HEALTH MANAGEMENT INFORMATION SYSTEM CAPABILITIES AND PERFORMANCE OF CATHOLIC MISSION HOSPITALS IN SELECTED COUNTIES IN KENYA

James Wangai Gitahi & Dr. Josphat Kyalo, PhD

The Strategic JOURNAL of Business & Change MANAGEMENT
ISSN: 2312-9492 www.strategicjournals.com
Vol. 11, Iss.2, pp 939 – 958, May 26, 2024. www.strategicjournals.com, © Strategic Journals

HEALTH MANAGEMENT INFORMATION SYSTEM CAPABILITIES AND PERFORMANCE OF CATHOLIC MISSION HOSPITALS IN SELECTED COUNTIES IN KENYA

[1] James Wangai Gitahi & [2] Dr. Josphat Kyalo, PhD

[1*] Scholar, School of Business, Economics and Tourism, Kenyatta University, Kenya
[2] Lecturer, Management Science Department, Kenyatta University, Kenya

Accepted: May 11, 2024

DOI: http://dx.doi.org/10.61426/sjbcm.v11i2.2960

ABSTRACT

This study established the relationship between the capabilities of health management information system and performance in the Catholic Mission hospitals in selected counties in Kenya. The study was informed by five theories namely Human Computer Interaction, Performance Theory, Resource-Based View Theory, Technology Acceptance Model Theory, and Unified Theory of Acceptance and Use of Technology. The study used descriptive research design. The target population composed of 150 Managerial, non-managerial system users, and ICT staff from 25 Catholic Mission Hospitals in four Selected counties in Kenya namely Nairobi, Kajiado, Machakos and Kiambu. The study revealed that Digital Infrastructure significantly influence Performance of Catholic Mission Hospitals (β=0.252; p=0.000). Furthermore, Information Security has a significant effect on Performance (β=0.181; p=0.000). Moreover, the study found that Data Storage (β=0.286; p=0.000) and Management Support (β=0.321; p=0.000) have a significant contributory effect on performance. The study concludes that an organization's digital infrastructure plays a crucial role in its success. Thus, hospitals can securely distribute, store, and monitor patient data throughout their operations if they have strong hardware and software infrastructures. Furthermore, the ability to retrieve and share patient health records highlights the importance of health information management. For this reason, cyber security is essential to protecting people and businesses from hackers and other cyber security threats. Thirdly, organizations need to make sure that sensitive information is protected against unauthorized access and data breaches by taking the appropriate security measures. In conclusion, the performance of an organization is largely influenced by four key crucial success factors: digital infrastructure, information security, data storage and managerial support. The study recommends that an organization's digital infrastructure need to be strengthened in order to provide cutting edge solutions for effective performance. Hence by offering new frameworks for structuring businesses, digital platforms can support sustainable business practices. Secondly, in order to improve productivity, organizations must strengthen system security with regard to passwords, usernames, authentication, and backups. Thirdly, the necessity for businesses to implement reliable data processing infrastructure, communication networks, and data retrieval systems is critical in order to stay competitive in the marketplace. Finally, in order for businesses to gain a competitive edge, they must prioritize employee competency, training, and appropriately and adequately allocate resources.

Key Words: Health Management Information System, *Digital Infrastructure, Storage, Security, Management Support*

CITATION: Gitahi, J. W., & Kyalo, J. (PhD) (2024). Health management information system capabilities and performance of catholic mission hospitals in selected counties in Kenya. *The Strategic Journal of Business & Change Management*, 11 (2), 939 – 958. http://dx.doi.org/10.61426/sjbcm.v11i2.2960

INTRODUCTION

According to a report by World Health Organization (WHO), technology has a significant impact on the performance of the healthcare ecosystem both locally, nationally, and globally and therefore proposes the integration of healthcare systems to provide a wider perspective of the healthcare data (Park et al., 2021). Today, predictive analytics continues to be applied in healthcare to identify high-risk patients and alert clinicians to potential problems based on the data curated using HMIS. This can improve the quality of care by providing clinicians with the information they need to make informed decisions about patient care. The systems streamline the various operations within the hospital thus improving the performance of a healthcare facility in terms of effectiveness and efficiency in service delivery in a cost-effective way.

In the global arena, India have made great strides towards adoption of technology in healthcare by implementing a Nationwide HMIS Initiative developed and deployed with an aim of enhancing quality of health information in the country and understanding the efficiency and effectiveness of the medical services provided to the citizenry (Sharon Ross & Venkatesh, 2016). The core objective of this implementation is to influence the performance of the health sector. The implementation of the high scale project involved thousands of health facilities, health workers who are key players towards the success or failure of the HMIS towards ensuring quality and efficient healthcare service provision to the population. Further, Countries such as Brazil has made had had significant improvement in the healthcare sector after implementing a unified advanced HMIS that covers the healthcare facilities in both private and public institutions that (Roman, 2023). However, this is not without challenges posed by the inadequate digital infrastructure, inadequate workforce in the country, the current level of implementation has seen impressive performance towards improvement of the healthcare access for her population and reduced mortality rates. Roman (2023) confirms that Brazilians has enjoyed significant improvement in the healthcare after the implementation of the advanced integrated healthcare system.

In Africa, Ghana has been keen on assessing the performance of the healthcare sector by being in the forefront in leveraging modern technology in improving the healthcare services by integrating digital health technologies into the healthcare systems, which has played a key role towards achieving the Universal Health Care (Opoku et al., 2021). With the support from the European Union (EU) Ghana piloted a national telemedicine program integrated with national health insurance scheme (NHIS) with mobile renewal, which enables the beneficiaries make payment for health insurance cover via mobile money services. Mur tola et al. (2013) also opines that with the advancement of modern technology, researchers have focused on the gradual development of health information systems leading to the complete establishment of medical-based information systems to achieve a balance between humanity and technology. The utilization of HMIS throughout the patient treatment journey minimizes clinical errors, supports the medical professionals, and provides relevant reports to the management to monitor the performance within various sections in the hospital. For that reason, the use of HMIS and integration with healthcare practices is an inevitable tool for any hospital interested in offering quality healthcare services efficiently. The management is concerned with profit growth for the hospitals that provides the resources required to run the facility. Thus, any initiative that enhances productivity and reduces operational costs while maintaining high quality of service delivery shall always be embraced. HMIS is a perfect tool to support the management in achieving this kind of mix.

The crucial role played by the Catholic Mission hospitals in the provision of healthcare services in Kenya cannot be underrated. Kenya like other developing countries, the performance in the healthcare sector remains to be an issue of concern.

Their performance is a concern to all their stakeholders among them the government who needs the sector to offer the best services in fighting diseases, the public who are interested in getting quality healthcare service, the management who is concerned with the overall income that sustains the operations of the institution. Further, the employees are interested parties who needs a guarantee that the hospital will be in a position to continuously compensate them in time by paying salaries on time. Thus, the government recognizes this fact and for this reason the Universal Health Coverage (UHC) has been anchored in the vision 2030 blueprint as one of the key pillars with an aim of providing quality healthcare to the citizenry (Ndung'u et al., 2011). The National Government medical insurance firms such as the National Health Insurance Funds (NHIF) has been one of the organizations that has embraced technology in the healthcare sector by implementing a nationwide information system. The system manages the health insurance coverage to all registered members deploying mobile payment technologies and providing an interface for all the accredited hospitals nationwide. Indeed, Technology is a great enabler that provides the means to facilitate a proper collection, processing, storage, and analysis of any set of data, the medical sector has really taken advantage of this. A study by Nawa and Wamitu (2019) confirms that that there has been a steady rise in the uptake of technology in the healthcare facilities in Kenya. His study attributes this to high internet penetration and increased adoption of digital technology by the population at large. However, not all facilities that have embraced technology in their operations due to the several factors that limits their capacity to invest in the digital infrastructure, this has a significant impact on their performance.

Moradipour et al. (2021) ascertained that systems are designed to provide healthcare providers with the information they need to make informed decisions about patient health and improve the overall efficiency and quality of care which influences on the overall performance of the medical facility. For instance, HMIS provide patient data in a timely manner which ensure that the doctors make informed decisions in developing the patient's care plan compared to situations where one would need to retrieve the information from the physical files. HMISs have been used to reduce costs by eliminating redundant data entry and streamlining administrative processes. It is confirmed that that the features of a HMIS which includes speed, quality, friendly user interface, up-to-date data, proficiency, and conformity with the processes and working conditions have a significant and positive influence on the user performance (Moradipour et al., 2021). Thus, it interests the researcher to identity how the performance of the Catholic mission hospitals is affected by the characteristics of the HMIS utilized during their routine operations.

Statement of the Problem

The performance of any institution is overly critical in determining the sustainability of its operations. The Catholic mission hospitals have which have a key role of providing the medical services to the population depends on the income from their services offered to the public. In this case, their performance has a profound influence on their foregoing aspect in that any inefficiency can edge them out of business. Notably, running the CMH involves a myriad of aspects such as interaction of massive data in managing various operations across the various service points. Further the hospital's management needs to prudently manage the resources to ensure the facility remains afloat and generate income. The patients expect that the hospitals provide the services effectively and efficiently to ensure timely service provision. In the management of the hospital resources and the patient data, most Hospitals have deployed HMIS to process automate the operations and help manage the information and financial resources. Critical information managed by the systems includes the biodata, medical history, treatment plan, test results, patient financial records, among others.

Implementing the HMIS have a potential of influencing the performance by improving their efficiency in managing patient data to deliver better medical services. Operating manually would otherwise lead to significant levels of inaccuracies, require a huge workforce to retrieve records, waste time, and lead to loss of finances which eat into the hospital profits resulting in unsatisfied customers.

The Catholic Mission hospitals in selected counties in Kenya have substantively embraced technology in their operations by implementing robust health management information systems to enable them to digitalize most of their operations. Despite having implemented the systems, the hospitals are still facing a myriad of challenges that affects their performance. Implementing a HMIS requires massive investment, and any investor would expect high returns and service improvement, however some factors could still make fully achieving this a pipe dream. Some of the factors could be classified as infrastructure gap, data storage challenges due to the ever-growing data size, information security related issues, knowledge gaps among the users, management commitment towards full utilization of technology, among others. Patient data storage and exchange are susceptible and require a security system to keep the data safe since the access to the data is many a times centralized and if the access if not properly controlled can be a great loophole that can put the sensitive information at risk of being corrupted, lost or theft Hausvik (2017). The massive data processed by the HMIS requires highly capacitated staff to analyze and help the management make useful decisions out of the data trends. There tend to lack the necessary support and investment by the management in enabling the ICT teams acquire and utilize the required capacity to fully utilize the systems in tracking and analyzing data.

In research carried out on the health information management systems capabilities by Kose et al., (2020) putting emphasis on the information security within the health management systems, it was evident that the sector is facing a continuing rise in data security breaches which proofs to be one of the major hinderance to optimal performance of the hospitals with health systems. The Catholic Mission hospitals in the selected counties are not spared either. Nonetheless, the above study focused on how the information security challenges and how it affects the hospital performance, the proposed study is timely and very key as it goes beyond and focuses on the four key factors in a HMIS namely the infrastructure, the data storage, information security and the management support and how they affect the performance of the Catholic Mission hospitals. The study sought to unearth the influence of HMIS capability on the performance of Catholic Mission hospitals in Selected counties in Kenya.

Objective of the Study

This study investigated the relationship between Health Management Information Systems capabilities and the performance of Catholic Mission Hospitals in Selected counties in Kenya. The specific objectives were;

- To determine the effect of digital infrastructure and performance of Catholic Mission Hospitals in Selected counties in Kenya.
- To evaluate the effect of data storage and performance of Catholic Mission Hospitals in Selected counties in Kenya.
- To establish the effect of information security and performance of Catholic Mission Hospitals in Selected counties in Kenya.
- To assess the effect of management support and performance of Catholic Mission Hospitals in Selected counties in Kenya.

The research was guided by the following questions:

- How does digital infrastructure affect the performance of Catholic Mission Hospitals in Selected counties in Kenya.
- How does data storage affect the performance of Catholic Mission Hospitals in Selected counties in Kenya.

- How does the information security affect the performance of Catholic Mission Hospitals in Selected counties in Kenya.
- What is the impact of management support on the performance of Catholic Mission Hospitals in Selected counties in Kenya.

LITERATURE REVIEW

Theoretical Review

Human-Computer Interaction Theory

As founded by a social-cognitive scientist John M. Carroll, Human-Computer Interaction (HCI) theory is vital to improving organizational performance in healthcare context. Croon (2022) asserts that HCI theory is based on the idea that people and computers should be able to interact in an intuitive, efficient, and effective way. HCI theory is based on several principles, including user-centered design, which focuses on creating technology tailored to the user's needs (Vinz, 2022). This means that the HMIS user interface should be designed with the user's needs in mind, considering their level of expertise, the tasks they need to accomplish, and the contexts in which the technology will be used. Health informatics encompasses the study of design, the development, adoption, and application of Information Technology based solutions to deliver healthcare. It focuses on acquiring, using, storing, and retrieving health information to support decision-making and communication among healthcare professionals, patients, and other stakeholders.

HCI is the study of the design, development, and use of interactive computer systems, it is used to understand how individuals interact with technology in the healthcare setting (Cooper & Schindler, 2013). These three areas of study provide a comprehensive understanding of the role of HMIS in improving organizational performance and patient satisfaction. HCI theory focuses on how computers can be designed to facilitate collaboration and communication between different healthcare professionals (Ponsa and Guasch, 2014). This is important for HMIS, as it allows information sharing between various departments and healthcare team members. By ensuring that the system is designed with this goal in mind, it is possible to improve the quality of care, service delivery, and patient satisfaction. HCI theory can ensure that the system is designed with the patient in mind so that it is easy for them to access the information they need, understand how to use the system, and get the necessary feedback.

Technology Acceptance Model

Technology Acceptance Model (TAM) as established by Davis (1989) is one of the most popular theories for determining specific user acceptance and utilization of technology and information systems. The theory suggests that individual's level of technology adoption is directly influenced by their perceived usefulness of the technology rather than just the attitude towards technology, and how easy it is to use it and its perceived usefulness Kariuki and Nzuki (2019). Numerous studies that investigate specific technology adoption patterns in different information system architectures have thoroughly investigated and authenticated the TAM as a satisfactory model to justify the adoption motivators.

According to the Technology Acceptance Model, perceived usefulness and perceived ease of use are crucial factors in computer usage habits. According to TAM, perceived utility and perceived ease of use are some of the key elements that encourage people to use computers (Worthington & Burgess, 2021). According to Davis (1989), a potential user's perceived belief that adopting a certain application system will improve their performance is what constitutes perceived utility. Perceived ease of use (EOU) is the degree to which a potential user predicts that the target system will be simple to use. According to TAM, perceived usefulness and simplicity of use are the most crucial factors in real software use.

Unified Theory of Acceptance and Use of Technology

Unified Theory of Acceptance and Use of Technology (UTAUT) is one of the baseline models

formulated by Venkatesh et al., (2016) that gives insight on technology adoption by organizations to execute their mandate. It is One of the most established and mature streams of information systems (IS) research (Venkatesh, Davis, & Morris, 2007). The theory proposes that the adoption of technology in operations depends on several aspects, namely effort expectancy, performance expectancy, facilitating conditions, and social influence.

The theory applies in this context as the core objective of the hospitals is delivering the best service to the patients which if achieved could be translated to satisfactory performance. As an enabler technology plays a key role in making the hospital deliver excellent services to their patients (Dwivedi et al., 2019). Due to implementation of HMIS, hospitals experience reduced efforts and manual operations while expecting a better performance shown by the financial income, customer satisfaction and quality service delivery. The researcher sought to identify if the performance of the Catholic Mission hospitals is influenced by the technology as this theory supposes.

Resource-Based View theory

The theory was formulated by Salancik and Pfeffer (1978) and states that power is dependent on strategic resources control in an institution. Resource based theory was founded from the theory of open systems as different organizations possess various levels of dependence on the external environment and particular resources required for their routine operations. Systems present a critical resource to the firms that enables them to have competitive advantage over their counterparts who do not make use of technology as an enabler to better and more efficient service delivery. The resource-based view (RBV) maintains that a firm can only elevate their performance by having an unapparelled competitive advantage based on its rare and valuable resources (Bharadwaj, 2020). The ability of a firm to acquire and sustain these resources affects their overall performance and the competitiveness visa vis their competitors.

HMIS is particularly a critical resource to an organization. In the case of the hospitals, the utilization of way information is controlled, disseminated and even more importantly because any changes do have a profound effect on the inter-dependence relationships for all involved parties (Yuchtman & Seashore, 2007). The theory presents itself as very significant to the research since part of HMIS is dependent on the resources available to facilitate implementation and thus lead to the improvement of the service quality, however, the system should ensure that the system is reliable (Shangala, 2020). The resource dependency assists the strategic managers to have in place a good HMIS and proper infrastructures within which the system components interact and hence it was relevant in determining the effect of health management information system on the performance of CMH in Selected counties in Kenya (Kihuba et al., 2014). The researcher finds this theory critical in evaluating the usefulness of a system towards influencing performance.

Theory of Performance

Richard Schechner, in his theory on performance considered performance as the result of six (6) core components namely identity, knowledge, context, learning skills, personal factors, and fixed factors. This theory lays the foundations of analyzing and defining the performance criteria with an aim of developing the performance measures (Bell, 2008). The level of performance of the selected CMH could be based on the core fundamental aspects raised by the proponents of the performance theory. The management of the CMH is not easy but the core objective of their existence drives the management to consider a series of initiatives that integrate knowledge and skills to deliver quality services to the customers cost effectively. This theory is very critical in assessing how various factors including the management support affect the performance of the CMH in the selected counties in Kenya.

Vainieri et al. (2020) argues that the health systems are faced with challenges inherent to the care demand and the technological evolution. Attempts to resolve the challenges requires a change in thinking in the overall operations in the organization information management, governance and organization, accountability frameworks, financing, and resource allocation, as well as public health system responses. Catholic mission hospitals are not exempted from such challenges, the need to assess their performance is attributed to the fact that technology that ideally should provide a solution to these challenges runs short of this expectation.

Empirical Review

The Digital infrastructure includes the hardware which entails the computers, servers, scanners, printers, and peripherals; software which is composed of programs and applications and the network connectivity containing the internet service, Local Area Network, and other means of communication between various users and integrated systems. Moradipour et al. (2021) argue that health management information systems have become increasingly important to healthcare organizations in the recent past. He sought to examine the effects of a hospital information system (HIS) on the performance of various management units in Ahvaz public hospitals, Iran (Moradipour et al., 2021). The study confirmed that the characteristics of HIS including speed, quality, being up-to-date, user-friendliness, proficiency, and conformity with working conditions have positive and significant impacts on the performance of management units. That shows that a properly configured and maintained infrastructure that aligns with the system needs influences on the performance with the HMIS as an enabler. Inadequate infrastructure can be a hindrance towards achieving the main objective of any system implementation. By having robust hardware and software infrastructures, organizations can store, share, and track patient information securely throughout their stay in the hospital. This improves confidentiality, integrity, and the availability of the patient data, reduces medical errors, and allows for more accurate diagnoses and treatments. Organizations that use HMIS also realize cost savings by having access to data that can help identify areas for improvement. This data can inform decisions about resource allocation, streamlining processes, and improving patient outcomes. Additionally, HMIS enables organizations to increase their efficiency by eliminating manual processes and facilitating communication between departments. Data analytics can also assist the hospitals in estimating their patient's growth trends and areas that need more investment in terms of staffing, machines as well as right sizing of resources.

In Kenya, Khainja (2018) observed that the utilization of health management information system (HMIS) has a great influence on healthcare service delivery among in the healthcare sector. His study sought to examine the use of Health management information Systems and Technology in Healthcare service delivery amongst Non-Governmental Organizations (NGOs) in Kenya. His study had the following variables: performance expectancy, effort expectancy and facilitating conditions which the researcher evaluated in his study to form part of the critical factors that contribute to the HMISs and the technology use in the healthcare service delivery specifically in the Kenyan NGOs. He concluded that it is important for NGOs to strengthen their infrastructure which provides the resources to help the organization realize better performance in their operations.

Hospital data storage is particularly important towards keeping the patients records for future retrieval and the treatment management. Data form one of the fundamental resources to an organization. The hospital data entails patient information, diagnosis records, financial records, treatment records, test records, pharmacy records, among others. The HMIS processes the data to make it more useful in making the necessary decisions in patient care. For a smooth patient

journey from the registration to discharge, an effective and efficient communication mechanism needs to be in place to ensure no data is lost and the patient is given the right treatment plan and right medication. Organizations that utilize information management systems have taken a keen interest in storage options including the use of the cloud, servers with high raid capacity as well as offsite data storage (Pilemalm, 2002). The integration of the HMIS in all the hospital sections is likely to help the patient take less time and get the best customer experience, this is likely to influence them to be a return customer which has an implication to the hospital performance. Kilimo et al. (2022) study conducted in Kenya, Elgeyo-Marakwet, Iten County Referral hospital concluded that the use of HMIS positively impacted on the service-delivery and strongly recommend that the healthcare organizations leverage on technology by managing the hospital data using HMIS.

Endriyas et al., (2019) asserts that the HMIS is a crucial tool upon which the data is collected, stored, processed, and analyzed to improve decision making. The data gathered through the HMIS emanate from routine service delivery reports and the administrative records (Endriyas et al., 2019). The HMIS collects data from and beyond the government-run facilities including from non-profit, faith-based facilities for-profit, schools, and from service delivery sites such as prisons, workplaces, and communities (Lippeveld et al., 2019). The systems help the facility to collect data which is integral to patient management and planning.

Security of information remains to be very important aspect for information processing events particularly where information is confidential in nature and critical for informed decision making (Stahl et al., 2011). Hospital information is one of such information that demands that integrity, confidentiality, and availability is always guaranteed due to the sensitivity of the information handled. Any system managing such information need to implement features that will facilitate maintenance of such critical security aspects by among others requiring passwords, encryption of data on transit and regular backups of the data. HMIS feeds into the centralized storage of data and interfaces between the data and the users, the more reason security features need to be implemented to ensure the authorized users are authenticated to access the data. Fatima and Colomo-Palacios (2018) concluded that safety of the patient's processed data is one of the greatest hinderance to adoption of Healthcare Information Systems, cloud storage is one of the models used to enhance security of the data. Healthcare facilities must take and maintain pro-active measures towards ensuring integrity of the hospital information resource (Stahl et al., 2011). Accuracy and confidentiality of the patient data stored in the database server is paramount. Server maintenance and data backup proofs as the most critical measures taken to enhance address the system security risks (Wei, 2011). Any loss of patient information presents a major drawback to the performance of the hospital in serving the patients with the appropriate standards.

In Kenya, Ayugi (2021) observed that that data protection and data availability was key driver to ensuring smooth operations for the medical facilities. Her study that was carried out in Nairobi County Based healthcare facilities appreciated the fact that sensitive patient information might need classification and access restricted to only those the same is required. There are encounters that affect the healthcare facilities in Nairobi in adoption of the data protection strategies (Alotaibi & Federico, 2019). Challenges such as; regulatory environment, rapid digital innovation, data interfacing with third parties and increased incidences of cyber security threats.

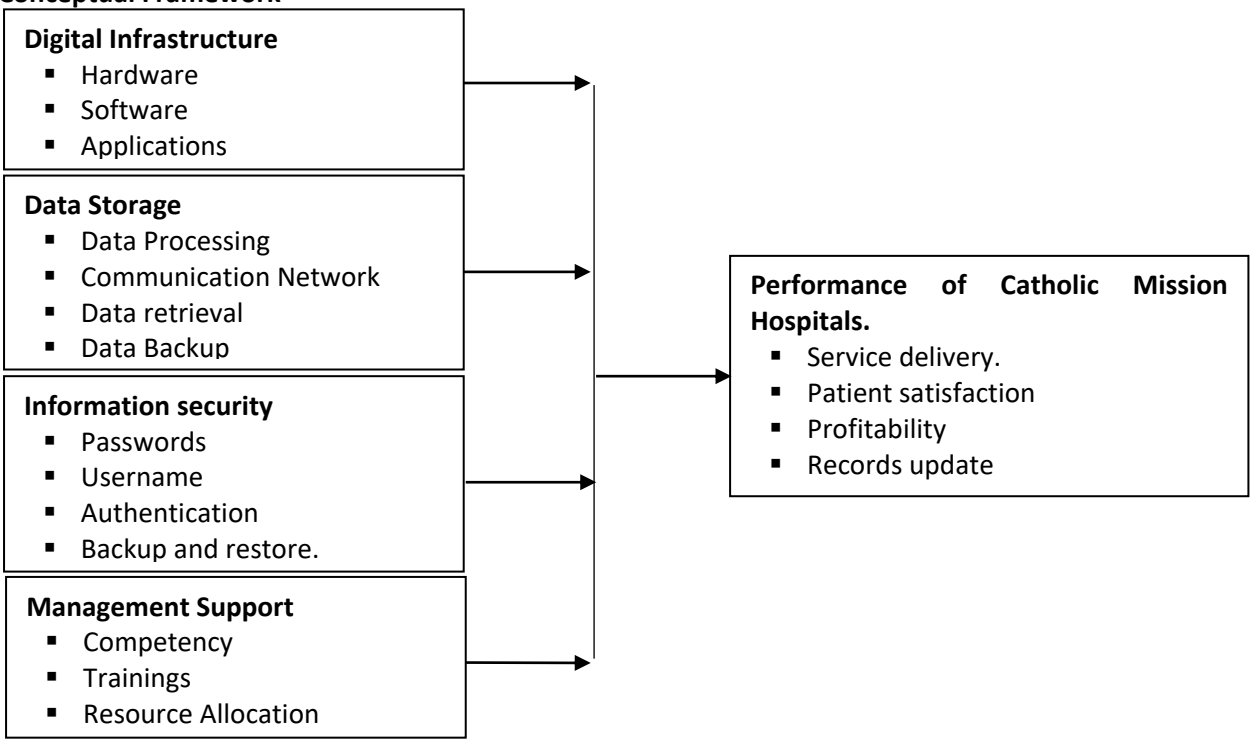
Literature has shown that the management support especially the top, is the most unequivocal essential factors for successful adoption of an information system (Hwang, 2019). Alotaibi &Federico (2017) argue that an effective HMIS allows healthcare providers to access patient data quickly, accurately, and securely. HMISs also provides healthcare organizations with real-time information about

quality, safety, and care performance. This allows healthcare providers to make informed decisions and improve patient outcomes. Better service based on objective decisions increases customer satisfaction.

Hwang (2019) states that among the factors that determine the success or the failure of any implementation of an Information system, the Support from the top management is considered as the most critical factor. Successful implementation of HMIS for both small and large enterprise is driven by the management support, sufficient resource such as developer and user support, sufficient skills development, motivation of the staff and most importantly acting as the change agents to create a good environment for implementing the system (Thong et al., 1996). The management support overcomes the organizational resistance to accept the information system.

In Kenya, Turpin et al. (2018) identified that management buy in towards the implementation and the adoption of HMIS is critical. The management provides the required resources as well as the strategies to be used in running the institutions, thus, the management plays an especially significant role towards the successful adoption of HMIS with an aim of improving performance. addition to the hospital (Turpin et al., 2018). Managers should feel motivated to champion the implementation of the system, which has a high potential of influencing the rest of the staff at the operational level towards the use of the HMIS to improve their performance. Chmielewska et al. (2022) asserts that the management bears the responsibility of ensuring that the staff members are motivated and professionally trained on the use of HMIS to ensure that the fully utilize and enhance on the delivery of service which will eventually improve the overall performance of the hospital.

Conceptual Framework



Independent Variable **Dependent Variable**

Figure 1: Conceptual Framework

Source: Author (2023)

METHODOLOGY

This study followed a descriptive research design. Based on this description, the target population was obtained from twenty-five selected Catholic Mission hospitals in four selected counties; Nairobi, Kajiado, Machakos and Kiambu in Kenya considering that they have implemented and are utilizing a HMIS. Each of the identified hospitals has an average staff capacity of 300 of which 3 to 6 of them are in the ICT department, making a total of about 7500 members of staff and about 75 to 150 ICT Specialists who support the HMIS. For this study, the target population were all medical facilities. Stratified sampling design was used where samples were obtained from the IT department staff in the selected hospitals. Sample size in research is the number of individuals or units included in a study (Andrade, 2020). A sample size of 150 respondents from the ICT departments from the twenty-five catholic Mission Hospitals which was obtained using stratified sampling method as follows. Semi structured questionnaires was used to collect the primary data as the data collection tool. Closed and open-ended questionnaires were utilized to help elicit the relevant evidential information for analysis. A Likert scale was utilized with 5 being the strongly agrees and 1 to be strongly disagrees. Prior to the actual study, a pilot study was conducted to assess the aspects such as the time, resources required and minimize the unnecessary hitches that may arise during the actual study (In, 2017). The instruments were evaluated for the internal consistency value using the Cronbach's alpha with the acceptable threshold being 0.7 which will proof the tools as reliable. The data gathered from the study was analyzed using SPSS (Statistical Package for Social Sciences) Version 26 software.

FINDINGS AND DISCUSSION

Descriptive Analysis

Digital Infrastructure and Performance of Catholic Mission Hospitals

The first objective of the study was to determine the effect of digital infrastructure and performance of Catholic Mission Hospitals in Selected counties in Kenya. This section made use of percentages, means, and standard deviations.

Table 1: Digital Infrastructure and Performance of Catholic Mission Hospitals

Statement	SD	D	N	A	SA	Mean	SD
There is adequate hardware infrastructure for use in operations of the hospital	15%	4%	25%	27%	30%	3.52	1.34
The available hardware is up to date for efficiency and effective use in digital technology	3%	23%	22%	32%	20%	3.41	1.14
The company has provided the appropriate software's needed to support digital technology	9%	11%	22%	39%	19%	3.48	1.17
Information systems have service delivery in the hospital	5%	21%	25%	29%	20%	3.36	1.16
Information systems cut down cost of operating the hospital	14%	14%	18%	29%	25%	3.37	1.36
Information systems has increased profitability of the hospital	10%	17%	25%	42%	7%	3.18	1.10
The available software infrastructure is up-do-date to run the digital processes in the firm	17%	9%	21%	43%	9%	3.18	1.24
The offices are connected to high-speed internet for use in organizational digital processes	20%	8%	8%	36%	27%	3.40	1.48
Location of the servers and databases in organization is secure and only accessible to the right people	11%	17%	15%	43%	14%	3.30	1.23
The company through the management has been committed in ensuring the technical team has adequate access to digital infrastructure	13%	13%	21%	40%	12%	3.25	1.22

Source: Researcher (2024).

The success of an organization depends critically on its digital infrastructure. In this study, 57% of the respondents indicated that there is adequate hardware infrastructure for use in operations of the hospital. A similar view was upheld by 52% of those who agreed that the available hardware is up to date for efficiency and effective use in digital technology. In this study, 58% of the participants agreed that the company has provided the appropriate software's needed to support digital technology. Similar views were propounded by 52% of those who reported that the available software infrastructure is up-do-date to run the digital processes in the firm.

Information systems are essential to a business because they facilitate improved decision-making, communication, and data accuracy. This study established that 49% of respondents agreed that information systems have service delivery in the hospital. A similar view was propounded by 54% of those who averred that information systems cut down cost of operating the hospital. It follows that HMIS encourages the efficient utilization of resources. Hospitals are using healthcare information systems to improve the quality of treatment they provide. In this study, it was observed that 63% of the respondents agreed that offices are connected to high-speed internet for use in organizational digital processes. In addition, 49% of the respondents indicated that Information systems has increased profitability of the hospital. This implies that a lack of understanding of infrastructure investments can cause problems in multi-business.

The performance of an organization's database is largely dependent on its security. According to the study, 57% of the participants indicated that the location of the servers and databases in the organization is secure and only accessible to the right people. Additionally, 52% of the participants specified that the company through the management has been committed to ensuring the technical team has adequate access to digital infrastructure. This result is consistent with that of Bernik and Prislan (2016), who stress that information security performance measurement is necessary for enterprises to make informed decisions and develop information security in accordance with their security requirements.

Data Storage and Performance of Catholic Mission Hospitals

The second objective of the study was to evaluate the effect of data storage and performance of Catholic Mission Hospitals in Selected counties in Kenya. In this section, percentages, means, and standard deviation were employed.

Table 2: Data Storage and Performance of Catholic Mission Hospitals

Statement	SD	D	N	A	SA	Mean	SD
The data shared in our systems is secure from unauthorized access	11%	10%	28%	32%	19%	3.36	1.22
Stored data can easily be retrieved from our company's health management information system	3%	22%	34%	39%	2%	3.14	0.90
Lesser time is utilized in retrieving the stored data in the company's health management information system	14%	14%	29%	32%	11%	3.13	1.21
When needed, the data can be easily transferred to the various users and departments.	6%	19%	23%	32%	20%	3.42	1.17
The data storage is scalable to offer the storage needs for the health management information system	7%	15%	38%	26%	15%	3.27	1.09

Source: Researcher (2024).

Businesses must take the necessary precautions to safeguard their sensitive data against data breaches, illegal access, and other disruptive data security risks that could jeopardize customer and corporate data. In this study, it was observed that 51% of the respondents affirmed that the data shared in their systems is secure from unauthorized access. Health information systems make patient data easily accessible and make managing health activities effortless. According to the study, 41% of the participants affirmed that stored data can easily be retrieved from our company's health management information system.

The management of an organization should be primarily focused on facilitating the rapid retrieval of information. In this study, 52% of participants agreed that when needed, the data can be easily transferred to the various users and departments. Efficient data retrieval guarantees prompt access to pertinent information, facilitating well-informed decision-making within an organization. According to 43% of respondents' less time is utilized in retrieving the stored data in the company's health management information system. Similarly, 41% of these participants indicated that data storage is scalable to offer the storage needs for the health management information system. This suggests that the speed and efficiency with which documents can be accessed and retrieved might have a significant impact on the organization's operational effectiveness. This study supports the findings of Kang and Seomun (2020), who found that the executive, technical, and physical characteristics of information affect healthcare system security. The following characteristics that determine the security of the information system were found in the study conducted in nursing homes in Korea after the three elements were evaluated.

Information Security and performance of Catholic Mission Hospitals

The third objective was to establish the effect of information security and performance of Catholic Mission Hospitals in Selected counties in Kenya. Percentages, means, and standard deviation was used in this section.

Table 3: Information Security and performance of Catholic Mission Hospitals

Statement	SD	D	N	A	SA	Mean	SD
The security of the information processed, stored, and transmitted in our company's digital systems is adequate	14%	9%	27%	34%	16%	3.28	1.24
The digital systems used in our company are secured against digital threats	9%	17%	11%	38%	25%	3.51	1.28
The HMIS handling devices are securely managed with antivirus installed on them.	10%	16%	28%	27%	20%	3.31	1.23
All the information handling devices have access controls such as passwords that is regularly changed	7%	16%	22%	42%	12%	3.35	1.12
There are no incidences of information leaks in our company	9%	15%	16%	45%	15%	3.41	1.17
There are few incidences of security breaches occurrence in the Health Management Information Systems	7%	16%	24%	34%	19%	3.41	1.17

Source: Researcher (2024).

The capacity to access and exchange patient health records underscores the significance of health information management. In this study, 50% of the security of the information processed, stored, and transmitted in our company's digital systems is adequate. This suggests that in order to safeguard individuals and companies against hackers and other online criminals, cyber security is crucial. A good business performance is largely dependent on having an efficient information security architecture.

Up to 63% of the respondents affirmed that the digital systems used in their company are secured against digital threats. This suggests that through preventing, identifying, and adjusting to both internal and external threats, an organization may safeguard the technology and information assets it employs through the implementation of information security.

All forms of security measures give employees a sense of security and safeguard their personal information within the company. The study found that 47% of the respondents agreed that the HMIS handling devices are securely managed with antivirus installed on them. This suggests that there is no way to overestimate the significance of network security. Preserving the integrity of information technology (IT) systems and safeguarding confidential data are essential components of any organization's operations. All the information handling devices have access controls such as passwords that is regularly changed. This suggests that it is necessary to safeguard private data, including financial records and client information. Businesses may experience data breaches and other cyberattacks if appropriate data security procedures are not in place.

It has been shown that when data is adequately secured, operations function smoothly, resulting in improved performance within the company. With this information, 60% of the participants reiterated that there are no incidents of information leaks in our company. This view was supported by 53% of those who argued that There are few incidences of security breaches occurrence in the Health Management Information Systems. This result is consistent with Dastres and Soori's (2021) assertion that, given the growing reliance of business systems on IT-based infrastructures, network security is one of the most crucial factors to be taken into account in the field of information security today. It is not ideal for business and marketing processes for IT infrastructure to be devoid of security safeguards since this could result in organizations and corporations suffering permanent harm.

Management Support and performance of Catholic Mission Hospitals

The fourth objective was to assess the effect of management support and performance of Catholic Mission Hospitals in Selected counties in Kenya. In this section, percentages, means, and standard deviation were employed.

Table 4: Management Support and performance of Catholic Mission Hospitals

Statement	SD	D	N	A	SA	Mean	SD
The management supports the HMIS implementation in your organization	5%	20%	18%	44%	13%	3.40	1.09
The management supports training of the staff to enhance their competencies in using the HMIS	10%	13%	26%	32%	19%	3.36	1.21
The employees are encouraged to utilize HMIS in their day-to-day duties in the organization	13%	6%	30%	26%	25%	3.43	1.28
The Management hires technical team with the technical capabilities to support and manage the health management information system	7%	21%	16%	32%	25%	3.46	1.25
Majority of the management regularly accesses the reports by utilizing the health management information system.	8%	14%	25%	33%	20%	3.43	1.19
The employees have minimal complaints on the efficiency and ease to use of the adopted health management information system.	13%	7%	30%	25%	25%	3.43	1.29
Current digital proficiency among employees in organization is efficient in enhancing performance of firm	3%	25%	28%	28%	16%	3.27	1.10

Source: Researcher (2024)

One of the most reliable and important elements in the adoption of information systems is thought to be top management support. In this research, it is established that 57% of the participants indicated that the management supports the HMIS implementation in their organization. This view was upheld by 51% of those who affirmed that the management supports training of the staff to enhance their competencies in using the HMIS. This implies that organizational culture and leadership principles are two of the most crucial elements that go into making strategic plans successful. Any system's performance depends on the personnel's technical training. In this research, 51% of the sampled participants affirmed that the employees are encouraged to utilize HMIS in their day-to-day duties in the organization. A similar view was proposed by 44% of those who affirmed that the current digital proficiency among the employees in the organization is efficient in enhancing the performance of the firm. This suggests that information security policy, training, and awareness, along with management support, are the three main known critical success factors for information security.

To maximize the use of information systems, it is imperative to have competent staff managing them. In this study, 57% reported that the management hires technical team with the technical capabilities to support and manage the health management information system. Furthermore, 53% asserted that the majority of the management regularly accesses the reports by utilizing the health management information system. This suggests that one major obstacle to the information system's successful adoption is insufficient user competency with regard to its application. In terms of process optimization and strategic execution, technology gives a variety of firms a competitive advantage. The findings recognized that 50% reported that the employees have minimal complaints about the efficiency and ease of use of the adopted health management information system. This shows that healthcare technology is a critical factor for effective management of patient care, resulting in enhanced effectiveness when adopted by healthcare professionals.

Performance of Catholic Mission Hospitals

The dependent variable of the study was to examine performance of Catholic Mission Hospitals. The indicators analyzed include service delivery, patient satisfaction, profitability and records update.

Table 5: Performance of Catholic Mission Hospitals

Statement	SD	D	N	A	SA	Mean	SD
Health Management information system enhances on efficiency and effectiveness in service delivery to our patients	2%	21%	17%	50%	10%	3.45	0.98
Health Information systems has increased profitability of the business	11%	7%	25%	25%	33%	3.60	1.312
Health Management Information system provides quality and accurate timely reports to the management for informed decision making	7%	20%	20%	32%	21%	3.41	1.219
Health management information systems ensure that the patients get quality services within a reasonable time	12%	8%	29%	31%	20%	3.37	1.24
Health management information system enables the hospital to track the income and expenses thus ensuring the entire income is accounted for with no wastages.	11%	12%	12%	44%	20%	3.48	1.26
Health management information system facilitates Realtime update of the patients' records in all service areas within the hospital	7%	16%	27%	33%	17%	3.36	1.15

Source: Researcher (2024).

In order to ensure that all pertinent information is easily accessible, integrated health systems are essential for combining patient records. According to the finding, 60% of the participants affirmed that Health Management information system enhances efficiency and effectiveness in service delivery to their patients. Furthermore, 58% of the participants indicated that Health Information systems has increased profitability of the business. HMIS's primary strength is its capacity to deliver thorough health data so that decisions may be made with expertise. According to this study, 53% affirmed that Health Management Information system provides quality and accurate timely reports to the management for informed decision making. Furthermore, 50% of the sampled participants reaffirmed that Health management information system facilitates Realtime update of the patients' records in all service areas within the hospital. This suggests that the goals of HMIS are to raise hospital operational effectiveness and patient management.

Enhancing performance and structuring Information is a key component of modern development and advancement. It was observed that 51% of the participants affirmed that Health management information systems ensure that the patients get quality services within a reasonable time. HMIS offers an infinite number of chances to streamline financial resource management and increase operational efficiency. According to the research, 64% of respondents affirmed that Health management information system enables the hospital to track the income and expenses thus ensuring the entire income is accounted for with no wastages. This outcome is consistent with that of Sanjay (2018), who notes that hospitals who use technology to their advantage have a competitive edge over those that do not; hospitals that are unwilling to integrate technology into their operations will inevitably fall behind. Additionally, as the system offers templates to enable this, it is confirmed that health management information systems have the ability to improve patient safety by lowering medical errors that could otherwise prevent adverse drug reactions and encouraging adherence to practice guidelines.

Correlation Analysis

A statistical method used to measure linear relationships between variables is correlational analysis. Its main goals are to ascertain whether an interaction between factors exists and, if so, to quantify and interpret the association. This study employed Pearson correlation analysis to establish the relationship between selected variables and Performance of Catholic Mission Hospitals. The results are presented in Table 6:

Table 6: Correlation Matrix

		Performance	X1	X2	X3	X4
Digital Infrastructure	Pearson Correlation	.844**	1			
	Sig. (2-tailed)	.000				
	N	122	122			
Information Security	Pearson Correlation	.823**	.755**	1		
	Sig. (2-tailed)	.000	.000			
	N	122	122	122		
Data Storage	Pearson Correlation	.858**	.742**	.762**	1	
	Sig. (2-tailed)	.000	.000	.000		
	N	122	122	122	122	
Management Support	Pearson Correlation	.865**	.758**	.731**	.773**	1
	Sig. (2-tailed)	.000	.000	.000	.000	
	N	122	122	122	122	122

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

X1= Digital Infrastructure; X2=Information Security; X3= Data Storage X4= Management Support

Source: Researcher (2024).

The study established that there exist a statistically and significant relationship between Digital Infrastructure and Performance of Catholic Mission Hospitals ($r=0.844^{**}$; $p<0.05$). This suggests that by offering new frameworks for structuring businesses, digital platforms can support sustainable business practices. Therefore, an organization's digital infrastructure is vital to its continued success.

Secondly, it was observed that Information Security significantly correlated with Performance of Catholic Mission Hospitals ($r=0.823^{**}$; $p<0.05$). This suggests that in order to improve productivity within their companies, organizations must strengthen system security with regard to passwords, usernames, authentication, and backups.

The study established that there is a statistically significant relationship between Data Storage and Performance of Catholic Mission Hospitals ($r=0.858^{**}$; $p<0.05$). This demonstrates the necessity for businesses to implement reliable data processing infrastructure, communication networks, and data retrieval systems in order to stay competitive in the marketplace.

Finally, it was noted that Management Support significantly correlates between Management Support and Performance of Catholic Mission Hospitals ($r=0.865^{**}$; $p<0.05$). This demonstrates that in order for businesses to gain a competitive edge, they must prioritize employee competency, training, and appropriate resource allocation.

Regression Analysis

Regression analysis is a statistical technique that estimates the associations between one or more independent variables and a dependent Analyzing the impact of multiple uncorrelated variables on a dependent variable is possible using this kind of analysis. Multiple linear regression analysis was employed to evaluate the effect of the independent variables on the dependent variable.

Model Summary

The model summary each time shows the R, R square, Adjusted R Square and standard error of the estimate statistics. These statistics can be used to correlate one model with another of the same type as well as provide an indicator of how well the model fits the data.

Table 7: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.940[a]	.884	.880	.34710

a. Predictors: (Constant), Management Support, Information Security, Digital Infrastructure, Data Storage

Source: Researcher (2024).

The findings showed that 88% in the Performance of Catholic Mission Hospitals is explicated by management support, information security, digital infrastructure, data storage. This shows that 12% of the variation could not be accounted by the model.

SUMMARY

Digital Infrastructure and Performance of Catholic Mission Hospitals. The security of a database within an organization has a significant impact on its performance. The majority of participants in the study stated that the organization's servers and databases are located in a secure area that is only accessible by authorized personnel. Furthermore, a few participants mentioned that the management of the organization has made a commitment to guaranteeing that the technical staff has sufficient access to digital infrastructure.

Data Storage and Performance of Catholic Mission Hospitals. The effectiveness of an information security architecture is a major factor in optimal business performance. Most survey participants confirmed that their company's digital systems are protected against online attacks. This means that by putting information security into place, a company can protect the technology and data assets it uses by preventing, identifying, and responding to both internal and external threats. Throughout the patient's entire hospital stay, from registration to

discharge, the right medication and treatment plan must be administered, and a dependable and effective communication system must be in place to ensure that no data is lost.

Information Security and performance of Catholic Mission Hospitals. Health information systems simplify the management of healthcare activities and provide easy access to patient data. A portion of the participants confirmed, per the survey, that the health management information system of our organization makes it simple to obtain stored data. Organizations depend on healthcare data systems because they centralize all medical records and arrange them in an easily accessible, structured style. It is imperative for businesses to implement appropriate measures to secure their confidential information against potential breaches, unauthorized access, and other data security threats that may compromise consumer and company information. It was noted in this study that more than half of the participants confirmed that the information sent inside their systems is protected from unwanted access.

Management Support and performance of Catholic Mission Hospitals. Top management support is considered to be one of the most dependable and significant factors in the adoption of information systems. According to the research, the majority of participants said that their organization's management supports the use of HMIS. Of those who confirmed that management encourages staff training to improve their proficiency with the HMIS, half supported this opinion. This suggests that two of the most important factors in ensuring the success of strategic goals are organizational culture and leadership principles.

CONCLUSION AND RECOMMENDATION

The study concludes that an organization's digital infrastructure plays a crucial role in its success. Thus, if businesses have robust hardware and software infrastructures, they can safely disseminate store, and monitor patient data throughout their operations. Furthermore, the ability to retrieve and share patient health records highlights the importance of health information management. For this reason, cyber security is essential to protecting people and businesses from hackers and other internet offenders. Thirdly, companies need to make sure that sensitive information is protected against unauthorized access and data breaches by taking the appropriate security measures. Therefore, proactive measures must be adopted and maintained in order to ensure that hospital information resources are kept as accurate as feasible. In conclusion, the performance of a company is largely influenced by three key crucial success factors: managerial support, information security policy, and training and awareness.

Firstly, the study recommends that an organization's digital infrastructure need to be strengthened in order to provide cutting edge solutions for effective performance. Hence by offering new frameworks for structuring businesses, digital platforms can support sustainable business practices. Secondly, in order to improve productivity within their companies, organizations must strengthen system security with regard to passwords, usernames, authentication, and backups. Thirdly, the necessity for businesses to implement reliable data processing infrastructure, communication networks, and data retrieval systems is critical in order to stay competitive in the marketplace. Finally, in order for businesses to gain a competitive edge, they must prioritize employee competency, training, and appropriate resource allocation.

Suggestion for Further Research

The importance of the Health Management Information System cannot be overstated. The deployment of this system contributes to several benefits such as enhanced patient care quality, decreased operating expenses, error-free administration data, and a better organized internal management process overall. Research can be conducted to establish the extent of health management information system integration and performance of Hospitals in Kenya.

REFERENCES

Alolayyan, M. N., Alyahya, M. S., Alalawin, A. H., Shoukat, A., & Nusairat, F. T. (2020). Health Information Technology and Hospital Performance the Role of Health Information Quality in Teaching Hospitals. *Heliyon*, *6*(10), e05040. https://doi.org/10.1016/j.heliyon.2020.e05040

Alotaibi, Y., & Federico, F. (2019). The impact of health information technology on patient safety. *Saudi Medical Journal*, *38*(12), 1173–1180. Ncbi. https://doi.org/10.15537/smj.2017.12.20631

Ayugi, E. D. (2021). *Information security strategies and patient data privacy among health facilities in nairobi*. Erepository. uonbi.ac.ke. http://erepository.uonbi.ac.ke/handle/11295/157072

Bell, E. (2008). Theories of Performance. In *Google Books*. SAGE. https://books.google.co.ke/books?hl=en&lr=&id=Qb9wZsoJw3YC&oi=fnd&pg=PT10&dq=theory+of+performance+&ots=sCrULwbIQN&sig=C3O_OU5CFoegxyIY5wejzMma20A&redir_esc=y#v=onepage&q=theory%20of%20performance&f=false

Bernik, I., & Prislan, K. (2016). Measuring Information Security Performance with 10 by 10 Model for Holistic State Evaluation. *PLOS ONE*, *11*(9), e0163050. https://doi.org/10.1371/journal.pone.0163050

Bharadwaj, A. S. (2020). A resource-based perspective on information technology capability and firm performance: An empirical investigation. *MIS Quarterly*, *24*(1), 169. https://doi.org/10.2307/3250983

Chmielewska, M., Stokwiszewski, J., Markowska, J., & Hermanowski, T. (2022). Evaluating organizational performance of public hospitals using the Mckinsey 7-S framework. *BMC Health Services Research*, *22*(1). https://bmchealthservres.biomedcentral.com/articles/10.1186/s12913-021-07402-3

Croon, A. (2022). Thinking with care in human–computer interaction. *Feminist Theory*, 146470012210822. https://doi.org/10.1177/14647001221082294

Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly*, *13*(3), 319–340. https://doi.org/10.2307/249008

Dwivedi, Y. K., Rana, N. P., Jeyaraj, A., Clement, M., & Williams, M. D. (2019). Re-examining the Unified Theory of Acceptance and Use of Technology (UTAUT): Towards a Revised Theoretical Model. *Information Systems Frontiers*, *21*(3), 719–734. https://doi.org/10.1007/s10796-017-9774-y

Endriyas, M., Alano, A., Mekonnen, E., Ayele, S., Kelaye, T., Shiferaw, M., Misganaw, T., Samuel, T., Hailemariam, T., & Hailu, S. (2019). Understanding performance data: Health management information system data accuracy in southern nations nationalities and people's region, Ethiopia. *BMC Health Services Research*, *19*(1). https://doi.org/10.1186/s12913-019-3991-7

Fatima, A., & Colomo-Palacios, R. (2018). Security aspects in healthcare information systems: A systematic mapping. *Procedia Computer Science*, *138*, 12–19. https://doi.org/10.1016/j.procs.2018.10.003

Hausvik, G. (2017). *The Role of Information Quality in Healthcare Organizations: A Multi-Disciplinary Literature Review*. https://scholarspace.manoa.hawaii.edu/server/api/core/bitstreams/10cb27f8-f8e2-45f6-935f-e1fd30096e24/content

Hwang, M. I. (2019). Top management support and information systems implementation success: A meta-analytical replication. *International Journal of Information Technology and Management*, *18*(4), 347. https://doi.org/10.1504/ijitm.2019.103050

Jeyaraj, A. (2020). DeLone & mclean models of information system success: Critical meta-review and research directions. *International Journal of Information Management*, *54*, 102139. https://doi.org/10.1016/j.ijinfomgt.2020.102139

Kang, J., & Seomun, G. (2020). Information security in nursing. *Advances in Nursing Science*, *44*(1), 16–30. https://doi.org/10.1097/ans.0000000000000330

Kariuki, M., & Nzuki, D. (2019). Management information systems capabilities and organizational performance of supermarkets in Nairobi city county, Kenya. *International Journal of Education and Research*, *7*(6). https://www.ijern.com/journal/2019/June-2019/08.pdf

Khainja, M. (2018). *Use of hospital management information systems and technology in healthcare service provision amongst non- governmental organizations in Kenya: A case of lVTC, Kenya*. http://erepository.uonbi.ac.ke/bitstream/handle/11295/104174/Mosee%20Final%20copy%20research(1).pdf?sequence=1

Kihuba, E., Gathara, D., Mwinga, S., Mulaku, M., Kosgei, R., Mogoa, W., Nyamai, R., & English, M. (2014). Assessing the ability of health information systems in hospitals to support evidence-informed decisions in kenya. *Global Health Action*, *7*(1), 24859. https://doi.org/10.3402/gha.v7.24859

Kilimo, S. K., Walekhwa, M. N., & Otieno, F. O. (2022). Impact of health management information systems on service delivery among healthcare workers at Iten county referral hospital. *International Journal of Research in Medical Sciences*, *10*(9), 1889. https://doi.org/10.18203/2320-6012.ijrms20222264

Kose, I., Rayner, J., Birinci, S., Ulgu, M. M., Yilmaz, I., Guner, S., Mahir, S. K., Aycil, K., Elmas, B. O., Volkan, E., Altinbas, Z., Gencyurek, G., Zehir, E., Gundogdu, B., Ozcan, M., Vardar, C., Altinli, B., & Hasancebi, J. S. (2020). Adoption rates of electronic health records in Turkish Hospitals and the relation with hospital sizes. *BMC Health Services Research*, *20*(1). https://doi.org/10.1186/s12913-020-05767-5

Lippeveld, T., Azim, T., Boone, D., Dwivedi, V., Edwards, M., & AbouZahr, C. (2019). Health management information systems: Backbone of the health system. *The Palgrave Handbook of Global Health Data Methods for Policy and Practice*, 165–181. https://doi.org/10.1057/978-1-137-54984-6_9

Moradipour, M., Javidi, M., & Sadeghi, T. (2021). Effects of hospital information system on the performance of management units in public hospitals analysis in southwestern Iran. *Jundishapur Journal of Health Sciences*, *14*(1). https://doi.org/10.5812/jjhs.119762

Ndung'u, N., Thugge, K., & Otieno, O. (2011). *Chapter 4 (preliminary draft) unlocking the future potential for Kenya: The vision 2030*. https://citeseerx.ist.psu.edu/document?repid=rep1&type=pdf&doi=6cac2758d61d962d9f98402148b8c453839d47e1

Opoku, D., Edusei, A., Agyei-Baffour, P., Teddy, G., Polin, K., & Quentin, W. (2021). Ghana: health system review 2021. *European Journal of Public Health*, *31*(Supplement_3), ckab164.577. https://doi.org/10.1093/eurpub/ckab164.577

Park, H., Kang, S.-H., Lee, Y. S., Lee, I.-S., Hwangbo, Y., & Cho, K. (2021). Global Trends of Regional Health Information Systems and Suggested Strategic Utilization of their Medical Information. *Healthcare Informatics Research*, *27*(3), 175–181. https://doi.org/10.4258/hir.2021.27.3.175

Pilemalm, S. (2002). *Information technology for non-profit organisations extended participatory design of an information system for trade union shop stewards*. https://www.diva-portal.org/smash/get/diva2:20857/FULLTEXT01.pdf

Ponsa, P., & Guasch, D. (2016). A human–computer interaction approach for healthcare. *Universal Access in the Information Society*, *17*(1), 1–3. https://doi.org/10.1007/s10209-016-0515-7

Richard, P. J., Devinney, T. M., Yip, G. S., & Johnson, G. (2009). Measuring organizational performance: Towards methodological best practice. *Journal of Management*, *35*(3), 718–804. https://doi.org/10.1177/0149206308330560

Roman, A. (2023). A Closer Look into Brazil's Healthcare System: What Can We Learn? *Cureus*, *15*(5). https://doi.org/10.7759/cureus.38390

Sanjay, D. (2018, December 17). *How technology can be a competitive advantage for your hospital*. HATI International. https://hatiintl.com/blog/how-technology-can-be-a-competitive-advantage-for-your-hospital#:~:text=By%20allowing%20patients%20to%20use

Sharon Ross, D., & Venkatesh, R. (2016). Role of hospital information systems in improving healthcare quality in hospitals. *Indian Journal of Science and Technology*, *9*(26). https://doi.org/10.17485/ijst/2016/v9i26/92686

Stahl, B. C., Doherty, N. F., & Shaw, M. (2011). Information security policies in the UK healthcare sector: A critical evaluation. *Information Systems Journal*, *22*(1), 77–94. https://doi.org/10.1111/j.1365-2575.2011.00378.x

Thong, J. Y. L., Yap, C.-S., & Raman, K. S. (1996). Top Management Support, External Expertise and Information Systems Implementation in Small Businesses. *Information Systems Research*, *7*(2), 248–267. https://www.jstor.org/stable/23010862

Venkatesh, V., Morris, M. G., Davis, G. B., & Davis, F. D. (2003). User Acceptance of Information Technology: toward a Unified View. *MIS Quarterly*, *27*(3), 425–478. https://doi.org/10.2307/30036540

Vinz, S. (2022, October 14). *The theoretical framework: What and how? | A quick guide*. Scribbr. https://www.scribbr.com/dissertation/theoretical-framework/

Wei, X. (2011). Hospital information system management and security maintenance. *Computing and Intelligent Systems*, 418–421. https://doi.org/10.1007/978-3-642-24091-1_54

Worthington, A. K., & Burgess, G. L. (2021). Technology acceptance model. *Ua.pressbooks.pub*. https://ua.pressbooks.pub/persuasiontheoryinaction/chapter/technology-acceptance-model/