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**EFFECTS OF ADOPTION OF DATA PROTECTION REGULATIONS ON THE
COMPETITIVENESS OF HEALTHCARE FACILITIES IN NAIROBI**

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ADMISSION NO. 120056

**A RESEARCH DISSERTATION SUBMITTED TO STRATHMORE BUSINESS
SCHOOL IN PARTIAL FULFILMENT FOR THE DEGREE OF MASTER OF
COMMERCE**



MARCH 2023


DECLARATION

I declare that this work has not been previously submitted and approved for the award of a degree by this or any other University. To the best of my knowledge and belief, the thesis contains no material previously published or written by another person except where due reference is made in the thesis itself.

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Approval

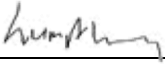
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ABSTRACT

Healthcare facilities are increasingly collecting personal data because data has become a source of competitive advantage. This has ignited a policy debate over data privacy leading to the introduction of data protection regulations that seek to ensure the transparency of data collection, processing, and security. The study sought to assess the effects of data protection regulations on the competitiveness of healthcare facilities in Nairobi. The study evaluated the effects of the rate of adoption of data protection regulations, cost of compliance with data privacy regulations and PrivacyByDesign principles on the competitiveness of healthcare facilities in Nairobi. Tavana and Moor's Privacy Theory, Nissenbaum's Theory of Privacy and the diffusion of innovation theory were used to guide this study. A descriptive research design was used by the researcher. Three level five health facilities and three private ones made up the population for the study. 399 employees of the facilities served as the survey's respondents. 450 structured questionnaires incorporating physical data gathering combined with Google forms was used for data collection. Descriptive metrics, correlation, and regression analysis were used to analyze the data. Charts and tables were used to present the findings. According to the study, adoption rate has a positive correlation with competitiveness of healthcare facilities in Nairobi $r=0.634$, compliance cost has a negative correlation to competitiveness of healthcare facilities in Nairobi $r= -0.757$ PrivacyByDesign has a positive correlation with competitiveness of healthcare facilities in Nairobi $r= 0.746$. The regression analysis shows that Rate of adoption has a positive and statistically significant effect on competitiveness of healthcare facilities in Nairobi $\beta_1=0.129$, $p =0.000$. Cost of compliance has a negative and statistically significant effect on competitiveness of healthcare facilities in Nairobi $\beta_2= -0.133$, $p =0.000$. Lastly the research found that privacy by design has a positive and statistically significant effect on competitiveness of healthcare facilities in Nairobi $\beta_3=0.220$, $p =0.000$. Large healthcare facilities adopt and follow data protection regulations because of their wealth of resources while implementing PrivacyByDesign principles increases productivity and competitiveness. Larger healthcare facilities have more resources to abide by data protection laws and defend themselves from prospective third-party enforcement and legal actions. Enhancing data protection policy accelerates the implementation of data protection laws and PrivacyByDesign, increasing the competitiveness. It is hoped that the study's findings will contribute to new knowledge and literature to scholars and future researchers, raise awareness among healthcare practitioners and patients regarding the impact of the Data Protection Regulations on their operations and value over time and re-focus competition authorities' assessment of market power from price and output only to other key considerations such as customer welfare and data privacy.

TABLE OF CONTENTS

DECLARATION	i
ABSTRACT	ii
LIST OF TABLES	viii
LIST OF FIGURES	x
LIST OF ABBREVIATIONS AND ACRONYMS	xi
DEFINITION OF KEY TERMS	xii
ACKNOWLEDGEMENTS	xiv
DEDICATION	xv
CHAPTER ONE: INTRODUCTION	1
1.1 Introduction	1
1.2 Background of the study	1
1.2.1 Data protection regulations	3
1.2.2 Organizational competitiveness	5
1.2.3 Healthcare Facilites in Nairobi	6
1.3 Problem Statement	8
1.4 Objective of the Study.....	8
1.4.1 General Objectives.....	8
1.4.2 Specific Objectives	9
1.5 Research Questions	9
1.6 Scope of the Study.....	9
1.7 Significance of the Study	9
1.8 Chapter summary	11
CHAPTER TWO:	12
LITERATURE REVIEW	12
2.1 Introduction	12
2.2 Theoretical Review	12
2.2.1 Tavani and Moor’s Privacy Theory	12

2.2.2 Nissenbaum’s Theory of Privacy.....	13
2.3 Empirical Review.....	14
2.3.1 Effects of adoption rate on competitiveness	14
2.3.2 Effects of compliance costs on competitiveness.....	15
2.3.3 Effects of PrivacyByDesign on competitiveness.....	16
2.3.4 Competitiveness of healthcare facilities in the data protection regime	17
2.4 Data Protection Regulation Application in Healthcare Sector.....	18
2.5 Research Gap.....	20
2.6 Conceptual framework.....	22
2.7 Operationalization of Study Variables	22
2.8 Chapter Summary.....	24
CHAPTER THREE	25
RESEARCH METHODOLOGY	25
3.1 Introduction	25
3.2 Research Philosophy	25
3.3 Research Design.....	25
3.4 Target Population.....	26
3.5 Sample size and sampling technique.....	27
3.6 Data collection.....	28
3.7 Research Quality	29
3.7.1 Instrument pilot testing	29
3.7.2 Instrument validity.....	29
3.7.3 Instrument reliability.....	30
3.8 Procedure for collecting data.....	30
3.9 Techniques for analyzing data.....	30
3.9.1 Model Specification.....	31

3.9.2 Test of Regression Assumptions.....	31
3.9.3 Linearity test	31
3.9.4 Normality test.....	32
3.9.5 Multicollinearity test.....	32
3.9.6 Homoscedasticity test	32
3.9.7 Autocorrelation test.....	32
3.9.8 Reliability test	33
3.10 Ethical considerations	33
CHAPTER FOUR.....	35
RESEARCH FINDINGS, INTERPRETATION AND PRESENTATION	35
4.1 Introduction	35
4.2 Response rate.....	35
4.3 Characteristics of respondents.....	36
4.4.3 Distribution of respondents by Gender	36
4.4.4 Distribution of respondents by the age group	36
4.4.5 Distribution of respondents by the highest Education level	36
4.4.6 Distribution of respondents by classification of healthcare facility.....	37
4.4.7 Distribution of respondents by number of patients served by the facility	37
4.4.8 Distribution of respondents by annual revenue generated by the facility.....	38
4.4.9 Distribution of respondents by average number of employees in the facility	38
4.4.10 Distribution of respondents by the years of data protection implementation by the facility	39
4.5 Descriptive statistics	39
4.5.1 Adoption of data protection regulation	39
4.5.2 Data protection regulations compliance costs.....	40
4.5.3 Data protection regulations on PrivacyByDesign.....	41

4.5.4 Competitiveness of healthcare facilities in Nairobi	42
4.5.5 Descriptive statistics for measured variables	44
4.6 Statistical Assumption tests	44
4.6.1 Test for Normality.....	44
4.6.2 Multicollinearity test.....	46
4.6.3 Homoscedasticity test	46
4.6.4 Autocorrelation test.....	47
4.6.5 Linearity test	47
4.7 Correlation Analysis.....	48
4.8 Regression Analysis	49
4.8.1 Effects of Rate of Adoption on Competitiveness	49
4.8.2 Effect of Cost of compliance on competitiveness.....	50
4.8.3 Effects of PrivacyByDesign on Competitiveness	51
4.8.4 Analysis of effects of data protection regulations on the competitiveness of healthcare facilities in Nairobi.....	51
4.8.5 Analysis of Variance.....	52
4.8.6 Effects of data protection regulations on the competitiveness of healthcare facilities in Nairobi	52
4.9 Chapter Summary	53
CHAPTER FIVE:	54
DISCUSSION, CONCLUSION AND RECOMMENDATIONS.....	54
5.1 Introduction	54
5.2 Discussion	54
5.2.1 Effects of the rate of adoption competitiveness	54
5.2.2 Effects of compliance costs on Competitiveness.....	55
5.2.3 Effects of PrivacyByDesign on competitiveness.....	56

5.3 Conclusions.....	57
5.3.1 Rate of adoption of data protection regulation	57
5.3.2 Compliance costs	57
5.3.3 PrivacyByDesign	57
5.4 Policy Recommendations.....	58
Implication to theory and academics	58
5.5 Limitations of the Study.....	59
5.6 Suggestions for Further studies.....	59
REFERENCES.....	60
APPENDICES	70
APPENDIX A: LETTER OF INTRODUCTION	70
APPENDIX B: INFORMED CONSENT FORM	71
APPENDIX C: QUESTIONNAIRE.....	74
APPENDIX D: PROPOSED WORK PLAN	80
APPENDIX E: PROPOSED BUDGET	81
APPENDIX F: QQ and PP PLOTS:	82
APPENDIX G: SIMILARITY INDEX REPORT	84
APPENDIX H: RESEARCH PERMIT NACOSTI.....	85
APPENDIX I: ETHICS REVIEW APPROVAL.....	86

LIST OF TABLES

Table 1.1: Organization of Public Healthcare Service Delivery System	7
Table 2.1: Summary of Research Gaps	21
Table 2.2: Operationalization of Study Variables	23
Table 3.1 Target Population	27
Table 3.2 Reliability test	33
Table 4.2 response ratel	35
Table 4.3 distribution of respondents by gender	36
Table 4.5 distribution of respondents by highest education level	37
Table 4.6 Distribution of respondents by classification of healthcare facility	37
Table 4.7 Distribution of respondents by number of patients served by the facility	38
Table 4.8 Distribution of respondents by annual revenue generated by the facility	38
Table 4.9 Distribution of respondents by average number of employees in the facility	38
Table 4.10 Distribution of respondents by the years of data protection implementation by the facility	39
Table 4.11 Rate of adoption of data protection regulations	40
Table 4.12 Data protection regulations compliance costs	41
Table 4.13 Data protection regulations PrivacyByDesign	42
Table 4.14 Competitiveness of healthcare facilities in Nairobi	43
Table 4.15 Descriptive statistics cumulative	44
Table 4.16 Jarque- Bera tests	45
Table 4.17 Shapiro-Wilk test	45
Table 4.18 Multicollinearity test	46
Table 4.19 Breusch-Pagan / Cook-Weisberg test for heteroskedasticity	47
Table 4.20 Autocorrelation test	47
Table 4.21 Linearity test	48
Table 4.22 Correlation Analysis	48
Table 4.23 Effect of Rate of Adoption on Competitiveness	49
Table 4.24 Effect of Cost of compliance on competitiveness	50
Table 4.25 Effect of PrivacyByDesign on competitiveness	51
Table 4.26 Overall regression model Summary	52
Table 4.27 Overall ANOVA (Analysis of Variance)	52



LIST OF FIGURES

Figure 2.1: Conceptual Framework	22
Figure 4.1 Normality Histogram.....	46
Figure 4.2 p-p plot.....	82
Figure 4.3 q-q plot.....	83



LIST OF ABBREVIATIONS AND ACRONYMS

CIPL	Centre for Information Policy Leadership
DHIS	District Health Information Software
DPA	The Data Protection Act, 2019, Kenya
DPO	Data Protection Officer
DPR	Data Protection Regulation
EHR	Electronic Health Records
EMR	Electronic Medical Records
EU	European Union
GDPR	General Data Protection Regulation
HCPs	Healthcare Professionals
HIS	Health Information system
HIV	Human Immunodeficiency Virus
IT	Information Technology
MFL	Master Facilities List
NCVHS	National Committee for Vital and Health Statistics
ODPC	Office of Data Protection Commissioner
PbD	PrivacyByDesign



DEFINITION OF KEY TERMS

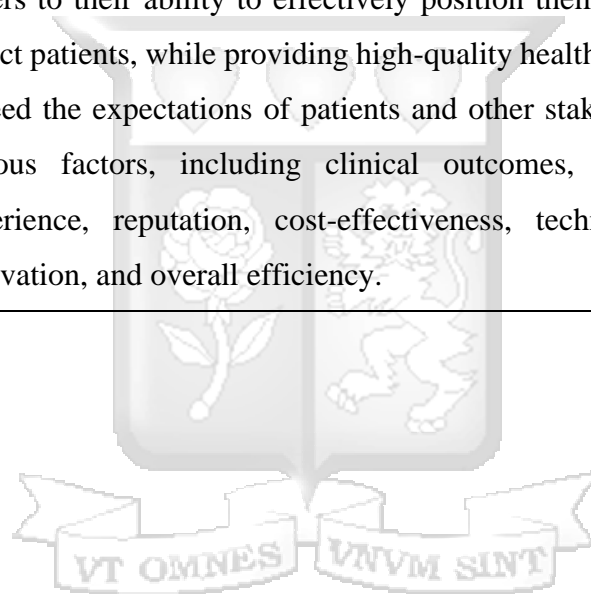
Consent	Consent is any “freely given, specific, informed and unambiguous” indication of the individual’s wishes by which the data subject, either by a statement or by a clear affirmative action, signifies agreement to personal data relating to them being processed for one or more specific purposes (part 1 (2) of the Data Protection Act, 2019, Kenya (DPA).
Data Controller	Any organization, person, or body that determines the purposes and means of processing personal data, controls the data and is responsible for it, alone or jointly. Examples when the data controller is an individual include general practitioners, pharmacists, and politicians, where these individuals keep personal information about their patients, clients, constituents etc. Examples of organizations can be data controllers, for profit or not for profit, private or government-owned, large, or small, where those organizations keep personal information about their employees, clients, etc. (part 1 (2) of the Data Protection Act, 2019, Kenya (DPA).
Data Processor	a natural or legal person, public authority, agency, or other body which processes personal data on behalf of the data controller (part 1 (2) of the Data Protection Act, 2019, Kenya (DPA).
Data subjects	A data subject is a natural person. Examples of a data subject can be an individual, a customer, a prospect, an employee, a contact person, etc. (part 1 (2) of the Data Protection Act, 2019, Kenya (DPA).
Personal data	Any information relating to an identified / identifiable individual, whether it relates to his or her private, professional, or public life. Can be anything from a name, photo, email address, bank details, posts on social networking sites, medical information, IP address, or a combination of the data that directly or indirectly identifies the person (part 1 (2) of the Data Protection Act, 2019, Kenya (DPA).
Data protection	Data protection encompasses the strategies, guidelines, and actions put in place to protect personal and sensitive data from unauthorized access, misuse, disclosure, alteration, or harm. It encompasses the entire data lifecycle, including data collection, storage, processing, and sharing, with the primary

goals of maintaining confidentiality, integrity, and availability of the data while upholding individuals' privacy rights.

Data protection regulations Refers to set of rules, guidelines, and legal requirements that govern the collection, storage, processing, and handling of personal and sensitive data. These regulations are designed to ensure the privacy, security, and proper use of individuals' personal information while providing them with certain rights and protections.

Adoption Refers to the pace or level at which organizations or individuals implement and adhere to measures, policies, and practices aimed at safeguarding personal and sensitive data.

Competitiveness Refers to their ability to effectively position themselves in the market and attract patients, while providing high-quality healthcare services that meet or exceed the expectations of patients and other stakeholders. It encompasses various factors, including clinical outcomes, service quality, patient experience, reputation, cost-effectiveness, technological advancements, innovation, and overall efficiency.



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DEDICATION

I dedicate my work to my family and supervisor. A special feeling of gratitude to my loving wife, Brenda, and daughters Cara and Crystie and my parents Samuel and Lydia whose words of encouragement and push for tenacity and excellence rings in my ears. My brother Meshack and sister Angelica have been by my side and are very special to me. I will always appreciate all that he has done for the many hours of proofreading and guidance. You have all been my best cheerleaders.



CHAPTER ONE: INTRODUCTION

1.1 Introduction

The context for this research project was described in this chapter. The chapter first presents a background to the topic of study, a short review of the variables under investigation, and the statement of the problem. It then presents the objectives and research questions. The chapter then ends with the scope of the study and its significance to various stakeholders.

1.2 Background of the study

The right to personal data protection is a fundamental human right that is enshrined in the Universal Declaration of Human Rights. As a result, because our personal data contains information about our private lives, it must be safeguarded (Kutasi & Marton, 2020). The General Data Protection Regulation (GDPR) (Impreva, n.d.) defines personal data as follows (Article 4): any information relating to an identified or identifiable natural person ("data subject"); (Kutasi & Marton, 2020) define a natural persona as one who can be identified, directly or indirectly, by reference to an identifier such as a name, identification number, location data, an online identifier, or one or more factors specific to that natural person's physical, physiological, genetic, mental, economic, cultural, or social identity.

Digital health systems for hospitals and clinics have been rapidly adopted in high-income countries over the last two decades (Al-Aswad et al., 2019). The transition from paper-based medical information storage and retrieval to digital systems allows for new ways of delivering care and a better understanding of healthcare processes and outcomes (Giaedi T., 2018). These countries have invested large sums and faced numerous challenges and failures along the way (Kruse et al., 2016). Interoperability - the ability to share data between different information technology (IT) systems and facilities - and usability continues to be significant barriers to realizing the full potential of digital systems in healthcare (Zhang & Walji, 2019).

The concerns healthcare facilities have in processing personal data are that data can be collected without consent, collection of unnecessary data, storage of data longer than needed, etc. As a result, there are increased cases of non-compliance with data protection regulations (Williamson & Mulaki, 2015). Data transparency, traceability, immutability, audit, data provenance, flexible access, trust, privacy, and security are all major challenges for today's healthcare data management systems (Yaquob, I., Salah, K., Jayaraman, R., & Al-Hammadi, Y. (2021). Furthermore, a large

portion of existing healthcare systems used for data management is centralized, posing the risk of a single point of failure in the event of a natural disaster Vest, J. R., & Gamm, L. D. (2010).

Low-income countries, such as Kenya, are now following suit and replacing paper-based systems with digital systems (Kang'a et al., 2019). Healthcare facilities in Kenya are now more heavily dependent on Electronic Medical Record (EMR) systems to manage medical data (Aminpour, F., Sadoughi, F., & Ahamdi, M. 2014). Electronic Medical Records (EMR) systems serve as data management tools, storing patients' health data for the course of their treatment and beyond (Kristianson, K. J., Ljunggren, H., & Gustafsson, L. L. 2009). The standards and guidelines on the Implementation of Electronic Medical Records (EMR) systems governs the development and implementation of Electronic Medical Records (EMR) systems in Kenya but these standards and guidelines were developed long before the enactment of the country's (Chebole, C.G 2015).

The enactment of the Data Protection Act, 2019, Kenya (DPA) has resulted in significant deviations in the data protection provisions in the Standards and guidelines implemented in Electronic Medical Records (EMR) systems. Although confidentiality, security and privacy provisions are in the standards and guidelines, they largely pertain to the technical systems and do not reflect certain data protection safeguards and principles, such as data minimization and storage limitation, outlined in The Data Protection Act, 2019, Kenya (DPA) (Mukiri-Smith, H., & Leenes, R. 2021).

The standards and guidelines on the implementation of Electronic Medical Records (EMR) systems must be revised to match the letter and spirit of The Data Protection Act, 2019, Kenya (DPA) (Ogonjo, F, Zalo, M and Odhiambo, R.A 2021). However, the technology landscape has changed significantly for the last ten years, when the systems now in use in The United Kingdom (UK), The United States of America (USA), and The European Union were specified through large national and regional procurement processes (Justinia T., 2017).

The national government, through the Ministry of Health, supports counties and has established an eHealth Unit to steer overall policy, set standards Kang'a et al. (2019), and support national-level systems such as the Master Facilities List (MFL) and the District Health Information Software (DHIS) (for collating national statistics on health indicators (Manya et al., 2012). The

eHealth Unit is also leading the implementation of new national projects, such as creating a national-level patient identifier, establishing a certification framework for Health Information Systems (HIS), and working to establish the use of the Digital Health Atlas for ongoing monitoring of Health Information Systems (HIS) implementations in Kenya (Manya et al., 2012).

To counter the challenges of processing personal data by healthcare facilities, the healthcare sector is now being guided by local and international standards on data privacy/protection (Argaw, S. T., Troncoso-Pastoriza, J. R., Lacey, D., Florin, M. V., Calcavecchia, F., Anderson, D., ... & Flahault, A. 2020). Moreover, after nearly a decade of debate, Kenya passed The Data Protection Act (DPA) (Act No. 24 of 2019), which is largely modeled after The European Union's General Data Protection Regulations (GDPR) (Mukiri-Smith, H., & Leenes, R. 2021). The General Data Protection Regulation (GDPR) governs the use of personal data in the context of the activities of an establishment in The European Union (EU) that is a data controller or a data processor, regardless of whether the processing takes place in The European Union (EU) or not. By adopting the local and international standards on data privacy/protection, the healthcare sector gains immensely thus improving its competitiveness (Lu, L., Liang, C., Gu, D., Ma, Y., Xie, Y., & Zhao, S. 2021).

The purpose of this research is to establish the effects of data protection regulations on the competitiveness of healthcare facilities by adopting data protection regulations in the health system landscape and to assist the rapidly growing digital health community in Kenya and the wider region in sharing knowledge and experience.

1.2.1 Data protection regulations

Personal data in healthcare facilities, as defined by the Kenyan government, is information about a person (Mwabu, G., Ainsworth, M., & Nyamete, A. 1993). This includes information such as an individual's race, gender, pregnancy, national, ethnic or social origin, age, physical or mental health, well-being, disability, religion, conscience, belief, culture, language, and birth; information relating to information, medical, employment, and financial transactions; identifying number, symbol assigned to an individual; fingerprinted and blood type; contact details (telephone number; correspondence sent to someone privately; person's contact details; person's contact details; person's contact details; person's (GoK., 2013).

Given the study's emphasis on privacy, it is critical that data privacy be clearly defined (Xu, H., Dinev, T., Smith, J., & Hart, P. 2011). Fortunately, others have given this issue careful consideration; the study adopts the definition chosen by The National Committee for Vital and Health Statistics (NCVHS), a key advisory committee to the US Department of Health and Human Services (Keeney, S., McKenna, H. A., & Hasson, F. 2011). "Health information privacy refers to an individual's right to control the acquisition, use, and disclosure of identifiable health data." Confidentiality, which is closely related, refers to those who receive information's obligations to respect the privacy interests of those to whom the data pertain (Assistance, H. C. 2003).

Healthcare facilities face challenges in managing their data and protecting it from cyber-attacks daily (Tibrewal, I., Srivastava, M., & Tyagi, A. K. 2022). While the healthcare sector is transmitting data at breakneck speed, it lacks a delivery support system to generate validated predictive results due to privacy and security concerns with big data. In fact, it's a complicated situation in which healthcare practitioners are unaware of the threats that are induced and can potentially jeopardize patient personal data (Abbas, T., Fatima, A., Shahzad, T., Alissa, K., Ghazal, T. M., Al-Sakhnini, M. M., ... & Ahmed, A. 2023)..

The right to personal data protection is a fundamental human right that is enshrined in the Universal Declaration of Human Rights (UN General Assembly, 1948). As a result, because our personal data contains information about our private lives, it must be safeguarded (Miraut Martín, L. 2021). The General Data Protection Regulations (GDPR) (Article 4), defines personal data as any information relating to an identified or identifiable natural person ("data subject"); an identifiable natural person is one who can be identified, directly or indirectly, by reference to an identifier such as a name, identification number, location data, an online identifier, or one or more factors specific to that natural person's physical, physiological, genetic, mental, economic, cultural, or social identity.

According to part v (44) of the Data Protection Act, 2019, Kenya (DPA), personal data must be processed transparently and with strict regard for privacy, as well as fundamental rights, freedoms, and guarantees. The Data Protection Act, 2019, Kenya (DPA) significantly alters the way institutions store and organize personal data. The regulation includes several measures, including the introduction of a new professional function known as a Data Protection Officer (DPO);

imposition of financial penalties for non-compliance with the regulation's rules; territorial expansion of the regulation's application; Self-regulation of personal data processing; breach of notification obligation; and establishment of the data holder's right to consent. Several national organizations and consulting firms have defined a set of practices that healthcare facilities should follow to implement The Data Protection Regulation (DPR). Bennett (2018) recommends reviewing internal procedures to ensure that all data holder rights and activities related to personal data processing are properly documented. Furthermore, healthcare facilities should review their policies and practices considering the new regulatory requirements (Bennett, 2018).

1.2.2 Organizational competitiveness

Organizational competitiveness is influenced by a range of factors, including both internal and external elements. Internal factors involve the individual capabilities of organizations to strategically operate within a competitive market, while external factors are beyond a company's control but still impact its behavior and operations within competitive markets. These factors shape the ability of organizations to compete effectively (Porter, 1980; Kogut, 1993). Traditional competition in healthcare includes factors such as price, quality, convenience, and superior products or services, but technological advancements and innovation also play a role in shaping competition. One key function of competition in healthcare is its potential to reduce costs by eliminating inefficiencies that would otherwise result in higher healthcare expenses for patients (Rivers, 2008).

The concept of competitiveness has long been the subject of policy discussions and extensive scholarly analysis. Competitiveness refers to an organization's capacity to compete with rivals, whether they are individual firms, entire industries, regions, or even countries. The understanding of competitiveness and its significance in relation to policies has been a topic of ongoing debate without clear resolutions (Porter, 1990; Sandy & Zeh, 2012). Various aspects of healthcare facilities' competitiveness have been studied, focusing on the links between competition and healthcare quality, costs, and patient satisfaction. These studies demonstrate how competition can lead to improved customer value over time through quality improvements, cost reductions, and increased satisfaction (Rivers & Glover, 2008).

Competition has wide-ranging impacts on healthcare facilities, with research documenting the effects of increased competition. Compliance with data protection regulations imposes significant costs on firms. A study by the International Association of Privacy Professionals (IAPP) found

that firms spent an average of \$1.3 million on General Data Protection Regulation (GDPR) compliance in 2018, with Fortune 500 firms in the U.S. facing costs as high as \$16 million. These costs encompass staff, technology solutions, legal counsel, consultants, and training, and they continue to incur ongoing operational expenses. The high compliance costs act as barriers for new entrants in data-intensive industries, potentially reinforcing the dominance of established facilities. Data privacy regulations also bring challenges for firms in collecting and utilizing personal data, affecting business models that rely on data-driven insights and analytics. Despite the potential advantages larger firms have in complying with regulations, their competitive edge can be diminished by the limitations and restrictions imposed by data protection regulations (Bessen et al., 2020; Marthews & Tucker, 2019).

1.2.3 Healthcare Facilities in Nairobi

The Kenyan health system can be divided into three categories: public providers; private non-profit organizations (including faith-based and mission hospitals as well as local and international NGOs); and private for-profit healthcare providers (Kioi, Cowden, & Karodia, 2015).

Kenya's public healthcare system is structured in a hierarchical manner that begins with primary healthcare, with the lowest unit being the community facilities, and then graduates, with complicated cases being referred to higher levels of healthcare. Kenya's public health sector is one of the 14 devolved functions managed by the 47 county governments as provided in the Fourth Schedule of the 2010 Constitution. The first five levels are managed on the county level, the sixth level by the national government. In this system the patients may move from one level to the next by using a referral letter.

The Ministry of Health (MOH) has a coordinating and capacity-building role that all services are in line with established policies and standards. The current structure consists of the following six levels as per the table below:

Table 1.1.: Organization of Public Healthcare Service Delivery System

Level	Description
Level 1	<ul style="list-style-type: none">• Community facilities - Run by certified medical clinical officers.
Level 2	<ul style="list-style-type: none">• Dispensaries - The dispensary is managed by clinical officers and functions similarly to a health center, with the exception that it lacks in-patient services.
Level 3	<ul style="list-style-type: none">• Health centres – Run by nurses, a clinical officer, and at least one doctor. These are small hospitals with few amenities, but they provide services comparable to those at large hospitals.
Level 4	<ul style="list-style-type: none">• Primary referral facilities / County hospitals – Supervised by a director who is a doctor. These medical facilities provide all-encompassing care. There is typically only one hospital each county, but major towns like Nairobi have two. They provide letters of referral to other facilities and, in theory, offer the same services as Level 3 hospitals..
Level 5	<ul style="list-style-type: none">• Secondary referral facilities / County Referral hospitals – Run by medical chief executive officers. These are the county referral hospitals, which were originally known as provincial hospitals, and they can accommodate over 100 in-patient patients. They also conduct health-related studies. In Nairobi, Mama Lucy Hospital and Mbagathi Hospital both serve as Level 4 hospitals and county referral centers..
Level 6	<ul style="list-style-type: none">• Tertiary referral facilities / National referral hospitals - They provide the same variety of services as Level 5, but they also provide patients with specialist therapies. They also serve East Africa and Central Africa in addition to Kenyans. They consist of the National Spinal Injury Referral Hospital, Moi Teaching and Referral Hospital, Mathari Hospital, and Kenyatta National Hospital.

Source: Kenya Health Policy 2014-2030 page 40

The private healthcare sector comprises the activities of agents who are largely outside the control of government. This includes individuals who privately own health facilities and seek to make profit in the healthcare sector, clinics and hospitals owned by private employers and those operated by religious missions and other non-governmental organizations (David I. M, Diana N. K, Stephen M, Damiano K. M, 2004).

Many studies on private healthcare providers have cited the existence of confusing arrays of terminologies over their classification (Oduwo et al, 2001; Kumaranayake, 1998; Hursh-Cesar et al, 1994).²

In addition to 2 sub-county hospitals, 47 county referral hospitals, and 7 national referral hospitals, there are 57 public hospitals in the nation. Kenya has 12 hospitals run by non-governmental organizations, 58 hospitals run by missions, and 103 private hospitals. Nairobi County has 62 hospitals, which is the greatest number of hospitals.

1.3 Problem Statement

According to Deloitte (2021) data privacy has become a growing concern that influences the competitiveness of the healthcare industry globally leading countries to respond by creating data protection regulations. The ability to collect and utilize unique and non-substitutable data has become a key to how firms stand out in the competitive environment (Lambrecht and Tucker 2015).

Adopting data protection regulations is likely to improve the competitiveness of healthcare facilities through quality and process improvements that lead to decreased costs, which in turn results in increased customer satisfaction (Rivers and Glover, 2008). According to Mucheru (2013) achieving sustainable compliance with the DPA and other data protection regulations may sound overwhelming, but organizations that are able to implement data protection regulations make their businesses more efficient, secure, and competitive.

Healthcare facilities in Kenya have not fully implemented Electronic Medical Records (EMR) systems that embed privacy into their design thereby ensuring some level of compliance with existing privacy regulations (Kutasi & Marton, 2020). This poses significant risks to patients' personal data. Many healthcare facilities in Kenya have yet to fully understand the existing privacy regulations and how these affect their operations. Healthcare facilities are encountering data protection laws locally for the first time, and as a result, they may lack adequate financial, human, and technical resources to implement and comply fully with the provisions to the DPA (Kutasi & Marton, 2020). According to a research survey released in May 2021 by Infotrak Research Consulting Limited, 70 per cent of Kenyans; including patients, are unaware of the data protection law while most patients are unaware of their data protection and privacy rights..

The DPA has brought about many opportunities for differentiation, strategic advantage, and innovation in a highly competitive marketplace and it is with this view that this study intends to highlight the effects of data protection regulations on the competitiveness of healthcare facilities in Nairobi, Kenya.

1.4 Objective of the Study

1.4.1 General Objectives

The study sought to establish the effects of data protection regulations on the competitiveness of healthcare facilities in Kenya.

1.4.2 Specific Objectives

- i. To determine the effects of the adoption rate of data protection regulations on the competitiveness in healthcare facilities in Nairobi, Kenya.
- ii. To determine the effects of data protection compliance costs on the competitiveness of healthcare facilities in Nairobi, Kenya.
- iii. To explore the effects of adoption of PrivacyByDesign on the competitiveness of healthcare facilities in Nairobi, Kenya.

1.5 Research Questions

- i. What was the effect of the adoption rate of data privacy regulations on the competitiveness of healthcare facilities in Nairobi, Kenya?
- ii. What was the effect of data protection compliance cost on the competitiveness of healthcare facilities in Nairobi, Kenya?
- iii. What was the effect of adoption of PrivacyByDesign on the competitiveness of healthcare facilities in Nairobi, Kenya?

1.6 Scope of the Study

The study focused on the analysis of the effects of data protection regulations on the competitiveness of healthcare facilities. From the conceptual scope, the factors applied in the current study were, the rate of adoption of data protection regulations, data protection compliance costs and PrivacyByDesign and their effects of the competitiveness of healthcare facilities in Nairobi, Kenya. From the theoretical scope, the study was anchored on Tavani and Moor's Privacy Theory and Nissenbaum's Theory of Privacy. Data was acquired from the various cadres of employees within the healthcare facilities that formed the population of the study. Geographically, this study was examined in Kenyan healthcare facilities in Nairobi; three level five health facilities and three private health facilities.

1.7 Significance of the Study

It is hoped that the study's findings will contribute to new knowledge, providing valuable literature to scholars and future researchers who wish to conduct research on Data Protection Regulations on the competitiveness of healthcare facilities. The Kenya Ministry of Health was able to identify the critical determinants of Data Protection Regulations implementation within healthcare facilities and develop policies to prevent the misuse of patients' personal data for selfish gain. The study will also raise awareness among healthcare practitioners regarding the impact of the Data

Protection Regulations on their day-to-day work. Customers within the healthcare facilities may also gain some insight into how Data Protection Regulations influences the value for them over time. Finally, this study will re-focus competition authorities' assessment of market power from price and output only to other key considerations such as customer welfare and data privacy.

Theoretical Contributions:

The study contributes to the existing body of knowledge by exploring the relationship between data protection regulations and competitiveness in the healthcare industry. By investigating how data protection regulations affect the competitive position of healthcare facilities, this research can provide theoretical insights into the dynamics between regulatory compliance and organizational competitiveness.

The study builds upon the existing theoretical frameworks related to data protection, privacy, and competitive advantage. It can contribute to theories and models that explain the impact of regulatory compliance on organizational performance, competitive positioning, and strategic decision-making in the healthcare sector.

The research can provide a theoretical understanding of the role of data protection regulations in shaping healthcare organizations' data management practices, risk management strategies, and overall information governance frameworks. It can contribute to theoretical discussions on the importance of data protection and privacy in healthcare settings and the interplay between compliance, competitiveness, and patient trust.

Methodological Contributions:

The study can make methodological contributions by employing rigorous research methods to investigate the effects of data protection regulations on competitiveness. It can utilize a mixed-methods approach, combining quantitative analysis to measure the adoption rate of data protection regulations and its impact on competitiveness, with qualitative methods such as interviews or case studies to provide rich insights into the experiences and perspectives of healthcare organizations.

The research can contribute methodologically by employing validated scales or developing new measurement instruments to assess the competitiveness of healthcare facilities. This can enhance

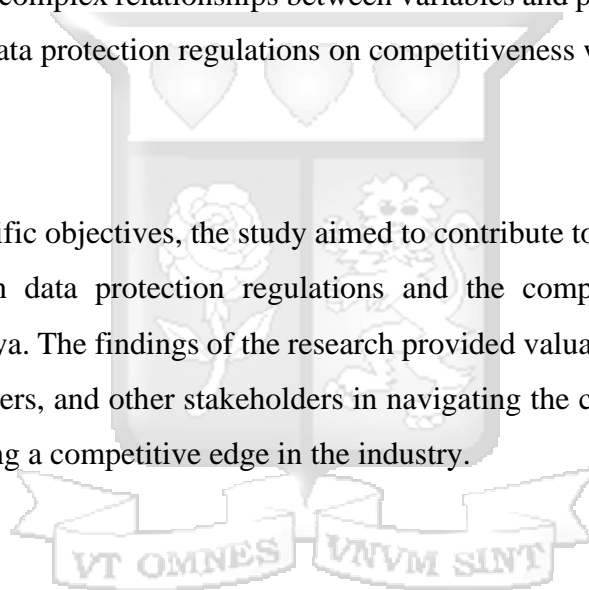
the reliability and validity of the study's findings and provide a robust foundation for future research in this domain.

The study can adopt a longitudinal research design, collecting data over an extended period, to capture the dynamic nature of the relationship between data protection regulations and competitiveness. This can enable the identification of long-term trends, the assessment of the cumulative effects of regulatory compliance, and the exploration of potential moderating factors that influence the relationship.

By employing statistical techniques such as regression analysis or structural equation modeling, the study can analyze the complex relationships between variables and provide empirical evidence regarding the effects of data protection regulations on competitiveness while controlling for other relevant factors.

1.8 Chapter summary

By addressing these specific objectives, the study aimed to contribute to a better understanding of the relationship between data protection regulations and the competitiveness of healthcare facilities in Nairobi, Kenya. The findings of the research provided valuable insights for healthcare organizations, policymakers, and other stakeholders in navigating the complex landscape of data protection and maintaining a competitive edge in the industry.



CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

This chapter evaluates the relevant literature on the effects of data protection regulations on healthcare facility competitiveness. It was organized in accordance with the study's objectives. It emphasizes empirical as well as theoretical literature.

2.2 Theoretical Review

A theory is a guide for research that includes concepts, constructs, theoretical principles, and tenets (Grant & Onsanloo, 2014). It establishes the foundation for research and directs the researcher not to stray beyond the boundaries of established concepts in order to create his or her final educated and educational impact (Adom et al., 2018). It establishes the foundation for research and directs the researcher not to stray beyond the boundaries of established concepts to create his or her final educated and educational impact (Adom et al., 2018). A theoretical framework is derived from an acceptable theory that provides philosophy, epistemology, methodology, and an analytical approach to a dissertation (Grant & Osanloo, 2014). Furthermore, it provides a solid foundation for supporting and structuring a study's rationale, as well as an underlying thread permeating all dissertation components. This section discusses two theories:

2.2.1 Tavani and Moor's Privacy Theory

Tavani and Moor identify the fundamental and essential components of a privacy theory. One result of their research is a three-part model to describe a sufficient theory of privacy, which they argue must include three key elements: (1) Privacy concept, (2) Privacy justification, and (3) Privacy management (Tavani & Moor, 2001). A good theory of privacy has at least three components: an account of the concept of privacy, an account of the justification for privacy, and an account of the management of privacy. This tripartite structure of the theory of privacy is important to keep in mind because each part of the theory performs a different function. To give an account of one of the parts is not to give an account of the others. (Tavani & Moor, 2001, p. 6).

The Tavani and Moor's privacy theory informs the study's independent variables. According to Tavani and Moor (1997), privacy and data protection is a state where a data subject is protected from intrusion, interference, and unauthorized information access by others. Data protection regulations have an impact to the competitiveness of healthcare facilities in Nairobi.

This theory resonates with the study in that in practice, the "concept" and "justification" of privacy can be addressed through careful consideration and clear articulation in governance policy. Nissenbaum, H. (2010) states that to underpin consideration of these privacy issues, an institution may choose to adopt a specific philosophy. Privacy broadly refers to protection from intrusion and data collection by actors who are not the subject of the information. The justifications for privacy are frequently "rights" based on data subject rights. Each aspect of privacy should be addressed in governance policies, ideally before implementing privacy strategies. The term "privacy management" broadly refers to the integration of technologies, policies, and procedures designed to address data protection and other privacy concerns.

Moor and Tavani focused on developing a privacy theory rather than developing specific justifications or recommendations for privacy management appropriate for specific contexts. As a result, this approach establishes a privacy theory foundation that will keep up with technological innovation activities. The resulting theory can be effective in a wide range of contexts, with enough flexibility to respond to constantly evolving technologies that could undo inadequate conceptualizations of privacy. Cavoukian, A., & Castro, D. (2009) As new technologies emerge, the "management" aspect will become more volatile than the comparatively stable "concept" and "justification" aspects. The concept of data protection by design was well articulated in tandem with the listed theory.

2.2.2 Nissenbaum's Theory of Privacy

This framework suggests that informational norms governing the sharing of information within and between contexts are essential in understanding privacy. These norms can be explicit, such as codified laws, or implicit, such as social customs. The framework identifies four key parameters: contexts, actors, attributes, and transmission principles.

Contexts are defined as structured social settings with canonical activities, roles, relationships, power structures, norms, and internal values. In the context of healthcare facilities, the World Medical Association's declarations, such as the Declaration of Geneva, codify dominant values such as patient health, autonomy, dignity, and confidentiality. Different contexts may inform the other parameters.

Actors in the contextual integrity framework encompass information subjects, senders, and recipients. In healthcare facilities, the primary information subjects are participating patients. The storage of personal data with specific attributes, such as biomaterials and health-related data, is

governed by explicit consent and purpose limitation under regulations like the General Data Protection Regulation (GDPR). Healthcare facilities must justify the collection of specific data and follow healthcare protocols reviewed by medical-ethical committees.

Transmission principles determine how information flows in a given context, including reciprocity, confidentiality, and sharing with additional recipients. Clinical biobanks, for instance, involve unidirectional information exchange, voluntary consent for donation, and explicit rights for withdrawal. Confidentiality is recognized throughout information processing, storage, and analysis, with data saved in coded form and access restricted to authorized individuals.

The contextual integrity framework emphasizes the need for governance structures that formalize these transmission principles and ethical norms. Ethical governance, beyond legal requirements, is crucial for responsible research conduct and building trust in data research. Incorporating ethical principles, such as disclosure of unexpected findings and maintaining confidentiality, strengthens the overall integrity of the research process.

The theory's contribution lies in providing a benchmark for the independent variable, PrivacyByDesign (PbD), in the study. PbD aims to proactively incorporate data privacy safeguards into the design of information systems, products, and services. By considering various forms and ethical norms shaped by social, cultural, political, and economic domains, PbD seeks to prevent data privacy breaches and protect individuals' privacy.

2.3 Empirical Review

This section reviews relevant literature pertaining to the effect of data privacy regulations on the competitiveness of healthcare facilities. It was structured according to the study's objectives and demonstrated how similar study variables were applied to infer conclusions and recommendations.

2.3.1 Effects of adoption rate and competitiveness

Competitive forces play a significant role in driving the adoption of new technologies, including the adoption of Data Protection Regulations (DPR). Aghion et al. (2001, 2005) argue that competitive pressures push businesses to adopt new technologies to differentiate their products and gain a competitive advantage, leading to increased profitability. Having the highest quality computer systems, which comply with data protection regulations, allows businesses to enhance their infrastructure reliability and scalability, improve cash flow, and develop competitive

capabilities such as increased agility, faster time-to-market, and new revenue streams (Lynn, 2018).

The adoption of DPR not only benefits businesses but also has positive implications for consumers. It leads to improved service and experience while potentially reducing or eliminating financial costs for consumers. By implementing data protection measures mandated by regulations, organizations can enhance the security and privacy practices surrounding consumer data, ensuring a higher level of trust and protection for their customers (Lynn, 2018).

However, it is important to note that the adoption of DPR can pose challenges for smaller companies. A study on security and privacy practices in Danish companies found that smaller organizations were less likely to enact or adopt the necessary changes to comply with The General Data Protection Regulation (GDPR) (PwC, 2018). These companies may face more significant hurdles in implementing data protection measures if they had not previously prioritized personal data protection. The level of effort required to achieve compliance will vary based on the existing data protection practices within an organization.

In summary, competitive forces drive the adoption of data protection regulations, as businesses seek to differentiate themselves and gain a competitive advantage. The adoption of DPR brings benefits to businesses, including improved infrastructure reliability, scalability, cash flow, and competitive capabilities. Consumers also benefit from enhanced service and experience with increased security and privacy protections. However, smaller companies may face challenges in adopting and implementing data protection measures, particularly if they had not previously focused on personal data protection.

2.3.2 Effects of compliance costs and competitiveness

DPR has two effects on firm performance. First, companies in The European Union (EU), for example, must use The General Data Protection Regulation (GDPR) compliant processes and technologies, which raises costs and reduces profits. Giving The European Union (EU) residents the right to access, correct, delete, and port their personal data, for example, necessitates companies developing or purchasing information technology (IT) systems that support these requirements. According to anecdotal evidence, these costs can be significant. According to PwC (2018), some businesses spend more than 10 million Euros per year on compliance. Second, the regulation may

have a negative impact on e-commerce, resulting in lower sales. The General Data Protection Regulation (GDPR) forbids websites from sharing user data with third parties without each user's consent. Valid consent must also be affirmative, which increases the cost of data collection and may limit companies' ability to extract personal data. However, when asked for permission to use their data, users may incur additional costs. If this is the case, we can expect a decrease in online sales as a result.

Large corporations have more technical and financial resources to comply with regulations (Brill 2011), invest more in lobbying (Bombardini 2008), and may be better positioned to obtain individual consumer consent for personal data processing (Goldfarb and Tucker 2011). Indeed, larger companies may have increased their market share at the expense of smaller companies by being better able to deal with the regulatory burdens (Johnson et al. 2020, Peukert et al. 2020).

Findings from studies have led to conclusions that the adverse performance impact of The General Data Protection Regulation (GDPR) on both profits and sales have been significant for companies operating in The European Union (EU). But the main effect has occurred through rising compliance costs rather than reduced sales. That said, the results must be interpreted with caution.

First, some of the adverse impacts documented might be temporary adjustment costs, meaning that the negative effects of The General Data Protection Regulation (GDPR) might taper off in the future. Second, if The General Data Protection Regulation (GDPR) is widely adopted and becomes a global standard, companies targeting The European Union (EU) residents will gradually become less disadvantaged. Third, estimates from the studies do not capture the aggregate welfare effects of the regulation since potential benefits to citizens concerned with data protection are unaccounted for.

2.3.3 Effects of PrivacyByDesign and competitiveness

PrivacyByDesign has been sighted as one of the two biggest challenges in The General Data Protection Regulation (GDPR) adoption program. It seems that PrivacyByDesign is a crystal-clear concept understood mostly from a theoretical perspective (Preukschat, A., & Reed, D. (2021).

However, when the hands-on work is undertaken to implement it, can an effective way of doing it be found? Is it a matter of elaborating on an internal regulation that states that any project dealing

with personal data should take privacy seriously from the very beginning? Would that solve the problem even if that internal regulation is formally approved by senior management and made public to the organization? In time, would that actually fill all possible gaps where privacy should be considered? Serres (2019) and Withey (2018) discusses the need for healthcare facilities to invest more in cybersecurity, specifically in hiring cybersecurity professionals and DPOs and incorporate PrivacyByDesign in their product and service development.

To ensure that the consent, rectification, and deletion policies are implemented in accordance with the regulations, new requirements must be added to the applications. At the organizational level, an audit system that allows citizens' data to be centralized from multiple applications is required, as is investing in employee training and rethinking budget planning to include budget associated with data privacy and security operations (Bilyk, 2018). Nonetheless, the benefits of The DPR are emphasized, including legal clarification, trust, better decision-making, and risk assessment (Bilyk, 2018). Furthermore, the documentation process was improved because all identified data breaches must be documented, explaining the underlying fact, the consequences, and the mitigation actions (Krikke et al., 2019).

2.3.4 Competitiveness of healthcare facilities in the data protection regime

Several studies have been conducted to assess the impact of Data Protection Regulation (DPR) on the competitiveness of healthcare facilities and the security of business information. Wallace and Castro (2018) believe that The DPR will have an impact on the development of competitive advantage because DPR adoption will eventually lead to a high percentage of efficiency and accuracy derived from personal data analysis.

Politou et al., (2019) discuss the challenges that the new way of handling personal data will pose to healthcare facilities that use big data and the internet of things. As a result, Li et al. (2019) forecast that the development and application of emerging technologies in The European Union (EU) will slow significantly in the coming years. Dellei (2019) emphasizes the importance of Data Protection Regulation (DPR) in increasing consumer trust. This situation has the potential to boost sales and give healthcare facilities around the world a competitive advantage.

Other benefits highlighted by Fimin (2018) include The DPRs contribution to minimizing collected personal data and improving its organization and associated data management processes. However,

according to Bennett (2018), while The DPR contributes to the existence of more efficient use and management of personal data, it is important to be aware that risks exist, and healthcare facilities with personal data-based business models will have to find new ways to refine the processes of collecting personal information.

Mackay (2017) believes that organizations must have interoperability mechanisms in place to facilitate data portability. In this regard, Hert et al. (2018) propose two technical approaches to data portability implementation: a minimalist approach and an empowering approach. Data are ported from service X to service Y in the minimalist approach, and the exercise of data portability is inherently linked to the withdrawal of data from the first data controller; whereas in the empowerment approach, data portability does not automatically imply the erasure of data from the first data controller, and this approach encourages the creation of platforms of interoperable services.

2.4 Data Protection Regulation Application in Healthcare Sector

According to the Data Protection Act, 2019, Kenya (DPA), personal data must be processed transparently and with strict regard for privacy, as well as fundamental rights, freedoms, and guarantees. The regulation includes several measures, including the introduction of a new professional function known as a Data Protection Officer; imposition of financial penalties for non-compliance with the regulation's rules; territorial expansion of the regulation's application; Self-regulation of personal data processing; breach of notification obligation; and establishment of the data holder's right to consent. Several national organizations and consulting firms have defined a set of practices that healthcare facilities should follow to implement data protection regulations.

Bennett (2018) recommends reviewing internal procedures to ensure that all data holder rights and activities related to personal data processing are properly documented. Furthermore, healthcare facilities should review their policies and practices considering the new regulatory requirements (Bennett, 2018).

According to Article 31-part (c) of the Kenyan Constitution, every person has the right to privacy if their person, home, or property is searched; their possessions are seized; information relating to their family or private affairs is unnecessarily required or revealed; or the privacy of their

communications is violated (GoK., 2013). Second, Kenya lacks a cybercrime law; however, the 2014 draft Cybercrime and Computer Related Crimes Bill 10 seeks to provide law enforcement agencies with the legal and forensic tools needed to combat cybercrime. Third, data retention is governed by the Kenya Information and Communications Act of 2009, which governs the retention of electronic records as well as "information in its original form." According to Section 15(1) of the Kenya Information and Communications (Consumer Protection) Regulations 2010, a licensee "shall not monitor, disclose, or allow any person to monitor, disclose, the content of any information of any subscriber transmitted through the licensed systems by listening, tapping, storage, or other kinds of interception or surveillance of communications and related data" (Privacy International, 2017).

According to The DPA, 2019, Kenya Part II (7) 1 on Duty to Notify, "Before an agency collects personal information directly from a data subject, the agency must take steps in the circumstances to ensure that the data subject is aware of; the fact that the information is being collected; the purpose for which the information is being collected; the intended recipient of the information; and the name and address of the agency that is collecting the information."

According to Edwards and Richard (2018), it is necessary to review subcontracting contracts for services provided as part of the processing of personal data to ensure that they include all the elements required by the regulation.

Finally, CIPL (2016) emphasizes the importance of evaluating the type of data collected, specifically whether any of it falls under the definition of sensitive data. Sensitive data, also known as special categories of data, are listed in Article 9 of The Data Protection Regulation. The following data fall into the category of sensitive data and must be processed under strict conditions: Personal data revealing racial or ethnic origin, political opinions, and religious or philosophical beliefs; genetic data, biometric data processed solely to identify a human being; health-related data; and information about a person's sexual life or sexual orientation. The DPR includes a new rule that aims to assess the impact of specific data processing on individuals' rights and freedoms. Before beginning a data processing process, this rule makes it possible to avoid potentially serious harm. In three cases, the impact of this measure is required: a systematic evaluation of personal

data using automated processing; large-scale processing operations of special categories of data; and large-scale monitoring of publicly accessible areas.

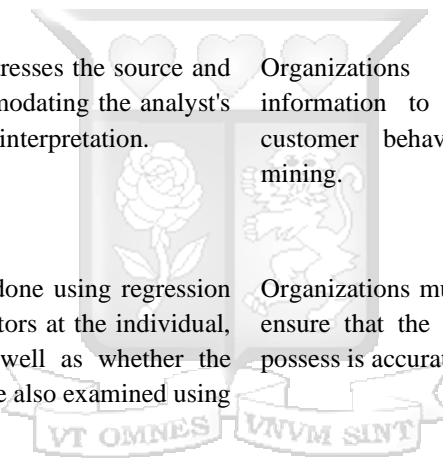
The Data Protection Regulation also establishes new data subject rights, such as the right to data portability, the right to be forgotten, and the right to object (Kaushik & Wang, 2018). Furthermore, The DPR reinforces rights that are typically found in national legislation, such as the right to information, rectification and deletion, and transparency. The rights to information and access are outlined in Articles 13 and 14 of the DPR, respectively, while the right to access refers to the holder's ability to access his or her data. In this sense, the data holder should not be prevented from accessing his data, and access should be simple and free of charge. Furthermore, if his or her data is transferred, the data holder must be informed of appropriate safeguards. The DPR is now fully in effect, and data processors/controllers in healthcare facilities must ensure that processing is lawful, fair, and transparent. While the principles of lawfulness and fairness express legalistic concepts, transparency suggests a socio-technical concept: it should be realized as a technical feature whenever appropriate (Article 29 Working Party, 2018, see paragraphs: 4, 7) but is intended to assist data subjects in understanding how their data is processed and whether it is done lawfully and fairly.

2.5 Research Gap

Table 2.1 summarizes previous research whose variables are related to those investigated in this study. An understanding of the methodologies used, and the findings enable the researcher to identify knowledge gaps. The studies did not use the various attributes denoting the variables that was used in the current study, resulting in a contextual gap.

Table 2.1: Summary of Research Gaps

Author	Title	Methodology/ Approach	Findings	Research Gap and how the study will fill the gap
Solove (2006)	A taxonomy of data privacy	Descriptive and inferential statistics were employed to analyze the data. To display the distribution of the responses, descriptive statistics were employed. To demonstrate the association and relationship between the variables, correlation and regression was used.	In addition to disclosing personal information about a person, data privacy laws violations also violate the confidentiality entrusted to a particular relationship.	This study focused on the impact of data privacy regulation on individuals, as opposed to the current study, which focuses on the effect of data protection regulation on the competitiveness of healthcare facilities in Nairobi, Kenya.
O'Malley and Prothero (2004)	Beyond the frills of relationship marketing	The Tesch (1990) technique, which stresses the source and context of the data as well as accommodating the analyst's values, was used for data analysis and interpretation.	Organizations use personal information to better understand customer behavior through data mining.	The study concentrated on organizations in general, as opposed to the current study, which focuses on healthcare facilities presenting a conceptual gap
Goldfarb and Tucker (2012a)	Privacy and Innovation. Policy and the Economy.	The estimation of data patterns was done using regression analysis. The association between factors at the individual, survey, and geographical levels as well as whether the respondent discloses their income were also examined using the econometric estimate approach.	Organizations must use vigilance to ensure that the personal data they possess is accurate.	The study concentrated on organizations in general, as opposed to the current study, which focuses on healthcare facilities presenting a conceptual gap
Goldfarb and Tucker (2012b)	Shifts in privacy concerns.	The correlation between the independent variables under consideration was measured using the Spearman rank correlation, and inductive qualitative content analysis was performed to identify overarching themes regarding the study variables.	Both disclosure and a breach of confidentiality harm people. In addition to exposing personal information, privacy violations go against the secrecy that has been agreed upon in a partnership.	The scope of the study was limited to disclosure and breach of confidentiality, as opposed to the current study, which focuses on the impact of data protection regulations on the competitiveness of healthcare facilities in Nairobi, Kenya.



Source: Researcher (2023)

2.6 Conceptual framework

The purpose of the study is to measure the impact of data protection regulations on the competitiveness of healthcare facilities in Nairobi, Kenya. According to Rocco and Plakhotnik (2009), a conceptual framework establishes the foundation for research objectives and questions by anchoring a study in the appropriate knowledge constructs. The conceptual framework aims to highlight the components of competitiveness and connect them to data protection. As shown in Figure 2.1, data protection was the independent variable, while competition was the dependent variable.

Independent Variable – Data Protection Regulations

Dependent Variable

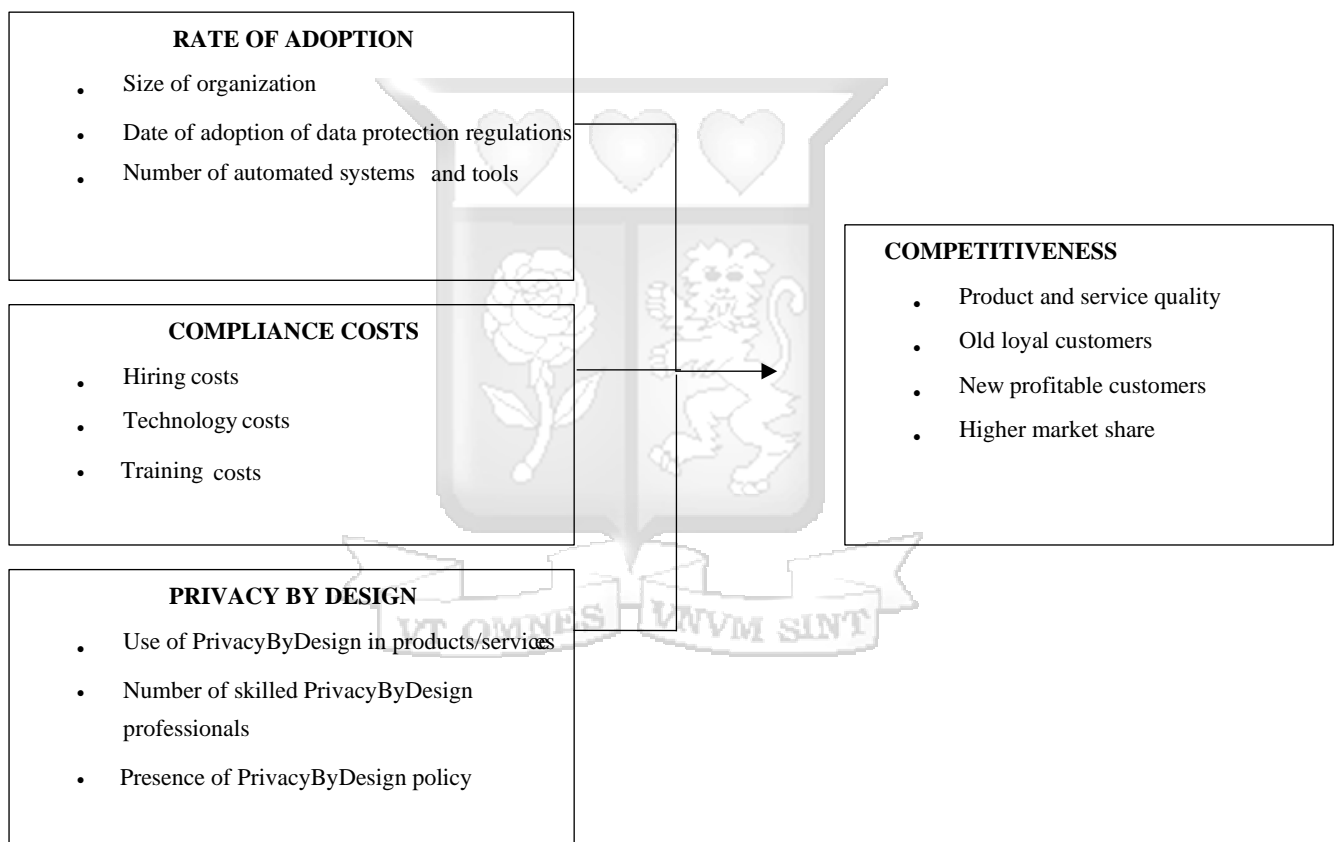


Figure 2.1: Conceptual Framework

2.7 Operationalization of Study Variables

This section went over how the research variables were put into action. Competitiveness was the dependent variable. Data protection; with its elements: rate of adoption, compliance costs, and PrivacyByDesign, are the independent variables. The study looked at how data protection regulations affected the competitiveness of healthcare facilities. This is shown in Table 2.2.

Table 2.2: Operationalization of Study Variables

Variable	Nature of variable	Operational indicators	Measurement Scale	Measurement and analysis	Source
Rate of adoption	Independent variable	<ul style="list-style-type: none"> • Size of the organization • Date of adoption of data protection regulations • Number of automated systems and tools 	Likert-type scale (Ordinal Scale)	Descriptive, inferential analysis	Aghion et al. (2001, 2005)
Compliance costs	Independent variable	<ul style="list-style-type: none"> • Hiring costs • Technology solutions • Training costs 	Likert-type scale (Ordinal Scale)	Descriptive, inferential analysis	Brill (2011), (Bombardini) 2008, Goldfarb and Tucker (2011) Johnson et al. (2020), Peukert et al. (2020)
PrivacyByDesign (PbD)	Independent variable	<ul style="list-style-type: none"> • Use of PrivacyByDesign (PbD) in products and services • Number of skilled PrivacyByDesign (PbD) professionals • Presence of PrivacyByDesign (PbD) policy 	Likert-type scale (Ordinal Scale)	Descriptive, inferential analysis	Serres (2019) Withey (2018) Krikke et al. (2019) Bilyk (2018)
Competitiveness	Dependent variable	<ul style="list-style-type: none"> • Product and service quality • Old loyal customers • New profitable customers • Higher market share 	Likert-type scale (Ordinal Scale)	Descriptive, inferential analysis	Wallace and Castro (2018), Politou et al., (2019), Li et al. (2019). Dellei (2019), Fimin (2018), Bennett (2018), Mackay (2017), Hert et al. (2018), Rivers & Glover, (2008)

Source: Researcher (2023)

2.8 Chapter Summary

Data subjects were subjected to new methods of managing personal data as healthcare facilities seek a competitive advantage as technology advances. Invasion of privacy occurs when there is a loss of control because of data exchanges with customers seeking convenience (O'Malley and Prothero, 2004). Regardless, a forward-thinking approach policy that takes changes into account must be fully developed to protect customers. If nothing changes, customers were subjected to information sharing and risking their personal information in a virtual environment over which they have no control.



CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This section describes the research design, followed by the study population and the data collection and analysis methods that were used to answer the research questions. It concludes with reflections on research quality and research ethics.

3.2 Research Philosophy

Research philosophy is concerned with the origin, nature, and progression of knowledge (Bajpai,2011). It is also defined as a framework that directs how research should be carried out based on assumptions about reality and the nature of knowledge (Collis and Hussey, 2014).

According to Johnson and (Assumptions & Frameworks, 2018) as business and management researchers, we must be aware of the philosophical commitments we make through the research strategy we choose, as this will have a significant impact on what we do and how we understand what we are investigating. A positivist paradigm was used in this study. Positivism provides a theoretical description as well as scientifically valid fact data. Theories provide a foundation based on descriptions and justifications. According to(Creswell, 2009), positivists believe in being steady and defined from a perspective that does not interfere with studied phenomena. Furthermore, the phenomena being studied should be isolated and credible observations made. It frequently entails altering reality with variations in independent adjustable to recognize uniformities and form associations amongst important factors of the social biosphere. Forecasts are based on previously described realities and their interdependence.

3.3 Research Design

Research design provides a framework for organizing research work activities such as the generation and collection of data that addressed the research questions. According to Orodho (2006), the research design is the arrangement of conditions for data collection and analysis in a way that aims to combine relevance to the research purpose with economy and procedure.

An explanatory research design was used by the researcher to assess the relationship between adoption of data protection regulations and the competitiveness of healthcare facilities. This type of research is useful if you want to understand the interrelationships between the phenomena under

consideration (Saunders et al., 2016). The three main goals of the research are to describe, explain, and validate results. Following creative exploration, description emerges and serves to organize the findings to fit them with explanations, which are then tested or validated (Krathwohl, 1993). The research data was collected using questionnaires with constructs assessed using Likert scales, which was distributed to respondents in healthcare facilities. The questions were designed in such a way that standardized responses for comparison analysis can be obtained.

3.4 Target Population

A population, according to Kombo and Tromp (2006), is a group of people, objects, or things from which samples are taken for measurement. The study's target was employees in all the three level five health facilities in Nairobi and three Private Hospitals in Nairobi (unit of analysis).

Key unit of observation included staff members in management, health information officers, laboratory technologists, medical officers, IT, finance, Doctors, and nurses' representatives of the respective healthcare facilities. These healthcare facilities were selected because they have employees who oversee over one hundred beds capacity for their in-patient services, provide an array of medical services across the economic spectrum in Nairobi, and issue referral letters to other healthcare facilities.

Thus, the study target population was 450 respondents. Table 3.1 shows the target population of the study.

This population will therefore avail an appropriate sample population that will provide richly textured information, relevant to the study. The facilities are Mama Lucy Hospital, Mbagathi Hospital, Ruai Family Hospital, Coptic Hospital, Nairobi Hospital, and Aga Khan University Hospital.

Table 3.1 Target Population

Public (Level 5) Health Facilities		Private Health Facilities	
1. Mama Lucy Hospital		4. Coptic Hospital	
2. Mbagathi Hospital		5. Nairobi Hospital	
3. Ruai Family Hospital		6. Aga Khan University Hospital	
STAFF CADRE			
Target population per cadre - public		Target population per cadre - private	
Management	15	Management	15
Health information officers	18	Health information officers	18
Lab technologists	30	Lab technologists	30
Medical Officers	36	Medical Officers	36
IT & Finance	6	IT & Finance	6
Doctors & Nurses	120	Doctors & Nurses	120
Total Public Health Facility	225	Total Private Health Facility	225
Total target population for public and private healthcare facilities			450

Source: Researcher (2023)

3.5 Sample size and sampling technique

A sample is a unique subset of a statistical population whose attributes are investigated in order to learn more about the entire population (Ordho & Kombo, 2002). Desu (2012) defines sample as a subgroup of the entire population. This study considered simple random sampling which is a probability sampling technique as all Healthcare Professionals (HCPs) in the five healthcare facilities the opportunity to participate in the study. Also due to the fact that the sample frame is small, a census was used for the questionnaire survey. By conducting a census, one can ensure that the population is representative and that the study's objectives are met. A census is a count or survey of all the elements in the population (Powell, 2004:93). To calculate the sample size of this study Yamane (1967) formula was used to identify the number of responses needed. The equation is as below.

$$n = \frac{N}{1+N(e)^2}$$

Where: n= the number of samples

N=the total population.

e= the level of precision

1= constant

The assumption of this formula was a precision level of 5% and a 95% confidence level. The study sample was highlighted below

$$n = 2250 / 1 + 2250(0.05)^2$$

n = 450 employees

The resultant sample size was 450 employees operating in different functions in the six healthcare facilities selected for this study.

3.6 Data collection

Data collection methods entail converting the research design into a data collection instrument to collect data to meet the research objectives (Chandran, 2004). As a research tool, questionnaires were used in this study. The questionnaire was used to collect primary data for the purpose of investigating the determinants of health-related data utilization for the competitiveness of healthcare facilities, with the target being three level-five healthcare facilities and three private healthcare facilities in Nairobi County, Kenya.

A self-administered questionnaire, according to Kothari (2004), is a methodical way to elicit values, beliefs, attitudes, and opinions. As demonstrated in Appendix II, the researcher created an online survey using the Likert scale. Physical visits to conduct the questionnaire were made in the event that there were no responses to the online questions. When online respondents didn't answer within two weeks, the researcher tried to collect data through physical surveys and face-to-face interviews. Primary quantitative data was the type of information gathered.

A questionnaire was selected for this study due to its advantages in enhancing respondent anonymity and ensuring uniformity of questions, enabling comparability among responses (Smith, 2018). The questionnaire used in this study was divided into five sections. The initial section aimed to gather basic information about the respondents, including their demographics (Johnson et al., 2020). The second section sought to explore the extent of staff involvement in utilizing data to enhance competitiveness (Brown & Williams, 2019). The third section focused on assessing staff attitudes towards data protection (Smith & Jones, 2021). The fourth section examined the role of leadership goodwill in relation to data protection (Garcia et al., 2019). Finally, the fifth section

aimed to elicit responses regarding staff involvement in data protection with the goal of improving competitiveness (Miller & Thompson, 2017).

To ensure consistency in responses, the questionnaire exclusively employed closed-ended questions (Robinson & Johnson, 2018). This format facilitated the differentiation of identical answers, enabling the collection of diverse responses (Smith, 2018). The researcher utilized computerized data collection platforms such as Google Forms for efficient data collection (Johnson et al., 2020). In addition, the institution responsible for the study sent an introduction letter to the respondents, reassuring them that the research was conducted with no intention to harm or disclose any trade secrets (Brown & Williams, 2019).

3.7 Research Quality

3.7.1 Instrument pilot testing

A small number of respondents was used in the pilot testing to assess the appropriateness of the question and their comprehension. The instruments were tested on ten people from two different health facilities in Nairobi County. This accounts for 10 per cent of the sample size. The pilot test will involve simulating the actual data collection process on a small scale in order to obtain feedback on whether the instruments would collect reliable data during the actual data collection exercise. The piloting exercise will aid in improving the clarity with which information is elicited from respondents, and the results were used to improve the research instrument.

3.7.2 Instrument validity

According to Mugenda and Mugenda (1999), validity is the degree to which a data-driven result accurately represents the phenomenon under investigation. Validity is also defined by Ranjit and Kumar (2005) as the quality of a measurement procedure that provides respectability and accuracy.

To be considered valid, the content chosen and included in a data collection instrument must be relevant to the need or gap identified. The use of the pilot test results to determine whether the study is measuring what it is supposed to measure will improve the content of validity. Data from the pilot study was entered, analyzed, and interpreted. The instruments will also be evaluated and amended by experts or supervisors, whose suggestions were considered in order to improve the face and content validity of the data collection instruments.

3.7.3 Instrument reliability

Mugenda and Mugenda (1999) define reliability as the degree to which a research instrument produces consistent results or data after repeated trials. When an instrument measures a variable accurately and consistently over time, it is said to be reliable. To assess the reliability of the study instruments, the researcher will employ the test-retest method, which entails administering the questionnaire to 25 respondents twice over the course of three weeks. Using SPSS, a measure of squared correlation was calculated between observed and true scores to determine Cronbach's coefficient. The alpha coefficient has a value between 0 and 1 and is used to describe the reliability of factors extracted from questions with two possible answers; a value greater than 0.7 indicates that the questionnaire is more reliable (George and Mallery, 2003).

3.8 Procedure for collecting data

Permission to collect data was obtained from the Ministry of Higher Education via the National Council for Science and Technology (NACOSTI), and a letter of transmittal was obtained from Strathmore Business School. The researcher will present the permits to the Medical Officers of Health, Kenyatta National Hospital, and Mbagathi County Hospitals, explaining the study's purpose and target population. There were discussions about ethical considerations, and the researcher was allowed to conduct the study in Nairobi County. The researcher will visit the respondents to explain the study and obtain their informed consent. The consenting respondents will then be given the questionnaires and the researcher will pick the questionnaires three days later.

3.9 Techniques for analyzing data

Saunders et al. (2019) note that data analysis is about making conclusions on the relationships between the data variables that the research is designed to test to address the research questions and objectives. Saunders et al. note that some findings may be discovered that had not initially been planned for and hence, are still important to report on. Data analysis addressed the study's objectives which examined the effects of data protection regulations on the competitiveness of healthcare facilities in Nairobi. The responses were downloaded from Google forms while the physical copies were converted to excel format then data cleaning was done. Data analysis tools utilized by the study are IBM SPSS and Microsoft Excel. The study carried out several analyses: descriptive statistics, and inferential statistics. Diagrams such as frequency tables, pie charts, and bar graphs were used to present the data.

According to Saunders et al. (2019), descriptive statistics describe and compare a variable's data values numerically and focus on two aspects of distribution: central tendency and dispersion. This study used the central tendency measures of mode, median, and mean to describe and compare data on the rate of adoption, compliance costs and privacy by design on the overall competitiveness within healthcare facilities in Nairobi. The study used standard deviation in describing the three study objectives among healthcare facilities in Nairobi. A correlation test was done using IBM SPSS to bring out the relationship among these variables. Linear regression was done on all the variables and the coefficient of determination (r^2) was obtained to determine the strength and direction of the relationship between the variables.

3.9.1 Model Specification

To measure the effects of data protection regulations on the competitiveness of healthcare facilities in Kenya, an OLS regression analysis was used to measure the measure of the impact.

Regression Equation

$$Y = \alpha + \beta_1ROA_1 + \beta_2COC_2 + \beta_3PBD_3 + \varepsilon$$

Where:

γ (Dependent variable) competitiveness of healthcare facilities in Nairobi

$\beta_1, \beta_2, \beta_3$ = are the regression coefficients

ROA_1 = rate of adoption of data protection regulation

COC_2 = compliance costs

PBD_3 = PrivacyByDesign

ε = is the residual/disturbance/error term

In order to adopt an appropriate model for the study, necessary diagnostic tests were carried out.

3.9.2 Test of Regression Assumptions

The required diagnostic testing was done in order to select a suitable model for the investigation. They include the tests for linearity, normality, multicollinearity, and heteroscedasticity. (Williams et al., 2013).

3.9.3 Linearity test

The assumption behind the linearity idea is that there exists a relationship between independent variables and dependent variables, i.e., that this relationship is linear. ANOVA's F statistic was

used to demonstrate and verify this. P value 0.05 denotes Linearity in Probability Value of probability (p value) > 0.05 suggests that the variables and linearity are unrelated.

3.9.4 Normality test

The anticipated dependent variable should be normally distributed in order for the assumption of normality to hold the residuals (ϵ). Normality of the data was evaluated using Shapiro-Wilk test., and Jarque Bera test. When the probability value (p value) is greater than 0.05, the data are presumed to be regularly distributed, and the null hypothesis is rejected (H_0) Probability value (p value) 0.05 denotes that the data are not normally distributed, which prevented the null hypothesis from being rejected (H_0)

3.9.5 Multicollinearity test

The link between the independent variables is examined by the multicollinearity test, and it is present when the independent variables have a high degree of correlation. According to (Garson, 2012), the Variance Inflation Factor (VIF), which was generated using the Statistical Package for Social Science, was used to conduct a multicollinearity test (SPSS) No multicollinearity issue is implied by a VIF for all independent variables 10. Any independent variables with a VIF > 10 indicate a multicollinearity issue.

3.9.6 Homoscedasticity test

Homoscedasticity means that the variance or spread of errors from the regression line is constant. (Lani, 2011) notes that in regression, an error is how distant a point deviates from the normal line of regression. The assumption of linear regression is that the spread of the residual or the error term is constant across the graph and if this assumption is violated, the statistical results may not be trustworthy due to biased coefficients.

3.9.7 Autocorrelation test

This test was performed to see if the residual values were independent in order to confirm that the observations were unrelated to one another and uncorrelated. The Durbin-Watson test was carried out to determine the degree of autocorrelation, according to (Unibo, n.d.) The statistic has a value between 0 and 4. A score close to 2 indicates non-autocorrelation, a value close to 0 indicates positive autocorrelation, and a value close to 4 indicates negative autocorrelation between independent variables.

3.9 8 Reliability test

It should be emphasized according to (Tavakol & Dennick, 2011) that an instrument's validity and reliability are strongly related. Without reliability, an instrument cannot be considered legitimate. The validity of an instrument, however, is unrelated to its dependability. It is feasible to quantify an instrument's reliability objectively, and in this essay, we define Cronbach's alpha, the most used reliability indicator. The alpha ratio higher than 0.7 indicates high levels of reliability of the survey data collected.

Table 4.1 indicates findings produced by the Cronbach's (Rate of adoption $\alpha=0.775$; Compliance cost $\alpha=0.786$; PrivacyByDesign $\alpha=0.766$; competitiveness $\alpha=0.719$). these findings showed that the data was reliable.

Table 3.2 Reliability test

Variable	Cronbach's Alpha	No of Items
Rate of Adoption	0.775	7
Compliance cost	0.786	4
PrivacyByDesign	0.766	4
Competitiveness	0.719	3

3.10 Ethical considerations

According to (Commission & Science, 2015) to guarantee no harm comes to human life, the natural world, society, or culture, it is crucial for research and development to have ethical approval. Before applying for a license to the Commission, the applicant must have clearance from an institutional ethics review committee that has been accredited by the National Commission for Science, Technology, and Innovations (NACOSTI) if the study includes human subjects. Ethical clearance was obtained from Strathmore University Ethical Review Committee and a research permit acquired from NACOSTI.

The requirements from NACOSTI were to list the target group, an online application to the Commission for a Research License in the prescribed format. An introductory letter which included name, title of research, research sites, duration of study and other relevant information. The proposal was also submitted which included the following: the title, an abstract or summary, a literature review, a problem description, objectives, rationale, methodology, workplan, budget, anticipated output and results, a means for disseminating the results, research tools, and pertinent annexes.

Prior to include individuals in the study, their agreement was requested to guarantee that ethical standards are upheld throughout the investigation. Throughout the research study, respondents were not in any way subject to coercion. Participants' study-related information was gathered, and it would only be used for research.



CHAPTER FOUR

RESEARCH FINDINGS, INTERPRETATION AND PRESENTATION

4.1 Introduction

In this section, the data analysis, findings, and interpretation of the study are presented. The study focused on the healthcare facilities in Nairobi, Kenya, specifically Mama Lucy Hospital, Mbagathi Hospital, Ruai Family Hospital, Nairobi Hospital, Coptic Hospital, and Aga Khan University Hospital. These facilities were chosen to represent both public and private healthcare sectors at the level five. The primary data was collected through a close-ended questionnaire, making it a cross-sectional study conducted within a specific timeframe.

To analyze the data, the researchers utilized the statistical software SPSS and applied quantitative methods in line with the research objectives and questions. Descriptive statistics were used to summarize the collected data, while inferential statistics, such as correlation analysis and multiple linear regression, were employed to examine the relationship between the rate of adoption of data protection regulations, compliance costs, PrivacyByDesign, and the competitiveness of the healthcare facilities in Nairobi, Kenya.

Overall, this section provides an overview of the data analysis techniques used and the statistical methods applied to interpret the findings in relation to the research objectives and questions.

4.2 Response rate

A total of 339 out of the sample size of 450 research respondents were able to submit responses to the study in a meaningful way by completing the questionnaires and sending them back as required. This resulted in an outstanding response rate of 75 per cent.

Table 4.2 response ratel

Frequency	Respondents
Sample	450
Total response	339
Total response rate	75%

According to the (Fincham, 2008) researchers should aim for response rates of about 60 per cent for the majority of their studies, and the editor and associate should expect this. Due to their busy schedules, several respondents found it difficult to make time for the interviews, which contributed to the non-response percentage. Yet, the high response rate was due to the researcher's tireless

efforts to follow up frequently and remind respondents that they needed to complete the surveys completely and return them by the deadline.

4.3 Characteristics of respondents

This part of the document centers on the most critical demographic characteristics with the strongest bearing on the study. These are: education level, classification of the facility, monthly patient count, mean yearly revenue in Kenyan shillings earned by the facility, average personnel count, and the length of time that the management and staff of the facility in charge of data collection have adhered to data protection regulations.

4.4.3 Distribution of respondents by Gender

The questionnaire requested information from respondents on the gender. The findings as per table 4.3 indicated 55.1 percent (n=220) are male, and 44.9 percent (n=179) are female.

Table 4.3 distribution of respondents by gender

Gender	Frequency	Percent
Male	220	55.1
Female	179	44.9
Total	339	100.0

4.4.4 Distribution of respondents by the age group

The questionnaire requested information from respondents on the age group. The findings as per table 4.4 indicated 20.3 percent (n=81) 58 years and above, 18.8 percent (n=75) 48 to 57 years, 19.8 percent (n=79) 38 to 47 years, 24.1 percent (n=96) 28 to 37 years, and lastly 17.0 percent (n=68) 19 to 27 years.

Table 4.4 distribution of respondents by Age group

	Frequency	Percent
58 years and A	81	20.3
48 to 57 years	75	18.8
38 to 47 years	79	19.8
28 to 37 years	96	24.1
18 to 27 years	68	17.0
Total	399	100.0

4.4.5 Distribution of respondents by the highest Education level

The questionnaire requested information from respondents on the highest education level each respondent had attained. The findings as per table 4.3 indicated that 10.32 per cent (n=35) had

reached college level, 8.55 (n=29) per cent had reached high school level, respondents with other qualification levels were 18.58 per cent (n=63) while university graduates were 62.53 per cent (n=212). The findings are an indication that healthcare facilities in Nairobi have well educated workforce that can support the execution of data protection regulations thereby increasing the facilities competitiveness.

Table 4.5 distribution of respondents by highest education level

	Education	Frequency	Percent
Level	College	35	10.32
	Highschool	29	8.55
	Others	63	18.58
	University	212	62.53
	Total	339	100.0

4.4.6 Distribution of respondents by classification of healthcare facility

The questionnaire had an item which asked the respondents to choose the classification of the healthcare facility that they worked at. Table 4.6 indicated the 56.93 per cent (n=193) of the respondents worked in a private facility while 43.06 per cent (n=146) of the respondents worked in a public facility. This classification of healthcare facilities indicates that large public and private healthcare facilities implement data protection regulations so that they are able to add more reliable security features to their product and service offerings thereby increasing their competitiveness.

Table 4.6 Distribution of respondents by classification of healthcare facility

Healthcare facility classification	Frequency	Percent
A private facility	193	56.93
A public facility	146	43.06
Total	339	100.0

4.4.7 Distribution of respondents by number of patients served by the facility

The questionnaire had an item that asked the respondents to estimate the number of patients served by the facility in a month. The results from the study indicated on table 4.7 that the 29.79 per cent (n=101) respondent with 1,001 to 2,000, 27.72 per cent (n=94) with 2,001 to 3,000, 30.67 per cent (n=104) with Above 3,000 and 11.79 per cent (n=40) with Less than 1,000. The findings are an indication that both public and private healthcare facilities process large amounts of personal data and therefore have to ensure they implement data protection regulations to ensure the transparency of data collection, processing, and security. Principles of PrivacyByDesign apply here. This in turn will increase their competitiveness.

Table 4.7 Distribution of respondents by number of patients served by the facility

Number of patients served	Frequency	Percent
1,001 to 2,000	101	29.79
2,001 to 3,000	94	27.72
Above 3,000	104	30.67
Less than 1,000	40	11.79
Total	339	100.0

4.4.8 Distribution of respondents by annual revenue generated by the facility

The respondents according to table 4.8 indicated that the average annual revenue in Kenyan shillings generated by the facility 25.66 per cent (n=87) above 1 billion, 24.18 per cent (n=82) 501 million to 1 billion, 24.77 per cent (n=84) 100 million to 500 million and 25.36 per cent (n=86) less than 100 million. The analysis highlights that the large healthcare facilities have adequate financial resources generation capacity which can be critical to the implementation of data protection regulations within the facilities. This in turn will increase their competitiveness.

Table 4.8 Distribution of respondents by annual revenue generated by the facility

Annual revenue	Frequency	Percent
Above 1 billion	87	25.66
501 million to 1 billion	82	24.18
100 million to 500 million	84	24.77
Less than 100 million	86	25.36
Total	339	100.0

4.4.9 Distribution of respondents by average number of employees in the facility

The questionnaire had an item requiring the respondent to give an estimate range of the number of employees in the facility that they work in. Table 4.9 indicated the findings that 34.51 per cent (n=117) responded that they have between 101 to 200, 25.66 per cent (n=87) have 201 to 300, 28.31 per cent (n=96) above 300 and 11.5 per cent (n=39) less than 100. The findings are an indication that these healthcare facilities have an adequate workforce that can support the implementation of data protection regulations in the facilities. This in turn will increase their competitiveness.

Table 4.9 Distribution of respondents by average number of employees in the facility

Number of employees	Frequency	Percent
101 to 200	117	34.51
201 to 300	87	25.66
Above 300	96	28.31
Less than 100	39	11.5
Total	339	100.0

4.4.10 Distribution of respondents by the years of data protection implementation by the facility

Respondents were required to indicate the number of years that data protection regulations had been implemented by the management and staff of the healthcare facility. Table 4.10 indicates that the results on the question “what is the number of years that data protection regulations have been implemented by the management and staff of this facility who are involved with data capture?” 24.48 per cent (n=83) 1 to 4 years, 24.1 per cent (n=82) 5 to 7 years, 22.12 per cent (n=75) above 7 years and 29.20 per cent (n=99) less than 1 year. The results were critical to the assessment of the effect of data protection regulations on the competitiveness of healthcare facilities in Nairobi owing to the provision of responses from respondents on the number of years data protection regulations have been implemented in their facility. Healthcare facilities that have implemented data protection regulations longer are able to maintain a competitive advantage against their competitors.

Table 4.10 Distribution of respondents by the years of data protection implementation by the facility

Years of implementation	Frequency	Percent
1 to 4 years	83	24.48
5 to 7 years	82	24.1
Above 7 years	75	22.12
Less than 1	99	29.20
Total	339	100.0

4.5 Descriptive statistics

The study sought to analyse the effects of data protection regulations on the competitiveness of healthcare facilities in Nairobi. The examination focussed on the rate of adoption of data protection regulations, cost of compliance with data privacy regulations and PrivacyByDesign. Descriptive statistics (Nicholas, 2006), includes a measure of central tendency indicators such as the mean, median and mode and a measure of spread or dispersion. Survey responses, from the Likert scale adopted; using standard deviation and mean values, are presented in this section in line with the variables of the research.

4.5.1 Adoption of data protection regulation

The first objective of the study was to determine the effect of the adoption rate of data protection regulations on the competitiveness of healthcare facilities in Nairobi. table 4.11 indicated frequency tables The responses are provided in table 4.11 below. The following key was used in the interpretation; 5 = Strongly Agree, 4 = Agree, 3 = Neutral, 2 = Disagree, 1= Strongly Disagree, table 4.10 indicated frequency tables

Table 4.11 Rate of adoption of data protection regulations

	5 = Strongly Agree	4 = Agree	3 = Neutral	2 = Disagree	1= Strongly Disagree			
						N	Mean	Std. Deviation
• We are a large facility, therefore, making us increasingly more able to adopt the guidance in data protection regulations.						339	4.6190	.78634
• We have fully adopted the guidelines in The Data Protection Act, 2019, Kenya (DPA) in the management of our patient records.						339	4.4837	.50036
• We have a number of automated systems and tools to ensure that data protection regulations are implemented and enforced.						339	4.1855	.66551
• We have employed data protection officers to ensure that our facility processes the personal data of our staff, customers, providers, or any other individuals (also referred to as data subjects) in compliance with the applicable data protection regulation						339	4.0201	.57990
Valid N (listwise)						339		

From the results, it can be seen that respondents agreed that larger facilities are better placed to adopt data protection regulations (mean of 4.6190). The results also show that healthcare facilities in Nairobi have fully adopted the guidelines in The Data Protection Act, 2019, Kenya (DPA) in the management of patient records (mean of 4.4837). It is also evident from the results that healthcare facilities in Nairobi have a number of automated systems and tools to ensure that data protection regulations are implemented and enforced (mean of 4.1855). Finally, it was deduced that healthcare facilities in Nairobi have employed data protection officers to ensure that they process personal data of data subjects in compliance with the applicable data protection regulation (mean of 4.0201).

4.5.2 Data protection regulations compliance costs

The second objective of the study sought to determine the effects of data protection compliance cost on the competitiveness of healthcare facilities in Nairobi. The responses are provided in table 4.12 below. The following key was used in the interpretation; 5 = Strongly Agree, 4 = Agree, 3 = Neutral, 2 = Disagree, 1= Strongly Disagree

Table 4.12 Data protection regulations compliance costs

	5 = Strongly Agree	4 = Agree	3 = Neutral	2 = Disagree	1= Strongly Disagree	Std. Deviation
	N	Mean				
• The size of our facility affects the cost of compliance and noncompliance?	339	4.3358				.47288
• Compliance with data protection regulations can be a significant cost burden to our facility especially due to the need to have dedicated professional staff.	339	4.5138				.58815
• Compliance with data protection regulations can be a significant cost burden to our facility that includes the need to have enabling technologies to protect data assets and curtail risks.	339	4.2907				.77699
• Healthcare facilities have to rely on expensive external resources such as consultants and lawyers to meet compliance requirements on a local, regional, and or global scale.	339	4.0827				.50691
• Providing healthcare facility-wide training and awareness at our facility on data privacy regulations reduces the total cost of compliance and offsets the risks of non-compliance.	339	4.2256				.49545
Valid N (listwise)	339					

The study showed that the size of the healthcare facility affects the cost of compliance and non-compliance with data protection regulations as indicated by a mean of 4.3358.

The analysis showed that compliance with data protection regulation has a significant cost burden to the healthcare facilities especially due to the need to have dedicated professional staff and have in place enabling technologies to protect data assets and curtail risks. This is shown by a mean of 4.5138 and 4.2907 respectively. A mean of 4.0827 leaned towards consensus that was seen from the results that indicated that healthcare facilities in Nairobi have to rely on expensive external resources such as consultants and lawyers to meet compliance requirements on a local, regional and global scale. Finally, respondents agreed that providing healthcare facility-wide training and awareness on data privacy regulations reduces the total compliance cost and offsets the risk of non-compliance (mean of 4.2256)

4.5.3 Data protection regulations on PrivacyByDesign

The third objective sought to explore the effects of adoption of privacy by design on the competitiveness of healthcare facilities in Nairobi. The responses are provided in table 4.13 below. The following key was used in the interpretation; 5 = Strongly Agree, 4 = Agree, 3 = Neutral, 2 = Disagree, 1= Strongly Disagree

Table 4.13 Data protection regulations PrivacyByDesign

5 = Strongly Agree	4 = Agree	3 = Neutral	2 = Disagree	1= Strongly Disagree			
					N	Mean	Std. Deviation
<ul style="list-style-type: none"> • Our facility uses privacy-enhancing technologies such as communication anonymizers, ring signatures, and homomorphic encryption to embody fundamental data protection principles in our products and services delivery. 					339	4.2957	.45695
<ul style="list-style-type: none"> • Our facility engages PrivacyByDesign, (PbD) professionals who handle the design and building of the data protection and privacy program and ensure its efficacy by considering data protection issues as part of the design and implementation of systems, services, products, and business practices. 					339	4.1704	.65049
<ul style="list-style-type: none"> • Our facility has privacy-enhancing tools and technologies that ensure privacy by design in the design and implementation of our systems. 					339	3.7845	.74257
<ul style="list-style-type: none"> • Management has in place a privacy-by-design policy that guides the development of products and services. 					339	4.0000	.64970
Valid N (listwise)					339		

Respondents agreed that their healthcare facilities have privacy enhancing technologies that embody fundamental data protection principles in their products and service delivery (mean of 4.2957). The data showed that healthcare facilities in Nairobi engage PrivacyByDesign professionals who handle the design and building of data protection and privacy programs and ensures their efficacy by considering data protection issues as part of the design and implementation of systems, services, products, and business practices (mean of 4.1704). The analysis showed agreement that healthcare facilities in Nairobi have privacy-enhancing tools and technologies that ensure PrivacyByDesign in the design and implementation of systems (mean of 3.7845). Further respondents agreed that their management has in place PrivacyByDesign policies in place that guide the healthcare facilities in Nairobi on the development of products and services (mean of 4.0000)

4.5.4 Competitiveness of healthcare facilities in Nairobi

The dependent variable of the study was focused on the analysis of the competitiveness of healthcare facilities in Nairobi. The responses are provided in table 4.14. The following key was used in the interpretation; 5 = Strongly Agree, 4 = Agree, 3 = Neutral, 2 = Disagree, 1= Strongly Disagree

Table 4.14 Competitiveness of healthcare facilities in Nairobi

	5 = Strongly Agree	4 = Agree	3 = Neutral	2 = Disagree	1= Strongly Disagree	
				N	Mean	Std. Deviation
<ul style="list-style-type: none"> • Management uses feedback and insight provided through our product and service quality surveys to develop superior products and services that incorporate data protection regulations through the PrivacyByDesign (PbD) principles thereby staying ahead of our competition. 				339	4.4160	.49352
<ul style="list-style-type: none"> • By embracing data protection regulations, our facility manages to maintain old loyal customers as a result of the very high-quality customer experience and customer satisfaction. 				339	4.3659	.54121
<ul style="list-style-type: none"> • Management recognizes that the adoption of data protection regulations supports the effective management of customer relationships. This goes a long way in ensuring that we attract and retain new profitable customers. 				339	4.4286	.49549
<ul style="list-style-type: none"> • Management focuses on increasing our market share through innovation, competitive pricing, strengthening customer relationships, advertising, continuous improvement of our products and services, expanding our reach, and adopting data protection regulation 				339	4.3935	.48914
Valid N (listwise)				339		

The results show agreement among respondents on the use of feedback and insight; by management of the healthcare facilities in Nairobi, provided through product and service quality surveys to develop superior products and services that incorporate data protection regulations through the PrivacyByDesign (PbD) principles thereby ensuring they stay ahead of their competition (mean of 4.4160). There is an agreement among respondents that embracing of data protection regulations by healthcare facilities in Nairobi enables the maintenance of old loyal customers. This is because of the high-quality customer experience and customer satisfaction (mean of 4.3695). There is further agreement among respondent that management of healthcare facilities in Nairobi recognizes that the adoption of data protection regulations supports the effective management of customer relationships and help to attract and retain new profitable customers (mean of 4.4286). Finally, the analysis shows agreement among respondents that management of healthcare facilities in Nairobi focus on increasing market share through innovation, competitive pricing, strengthening customer relationships, advertising, continuous

improvement of products and services, expanding reach and adopting data protection regulations (mean of 4.3935).

4.5.5 Descriptive statistics for measured variables

The cumulative descriptive statistics for the measured variables was presented on table 4.15 below. showing that there were 339 valid entries. The competitiveness variable indicated a mean of 4.4667 and a standard deviation of .24846. The rate of adoption variable indicated a mean of 4.3365 and a standard deviation of .3254. The cost of compliance indicated a mean of 4.3817 and a standard deviation of .22793 while the PrivacyByDesign variable indicated a mean of 4.2199 and a standard deviation =.38220

Table 4.15 Descriptive statistics cumulative

	N	Mean	Std. Deviation
	Statistic	Statistic	Statistic
Competitiveness	339	4.4667	.24846
Rate of Adoption	339	4.3365	.32545
Cost of Compliance	339	4.3817	.22793
PrivacyByDesign	339	4.2199	.38220
Valid N (listwise)	339		

4.6 Statistical Assumption tests

Some presumptions regarding the variables employed in the analysis are required for statistical testing. According to (Distributions, n.d.)and, (Garson, n.d.) the results might not be reliable if certain presumptions are not satisfied. They further claim that this may lead to type I or type II errors, as well as an over or underestimation of significance or effect size (s). Pretesting for these assumptions is crucial to ensure that the results are legitimate.

Prior to doing a data analysis, multicollinearity, normality, and assumptions for linear regression were examined. To guarantee the validity of the results, it is essential to pre-test for these assumptions.

4.6.1 Test for Normality

In most cases, the test for normal distribution is the most useful. It is the ratio of two variance estimates from normal distributions based on n observations chosen at random. The best linear estimator of the standard deviation is proportional to the numerator. The sum of the squares of the observations made around the sample mean serves as the denominator. The normality assumption was assessed using graphical and numerical methods. For the numerical methods for testing

normality the Jarque-Bera test, and Shapiro-Wilk tests were used. The graphical methods used were the q-q plot and p-p plots, the normal distribution histogram.

The results for the Jarque-Bera test from the residuals indicate according to a significance value >0.05 indicates a normal distribution. Table 4.16 indicated a p value of .0539 indicating that the data was normally distributed.

Table 4.16 Jarque- Bera tests

Jarque-Bera	normality test: 6.252 Chi (2)	.0539
Jarque-Bera	test for Ho: normality:	

The Shapiro- Wilk test on table 4.17 measured the assumption for normal distribution with the condition that significance value ≥ 0.05 indicated that the data was normally distributed and if the p values <0.05 the data was not normally distributed

The significance values for Rate of Adoption $p= 0.652$, the cost of compliance was $p= 0.355$ the privacy by design was $p=0.233$. the $p>0.05$ therefore the assumption for normal distribution has not been violated and the data is normally distributed.

Table 4.17 Shapiro-Wilk test

	Kolmogorov-Smirnov ^a			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Rate of Adoption	.153	399	.125	.944	399	.652
Cost of Compliance	.372	399	.442	.656	399	.355
PrivacyByDesign	.160	399	.366	.931	399	.233

a. Lilliefors Significance Correction

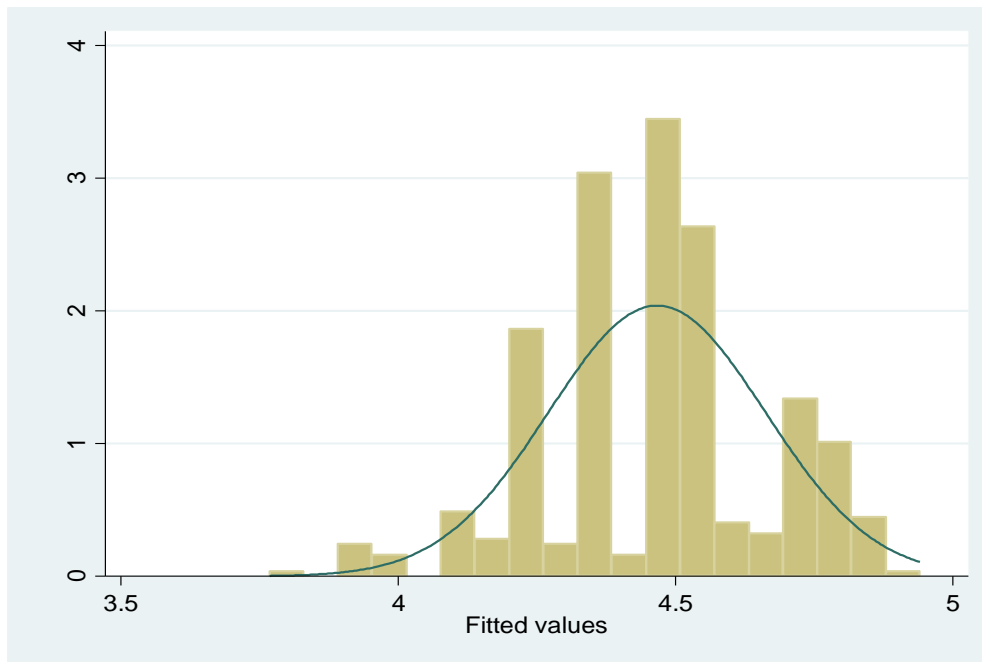


Figure 4.1 Normality Histogram

4.6.2 Multicollinearity test

To determine if there was multicollinearity among the predictor variables, the study conducted a regression analysis utilizing tolerance and the variance inflation factor (VIF) as reference scales. As explained by (Collinearity, n.d.) tolerance and VIF are useful indicators of multicollinearity in a regression model. (Joshi, 2012) state that the tolerance margins should be limited above 0.1 (> 0.1) and the VIF should be limited below 10 in order to create a model that is appropriate for the investigation. In the model, tolerance values lower than 0.1 and VIF outputs higher than 10 are regarded as unsatisfactory. Table 4.18 indicated that the VIF for rate of adoption was 2.217 for cost of compliance was 1.144 for PrivacyByDesign was 2.020. The findings indicated that all the VIF were <10 and tolerance were >0.1 thus there was no multicollinearity.

Table 4.18 Multicollinearity test

Model		Collinearity Statistics	
		Tolerance	VIF
1	Rate of Adoption	.451	2.217
	Cost of Compliance	.874	1.144
	PrivacyByDesign	.495	2.020

a. Dependent Variable: Competitiveness

4.6.3 Homoscedasticity test

The homoscedastic nature of the error dispersion from the regression line indicates that it is constant. A regression error, according to (Lani, 2011), is the deviation of a point from the normal

line of regression. The distribution of the residual or error term throughout the graph is a crucial assumption of linear regression, according to (Garson, 2012) if this assumption is violated, the statistical findings may be altered due to biased coefficients. Heteroscedastic dispersion refers to a variance of errors from a regression line that is neither constant nor homoscedastic.

Regressing the square of the predicted residuals onto the predictor variables and then calculating the F statistic and the probability yields the Breusch-Pagan/Cook-Weisberg test for heteroskedasticity statistic. There is heteroscedasticity if the p value is 0.05 and homoscedasticity if it is ≥ 0.05 . Table 4.19 presents the findings $p = 0.1782$. The findings concludes that the data is homoscedastic.

Table 4.19 Breusch-Pagan / Cook-Weisberg test for heteroskedasticity

Ho: Constant variance	Variables: fitted values of competitiveness	
chi2(1)	=	1.81
Prob > chi2	=	0.1782

4.6.4 Autocorrelation test

(Unibo, n.d.) states that the independent nature of the error components is one of the assumptions made by our linear regression model. The connection between each mistake word and its immediate predecessor I and $i-1$) usually violates this presumption. This is more likely to occur if the data points are observed in an appropriate chronological order (weekly sales data, for example). For this kind of interaction, the term used is first order autocorrelation. Regression makes the independent nature of the observations one of its underlying premises. When several observations are made throughout time, it's likely that they are connected. (Marshall & Karadimitriou, 2018) explains that Durbin-Watson statistic should fall between 1.5 and 2.5 if there is no autocorrelation. The Durbin-Watson statistic according to table 4.20 was 0.800 indicating that there was no autocorrelation.

Table 4.20 Autocorrelation test

Model	Durbin-Watson
1	.800

4.6.5 Linearity test

Linearity tests were performed to show that the correlation between the dependent and independent variables is linear. The departure of a variable from the linearity measure, which has an alpha of 0.05, is used to determine linearity. According to (Csörge, 1985) the assumption of linearity is not violated if the p value of the departure from linearity is > 0.05 ; however, if the p value is $= 0.05$,

the assumption has been violated. The deviation from linearity is not statistically significant according to table 4.21 $p=0.103$ $p>.05$. Therefore, the assumption of linearity has not been violated.

Table 4.21 Linearity test

				Sum of Squares	df	Mean Square	F	Sig.
		(Combined)		7.116	6	1.186	1.634	.075
Competitiveness * Cost of compliance	Between Groups	Linearity	from	3.283	1	3.283	1.735	.083
		Deviation from Linearity		3.832	5	.766	1.214	.103
	Within Groups			17.455	392	.045		
	Total			24.570	398			

4.7 Correlation Analysis

The Pearson product moment correlation coefficient was applied in this experiment. A two-variable linear connection's strength may be evaluated using correlations. The range of correlation coefficients is from zero (totally uncorrelated) to one (entirely correlated) (perfectly positive correlation). (*Statistics*, 2008) asserts that the correlation coefficients become closer to -1.0 or 1.0 the stronger the association is. The correlation coefficient deviates closer to 0 as the independent and dependent variables become less correlated. Table 4.22 indicated that Rate of adoption has a positive $r=.634$ and statistically significant correlation to competitiveness $p=0.00$ $p<0.05$.

Cost of compliance has a negative $r=-.757$ and statistically significant correlation to competitiveness $p=0.00$ $p<0.05$ and PrivacyByDesign has a positive $r=.746$ and statistically significant correlation to competitiveness $p=0.00$ $p<0.05$. The correlations were all significant at 0.01 alpha and 0.05 alphas.

Table 4.22 Correlation Analysis

		Competitiveness	Rate of Adoption	Cost of compliance	PrivacyByDesign
Competitiveness	Pearson Correlation	1			
	Sig. (2-tailed)				
Rate of Adoption	Pearson Correlation	.634**	1		
	Sig. (2-tailed)	.000			
Cost of compliance	Pearson Correlation	-.757**	-.483**	1	
	Sig. (2-tailed)	.000	.475		

PrivacyByDesign	Pearson Correlation	.746**	.707**	-.617**	1
	Sig. (2-tailed)	.000	.000	.000	

** Correlation is significant at the 0.01 level (2-tailed). *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

4.8 Regression Analysis

A regression model was adopted to measure the effect of the independent variables on the dependent variable. The variables being measured were the effect of adoption of data protection regulation, data protection regulations compliance costs, data protection regulations on PrivacyByDesign on the competitiveness of healthcare facilities in Nairobi. ANOVA, model summary and a linear regression model were conducted to determine the effects.

4.8.1 Effects of Rate of Adoption on Competitiveness

The model summary from table 4.23 indicated that the correlation between the rate of adoption and competitiveness was positive. R was 0.634 and R square was 0.402. This shows that rate of adoption caused a 40.2 per cent variation on competitiveness. The remaining 59.8 per cent of variation was caused by other factors not captured in the model.

Further the ANOVA table findings indicated an F of 266.440 with a significant value p of 0.000 < 0.05 which indicated that the model was statistically significant. The β_1 was 0.484 sig. was 0.000 indicating that unit change in rate of adoption caused a positive and statistically significant increase in competitiveness.

Table 4.23 Effect of Rate of Adoption on Competitiveness

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.634 ^a	.402	.400	.19244

a. Predictors: (Constant), Rate of adoption

ANOVA^a

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	9.867	1	9.867	266.440	.000 ^b
	Residual	14.703	397	.037		
	Total	24.570	398			

a. Dependent Variable: Competitiveness

b. Predictors: (Constant), Rate of adoption

Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.369	.129		18.377	.000
	Rate of adoption	.484	.030	.634	16.323	.000

a. Dependent Variable: Competitiveness

4.8.2 Effect of Cost of compliance on competitiveness

The model summary from table 4.24 indicated that the correlation between cost of compliance and competitiveness was positive. R was 0.757, the R square was 0.574. This concludes that cost of compliance caused a 57.4 per cent variation on competitiveness, the remaining 42.6 per cent of variation was caused by factors not captured in the model. The ANOVA showed an F statistic of 266.440 and sig, of 0.000, p of 0.000 < 0.05 indicating that the model was statistically significant. The study further found that the β_2 of 0.216 sig. of 0.000 indicating that unit change in cost of compliance caused a positive and statistically significant increase in competitiveness.

Table 4.24 Effect of Cost of compliance on competitiveness

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.757a	.574	.573	.16244

a. Predictors: (Constant), Cost of compliance

ANOVA^a

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	14.094	1	14.094	534.126	.000b
	Residual	10.476	397	.026		
	Total	24.570	398			

a. Dependent Variable: Competitiveness

b. Predictors: (Constant), Cost of compliance

Coefficients

Model		Unstandardized Coefficients	Std. Error	Standardized Coefficients	t	Sig.
		B	Error	Beta		
1	(Constant)	5.352	.039		136.737	.000
	Cost of compliance	-.216	.009	-.757	-23.111	.000

a. Dependent Variable: Competitiveness

4.8.3 Effects of PrivacyByDesign on Competitiveness

The Model summary form table 4.25 indicated that there was a Correlation of R of 0.746 and R square of 0.556, this shows that PrivacyByDesign caused a 55.6 per cent variation on competitiveness. The remaining 44.4 per cent of variation was caused by other factors not captured in the model. The ANOVA table findings indicated an F of 498.032 with a significant value p of 0.000 <0.05 which indicated that the model was statistically significant. The β_3 was 0.485, sig. was 0.000 indicating that unit change in PrivacyByDesign caused a positive and statistically significant increase in competitiveness.

Table 4.25 Effect of PrivacyByDesign on competitiveness

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate		
1	.746a	.556	.555	.16569		
a. Predictors: (Constant), Cost of compliance						
<i>ANOVA^a</i>						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	13.672	1	13.672	498.032	.000b
	Residual	10.898	397	.027		
	Total	24.570	398			
a. Dependent Variable: Competitiveness						
b. Predictors: (Constant), PrivacyByDesign						
<i>Coefficients</i>						
Model		Unstandardized Coefficients	Std. Error	Standardized Coefficients	t	Sig.
1	(Constant)	2.420	.092		26.288	.000
	PrivacyByDesign	.485	.022	.746	22.317	.000
a. Dependent Variable: Competitiveness						

4.8.4 Analysis of effects of data protection regulations on the competitiveness of healthcare facilities in Nairobi

Model summary indicated the correlation and the subsequent variation caused by the independent variables on the dependent variable. R indicating correlation an r square indication variation caused. The Correlation was positive R=.845, and a R square = 0.713 indicating that 71.3 per cent of variation caused on competitiveness of healthcare facilities was caused by adoption of data protection regulation, data protection regulations compliance costs, data protection regulations on

PrivacyByDesign. The remaining 28.7 per cent of variation was caused by factors not captured in the model.

Table 4.26 Overall regression model Summary

Model	R	R Square	Adjusted Square	R Std. Error of the Estimate
1	.845 ^a	.713		.13353

a. Predictors: (Constant), Rate of adoption, Cost of compliance, PrivacyByDesign

4.8.5 Analysis of Variance

A statistical technique called analysis of variance (ANOVA) is used to find differences between the means of experimental groups. (Concepts, n.d.) In experimental designs with numerous experimental groups within one or more independent (categorical) variables, one continuous parametric numerical result measure as the dependent variable, and ANOVA is justified.

Table 4.27 indicates the findings indicated that F statistica was 327.674 and a significance value of 0.000 $p < 0.05$ indicating that the model variation caused was statistically significant.

Table 4.27 Overall ANOVA (Analysis of Variance)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	17.527	3	5.842	327.674	.000 ^b
	Residual	7.043	395	.018		
	Total	24.570	398			

a. Dependent Variable: Competitiveness

b. Predictors: (Constant), Rate of adoption, Cost of compliance, PrivacyByDesign,

4.8.6 Effects of data protection regulations on the competitiveness of healthcare facilities in Nairobi

A regression model was generated to measure the overall effect of adoption of data protection regulation, data protection regulations compliance costs, data protection regulations on PrivacyByDesign on the competitiveness of healthcare facilities in Nairobi.

Regression Equation

$$Y = \alpha + \beta_1 ROA_1 + \beta_2 COC_2 + \beta_3 PBD_3 + \varepsilon$$

Where:

γ competitiveness of healthcare facilities in Nairobi

$\beta_1, \beta_2, \beta_3$ the regression coefficients

ROA_1 = rate of adoption of data protection regulation

COC_2 = compliance costs

PBD_3 = PrivacyByDesign

ε = The error term or residuals

Table 4.28 indicated that the equation resulted as

$$Y = 3.525 + .129*ROA_1 - .133*COC_2 + .220*PBD_3 + \epsilon$$

The model indicated that for a unit change in adoption of data protection regulation resulted in a unit increase of .129 in competitiveness of healthcare facilities in Nairobi. For a unit change in data protection regulations compliance costs causes a -.133 unit to decrease in competitiveness of healthcare facilities in Nairobi. Lastly a unit change in data protection regulations on PrivacyByDesign caused a unit increase of .220 in competitiveness of healthcare facilities in Nairobi.

Table 4.28 Overall regression Coefficients

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	3.525	.137		25.736	.000
Rate of adoption	.129	.029	.169	4.414	.000
1 Cost of compliance	-.133	.010	-.467	-13.606	.000
PrivacyByDesign	.220	.028	.339	7.963	.000

a. Dependent Variable: Competitiveness

4.9 Chapter Summary

The findings sought to establish the effects of data protection regulations on the competitiveness of healthcare facilities in Kenya. The research showed that the effects of data protection regulations on the competitiveness of healthcare facilities in Kenya had a positive correlation. The regression analysis indicated that the general model was statistically significant. The findings agree with a research from the (Organisation for Economic Co-operation and Development (OECD), 2018) where the research indicated an improvement in data protection regulations impacted competitiveness and growth in the healthcare industry. Further sections of the analysis indicated that the effect of adoption of data protection regulation was statistically significant. The research further found that the effect of data protection compliance costs on the competitiveness of healthcare facilities in Nairobi was statistically significant. Finally, the research found that the effect of PrivacyByDesign on the competitiveness of healthcare facilities in Nairobi was statistically significant.

CHAPTER FIVE: DISCUSSION, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

The chapter offers a summary of the most important study findings, interesting remarks, conclusions, and the researcher's recommendations. Based on the results of the statistical analysis conducted after the research problem were validated and the study objectives were established, the summary was produced. A list of suggested areas for more research is also included in this chapter.

5.2 Discussion

The summary of findings is hereby provided under themes reflecting the study objectives. The general objective of the study was to establish the effects of data protection regulations on the competitiveness of healthcare facilities in Nairobi, Kenya. The specific objectives were to determine the effects of adoption rate of data protection regulations on the competitiveness in healthcare facilities in Nairobi, Kenya; to determine the effects of compliance costs on the competitiveness of healthcare facilities in Nairobi, Kenya and to explore the effects of PrivacyByDesign on the competitiveness of healthcare facilities in Nairobi, Kenya. The target population was all the level five hospitals in Nairobi and 3 private hospitals in Nairobi. Data was collected using a questionnaire and analyzed through descriptive correction and regression analysis.

5.2.1 Effects of the rate of adoption competitiveness

The first objective of the research was to determine the effects of the rate of adoption of data protection regulations on the competitiveness of healthcare facilities in Nairobi. The results of the correlation analysis showed a relationship between the competitiveness of Nairobi's healthcare facilities and the rate of adoption of data privacy laws. The regression also revealed that the rate of adoption of data privacy laws had a considerable favorable impact on Nairobi's healthcare institutions' ability to compete. This was according to the results of the descriptive statistics which showed a mean of 4.3365. The study findings are corroborated by prior literature on how data privacy regulations influence competition that argues that larger firms can better comply with the data protection regulations thanks to their abundant resources (Bessen et al. 2020; Marthews and Tucker 2019). Wu, Xi and Pang, Min-Seok (2021) investigated how data privacy regulations affect competition in the mobile application market. The research determined that privacy regulations have pro-competitive impacts on the competitiveness of organizations, and the overall effect is

determined by the degree of reliance on monetizing users' personal data. The study results indicate that data privacy regulations have significantly affected the competition intensity in the market.

Wu, Xi and Pang, Min-Seok (2021) found that despite there being a large body of literature in economics and strategy on how various regulations affect competition in different industries such as regulations of pricing, entry, and exits in the airline industry and their influence competition (Borenstein 1992; Mazzeo 2003; Truxal 2013) and price control policy in many industries such as pharmaceutical and its influence of firms and competition (Danzon and Chao 2000; Kanavos et al. 2008), these regulations expressly target the market structure and aim to promote or undermine competition while the purpose of data privacy regulations is to increase individuals' ownership and rights over their personal data while also imposing a standard regulatory environment for firms thereby influencing competition in multiple ways. Their findings can be generalizable to other industries that monetize consumers' personal data such as the healthcare industry.

5.2.2 Effects of compliance costs on Competitiveness

The second objective of the study was to determine the effect of data protection compliance costs on the competitiveness of healthcare facilities in Nairobi, Kenya. The results of the correlation analysis showed an inverse relationship between Nairobi's healthcare facilities' competitiveness and the cost of complying with data privacy requirements. The regression also demonstrated a considerable detrimental impact on Nairobi's healthcare facilities' ability to compete. This was supported by a mean of 4.3817.

According to a report from the International Association of Privacy Professionals (IAPP) (IAPP and EY 2018), firms, on average, spent \$1.3 million on GDPR compliance efforts in 2018, which mainly fall into the five categories: staff, technology solutions, outside counsels, consultants, and training. This cost is estimated to be as high as \$16 million for Fortune 500 firms in the U.S. (Smith 2018). Nonetheless, this figure is just the initial cost of preparation for GDPR compliance. Compliance with it entails ongoing operational costs as well (DataGrail 2020). These high compliance costs act as barriers for new firms to enter into data-intensive industries. Seo et al. (2018) suggests that the cost of digital businesses could increase by three or four times because of GDPR.

The degree of compliance burdens could differ significantly within the same industry (Layton and Elaluf-Calderwood 2019). While compliance with data privacy regulations can be costly, larger firms have far greater capabilities and resources to comply with the regulations and defend themselves against potential enforcement actions and litigations (Jia et al. 2019; Marthews and Tucker 2019; Martin et al. 2019). On the other hand, the compliance cost can be much more burdensome for start-ups than for larger established firms (Jia et al. 2019; Marthews and Tucker 2019; Martin et al. 2019).

High compliance costs are burdensome and may stifle competitiveness and reinforce dominance of incumbents (Wu, Xi and Pang, Min-Seok 2021, Jia et al. 2019; Marthews and Tucker 2019; Martin et al. 2019). By raising the compliance costs, the regulations raise entry barriers and stifle competition in the market. Janssen et al. (2021) find that there are fewer new entries of Android apps after GDPR; results that can be generalizable to other industries

5.2.3 Effects of PrivacyByDesign on competitiveness

The third specific objective was to explore the effects of PrivacyByDesign on the competitiveness of healthcare facilities in Nairobi, Kenya. The analysis indicated that the correlation between PrivacyByDesign and competitiveness of healthcare facilities was positive. The regression model further indicated that the effects of PrivacyByDesign on the competitiveness of healthcare facilities in Nairobi, Kenya, were positive. The mean of the responses indicated that most of the respondents agreed with the statements as reflected by a mean of 4.2199.

According to Krikke et al. (2019), Data Protection Regulations encourages PrivacyByDesign, thereby assisting healthcare facilities add more reliable security features to their product and service offerings. Similar positive findings were reported by Chebole (2015), who determined that the adoption of EMR is one PrivacyByDesign response as a result of limitations in paper-based records that include temporal, spatial, and monetary constraints associated with continued paper-based record accumulation and compression over time. The study also determined aligning organization-wide processes and procedures with PrivacyByDesign principles would improve competitiveness and efficiency. According to The Government of Kenya. 2013.

Health Information System Health Information Policy. Nairobi, Kenya: Ministry of Health, AfyaInfo Project, there is a commitment by the health sector to goals and priorities for improving

health information products and health services. The application of the core values and guiding principles in the Health Information Policy is expected to build information culture that will enhance data demand and information use for evidence-based healthcare decision making in Kenya. These studies provide supporting evidence that data protection regulations and supporting legislation provide an environment within which firms are able to incorporate PrivacyByDesign principles into their processes and procedures that would improve their product and services offering thereby enhancing their competitiveness. Adhering to data protection regulations has been guaranteed to improve a firm's competitiveness.

5.3 Conclusions

The analysis pointed out significant effect of data protection regulations on the competitiveness of healthcare facilities in Nairobi, Kenya. The three selected variables; rate of adoption, compliance costs, and PrivacyByDesign are critical to the competitiveness of healthcare facilities in Nairobi, Kenya.

5.3.1 Rate of adoption of data protection regulation

The first objective was to determine the effect of rate of adoption of data protection regulation on the competitiveness of healthcare facilities in Nairobi, Kenya. The study concluded that the effect of the rate of adoption on competitiveness was positive and was statistically significant, thus increasing the rates of adoption would place healthcare facilities at a competitive advantage compared to those with lower rates of adoption. The research incisively indicated that improvements in the rate of adoption of data protection regulation accelerated the competitiveness of healthcare facilities in Nairobi, Kenya.

5.3.2 Compliance costs

Additionally, the study sought to determine the effects of compliance costs on the competitiveness of healthcare facilities in Nairobi, Kenya. There was a positive and statistically significant correlation between compliance costs and competitiveness in healthcare facilities in Nairobi, Kenya. It was seen that although compliance cost may be a barrier to adoption of data protection regulations, healthcare facilities that adopted data protection regulations were more competitive and were able to reduce the total cost of compliance and offsets the risks of non-compliance.

5.3.3 PrivacyByDesign

The third objective was to explore the effects of PrivacyByDesign on the competitiveness of healthcare facilities in Nairobi, Kenya. The study concluded that PrivacyByDesign had a positive

and statistically significant effect on the competitiveness of healthcare facilities in Nairobi, Kenya. Privacy enhancing technologies, using PrivacyByDesign professionals and having a PrivacyByDesign policy provides data subjects confidence that the healthcare facilities in Nairobi are handling their personal data appropriately. This confidence by data subjects gives healthcare facilities competitive advantage against their rivals. The research further indicated that incorporating PrivacyByDesign in the design of products and services in healthcare facilities in Nairobi enhanced their competitiveness.

5.4 Policy Recommendations

The following recommendations were made based on the study findings

The study found that the rate of adoption of data protection regulations had a positive correlation on the competitiveness of healthcare facilities in Nairobi, Kenya. This study therefore recommends that policy makers to continuously improve data protection regulations so as to encourage an increased adoption rate which will in turn increase the competitiveness of healthcare facilities in Nairobi, Kenya.

Based on the findings that compliance cost has a positive and significant influence on the competitiveness of healthcare facilities in Nairobi, Kenya, this study recommends that policy makers should moderate the costs associated with compliance with data protection regulations such as the fee charged by the office of The Data Protection Commissioner for the registration of all private and public organizations processing personal data. An affordable charge would benefit the health sector by encouraging more facilities to adopt the requirements of the Data Protection Act, 2019 which will in turn increase the competitiveness of healthcare facilities in Nairobi, Kenya.

Study findings revealed that PrivacyByDesign has a positive as well as significant influence on the competitiveness of healthcare facilities in Nairobi, Kenya. It is therefore important that policy makers align with industry players to assess the industry's readiness and to develop and enhance standards and regulations that incorporate PrivacyByDesign principles which if implemented will in turn increase the competitiveness of healthcare facilities in Nairobi, Kenya.

Implication to theory and academics

This study adds and recommends the findings onto the existing empirical studies to the extent that the rate of adoption of data protection regulations, data protection compliance costs and, PrivacyByDesign affects the competitiveness of healthcare facilities in Nairobi, Kenya. It also

advances the growing body of literature on the impact of data protection regulations on the competitiveness of healthcare facilities.

5.5 Limitations of the Study

Data collection was difficult since respondents were reluctant, especially after learning that the research asked them to disclose their educational background and the department they worked in. This was lessened by the researcher's promise that the data would only be used for scholarly purposes and that confidentiality would be guaranteed. With this assurance, field work exercise was made possible. A non-confidentiality clause on the survey was to be signed before filling the questionnaire. Another limitation of the study was that the factors being studied only accounted for less than 70 per cent of variations impacting competitiveness of health care facilities.

5.6 Suggestions for Further studies

The study sought to determine effects of data protection regulations on the competitiveness of healthcare facilities in Nairobi. Based on the available literature, this study found minimal exploration of across various industries. This study recommends exploration into the effect of data protection regulations on the competitiveness of firms in non-healthcare industries such as the financial and manufacturing sectors which are highly reliant on data protection regulations. Further research should also be carried out to determine the effect of the data protection regulations on competitiveness as this would provide a more in-depth understanding of the importance of data protection regulations in enhancing industry competitiveness. This study's respondents should be widened to include all data controllers and data processors.

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APPENDICES

APPENDIX A: LETTER OF INTRODUCTION

Dear Respondent,

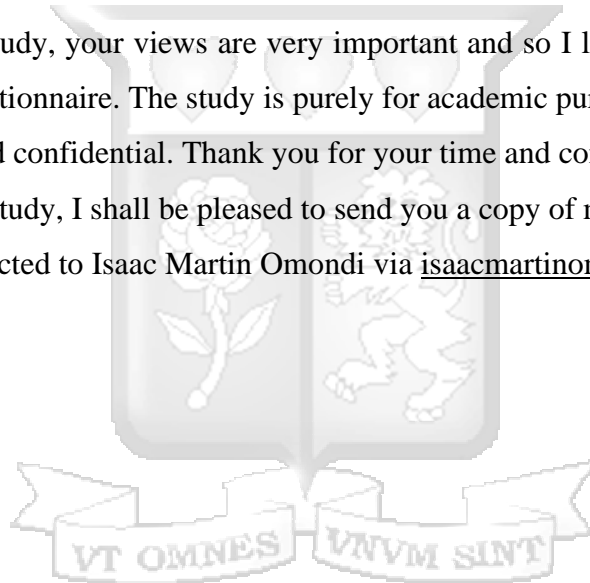
I am the undersigned, currently undertaking a master's degree in commerce at Strathmore University – Business School. I am conducting a study that involves collecting data for writing and compiling the final thesis as a partial fulfilment of the requirements for the degree's award.

The research study is on the effects of data protection regulations on the competitiveness of healthcare facilities in Nairobi and focusses on all level five hospitals in Nairobi and three private hospitals in Nairobi.

As a respondent to my study, your views are very important and so I look forward to reviewing them in the attached questionnaire. The study is purely for academic purposes and your input was treated as anonymous and confidential. Thank you for your time and contribution to my study.

Upon completion of my study, I shall be pleased to send you a copy of my findings.

Any inquiries can be directed to Isaac Martin Omondi via isaacmartinomondi@gmail.com



APPENDIX B: INFORMED CONSENT FORM

THE EFFECTS OF DATA PROTECTION REGULATIONS ON THE COMPETITIVENESS OF HEALTHCARE FACILITIES IN NAIROBI

SECTION 1: INFORMATION SHEET

Investigator: Isaac Martin Omondi

Institutional affiliation: Strathmore Business School (SBS)

SECTION 2: INFORMATION SHEET–THE STUDY

2.1: Why is this study being carried out?

Overall, to establish the effects of data protection regulations on the competitiveness of healthcare facilities in Nairobi. Specifically:

- To determine the effects of level of adoption of data protection framework on the competitiveness in healthcare facilities in Nairobi, Kenya.
- To determine the effects of compliance costs on the competitiveness of healthcare facilities in Nairobi, Kenya.
- To explore the effects of PrivacyByDesign for product and service provision on the competitiveness of healthcare facilities.

2.2: Do I have to take part?

No. Participation in this study is entirely voluntary, and the decision is entirely yours. If you decide to participate, you will be asked to complete a questionnaire to obtain information on the effects of data protection regulations on your organization's competitiveness. If you are unable to answer all the questions correctly the first time, you may be required to attend another informational session before answering the questions again. You are free to decline participation in this study at any time without giving any reason.

2.3: Who is eligible to take part in this study?

- Health record officers
- Health information officers
- Lab technologists
- Medical Officers
- IT & Finance
- Doctors and Nurses

2.4: Who is not eligible to take part in this study?

Non-healthcare professionals and those who do not work in healthcare facilities in the categories listed under “who is eligible to participate in the study”

2.5: What will taking part in this study involve for me?

You will be approached and asked to participate in the study. If you are satisfied that you fully understand the objectives of this study, you will be asked to sign this informed consent form before being taken through a questionnaire.

2.6: Are there any risks or dangers in taking part in this study?

Taking part in this study has no risks. We will consider all the data you give us as confidential and won't use it in any way without first getting your permission. The only use of the data is for academic research.

2.7: Are there any benefits of taking part in this study?

The data will be used to shed light on how data privacy laws affect healthcare facilities' ability to compete, and it is hoped that this knowledge will help policymakers in healthcare facilities make changes to systems and policies that will benefit all stakeholders.

2.8: What will happen to me if I refuse to take part in this study?

The decision to take part in this study is entirely voluntary. You have the right to withdraw at any moment without giving a reason, even if you first opt to participate but later change your mind.

2.9: Who will have access to my information during this research?

All study data will be safely stored. This data may be entered into our database, but it will be adequately password- and encryption-protected. Your information won't be accessible to anybody other than those who are directly involved in this study. Your entire information will be kept private.

2.10: Who can I contact in case I have further questions?

You can contact me, ISAAC MARTIN OMONDI, at SBS, or by e-mail isaac.omondi@strathmore.edu. You can also contact my supervisor, DR. HUMPHREY NJOGU, at the Strathmore Business School, Nairobi, or by e-mail Hnjogu@strathmore.edu.

If you want to ask someone independent anything about this research, please contact:

The Secretary–Strathmore University Institutional Ethics Review Board, P. O. BOX 59857, 00200, Nairobi, email: ethicsreview@strathmore.edu Tel number: +254 703 034 375

I, _____, have had the study explained to me. I have understood all that I have read and have had explained to me and had my questions answered satisfactorily. I understand that I can change my mind at any stage.

Please tick the boxes that apply to you.

Participation in the research study

I AGREE to take part in this research _____

I DO NOT AGREE to take part in this research _____

Storage of information on the completed _____

questionnaire I AGREE to have my completed questionnaire stored for future data analysis

I DO NOT AGREE to have my completed _____ questionnaire stored for future data analysis

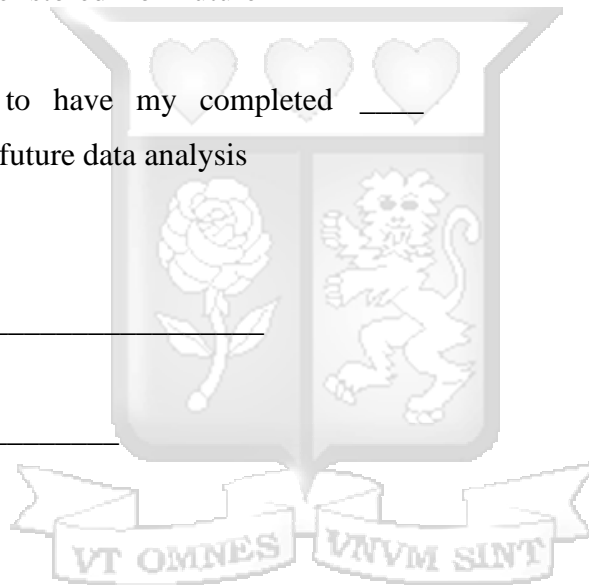
Participant's Signature:

Date: ____/____/____

DD / MM / YYYY

Participant's Name:

Time: ____/____



APPENDIX C: QUESTIONNAIRE

This questionnaire aims to collect information regarding the effects of data protection regulations on the competitiveness of healthcare facilities in Nairobi. The study will focus on three level five health facilities in Nairobi and three private hospitals and will incorporate feedback from Health care professionals who are involved in patient data capture. The responses you provide will be used in strict confidence and solely for academic purposes advanced by this research.

SECTION 1: BACKGROUND INFORMATION

Answer the questions below by ticking (✓) the appropriate choice.

Gender: Male _____ Female _____

What is your age group? (Please tick your option below)

18 – 27 years	_____	28 – 37 years	_____
38 – 47 years	_____	48 – 57 years	_____
58 years and above	_____		_____

What is your highest level of education?

University _____
College _____
High School _____
Other _____ (Please Specify): _____

How many years of experience do you have at the healthcare facility?

Less than 2 years _____
3 – 5 years _____
6 – 8 years _____
9 years and above _____

What is the classification of this healthcare facility?

A public facility _____ A private facility _____

What is the average number of patients served by the facility in a month?

Less than 1,000 _____ 1,001 – 2,000 _____
2,001 – 3,000 _____ Above 3,000 _____

What is the average annual revenue in Kenya Shillings generated by the facility?

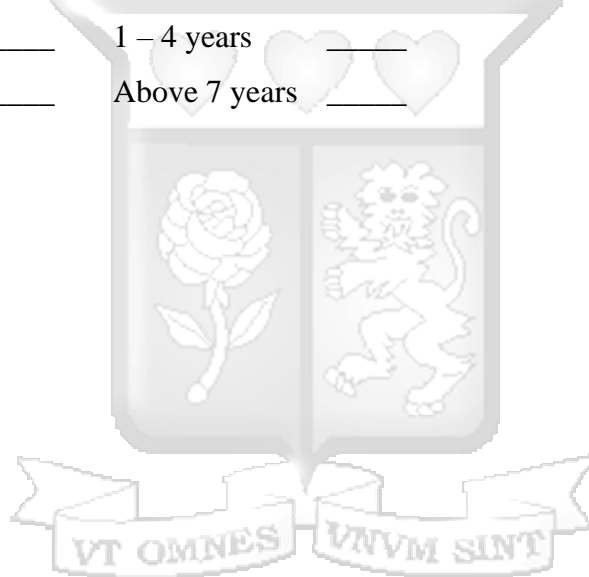
Less than 100 Million _____ 100 Million – 500 Million _____
501 Million – 1 Billion _____ Above 1 Billion _____

What is the average number of employees in the facility?

Less than 100 _____ 101 – 200 _____
201 – 300 _____ Above 300 _____

What is the number of years that data protection regulations have been implemented by the management and staff of this facility who are involved with data capture?

Less than 1 year _____ 1 – 4 years _____
5 – 7 years _____ Above 7 years _____



COMPETITION

Please indicate in the table with a tick (✓) your level of agreement based on the below scale:

1 = strongly disagree 2 = disagree 3 = neutral / neither agree nor disagree

4 = agree 5 = strongly agree

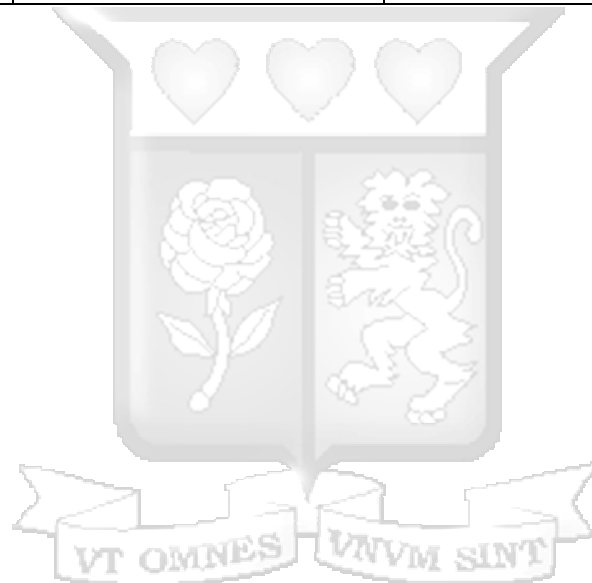
		1	2	3	4	5
5.1	Management uses feedback and insight provided through our product and service quality surveys to develop superior products and services that incorporate data protection regulations through the PrivacyByDesign (PbD) principles thereby staying ahead of our competition?					
5.2	By embracing data protection regulations, our facility manages to maintain old loyal customers as a result of the very high-quality customer experience and customer satisfaction.					
5.3	Management recognizes that the adoption of data protection regulations supports the effective management of customer relationships. This goes a long way in ensuring that we attract and retain new profitable customers?					
5.4	Management focuses on increasing our market share through innovation, competitive pricing, strengthening customer relationships, advertising, continuous improvement of our products and services, expanding our reach, and adopting data protection regulations leading to higher profit growth rate and revenue.					

Thank you for participating in the research

APPENDIX D: PROPOSED WORK PLAN

STUDY PROPOSED WORKPLAN – ISAAC MARTIN OMONDI - 120056
STUDY PERIOD 1 ST AUGUST 2022 – 14 TH APRIL 2023

ACTIVITY	PROPOSED START DATE	DURATION	END DATE
Data collection	1 st February 2023	10 days	10 th February 2023
Data analysis	11 th February 2023	5 days	15 th February 2023
Thesis writeup & correction	17 th February 2023	55 days	12 nd April 2023
Submission of final thesis	13 th April 2023	1 day	14 th April 2023



APPENDIX E: PROPOSED BUDGET

STUDY PROPOSED BUDGET – ISAAC MARTIN OMONDI - 120056
STUDY PERIOD 1 ST AUGUST 2022 – 14 TH APRIL 2023

	Budget Item	Kes
1	Logistics – Transport, Data entry clerk	10,000
2	Typing, printing & binding – Stationery	10,000
3	Software Analysis	25,000
4	Contingency (20per cent of 1+2+3)	12,000
	Total	57,000



APPENDIX F: QQ and PP PLOTS:

Figure 4.3 indicated the p-p plot for predicted residuals. Comparing a variable's actual cumulative distribution function to a predetermined theoretical cumulative distribution function is done using a probability-probability plot (P-P plot or probability percent plot) the standard normal distribution function). According to (Creswell, 2009) The position of the points indicated how close to the normal probability line the predicted residual point are

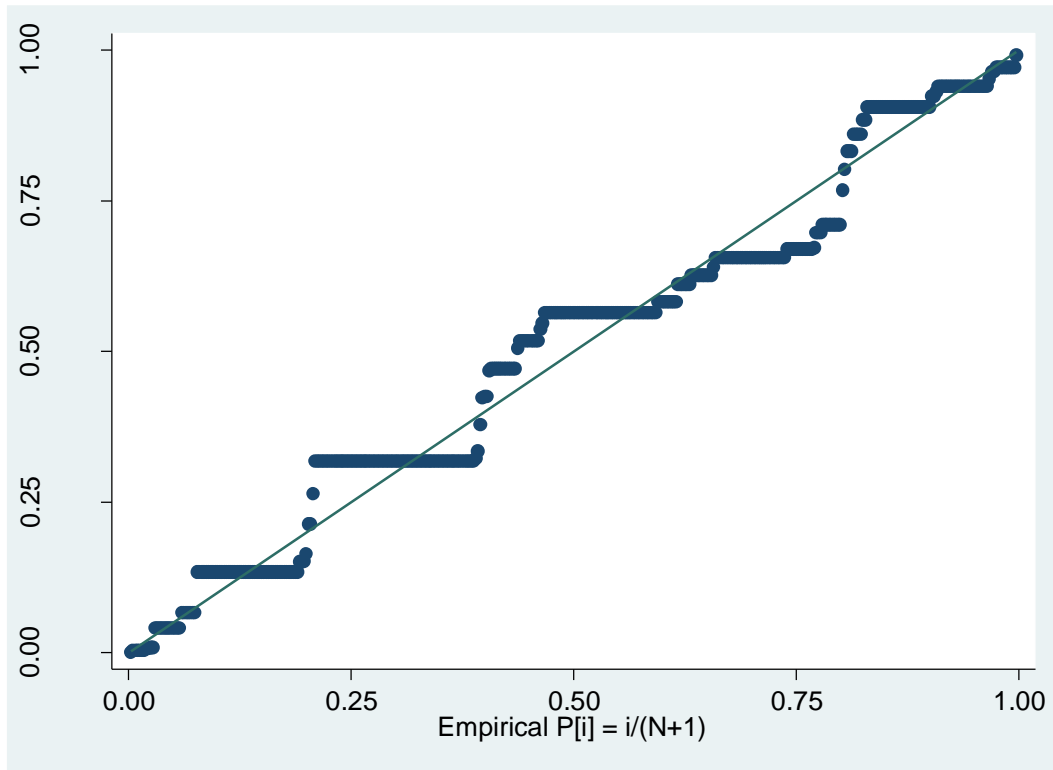


Figure 4.2 p-p plot

An exploratory graphical technique for testing the accuracy of a distributional assumption for a data set is the quantile-quantile (q-q) plot. The fundamental idea is to estimate each data point's theoretically predicted value based on the distribution being considered. Figure 4.4 indicated the points on the q-q plot will roughly fall on a straight line if the data do in fact match the expected distribution.

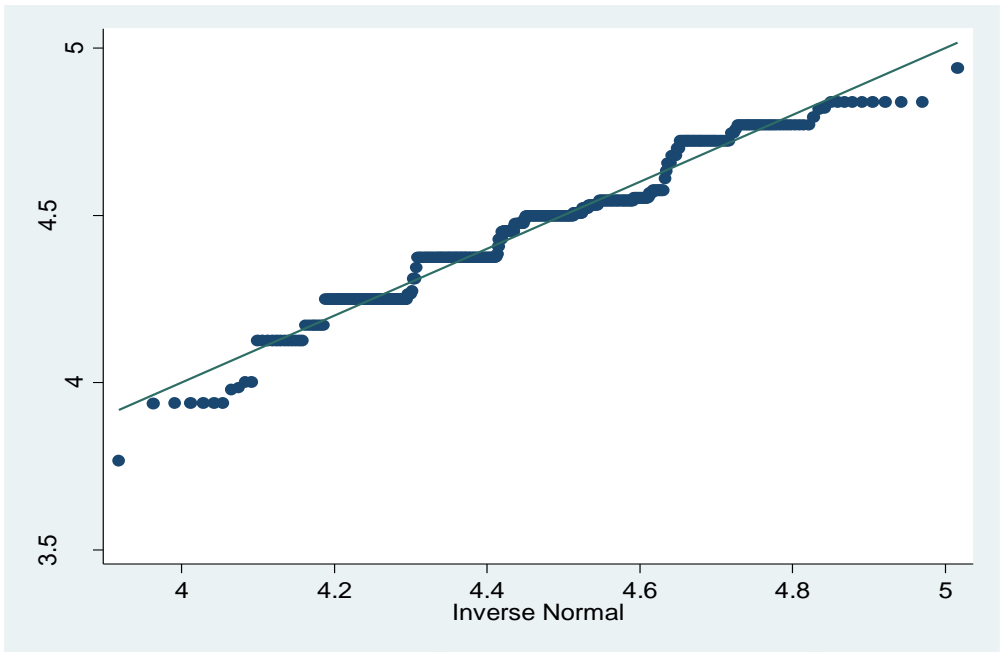
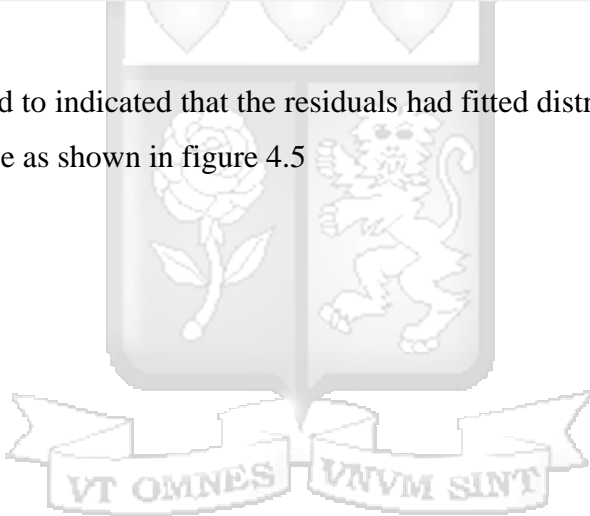


Figure 4.3 q-q plot

A histogram was also used to indicated that the residuals had fitted distribution point appeared to be within the normal curve as shown in figure 4.5



APPENDIX G: SIMILARITY INDEX REPORT




Document Information

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Sources included in the report


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APPENDIX H: RESEARCH PERMIT NACOSTI


REPUBLIC OF KENYA
National Commission for Science, Technology and Innovation

Ref No: 801958 **Date of Issue: 08/September/2022**


RESEARCH LICENSE




This is to Certify that Mr. Isaac Martin Omondi of Strathmore University, has been licensed to conduct research in Nairobi on the topic: EFFECTS OF DATA PROTECTION REGULATIONS ON THE COMPETITIVENESS OF HEALTHCARE FACILITIES IN NAIROBI for the period ending: 08/September/2023.

License No: NACOSTI/22/20203

801958
Applicant Identification Number


Director General
NATIONAL COMMISSION FOR
SCIENCE, TECHNOLOGY &
INNOVATION

Verification QR Code



NOTE: This is a computer generated License. To verify the authenticity of this document, Scan the QR Code using QR scanner application.

APPENDIX I: ETHICS REVIEW APPROVAL



14th September 2022

Mr Omondi Isaac Martin,
isaac.omondi@strathmore.edu

Dear Mr Omondi,

RE: Effects of Data Protection Regulations on the Competitiveness of Healthcare Facilities in Nairobi

This is to inform you that SU-ISERC has reviewed and **approved** your above **SU- master's** research proposal. Your application reference number is **SU-ISERC1482/22**. The approval period is from **14th Sep tember 2022 to 13th Sep tember 2023**.

This approval is subject to compliance with the following requirements:

- i. Only approved documents including (informed consents, study instruments, MTA) will be used
- ii. All changes including (amendments, deviations, and violations) are submitted for review and approval by SU-ISERC.
- iii. Death and life-threatening problems and serious adverse events or unexpected adverse events whether related or unrelated to the study must be reported to SU-ISERC within 48 hours of notification
- iv. Any changes, anticipated or otherwise that may increase the risks or affected safety or welfare of study participants and others or affect the integrity of the research must be reported to SU-ISERC within 48 hours
- v. Clearance for export of biological specimens must be obtained from relevant institutions.
- vi. Submission of a request for renewal of approval at least 60 days prior to expiry of the approval period. Attach a comprehensive progress report to support the renewal.
- vii. Submission of an executive summary report within 90 days upon completion of the study to SU-ISERC.

Prior to commencing your study, you will be expected to obtain a research license from National Commission for Science, Technology, and Innovation (NACOSTI) <https://research-portal.nacosti.go.ke/> and obtain other clearances needed.

Yours sincerely,

for: **Dr Ben Ngoye,**
Secretary; SU-ISERC

Cc: Prof Fred Were,
Chairperson; SU-ISERC

