

**INTEGRATED SYSTEMS AND SERVICE DELIVERY AT  
METROPOLITAN HOSPITAL**

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**A RESEARCH PROJECT SUBMITTED IN PARTIAL  
FULFILLMENT OF THE REQUIREMENTS FOR THE AWARD OF  
THE DEGREE OF MASTER OF BUSINESS ADMINISTRATION  
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2019**

## DECLARATION

Research project is my work and has not been presented to any university for any award.

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D61/86825/2016

Signature.....Date.....

This research project has been presented for examination with my authorization as the University supervisor.

Signed.....Date.....

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## **DEDICATION**

I dedicate research project to God for giving me this wonderful chance to carry out this research and equipping me with the expertise and abilities necessary in attaining the capacity to reach this level of education. Second to my husband Mr. Patrick Nyadimo, Children Felix, Laurene and Neville for their devotions and good support which have been a source of encouragement during the entire program. May the Almighty God exalt and protect you with good health.

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## **ABBREVIATIONS AND ACRONYMS**

AMS	Alliance Management System
ERP	Enterprise Resource Planning
ICT	Information and Communication Technology
IS	Integrated System
NHIF	National Health Insurance Fund
SPSS	Statistical Package for Social Sciences
TAM	Technology Acceptance Model
UNICEF	United Nations Children's Fund
WHO	World Health Organization

## **ABSTRACT**

Increase in competition demands efficiency and effectiveness of service delivery of institutions and improvement in their performance. The way to reach this goal is through the successful implementation of the Integrated System. Integrated System is used to manage resources in healthcare institutions, this help organizations to save time and enhance efficiency. The main objective of this study is to investigate the extent of Integrated System on service delivery in Metropolitan Hospital. Case study was adopted as the research design. Study population was 287 staff with a sample population of 75. Sample population comprised of staff from clinical, administration, finance and support services operations. Questionnaire was used to collect primary data. Out of 75 questionnaires distributed, 70 questionnaires were returned constituting 93 percent while 7 percent were not returned. Descriptive statistic was used for data analysis in objective one. Paired t-test was used to analyze relationship of Integrated System and service delivery in objective two. Use of Integrated System was supported by management, system was used in process improvement, system users had required skills and there was a stable system infrastructure as per study findings. Service delivery was measured in terms of departmental efficiency and communication and recordkeeping. Respondents indicated there was extent of improvement in departmental efficiency and communication and record keeping. Service delivery was noted to have significant improvement in consultation waiting time, prescription dispensing time. Laboratory results waiting time and diagnostic imaging results waiting time. The study had an average weighted adoption score of 79.71 percent in use of Integrated System. This is an indication that there is opportunity for advancement in the hospital Integrated System adoption. Specifically, the hospital seems to be week in factors of attendance management, communication, couriers/transport system, Integrated System network and dispensing waiting time. Although Integrated System may not be able to advance all the areas of influence stated in the study, they can enhance improve weaknesses in service delivery. The findings of the study concluded that adoption of Integrated System has a significant positive influence on service delivery. Researcher recommended research to be done on objectives of service delivery like quality of service and cost reduction effectiveness.

# CHAPTER ONE

## INTRODUCTION

### 1.1 Background of the Study

Over the past decade, advancement and use of Integrated Systems (IS) have transformed the healthcare sector in regard to provision of well-organized and secure healthcare. Information and Communication Technology (ICT) adoption in healthcare sector, also known as E-health, has tremendously increased the use of Integrated System in hospitals (Gomes, 2019). Thus, healthcare providers consider IS as a critical tool for increasing access and delivering quality healthcare and customer service (Gomes, 2019). Indeed, when systems are designed and implemented effectively, they can improve access to healthcare, especially among isolated communities. IS can facilitate healthcare providers to share information and offer a visual tool, which links population and demographic numbers with outbreaks of illness (World Health Organization, 2019). The reason is that IS facilitate information capture, storage, analysis, and management.

The aspects that impact the adoption and execution of IS are contextual and universal regardless of the unique approach towards IS integration. Top management of health organizations is deemed essential regarding their power to influence the adoption of IS in their organization (Fournier, 2017). Senior administration is responsible for setting a mission and a vision that leads an organization or healthcare provider to make decisions that align with their overall IS goals. Many emerging nations are limited to adopt IS infrastructure due to the deficiency of adequate resources needed to provide hospitals with advanced systems (Nzuki & Mugo, 2014). Aside from that, poor leadership often results in poor policies that hinder healthcare institutions and providers from addressing both their short-term and long-term objectives. United Nations Children's Fund (UNICEF, 2016) acknowledged that limited funding hinders training plans to provide healthcare providers with the expertise and competences needed to use IS. Adding to poor management, adoption and implementation of IS are delayed and become low compared to developed countries.

Nzuki and Mugo (2014) conducted a study on Information Systems to investigate the effect of IS in healthcare. The findings of the study indicated that integration plans often result in improved quality of care and reduction in operation costs. Further, the authors noted that new technologies in inpatient care could lead to decreased inpatient care for hospitals. The authors explained that diversification of healthcare services using IS, particularly when operated by trained staff, enhances effectiveness in outpatient service, long-term care, home health services, and hospice service. Such benefits have encouraged many stakeholders in the healthcare sector to invest in IS infrastructure and maximize its untapped resources to improve healthcare systems.

IS can bring a paradigm shift in conventional ways of providing care. To be specific, using IS tools can reduce clinical errors, promote healthcare quality, reduce operational costs, and facilitate access to confidential information to individual patients to address their medical needs (Kaerasora, 2017). In addition, IS tools, such as mobile phones and computers, can facilitate healthcare providers to interact with patients online. For example, patients can use web technologies and tablets to book for an appointment with their preferred doctor online without being limited by geographical location in real-time patient consultations (Crock, 2016). Healthcare providers who use IS have confirmed that IS solutions can enhance patient safety, increase efficiency, optimize healthcare outcomes, and improve care coordination (Bagala & Kawono, 2013; Nzuki & Mugo, 2014).

## **1.1 Integrated Systems**

Integrated System is a single information system linked from different sub systems and is used by an organization in managing its processes in totality, with an aim to meet organization's objectives and equitably enhance stakeholder's satisfaction (Lehtonen, 2018). IS describes the role of virtual communications and the combination of telecommunications (wireless signal transmission and telephone systems), as well as software installation, and storage of information in the audio-visual systems. These tools facilitate users to access data, store, retrieve, and transmit relevant information to other systems. IS provides coordinated care to patients and leads to higher excellence of treatment as well as better health results for patients.

Integrated System is operated in the field of public health and clinical informatics. IS aims to function as an essential enabler of integrated models of public-based primary care which can be used for supporting patient care. Even in innovative models of medical care, providers and managers use technology to enable conventional ways of working. Thus, the Internet facilitates the proliferation of IS services, which improves access and delivery of health services and information for clinical decision-making (Nzuki & Mugo, 2014). IS promote innovative uses of technology to promote information sharing or exchange among healthcare providers and patients. IS also facilitates improved wellbeing outcomes for everyone. In the healthcare sector, IS integration comprises an integration of health care systems and to advance healthcare delivery and superiority of care (National Centre for Health Statistics, 2015).

Integrated Systems provides access to healthcare-related data electronically. In healthcare industry, use of IS can reduce cost of information management and improve healthcare services. In other words, IS can facilitate exchange of health information electronically (Al-Saddique, 2018). Thus, the idea of IS has permeated the healthcare sector and encouraging healthcare providers to adopt innovation and technology to improve health services.

Integrated Systems supports integrated healthcare delivery, which coordinates and brings together services across the communal and health system to encounter the demands of diverse populations, prevent unnecessary use of social and health care resources. IS has been acknowledged as a critical enabler to support the conveyance of organized and integrated primary care while reducing cost, enhancing quality, and service delivery. IS facilitates healthcare providers and patients to interact and access information virtually without being limited by geographical location. Therefore, IS increases the ability of healthcare providers to readily access and use the correct data provided by their patients for clinical purposes (E-Health News (2016) through the use of EHR. IS enables patients to obtain information on various health conditions through the internet (Davdson, & Heslinga, 2013). The storing and transfer of information electronically facilitates healthcare providers to manage health information efficiently. The reason is that they gather, store, retrieve, and transfer relevant information for clinical decision-making. To

capture the role of informal interactions in the process of knowledge diffusion, physicians rely on the recommendations of colleagues with whom they interact on a day-to-day basis through EHR.

### **1.1.2 Service Delivery**

Service delivery entails specific actions geared towards the provision of a service (Samitier, 2017). Service delivery involves a set of activities that take place to provide a service to a customer. During the provision of a service, both the provider of the service and the user of the service perform coordinated actions. Organizations come up with service delivery systems to ensure services are delivered to their ultimate recipients efficiently and effectively. Some of the characteristics of properly functioning service delivery systems include; accessibility, clarity in communication, competency of the staff, courteous staff, credibility, reliability, responsiveness, security, tangibility, and understanding of the requirements of all stakeholders (WHO, 2016).

Understanding service delivery is key to all organizations. Service delivery covers areas of competitiveness, efficiency, efficacy, financial viability and relevance (Samitier, 2017). In the competitive context, the response to changes in organizations install IS systems calls for improvement in service delivery and providing excellent customer service by continually meeting and exceeding customer demands. Service delivery is also linked to availability of resources and how they are organized and used for delivery of services. Healthcare service delivery can use less or more resources depending on the standardized processes with an aim of enhancing efficiency in the organization. Service delivery in healthcare is described as interlinked processes of organizing providers in managing healthcare services with continuous performance improvement. Key areas for optimization of healthcare services are health promotion, health protection, diagnosis treatment and disease management.

### **1.1.3 Metropolitan Hospital**

A group of health professionals founded Metropolitan Hospital Limited in 1995. It is one of the most equipped hospitals in the Eastland part of Nairobi. The hospital was established on the belief that it was possible to offer quality, cost-effective, and affordable healthcare.

The hospital is currently offering various services, both inpatient and outpatient in 24 hours (Metropolitan Health Services Ltd, 2018). Metropolitan hospital offers excellent support services to employees and their dependents from public service, parastatals and private institutions, and general public in healthcare service. The hospital uses its core competencies to improve medical quality, community health, and delivering quality service. In doing so, Metropolitan administration guarantees that the demands of its patients are met while guaranteeing quality clinical care and service delivery (Metropolitan Health Services Ltd, 2018). The hospital installed an ERP system in the last two years with modules for various functions; Alliance Management System (AMS) and other Insurance Systems. The study, therefore, aimed to find out whether the installation of the Integrated System had brought about improved service delivery.

## **1.2 Research Problem**

The healthcare sector in Kenya experiences many challenges, such as the rising cost of healthcare, poor record management, misdiagnosis, and abuse of patients' information. Poor record management can be addressed by having efficient storage and retrieval of records processes in healthcare institutions by adoption of IS. Traditionally, government regulation has concentrated on providing subsidized or free healthcare services because most of its citizens are deprived. The government ensures it increases access to healthcare, but they do not address the need to enhance competency and superiority of provision quality service in the country. For the reason, there is need to create sustainable solutions and regulations to improve the healthcare system and service delivery in hospitals. That also includes funding research and providing adequate funding to the healthcare sector to facilitate knowledge acquisition and skills in Integrated System use to improve overall healthcare outcomes. Therefore, the government must collaborate with the private sector and involve all the primary stakeholders in the sector to implement such a policy.

Healthcare is one of Kenyan Government big four agenda which aims to promote provision for universal healthcare to its citizens. It is imperative that mobilization of adequate resources, reform institutions such as National Hospital Insurance Fund (NHIF) and increase investments in primary health care are necessary to achieve universal healthcare coverage. While the government has made progress, there is a need to strengthen the

service delivery in health care to ensure there is collective health coverage for all citizens by use of Integrated Systems. This will thus enhance access and speed of service in health institutions and the adoption of telemedicine and artificial intelligence capabilities for diagnosis (Odhiambo, 2018).

Metropolitan hospital installed the Alliance Management System that had been operating for the last two years. Since the installation of the system there is no study that had been previously conducted to determine if the implementation of the system has an impact on service delivery. This formed the basis of this study.

Khatun (2015) on his study on Impact of Integrated System on Health Services in Bangladesh. The study findings indicated that many developing countries like Kenya, have made less investment in the provision of e-healthcare in hospitals, which adds to the challenges, which already severely affect the healthcare service delivery both in Bangladesh and Kenya. Gomes (2019) concluded that Integrated System in service delivery in healthcare has great potential in enhancing access to healthcare information which provide accurate patient information leads to minimized medical errors and efficient service delivery in healthcare. Adoption of integrated system in Kenyan hospitals is still low, patient and other data is recorded and kept using manual and is thus bound to human error, misplacement or loss of files. These may increase the cases of misdiagnosis of a patient. The Kenyan health institutions including teaching and research centers would significantly benefit from having a robust IS system to manage patients' data records and offer support services (Mwaniki,2017).

The literature on the impact of IS on optimizing output in healthcare industry shows challenges of not adopting Integrated System. Gomes (2019) examined the problems salient in the healthcare sector and noted that hospitals that use IS have recorded improved productivity. The author investigated the healthcare system which is primarily funded by the government in the developing countries, this may not be a true reflection in Kenyan healthcare service delivery since healthcare is a devolved function to county governments. This study was therefore done in a private hospital and was seeking to respond to the research questions: to what extent has Integrated System been adopted in service delivery



at Metropolitan Hospital? And is there any relationship between Integrated System and service delivery provision at Metropolitan Hospital?

### **1.3 Research Objectives**

The objective of the study was to determine effect of Integrated Systems on service delivery at Metropolitan Hospital.

Precise objectives were to,

- i Determine the extent of IS adoption by various departments in Metropolitan Hospital.
- ii Examine the relationship of IS and service delivery in Metropolitan Hospital.

### **1.4 Significance of the Research**

It was projected that the result of the research will be useful to administration of various hospitals because they can use the information to review their service delivery systems. Similarly, they can examine gaps and challenges identified to address their salient problems and enhance their operational efficiency. In addition, it was expected that outcome of study will be useful to healthcare establishments to guide them in recognizing untapped opportunities in the use of IS in hospitals to improve service delivery. That will also include identifying how to avoid misuse of resources and reduce operational costs. The study will be of significance to organizations in developing strategies for the implementation of IS in service delivery successfully and setting standards that will enhance efficiency during the implementation process.

The results of the research will be beneficial to policymakers because they can use some recommendations provided to formulate relevant regulation policy blueprints that will identify minimum IS standards in the healthcare industry. Researchers will also benefit by determining the gaps and identify other various uses of IS not only in Metropolitan Hospital but all health care facilities in the world. The study findings could be utilized to evaluate the benefits of adopting IS in healthcare institutions to improve service delivery.

## **CHAPTER TWO**

### **LITERATURE REVIEW**

#### **2.1 Theoretical Framework**

Philosophical approach provided framework on which the study was undertaken. It formed the connection between the theoretical aspects and practical components of the explorations which were conducted. The theoretical framework used in the study had implications for decisions made in the study process.

##### **2.1.1 Technology Acceptance Model (TAM)**

Davis (1989) founded Technology Acceptance Theory (TAM). TAM is an improvement of the philosophy of rational action specifically designed to show recognition and use of information systems. The approach seeks to describe the general elements of computer recognition. TAM explains user conduct across diverse populations and end-user computing innovations. Researchers often use a model which can provide accurate prediction and explanation. TAM helps to categorize whether a specific system may be acceptable and take necessary remedial plans. Therefore, TAM helped the researcher to understand the influence of external elements on internal performance of the IS users.

TAM was useful in this study since it indicated that internal factors unknowingly affect people's attitudes toward the adoption of IS use in their organization. TAM influenced perceived usefulness and perceived ease of utilization of those individuals. External aspects comprised of personal user traits, social variables, or those connected to their tasks which might have affected the adoption of IS in the organization. TAM is widely used by clinicians to examine the acceptance of telemedicine technology since it is a well-researched focused innovation. Psychometric measurements are used for telemedicine innovation uses psychometric measurements. Further, many researchers use it to examine user technology approval (Mary, 2008).

##### **2.1.2 DeLone and McLean Model**

DeLone and McLean model of IS Success is mostly analyzed by many scholars as pointed out by Heo and Han (2003). Meyers asserts that many researchers find the basic

contributions of the model very essential for their work since it offers a classification for the entire assessment measures cited in IS research publications. This helps to recognize potential stakeholder groups who may be evaluated in a study. The model also suggests how to study cohorts that can associate with each other.

DeLone and McLean (2004) use six categories for determining IS success. They include information quality, data use, user gratification, company impact, information quality, and individual impact. DeLone and McLean (2004) pointed out that the most researched dimension of system quality is the IS accomplishment. It deals with information processing, hardware and software compatibility, and function. Besides, system quality in the data system literature talks about the flexibility of system, timely response and simplicity of access, to mention a few. The relevance of this model on the study is that it will be used to assess the success of IS adoption at Metropolitan Hospital.

### **2.1.3 SERVQUAL Model**

The most suitable model for creating quality service delivery at Metropolitan Hospital is the SERVQUAL model. That was because a person can use a standard SERVQUAL model to adequately evaluate service quality in a hospital or the entire healthcare sector. The model may not provide an excellent measure of consumers' insights. Parasuraman et al. (2005) created a concept for assessing service quality. In the study, the authors developed four primary service circumstances, namely, bank trading, services for cards that offer credit, service for isolated telephone, electrical appliances restoration and maintenance. Thus, SERVQUAL model has been applied to gauge quality of service because it identified the factors causing inconsistency amongst a customer's anticipations of support provision and consumer's experience of service delivered.

These dimensions primarily concentrate on the individual element of service delivery (include assurance, consistency, responsiveness, and empathy) and the real provision. Ladhari (2009) conducted a study to evaluate the significance of SERVQUAL model used in the healthcare sector. The author recommended that the model is an excellent measurement tool to evaluate service quality, mainly in the healthcare sector. The author further added that the model is appropriate to use when the essential aspects of the model fit a specific service being assessed to assure credible and practical results. In this study,

the SERVQUAL model was preferred since it considered the consumer's anticipations of a service and opinions that give an honest assessment of service quality in the healthcare sector (Javed & Iiyas, 2018). Ranjith (2018) states that hospitals should embrace SERVQUAL concept to establish brand image in the market by enhancing quality services. Quality supports development of brand image by providing affordability, acceptability and accessibility as these are the foundation for excellence healthcare.

The SERVQUAL model was appropriate for service delivery measurements in creating quality service provision at Metropolitan Hospital. Evaluating service quality and effect of various dimensions of service value enabled Metropolitan Hospital to design and adopt the efficient service delivery approaches that meets the need of their customers. Recognizing strengths and weaknesses regarding various dimensions of service quality helped the hospital to allocate resources to enhance the quality of customer service.

## **2.2 Integrated Systems Adoption and Service Delivery**

The adoption of Integrated System in health does not only concern innovation but also a tool to accomplish many goals. IS facilitates the provision of higher quality and safer care, better treatment decisions, and information about alternatives. Besides, IS provides support to the efficient and fair health system and improves efficiency to health service. IS also strengthens the ability to observe health service provision in remote locations. It supports health research and facilitates collaboration among clinicians and researchers. Also, IS improve the dissemination of health services and enables remote consultations (Kenya, 2015)

The adoption of IS in the healthcare sector has remained low in developing nations, which has severely affected the overall adoption and success of IS. Further, the healthcare sector in developing countries is hindered by challenges such as lack of technical expertise, insufficient IS infrastructure, and lack of computer skills of employees (Nzuki & Mugo, 2014). Subsequently, the worldwide state of IS suggests that the application of IS does not primarily depend on the availability of expertise. Instead, it depends on factors such as limited experienced in IS among healthcare staff and technical support in clinical institutions.

Since 2005, when the revolution to the migration of the World Health Assembly began, the World Health Organization (WHO) has considered IS as its top priority (Qureshi & Shan, 2013). The shift to Integrated System is necessary for the provision of quality patient care since it allows healthcare providers and patients to access and send confidential clinical information to relevant departments or physicians for diagnosis or clinical decision-making. Current research on IS adoption in healthcare suggests that IS is the solution to delivering quality care since it facilitates better services for patients (Davidson & Heslinga, 2013). Moreover, healthcare providers who use Integrated System to increase care quality and provide excellent customer service because of efficient information management. Thus, healthcare providers and government collaborate to invest massively in IS infrastructure and its adoption in healthcare organizations. These stakeholders understand that some challenges in health institutions can be solved by Integrated System adoption.

In the twenty-first century, IS implementation plays an essential role in advancing healthcare systems (KIPPRA, 2017). Such efforts have increased in areas of automated health record, wellbeing portals, as well as access to personal health records. Such development has also occurred in e-prescription, telemedicine, remote patient monitoring (RMP), and analysis (KIPPRA, 2017). The adoption of IS in healthcare organizations eliminates the paper-based system of recording and managing information and healthcare. In many nations, the government and the private sector participants in the healthcare segment know the value of IS in terms of lowering the costs associated with information management, increasing access, and expansion of healthcare. Hence, in both developed and developing countries, IS adoption is noticeable and promises better access to health informatics and healthcare services anywhere.

The literature on IS and the benefits of its adoption have heightened the need for its implementation in healthcare organizations (Moerman, Houwelingen, & Kort, 2014; Nielsen 2016; Farzianpour, Amirian, & Byravan, 2015). The benefits of IS are clearly outlined in various publications, but developing nations lack adequate resources and leadership to increase its adoption, especially in community hospitals (Githinji, 2016). Several practical questions arise when investigating this phenomenon. Of the particular interest to researchers is the observation that some nations use specific strategies when

implementing IS goals. That shows the variation that exists globally regarding IS adoption efforts.

Sun (2016) conducted a study on outcome of health information system on hospital excellence care. The results of the survey indicated that healthcare providers who adopted IS reported improvements in quality of care and reduced cost of operation. Further, he added that the integration of new technologies improved customer service because of the decreased need for clinic inpatient care. Indeed, more specialized services were needed, which required experienced healthcare providers and adequate resources to meet the demands of the hospital. These included home health services, outpatient services, and hospice services. Moreover, healthcare providers noted the need to adopt IT because they did not maximize their value for health systems improvement. It is the reason healthcare providers took unified approach system, which commenced in the early 1990s (Nzuki & Mugo, 2014).

Previous studies indicate that data and interaction play an essential part in supporting health care system by using IS. Madon, Krishna, and Michael (2010) identified three primary categories for harnessing ISs to improve health service. They include efficient management of patient records and hospital administration to enhance the functioning of healthcare systems, using ISs to improve healthcare delivery, and effective communication regarding health matters. ISs have become essential tools in everyday life by offering not only communication but also providing equality health information in a faster and convenient way. Rissanen (2014) points out that IS provide robust knowledge management in organizations. Enhanced knowledge management in companies adds value to planning, strategy formulation, policy establishment, and management of company resources. Information technology systems provide a resourceful service system that allows companies to accomplish competitive opportunities through efficient use of resources, new technologies, and enhanced service delivery (Adebayo & Ofoegbu, 2014). IS has enhanced customer service in commercial organizations. Varsi (2016) highlights that a company's IS often includes various systems that support many functional areas. These areas include human resources, monetary services, and sales promotion.

Advancements in IS have improved the delivery of health care services in Kenya. Information systems present creative methods that offer healthcare services in the institutions. Such methods require a person to have expertise in IS to perform them to achieve desired outcomes. Öner and Sertel (2015) opines using IS enhances organizational performance. Information and Communication technology comprises various innovations created to capture data, store, and disseminate information from one location to another.

The increased utilization of IS in clinics has helped improve the knowledge levels of the patients (WHO, 2016). This is because using the computers; the patients have a chance of grasping the visual perspective of the health status, for instance, X-rays, radiographs, and a range of other visual image representations. The systems being used in modern hospitals have helped advance the recording, analysis, and understanding of different patients' information. Another key point is that besides the visual image representations, the patients can inform themselves on their health through the information they gather from the internet, which is again a result of the advancing IS sector (WHO, 2016).

Using IS has improved financial management and efficiency in hospitals (Goel, 2014). The Accounting and Financial departments in many healthcare facilities are now using computer programs and software such as Quick-books and Excel in running their financial operations. By using well-integrated financial management systems, the hospital departments are better placed as regards the calculation of patient's expenses, employees' salaries, pay-checks, and respective taxes. As compared to paperwork, using these systems has helped in the aversion of different financial errors. Hence, that brings down issues of corruption and financial theft in different facilities (Goel, 2014).

Adequate financial resources determine the widespread integration of IS systems in the health sector. The reason is that healthcare organizations with adequate funding can acquire technologies that facilitate their daily operations. Inadequate financial resources create a barrier for the adoption of IS due to lack of training opportunities for healthcare providers, covering IS operation costs, and maintaining IS systems (Kenya, 2015).

Brenner and Herrmann. (2018) assessed challenges that staff encounter while implementing IS strategy. The authors found that computer literacy and technology use

was the primary challenge. They assert that lack of computer skills among staff is attributed to the low implementation of IS approaches in developing nations.

Macharia (2013) in his study on aspects prompting acceptance of Information System in private healthcare organizations Kiambu County points out that the attitude of the IS expert and the users who may either accept or reject the IS innovation used in healthcare can affect the output of an organization. Information System (IS) attitude is the set of values and practices shared by the staff of an organization involved in IS activities. These include IT experts, executives, and end-users. Thus, IS attitude is a subcategory of company culture, with unique values attached to the information technology department. IS attitude can resist innovations that hinder the change process because people may want to maintain their status quo. Because of that, the staff may disregard some of the groups' shared norms.

Ndea (2016) explored the challenges and advantages of adopting IS by commercial institutions in Kenya. Research aimed to establish the challenges that commercial banks in Kenya encounter in achievement of sustainable advantage and determining the approached adopted by those commercial companies in Kenya to cope with challenges. The study findings concluded that use of IS influenced achievement of competitive advantage.

### **2.3 Literature Review Summary**

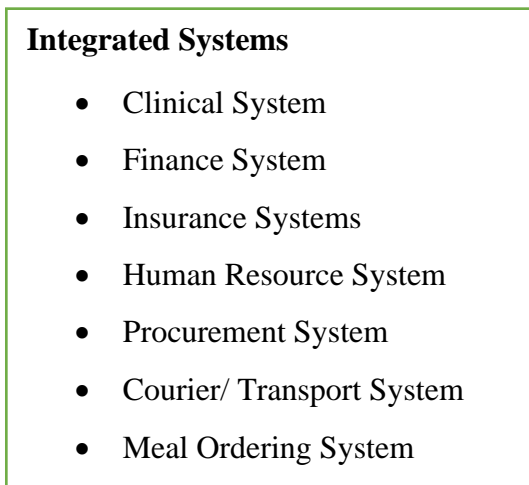
The section presented relevant information published by various scholars on the integration of IS systems in healthcare service provision. Literature revealed that among factors limiting the use of IS healthcare delivery are the availability of funds, lack of training, inadequate infrastructure, confidentiality and security, legislation and standards on a healthcare information system, and individual characteristics (Buchwalid, Urbach and Minocha, 2014). IS systems enhance the quality of services offered. When information technology systems are implemented, efficiency and effectiveness improve hence leading to better customer experience. These develop customer relationship paving the way for future business for the organization. Advancements in technology have many uses for service systems. Such benefits include enhanced service quality, reduced costs, and increased access to service provision (Adebayo & Ofoegbu, 2014). These factors facilitate consumer acquisition and retention in an organization.



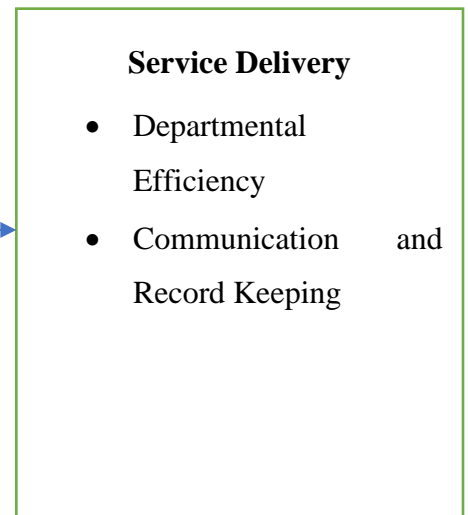
## 2.4 Conceptual Framework

The independent variable will be Integrated Systems which was analyzed under different sub-systems. Dependent variable was analyzed under departmental efficiency and communication and record keeping.

### Independent Variables



### Dependent Variables



**Figure 2.1: Conceptual Framework**

**Source: Author 2019**

Figure 2.1 shows the relationship between Integrated Systems and Service Delivery under study.

## CHAPTER THREE

### RESEARCH METHODOLOGY

#### 3.1 Research Design

The case study was to find out extent of Integrated System adoption on service delivery at Metropolitan Hospital. Descriptive research method was applied. The study involved first-hand and practical review into a modern-day phenomenon in its context using multiple sources of evidence (Yin, 2014).

#### 3.2 Study Population

Metropolitan Hospital was the study unit, the hospital has a population of 287staff. (Metropolitan Human Resource Records, 2019). The study population was all staff from different age groups, years worked and educational status.

#### 3.3 Sample Design

The number of staffs across various departments at Metropolitan Hospital was considered during sampling. The respondents of the study were sampled from different areas of operations; clinical, administration, finance and support services. As used by Ariola (2006), Slovin's Method was used to validate sample scope of 75 respondents as shown in Table 3.1.

**Table 3.1: Respondent Distributing Sample**

Staff Category	No. of employees	Percent%	No selected
Clinical staff	187	65	49
Administration staff	36	13	10
Finance staff	20	7	5
Support services staff	44	15	11
Total	287	100	75

**Source: Author (2019)**

#### 3.4 Data Collection

Research data collected was by means of questionnaires. Questionnaires were structured and created based on the study objectives which was employed to collect data primary data.

Questionnaire consisted of closed ended questions. Cooper and Schindler (2005) noted that the design of the questionnaire identified the problem and the specific research objectives. Section A provided respondents general information, section B contained information on extent of IS adoption, section C contained questions on the impact of IS on service delivery at Metropolitan Hospital. Questionnaire was pre-tested to ascertain the reliability and validity of the information collection. This was done by providing questionnaires to five of the respondents as pilot test. The same participants were asked to respond to the same questionnaires after two days, but without prior notification to assess any difference in the first and second test answers. This is very useful as it helps to recognize and answer vague questions and contradictory directions in the research process. This helped improve the instrument's efficiency.

### **3.5 Data Analysis**

All received questionnaires were referenced and items coded to facilitate data entry in the questionnaire. For the variables in section A and B, the descriptive statistics used were measurements of frequencies, mean and standard deviation, and the information presented in the form of tables. For the variables in section A and B, the descriptive statistics used were measurements of frequencies, mean and standard deviation, and the data provided in tables. Data was analyzed using the Social Sciences Statistical Package (SPSS).

In Objective Two, Paired t-test was used to evaluate significant effects among variables. To present the findings of the study, tables and narrative statements were used.

## CHAPTER FOUR

### DATA ANALYSIS, FINDINGS AND DISCUSSIONS

#### 4.1 Introduction

The section contains analysis, findings and discussions of information collected on influence of integrated systems on service delivery in Metropolitan Hospital. The researcher utilized frequencies, standard deviation and mean to present conclusions.

#### 4.2 General Information

##### 4.2.1 Response Rate

Out of 75 questionnaires administered, 70 questionnaires were returned constituting 93 percent while 7 percent were not returned as shown in Table 4.1.

**Table 4.1: Respondent Response Rate**

Response	Frequency	Percent (%)
Response	70	93
No Response	5	7
Total	75	100

##### 4.2.2 Demographic Statistics

Data include gender, number of years worked, highest level of qualification, age bracket and staff category in terms of operations.

##### 4.2.3 Gender of the Respondent

Data collected was as tabulated in Table 4.2.

**Table 4.2: Gender of the Respondent**

Gender	Frequency	Percent (%)
Female	45	64.3
Male	25	35.7
Total	70	100

From Table 4.2, 35.7 percent of the respondent were male while 64.3 percent were female. The information obtained by the researcher was obtained from all genders.

#### 4.2.4 Respondent Category

The study also enquired staff category of the respondent and results were as tabulated in Table 4.3.

**Table 4.3: Respondent Category**

Respondent Category	Frequency	Percent (%)
Clinical staff	46	66
Administrative staff	9	13
Finance staff	5	7
Support staff	10	14
Total	70	100

Table 4.3, Staff category showed majority of the respondents were from clinical staff at 66 percent., Others were from administration, finance and support. This shows that most of the information for the study was collected from the clinical staff.

#### 4.2.5 Respondents Highest Level of Qualification

**Table 4.4: Respondent Level of Qualification**

Level of Qualification	Frequency	Percent (%)
Primary	0	0
Secondary	2	3
Certificate	12	17
Diploma	40	57

1st Degree	14	20
Masters	2	3
Doctorate	0	0
<b>TOTAL</b>	<b>70</b>	<b>100</b>

Table 4.4, 57 percent of respondent got diploma as their most eminent education level, while 43 percent were holders of other qualification. This finding show that respondents were able to respond to study objects.

#### **4.2.6 Respondents Years Worked.**

**Table 4.5: Respondent Years Worked**

Years Worked	Frequency	Percent (%)
5 years and below	16	23
5-10 years	33	47
11-15 years	12	17
16-20 years	6	9
Above 20 years	3	4
<b>Total</b>	<b>70</b>	<b>100</b>

Table 4.5, most of respondents had worked 5-10 years. This shows the sampled respondent understood the operations of the institution well and thus gave accurate information on the subject under study.

#### **4.2.7 Respondent Age Bracket**

**Table 4.6: Respondent Age Bracket**

Age Bracket	Frequency	Percent (%)
20 years and below	1	1

21-30years	22	31
31-40years	31	44
41-50years	12	17
Above 50years	4	6
Total	70	100

Table 4.6, most of the respondents were between 31-40 years representing 44 percent, the rest were from other age bracket.

### **4.3 The Extent of Integrated Systems Adoption at Metropolitan Hospital**

Respondents provided input regarding the extent of integrated systems adoption and devices available within their disposal at the departmental level at Metropolitan Hospital.

**Table 4.7: Integrated Systems Devices Availed to Respondent**

	Frequency	Percent (%)
Desktop	56	65.1
Laptop	14	16.3
Mobile Phone	15	17.4
Tablet	1	1.2
Others	0	0
Total	86	100

Table 4.7, 65.1 percent of respondents had desktop within their disposal. Some of the respondents had more than one IS device at their disposal.

**Table 4.8: Extent of the Integrated Systems Adoption in Metropolitan Hospital**

Systems	No Extent	Small Extent	Neutral	Very Large Extent	Very Great Extent	Weighted Adoption percentage
Clinical System	0.00	5.20	27.60	53.30	13.80	75.08
Finance System	0.00	0.00	7.10	52.90	40.00	86.58
Insurance System	0.00	0.00	0.00	72.90	27.10	85.42
Human Resource System	0.00	0.00	20.00	68.60	11.40	78.28
Procurement System	0.00	0.00	0.00	58.60	41.40	88.28
Courier/Transport System	5.70	15.70	45.70	24.30	8.60	62.88
Meal Ordering System	0.00	0.00	10.00	72.90	17.10	81.42

Table 4.8, majority of respondent indicated procurement system has been adopted at 88.28 percent and the least system is courier/transport system. The higher the percentage the higher the level of adoption. The average weighted adoption percentage of Integrated System at Metropolitan Hospital is at 79.71 percent successful.

The study findings is similar to Gomes (2019) who pointed out that planned utilization of IS success in organizations depends on combination of systems like records pertaining to patient details, transaction handling, information reporting, digital diagnostic imaging and clinical decision support. Success of IS adoption also entails use of the system, system quality, recognized usefulness and user contentment. When different information systems exist on a consistent platform, participants can restructure the adoption course and enhance quality of system.



#### 4.4 Support the Use of Integrated Systems

Respondents were requested to give information on extent of support in the use of integrated system in areas of management support, processes, users skills and IS infrastructure.

**Table 4.9: Support the use of Integrated System**

	Mean	Std. Deviation
<b>Management Support</b>		
Funds availed for IS support	4.971	0.564
Internal Rules favor use of IS	4.086	0.654
<b>Processes</b>		
Analysis of customer feedback	4.114	0.603
User involvement	3.843	0.629
<b>User Skills</b>		
Technical expertise available to support use of IS	4.057	0.587
Users have required skills	4.000	0.59
<b>Infrastructure</b>		
IS security and corrective action	4.057	0.562
Network failure	3.100	0.980

Table 4.9, management is supporting the use of Integrated System to a large extent by availing funds and implementing internal organization rules that favor the adoption of the system. Internal processes had been improved by involving the users to a large extent and incorporating customer feedback, this indicates that process related challenges were low during the implementation of IS. Technical expertise is available to support users adopt IS and users have been trained and acquired requisite skills needed. Network challenge was a mild challenge in the use of IS, an indication that there is a stable infrastructure to support use of the Integrated System. The study finding conclude that there is level of support to use IS at Metropolitan Hospital.

The findings are like Brenner and Herman (2018) study which concluded that Integrated System adoption are centered on some important success aspects, commitment of all participants, reliable information, and proper infrastructure. The success of IS adoption in healthcare depends on strong leadership, realistic financing, affective management, constant improvements on strategy and good communication.

#### 4.5 Service Delivery in Metropolitan Hospital

Respondents were requested to show the inclination for various aspects of service delivery in Metropolitan hospital after adoption of integrated systems.

**Table 4.10: Departmental Efficiency in Metropolitan Hospital**

	Mean	Std. Deviation
Customer Complaints	4.0571	1.1533
Allocation of Resources	3.8571	1.0534
Reduced Error Rate	4.0714	1.0118
Creation of differentiated services	4.0000	0.6138
Process improvements	4.0429	0.5500

Table 4.10, respondents indicated the extent of improvement in departmental efficiency after adoption of integrated system is at a mean of 4.0057. Customer complaints and Error rate greatly reduced to a very high extent, and creation of differentiated services were enhanced in metropolitan hospital. Allocation of resources was revealed to have moderately improved after adoption of IS. This shows that majority of service delivery aspects in Metropolitan Hospital have improved after implementation of integrated Systems.

The findings is similar to Grazzi and Jung (2015) study which concluded that service differentiation strategy with the adoption of IS such as having more high-tech medical service can have much stronger influences on efficiency which can be achieved by employing proper integration strategies in operations.

**Table 4.11: Communication and Record Keeping in Metropolitan Hospital**

	Mean	Std. Deviation
Communication between the employees.	2.8714	1.0484
Communication of new services	3.9000	0.7051
Decision making.	4.0286	0.5099
Retrieval of records	3.8714	0.6120
Access to records.	4.1286	0.5626

In Table 4.11, respondent indicated that after IS adoption decision making and access to records had greatly improved in Metropolitan Hospital. Additionally, communication of new services and retrieval of records were also revealed to have improved. communication between the employees showed to have increased by a little extent after adoption of IS. This infers that communication and record keeping has improved after adoption of integrated systems.

The study findings are consistent with Gomes (2019) study which he noted that Integrated System can save time and money by improving communication throughout the organization and making workflows and employees more efficient and productive. It can also help to improve the quality of information and the speed at which one can access it. The key objective of Integrated System is to operate information on or after healthcare events, including preparing, monitoring, organizing and decision making.

#### **4.6 Effect of adoption of IS on Service Delivery**

The study aimed at identifying the influence of Integrated Systems on service delivery. The respondents indicated the time taken to access different services before and after the implementation of IS at Metropolitan Hospital. The data was evaluated applying Paired t-test and results tabulated.

**Table 4.12: Paired Sample Test**

	Paired Differences					t	df	Sig. (2-tailed)
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
				Lower	Upper			
Pair 1 Consultation waiting time	2.029	.701	.084	1.861	2.196	24.199	69	.000
Pair 2 Prescription dispensing time	1.886	.692	.083	1.721	2.051	22.784	69	.000
Pair 3 Laboratory results waiting time	1.114	.671	.080	.954	1.274	13.890	69	.000
Pair 4 Diagnostic Imaging results waiting time	2.829	.780	.093	2.643	3.014	30.354	69	.000

The paired mean difference in consultation waiting times before and after was 2 intervals with a standard deviation of 0.701 and the paired difference ranging from 1.861 to 2.196. There is evidence to suggest that respondents experienced statistically significant difference of consultation waiting time after adoption of Integrated System.

The prescription dispensing time is found to have paired mean difference of 1.88 (approximately 2) intervals with a deviation from the mean of 0.692. The differences lie between 1.721 and 2.051 at 95% level of confidence.

The laboratory results waiting time paired mean difference between before and after implementation of IS was found to range from 0.954 and 1.274 and a mean of 1 interval with 0.780 standard deviation. There is evidence to suggest that respondents experienced

statistically significant difference of laboratory results waiting time after adoption of Integrated System.

Findings showed paired mean difference for diagnostic results waiting time before and after ranged between 2.643 and 3.014 with a mean of 2.829 (approximately 3) intervals with a standard deviation of 0.780. There is evidence to suggest that respondents experienced statistically significant difference of diagnostic results waiting time after adoption of Integrated System.

Hypothesis tested:

$H_0: \mu_1 = \mu_2$  ("means for the waiting times before and after implementation of IS are equal")

$H_1: \mu_1 \neq \mu_2$  ("means for the waiting times before and after implementation of IS are not equal")

From the table above  $P=0.00$  and the level of Significance is 5% ( $\alpha= 0.05$ )

The verdict rule is provided by: If  $p \leq \alpha$ , then reject  $H_0$ . 0.000 is less than .05,  $H_0$  is rejected That suggests that there is enough proof to determine that waiting times before and after implementation of IS are distinct. Since p-value for each of pairs is less than alpha hence we reject the null hypothesis.

Further analysis was done to determine whether the change in service delivery is a negative or a positive change.

$H_0: \mu_1 = \mu_2$  ("means for the waiting times before and after implementation of IS are equal")

$H_1: \mu_1 > \mu_2$  ("means for the waiting times before is greater than after implementation of IS")

The calculated test statistics from table are 24.199,22.784,13.890 and 30.354 for Consultation time, dispensing time, laboratory time and diagnostic imaging time respectively. To test the above hypothesis, a T-statistic was obtained from the t-tables to be compared to the calculated test statistics for each pair. The t-statistic (tabulated) at  $\alpha=0.05$  and 69 degrees of freedom is equal to 1.9949. Indication of enough support to reject null hypothesis since test statistic for each pair is greater than tabulated test statistic and conclude that means for waiting times before is greater than after implementation of IS. Therefore, the implementation of IS has reduced waiting times for consultation,

laboratory results and diagnostic results. This is a confirmation that adoption of IS has improved service delivery at Metropolitan Hospital.

The study findings are like Brambilla and Tortarolo (2018) who concluded that efficiency in health system is caused by shorter waiting time which may enhance quality of patient health outcomes through timely diagnosing and administering treatment. Shorter waiting times may enhance hospital's competitiveness. Volland, Korak and Kowatsch (2014) concluded that procedure of dispensing medication through advanced service has been slow with the adoption of IS. This may be because face-to-face meeting still are consultation norm among health experts and patients, there are constraints concerning timeframe and place where consultation take place. Lack of a constant communication procedure limits the possible benefit that could be established with the adoption of IS.

## **CHAPTER FIVE**

### **SUMMARY, CONCLUSION AND RECOMMENDATIONS**

#### **5.1 Introduction**

This chapter summarized findings as presented in previous chapter, conclusions and recommendations are discussed on objectives of study. Research aimed at determining the extent to which Metropolitan Hospital have adopted Integrated System and its impact on service delivery.

#### **5.2 Summary**

This section summarized findings on respondents' demographics, extent of Integrated Systems adoption at Metropolitan Hospital, level of IS support and service delivery.

##### **5.2.1 Demographic Statistics of Respondents**

Researcher administered 75 questionnaires to respondents, 93 percent were returned, these were adequate to provide reliable information for study. Research outcomes revealed majority of the respondents were female formed 64.9 percent of the respondents while rest were male, Information was obtained from all genders since they participated in the study. On respondents' category, most of the respondents were from clinical category at 66 percent. Administrative staff were 13 percent, finance staff were 7 percent, while support staff were 14 percent. This shows that all cadres of staff participated in the study; therefore, information was obtained from different cadre of staff. Respondents' highest level of qualification was diploma at 57 percent, while first degree holders were 20 percent. The remainder were 17 percent and 3 percent for certificate and Secondary Education as the highest qualification respectively and only 3 percent indicated masters as highest qualification attained. None of respondent had neither primary nor doctorate as level of qualification, findings show that respondent obtained professional knowledge that enables execution of their responsibilities. Study finding revealed 44 percent of respondent were 31-40 years, 31 percent aged 21-30 years, 17 percent aged between 41-50 years while 6 percent were 50 years and above. The respondent who have been working in the institution for 5-10 years were 47 percent of total respondent. The rest were distributed as follows; 23 percent worked for 5 and below years, those who had worked for 11-15 years were 17

percent, only 9 percent of respondents had worked for 16-20 years while 4 percent had been engaged for 20 years. This shows respondents understood the operations of the institution well and thus gave accurate information on subject under study. Respondents qualification, work experience and age in the hospital is an indication that they interact with customers on day to day activities and therefore are well placed to evaluate study objectives of the research and they are best positioned to understand the influence of integrated system on service delivery.

The findings are like Billion et al, (2017) study which concluded that the amount of skilled member of staff organization has clarifies the level of IS used to sustain company operations. The author also stated that employees years relate with the degree of IS competences and expertise in a way that the younger a person is, the higher the abilities and expertise she or he will require.

### **5.2.2 The Extent of Integrated Systems Adoption at Metropolitan Hospital**

Integrated System devices were availed to all respondents at a 100 percent, some of the respondents had more than two devices within their departments. The clinical system had been adopted to a very large extent at 75.08 percent. Integrated System is used in patient queue management, setting of patient appointment and sharing of information across the departments. The findings are like KIPPRA (2017) assertion that booking appointment times and efficient queue management would credibly result in shorter waiting times to access services.

Finance system has been adopted to a very significant degree. 86.58 percent of the respondents showed that finance system is applied in debt collection and billing of patient services, this enhances timely billing and accuracy. The findings are like Juma and Kimencu (2017) assertions that integrated finance systems is important to generate quality accounting data on appropriate basis and exchange of the information to the decision makers.

Human resource system has been implemented to a very significant extent and very huge extent at 85.42 percent. Respondents indicating that the human resource system is used



to a very significant extent and very great scope through leave and attendance management leading to user satisfaction because of timely service delivery. The findings of the study are like Nyamweya (2017) assertion that human resource system is important in-service delivery to enhance employee satisfaction.

Procurement system has been adopted at 88.28 percent. The system is used for management of stock by tracking and purchasing of stocks, this enhances stock control and enhances availability of items when required for service delivery to clients. The study findings are like Juma and Kimencu (2017) assertion that procurement system enhances organization performance in delivery of services by integrating best practices on different aspects of procurement system including timeliness of processes, quality, system integrity, system productivity and cost.

Insurance system has been adopted at 85.42 percent. Respondents indicated that the system has been implemented to a very significant and very huge degree. The system has enhanced patient membership identification and tracking pre-authorization of services for efficient billing. This has enhanced patient management by identifying benefits and exclusions a patient is entitled to. The study findings are like that of World Bank (2018) assertions that digital identification increase efficiency and accuracy in accessing healthcare services.

The meal ordering system had been adopted to a very large extent 81.42 percent while courier/transport system is at 62.88 percent. Respondents indicated that meal ordering system is used to order patient's food and tracking of stock used against meals served, this enhances menu accuracy and stock control in the organization enhancing service delivery. The findings are like Adithya et al. (2017) who concluded that meal ordering makes customer order easier, gives customer information on preference and helps management in implementing control systems in place.

Courier/Transport system had a neutral extent adoption at 62.8%, system is adopted for efficient fleet management in the organization. The study findings show that adoption of the system is lower compared to other systems in the hospital. The study findings are like Agu et al. (2015) who concluded that adoption of courier/transport system is still far but when fully adopted, it will enhance service delivery improvement.

### **5.2.3 Support the Use of Integrated System**

The study findings indicated that management had supported implementation of IS by availing funds for IS support with a mean of 4.971 and internal rules favored the use of system by mean of 4.086.

Business operations had improved to a larger scope with mean of 4.1143 while user involvement was at neutral. This is an indication that process related challenges were very low during implementation of IS since users were involved in the process. Users related challenges were minimal since users had required skills to a mean of 4.000 as well as technical expertise were available to support the use of IS to mean of 4.057. The study findings further indicated security and corrective action measures were ensured to a mean of 4.057 and network failure was moderately low a mean of 3.1000. This infers that network challenge was a mild challenge in the adoption of IS. Study findings concluded that minimal challenges were encountered during use of IS due to network failure. Similarly, Mwantimwa (2019) asserts that leaders need to support implementation of the technology through acquiring the needed infrastructure. Financial investment has increasing influence on other IS practice determining factor such as expertise and capability and IS foundation assets. The findings also disclosed the impediments to enhanced use of IS and recommend that for innovative activities to be significant, a stable implementation of IS ought to be completed with suitable understanding of the entire facilitating aspects.

### **5.2.4 Service Delivery at Metropolitan Hospital**

The study showed that an improvement in departmental efficiency attributed to reduction in customer complaints a mean of 4.0571 and error rate mean of 4.0714 as well as improvement in creation of differentiated services to mean of 4.000 and 3.8571 for allocation of resources. The study results concluded there was improvement in departmental efficiency at Metropolitan Hospital because of IS adoption.

In addition, the respondents indicated that after the adoption IS had led to improved decision making a mean of 4.0286, access to records a mean of 4.1286, communication of new services a mean of 3.900 and retrieval of records a mean of 3.8714 were also

revealed to have improved. However, Communication between the employees a mean of 2.8714 was indicated to have changed by a little extent. Management need to implement policies and processes that will enhance communication in the organization. The findings concluded that adoption of IS has significant effect in communication and record keeping at Metropolitan Hospital

Findings of study is similar to Eze and Chinedu-Eze (2018) who concluded that IS provides support to define the administration of health information and its reliable interchange between workers, patients, government, suppliers and value entities and underwriters. Its position in healthcare cannot be compared since it performs a starring role in early exposure of communicable disease epidemics throughout the region, chronic disease management tracking and in creating transparent and substantiate outcomes for health system involvements. IS progresses the healthcare service through reducing medicinal inaccuracies with confidence that healthcare workers have correct and appropriate information. Integrated System in broad is progressively perceived as the highly favorable means enhancing safety, excellence and effectiveness of the healthcare providing systems.

Integrated System usage on waiting time, the study concluded that the time taken for patients to access the services at metropolitan Hospital had reduced after the adoption of the integrated system. This was indicated by the t- statistic of each pair of time taken to deliver a service before and after adoption of IS was significant compared to T-tabulated at 5 percent level of significance. This inferred that there was an improvement in waiting time for consultation, prescription dispensing, laboratory results and diagnostic imaging results services after adoption of the integrated system.

The findings is consistent with Demiris and Kneale (2015) study of informatics systems concluded that integrating information flow in a hospital by providing the roles which are shared across applications supports healthcare workers in accessing patient information in real time, document preparation, tracking patient movement across locations, data compilation, reduce errors relating to handwriting, error checking for inappropriate dosages or examinations and make things easier for inventory management and post charges. IS enhances service delivery in healthcare provision.

### **5.3 Conclusion**

The development and use of integrated system have revolutionized service delivery in healthcare sector by developing a model to ensure clients are served better by creating value -based services with an aim of continuing competitive in industry. Integrated Systems enabled creation of ways to offer variety of services while at the same time enhancing service-delivery. This has led to increase of capacity to the service providers to provide safe and timely healthcare services at Metropolitan Hospital.

Integrated System helps management to lead the organization in an effective way. IS can also help management to overcome challenges faced by the hospital by improving patient satisfaction and having knowledge on recurrent trends on population health. This can be done by keeping track on client's statistics for the benefit of proper planning (Brenner and Herman, 2018). Adoption of Integrated System is the best choice in enhancing improvement of services at Metropolitan Hospital to stay on the track and this is important for the hospital's future in terms of competitiveness. The study therefore concluded that the adoption of Integrated System has significant effect on service delivery at Metropolitan Hospital.

### **5.4 Recommendations**

Integrated System has brought a paradigm shift on service delivery and performance in healthcare industry. The benefits of use of IS in providing services to customers were acknowledged and understood, especially in terms of achieving efficiencies. The benefits were not without some key challenges at Metropolitan Hospital since the implementation of IS. In order to remain competitive, enhance quality of service delivery to customers and improve efficiency in hospital, management need to continue investing in integrated system by ensuring challenges such as queue management are addressed in order to enhance customer satisfaction and minimize complaints on customer delays. Enhanced employee communication can also be addressed by installing staff intranet and system alerts for new records. Network failure has also been noted as one of the challenges being faced by IS users. Management should ensure that IS network is more stable by putting in place policies on replacement of IS hardware, maintenance schedule and a stable power backup in place. Use of courier/transport system was also noted not to be fully utilized by

the users. Management need to put into place policies and procedures that will encourage IS users to adopt courier/transport system to enhance efficiency in fleet management.

The study had produced a weighted average adoption score of 79.71 percent out of a possible 100. This is an indication that there is even opportunity for advancement in the hospital adoption of IS. Specifically, the hospital seems to be weak in factors of attendance management, communication, couriers/transport system, IS network, prescription dispensing and laboratory waiting time. Laboratory results waiting time can be addressed by integrating laboratory equipment in the system to minimize error rate on reports, timely results, better consumable management. Although adoption of IS may not be able to advance all the areas of influence stated in this study, they can enhance improving weaknesses in the hospital,

Demand for excellence in healthcare remains more essential and is growing greatly with the increasing healthcare needs. IS performs an important role by organizing employees to deliver superior services and it will enhance the service value provision at the hospital. It is the obligation of the top management and then all stakeholders in healthcare to incorporate and execute IS in hospitals to shift the overburdened labor-intensive processes into a technological establishment.

### **5.5 Suggestions for Further Studies**

This study made contributions to existing studies on Integrated System, it only focused on Integrated System and service delivery at Metropolitan Hospital. The effectiveness of IS adoption was researched from improvement of service delivery which was gain measured by departmental efficiency and communication and record keeping. Other objectives of service delivery like quality of service and cost reduction effectiveness would add more value in the study. Researcher also recommends the study to be done in more than one private hospital's to fully understand the impact of Integrated Systems on service delivery in Kenya.

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## APPENDICES

### APPENDIX I: QUESTIONNAIRE

**Instructions:** Please answer following questions where applicable, mark relevant box with a tick (√)

**Confidentiality:** Responses you give will be strictly confidential. No mention will be made of any individual in report of the study.

#### Section A: General Information:

1. What is your gender?

Female [ ]            Male [ ]

2. Please state your staff category

Clinical staff [ ]    Administrative staff [ ]    Finance staff [ ]    Support staff [ ]

3. Indicate highest level of qualification

Primary education [ ]    Secondary education [ ]    Certificate [ ]    Diploma [ ]

1<sup>st</sup> Degree [ ]    Masters [ ]    Doctorate [ ]

4. How many years have you worked for Metropolitan Hospital?

5 and Below [ ]    5-10 [ ]    11-15 [ ]    16-20 [ ]    Above 20 [ ]

5. Indicate your age bracket

Below 20 years [ ]    21-30years [ ]    31-40years [ ]    41-50years [ ]

Above 50years [ ]

#### Section B: Extent of the use of Integrated System (IS) Adoption at Metropolitan Hospital

6. What Integrated Systems device (s) do you have at your disposal?

Desktop computer [ ]    Laptop [ ]    Mobile phone [ ]    Tablet [ ]

others [ ]

7. To what extent do you concur with the statements in view to IS adoption at Metropolitan Hospital (5)-Very great extent, (4)- Very large extent, (3)- Neutral, (2)- Small Extent, (1)- No extent

<b>Statement</b>	<b>(5)</b>	<b>(4)</b>	<b>(3)</b>	<b>(2)</b>	<b>(1)</b>
<b>Clinical System</b>					
Integrated System is being used to manage patients' queue.					
Integrated System is being used for patients' appointment					
Integrated System is being used in sharing of patient information across the departments					
<b>Finance System</b>					
Integrated System is being used for debt collection.					
Integrated System is being used for billing of patient services.					
<b>Insurance System</b>					
Integrated System is being used for members identification.					
Integrated System is being used for tracking pre-authorization of patients' services					
<b>Human Resource System</b>					
Integrated System is being used for leave management.					

Integrated System is being used for contract management					
<b>Procurement System</b>					
System is being used for tracking of stock level.					
System is being used for purchasing and ordering of stocks					
<b>Courier/Transport System</b>					
System is being used for fleet booking					
System is being used to track maintenance costs per vehicle.					
<b>Meal Ordering System</b>					
System is being used to order patients food.					
System is being used to track stock used against meals served.					

8. Indicate extent to which you agree with the statement (s) pertaining to level of support in utilization of Integrated System at Metropolitan Hospital.

(Use a scale of 1-5 where (5) = Very large extent, (4)= large extent, (3)= Neutral, (2)= little extent and (1)= very little extent. (Tick where appropriate)

<b>Statement</b>	<b>(5)</b>	<b>(4)</b>	<b>(3)</b>	<b>(2)</b>	<b>(1)</b>
<b>Management Support</b>					
Funds are availed to support use of IS operations.					
The internal rules of Metropolitan Hospital favor the use of Integrated System.					

<b>Processes</b>					
Implementation of IS have led to receiving of customers feedback					
Users involvement has led to acceptance of use of IS.					
<b>Users Skills</b>					
Users have the skills required in the use of IS					
The hospital has technical expertise to support the use of IS					
<b>Infrastructure</b>					
IS does not encounter frequent network failures.					
IS security in place and when insecurity is encountered immediate corrective action is taken.					

9. In your own opinion(s) which other challenge(s) are faced in utilization of IS at Metropolitan Hospital?

.....

.....

.....

.....

**Section C: Service Delivery**

10. Please indicate extent of service delivery after implementation of Integrated System at Metropolitan Hospital

Use the following scale:(5)= Very high extent (4)=High extent (3)= moderate extent (2)= low extent (1)= Very low extent

		5	4	3	2	1
<b>Departmental Efficiency</b>						
	Use of IS has led to reduced customer complaints.					
	Use of IS has led to improvements in the allocation and use of resources.					
	Use of IS has led to reduced error rates.					
	Use of IS allows the creation of differentiated services.					
	Use of IS has enhanced process improvements.					
<b>Communication and Record Keeping</b>						
	Use of IS has enhanced communication between the employees.					
	Use of IS has led to timely communication of new services to both internal and external customers					
	Use of IS has enhanced timely decision making.					
	Use of IS has led to timely retrieval of records					
	Use of IS has enhanced controls in access to records.					

11. The level of time taken to receive service

**Before implementation of IS**

	Time taken in minutes			
	0-10	11-20	21-30	More than 30
Consultation waiting time				
Prescription dispensing time				
Laboratory results waiting time				
Diagnostic Imaging results waiting time				

**After implementation of IS**

	Time taken in minutes			
	0-10	11-20	21-30	More than 30
Consultation waiting time				
Prescription dispensing time				
Laboratory results waiting time				
Diagnostic Imaging results waiting time				

**THANK YOU FOR YOUR PARTICIPATION**