

RECOMMENDATION

Looking at the findings of our study, therefore the following recommendations are:

- All tertiary institutions should adopt information audit strategies to ensure effective decision making.
- Management should conduct regular information audit in tertiary institutions to foster a data-driven decision-making culture, enabling evidence-based and informed choices across all levels of the organization.
- Data authentication should be encouraged by organizations as the study showed that it enhances decision making success.
- Information application still remains a very important tool for decision making success; hence it should be utilized and encouraged across all institutions of the State.

- Data infrastructure plays a crucial role and serves as the backbone for managing data effectively therefore it should be adopted in terms of service quality.

- Data source should always be verified before taken decisions because it will help institutions improve service quality and accomplish vision.

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