
ORGANIZATIONAL EFFICIENCY AND SERVICE QUALITY OF GOVERNMENT-OWNED TERTIARY HOSPITALS IN NIGERIA: THE NECESSITY OF INFORMATION ASSURANCE

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ABSTRACT

This study investigated the exigency of information assurance to organizational efficiency and service quality of government-owned tertiary hospitals in Nigeria. The study adopted the quasi-experimental design with a cross-survey sectional approach. The study utilized structured questionnaire to collect primary data. The study population comprised 16 government government-owned tertiary hospitals operating in South-South Nigeria. 4 copies of questionnaire were administered on management staff of each of the 16. Hence, a total of 64 respondents participated in the study. The data was analyzed using Pearson's Product Movement Correlation statistic, and was aided by the Statistical Package for Social Science (SPSS) version 23.0. The result of the data analyses revealed a strong positive and statistically significant correlation between information assurance and organizational efficiency of government-owned tertiary hospitals; and a very strong positive and statistically significant correlation between information assurance and organizational efficiency of government-owned tertiary hospitals. The study concluded that information assurance has significant positive effect on organizational efficiency and service quality and recommends that government-owned tertiary hospitals should maximize the use of information assurance, if they intend to improve the efficiency of their operations and also deliver quality service to customers (patients).

Keywords: Information assurance, organizational efficiency, service quality, tertiary hospitals

INTRODUCTION

The desire of organizations to protect or otherwise defend their prized information assets against devastation, degradation, manipulation or exploitation by unauthorized users is addressed through the instrumentality of information assurance (Andrew & Gerald 2001). Information assurance thus entails protecting information assets, and detecting and reacting to information security breaches, in order to restore information and information systems. Information assurance offers a perspective on information security that takes protective measures into account during all three informational states: processing, storage, and transmission. Thus, information assurance is essential in the healthcare system.

The healthcare is an information involving, complex, all-encompassing, adaptive, distributed and progressing activity (Leap & Berwick 2005). With advances in information and communication technology (ICT), digitalization of medical care cycles and conventions are evolving at an alarming speed.

Accessibility to healthcare data is quickly expanding and the extension and expansion of wellbeing data is unavoidable.

Information is an essential asset to any organization as it assist in making effective decisions. Obviously, we live in a data ward and data driven world. A reality where data and data frameworks are utilized to drive quick changes in the worldwide commercial center and which is significantly affecting the development of nations. Electronic Medical services Record, Electronic Clinical Record and Individual Wellbeing Record are at the center of this pattern and are expected for fitting and practicable exchange of health information.

In any case, it is turning out to be progressively perceived that it is vital to safeguard patients' data while using them for clinical, management and administrative processes. With the shift from conventional paper based organization records to electronic record (ER), information systems are being stimulated rapidly. While ER systems is highly beneficial, it also raises data security and privacy issues. Data security refers to the protection of identity and personal information divulged by consumers (patients in this instance) in their interaction with a business (Ateke & Isaac, 2020) or the degree to which individuals' personal information is not shared with third parties without their permission (Ateke & Ogbuji, 2017).

Efficiency and service are the explained variables in this study. Efficiency describe the ability to reduce waste of resources in achieving a goal or carrying a task. It is an essential element needed in evaluating a firm in its acquisition and use of resources to achieve its goals. Efficiency thus entails the capability to eliminate waste of resources (time, materials, effort and money) in producing a desired result. In a more general sense, efficiency is the ability to achieve results without wastages (Chinyere, 2022). According to Hussey et al. (2008), an organization's efficiency is a result of its perspective, output, and input. One of the most important key performance areas in modern economic management systems is organizational efficiency.

Service quality on the other hand, entails developing and rendering services that meets or exceeds customers' expectations. If an organization's service offerings satisfy customers or exceed their expectations, it means the organization has provided quality service (Adeniyi, 2018). Thus, for the success of an organization, quality service is needed to attract customers. Companies can provide unique service solutions to customers bring about customer satisfaction, positive purchase beahviour and retention (Susie et al., 2017).

Healthcare is an important sector of economies in lieu of roles in protecting, remedying and preserving health. Thus, the efficiency of healthcare providers is essential and need to be paid more attention. The healthcare sector is an information intensive industry, and most of this information are sensitive, and need to be protected against devastation, exploitation and manipulation. Furthermore, hospitals are at risk if they do not have information assurance policy.

Mishandling of sensitive private data can lead to significant security risks. Hence, hospitals institute information assurance to defend against devastation, degradation, manipulation, and exploitation of information by adversaries or malicious users. Lack of information assurance could lead to financial loss, reputation damage and loss of patient and patronage. Hence, the need for information assurance is vital to protecting information in the organizations.

Over the years, several studies have been conducted in related areas, but to the best of our knowledge, there is still lack of empirical work on information assurance and organizational efficiency of government-owned tertiary hospitals in South-South Nigeria. This study therefore sought to fill this research gap and to provide a better understanding of the effect of information accountability on organizational efficiency.

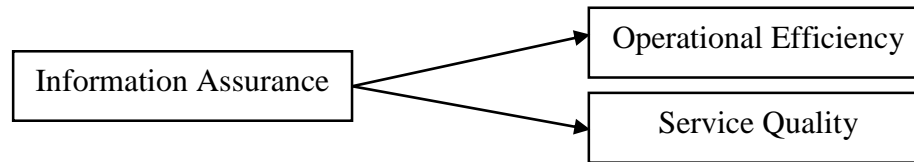


Fig. 1: Conceptual framework of information assurance and operational efficiency and service quality

LITERATURE REVIEW

Theoretical Foundation

This study is hinged on general deterrence theory (GDT) which explain the human behaviour and decisions in terms of minimizing their cost and maximizing their benefit to individuals. General deterrence theory is rooted in criminology. Losing reputation, competitive advantage, productivity and profit can results from employees' behaviour that threaten the availability, confidentiality and integrity of organizational information assets. Hence, GDT state that employees tend to behave well in the organization when they are aware of effective punishment. It is acknowledged that deterrent approaches, such as disincentives and sanctions influence the direction of individuals' behavior towards avoiding certain actions. The effectiveness of such disincentives is based on the certainty and severity of sanctions (Hua & Bapna, 2013).

Furthermore, an offender realizes that their act will be detected (sanction certainty) and that the authority will consider harsh punishment, such as a fine, jail term, dismissal, denunciation, or some other form of punishment (sanction severity), they will not engage in deviant behavior (Liz et al., 2010). GDT has been used to show how sanction certainty and severity influence attitudes and intention of employees with regards to deviant behaviors in the domain of information security.

Concept of Information Assurance

Information Assurance is characterized as policies and procedures established to safeguard information and information frameworks by guaranteeing their accessibility, trustworthiness, validation, privacy, and non-renouncement. It is the process of defending information assets against devastation, degradation, manipulation and exploitation by unauthorized parties (Andrew & Gerald 2001). This incorporates accommodating rebuilding of data frameworks by integrating insurance, identification and response abilities. (Public Data Frameworks Security [INFOSEC], Glossary, 1997).

Information assurance as indicated by Arun-Kumar (2018), is the practice of ensuring data and overseeing information risks connected with the utilization, handling, stocking, and transmission of information and the frameworks and cycles utilized for those reasons. It incorporates assurance of the uprightness, accessibility, genuineness, non-disavowal and secrecy of user information, utilizing physical, specialized and regulatory controls. As such, information assurance address the conveyance of legitimate, exact, secure, solid, timely information, and paying attention to danger conditions, in the dispersed and heterogeneous computing and correspondence climate.

Arun-Kumar (2018) outlined five pillars of information assurance which are availability, integrity, authentication, confidentiality, and non-repudiation. The foundational elements for ensuring trust and integrity in information systems are these pillars and any actions taken to safeguard information and information systems, including offering for their restoration. The final four pillars of integrity, authentication, confidentiality, and non-repudiation are primarily addressed by the cryptologic components of information assurance. These pillars are implemented in accordance with the organizational mission requirements.

Integrity incorporate safeguarding against improper information modification or harm, and incorporates guaranteeing information non disavowal and authenticity. As it connects with information, honesty implies

that the data is sticking to "proficient principles... the condition total or undivided...sound or flawless In this manner there is some sensible confirmation that the data is exact, can be depended upon to be verifiable and not adjusted or generally different without going through a conventional cycle to guarantee respectability is kept up with.

Confidentiality include saving approved limitations on access and divulgence, including means of safeguarding individual protection and restrictive information. Confidential information implies information that is "private or secret completed or uncovered in the assumptions that anything done or revealed will be kept private for a selected group not accessible to people in general, for example since it is commercial or industrially sensitive or concerns matters of public safety. " confidential information is just given updated as the need arises. Utilizing this model, as a subset of information assurance, implies that the objective is for getting sensible confirmation that the data put away, handled or sent by a data framework won't be revealed to any individual who has not been recognized as authorized to get that information.

Availability includes guaranteeing timely and reliable access to and utilization of information. Accessibility implies that one is guaranteed, with sensible certainty and conviction, that the information and the information frameworks are generally accessible when required. In rundown, one can see the significance of this model as it connects with information assurance. Truth be told, it is the standard, the core of any information assurance process, framework or program. The model when effectively executed, guarantees that the data is exact and can be depended on to be accessible just to the people who need that information when it is required.

Authentication implies checking the character of a user, process, or gadget, frequently as an essential to permitting admittance to assets in an information system; while means ensuring that no party can deny that it sent or received a message as there is a provision of proof of identity for both the sender and receiver.

Functionalities of information assurance encompass protection of confidentiality, integrity and availability of information; assurance of data and data frameworks from unapproved access, use, divulgence, disturbance, adjustment, or obliteration to give secrecy, respectability, and accessibility and guarantees that main approved users (privacy) approach precise and complete information (uprightness) when required (accessibility). Information assurance on the other hand, include cyber security awareness and education; strong cryptography; good security-enabled commercial information technology; an enabling global security management infrastructure; and a civil defense building outfitted with an assault detecting and cautioning capacity and facilitated reaction instrument/

The full scope of information assurance envelops computerized as well as analog form. These securities apply to information on the way, both physical and electronic structures as well as information at rest in different kinds of physical and electronic storerooms. Andrew and Gerald (2001), expressed that information assurance is worried about the regulation of, and recuperation from, an attack. It likewise characterizes how attacks are to be identified using a bunch of indicators and warnings.

Moreover, information assurance manages stopping attacks and the utilization of regulation intended to resolve issues of security. Information assurance incorporates a powerful aspect where the organization engineering is itself an evolving climate, including the data security systems that distinguish attacks and empower a reaction to those attacks. Information assurance adds business benefit using IRM (Data Hazard Board) which builds utility of data to approved users, and lessens the utility of information to those unauthorized (Lui et al., 2005).

Organizations progressively depend on digitally stored and accessed information, applications have progressively higher necessities on supporting the accessibility, integrity, and confidentiality of this

information, and customary information security advances are progressively restricted in fulfilling the security prerequisites of utilizations because of their failure to endure effective attacks. Thus, Data confirmation advances are acquainted with not just keep data from being unveiled, changed or obliterated, yet additionally recognize interruptions and work through attacks so that a specific degree of data security can be guaranteed within the sight of attacks.

Organizational Efficiency

Bestman and Chinyere (2021) defined efficiency as the capability for organizations to avoid wasting resources in the course achieving a task. It is organizations' degree of success in using the least possible input to produce the highest possible output. The more efficient an organization is, the more likely the organizations will excel and survive over a longer period of time (Chinyere 2022). Mokhtar et al. (2006) contend that efficiency refers to the comparison between outputs and inputs used in the process of producing a product. Mokhtar et al. (2006) further propose that technical efficiency is the firm's ability to obtain maximal output from a given set of inputs while allocative efficiency means the firm's ability to use inputs in optimal proportions, given their respective prices and production technology.

Based on the foregoing the following null hypothesis was formulated:

Ho₁: There is no significant relationship between information assurance and organizational efficiency of government-owned tertiary hospitals in South-South Nigeria.

Service Quality

Service quality can be defined as exceeding customer expectations. Faraj et al. (2021) refers to service quality as the value customers receive from a service. Therefore, service quality refers to customer's comparison between service expectations and perceptions of what the service provider actually provides. Parasuraman et al. (2005) pointed out that aspects of a quality service include tangibles, reliability, responsiveness, assurance, and empathy. Ladhari (2010) explored the most discussed aspects in literature: Ease of use (reliability), quick access (accessibility), information completeness (benefit of information), and website design (content), capabilities. Likewise, improving service quality levels has become an important factor for all organizations in terms of global competition. The rapid growth of the service sector has raised different views on the issue of quality and the meaning of service quality. Service companies (banks, hospitals, and hotels) do not provide tangible goods. The interaction between suppliers and customers is very important in these businesses.

Based on the foregoing the following null hypotheses was formulated:

Ho₂: There is no significant relationship between information assurance and quality service of government-owned tertiary hospitals in South-South Nigeria.

METHODOLOGY

The study adopted a quasi-experimental design with a cross-sectional survey approach, where all the variables of study were investigated as a one-time observation. It employed a correlational method of investigation to examine the correlation between information assurance and organizational efficiency and the correlation between information assurance and service quality. The population of the study comprised 16 government-owned tertiary hospitals operating in South-South Nigeria, according to thehospitalbook.com/hospital/tertiary. The sample size is the same as the population. However, the 4 copies of questionnaire were administered on management level staff (Chief Medical Director, Director of Administration, Director of Clinical Services and Director of Finance) of the hospitals, making a total of 64 respondents. Pearson's Product Moment Correlation was used to test the hypotheses, with the help of Statistical Packages for Social Sciences version 23.0. The probability criterion of 0.05 significance level was adopted for accepting the null hypotheses at ($P > 0.05$) or rejecting the hypotheses at ($P < 0.05$).

DATA ANALYSIS AND RESULTS

Table 1: Descriptive Statistics of Information Assurance

	N	Sum	Mean	Std. Dev.	Skewness	Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Std. Error
The use of authorize restriction on access and disclosure of information increase efficiency in the organization	42	182.00	4.3333	1.00406	-1.642	.365	.717
Confidentiality of patients information enhances quality services	42	186.00	4.4286	.85946	-1.462	.365	.717
Ensuring timely and reliable access of information save cost for the organizations	42	186.00	4.4286	.96633	-2.002	.365	.717
The use of password to protect sensitive information against malicious user enhances quality service	42	194.00	4.6190	.62283	-1.431	.365	.717

Source: SPSS output from field survey, 2023.

As shown in Table 1, most of the responses were on the higher side of the Likert scale which ranges from very low extent = 1 to very high extent = 5. As a result of the high concentration of the responses on the higher side of the scale, the mean scores are greater than 4.00. Particularly, the mean score of question 4 is the highest because it has the highest sum of 194.00. In other words, mean = 4.6190, sum = 194.00 thus, question 4 has the greatest influence on information assurance. However, question 1 has the highest standard deviation of 1.00406; indicating that, responses spread most in question 1 compared to other questions with respect to information assurance. Furthermore, the analysis revealed that the skewness statistics are all negative indicating a negatively skewed distribution with scores concentrating on the high end of the Likert scale. Furthermore, standard errors of skewness are .365 which shows that, the distribution is skewed to a significant degree. Similarly, the kurtosis result showed positive statistics indicating a relatively peaked distribution. However, values of the standard errors of kurtosis are greater than .717 indicating that the distribution is high to a significant degree.

Table 2: Descriptive Statistics of Organizational Efficiency

	N	Sum	Mean	Std. Dev.	Skewness	Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Std. Error
Efficiency is achieved when there are little or no waste in the organization	42	175.00	4.1667	1.14587	-1.466	.365	.717
Little or no expenses is achieved when there is no misuse of information	42	173.00	4.1190	1.23372	-1.219	.365	.717
Lack of information accountability can lead to huge financial loss	42	173.00	4.1190	1.10878	-1.147	.365	.717
The use of accountability system enhance efficiency	42	172.00	4.0952	1.22593	-1.190	.365	.717

Source: SPSS output from field survey, 2023.

As shown in Table 2, most of the responses were on the higher side of the Likert scale which ranges from very low extent = 1 to very high extent = 5. As a result of the high concentration of the responses on the higher side of the scale, the mean scores are greater than 4.00. Particularly, the mean score of question 1 is the highest because it has the highest sum of 175.00. In other words, mean = 4.1667, sum = 175.00 thus, question 1 has the greatest influence on organizational efficiency. However, question 2 has the highest standard deviation of 1.23372; indicating that, responses spread most in question 2 compared to other questions with respect to organizational efficiency. Furthermore, the analysis revealed that the skewness statistics are all negative indicating a negatively skewed distribution with scores concentrating on the high end of the Likert scale. Furthermore, standard errors of skewness are .365 which shows that, the distribution is skewed to a significant degree. Similarly, the kurtosis result showed positive statistics indicating a relatively peaked distribution. However, values of the standard errors of kurtosis are greater than 2 indicating that the distribution is high to a significant degree.

Table: 3 Descriptive Statistics of Quality Service

	N	Sum	Mean	Std. Dev.	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
patients are happy when quality services is rendered	42	175.00	4.1667	1.24776	-1.359	.365	.577	.717
Government tertiary hospitals with better service providers are always at the frontline in having more patients	42	175.00	4.1667	1.10247	-1.264	.365	.719	.717
Patients always wish that government tertiary hospitals will exceed customers' expectations.	42	171.00	4.0714	1.25704	-1.146	.365	.074	.717
Adequacy of information in the organization enhances quality service.	42	183.00	4.3571	1.05510	-1.958	.365	3.596	.717

Source: SPSS output from field survey, 2023.

Table 3 revealed that most of the responses were on the higher side of the Likert scale which ranges from very low extent = 1 to very high extent = 5. As a result of the high concentration of the responses on the higher side of the scale, the mean scores are greater than 4.00. Particularly, the mean score of question 4 is the highest because it has the highest sum of 183.00. In other words, mean = 4.3571, sum = 183.00 thus, question 4 has the greatest influence on quality service. However, question 3 has the highest standard deviation of 1.25704; indicating that, responses spread most in question 3 compared to other questions with respect to quality service. Furthermore, the analysis revealed that the skewness statistics are all negative indicating a negatively skewed distribution with scores concentrating on the high end of the Likert scale. Furthermore, standard errors of skewness are .365 which shows that, the distribution is skewed to a significant degree. Similarly, the kurtosis result showed positive statistics indicating a distribution relatively peaked. However, values of the standard errors of kurtosis are greater than 2 indicating that the distribution is high to a significant degree.

Table 4: Correlation Analysis between Information Assurance and Organizational Efficiency

		Information Assurance	Organizational Efficiency
Information Assurance	Pearson Correlation	1	.624**
	Sig. (2-tailed)		.000
	N	42	42
Organizational Efficiency	Pearson Correlation	.624**	1
	Sig. (2-tailed)	.000	
	N	42	42

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

Source: SPSS output from field survey, 2023.

The results of correlation analysis between information assurance and organizational efficiency as shown in Table 4 indicates a strong, positive and statistically significant relationship between the variables. This is indicated by the correlation coefficient and the probability value ($r = 0.624$, $N = 42$, $p = 0.000 < 0.01$) showing the strength, direction and significance of correlation between the variables. In view of this result, the study rejected the null hypothesis which states that there is no significant correlation between information assurance and organizational efficiency of government-owned tertiary hospitals in South-South Nigeria.

Table 5: Correlation Analysis between Information Assurance and Quality Service

		Information Assurance	Quality Service
Information Assurance	Pearson Correlation	1	.563**
	Sig. (2-tailed)		.000
	N	42	42
Quality Service	Pearson Correlation	.563**	1
	Sig. (2-tailed)	.000	
	N	42	42

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

Source: SPSS output from field survey, 2023.

As shown in Table 5, the correlation analysis between information assurance and service quality indicates a strong, positive and statistically significant relationship. This is demonstrated by the correlation coefficient and probability value ($r = 0.563$, $N = 42$, $p = 0.000 < 0.01$) which show the strength, direction and significance of correlation between information assurance and service quality. In view of this result, we reject the null hypothesis which states that there is no significant correlation between information assurance and service quality of government-owned tertiary hospitals in South-South Nigeria.

DISCUSSION OF FINDINGS

Results of the correlation analysis between information assurance and organization efficiency show that there is a positive and statistically significant relationship between the variables. Similarly, the results of the correlation analysis between information assurance and quality service, show that there is a positive and statistically significant relationship between the variables. These findings is consistent with the findings of Bestman and Ikuru (2019) that a positive and significant relationship between information security and organizational performance. This suggests that risk-based strategy used by management of hospitals strengthens organizational performance.

Our findings also cohere with report of Rahiman et al. (2021) that implementing and updating comprehensive information security policies and planning together with relevant regulations and standards

define security measures, identify authorized uses, and describe authorized uses and control information and procedures, which leads to organizational effectiveness. Further, our findings align with that of Tantua and James (2020) that there is a positive relationship between information security and organizational effectiveness in banks in Rivers State.

CONCLUSION AND RECOMMENDATIONS

Based on the results of this study, it is concluded that information assurance significantly relates with organizational efficiency and it measure quality service of government tertiary hospitals in South-South, Nigeria. Information assurance is a necessity determinant for efficiency in government tertiary hospitals in South-South, Nigeria. Based on the findings of the study, we recommend that government tertiary hospitals should employ the use of information assurance as it defend information assets against the devastation, degradation, manipulation, and exploitation by an adversary that enable smooth operations of activities in the hospital.

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