

sAn Exploration of Alternative Ways that The Catholic Church in Kenya can
Communicate Big Data to Clergy and Congregants A Study of The Catholic Diocese of
Kakamega

by

Alex Okware Ekodere

A thesis presented to the School of Communication

of

Daystar University
Nairobi, Kenya

In partial fulfillment of the requirements for the degree of

MASTER OF ARTS
in communication

October 2021

APPROVAL

AN EXPLORATION OF ALTERNATIVE WAYS THAT THE CATHOLIC CHURCH
IN KENYA CAN COMMUNICATE BIG DATA TO CLERGY AND
CONGREGANTS: A STUDY OF THE CATHOLIC DIOCESE OF KAKAMEGA

by

Alex Okware Ekodere
17-1474

In accordance with Daystar University policies, this thesis is accepted in partial fulfillment of the requirement for the Master of Arts degree.

Date:

Agnes Lucy Lando, PhD,
1st Supervisor

Julia Kagunda, PhD,
2nd Supervisor

Kinya Mwithia, PhD,
HoD, Strategic and Organizational
Communication Department

Levi Obonyo, PhD,
Dean, School of Communication

Copyright©2021 Alex Okware Ekodere

DAYSTAR UNIVERSITY

DECLARATION

AN EXPLORATION OF ALTERNATIVE WAYS THAT THE CATHOLIC CHURCH
IN KENYA CAN COMMUNICATE BIG DATA TO CLERGY AND
CONGREGANTS: A STUDY OF THE CATHOLIC DIOCESE OF KAKAMEGA

by

Alex Okware Ekodere

I declare that this thesis is my original work and has not been presented to any other college or university for academic credit.

Sign: _____
Alex Okware Ekodere
17-1474

Date: _____

ACKNOWLEDGEMENTS

First, I acknowledge God's grace and love. Gratitude to Rt. Rev. Joseph Obanyi Sagwe, Bishop of the Catholic Diocese of Kakamega who sponsored the program. His imprint will remain in the pages of this thesis and for that, I am deeply grateful. My gratitude goes to my first supervisor Sr. Prof. A.L. Lando, for working alongside me to make this research a reality. I am also indebted to Dr. Julia Kagunda, for her invaluable knowledge and insight as a second supervisor. I must thank the entire communications department of Daystar University and students I interacted with. I extend my gratitude to Rev. Frs. Onesmus Muthoka, Isaac Njehia and Nelson Ojijo for the support they accorded me during my stay and studies.

May God bless them all, Amen.

DAYSTAR UNIVERSITY

TABLE OF CONTENTS

APPROVAL	ii
DECLARATION	iv
ACKNOWLEDGEMENTS	v
TABLE OF CONTENTS	vi
LIST OF TABLES	viii
LIST OF FIGURES	ix
LIST OF ABBREVIATIONS AND ACRONYMS	x
ABSTRACT	xi
DEDICATION	xii
CHAPTER ONE	1
INTRODUCTION AND BACKGROUND TO THE STUDY	1
Introduction	1
Background to the Study	4
Problem Statement	10
Purpose of the Study	12
Objectives of the Study	12
Research Questions	12
Justification of the Study	13
Significance of the Study	13
Assumptions of the Study	14
Scope of the Study	14
Limitations and Delimitations of the Study	15
Definition of Terms	15
Summary	17
CHAPTER TWO	19
LITERATURE REVIEW	19
Introduction	19
Theoretical Framework	19
General Literature Review	21
Conceptual Framework	33
Discussion	34
Summary	35
CHAPTER THREE	37
RESEARCH METHODOLOGY	37
Introduction	37
Research Design	37
Population	38
Target Population	38
Sample Size	43
Sampling Technique	46
Data Collection Procedures	47
Ethical Considerations	50

CHAPTER FOUR.....	53
DATA PRESENTATION, ANALYSIS, AND INTERPRETATION	53
Introduction	53
Analysis and Interpretation	53
Summary of Key Findings	88
Summary	89
CHAPTER FIVE	91
DISCUSSIONS, CONCLUSIONS, AND RECOMMENDATIONS	91
Introduction	91
Discussions of Key Findings.....	91
Conclusion	109
Recommendations	112
Recommendations for Further Studies.....	114
REFERENCES	116
APPENDICES	124
Appendix A: Key Information Interview (KII) Guide Instructions	124
Appendix B: Questionnaire on Large Sets of Information Flows.....	127
Appendix C: Observation Schedule	134
Appendix D: Consent Form	149
Appendix E: Focus Group Discussion Guide	152
Appendix F: Ethical Clearance	155
Appendix G: Researcher’s Introduction Letter from Daystar University	156
Appendix H: Approval Letter to Conduct Research	157
Appendix I: Research Permit	158
Appendix J: Map of Kakamega Diocese.....	159

LIST OF TABLES

<i>Table 3.1: FGDs Respondents</i>	<i>41</i>
<i>Table 4.1: Distribution of Respondents by Age</i>	<i>56</i>
<i>Table 4.2: Distribution of Respondents by Academic Qualifications.....</i>	<i>57</i>
<i>Table 4.3: Distribution of Respondents by Type of Parish.....</i>	<i>58</i>
<i>Table 4.4: Distribution of Respondents by Definition of Big Data ‘Large Sets</i>	<i>63</i>
<i>Table 4.5: Degree of Variances in the Church having large sets of Information Flows..</i>	<i>64</i>
<i>Table 4.6: Sources of big data in the Catholic diocese of Kakamega</i>	<i>66</i>
<i>Table 4.7: Variance in Whether the Church Has Big Data in Different Forms.....</i>	<i>67</i>
<i>Table 4.8: Channels of Data Dissemination in the Catholic Diocese of Kakamega.....</i>	<i>68</i>
<i>Table 4.9: Distribution of Respondents by Avenues of Accessing Data</i>	<i>72</i>
<i>Table 4.10: Distribution of Respondents by Instrument used to Access Big Data</i>	<i>74</i>
<i>Table 4.11: Distribution of Respondents by Frequency of Accessing Big Data.....</i>	<i>75</i>
<i>Table 4.12: Variance of Data Accessibility in the Catholic Church.....</i>	<i>77</i>

DAYSTAR UNIVERSITY

LIST OF FIGURES

<i>Figure 2.1: Conceptual Framework</i>	33
<i>Figure 4.1: Distribution of Respondents by Gender</i>	55
<i>Figure 4.2: Platforms Used to Access Large Sets of Information Flow</i>	70
<i>Figure 4.3: Whether Clergy Determines Data Uptake in the Diocese of Kakamega</i>	78
<i>Figure 4.4: Response to Whether Congregants Accessed Church Data</i>	82

DAYSTAR UNIVERSITY

LIST OF ABBREVIATIONS AND ACRONYMS

AA	<i>Apostolicam Actuositatem</i>
AMECEA	Association of Member Episcopal Conference in Eastern Africa
AP	<i>Annuario Pontificio</i>
ASE	<i>Annuarium Statisticum Ecclesia</i>
BBVA	Banco Bilbao Vizcaya Argentaria
CAN	Canon
CANs	Canons
CCC	Catechism of the Catholic Church
CDKK	Catholic Diocese of Kakamega
CMA	Catholic Men Association
CWA	Catholic Women Association
FGD	Focus Group Discussion
KCCB	Kenya Conference of Catholic Bishops
KII	Key Informant Interview
LEGIONS	Legion of Mary Devotion
NA	<i>Nostra Aetatis</i>
OIT	Organization Information Theory
PCAs	Parish Communications Agents
SCC	Small Christian Community
YCAs	Young Christian Adults

ABSTRACT

Big data continues to elicit excitement and anxiety in almost equal measure among organization that are religious and non-religious. This study sought to establish the alternative ways that the Catholic Church could communicate big data based on the apparent gap between the existing large sets of data vis-à-vis their utilization. Objectives were to assess awareness levels of large sets of information flows, to identify accessibility levels of big data and analyze alternative ways of communicating in the Catholic diocese of Kakamega. The Organizational Information Theory and conceptual framework provided an insight on the relationship between stakeholder communication patterns versus big data utility. A descriptive survey research design targeted 38 respondents who were drawn from stratified purposive sampling was employed. Questionnaires and KII assessed the clergy only while FGDs assessed congregants alongside participant observation as instruments of data collection. Findings revealed the Catholic diocese of Kakamega had big data in form of texts, audio, videos, graphics and symbols whose awareness and accessibility levels varied due to behavioral and literacy related noise. As such, the existing channels were subject to review in order to reduce noise. The researcher determined that the definition of big data remained a challenge to even academicians. Religious corporations have big data whose utility affected them, and the investigation of the topic proved useful and not as earlier perceived as business-oriented only. Recommendations for policy-education on information delivery and packaging, introduction of a special needs office and mainstream media. Recommendations for further studies with a larger sample size, time frame and study site.

The impact of big data on social welfare and exploration of big data in bridging the generational gap in churches was also presented in this study.

DEDICATION

I dedicate this work to the Catholic Diocese of Kakamega.

DAYSTAR UNIVERSITY

CHAPTER ONE

INTRODUCTION AND BACKGROUND TO THE STUDY

Introduction

The realization of 'big data' and its role in corporations and/or organizations has been one of the trends in both profit and non-profits corporations/organizations. According to Sigma Computing (2021), big data has been utilized by every industry and its growth is estimated to be worth 77 billion US dollars by 2023 yet 73.4% of companies report it as a challenge especially when it comes to adopting big data initiatives through analytics and insights required for its utility. Argentina, South America has proved to be the fastest country in the adoption of big data with an annual growth rate of 20.8% despite the fact that most technology driven companies are based in North America (Wiesenberg et al., 2017). This Stigma computing survey also point out that only 26% of the companies assesses data-based cultures despite the benefits of big data. The study reveals that 63% of employees cannot point out certain data insights that concern their organization within a specified framework.

The challenges in utilizing and analyzing data as a strategy in boosting performance are quite evident as stipulated by most scholars (Aversa et al., 2021). The use of the data studies is still at its early stages in non-profit corporates. There exists insufficient review on large sets of information in the Catholic Church especially in relation to the spiritual development of her congregants and other developmental aspects (Wiencierz & Rotteger, 2017.)

The Catholic Church is a corporate with rights and privileges to own property and acquire wealth characterized by the logo, clergy and congregants. The Catholic Church

has a mission statement and vision. It also has a defined hierarchy which comprises of the Bishop (Local Ordinary), Vicar General, Body of Consulters, Presbyterian council, Deans and Parish priests. The hierarchy of communication flows from the diocese to parishes then to Small Christian Communities (SCC). As an organization the Catholic Church also has colors, signature tune, anthem, seal and most importantly the mandate and trading name called the “*Catholic Church*” (Kauper & Ellis, 1973).

Fuller (2017) stated that religion especially Christianity utilizes large sets of information to create awareness and deal with injustices. For instance, in Scotland, Fuller (2017) noted that issues raised by the church on sheep cloning by parishioners and other stakeholders were to investigate how ethical the experiments were with respect to both religion and science.

In 2012, Harris conducted an online survey by Suite Global with 154 respondents targeting management and their perceptions of big data. The findings revolved around what they thought big data is and what it was meant to do. Diebold (2012) relates the origin of “big data” to the 1990’s as stated by John Mashey on a lunch conversation. According to the European commission, large sets of information consists of diverse, huge and multi-sourced kinds of information which constitutes information on social media platforms, business transactions, as well as names and addresses and not limited to health records. Zerfass, Verčič and Wiesenberg, (2016) denoted large sets of information as any information that is sequentially analyzed to produce styles that defined interactions and behavioral patterns.

According to Tsai, Lai, Chao, and Vasilakos, (2015) an organization is linked to diverse data inclusive of that which is streamed. As such big data is characterized by

massive, complex, incomplete, heterogeneous, and noisy information that is of higher dimensions and changes according to the analysis approach in question. In this context, it's not necessarily about amount but about how useful the information is. Furthermore, organizations have information that is and can be ambiguous and/or even abnormal.

First, this study refers to big data as a continuous and ever-increasing flow of information from individuals to an organization via multiple sources: enormous in nature and by traditional channels. Such large sets of information flows in the form of texts, comments, images, audio, and video. Second, big data refers to large amounts of information, whose dissemination is not limited to high speed but also diversity.

Third, big data refers to a lot of information that is coming fast, in a complex format, and from a variety of sources from individuals to an organization. Fourth, big data refers to a large amount of information about people in an organization; the information is collected from the people by oral tabulation and by social networks (Wiencierz & Rotteger, 2017). Finally, big data refers to complex, heterogeneous, noisy and massive information in higher dimensions that is either ambiguous or abnormal.

Though, there is no precise description of large sets of information flows 'big data'. The study underscores that big data is characterized by size, speed, and accuracy. It is therefore a relative concept. This study adopts Tsai et al. (2015) definition of big data as the most suitable definition for this study. According to Fuller (2017), Christianity and other faith traditions use big data to explore theological concerns and increase religious engagement at a more academic level. As Boyd and Crawford (2012, p.662) noted, that 'big data is at its metamorphosis especially in the religious sphere'. The study explores the alternative ways that the Catholic Church can communicate and utilize big data. As

noted by the article on Communication as the core activity of the Church (2015, November 7), the Catholic Church information flows from clergy and congregants via registers, intake forms, reports, meetings, and private interviews were enormous.

Background to the Study

Aristotle, the Greek philosopher, highlights in his political thoughts that “Man by nature is a social animal.” (p. 27). According to Aristotle, human beings interact with each other and other elements in society, either verbally or non-verbally. The interaction of human beings is what Aristotle terms as “communication”. Therefore, communication has become a social condition of exchanging information by speaking, writing, or using other medium (Ruesch & Bateson, 2008).

The relationship between communication and big data remains a debatable and novel concept among scholars in strategic communication. Emphasis have been placed on opportunities, measures, evaluation and control especially when dealing with technology i.e., sensors, social /online media platforms and other data sources. Big data and communication in non-profit corporate have not been ventured despite its benefits.

Transformation in the society is attributed to large sets of information that organizations collect through their intermediaries, service/platform and technology firms and providers. Metaphorically, information is the engine and data is its oil (Mayer-Schönberger & Cukier, 2013). Discussions on big data reveals that better decisions, services and deliveries have been made despite the fact that this study revolves around data acquisition and usage from a variety of sources. This study has been considered a novel study in the field of strategic communication attributing it more to public relations (Weiner & Kochhar, 2016). Big data utility is crucial for strategic communication

considering creation, adoption and distribution of content. However, this is only possible under the implementation of individual stakeholders and the organization.

A survey in Canada ,2021 assessing retail organizations focused on the opportunities and challenges characterized by organization failing to fully utilize big data in the communication sector with the objectives that identifies awareness and availability .The findings points out that there existed a general view especially about the importance of large sets of information and its accessibility .The study also points out that the adoption of big data was dependent on an organizations environment that promotes clear data strategies (Aversa, Hernandez, & Doherty, 2021).

A survey by Every Action team in 2018 with more than 460 respondents from non –profit organizations assessing big data utility in relation to culture, communication, and the impact it has on their profession. A half of the respondents points out that they were not aware of how it impacted their profession while 90% were aware that organizations collected large sets of information. Big data exists in the diverse departments that non –profits corporate have, ranging from marketing, finances and metrics programs that is used to improve performance, check on donors (demographically) and also for the organization’s communication skills. The survey also found out that only 5% points out that big data is considered in decision making. The survey’s findings point out that analyzing big data was the main problem in organizations. Non-profits organizations have yet to understand the importance of big data. The study assesses that analyzing previous patterns on performance and communication enables an organization to re-strategize.

In a study conducted a similar study in China on the relationship between big data, environment, and communication projects as the focus point with 70 heterogeneous respondents. The study's findings revealed that the relationship between communication and big data was directly proportional to that of awareness. The awareness in this study was and is a major factor that organizations rely on during adoption of big data when managing projects especially by applying effective communication. The study attributed big data to volumes in terms of size, transactions and even records, velocity in relation to the type of information, available resources and whether it is structured/unstructured and finally velocity with regards to how frequent it is passed, the methods of processing it and whether it was real-time/streamed. The research concluded that there existed a gap in most organizations that failed to adopt big data and that incorporating big data was essential in a company's success especially if the focus was communication.

A European survey with 2,710 respondents from diverse countries divulges that big data is still an issue of concern among communication practitioners with 44% as the only representative figure of those who view big data as an essential in corporate organizations (Wiesenberg et al., 2017). The study by these authors pointed out that 22% displayed adequate knowledge of big data while very few had implemented big data in their organizations with a 21.2% representation. In Switzerland, only 14.8 % stated that they operated big data applications. Findings from this study presented by 72.3% states, indicated that communication practitioners can benefit by big data (Tsai et al., 2015).

In most organizations, the purpose of effectiveness in communication is to drive organizations goals from small businesses, multinational corporations, and government agencies. These organizations are created by people who have different values, preferences, ideologies, motivations, abilities, and resources. Information flow involves the correct mediums without noise and to the intended persons/groups in order for progress to be accounted for. On the contrary, communicating the wrong information in an organization becomes a barrier to communication (Schoeneborn, 2011).

Today, individuals and companies are exposed to constant and overwhelming information. The availability of several platforms results to another challenge for users in most organizations. These manifests in terms of selecting the most appropriate stream and processing platforms for their needs. Communication can slow down the speed of information clock and pushing the hands of knowledge to the clock. In view of big data, it is hoped to generate information. Communicators aim at creating knowledge in order to achieve credible and long-term positioning for companies (Zerfass et al., 2016).

Currently, 98% of information is retrieved digitally(Wiencierz & Röttger, 2017). It is then logical to state that large sets of information and how they are analyzed are key to an organization's progress. All disciplines including non-profits such as church and religious ministries ought to embrace such aspects in order to meet their congregants and clergy needs both externally and internally especially by basing on its performance as the main concern as cited by (Zerfass et al., 2016). As noted by the article on Communication as the core activity of the Church (2015, November 7), communication is the core activity of the church. Through different mediums the Catholic Church has realized opportunities that focus on interactions with clergy and congregants on a variety

of programs. This study established that although the Catholic Church communicates to clergy and congregants by word of mouth and print, there are alternative ways that it can communicate big data to clergy and congregants.

One of the largest religious organizations commanding over 1.2 billion followers worldwide is the Catholic Church. It has 221,700 parishes, 640 archdioceses, and 2,857 Dioceses (Official Website of Vatican- ZapMeta Search Results, 2017). As an organization, the Catholic Church continuously connects with clergy and congregants on relatable topics such as sacraments and monetary collections by word of mouth and print. Most of the information in the Catholic Church is in the form of text, which is communicated through *Apostolicam Actuositatem (AA)*, *Nostra Aetate (NA)*, *Annuario Statisticum Ecclesia (ASE)* and *Annuario Pontificio (AP)* (Arasa, Cantoni & Ruiz, 2010; Walsh, 2005).

For example, in the Vatican Curia in Rome, the Catholic Church receives large amounts of printed information from Bishops. Other large amount of information on print included Lenten Campaigns and vocation Sunday. On the same note, propaganda fidei (on the doctrine of faith) communicated papal ex-cathedra teachings on print. Apostolic Nunciatures (*Charge' de'Affaires*) and Conferences of Catholic Bishops across the world receive and relay large amount of information to the clergy using print and congregants by word of mouth (Arasa et al., 2010; Walsh, 2005).

At the Diocesan level, the *Diocesan curia* (Secretariat) receive information on clergy and congregants by word of mouth and print. Such information is on mission Sunday (Collections for evangelization) and St. Peter's Pence (Donations made to the Vatican to facilitate the Pope to respond to needy countries as a result of war, diseases

and natural disasters). At the parish level the clergy receive information from congregants on small Christian communities' programs, self –reliance collections by word of mouth and print. While the congregants receive information from the clergy by word of mouth and print (Arasa et al., 2010; Walsh, 2005).

According to Walsh (2005) in Africa, most of the information in the Catholic Church is communicated to congregants using word of mouth and print. Recently, the Catholic Church in Africa has established other forms of reaching out to congregants using radio and television. According to statistical data, Africa has over 200 million catholic congregants. The Catholic Church in Kenya feats diverse media platforms. Some Catholic Dioceses in Kenya are visible through annual publications such as newsletters, directories and magazine. Others have radio and television stations for example the Franciscan Capuchin Television.

In addition, the utilization of big data presents problems because big data is not only valuable when its contents are utilized but also when communicated (Buyya et al., 2016), Catholic Media publication,2019). According to (*Catholic-Hierarchy: Its Bishops and Dioceses, Current and Past*, n.d.), a Diocese comprises of individual Catholics organized into parishes. A diocese is not just as a quaint organizational unit of the Catholic Church. Rather, each diocese is also registered as a non –profit corporation. Each diocese has a defined composition of a corporate structure that leads itself particularly well and is governed by just one *juridical person* (Bishop).

The Catholic Church is a corporate body with a corporate officer (Bishop), it fits in the description of an organization. The structure of the Diocese as corporate is in the form of deaneries, parishes and small Christian communities. The structure is known as

the Diocesan Synod that consists of declarations and degree of a particular diocese. A Diocese as a corporate sole has a legal entity consisting of single sole with subsequent office and powers that is passed from one bishop to another. Also as a corporate body, the Catholic Church is founded on legal structure, moral person, founded on divine law with powers to administer its own property independence of any sovereign (Caparros, Theriault, & Thorn, 2004).

Big Data is characterized by filtration and vagueness of information as such the most valuable data is missed out (Wiencierz & Röttger, 2017). Big data is also used to effectively customize and segment communication. The intention of using big data is to make sure that communication becomes more effective and meets the demands of the recipients. According to Wiencierz and Röttger (2017) as the disseminator of information; management and exposure is key to interpreting and converting it for productivity purposes.

The study therefore sought to fill the gaps on the existing channels of communication in the Catholic Diocese of Kakamega and explored alternative ways that the church utilizes big data within the process of communication.

Problem Statement

Zerfass et al. (2016) on big data asserted that those insufficient communication skills by practitioners especially managers result to insufficient utilization of the large sets of information whether incoming or outgoing. Service providers and technology instead have transformed the societies with the presentation and accessibility of enormous information. According to a study conducted in 2016 by the European monitors (communication). The study reported that utilizing large sets of information was

crucial for institution heads represented by 23%. In every 3 participants out of 4, concludes that utilizing large sets of information has improved their professional expertise.

Scholarly research on big data have focused more on management, integration, processing, and ethical implications. Ironically there is limited penetration of big data in strategic and organizational communication especially the non-profit organizations such as the church. Despite the importance of big data, the Catholic Church has underutilized large sets of data when communicating to clergy and congregants. In order for the Catholic Church to remain relevant the church leaders have to display relevance by associating evangelization to more than the spiritual role in their lives by reaching out to them and solving their needs (Belief net).

The study therefore proposes solutions to the gaps in the existing channels of communicating big data in the Catholic Diocese of Kakamega by examining how big data can be alternatively communicated to the clergy and congregants. The findings will enable the Catholic Diocese of Kakamega to embrace big data and its importance in communication.

The Catholic Diocese of Kakamega has a following of 950,400 who subscribes to the Catholic faith during the study period (CDoK, 2019). It also has existing networking channels that transmitted communication. However, the diocese still faces the challenge in addressing the unique needs of the clergy and congregants. Proper utilization of big data aims at serving and building the relationships within churches which is the basic agenda of most religious non-profit corporate. The study aims at aligning the unique

needs of the clergy and congregants of the Catholic Diocese of Kakamega by utilizing and examining alternative channels of communication.

Purpose of the Study

The purpose of this study was to explore alternative ways that the Catholic Diocese of Kakamega could adopt to effectively communicate to clergy and congregants by use of the available big data.

Objectives of the Study

The study was guided by the following objectives.

1. To assess awareness levels of large sets of information flows among the clergy and congregants in the Catholic Diocese of Kakamega.
2. To identify the accessibility levels of large sets of information flows among the clergy and congregants of the Catholic Diocese of Kakamega.
3. To analyze alternative ways through which large sets of information flows can be communicated among the clergy and congregants in the Catholic Church.

Research Questions

The following research questions were responded to:

1. How did the clergy and congregants exhibit awareness of large sets of information flow in the Catholic Diocese of Kakamega?
2. How often did the clergy and congregants access big data/large sets of information in the Catholic Diocese of Kakamega and to what extent?
3. What channels were used for the flow of large sets of information in the Catholic Diocese of Kakamega?

Justification of the Study

The use of the term “Big data,” has been a household name for academic corporate investigation. Scholarly research on big data focuses more on management, integration, processing, and ethical implications. Conversations on big data too focuses more on communicating business strategies as opposed to communicating tactics of relaying big data to intended publics.

Big Data is found to be valuable if its content are utilized. Understanding the cause behind utilization of big data is vital to an organization. Besides, organizations that embraces using big data to segment messages cited progress in their ministries. Notwithstanding, Christian scholars have extensively explored the interconnections between technology, culture, and religion.

The justification of this study was based on the apparent gap between the existing big data in the Catholic Diocese of Kakamega vis -a - vis its utilization by her clergy and congregants. There is a critical need to focus and fully utilize big data in order to increase efficiency in communicating. The study was based on the need for the Catholic Diocese of Kakamega to use data to maximize ministry, and act upon the data they collect.

Significance of the Study

The Catholic Bishops of Kenya umbrella body as policy makers were provided with useful information from the findings of this study that identifies the shortcomings that led to underutilization of church big data. The findings could inform the Catholic Bishops of Kenya on some of the church policies to be reformulated to cater for all clergy and congregants who missed out on church data due to their special needs and the different ways of packaging and delivering church data. The findings would specifically

enable the communications office in the Catholic Diocese of Kakamega to make use of the right channels of communicating big data to clergy and congregants.

The findings from this study are meant to assist institutions and bodies as showcase that are equipped with the responsibility for communication on how to improve on big data utilization when formulating policies. The research's findings could enrich literature on large sets of information flows in church ministries by realizing the importance of big data utilization in non-profit based organizations. This study will have enabled the researcher to gain a master's degree in strategic and organizational communication.

Assumptions of the Study

These were the assumptions of this study:

1. The Catholic Diocese of Kakamega had existing big data that was underutilized.
2. The Catholic Diocese of Kakamega was employing specific approaches to communicate big data to clergy and congregants.
3. The leadership of the Catholic Diocese of Kakamega would grant permission for the study to be carried out within clergy and congregants in the counties of Kakamega and Vihiga.

Scope of the Study

For the study to fully exploit the topic, the researcher preferred respondents from all the dioceses in Kenya, but that was impossible since monetary relations and the time frame set for the research was limited. The study only focused on Kakamega diocese – clergy and congregants. The study focused on exploring alternative ways through which

the Catholic Church adopted to communicate big data to her clergy and congregants in the Catholic Diocese of Kakamega. The participants were drawn from the Catholic Diocese of Kakamega. The study targeted populations were the clergy and congregants from selected parishes within the Diocese of Kakamega. The researcher also used a sample due to health –related factors such as Covid -19.

Limitations and Delimitations of the Study

Creswell (2008) noted that all academic researchers are limited by various factors. The researcher faced several challenges which can be dealt with by others in case of future studies. They included limitation in scope as the informants come from the Catholic diocese of Kakamega and they comprised of the clergy and congregants.

Since the study was done in the Catholic Diocese of Kakamega, generalizing the results to other dioceses due to differences in culture was deemed as inappropriate. Financing the preparation, implementation, training of research assistants, stationary, data collection and analysis was an expansive and expensive venture. The study faced the challenge of Covid-19 pandemic during data collection. To avert the challenge of Covid -19, the study used a sample size of respondents bearing the health of both respondents and the researcher.

Definition of Terms

Big Data: According to Mayer-Schonberg and Cukier (2013), big data refers to value precision, speed and amount in information flow in an organization. Whereas Kitchin (2014) quoted the oxford English Dictionary: *Datum* as the Latin version of data

which refers to classified information that was sourced. In this study, big data refer to unexploited amount of information in an organization.

Catholic: Refers to “an organized society of baptized Christians professing the same faith under the authority of Christ and the leadership of the pope and the bishops” (Coriden, Green, Heintschel, 1985). For the purpose of this study, the term Catholic was used to identify those who subscribed to the Catholic teachings.

Church: The church refers to a religious community that is an organized body of believers in a particular community (Vatican Council, 2012; Catholic Church & Kenya Episcopal Conference, 2008). In this study, the Church is an organized and hierarchical Assembly of God’s people in the Catholic Diocese of Kakamega who exercise the Catholic teaching.

Corporate communication: A channel of cultivating relationships between stakeholders, personnel, investors/donors in relation to the corporate environment with similar values/interests in increasing an organizations value Jones & Holmes (2011.) And in this study corporate communication refers to the exchange of information and ideas between the Catholic church and her clergy and congregants.

Congregants: Refers to members who subscribe to the Catholic teachings (Coriden, Green, Heintschel, 1985). In the study the congregants are members who subscribes to the Catholic teachings in the Diocese of Kakamega.

Clergy: Refers to a collection body of men ordained under the Roman rite and serving the needs of its members (Caparros et al., 2004). And in the study, the clergy refers to the priests working in the Catholic Diocese of Kakamega under the leadership of the local ordinary (Bishop).

Diocese: Refers to a district area under the pastoral care of a local ordinary (Caparros et al., 2004) In this study ,the Diocese refers to the area administrated by the by the local ordinary of the Catholic Diocese of Kakamega.

Organization: Refers to an entity constituting members with a particular interest who attributed responsibility to the organization (Tang, Choy, Ho, Lam, & Tsang, 2020). In this study, organization refers to the Catholic Diocese of Kakamega.

Parish: Geographical location of people following the Catholic rite (Caparros et al., 2004). In the study a parish refers to a baptized community of Catholic believers whose care has been entrusted to a parish priest or Father –in charge under the authority of the local ordinary of the Catholic Diocese of Kakamega.

Parish priest: It refers to the priest in charge of a particular area of the people of God (Caparros et al., 2004). In the study a parish priest refers to a religious leader trained and authorized to perform sacred rites in the Catholic Diocese of Kakamega.

Parishioners: Refers to people who identified and subscribed themselves with the Catholic faith within an area (Catholic Church & Kenya Episcopal Conference, 2008).And in this study parishioners refers to people who were baptized and have registered with the parish administration under the leadership of a priest designated for that particular area of the people .

Summary

This chapter has given the background to the study, the statement of the problem, objectives of the study, the research questions, and justifications of the study and the significance of the study. The chapter has also highlighted the assumptions, the limitations, and delimitations, as well as the scope of the study. The following chapter

will offer relevant literature including theories, general and empirical literature as well as the researcher's framework.

DAYSTAR UNIVERSITY

CHAPTER TWO

LITERATURE REVIEW

Introduction

This chapter contains literature review, the Organization Information Theory (OIT) and conceptual framework displaying the relationship between large sets of information and strategic communication in the Catholic diocese of Kakamega as non-profit corporate. The chapter provides diverse insights from other scholars who have ventured into big data.

Theoretical Framework

Labaree (2013) defined a theoretical framework as a structured method that employs a theory that aligned with a research's objectives and questions. With respect to dissemination and utilization of information, Organization Information Theory met the criteria.

Organization Information Theory (OIT)

Academicians have invested in big data as the new focal point based on its potential to magnify and solve issues (Feldman, Martin, & Skotnes, 2012). It has been seen as a game-changer by magnifying numbers and production especially if well analyzed. Management relies on effective communication. Similarly, Leadership, structuring and maintenance all rely on how the information flows both internally and externally.

The importance of effective communication in an organization can neither be underestimated nor over emphasized. Weick's invention of the theory was to address the

challenges organizations faced due to underutilization of available information (Alan 2000; Avgerou, 2002; Weick, 1969). From the personal to the social spheres of life everything depends on how we communicate. OIT then deals with clarity by reducing filtration and vagueness in message delivery and dissemination.

Information Management and OIT were once regarded as the same concept. It was later found that OIT addresses more than just management but looks at the setbacks any company /corporation may face in the event of not analyzing data properly towards its production (Weick, 1969). The information given should put into consideration the audience and their needs for instance an advert about the latest brands of vehicles would not be suitable for a hungry person. It is deemed as appropriate to give a food advert. The perception that the audience have determines what they take in from a number of messages (Weick, 1996).

According to Weick (1996), before the 1960's communication was not considered as an influential aspect of success in most organizations. Embracing communication in management results in efficiency and effectively in both production and delivery. In this technologically advanced era, it's wise to make use of all platforms when reaching the intended spectators, audience and publics. Weick (2012) pointed out that, if new ideological concepts can be introduced or intertwined with existing ones during hermeneutics then production was seen to be at its peak. OIT emphasizes objectivity during interaction in order to meet the set goals (Mladovsky& Mossialos, 2008). Presentation of a message was dependent on the kind of message, its cycle, delivery, vagueness /ambiguity to the receiver (Weick, 2012: Weick, 2015).

The theory is based on the following key tenets:

First, the theory is applicable to corporates, organizations, and companies. The Choice of Catholic Diocese of Kakamega was a good sample of non-profit Religious Corporation since it had large sets of data flowing both externally and internally which have proved a challenge to utilize.

Second, it is applicable to the Catholic Diocese of Kakamega due to its metropolitan nature. Clergy and congregants of this diocese are from diverse backgrounds and culture since they comprise of the intended audience the theory is applicable in assessing how and why they don't utilize existing channels to pass information effectively.

Third, in the Catholic Diocese of Kakamega the message goes through a number of channels thus is subject to filtration, distortion and vagueness.

Fourth, the theory reduces the level of vagueness on information communicated to intended publics. This is mainly by decreasing the level of ambiguity; the organization communicates what is essential while excluding that which is unclear. The theory also explains ways of managing large amounts of information that flows in an organization using the right steps (Weick, 2012). This research intends to reduce noise in the channels through which information gets to the clergy and congregants .

General Literature Review

The term "Big Data" is generating notable attention in most corporate organizations. According to Sigma Computing (2021) ,70% of the banking sector has grown because of big data, the communication sector especially media and entertainment has reaped most of the benefits associated with big data – for example Netflix influences its subscribers by 80%. Despite big data's publicity, local and international organizations

are finding out tactics of communicating big data that will help them dominate the global market. Decision making in most corporate and companies is now based on analyzing the existing information. According to Alam et al. (2015), some organizations have not ventured into big data because they do not understand the benefits of big data.

Big data involves having a lot of information that flows in the data bases. Certainly, big data does not refer to data volume alone. Data coming to the user fast and in complex format is part of its definition (Fuller, 2017). Academicians have ventured in the topic as they see it as a bloom in the realm of innovation. Based on analysis, large sets of information flows in and out of an organization can greatly impact its production (Feldman et al., 2012).

As an evolving aspect and determinant of success to most organizations, the idea has not been fully embraced by most organizations since they come up with their strategies based on ethics and privacy only. Little has been done in the area especially by academicians (Hanfit, Lyer, Levine & Reddy, 2016).

Data circulation in corporate is characterized by structures that stakeholders embrace during communication. Most corporates have both external and internal environments. Corporate data enables companies to evaluate risks and strengths in relation to both the internal/external environment (WeichertMehner, 2017). Formal communication networks have been seen as a constitute of all corporate. Downward communication being the most common with dissemination from top to bottom based on hierarchy which was first presented by Weber (1930), who argued that information from authority in organizations is considered legit.

Upward communication is also discussed broadly by most scholars in communication, that is, from the bottom to the top. Upward communication is important due to its nature of allowing all (subordinates) to participate in decision making (Hirokawa, 1994). Horizontal communication is characterized by members of the same rank by Massie (1960), who pointed out that structure enabled subordinate supervisors to make some decisions on behalf of management, that is, decentralization. Informal communication also characterizes corporate and strategic communication, these structures do not exist within the original structures of many corporate mostly known as grapevine communication (Mishra, J 1990). This form of communication is common among stakeholders who have lower positions or are in the middle ranks (Davis, 1969).

Awareness of Big Data in Organizations and the Church

Corporate communications; Artificial Intelligence and big data

The thesis assesses the role of big data, terming it as a game changer for corporates especially communication practitioners. Big data has eased the process of mining data from production to delivery of services and products. Decision making in companies is based on the information they have which has been fastened and made much easier due to the digital revolution and technology. Corporate data enables companies to evaluate risks and strengths in relation to both the internal and external environment (WeichertMehner, 2017).

Face-face interactions have reduced due to the digital sphere as this will also bring about changes within corporate communicators (Loebbecke & Picot 2015). Stakeholders also play a role in determining what trends and changes are more suitable at the time (Clemons et al., 2015; Marabelli, 2015). Big data plays the convenient role of

deciphering what is more relevant /irrelevant in corporate especially in the communication sector by ensuring reports are organized.

Traditional tools have been surpassed by technology in the corporate world these has posed a challenge to communicators practitioners urging them to embrace artificial intelligence and big data especially when addressing stakeholders (WeichertMehner, 2017). A 2016 survey by the European Monitors (Communication) assesses perceived levels of knowledge and significance of big data by interviewing 2,700 respondents from 43 diverse countries. The findings of this study recommended that aligning strategies for communication in corporate was entirely dependent on safeguarding the company's brand and reputation by the communication practitioners.

Although big data analytics has not been fully immersed in corporate, 73% believes that big data would affect their professional spheres positively (Aversa et al., 2021). The study also establishes that big data in the corporate communication world was hurdled by the following inadequacies: organizational barriers at 23%, budget 24%, technical skills 37%, time 45% and analytical skills at the top with 49%. The analysis is arrived at by assessing the most common reasons why big data has not yet been embraced and out of 11 those 5 were the most common.

Weichert Mehner (2017) stated that corporate communication is best summarized as a challenging process that require constant feedback through continuous testing and evaluation through feedback by defining the target, generating data, clearing, and transforming it then finally analysis through evaluation and assessing the outcome. The paper concluded that creation and valuation of content within companies will reveal a lot of opportunities for corporate communicators, recommending that strategic

communication should embrace and decide how big data could be used in corporate communication which is inclusive of the planning and controlling.

DAYSTAR UNIVERSITY

Big Data in Corporations: A Trend and Opportunity Setter, Its Challenges.

The paper places emphasis on how big data can be used alongside innovation in organizations to fill the gap presented by insufficient overview of large sets of information flows in an organization. The findings on big data proved crucial in assessing market needs at the time, solutions and strategies incase problems arose.

New opportunities could be created through

1. Introduction of a business model.
2. Assessing the availability of ready markets and assets involved.
3. Adjusting an organization's goals, strategies, and policies.

Big data has emerged as an attraction to not only academicians but also practitioners whose belief in innovation as key to solving issues has been witnessed. The open paradigm can be said to be one of those unexpected fruits of large sets of information in a corporation (Velchio et al 2017).

Chesbrough (2003) opined that, data flow would be seen through a firm's profits. The proper utilization of data in and out of an organization improves an organization. According to Kaisler et al. (2013) big data is summarized as large sets that can't be analyzed and stored traditionally because of space and time.

Competitive Advantages of Big Data Analytics; Banks and Insurance Agencies in Kenya

The study employed a descriptive survey and used 45 companies to establish how an organization utilized large sets of information and establish how these companies' linked utilization to its performance-an upper hand against competitors. Consumer

behavioral analysis was one of the most effective methods used to meet their needs at the time. Sales could also be optimized if customers felt contented with the services they received. Managerial constraints were dealt with if business reports and customer feedback were well taken care of (Ndambo, 2016).

The large sets age' finally have a breakthrough in almost all spheres of life and for efficiency in production available information is well utilized. The study found that companies in the financial industry specifically commercial banks and insurance firms had invested in data storage facilities and advanced tools in the area of business intelligence for reporting and analyzing consumer/ client behavior. These tools allow the companies to anticipate consumer needs more effectively, in addition to optimizing them (Ndambo, 2016).

This study, through a thorough analysis of its findings concludes that the big data revolution has found a place in the commercial banking and insurance industry in Nairobi, and that the trend is on the rise as these companies continue to discover the valuable data with tremendous potential they have had in their storage for decades.

Big Data in Corporations and Its Use in Communication Strategies

The advent of technology and current systems has made it difficult to process all data that is generated. Digital communication and technology have been strongly linked to big data analytics (Boyd & Crawford, 2012; van Dijck, 2014). Placing the relationship between information, speed and time as crucial factors is the main ideology behind big data utility in organizations (Wiencierz & Rotgger 2017). The challenge that communication faces is not limited to generating information but also its aim of creating knowledge especially for companies that are willing to achieve credible goals.

This paper points out that large sets of information do not only play a crucial role in a company's position against competitors but also facilitates crucial decision making patterns. Big data provides insights that corporations can use to potentially improve (Chen, Chiang, & Storey, 2012; Park, 2014). The study opines that communication particularly journalism and art are bound to big data citing those 11.5 million documents analyzed translating to the largest data leak in journalism history, this includes texts in the form of emails and notes. The study has highlighted that big data is applied as a tool for management.

Big data constitutes communication strategies; often termed as a unique way for organizations to generate knowledge for society. This then means that the data interpretation from a communication perspective enhances flexibility and places the needs of stakeholders as a priority. Assessing the large sets of information generated every day in communication provides room for; noteworthy events-news, consumer trends, behaviors and their perspective of the publications they need. For a corporate to fully utilize big data it should understand the potentials and limitations brought about by differentiating the internal, public relations and marketing communication as spheres that constitute a corporate (Zerfass, 2008).

Privacy and contextualization of sensitive information enables an organization to; customize, subdivide, and ensure communication is more effective and reaches the target audience. The paper also points out that technology and its use are essential in corporate communication by analyzing big data for their competitive benefits. Equipping an organization with technology enhances analysis; links consumers' needs and ensures an organizations reputation is maintained.

Revelation for a bigger god; by el Kornegay, Jr. Phd big data

Since biblical times as recorded in Genesis 1:1-25, we note that large sets of information have been there, but the advent of technology has caused storage and interpretation to be different. Big data as a venture of new ideologies and challenges is also presented by William Brees who submitted that Large sets of data best known by understanding the current trends and putting into use the available data. How and what kind of information gets disseminated determines the results one is likely to yield. With respect to theology and matters science how information is interpreted is often determined by ethical factors.

The importance of large sets of information and their flows can be influenced by standards and moral concerns. Digitizing church activities for instance, may help congregants to not only embrace technology but also appreciate its role in evangelization. The different techniques used to analyze data will now affect the interpretation of the message and its impact on the audience. Considering speed, space, volume and density of the information as displayed by the number of characters applicable in disseminating information also varies for instance a message that is under the hash tag versus a message placed in an e-book or even Instagram was interpreted differently based on key words.

The E-Book Data and Churches: How Big Data Analytics Empowers Churches

Decoding e-book data and texts are determined by a few factors; the audience, their level of knowledge and exposure. The importance ascertains bias since different senders have different viewpoints especially when determining what is more crucial than the other. If the church diverted part of its attention to the technology of the time, then it

is deemed easier to create more transparent channels that fight injustices by displaying the truth, curbing fear and hindrances that show that religion not only focuses on spirituality but also other aspects of life. If theology plays its main role of deciphering information to the right audiences, then it would usher in a new era of global truth.

Paying attention to privacy of information shared, ensures that, firstly, congregants are protected from fraudsters and secondly, that the information is used only for the intended purpose. This can be achieved by setting rules that regulate the access of church data and how the church can use it since most ministries have been considering the platform and the sources due to ethical concerns. This can be achieved by defining trust, in terms of; transparency, liability and confidentiality.

The most common forms of data in the church are:

Raw data: can be collected from the congregants through events, seminars and intake forms. *Secondary data*: is retrieved from archives or is shared either by anonymity or through purchase. It is used as complementary data to raw data. If it's provided by someone it should be credible.

The information given by congregants must be analyzed for there to be an impact on a ministry's performance. Since the information revealed and is not limited to spiritually, that is, baptism, offertory and attendance. Most leaders lack the insight of how to utilize the information especially in relation to real time challenges. Auditing, keeping records and following up on the congregants is one of the best ways to solve the issue.

The strategies most ministries need to adopt are those which measure the congregant's needs apart from their spirituality. For instance, having congregants

especially the youth engaged in activities that directly affect them can increase production. For example, going to church and singing happily can't show the level of frustration or how troubled one is; having open seminars and forums whether orally or written can show how troubled congregants are.

By retrieving information from congregants can be used to improve a group's productivity by solving its issues. This encourages people to share information willingly but also motivate their belief in viewing the church as a safe place to give your data and helps the church identify other underlying issues that its congregants are going through right from the small Christian communities to all spheres of the church and filling in the gap.

Analyzing Whether Big Data Flows Within Organizations and the Church

E-book data and the church: how big data analytics empower churches

According to the E-book data and the church, data and analytics empower churches to reach more people the question would be how is big data related to the church? Proper usage of large sets of information is an important aspect, most churches should consider in this era; most ministries are challenged with proving relevant. For instance, adults in America do not believe in the church's role, they think it's outdated (Smith et al., 2014). Most members leave the church because they don't find enough spiritual fulfillments as such; instead seek more engaging items outside church (Smith et al., 2014).

The other challenge stems from the struggle for the church's relevance, evidenced by the nonchalant participation or exit of many congregants from most churches. By

accessing data it's easier to align the needs which would in turn motivate congregant's spiritual life and uniqueness. It's important for the church to prove its significance even to a non-Christians by integrating both the spiritual and other aspects of life. (Belief net), pointed out that, if churches addressed the right questions, then many people would not opt out of the spiritual life (sdesai et al., 2016).

How data is utilized is dependent on the strategy put in place by the church. Reaching a lot of people is about relevance and quality as opposed to quantity. Delivering the correct message through the right channels by first understanding your congregation can limitlessly influence a community. Put into consideration some of the motivating factors a church can offer her audience for instance leadership positions, how people affiliate when choosing and the indicators they look at.

Matters related to finances can be assessed by setting a budget and analyzing what motivates them by deliberating the expenditures. This can give an insight on how congregants contribute, and it can also help to assess the different financial needs. As a church, the strategies put in place must answer the goals that you strive to achieve with the data you have. It is important for congregants to know whether the data they give is useful and in what ways. They must be well informed about the main reason why their data should be given, how it builds both their spiritual and other aspects in life.

Matt Engels' Church and Ministry Analytics: Big data by Rich Birch

Rich Birch first addresses what data intelligence is and how to fully utilize it better. He asserted that, 'the church tends to place its focus on baptism and budget, instead of coming up with ways to measure how congregants engage with the church. He observes that ministry leaders focus on stewardship rather than assessing data and how its

utilization can impact congregants (Birch, n.d.) He highlighted the main ways a ministry can better itself using the data it has.

Examining and Assessing Data.

In other instance, Congregants from Matt's church (Birch, n.d.) could not identify what their prayer requests were about specifically. Since this was a weekly norm, he decided to evaluate prayers in a 3 months' period so that he could see what the concerns were about. Marriage topped the list then health. After another 3 months there was a change; finances then later divorce filings. The research enabled Matt's church to identify the major concerns that were in relation to sexual life and monetary prayers.

Reactions

A plan was then devised by Matt to observe the culture that congregants had adopted on finance. He observed that insights from the data were well-acted upon, and it had impacted on church's progress. Matt's main agenda was on governance and leniency. This was achieved by Matt assessing why monetary issues were deliberated in the month of November. He learnt that people were aware of the research, and he noticed the reason it worked was because he first let the congregants know it was a survey, the reason for its conduct and the feedback he got was that congregants had grown by a significant number and so was the monetary contribution.

Perception

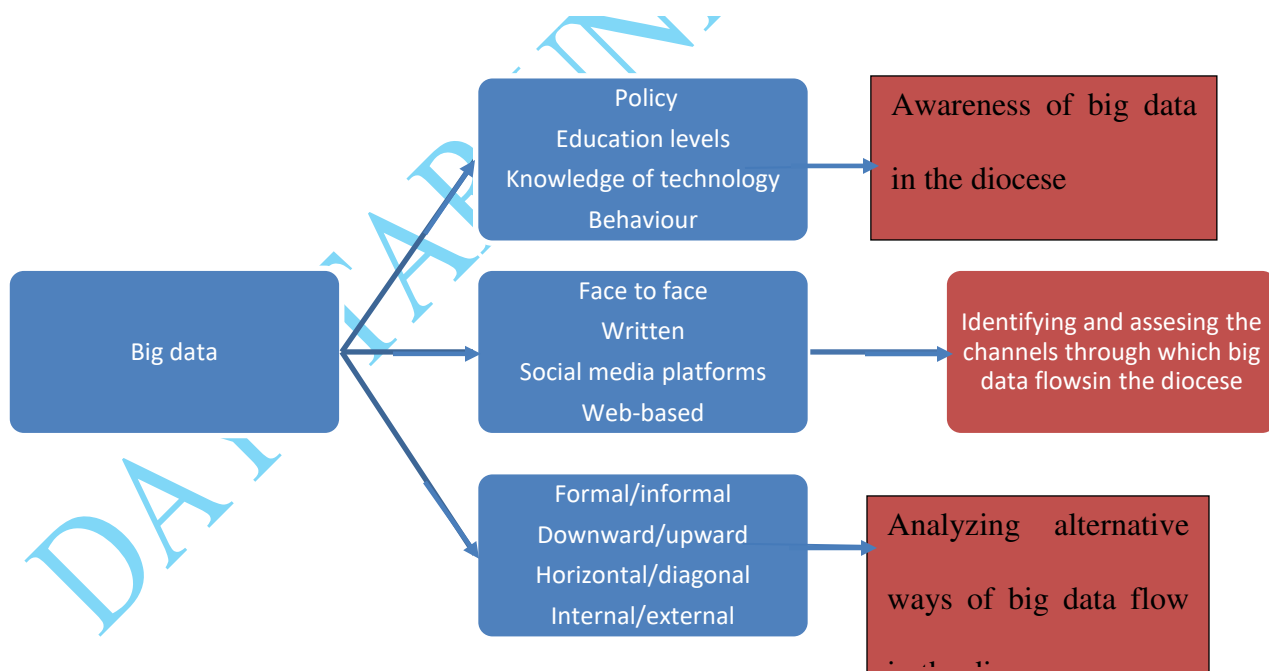
Matt came up with a procedural way of dealing with large sets of data. He opined that church ministers should be accountable by recognizing, linking, and bringing about the ideas and acting on them. All this should be linked up to evangelization and more so how data can be used effectively.

Solutions

Gloo is a technology based company where Matt works. It specializes in match making in relation to the know-how. He advised church ministers to employ this technology so that they can serve people better. Through this they can assess congregant's growth at different levels while supporting them.

Conceptual Framework

The relationship between organizational ideas presented in a study refer to as a framework Shields &Rangajaran (2013). Figure 2.1 illustrated the problem being explored by defining the relationship between big data utility in corporations (Catholic church). In figure 2.1 the relationship between the variables is illustrated.



Dependent variables, intervening variables and independent variables

Figure 2.1: Conceptual Framework
Source: Author (2021)

Discussion

Figure 2.1 is a representation of the relationship between big data and its utility against the variables displayed by the different stakeholders in a non-profit corporate. Contextually, the clergy and congregants of the Catholic Diocese of Kakamega. The suitability of this study in organizational communication was based on the Catholic Church being argued as a corporate non-profit organization thus validating the use of OIT and formulating the study's theoretical base.

Literature review has pointed out the relationship between big data and the variables that affect data awareness, availability, and usage in corporate. As such, this model presents a hypothesis of how big data utility is underutilized. For example, big data on Lenten campaign is packaged differently. It is mainly presented as a banner, printed books, posts on social media platforms and even posters each year. All the platforms have the same basic message, but its presentation will differ due to factors such as channel, accessibility and space. The big data in this case remains the Lenten Campaign; the intervening variables were dependent on the consumer.

The information flow in the Catholic Church is from both internal and external sources (Vatican) it then flows to the clergy and congregants through the bishop and other communication channels. For example, considering knowledge in terms of education and technology programs, most of the youth will embrace more channels and sources of data access and acquisition compared to the old. The volume and space vis a vis the channels used to deliver and package big data in the Catholic church are characterized by filtration and vagueness of information.

Big data was the dependent variable in this relationship, because it provides the diversity of information choices for clergy and congregants within the Catholic Church. The level of uptake of big data was envisaged as an independent variable by the Catholic Church and clergy and congregants as the intervening variable due to their differences in awareness and accessibility levels as factors related to big data utilization. The presumption was that knowledge and uptake of big data by the clergy and congregants affected data utility and performance patterns in the organization.

Summary

Researchers often face problems when exploring the concept of big data due to complex and diverse organizational structures. The methodologies used by most scholars are surveys and self-reports. Literature review on big data mainly evolved on business-related fields. Using it to analyze church communication is not a very common aspect as noted by the literature review which is inadequate. Scholars who have assessed big data in relation to communication, have focused on marketing, journalism, public relations, and art.

Perhaps few scholars studied big data in relation to communication especially in the Catholic Church. Other none profit scholars have focused on big data in relation to increased membership and the ease of evangelization thus presenting the study gap in question and a need to explore alternative ways the Catholic Church can better communicate big data to clergy and congregants. A study focusing on clergy and congregants of the Catholic Church is yet to appear in literature review in Kenya and in specifics the Catholic Diocese of Kakamega. Most scholars have exploited the topic in relation to financial patterns, membership, marketing, public relations, art and less the

communication channels used to communicate church's big data. This study will add to the existing literature on big data and urge scholars to venture into big data and strategic communication in nonprofit corporations.

The review of other scholars' literature has enabled the researcher identify variables relevant to the study. Chapter three presents the research methodology used in the study.

DAYSTAR UNIVERSITY

CHAPTER THREE

RESEARCH METHODOLOGY

Introduction

This chapter comprised of the methods and procedures used in the study.

Research Design

According to Poggenpoll (2009), and Boyd and Crawford (2012), a research design is described as a means of developing a plan that justifies research objectives and responds to research questions. This study applied a descriptive survey research design. The study employed Mugenda (2003), who stated that 10% of a population used in a survey that was descriptive in nature was sufficient. Since the interest was to establish the exploration of large sets of information flow in organizations and its key respondents were the clergy and congregants of the Catholic Diocese of Kakamega.

The design was the most appropriate since the researcher was able to retrieve accurate data from the respondents especially after assuring them that their identities would remain anonymous even after the study. The design was appropriate in generating information on big data flow within the Catholic Diocese of Kakamega which interests' organizational practitioners and policy makers. In a bid to prioritize the objectives and research questions several approaches of qualitative and quantitative nature were employed.

Mixed approaches provided additional information on the situation that was being analyzed than employing one method, failure of one method was compensated by the other especially by addressing its weaknesses.

The researcher conducted a survey comprising of 10% of 384 selected respondents that resulted to 38 respondents. The research fulfilled the objectives which were both qualitative and quantitative in nature, the methods of collecting and analyzing data were from a number of approaches. The researcher used 8 questionnaires, 8 interviews for clergy and 6 FGDs among the 30 congregants; participant observation was used on all the respondents of this study.

Population

Chandran (2004) defined inhabitants as the total number of species, entities, or incidents having some common observable characteristics that were different from other populations. The population in the study referred to concrete or set of individuals or cases, objects having common characteristics. The study targeted parishes of Kakamega Diocese. The total population of all Catholics of Kakamega diocese was approximately 950,400 (CDOK –Strategic plan 2019-2023).

Target Population

The target population for the study was 38 respondents from diversely selected parts of the diocese and considering the representation of each type of parish and devotional group. The respondents were picked out of approximately 950,400 Congregants in the Catholics Diocese of Kakamega (CDoK –Strategic Plan 2019-2023).

The study was conducted in Kakamega County; its inhabitants were mainly farmers. Vihiga County as its south border, on its west was Siaya County, to the north were Trans Nzoia and Bungoma Counties and, from the east were Uasin Gishu and Nandi

Counties. The respondents comprised of the clergy and congregants from selected parishes in the Catholic Diocese of Kakamega.

The jurisdiction of the Catholic Diocese of Kakamega comprises of 43 parishes divided into 5 deaneries: Kakamega, Mumias, Eregi, Chekalini and Mukumu. Each deanery has 8-9 parishes. The clergy were purposively selected for 8 Key Informant Interview (KII) and questionnaires so that the same respondent gave a diverse opinion about big data and its utilization from their viewpoint. The 8 clergy were spread across the 5 deaneries. The clergy comprised of 4 Parish priests and 4 Assistant priests. Since participant observation was used as a complementary method of collecting data in the study. The researcher employed participant observation through taking part in events, meetings, and other activities that respondents of the study took part in. Since the researcher did not disclose that they were on academic research it was easy to retrieve data from the respondents in relation to big data utility using this tool.

In order for the researcher to distribute the respondents of the study. The researcher focused on the ratio of clergy versus congregants in the Catholic diocese of Kakamega. The diocese had 120 clergy members in total serving 950,400 congregants which by ratio could be represented as 1: 7,920 that translated to one clergy member serving at least 7,920 congregants. That meant 8 clergy members from the study served at least 63,360 congregants and by extension the use of 8 out of the 38 was equated to 21% only 10% was required for a descriptive survey. The researcher found it suitable to use 8 members only by applying the same principle when distributing the respondents of the study who were 38 in total.

The researcher used 8 clergy members who represented the whole clergy community against 30 congregants in FGDs. By ratio that would translate to 4:15 which was a fairer representation. Such that out of every 15 congregants, 4 clergy members were represented as such; the researcher used 8 clergy respondents in reaching the saturation point as presented by objectives of the study.

The researcher selected 1 clergy from Kakamega deanery and 1 clergy from Mukumu deanery because it was easy to observe participants because of the researcher's interaction with them on daily basis. One member of the clergy was selected from St. Anne's Eshisiru and the parish priests of St. Joseph's Kongoni parish in Chekalini Deanery were selected as respondents of peri-urban parishes. In Mumias deanery, St. Peter's Parish, Mumias and St. Matthias Mulumba Parish, Matunda were selected as respondents from urban parishes. St. Joseph the worker parish, Shibuye produced two respondents a parish priest and an assistant parish priest from Mukumu deanery; the parish priest of the Nativity of our lady of Assumption parish, Mutoma and St. Augustine's parish, Eregi were selected as respondents from rural parishes.

The respondents for FGDs came from the 5 deaneries. The researcher purposively sampled the respondents of the study from already existing groups within the Catholic Diocese of Kakamega register (CWA, CMA, Legions of Mary, PCA's, YCAs and Clergy). The researcher through colleagues set up FGDs that had both devotional group leaders and members. That enabled the researcher to get an insight from congregants who had ranks and those without on big data accessibility and awareness in the diocese. All other FGDs were gender based except for the YCAs and PCAs who produced 3 males

and 3 female participants each for participation in the discussions for purposes of gender balance.

Table 3.1: FGDs Respondents

Deanery	Clergy	Groups in Parishes
Kakamega- St. Anne's Esishiru (PP)	1	6 CWA
Mukumu -St. Joseph's the worker, shibuye (APP)	1	6 Legion
Eregi- St Augustine's Eregi parish (PP)	1	6 CMA
St. Charles Lwanga, Hambale (APP)	1	
Chekalini-St. Joseph's Kongoni (PP)	1	6 PCAs
St. Matthias Mulumba Parish, Matunda (APP)	1	
Mumias-St. Peter's parish, Mumias (APP)	1	
Nativity of our lady parish, Mutoma (PP)	1	6 YCAs
Total Respondents	8	30

The study had 8 in-depth interviews and questionnaires for clergy. The interview retrieved answers on questions of policy definition and value. For FGDs, 6 members were picked as a representative from the church register. CWA respondents were interviewed because they were a group that acted as bridge between the church leadership and the Catholic women community. CMA group was interviewed because they were a group that acted as bridge between the church leadership and the Catholic men community.

The YCAs group was interviewed because they acted as bridge between the church leadership and the Young Adults community. The legionaries of Mary were relevant respondents because most of them acted as guardians and God-parents/sponsors for those receiving the sacraments of initiation. In addition, the legionaries of Mary also were entitled in safeguarding the teachings of the Church by embracing the prayer of the rosary on a daily basis (*Isapuli*), acts of mercy and charity within the Christian communities. Besides, the study shed light on how much knowledge the CWA, CMA,

PCAs, legionaries of Mary and YCAs had on the utilization, availability and retention on of large sets of information flows for betterment of the Catholic men, women and young catholic adults.

In-depth interviews provided the ability to understand what the respondents felt and thought about the organization. It was advantageous to the researcher because it allowed the researcher to understand the existing channels and their shortcomings. It also gave the interviewee an opportunity to provide their insight since the questions were open ended. However, the In-depth interviews permitted the interviewer to probe the responses of the single interviewee and there was room to record the interviewee with consent (Stacks, 2011). The interviews were designed to ascertain big data communication channels used in parishes. It took at least 8 minutes for each KII because they had gone through the interview questions which were almost similar in nature to those of questionnaires and most respondents chose combining the answers to most questions. According to Kothari (2008), semi -structured interviews allowed the respondents to give a wide range of reactions on their perspective on the subject in question. The study, exploited the semi-structured questions when exclusively extracting information on big data and its utility in the Catholic diocese of Kakamega.

Focus group discussions were used for generating information collectively and the meanings that lie behind those views. According to Hennink et al., (2011) focus group discussion includes 6-8 participants. Stacks (2011) noted that the focus group can be 3 to 20 interviewers. While Kimalu and Marimba (2014) stated that effective focus group consisted of 6-12 respondents. The study used 5 FGDs. Each FGDs group in the study had 6 participants because groups that had less than 6 members proved hard to gain

diverse insights on a certain topic. At the same time a number bigger than 8 limited the chances of active participation. The moderator led the discussions. The moderator asked questions to the group that probed a better understanding and agreement among the group members.

The researcher used between 45 minutes to 1 hour because according to Rukwaru (2015), that was sufficient time to conduct an interview; any period between 1-2 hours. It was applicable for most FGDs except the legionaries where the assistant researcher lost the recording and the researcher had to start afresh. In the study the direct questions asked by the moderator exposed issues that determined how much the researcher understood the problem statement, opportunities, and the solution to the study (Kimalu & Marimba, 2014; Stacks, 2011). The use of the focus group discussions allowed members to tag off each other responses while providing extensive insight into the research problem. The discussions were tape recorded then transcribed and later analyzed (Kimalu & Marimba, 2014; Stacks, 2011).

Key Informant Interviews (KII) involved interviewing a selected group of individuals who provided desirable information. The clergy were the link between the bishop and the congregants. The researcher assessed their knowledge levels in relation to congregants who were represented by the CWA, CMA, PCAs YCAs and Legionaries of Mary. Key Informant Interviews offered insights on adapting alternative channels that did not only suit them but also the congregants. In the study KII were 8 clergy represented the following classifications; deans, consultants of the local ordinary, parish priests and assistant parish priests.

Sample Size

Cooper and Schindler (2008), referred to a sample size as a representative of individuals obtained from the accessible population of study. Patton (2015) cited that a sample size involved choosing relevant cases which developed knowledge and had a visible impact that yield result. While Creswell (2013) observed that a sample size involved collecting extensive details out of a few sites or individuals. The study employed the definition of Patton (2015, p.276) so as to realize knowledge on the utilization of large sets of information flows among the Catholic clergy and congregants of Kakamega diocese at the same time analyzing alternative ways of communicating it.

Robson (2002) further observed that considering homogeneity, and the small size enabled the researcher to generalize the findings. Selection of entities included impartiality and balance for proper representation (Kothari, 2004). The study sampled 38 respondents. The sample included the clergy, CWA, YCAs, PCAs, Legionary of Mary and CMA from diverse parishes and deaneries in the diocese.

The researcher adopted Krejci and Morgan (1970) sampling method; small sample size techniques to arrive at the number of respondents. The sample represented was 10 % of the 3840 selected in Kakamega diocese. Mugenda (2003) opined that 10% was sufficient representation in any descriptive study.

<i>N</i>	<i>S</i>	<i>N</i>	<i>S</i>	<i>N</i>	<i>S</i>
10	10	220	140	1200	291
15	14	230	144	1300	297
20	19	240	148	1400	302
25	24	250	152	1500	306
30	28	260	155	1600	310
35	32	270	159	1700	313
40	36	280	162	1800	317
45	40	290	165	1900	320
50	44	300	169	2000	322
55	48	320	175	2200	327
60	52	340	181	2400	331
65	56	360	186	2600	335
70	59	380	191	2800	338
75	63	400	196	3000	341
80	66	420	201	3500	346
85	70	440	205	4000	351
90	73	460	210	4500	354
95	76	480	214	5000	357
100	80	500	217	6000	361
110	86	550	226	7000	364
120	92	600	234	8000	367
130	97	650	242	9000	368
140	103	700	248	10000	370
150	108	750	254	15000	375
160	113	800	260	20000	377
170	118	850	265	30000	379
180	123	900	269	40000	380
190	127	950	274	50000	381
200	132	1000	278	75000	382
210	136	1100	285	100000	384

Note.—*N* is population size. *S* is sample size.

Source: Krejcie & Morgan, 1970

Figure 3. 1: Krejci and Morgan (1970) Sampling method

The sampling size comprised of 38 respondents from the Catholic Diocese of Kakamega. There were different types of respondents from; urban, peri-urban and rural parishes in the diocese. The selected parishes were picked through purposive sampling. Focus Group Discussions consisted of 6 respondents from the selected parishes.

Patton (2015) termed qualitative samples as those which were purposive in nature. Respondents were selected by virtue of their capacity to provide richly textured information, relevant to the phenomena under investigation. Purposive sampling targeted only people that meet certain predetermined criteria (Cooper & Schindler, 2008).

The clergy were purposively selected and interviewed because of their position in the diocese and their special knowledge and experiences in pastoral programs.

Sampling Technique

According to Stacks (2011), the systematic selection of a reliable population from an existing vital group that was scientific in nature was termed as sampling. Purposive sampling was used as the study picked what to include because the study was dealing with focused information (Oso and Onen 2003). The pilot study was conducted in the Catholic Diocese of Bungoma. Parishes were structured into three. This comprised of; urban, peri- urban and rural parishes. Urban parishes had vast characteristics of the population (metropolitan communities) and were located within different parts of the Diocese. Peri -urban were parishes those had some vast characteristics of the population which were in both urban and rural parishes, that is, semi-developed. While rural parishes comprised of vast characteristics of the population that defined a rural area. This was based on the geographical location and development of a parish in relation to other parishes.

The study picked parishes from each structure (using purposive sampling). There were 5 urban parishes; therefore, the study picked 1 urban parish. The Peri urban totaled 8 parishes, the study picked 2. Lastly, the study picked 2 rural parishes from the total 29 parishes as a representation of the different types of parishes that existed during the study period. Study participants were structured into 5 groups. They were CWA, CMA, YCAs, legionaries of Mary and PCAs. Key Informant interview (KII) comprised of 8 clergy members from the structured parishes. It involved 4 Parish priests and 4 Assistant parish

priests. The study then used 6 FGDS that had between 5-6 participants that were purposively sampled.

To collect the data, the researcher employed the use of questionnaires, interviews alongside participant observation. The instruments were put into consideration in line with the objectives while structuring the questions in use. Questionnaires were used to obtain data from the selected sample. The instruments were preferred, because they gathered a lot of information, less time consuming while participant observation was used for additional information due to its nature it was also useful in mitigating bias. The researcher employed participant observation in order to establish the respondents' patterns of church data utilization during their day-day church activities.

Types of Data

The study used both qualitative and quantitative approaches. The quantitative approaches offered by anonymity of questionnaires were advantageous since they granted uniformity. The questionnaires also ensured confidentiality and thus helped gather more candid and objective responses (Orodho, 2009). The qualitative method approach allowed the respondents to answer questions from the researcher's perspective at the same time giving respondents a forum to air their opinions on the issue at hand. The methods used complimented each other and helped the researcher to obtain data on the flow of big data in the Catholic Diocese of Kakamega.

Data Collection Procedures

The researcher visited the area for familiarization and assured respondent's confidentiality. The researcher went ahead to get information using research tools.

Considering its nature, the researcher utilized questionnaires, interviews, and participant observation. The data was primary in nature. In order for the respondents not to shy away the researcher established rapport. Their identities were also not revealed since it was strictly confidential, and the researcher focused on the objectives of the study.

The respondents were given a period of 3 days before returning the questionnaires. That was because the researcher established through the pretest study that giving respondents little time resulted to a poor response rate. In the FGDs, the participants were taken through questions and asked to discuss freely. The respondents were informed that their participation was out of free-will. They were also informed that there were no correct /incorrect answers and that the contribution of each participant was valued. During the study all the data was accessed by the researcher, only raw data was to be destroyed upon completion of the study.

Pretesting

A pretest study was conducted by randomly selecting respondents among clergy and congregants of the Catholic Diocese of Bungoma. It aided in testing how reliable and valid the instruments were before the actual data collection process (Orodho, 2009). The pre-test study was administered at an interval of 1 week. This enabled the researcher to adjust questions on the questionnaires and the period which respondents would take before returning the questionnaires.

The researcher had given them 5 days. This resulted in a poor response rate since most respondents had not answered the questionnaires and most of them had misplaced theirs. The pretest ensured that there was lack of ambiguity and more clarity by properly setting questions that were impartial and evoked answers relevant for the study.

Instruments of the study were pre-tested on 20 respondents from Bungoma diocese because they were not included in the final study.

Validity

In order to validate the study triangulation was used; the use of contradictory evidence among the respondents surfaced. According to Saunders et.al (2013), triangulation was the processing of using two or more methods to study the same phenomenon. Validity of the instruments was pretested in the Catholic Diocese of Bungoma with 20 respondents.

It helped the researcher to establish the shortcomings of the instruments which in turn enabled the researcher adjust questions and duration with which respondents were offered questionnaires and how the researcher conducted the FGDs during the final study case. That was how the researcher arrived at using an assistant researcher and thus strengthening its validity. The degree to which an experiment or tool measured the intended purpose was referred to as validity (Mbwesa2006).

Reliability

Reliability was termed as the degree to which a research instrument constantly proved worthy in reference to the production of results. According to Mbwesa (2006), instruments used to collect data that were error-free and displayed consistency in producing a result were said to be reliable. The pretest comprised of 20 respondents for a study period of 5 days. It enabled the researcher arrive at 3 weeks where consistency was derived from the targeted population.

Data Analysis

The study adapted a descriptive statistical method which was edited then recorded in table and figures. Quantitative data was coded, quantified then analyzed. The researcher systematically arranged transcripts, observation and documents notes, and audio recordings, images and text documents to increase the understanding of the qualitative data. The study observed recurrent themes, opinions, and beliefs. The study highlighted the key words and phrases. Information generated from the focus group discussions and the Key Informant Interviews was analyzed and presented thematically. The study reformulated responses given by different respondents taking into account the different experiences of each respondent.

Ethical Considerations

The researcher chose a preferred topic of interest which was accepted by the board after writing a proposal. The study was subject to plagiarism checks. In order to collect information, the researcher observed and maintained the following aspects from respondents, their dignity, willingness, privacy and confidentiality through a documented informed consent form. Gender non-discrimination and anti-manipulation was also employed. The respondents were given voluntary participation without coercion or force implicated on them (Chandran, 2004).

The study observed ethical concerns associated with carrying out research as explained below:

1. The study had FGDs guide and KII guide that had informed consent forms. Before interviews were conducted, the participants were taken through the informed consent where they were informed of their right to participate or not to participate in the study

- if they were not comfortable. In case they consented; participants only answered questions they felt comfortable with. They were assured of anonymity whereby during the interviews and recording numbers of reference were assigned.
2. The researcher ensured that the respondents were granted confidentiality as part of the professional ethics. By ensuring that the participants remained anonymous through the whole research process without mentioning their names.
 3. The researcher obtained an introductory letter from Daystar University's Department of post –Graduate studies and Daystar University Ethical Review Board (ERB). The letter was presented to the National Commission for Science, Technology and Innovation (NACOSTI), who authorized the research to be conducted. Thereafter, the letter from the Bishop of the Catholic Diocese of Kakamega and Apostolic Administrator of the Diocese of Bungoma was obtained to allow the researcher to collect data in the jurisdiction of Kakamega and Bungoma Dioceses which were attached as appendix xi and xii.
 4. The sources of data used in the study were acknowledged so as to maintain moral norms of academic writing. This ensured that there was no form of plagiarism in the report writing. No data was manipulated to change the findings of the study. All data was kept under lock and key only the principal investigator accessed them.
 5. The researcher worked in the organization under study and was present during the data collection process. To mitigate possible bias and erase errors that arose due to subjectivity, the researcher used an assistant researcher because most of the participants were colleagues (clergy) while the FGDs respondents also knew the researcher due to past interactions in church gatherings. Participant observation was also an effective tool

in mitigating bias since the respondents were not aware that they were under investigation.

6. The study was carried out during the Covid- 19 pandemic and that posed a health risk. However, the study followed all the applicable health guidelines. Since the study involved participants from different deaneries in the Catholic Diocese of Kakamega. The researcher considered that exploiting a small sample size was effective in maintaining the respondents and researcher's health.

Summary

The researcher focused on the methodologies relevant to the study. The study employed a descriptive survey. It focused on data collection methods that retrieved information on the flow of big data in the Catholic Diocese of Kakamega. The researcher used 20 respondents from Bungoma diocese for the pretest study and the main study had 38 respondents from Kakamega diocese. The data collected was both qualitatively and quantitatively where informants were informed about the research. The chapter consisted of the design, study site and population, sample size, sampling technique and the ethical considerations.

CHAPTER FOUR

DATA PRESENTATION, ANALYSIS, AND INTERPRETATION

Introduction

The focus of this study was to analyze the alternative ways that the Catholic diocese of Kakamega can communicate big data to clergy and congregants. This chapter analyzed and presented the field data in tables and figures.

In this chapter, findings of the study are presented, analyzed, and interpreted.

Analysis and Interpretation

Response Rate

In order for the researcher to arrive at the sample size, the researcher adopted Krejci and Morgan (1970) sampling table; small sample size techniques to arrive at the sample from the 1 million Catholics in the Diocese of Kakamega which was 384. The study then applied Mugenda (2003) for a survey that was descriptive in nature of 10% of the sampled population was enough. This helped the researcher arrive at the 38 respondents.

The researcher administered 8 questionnaires to the clergy, who were purposively sampled for KII interviews. Six FGDS were also employed as research tools alongside participant observation which was used to complement the data. Participant observation was used to retrieve data from events in the Catholic diocese of Kakamega which both clergy and congregants took part in. An observation schedule was created showing

activities that the researcher observed. The researcher focused on non-verbal aspects of communication and language use.

The observation table was attached in the appendices section. Participant observation was done among all clergy and congregants by the researcher taking part in events and meetings that respondents participated in. All the questionnaires were filled successfully and the KII and FGDs interviews conducted successfully. This translated to a 100% response rate.

The high response rate was because the respondents were guaranteed of anonymity. Schlenker and Weigold, (1990) pointed out that anonymity reduces concerns of self-presentation by respondents; this was also the case for this study. The researcher also established rapport with most of the respondents before conducting the research. The use of an assistant researcher proved productive in ensuring that the information acquired was not biased. In addition, the respondents were given adequate time to respond to the questionnaires (3 days before returning them.)

Section A Demographic Information of Respondents

The study established the gender, age, and type of parish of the respondents used in this study in order to assess whether such factors affected data utility in the Catholic diocese of Kakamega. The following data was retrieved:

Gender of Respondents

The study established the alternative ways the Catholic Church in Kenya can communicate big data. As such, it was important to analyze whether gender was a factor in utilizing large sets of information flows in the Catholic diocese of Kakamega. This was

important as it gave the researcher an insight as to whether big data utilization was affected by gender in religious ministries. Findings from field data indicated that the male gender was more dominant compared to the female gender in the Catholic diocese of Kakamega as per respondents used in this study because the clergy consisted of male ordained priests only which resulted to the disparity.

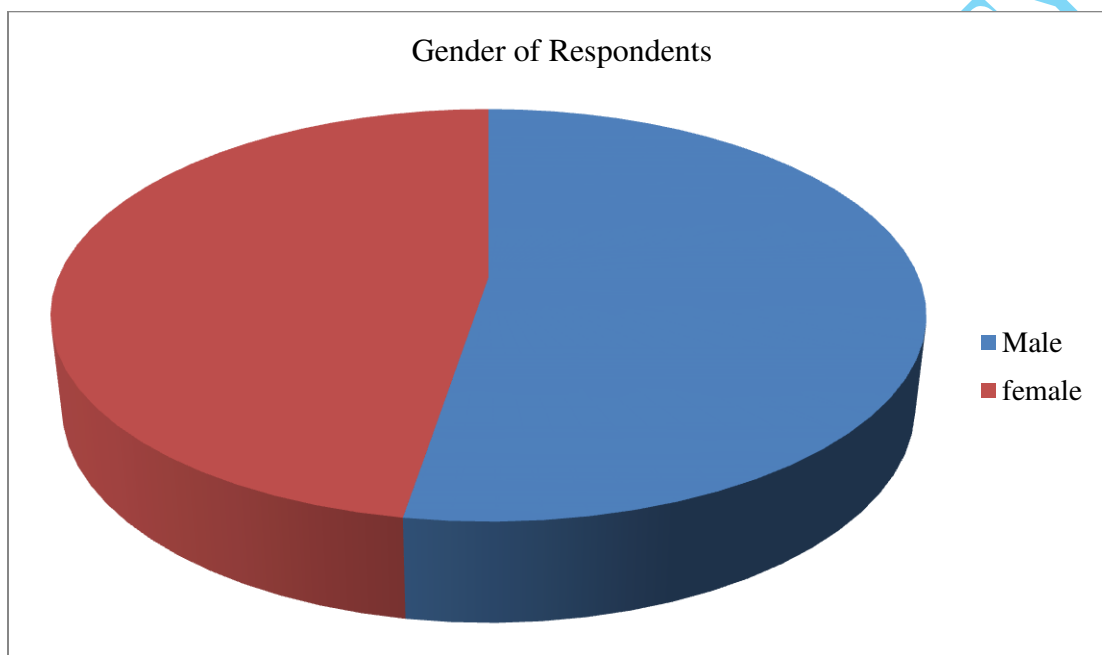


Figure 4.1: Distribution of Respondents by Gender.

The Figure 4.1 showed that there were more male respondents as shown by the green color represented by $n=20, 52.6\%$. It comprised of 8 clergy respondents 6 CMA, 3 PCAs and 3 YCAs. The female was represented by the blue color and were fewer by 2, $n=18, 47.4\%$. This constituted of the CWA, and Legionaries produced 6 respondents each. The PCAs and YCAs produced 3 respondents each.

Age of Respondents

The study established the alternative ways that the Catholic diocese of Kakamega communicated big data. As such, it was important for the researcher to establish whether

age was a factor in utilizing big data in the Catholic diocese of Kakamega. Findings from field data indicated that the youth were fewer and their participation in church activities was lower than the elderly, only 15 out of the 38 respondents were classified as the youth.

Table 4.1: Distribution of Respondents by Age

Age bracket	Number of respondents	Percent
20-29	2	5.3
30-39	13	34.2
40-49	6	15.8
50-59	6	15.8
60-69	8	21.1
70-79	3	7.9
Total	38	100

The Table 4.1 shows that most respondents were aged between n=30-39 ,34.2 % most assistant parish priests fell between the age bracket; YCAs and PCAs who participated in the study also formed part of this age bracket. Ages 40-49 and 50-59 formed 15.8%. Most clergy and congregants at ages 40-49 and 50-59 were more established religious-wise. Most of these respondents were the CWA and some elderly clergy. Respondents between ages 60-69 comprised of n=8, 21.1% they comprised of the CMA whose membership consisted of retirees from active life. Most senior legionaries fell in the age bracket between 70-79 years where n=3, 7.9%. The age bracket with the fewest number of respondents was that of 20-29 where n=2, 5.3%.

Academic Qualifications of Respondents

The study exploited academic achievements and their influence on big data utilization in the Catholic diocese of Kakamega. This provided an insight to the researcher on how big data and its utilization were related to one's academic achievement.

This was applicable only to the clergy who were key informants for this study and also because they act as custodians of big data at the parish level and the link between the diocese and congregants. The researcher avoided exploiting academic achievements of other respondents as it would limit the research and also focused on the study's main focus of retrieving data on alternative ways the Catholic Church communicated big data. Retrieving the academic qualifications of the clergy was important as it gave the researcher an insight into whether academic qualifications played a crucial role in data utilization. Findings from this study indicated that all clergy members were educated but at different levels.

Table 4.2: Distribution of Respondents by Academic Qualifications

Level	Number of respondents	Percent
PhD	0	0
Masters	1	12.5
Post graduate diploma	0	0
Degree	5	62.5
Diploma	2	25
Certificate	0	0
None	0	0
Total	38	100

The table 4.2 shows that at least all academic levels attained in Kenya were represented. PhD and post graduate diploma cases were represented by none of the respondents where $n=0$, 0%. This is because the seminaries in Kenya mainly offer a degree to the clergy and diploma for some exceptional cases. Post graduate diploma and PhD was only offered when the diocese felt the need to educate its own for purposes of specialization. The same applied for master's as represented by $n=1$, 12.5%. Diploma

n=2, 25% was applicable for priests whose academic attainment did not qualify for degrees in special relation to their previous scores at KCSE levels. Most priests had degrees because the seminary mainly offered degree programs in philosophy and theology as represented by n=5, 62.5%.

Type of Parish

The study established that the type of parish where the clergy and congregants came from affected the utilization of big data by both clergy and congregants in the diocese. This was important as it gave the researcher an insight on how big data and its utilization were affected by where a church was situated. In order to achieve this the researcher exploited the 3 types of parishes in the diocese by representing those that were further from the Cathedral with more numbers than those which were nearer (central point of control in the diocese-where the bishop's office lie). The researcher ensured each deanery was represented and by extension both counties produced parishes (since the Catholic diocese of Kakamega comprises of both Kakamega and Vihiga counties.)

Table 4.3: Distribution of Respondents by Type of Parish

Type of parish	No. of respondents	Percent
Peri urban	15	39.5
Urban	8	21.1
Rural	15	39.5
Total	38	100

The Table 4.3 shows that the researcher's main focus was on peri urban and rural parishes. Out of the 38 respondents only 8 were from urban parishes as indicated by n=8,

21.1%. Lutonyi an urban parish produced the PCA FGD (who were 6 in number). Hambale and Matunda parishes produced 1 KI (clergy) each.

The Peri urban parishes were represented by n=15, 39.5% respondents which comprised of Eshisiru parish which produced 1 KI (clergy) and CWA FGD. Mumias and Mutoma parishes produced 2 KI's and YCAs and FGDs from Mutoma. The rural parishes comprised of Shibuye producing 2 KIs (clergy) and FGDs Legionaries, Eregi produced 1 KI (clergy) and FGDs- CMA.

Awareness of Big Data in the Catholic Diocese of Kakamega

The first objective was to assess the level of awareness of large sets of information flows among the clergy and congregants in the Catholic Diocese of Kakamega.

Findings from field revealed that the Catholic diocese of Kakamega had large sets of information flows which the clergy and congregants were aware of at different levels. The researcher established that the clergy and congregants were not aware of most church big data that was in the form of paintings, graphics, ornaments, and symbols. This was also observed through identifying the specific sets of data that the Catholic Church had.

The awareness levels varied from individuals but still there was harmony on the data collection instruments arriving at the same ideology that there existed a lot of data that was packaged differently. Questionnaires and KIIs were in harmony confirming that most church data in the Catholic diocese of Kakamega was packaged in oral and written form. All FGDs also agreed on the same. Participant observation also established that church data was not only packaged in oral and written forms but also through graphics,

paintings and symbols-statues found in all Catholic churches, yet the clergy and congregants of this study failed to identify them as both sources of access and acquisition of church data.

The researcher observed that the Catholic Church exploited graphics and paintings exclusively not only in their liturgy but also in their symbols-statues, and ornaments with respect to the church calendar. The most common being the statue of Mary (mother of Jesus). The Catholic used the blue and white colors in her drawings /sculptures and any content related to her. Saint Joseph (patron saint) was mainly in pink/maroon. Other church data existed in the colors related to specific celebrations for example during confirmation at Lutonyi the clergy put on red vestment which signified passion, yet it was the liturgical year A where clergy put on the color green that signified prosperity in the church. The researcher also established that the church was painted in liturgical colors (green, yellow, white and red).

The researcher observed that most congregants did not embrace the church's liturgical colors. This finding cut across all the congregants despite the age, education levels and hierarchy as factors in this study. The legionaries were comfortable in using mother tongue, very few were conversant with communicating effectively in Kiswahili. This finding was backed up with data from questionnaires and KIIs which confirmed that language barrier was an issue in dissemination of church data CMA. The FGDs pointed out wrong translation as a factor that affected data awareness in the diocese. The CMA FGD presented the catechism books used at their parish as insufficient and noted that they were misleading due to the errors of translation. They further pointed out that using the local dialects would better all since the Diocese comprised of most of the sub tribes

and that employing locals to translate would resolve the issue citing out ‘...*mlembe* Maria-Hail Mary and *Sefwe uri Mwikulu*-Our Lord’s prayer’ as the most poorly translated texts. Language use was also pointed out by FGDs CWA, YCAs, and PCAs.

Questionnaires and KIIs respondents pointed out that language barrier manifested in terms of using complex terms and ‘heavy language’ whose translation led to misinformation. All respondents agreed that language barrier cut across all congregants and clergy. Data retrieved from questionnaires and KIIs from the clergy clearly pointed out that all clergy were aware of specific church data called dogmatic (religious and social teachings of the church). Through FGDs the researcher established that their awareness of church data was random, and each participant was aware of different church data. This enabled the researcher to conclude that academic qualifications were useful in assessing the awareness levels of specific kind of information about the Catholic diocese of Kakamega.

The clergy easily identified with readings and saints compared to congregants attending mass who followed the sermon of the day without noticing errors. Congregants relied on what the reader (of Bible verses) read without identifying whether it was the correct reading since most congregants in the diocese did not carry copies of Bibles to church and bought print booklets which were sold before mass. This was notable through observation during most events and church gatherings.

The researcher also established that data awareness in the Catholic diocese of Kakamega was influenced by technology know-how. Questionnaires and KIIs confirmed that the use of technology with respect to the instruments used to create and access church big data during communication, was not a challenge to most of their colleagues

but attributed technological illiteracy, ignorance, and inaccessibility especially for the old congregants. This challenge among the old congregants was noted during the interviews as noted by KII number 008, that although most of the old congregants had mobile phones, they used them for other activities such as (M-PESA) not related to accessing and making them aware of church data since they did not know how to operate them.

All KIIs also pointed out that lack of interest and ignorance among both clergy and congregants as key determinants in determining data awareness this was arrived at by ignoring one's age, academic level, or hierarchy in the church. The researcher established that data regarding finances, marriages, order of mass and other less sensitive data about an individual was accessible to all clergy and congregants through church announcements, registers and intake forms yet data that was perceived as sensitive was only accessible to the management examples included confessions, child abuse/family – related issues (details on marriage counseling about specific couples, as well as guiding and counseling services.)

Using questionnaires, the clergy were asked what they understood by the term, “large sets of information flow”. Most respondents were aware of the phrase, ‘large sets of information flows.’ but by the phrase 'big data 'was ambiguous and confusing to most of them. By correctly defining big data the researcher employed the question in order to get the respondents insight on what large sets of information flows meant. The table below shows the findings from field data.

Table 4.4: Distribution of Respondents by Definition of Big Data 'Large Sets

Definition	Number of respondents	Percent
A. A continuous and ever-increasing information from individuals to an organization through multiple sources that can't be processed by traditional means	4	100
B. Large amounts of information flowing to an organization from a variety of sources.	4	0
C. Don't know	0	
Other		
Total	8	100

Table 4.4 presented the distribution of respondents by their perception of what big data was. It was indicated by the representation of n=4, 50 % had been distributed to option A and B respectively. Only half of the clergy understood the actual meaning of the phrase. The other half defined it partly as presented by option B. The researcher established definition A as suitable for the Catholic diocese of Kakamega as a non-profit corporation since it has a lot of existing data that is always incoming and outgoing both internally and externally which requires more than traditional means in both storage and dissemination. 'Definition B' limited information flows to only incoming data which is not the case for the Catholic church at large. For focus group discussions and KIIs, the researcher and assistant had the role of explaining to the participants what big data was and it was clearly understood before they proceeded with the session. The researcher established by degree of variance that all respondents strongly agreed to the Catholic diocese of Kakamega having large sets of information flows as presented in Table 4.5

Table 4.5: Degree of Variances in the Church having large sets of Information Flows

Degree	Number of respondents	Percentage
Strongly agree	8	100
Agree	0	0
Disagree	0	0
Strongly disagree	0	0
Undecided	0	0
Total	8	100

By exploiting questionnaires and KIIs the researcher established that all respondents strongly agreed to the Catholic Church-Catholic Diocese of Kakamega having large sets of information flow. All FGDs strongly agreed to the Catholic Church having large sets of information flows. Participant observation also derived similar results. All respondents acknowledged that the Catholic diocese of Kakamega had large sets of information flows packaged differently, yet it's only through observation that the researcher established that other church data was packaged in terms of graphics, paintings and symbols other than the most popular forms which were print and oral.

Accessibility and Acquisition Levels of Big Data in the Catholic Diocese of Kakamega

Findings revealed that indeed the Catholic diocese of Kakamega had accessible data to both clergy and congregants at different levels through numerous existing channels. Respondents used in this study were from different church ranks. Among the clergy, each rank produced a respondent (deans, parish priests, assistant parish priests and the consultants-for the local ordinary.) In relation to the other respondents used in FGDs the researcher requested for groups that had both church leaders and members to engage, since church leaders in Catholic diocese of Kakamega used church leaders as links to all

congregants incorporating members who had no rank. This proved useful in assessing whether congregants at the grass root levels accessed and acquired church data.

Questionnaires and KIIs confirmed that church data was accessible to clergy members at the different levels as noted by KII 004, ‘...*although we are all clergy member’s information circulates depending on our ranks.*’ Data from FGDs concurred with this finding; respondents from all the FGDs highlighted that there was a difference in the levels of data access and acquisition. This was denoted by this common sentence ‘*kuna mikutano ya viongozi pekee yao na kuna mikutano ambayo inahusu wanajumia wote...*’ which translates to ‘*some meetings required church leaders while others required all congregants.*’ All FGD respondents noted that at their parish’s meetings meant for leaders especially the parish council and small Christian communities were exclusive, unless stated otherwise by the clergy. Participant observation also established the same results.

Accessibility and acquisition of data was also related to its packaging and the type of communication channels that the diocese embraced. As such, noise was identified in the channels of data dissemination. This resulted to preference in data utilization and uptake as established by the research instruments of this study.

First, in order to assess the accessibility and acquisition levels of large sets of information flows by the clergy and congregants of the Catholic diocese of Kakamega the researcher established the sources of data in the diocese.

Sources of Big Data in the Catholic Diocese of Kakamega

Findings from field data established that the Catholic diocese of Kakamega had a variety of sources for its large sets of information. The distribution of respondents by

sources of data access and acquisition according to the clergy of this diocese was represented in Table 4.6.

Table 4.6: Sources of big data in the Catholic diocese of Kakamega

Source	Number of respondents	Percent
Media, Religious space, and friend	2	25
Media and Religious space only	2	25
Friend only	1	12.5
Media only	0	0
Religious space only	3	37.5
Total	8	100

The table 4.6 represented the different sources that clergy use as a source of their information. Findings from this data revealed that there were a variety of sources that were preferable and credible depending on the type of information.

The use of religious space only was very popular among the clergy since this was considered a reliable and credible source of both data access and acquisition. The researcher established through FGDs that congregants shared the same opinion. Information that came directly from the clergy and credible church leaders was highly reacted upon by both clergy and congregants. Participant observation also established the same.

The researcher observed that congregants were more receptive to this information as represented by n=3, 37.5%. The use of media alongside religious space and information from colleagues as well as the use of media and religious space only had a similar response because the correspondents felt that media (especially the church platforms were controlled at the diocesan levels.) and that the religious space was also credible. KIIs and FGDs also cited that depending on the church's social media platforms

were reliable and credible sources of church data. Among the congregants the use of friends was not a reliable source of data access and acquisition due to grapevine (gossip) communication being embraced by most congregants.

The use of friends only as a source of credible information was not as reliable as indicated by $n=1$, 12.5%. This was because relying on second- or third-party data was subject to distortion according to KIIs. The use of media only proved as the least favorable with none of the respondents choosing it. This finding was also backed up by the respondents from the FGDs. The Legionaries admitted to not being able to access and acquire data through media platforms since the church did not own mainstream media.

The study also assessed whether the Catholic diocese of Kakamega had large sets of information flows inform of texts, audio, audio-visuals.

Table 4.7 was retrieved from questionnaires it represented the different forms in which that clergy members accessed and acquired church data. The following was a representation of the data retrieved.

Table 4.7: Variance in Whether the Church Has Big Data in Different Forms.

Degree	Number of respondents	Percent
Strongly agree	3	37.5
Agree	5	62.5
Strongly disagree	0	0
Disagree	0	0
Undecided	0	0
Total	8	100

Findings from this data revealed that most clergy agreed that the Catholic diocese of Kakamega had a lot of information presented in different forms as represented by $n=5$, 62.5%. Similar results were retrieved from FGDs and KIIs. The researcher established that all respondents pointed out that the church had a lot of data in form of text, audio,

and videos. The other percentage strongly agreed represented by n=3, 37.5% opining that the Catholic Church had big data in the form of texts, audio, and videos. The disparity manifested because of KIIs and FGDs pointing out that they were aware of texts and oral forms as established by objective 1 as such very few mentioned videos as a source of church data in the Catholic diocese of Kakamega. Participant observation established that clergy and congregants did not consider colors, graphics, designs, ornaments, and symbols- as one way of the church communicated yet they would embrace the church's liturgical colors. This finding is further backed up by none of the clergy mentioning this is as a form of data.

Channels Used in Communicating Big Data in the Catholic Diocese of Kakamega

The researcher then assessed whether there were existing channels of communicating big data. Findings from this study established that the Catholic diocese of Kakamega has a lot of communication channels that are based on hierarchy and church structures. The researcher also established that the channels of communication were in use by both the clergy and congregants of the Catholic diocese of Kakamega. Below is data retrieved from questionnaires in relation to the other research instruments.

Table 4.8: Channels of Data Dissemination in the Catholic Diocese of Kakamega

Channel	Number of respondents	Percent
Word of mouth only	1	12.5
Print publications only	0	0
Social media only	0	0
Word of mouth and print only	1	12.5
All of the above	6	75
Total	8	100

Table 4.8 presented a summary by popularity the most embraced channels of communicating big data in the Catholic diocese of Kakamega. Findings from this study established that most clergy embraced a combination of word of mouth, publications and social media platforms in a supplementary manner as means and channels of accessing and acquiring church data. This finding concurred with that of KIIs and FGDs except for the Legionaries who pointed out that accessing publications and social media was a challenge to them ‘...*efwe shihwamanya olusungu,kata ohusoma nohutunyi mana evindu vya tsimu kwakorwa fwana imesag husomerungwa na vana...*’ which translates to ‘*we don’t understand English let alone reading ,we have lots of difficulty in using phones we are only aware of messages which our children read to us.*’

Through participant observation the researcher established that a combination of all these channels was the most common among the clergy and congregants. The researcher observed that all parishes had active social media platforms; most church settings had data that was stored in written form (readings, order of mass, intake forms among others.) Face to face communication was achieved through word of mouth during evangelization (sermons) and interactions among clergy and congregants of the Catholic diocese of Kakamega.

Numerically, the data was represented by n=6, 75 %. This was strengthened by the fact that all those channels packaged their data differently this was confirmed by all respondents. Word of mouth only as a channel of data dissemination was only preferred by a small number as represented by n=1, 12.5%. This was in agreement with the Legionaries who pointed out that they accessed data through their leaders and church announcements and that all other channels proved a challenge to them.

The researcher through participant observation established that this was a controversial aspect since interactions in the Catholic diocese of Kakamega were run on face-face basis (sermons, meetings, seminars and even church announcements). A combination of word of mouth and print only was unpopular represented by n=1, 12.5%. This data was not in line with most KIIs and FGDs except for the Legionaries FGD. The researcher established that both clergy and respondents were comfortable in pointing out that the Catholic diocese of Kakamega had a lot of data in form of texts, audio and videos. The respondents were specific in identifying the written forms of church data - most of the clergy pointed out dogma (religious and social teachings of the Catholic Church) while the congregants were not specific; each of them had their own versions of data.

The researcher established that the Catholic diocese of Kakamega mainly embraced social media platforms in data dissemination. Data retrieved from questionnaires and in relation to other instruments is discussed below:

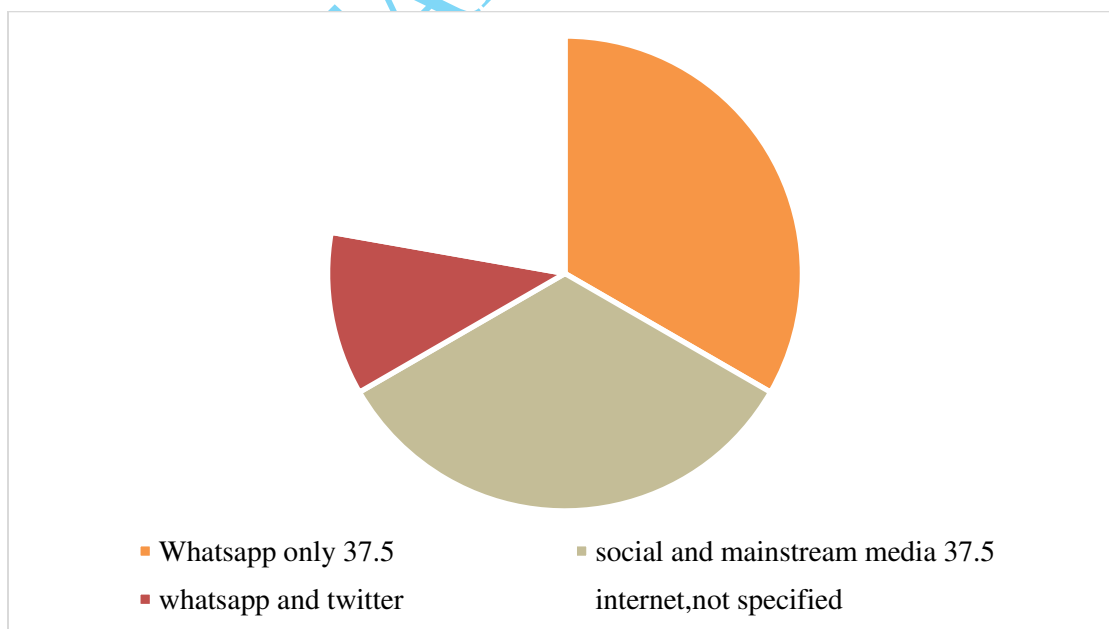


Figure 4.2: Platforms Used to Access Large Sets of Information Flow

The researcher established that the use of social media platforms in communicating to both clergy and congregants was highly embraced. Most of the church data was disseminated to clergy through social media platforms. WhatsApp was the most popular as represented by the orange color and numerically n=3, 37.5%. KIIs and FGDs except Legionaries FGD shared the same sentiments.

The researcher through participant observation established that the clergy and congregants embraced WhatsApp groups at the parish level. An equal number was affiliated to using both mainstream and social media platforms as channels of accessing and acquiring data as represented by the grey color and numerically n=3,37.5%. Clergy who pointed out using this channel attributed to accessing and acquiring church data from KII 003, KII005 and KII 008 'Although our church does not have its own television and radio stations it uses others to evangelize namely :Capuchin Tv, Lubao FM, and Citizen (radio and TV). This data was also backed up by the YCA ,PCAs, CMA, and Legionaries FGDs who shared a common sentiment with participant number 6 in legionary group stating that *'hunyola amacheni kamkanisa mu Lubao fm.*' Translating to *'we often get church news from Lubao fm.'* In the CMA FGD participant 3,5 and 2 stated that *'habari nyingi za jimbo hupatikana kwa tv has wakieka live mass sana sana Waumini na Lubao fm* which translates to most diocesan updates are accessed through TV especially the live masses on Waumini and Lubao FM.' The researcher concluded that clergy and congregants knew the specific mainstream media where church data was accessed.

As such, findings from this instrument concurred with that of the other research instruments used in this study. This was followed by respondents who used the internet without specifying the platform. This case was unique since all KIIs and FGDs except

Legionaries were aware of the platforms they visited in order to access data. This was represented by the white color and numerically $n=2$, 25%. The researcher established that this number was slightly high since those clergy members who did not specify forgot to indicate the platforms. Respondents who embraced both WhatsApp and Twitter were the least represented by the red color $n=1$, 12.5%. This was because using Twitter was a challenge to most respondents, they did not mention it except for KII001. The same was also observed in other KIIs, FGDs and participant observation.

The researcher then assessed church-based avenues of accessing and acquiring church big data. Findings from this study revealed that most clergy members embraced all the avenues presented. The table 4.9 presented data retrieved from questionnaires:

Table 4.9: Distribution of Respondents by Avenues of Accessing Data

Venues	Number of Respondents	Percent
Anytime clergy and congregants attend mass	0	0
Small Christian community meetings	1	12.5
Diocesan communications office	2	25
All of the above	5	62.5
Total	8	100

Findings retrieved from field data revealed that most clergy members in the Catholic diocese of Kakamega accessed church data from a combination of church-based avenues. They exploited mass attendance, small Christian communities, diocesan communications office at once in accessing and acquiring church data. This was represented by $n=5$, 62.5%. This data concurred with that retrieved from KIIs and FGDs- all respondents agreed upon their reliance on a combination of church-based avenues in accessing and acquiring church data.

For instance, through observation the researcher established that the use of small Christian communities was the most effective channel of communicating big data to and from both clergy and congregants of the Catholic diocese of Kakamega. Church leaders (small Christian communities and parish council) were also an effective way of accessing church data. The most effective channel was attending mass in order to get first-hand information about the church. The Diocesan communications office only as a channel of data access was also popular represented by $n=2$, 25%. This data corresponded with that retrieved from KIIs where the researcher established this channel was mainly for official communication that was meant for clergy and even if it concerned the clergy it had to be addressed through them.

The researcher established through observation that letters sent by the local ordinary to the congregants had to go through this channel. FGDs also established the same. The use of small Christian communities only as a channel of data access was mainly limited to the parish level. This was agreed upon by all respondents terming it as an alternative for those who failed to attend mass or church gatherings especially by congregants. This was established through FGDs and participant observation its data is represented by $n=1$, 12.5%.

The researcher then sought to identify the instruments used to access big data in the Catholic diocese of Kakamega. Findings from field data established that the use of mobile phones was the most common in accessing church data among the clergy and congregants of this study. Data retrieved from questionnaires in relation to the other research instruments used to establish access and acquisition of big data in the Catholic diocese of Kakamega was represented in table 4.10.

DAYSTAR UNIVERSITY

Table 4.10: Distribution of Respondents by Instrument used to Access Big Data

Instruments used	Number of respondents	Percent
Mobile phone	7	87.5
Computer/laptop	0	0
All of the above	1	12.5
Other	0	0
Total	8	100

The researcher established that the use of mobile phones was the most popular among the clergy in accessing and acquiring church data. This information was supported by all FGDs and KIIs except for KII 008 who pointed out that most congregants had phones, but they did not use them for accessing church data.

‘...wakristu wengi wana simu ila hawazitumii kupata ujumbe wa kanisa .Vijana wanazitumia kwa mambo mengi na kwa wale wazee wanazitumia kwa biashara(MPESA.)wengine pia wanashida za teknolojia...’

translating to

‘...most congregants have phones but they don’t use them to access church data. The youth use their phones to access other data that is not related to the church while the old use them for cash-based transactions.

That is, M-PESA.’ Participant observation established that most congregants had mobile phones, but they did not only utilize them for accessing church data and the use of mobile phones was according to the users’ gratification. Mobile phones were mainly used to access data in the form of short messages as cited by Legionaries FGDs and social media platforms by all other respondents.

The researcher also established that their popularity was associated with the price. This is because mobile phones were less costly. In Kenya, they were as cheap as 1000

Kenya shillings. This was represented numerically by $n=7$, 87.5%. The other population consisted of respondents who used a combined number of gadgets in accessing church data. The respondents represented by this bracket was the smallest with a representation of $n=1$, 12.5%. The researcher also established the same through participant observation and attributed this to the cost of acquiring such gadgets and skills required to use them. This was confirmed by all KIIs pointing out that technology literacy was a challenge for some clergy and most congregants. The researcher also established that publications were commonly embraced as instruments of accessing and acquiring church data as agreed upon by all FGDs, KIIs and participant observation.

Frequency of data access and acquisition in the Catholic diocese of Kakamega was also seen as a factor in data utility. Table 4.11 presented data retrieved from questionnaires in relation to other instruments used in this study.

Table 4.11: Distribution of Respondents by Frequency of Accessing Big Data

Frequency	Number of Respondents	Percent
Once	0	0
Twice	1	12.5
Thrice	1	12.5
More	6	75
None	0	
Total	8	100

Findings from this study established that most clergy accessed and acquired data more frequently as indicated by $n=6$, 75%. This data was similar to that of KIIs and participant observation. The researcher also observed that mass and specific devotional groups, meetings, and specific masses were written at their gates, and on notice boards

this meant that at any time anyone could access the data. FGDs established that accessing data was not very often since they relied on Sunday church announcements and attending mass to get church data this was backed up by the data that was represented by n=1,12.5%. For those who acquired church thrice or twice. Frequency of data access was also attributed to packaging. The researcher established that oral sources and written forms of accessing church data were affected by the frequency through which the respondents would access church data. This was in reference to how the leaders packaged and delivered the information.

The researcher established that most devotional groups and small Christian communities had only 1 day for their meetings each week and if they were joined by the clergy, it would be after a very long time (clergy often joined these meetings when retrieving intake forms, finances, and church dues). Noise was a factor in data accessibility and acquisition in the Catholic diocese of Kakamega. The researcher established that there was a lot of noise in the dissemination of church data that is why there was a lot of variances in identifying the sources of data, channels and avenues that were used to disseminate church data. The researcher established this through getting an insight on their different perceptions of the challenges that were faced by clergy and congregants of the Catholic diocese of Kakamega in the utilization of church big data. Data retrieved from questionnaires in relation to other research instruments was presented in Table 4.12.

Table 4.12: Variance of Data Accessibility in the Catholic Church

Degree	Number of respondents	Percent
Strongly agree	3	37.5
Agree	4	50
Strongly disagree	0	0
Disagree	1	12.5
Undecided	0	0
Total	8	100

Findings from field data indicated that there was a lot of variances in data accessibility. Most respondents agreed that church data was accessible as indicated by n=4, 50%. The researcher established that most clergy pointed out two main classifications of noise in data accessibility. These were: behavioral (ignorance, lack of interest, culture and tradition of clergy and congregants) and literacy levels (language barrier, technology, and academic illiteracy). Data from FGDs, KIIs and participant observation shared the same sentiments. The researcher employed the use of translation in data retrieval from the respondents of this study. The researcher had to translate the questions to their first language for legionary FGD, and Kiswahili for the other respondents since few were conversant with English. As such most congregants relied on church announcements and very few leaders who were considered credible.

The researcher concluded that the Catholic diocese of Kakamega had a lot of data that was accessible but none of the respondents pointed out that the diocese had graphics, paintings and symbols that were used as channels of data access and storage. Respondents who strongly agreed that the Catholic diocese of Kakamega were represented by n=3, 37.5 %. The least popular represented by n=1, 12.5% by KII 005 stated that church data was not accessible. The researcher then identified that data intake

among both the clergy and congregants of the Catholic diocese of Kakamega were at a preferential level. In order for data to be utilized the clergy and congregants focused on a variety of factors. Data derived from questionnaires in relation to other research instruments was presented as follows:

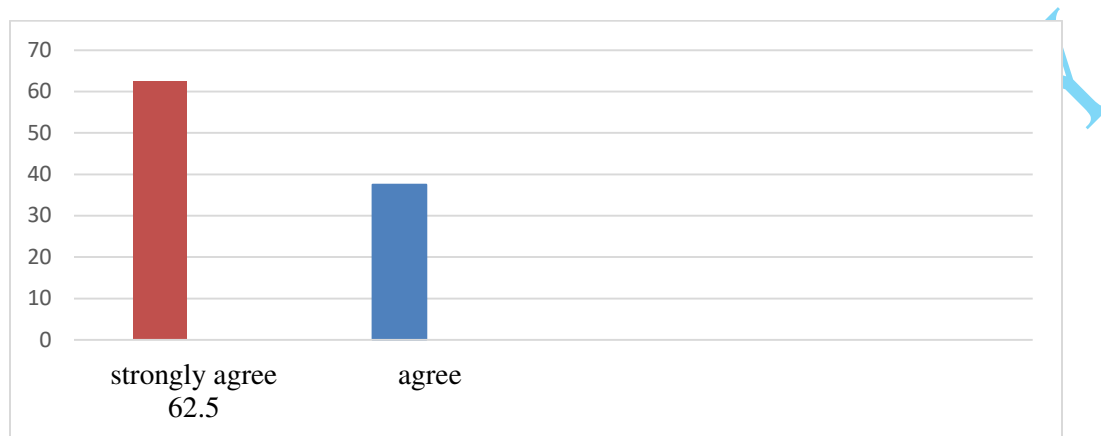


Figure 4.3: Whether Clergy Determines Data Uptake in the Diocese of Kakamega

The Figure 4.3 represented the distribution of respondents in relation to whether the clergy influenced data uptake in the Catholic diocese of Kakamega. Most respondents strongly agreed that the clergy had an influence on the kind of data that circulated especially at the parish level. This was represented by n=5, 62.5%. This finding cut across all FGDs and KIIs.

The respondents confirmed that the clergy administered and influenced most of the data that congregants accessed. Most FGDs confirmed that data access and acquisition was through leaders who had received it from the clergy. From the grass root levels congregants accessed the clergy through their small Christian community leaders. Participant observation also derived similar findings especially on matters relating to finance during church announcements. Errors arising from the contributions by the

devotional groups or small Christian communities' congregants resolved to murmuring or frowning.

Findings indicated that the clergy and congregants used information selectively as such the main benefits were spiritual nourishment and developmental aspects of the church and self. Participant number 4 in YCA FGD and participant number 3 in legion FGD said, '*...kuenda church haitujengi tu kiroho but inatufaidi personally...*' that translated to '*...Engaging in church activities is beneficial to not only the spiritual aspects but also one's personal life.*' Observation also established that apart from the two most common benefits being updated was among the key benefits of accessing and acquiring church data. The other respondents were represented by n=3, 37.5% citing a lot of noise in data accessibility.

Access of information was limited to a combination of factors that were classified into two (behavioral and literacy) related factors.

Behavioral Related Noise

The researcher established that data accessibility was highly clustered into culture and tradition of the clergy and congregants as pointed out by KIIs 004 and KII 005. Cultural values and tradition also posed a great challenge in disseminating the information, preference of male leaders over female ones was one of the main challenges as noted by KII 005. Lack of interest and ignorance about church data also proved to be a dominant aspect as retrieved from most questionnaires. This noise was attributed to all despite the differences in ranks, age, academic qualification or even the technological literacy levels. The YCA FGD pointed this as a major challenge amongst the youth

participant 1 said *'youth wengi hwako tayari kuparticipate kwa miradi za church hawaezi kosa excuse kama si simu ni bundles ama wanapuaza tu ni kama hawajaona...'* this translates to *'most of the youth are not ready to participate in church activities they have a lot of excuses ranging from lack of bundles, ignorance and even lack of interest.'* This was agreed upon by all respondents as a major reason of data underutilization.

The researcher established through observation that most clergy and congregants had a poor reading culture; they rarely checked the notice boards for church updates this was also applicable to social media platforms. Out of 20 congregants only 9 were seen carrying Bibles to church and purchasing the print outs for the readings. The PCA FGD cited that body shaming stemmed when delivering church data. In summary, the clergy and congregants had specific traits as discussed above that hindered access of church big data in the Catholic diocese of Kakamega. Body shaming was also established by the PCAs FGD which stemmed during delivery of information.

Literacy Related Noise

In this context, the researcher classified literacy related noise as that which arose due to academic achievements, the use of technology and level of technology literacy with respect to data access in the Catholic diocese of Kakamega.

Language Use and Barrier

Findings revealed that data in the Catholic diocese of Kakamega was in English or Swahili and that which existed in local dialect was wrongly translated. The researcher had to translate the contents of the research instruments to both the KIIs and the FGDs. The use of complex language as established by objective 1 in defining what big data was

said to be the only challenge the clergy displayed. Language complexity was also identified by all FGDS as a challenge when it came to data dissemination. Respondents from all the FGDs shared the view that complex language was used by leaders in delivering and packaging church big data. KII 005 attributed the culture and tradition of both clergy and congregants to inadequate catechism classes and inconsistency in attending mass given that most church data was disseminated on Sunday. This finding cut across all FGDs where respondents attributed attending to mass and listening to church announcements as an effective source and channel of communicating church data.

Technology and Church Structured Channels

The researcher also established that the use of too many channels resulted to filtration, distortion, and vagueness of information. Findings revealed that the church often placed the clergy as custodians of church data at the parish level, then delegate leaders from the small Christian communities and parish council who were used to disseminate data to the grass root levels. FGD respondents cited that most church leaders had poor delivery and packaging skills of communicating church data. For instance, the CWA FGD pointed out that those leaders who went to the same meeting came back with very different ideas that were contradicting about the same issue. Participant observation also established that congregants would only react to data acquired through church announcements or credible leaders.

The researcher established that most clergy and congregants did not mainly use their phones for acquiring and accessing church data. KII 008 said that ‘...*although Catholics have phones, they don’t use them for church data acquisition...*’ KII 004 also pointed out that ‘...*technology and the digital realm have hindered data access for most*

of our congregants...' This finding was backed up by information retrieved from FGDs that they accessed church data through short messages only as cited by the Legionaries and CWA FGD. The legionaries emphasized that they relied on third parties to retrieve the information.

Assessing Alternative Ways of Communicating Big Data in the Catholic Diocese of Kakamega

The third objective analyzed the alternative ways through which large sets of information flows could be better communicated in the Catholic Church diocese of Kakamega.

Findings from field data indicated that the existing channels of communicating big data in the Catholic diocese of Kakamega were subject to review through either: improvisation, modification or introduction of new concepts in order to reduce the aspect of noise when communicating church big data that was evident as established in objective 2. The researcher established the following:

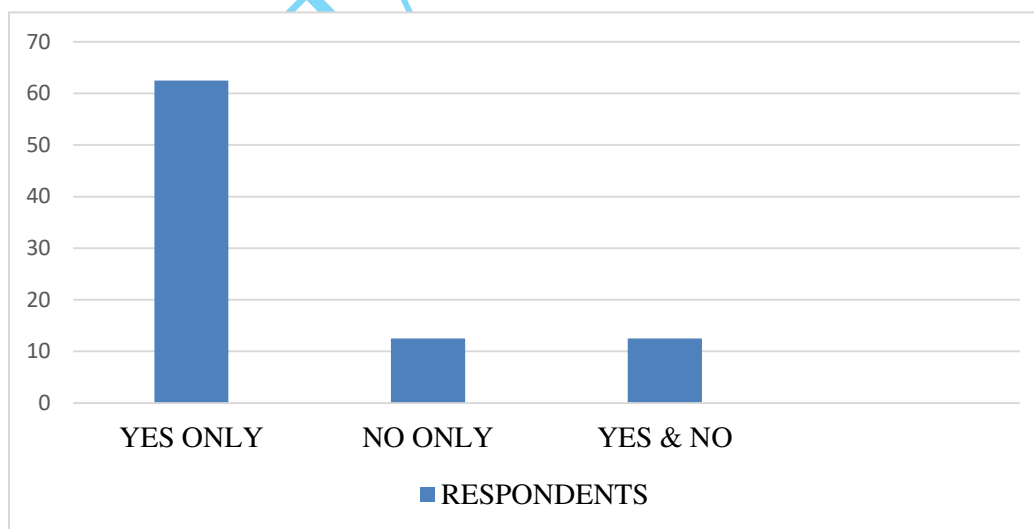


Figure 4.4: Response to Whether Congregants Accessed Church Data

Findings from this study established that most congregants were able to access church data from a variety of sources as represented by n=6, 62.5%. KII 001 attributed data access to inadequacies. KII 001 view was represented by n=1, 12.5% who attributed the congregants to lacking access of data because of hierarchy and ranks only.

In a bid to establish the reviews the researcher embraced the common types of communication structures employed by the clergy and congregants of this diocese. The reviews lied within the following structures:

Formal/Informal Structures

Findings established that the clergy and congregants from the Catholic diocese of Kakamega embraced both formal and informal structures of communication. All research instruments established that formal communication was the most common when relating to superiors. The use of circulars, letters (publications) and face to face interactions (sermons, meetings, and seminars) when communicating church data was pointed out by all KIIs, FGDs and questionnaires. Through observation the researcher established that church data awareness and access was affected by hierarchy.

The use of informal communication was mainly embraced by the congregants who rewarded grapevine (gossip) as a means of creating awareness and accessing church data.

Downward/Upward Structures

The researcher established that downward and upward structures were also embraced by the clergy and congregants of the Catholic diocese of Kakamega. This finding cut across all the research instruments used in this study. Most church big data

originated from the local ordinary through the clergy in order to reach the congregants. Data from FGDs, KIIs and questionnaires held the same view. Upward communication on the other hand was embraced by both the clergy and congregants when communicating to their superiors but it was mostly used by congregants through their leaders (small Christian communities and parish councils). These leaders mainly acted as the main link between clergy and congregants as established by both KIIs and FGDs.

The researcher observed the same during the Young Catholic Students mass where there was a very big disparity in the deanery and individual parish contributions towards the Lenten campaign. This was also observed at the parish levels where there were disparities in contributions.

Horizontal/Diagonal Structures

The researcher also established that the existing channels of communicating big data in the Catholic diocese of Kakamega had both the horizontal and diagonal structures. Findings from this study revealed that the horizontal communication was the most common among both the clergy and congregants of this diocese. The researcher through observation established that devotional groups in the Catholic Church were based on members who shared the same attributes for example the YCA consisted of young adults who were done with school and were working/process of searching for livelihood. Social media platforms also displayed the same. Clergy had their own WhatsApp walls independent from those used by the congregants this logic also applied to the congregants. The researcher also observed that small Christian communities were formed on proximity basis (members from the same locality formed a small Christian community group).

The diagonal structure was mainly embraced during sermons, and it was unpopular among the congregants. This structure also manifested in the social media platforms where most parishes had an alternate group that comprised of both the clergy and congregants. The researcher also observed that these walls had fewer contributions (in terms of views by congregants) since most of them did not associate the platform with any other purpose, than church data. This was also the case for clergy walls, that had the local ordinary. The use of this structure also manifested in accessing church data from the social media platforms-once it was published/uploaded anyone would be aware of it and acquire without any particular order.

Internal/External Structures

Findings from this study established that internal communication was the most embraced in the Catholic diocese of Kakamega as means of creating awareness, accessing and acquiring church data. The researcher concluded through the harmony of FGDs, KIIs, questionnaires and participant observation that indeed the clergy and congregants from the Catholic diocese of Kakamega were aware of church data that was accessible through a number of channels. This was established by assessing whether internal flow of big data affected the clergy, congregants and their colleagues in relation to performance.

External communication was very limited to both the clergy and congregants of the Catholic diocese of Kakamega as established by the researcher- only the clergy mentioned Vatican –related documents. This structure was only limited to the local ordinary and the local ordinary council who determined the major decisions regarding the diocese. At the same time policies and major decisions about the Catholic diocese of

Kakamega were decided externally for example the theme offered for World Day of Social Communications was determined by what the Vatican (Pope) had given.

DAYSTAR UNIVERSITY

Review of Channels

The researcher established that the following concepts did not exist in the communication channels and structures of communicating church data to the clergy, and congregants of the Catholic diocese of Kakamega. The need to review this channel will prove effective in data utility in this corporate.

Lack of a special needs office that constituted of sign language interpreters, Braille and Church Designs.

The researcher established that awareness and acquisition of church big data was affected by its packaging and delivery. The existing channels did not cite that people with special needs also formed part of the clergy and congregants of the Catholic diocese of Kakamega. As such, the researcher through CWA FGD participant number 5 who stated that

‘...hii church yetu watu wana upungufu hua hawasaidiki kwa mfano viziwi vipofu na wenye hawaezi tembea...’

which translates to ‘...in this church the physically challenged are not catered for. For example, the blind, deaf and even the lame ...’ The researcher established that this special group missed out on most church big data through both evangelization and its utilization. The researcher also established that most church data was stored and acquired in written form but none of the respondents pointed out that church data was stored in Braille form. The church designs employed by most churches also did not cater for these groups.

Poor Packaging and Delivery of Church Big Data

The respondents of this study failed to present the aspect of church data that was packaged in the form of graphics, ornaments and symbols which were the oldest and most common forms of data awareness and access. The researcher also established that the language used by the church's publication and storage was an issue for most respondents. The researcher established the need to reduce noise in the existing channels by improving or modifying the already existing channels for communicating big data by.

Lack of the Church's Own Mainstream Media

The researcher established that the Catholic diocese of Kakamega mainly exploited social media platforms when disseminating church data. Through the research instruments, the researcher established that both clergy and congregants from the Catholic diocese of Kakamega also relied on mainstream media when creating awareness and accessing church data. The respondents pointed out that Capuchin TV, Lubao FM, Radio Waumini, Citizen Radio and TV were alternate channels of accessing church big data. Participant number 6 legionary FGD said,

'...ikanisa yefu iuma itv kata iredio evindi viri wo...' which translates to

'...our church has all other channels except for radio and TV.'

Participant number 3YCA's FGD also pointed out that:

*'mimi hupata news za church Radio Waumini itakua poa diocese
ikianzisha redio yao,*

which translates to 'I get church updates from Radio Waumini, it would be nice for the diocese to have its own radio/TV station.' The same sentiment was found in CMA FGD.

Summary of Key Findings

The results obtained were based on the study's objectives respectively. The findings were that the Catholic diocese of Kakamega has large sets of information flows which the clergy and congregants were aware of at different levels. In relation to data accessibility and acquisitions findings of this study established that the Catholic diocese of Kakamega had a lot of data that was packaged in text, audio and video forms according to the clergy and respondents of this study.

The researcher also established that the Catholic diocese of Kakamega had a lot of data in its liturgy (graphics, dress code, symbols-statues and paintings used in church ornaments) which respondents failed to identify. Findings from this study revealed that there were a variety of sources that were more preferable, and credible, depending on the type of information. The use of religious space only was very popular among both the clergy and congregants.

Findings established that access and acquisition of church data was more frequent among the clergy than the congregants of the Catholic diocese of Kakamega. The clergy accessed data from mass, small Christian communities, and the diocesan communications office. Most congregants attributed accessing church data to attending mass and the small Christian communities while the clergy frequently accessed church data from all the church channels including the congregants and the diocese.

Findings from this study established that the Catholic diocese of Kakamega had church structures that were used in communicating church data. These channels were

further structured into formal and informal, downward and upward, horizontal and diagonal, and external and internal structures of church communication.

Accessibility of information was limited to a combination of factors which were classified into two (behavioral and literacy) related factors. These were: behavioral (ignorance, lack of interest, culture and tradition of clergy and congregants) and literacy levels (language barrier, technology, and academic illiteracy) as the major noises in accessing data.

Findings from field data indicated that the existing channels of communicating big data in the Catholic diocese of Kakamega were subject to review through either: improvisation, modification, or introduction of new concepts in order to reduce the aspect of noise.

The researcher established that the Catholic diocese of Kakamega did not have a special needs office that employed sign language interpreters, decode church data in Braille and ensure that all parishes have building designs that suit this group and that the diocese had not ventured in.

The researcher established that the Catholic diocese of Kakamega mainly exploited social media platforms when communicating it did not have its own mainstream media.

Summary

Field data was analyzed and interpreted according to the objectives of this study. It was then presented thematically in tables, and figures. Before the study, the researcher had knowledge that the Catholic Church had existing channels of communication and data that was utilized by clergy and congregants. Three unexpected findings came up that

were not present in previous studies. These were in response to the research questions. The first was the lack of a special needs office that constitutes sign language interpreters, Braille and the adjustment of church designs to meet the needs of this special group, that forms part of the clergy and congregants of the Catholic diocese of Kakamega.

The second was on the lack of awareness on aspect of colors, paintings, symbols and ornaments embraced by the Catholic church in its communication. Third, the findings revealed that the Catholic Church as a non-profit corporate relies on strategic communication and data utility in order to meet the clergy and congregants needs. The study also revealed findings presented by previous studies they were the lack of mainstream media –radio and TV which was attributed to strategically communicating to their audience since these channels had lesser noise (Arasa et al., 2010; Walsh, 2005).

Second, big data awareness and accessibility varied among the respondents of this study this was presented with other scholars such as Zerfass, (2016) especially considering hierarchy/management and staff/superiors and their juniors. Third, big data utility was associated by noise mainly in behavioral and literacy related forms (Tsai et al., 2015). Fourth, the definition of big data remained a challenge to even academicians.

Finally, the channels of communication in any corporate were subject to review, this finding was also present in previous studies and it was seen as an influential factor especially with big data analytics in strategic communication since most corporate used this to re-strategize and make decisions that meet stakeholders needs (Clemons et al., 2014). The value of this study lies in applying big data in strategic communication especially for non-profit corporate in order for them to maximize their data just like profit-based corporations do with respect to stakeholder needs and corporate goals.

CHAPTER FIVE

DISCUSSIONS, CONCLUSIONS, AND RECOMMENDATIONS

Introduction

This chapter comprises of the discussion of key findings that the researcher established from field data in relation to previous studies and the OIT as a theoretical framework.

Discussions of Key Findings

The study was guided by three objectives, namely:

1. Assessing awareness levels of large sets of information flows among the clergy and congregants in the Catholic Diocese of Kakamega.
2. Identifying the accessibility levels of large sets of information flows among clergy and congregants in the Catholic Diocese of Kakamega.
3. Analyzing alternative ways through which large sets of information flows can be communicated among the clergy and congregants in the Catholic Diocese of Kakamega.

To achieve the objectives, the study adopted the descriptive survey design. The researcher did not use the entire population 950,400 that comprised of the Catholics of Kakamega diocese. Instead, a sample of 38 respondents was used for in depth findings of this study to the entire population. Questionnaires, KIIs, 6 FGDs alongside participant observation were used to obtain data from the respondents of this study. Validity and

reliability of the instruments was obtained through pretesting in Bungoma diocese with 20 respondents. This enabled the researcher to restructure questions used in the research tools.

The data obtained from the study was analyzed descriptively and thematically bearing the study's objectives.

The first objective was to assess awareness levels of large sets of information flows among the clergy and congregants in the Catholic Diocese of Kakamega. This study found that the awareness levels varied among the clergy and congregants. This finding was supported by Aversa et al. (2021), Every Action (2018), Memon, (2018), and Weincerz and Rotgger (2017) who asserted that, awareness of big data varied among respondents of their studies.

Findings from this study revealed that indeed the definition of big data remained a challenge to even academicians. Its definition was applicable to the nature of an organization as shown in table 4.11. 'Definition A' was suitable for the Catholic diocese of Kakamega since a lot of communication existed both internally and externally. Tsai et al. (2015) and the European commission's definition were the most suitable and agreed with the definition the researcher allocated. Data flows for religious corporations was characterized by, speed, accuracy, volume, multiple sources, heterogeneity, and noise.

The study's findings also pointed out that big data was at its metamorphosis in the corporate world especially in non-profit religious corporate based on the limited literature that the researcher had. This finding merged with (Lyer, Levine & Reddy, 2016; Boyd and Crawford (2012, p.662) that big data was at its metamorphosis especially in non-profit corporate and the academic wave. The use of this topic in relation to religious non-

profit corporate is the next big revelation for corporations to not only remain relevant but to meet the needs of its members through effective communication. As such; this finding answered the first research question that assessed whether clergy and congregants were aware of large sets of information flows.

With respect to the OIT as a theoretical base for this study, the researcher concurred with its tenet that stated that the theory was applicable to corporations/organizations. The Catholic diocese of Kakamega displayed all attributes of a corporation, it had a legal status in terms of logo, defined jurisdiction and officers who managed it. The researcher concluded that the Catholic diocese of Kakamega is a non-profit corporation that has a lot of existing big data (large sets of information flows). It was a suitable theory since it was applicable to both profit and non-profit organizations. Weick (1996) ascertained that communication was very essential for any organization especially by identifying the awareness of products and services that an organization offers in relation to meeting its consumer's needs.

Based on the literature reviewed, previous studies were in agreement with the fact that the Catholic church as a non-profit corporate had a lot of big data which most of its members were aware of, but at different levels. Mladovisky & Mossialos (2008) opined that communication was used objectively by most corporations to meet goals. Additionally, Mladovisky and Mossialos (2008) linked big data in corporations to awareness by the audiences in reaching the goals set by any corporation.

Kornegray (2015) also agreed that the Church had big data since biblical times, stating that these were displayed throughout Biblical texts such as Genesis 1:1-25. According to the e-book, "*Data and the Church*", proper usage of large sets of

information flows was an important aspect especially in this era. The book acknowledged that religious ministries, just like other organizations or corporates, had a lot of data whose utilization by members and management proved relevant.

Further back up on the Church's large sets of data, was supported by Birch (2018), who concurred with the idea that the church had large sets of information flows and that members were aware at different levels. Data intelligence was key and fully utilizing data, was regarded as the stewardship role that ministry leaders embraced when relating with congregants. The researcher designed a conceptual framework that assessed the awareness of big data in the Catholic diocese of Kakamega the following were intervening factors established from the findings:

Corporate Policy on Communication

The study's finding revealed that the Catholic Church had a defined communication policy just like any other corporate. However, specific big data was more known to management than the congregants for instance, the clergy knew dogma-specific church data compared to congregants, hence, attributing sensitive matters to management. Privatization of data for an ethical reason was found as a factor in strategic communication. This finding concurred with Wiencierz & Rottger (2017), Birch (2018) and the E-book '*Data and the church*' which attributed the handling of information in corporate to management especially that which was considered sensitive.

Stakeholder Behavioral Patterns in Corporate Communication

Accordingly, behavioral patterns play a greater role in consumption of data and communication. The researcher's findings revealed that indeed the behavior of an audience affected communication in corporate as shown in table 4.1. The researcher

established that the youth were not aware of most church-based activities because they failed to actively participate in church. This translated to a direct relationship where lower chances of participation in a particular communication setting were equated to lower chances of communication and awareness about the data.

This finding was similar to that of Zerfass et al. (2016) who pointed out that any information that was analyzed, produced a consistency in the interaction and behavioral patterns of consumers during communication, and affected data utility. The e-book "*Data and the church*" presented the same idea that (American) adults especially the youth (millennial) left the church due to lack of fulfillment and gratification. The researcher concluded that indeed age and behavioral patterns affected data awareness and utilization among the stakeholders of a corporate regardless of whether it was profit/non-profit.

Stakeholders' education and technological levels in corporate communication

The researcher did not prioritize academic qualifications as a basic requirement of selecting the respondents of this study. As shown in table 4.2, researcher only assessed the clergy's qualification because they were the link and key agents of communication between the congregants and the diocese. The findings revealed that anyone who was illiterate academically was also limited to information in written forms regardless of communication platforms used. Previous studies did not indicate that academic qualifications were prioritized when choosing respondents of their studies and neither did they point out that it affected communication.

Technological literacy on the other hand was considered a factor by most scholars. The researcher's findings indicated that data awareness by means of technology remained a challenge in this corporate. Phones were the most embraced communication

devices due to their cost and simplicity of use compared to the other gadgets - laptops and tablets. The researcher established that technology use was not only limited to the skills required in using the platform but also proper internet coverage and data bundles by the user.

This finding was similar to (Weick, 2012, Kornegay, 2015) who pointed out that new ideological concepts were to be introduced and intertwined especially in communication by embracing technology. Digital communication and technology have been strongly linked to big data analytics (Boyd & Crawford, 2012; van Dijck, 2014) this implied that during this digital era embracing technology was one of the most efficient ways of a corporate meeting stakeholder needs.

The researcher established that education and technology levels affected awareness of big data in the Catholic Church and non-profit corporate at large. The researcher determined that having clergy as custodians of church data was effective since they had an in-depth knowledge on matters sacraments and spirituality. This meant that the clergy communicated church data in the most appropriate way and through the right channels. Most studies based on big data and its role in innovation and business related fields but with the existing literature review and its utilization, the researcher established even non-profit corporations have a lot of existing big data which stakeholders are aware of at different levels.

The second objective identified the accessibility levels of large sets of information flows in the Catholic Diocese of Kakamega. Under this objective the researcher established the following:

Findings of this study revealed that big data was accessible in non-profit corporate but the accessibility levels differed. This finding was also presented by Every Action (2018) and Memon (2018) who pointed out that the different departments that constituted a corporate displayed different accessibility levels. The European survey also pointed out that although corporate knew benefits of big data only 21.2 % acknowledged that they accessed it.

The Catholic diocese of Kakamega had large sets of information in the form of texts, audio, videos, audio-visuals, symbols, ornaments, graphics, colors, and paintings from a variety of sources that were retrieved through diverse avenues, channels, and structures as shown in tables 4.11, 4.12 and 4.13. Big data in form of texts and word of mouth was not unique to this case but was also presented by (Arasa et al., 2010; Walsh, 2005) who argued that the church had big data in form of word of mouth and print. Several studies (Arthur, 2013; Gartner, 2012; Swanson, 2018) also suggested that the church relied on social networks in data dissemination.

The findings also showed that data uptake was highly connected to preferential channels of dissemination due to noise. This finding was supported by (Weick, 2012) who posited that information flows in an organization using the right steps achieved its intended purpose, while acknowledging that using too many channels distorted and filtered information.

Findings of this study answered research question two that sought to establish how often the clergy and congregants accessed large sets of information flows. Findings from this study implied accessibility of data in non-profit corporate varied among its

members with the clergy accessing data more frequently through more channels than congregants as shown in Table 4.15

OIT was an effective theoretical base for this study based on its tenets that stated: Effective management required effective communication and the channels used to disseminate information went through noise (distortion, filtration and vagueness.) This was also the case for the Catholic diocese of Kakamega especially in relation to delivery of information from the sender to the intended audience.

The Catholic Diocese as a Non-Profit Organization

Due to its metropolitan nature, packaging and delivery of information was a big challenge especially since Catholic audiences were diverse. In the Catholic Church, information went through a lot of channels before reaching the intended public's (clergy and congregants). As such, noise interfered with the original message. This finding merged with the following scholars who presented noise as factors in data dissemination (Avgerou, 2002, Alan,2000, Weick ,1969) who also addressed noise as a challenge in organizations.

Underutilization of available data was highlighted in organizations through noise that manifested between the sender and receiver of a given message by taking into account that the message either failed to achieve its intended purpose or was not consumed at all this also merged with Weick (1996) who objectified that perception determined intake of data.

Findings of this study revealed that clergy and congregants in the Catholic diocese of Kakamega preferred combining word of mouth, publications and social media as supplementary methods of getting the same church data. This implied that using a

multimedia approach in data access and dissemination was very effective. As such, the researcher agreed with (Arthur, 2013; Fuller 2017; Gartner, 2012; Swanson, 2018; Wiencierz & Rotteger, 2017) that merging oral and social networks as major ways of communicating data in corporate effectively. This alternatively meant that relying on one source of church data unless it was the clergy and or credible leaders was not an effective means of communicating church data. The suitability of OIT as a theoretical base for this study was backed up by its nature of ensuring effective management, was achieved through effective communication and that the channels used in communicating a given message went through little/no noise.

Literature reviewed considered the church as a non-profit corporation with a lot of accessible data through diverse channels. The E-book '*Data and the church*, 'Kornegay (2015) also supported the concept that non-profit corporations that are religious in nature had diverse sources of data that were accessible at different levels. The article noted that the church had big data from raw and third-party sources, that is, sermons, reports, intake forms whose access and storage was different especially in this technologically advanced times. Stating that different techniques used to analyze data affected the interpretation of the message and its impact on the audience. None of the researchers pointed out the use of graphics, colors, paintings, ornaments, and symbols yet corporate embrace them in their communication patterns.

The researcher designed a conceptual framework on accessibility of big data in the Catholic diocese of Kakamega whose variables were also presented in the literature review and were addressed by the OIT in relation to information accessibility (acquisition and delivery.) Its variables were as follows:

Channels of Communication in Corporate

Face to Face

Face-face interactions were the most common method of passing and accessing information by both clergy and congregants. The researcher established that attending mass, sermons, prayer requests, meetings and seminars were the most common avenues of obtaining large sets of information flows in the Catholic diocese of Kakamega. This finding merged with (Arasa et al., 2010; Walsh, 2005) Data in the church was mainly communicated by word of mouth. This implied that most corporations invested in face-to-face communication during data dissemination. Birch (2018), the E-book '*Data and the church*' also pointed out that face-face communication was very common in religious nonprofits corporate as channels of data dissemination.

Written

Findings from this study revealed that religious non-profit corporate kept records especially in written form, such as; dogmatic, circulars, newsletters, calendars, the angel magazine, and the diocesan Synod.

Written forms were very popular since they cut across all the social media platforms-most church data were stored in written forms compared to the audios and videos. This finding was also displayed in the literature reviews presented by (Arasa et al., 2010; Walsh, 2005) who identified written forms of communication as being popular in corporations. Birch (2018) also backed up that data in church was accessible in written form (the Bible). The e-book, '*Data and the church*' also presented written data stating that the church used intake forms and other written records.

Social Media Platforms

The use of technology in religious ministries is no longer a question of compromise as observed by the dynamic changes taking place in the world. This research established that the use of social media platforms as an accessible channel of big data was commonly embraced by both the clergy and congregants of the Catholic diocese of Kakamega as shown in Figure 4.2. Previous studies also pointed out that face-face interactions have reduced due to the digital sphere and would definitely bring about changes within corporate communicators (Loebbecke & Picot (2015); Marabelli, 2015).

In reference to literature reviewed by Vecchio et al. (2017), innovation filled the gaps provided by underutilization of big data. Consequently, Kornegay (2015) placed emphasis on the need for religious ministries to embrace technology, to enable them stay relevant, while putting technology to use. Birch (2018) established that church ministers who embraced and employed technology served people better. Tighe (2015) further noted that communication was the core activity of the church especially by embracing the most suitable channels of data dissemination.

From the discussion, the researcher concluded that social media platforms have been embraced by both profit and non-profit corporate in data dissemination and corporations that had incorporated social media platforms were at a better chance of reaching diverse audience at once with reduced noise.

Web-based

This was the most unlikely channel embraced by both clergy and congregants of Kakamega diocese. The only difference between web-based communication and social media platforms was slightly thin, with no respondents mentioning its applicability. The use of web-based communication would require a good mastery of technology as well as

proper internet connection. None of the literature reviewed pointed out web –based communication as an effective channel.

DAYSTAR UNIVERSITY

Noise (filtration, distortion, vagueness)

Findings derived from the field data implied that the channels and sources of data were only utilized depending on an individual's perception of how credible they were. This finding was like that of Weick (1996) that highlighted data utility and communication in most corporations as affected by perception and preferences. This finding merged with Buyya et al. (2016) Every Action (2018) and the European monitor (2016) where big data was a communication problem in most corporations because it was not utilized. All these studies proved that although non-profit corporate knew the importance of big data, they did not apply or venture into its analytics. Selectively using information in an organization proved ineffective especially, therefore, in achieving organization's goal (Weick, 1969). The researcher concluded that data utility in corporations was affected by frequency of access and other forms of noise as shown in table 4.16. Previous studies also noted that human behavior and literacy-related factors were key in determining how and what data was consumed by a particular audience.

Schoeneborn (2011) also pointed out that communicating wrong information in an organization was a great barrier to communication. The same ideology was presented by (Weick, 2012; Weick 2015) stating that presentation of a message was dependent on the kind of information. This was in line with the researcher's finding that information delivery and utility was dependent on presentation where most respondents confirmed that communication was hindered due to presentation. This implied that even church data that was formal in nature had noise and it was subject to a lot of verification before use.

Findings also revealed that data intake among both the clergy and congregants of the Catholic diocese of Kakamega were at a preferential level as shown in figure 4.3.

This implied that in order for data to be utilized, the clergy and congregants focused on a variety of factors. Ruesch and Bateson (2008), noted that, communication has become a social condition of exchanging information by speaking, writing, or using other medium also cite effective communication as an essential for corporations.

These findings were also attributed to the OIT theory and its tenet that understanding an audience helped management cater for them efficiently by using channels that had less noise. Understanding the audience in relation to the intended message varied from the type of audience and how the sender packaged and delivered it so that it fulfilled the intended purpose. In relation to previous studies the researcher established that big data utility is crucial for strategic communication considering creation, adoption and distribution of content (Weiner & Kochhar, 2016).

According to the e-book "*Data and the church*" delivering messages through the correct channels was pointed out as a crucial means of ensuring church data was property utilized especially by considering the motivating/demotivating factors in relation to what congregants were affiliated to and choosing the correct indicators as determining factors to a message fulfilling its intended purpose .Kornegay (2015) also evaluated that the interpretation and use of data is based on the ethical concerns of an audience.

Vecchio et al. (2017) and Ndambo (2016) also arrived at the same conclusion citing consumer satisfaction through effective communication is a booster in the corporate world. Birch (2018) presented the same idea attributing the insufficiencies brought about by the church's strategies in reaching to the congregants.

In summary religious corporations had a lot of accessible data which was passed through a lot of channels before getting to the intended publics just like any other

organization; The church's message was challenged by noise (distortion, filtration and vagueness) during delivery thus hindering utilization supported by (Zerfass et al., 2016) that those insufficient communication skills by practitioners especially managers led to a failure in the proper utilization the large sets of information whether incoming or outgoing The researcher through objective 2 was able to identify the main noise in dissemination of big data in the Catholic diocese of Kakamega.

Discussion of objective 3: Analyzing the alternative ways that the Catholic Church can communicate big data; CDKK

The third objective analyzed the alternative ways through which large sets of information flows could be better communicated in the Catholic Diocese of Kakamega. The findings were that the Catholic Church had existing channels of communicating big data that were subject to review through modification, improvisation, and introduction of new channels that supplemented the existing ones as shown in figure 4.4. As such, the researcher established that, review of existing channels of communication in corporations proved fruitful. This finding was supported by Chresbrough (2003) and Feldman (2012) who established that data flows in corporations through proper utilization and effective channels of communication was seen through a firm's profits especially by focusing on big data and its potential to magnify and solve issues especially when communicating in organizations.

This is because the Catholic diocese of Kakamega has more congregants compared to the clergy shown in figure 4.4 and the church registry as well. This implied that although the congregants formed the majority of subscribers in the Catholic diocese of Kakamega data underutilization manifested itself widely amongst them. This finding was also presented by Alam et al. (2015) who noted that some organizations had not

ventured in big data especially when assessing communication strategies and inadvertently, did not understand the benefits' it had to their audiences. For instance, Corporations can use big data to potentially to get competitive advantage over its competitors (Chen et al., 2012; Park, 2014). The researcher established that the Catholic diocese of Kakamega had not ventured into communicating big data through assessing what clergy and congregants needed. This answered the third research question that stated what alternative channels were to be used in communicating church big data.

The suitability of OIT as a theoretical base and its applicability to this research was based on the tenet that the theory aims at reducing noise in dissemination of information from the sender to the receiver by decreasing the level of ambiguity, distortion and vagueness in organizations by communicating what is essential while excluding that which is unclear. The theory also posits ways of communicating large amounts of information effectively and through the right channels. This aligned with the third objective that the researcher presented.

Introduction of a special needs office and augmentation of symbols, paintings, color, ornaments and graphics was unique to this study since no other scholar points it out. Introduction of the church's own mainstream media and modification in the form of educating and training both clergy and congregants on information delivery have been pointed out by WeichertMehner (2017). This was also pointed by other scholars that stakeholders also played a role in determining what trends and changes were more suitable at the time (Clemons et al., 2015; Marabelli, 2015).

This study finding concurred with Vecchio et al. (2017) who argued that it was crucial for an organization to analyze market needs at the time by offering solutions and

strategies that not only favored consumers but also the performance of a corporation. The publication further cited that adjusting organizations goals, strategies and policies were key in gratification towards the unique needs of an audience. Kornegay (2015) concurred with review of existing channels of communicating big data in religious ministries stating that digitizing church activities helped the church to embrace technology with a view of deciphering information to the right audiences.

The conceptual framework presented by the researcher also backed up the concept. The researcher assessed the structures that determined data utilization in the Catholic diocese of Kakamega and presented them in the following discussion:

Communication Structures within Non-profit Corporations Internal/external

Findings revealed that non-profit corporate are characterized by both internal and external communication. This implied that data circulation among all stakeholders in the Catholic diocese of Kakamega was not limited to its internal structure. The Catholic Church for example is a universal entity with its central point being the Vatican in Rome (Italy.) –this external environment formed part of its constitution especially in making major policies and decisions. Internal communication was seen throughout the interactions of both clergy and congregants in church-based activities. This finding was also in previous studies WeichertMehner (2017) opined that this data circulation enables companies to evaluate risks and strengths in relation to both the internal/external environment. (Ndambo 2018; Velcchio et al., 2017) also cited that analyzing big data helped beat competitors (who formed part of the external world. Birch (2018) introduced

Gloo technology that was supposed to assess not only members of Matt's church but any other religious ministries with respect to big data utilization.

OIT as a theoretical base favored communication both internally and externally in organizations.

Formal

Findings revealed that Catholic diocese of Kakamega embraced downward, upward and horizontal structures in communicating church big data. The clergy and congregants embraced downward communication especially if the data originated from the diocese it reached the congregants through the clergy who passed it to church leaders and finally congregants such information was considered legit as shown in figure 4.4. This finding was supported by Weber (1930) who posits that management is attributed to legitimacy and that hierarchy forms part of all organizations.

The findings also revealed that upward communication was embraced by both clergy and congregants of this study especially when issues arose from congregants and had to be addressed by the clergy this was possible through small Christian community leaders or on exceptional cases the congregant would address this issue themselves. The same finding was associated with the clergy when communicating with their superiors on collections, transfers and sensitive matters. Previous studies also pointed out that upward communication was common in organizations due to its nature of allowing all (subordinates) to participate in decision making (Hirokawa, 1994).

Findings also revealed that horizontal communication constituted of the Catholic diocese of Kakamega as non-profit corporate. This is shown in figure 4.1 and table 4.1

which presented the respondents demographics and that the church devotional groups were formed on the basis of members who had similar attributes i.e. age and gender. Previous studies also established that horizontal communication is characterized by members of the same rank Massie (1960).

Findings also revealed that the Catholic diocese of Kakamega embraced diagonal communication especially during sermons, the same was also observed when data was uploaded on the church's social media platforms no particular order was used in accessing and being aware of this data. This finding was also present in previous studies by Birch (2018), who cited that employing Gloop technology was the most effective way of serving and assessing congregant's growth at different levels. Kornegay (2015) and Every Action (2018) also pointed out that data awareness and access was not limited because technological advancements eased the storage and accessibility patterns.

Informal

Findings of this study revealed that clergy and congregants also embraced informal structures of communication, but they did not rely on them as credible sources of church data as shown by table 4.11 and figure 4.3. Grapevine was the most common in this context especially among the congregants. Previous studies also indicated that informal communication is common in organizations Mishra (1990). This form of communication is common among stakeholders who have lower positions or are in the middle ranks (Davis, 1969).

In summary, communication networks affect data utility in non-profit corporate. All structures are useful in the data utility process.

Conclusion

The study based its primary objective on assessing the alternative ways that the Catholic Church can communicate big data to clergy and congregants. The researcher concluded that big data and communication were intertwined in most corporations since both rely on daily interactions and behavior of members in a corporation. The researcher concluded that communication of large sets of information was entirely dependent on the nature of the interaction at hand in most corporations.

The researcher's findings enriched literature on big data in corporations from the communication perspective especially in religious corporations by addressing the gaps that existed in the communication of big data in CDKK. The researcher established that the Catholic Church has large sets of information that flow through basic interactions among the clergy and congregants of CDKK. The researcher concluded that the definition of big data remained a challenge to most academicians as established from the findings of this study. As such, the definition of big data and its application was in relation to the nature of organization at hand.

The Catholic diocese of Kakamega as a non-profit religious corporation had a lot of existing big data that was stored in a variety of forms and disseminated through a lot of channels. This implied that religious ministries too had big data whose clergy and congregants communicated and were aware of at different levels just like in profit based corporations and not as earlier assumed by most scholars. The researcher also concluded that the Catholic diocese of Kakamega has large sets of information that was constantly communicated to both clergy and congregants in form of texts, audio, videos, graphics and symbols whose level of awareness and access varied this finding was also present in

previous studies. The use of non-verbal aspects especially graphics, paintings and symbols was the least popular with none of the respondents mentioning it yet the church had it not only as a source but also a channel of its big data that it intended to communicate. As such, the researcher concluded that the awareness and accessibility levels of big data was not only an issue of concern in profit-based organizations as earlier thought by scholars but it also cut across non-profit based organizations.

The researcher also established that awareness and accessibility of data in the Catholic diocese of Kakamega was affected by noise; this was also the case from previous studies that were both non-profit and profit based organizations. The researcher established two major types of noise that manifested in data utilization. These were: behavioral and literacy related aspects of clergy and congregants that resulted to data underutilization.

The researcher then established that improvisation and introduction of new concepts to the existing channels of communicating church big data can reduce the noise. Findings from previous studies also pointed out that adapting new strategies and policies helped nonprofit corporate to cater for their members in a more effective manner in relation to big data utilization.

The findings also pointed out that improvising and modifying existing channels of data utility would yield results in non-profit corporate. The Catholic diocese of Kakamega has to venture in special needs especially sign language interpreters, Braille and suitable church designs in order to cater for this group that forms part of the clergy and congregants of the Catholic church. Venturing into the non-verbal aspects that comprise of paintings, ornaments and symbols as sources of church data improved can

improve its utility. The church does not have its own mainstream media incorporating this to the existing channels of communicating data can also reduce noise.

The Organization Information Theory was the most suitable theory for this study. Its applicability to non-profit based organizations helped the researcher achieve the objectives of this study by basing on its key tenets that evolved in efficient and effective data delivery and packaging through reduced channels with reduced noise. The researcher's framework highlighted the variables that affected the utilization of big data in the Catholic diocese of Kakamega. This enabled the researcher to answer the research questions for this study.

The researcher concluded that exploitation of the topic big data from the communication perspective in non-profit religious based organizations was just as relevant as exploiting the topic big data in profit based organizations and not as earlier thought by most scholars.

Financial and time constraints curtailed the researcher. The small sample size was also attributed to the COVID-19 pandemic. In order to ensure that the health of the respondents and the researcher were not affected; the researcher opted to use a small sample size arrived at through purposive sampling techniques.

This study was able to explore a research gap on how the Catholic Church in Kenya communicated big data to her clergy and congregants (Catholic Diocese of Kakamega) this provided an insight on the alternative ways the Catholic diocese of Kakamega could in calculate the new concepts when communicating big data to clergy and congregants in order for clergy and congregants to maximize church data when communicated.

Recommendations

The researcher came up with the following reviews by modifying and introducing the following in the existing channels of communicating big data in the Catholic diocese of Kakamega.

Recommendations from the Study -For Policy /Authority

Due to the dynamics that revolve around communication and the digital (new) media in the country. The Kenya Conference of Catholic Bishops in Kenya and local ordinary of the Catholic diocese of Kakamega are at a better position of utilizing the existing big data by modifying and incorporating the following:

Introduction of a Special Needs Office

The Catholic diocese of Kakamega has never ventured into sign language interpretation as a means of evangelization for clergy and congregants with special needs. Defined by the case study people with special needs exist within the clergy and congregants of Kakamega diocese. This means that the existing data is not utilized due to their unique differences. The physically challenged were left out in the process of evangelization since they lacked assistance.

Considering church designs, the researcher observed that most churches in the Catholic diocese of Kakamega did not design their constructions putting into consideration the physically challenged. Since most church data is stored in recorded form (written) the introduction of Braille will prove helpful in catering for the physically challenged especially the blind.

The researcher recommended that authority sets up offices at the parishes that cater for this group. The researcher also recommended that authority employs sign language experts who are supposed to train both the clergy and congregants from the Catholic diocese of Kakamega so that the problem is solved at all levels. The researcher recommended this in order to cater for all groups in the society.

Educating and Training Clergy and Congregants on Information Packaging and Delivery

This is crucial especially considering the presence of noise that was found to emanate from the packaging and delivery of information as per this study. Knowledge and understanding of audience, in terms of congregant's perceptions and interpretation of church data varied considering that the Catholic Church, has diverse audience. Educating clergy and congregants on the artifacts', ornaments, graphics, and symbols used in the Catholic Church would prove useful in data utility. This study recommends incorporating church colors, ornaments, symbols, and graphics as part of the church's catechism.

Training clergy and congregants through seminars and workshops would equip them with relevant skills required to effectively communicate a given message using the alternative methods cited in this study. This would reduce the noise brought about by using leaders as channels of data delivery.

Mainstream Media

The Catholic diocese of Kakamega mainly exploits social media platforms when reaching clergy and congregants (WhatsApp, Facebook, Twitter, and YouTube). In the event of using mainstream media, it incurs costs and sometimes lacks access due to

bookings associated with broadcast media and their programs. Owning a diocesan local radio and Tv station is associated with reduced noise attributing it to its wide coverage and affordability. The researcher recommends that authority consider this transmitting live masses/announcements thus reaching more people at once and enabling the diocese to evangelize, more so during the Covid-19 pandemic and any other future catastrophe that can alter the church's liturgical patterns.

Recommendations for Further Studies

The researcher only used clergy and congregants from the Catholic Diocese of Kakamega whose religious culture and perceptions are the same. A study with more respondents from diverse cultures will provide a deeper insight. A study including missionaries who form part of the clergy in relation to how the Catholic Church in Kenya can communicate big data to clergy and congregants will be useful.

The study further recommended a similar study with a larger sample size, more dioceses across the country and even across the globe since the Catholic Church is universal. The researcher also recommends that future studies use more time as this researcher was limited by a time frame of three weeks to collect the data.

Impact of Big Data on Social Life Rather than Spiritual Well-Being in Religious Ministries

The researcher focused on big data in relation to the alternative ways it could be communicated among the clergy and congregants of the Catholic diocese of Kakamega. A study that assessed whether big data affected other aspects of clergy and congregant's social life rather than the spiritual life and how it affected one's moral life and reflected on one's wellbeing would better the data utility process.

DAYSTAR UNIVERSITY

Exploration of Big Data in Relation to Bridging the Generational Gap

The researcher's findings indicated that the youth were not actively involved in church activities as established by the demographic factor of age. As such, the researcher concluded that conducting a study that assesses whether venturing into big data by the Catholic Church can bridge the generational gap displayed in this study is likely to address the unique needs of this group in relation to big data and communication.

DAYSTAR UNIVERSITY

REFERENCES

- Alam, J. R., Sajid, A., Talib, R., & Niaz, M. (2014). A review on the role of big data in business. *International Journal of Computer Science and Mobile Computing*, 3(4), 446-453.
- Arasa, D., Cantoni, L., & Ruiz, L. A. (2010). Religious internet communication: Facts, experiences, and trends in the Catholic Church. *Religious Internet Communication*, 1(3)1-250.
- Arthur, L. (2013). *Big data marketing: Engage your customers more effectively and drive value*. Hoboken, NJ: John Wiley & Sons.
- Ary (2010). *Introduction to research in education*. Scarborough, ON: Nelson Education.
- Ary, D., Jacobs, L. C., Irvine, C. K. S., & Walker, D. (2018). *Introduction to research in education*. Boston, MA: Cengage Learning.
- Aversa, J., Hernandez, T., & Doherty, S. (2021). Incorporating big data within retail organizations: A case study approach. *Journal of Retailing and Consumer Services*, 60(1). doi: <https://doi.org/10.1016/j.jretconser.2021.102447>.
- Avgerou, C. (2002) *Information systems and global diversity*. Oxford, UK: Oxford University.
- Baker-Ward, L., & Willoughby, M. T. (2013). *Undefined by big data; A survey of big data*. Retrieved from <https://www.semanticscholar.org/paper/Undefined-By-Data%3A-A-Survey-of-Big-Data-Definitions-Ward-Barker/5a47e047d4d41b61204255e1b265d704b7f265f4>
- Big Data (2017). *A revolution that will transform how we live, work, and think*. Retrieved from <https://www.amazon.com/Big-Data-Revolution-Transform-Think/dp/0544227751>
- Bigger Dilemmas: A critical review. *Journal of the Association for Information Science and Technology*, 66(8), 1523-1545.
- Birch (2018). *Big data ministry analytics and your church with Matt Engel* Retrieved from <http://nseminary.com/big-data-ministry-analytics-your-church-with-matt-engel/>.
- Bordens, K. S., & Abbott, B. B. (2002). *Research design and methods: A process approach*. London, UK: McGraw-Hill.

- Boyd, D., & Crawford, K. (2012). Critical questions for big data: Provocations for a cultural, technological, and scholarly phenomenon. *Information, Communication & Society, 15*(5), 662-679.
- Buyya, R., N., & VahidDastjerdi, A. (2016). *Big data: Principles and paradigms*. Amstaerdam, Netherlands: Elsevier.
- Caparros, E., Theriault, M., & Thorn, J. (2004). *Code of canon law annotated*. Montreal, Canada: Wilson & Lafleur.
- Catholic Church & Kenya Episcopal Conference (2008). *A Catholic catechism*. Retrieved from [https://www.amazon.com/CATHOLIC-CATECHISM - Produced –Episcopal –conference/dp/B004IALZU2](https://www.amazon.com/CATHOLIC-CATECHISM-Produced-Episcopal-conference/dp/B004IALZU2).
- Catholic Media Network in Kenya (August 2020). *The Kenya Conference of Catholic Bishops (KCCB)-Commission for Social Communications*. Retrieved from <https://catholicmedia497322637.wordpress.com/>.
- Catholic-Hierchacy (2019). *Its bishops and dioceses, current and past*. Retrieved from <https://doi.org/10.2139/ssrn.2641802> .
- Chandran, E. (2004). *Research methods: A quantitative approach with illustrations from Christian ministries*. Nairobi, Kenya: Daystar University.
- Chen, H., Chiang, R. H., & Storey, V. C. (2012). Business intelligence and analytics: From big data to big impact. *MIS Quarterly, 1165-1188*.
- Chesbrough, H. (2003). *Open Innovation: The new imperative for creating and profiting, from technology*. Boston, USA: Harvard Business School.
- Clemons, E., & Wilson, J. S. (2015). Family preferences concerning online privacy, data mining and targeted ads: Regulatory implications. *Journal of Management Information Systems, 32*(2), 40-70.
- Combs, G. (2017). *Communication: The social matrix of psychiatry*. Oxfordshire, UK: Routledge.
- Communication is the core activity of the Church.” (2015, November 7). *Catholicireland.Net*. Retrieved from <https://www.catholicireland.net/importance-communications-life-church/>
- Cooper, D. R., Schindler, P. S., & Sun, J. (2006). *Business research methods*. New York, NY: McGraw-Hill.
- Coriden, J. A., Green, T. J., & Heintschel, D. E. (1985). *The code of canon law: A text and commentary*. Mahwah, NJ: Paulist Press.

- Davis, K. (1969). Grapevine communication among lower and middle managers. *Personnel Journal*, 48(4), 269-272.
- De Micheli, C., & Stroppa, A. (2016) How open is innovation? *Research Policy*, 39(1), 699-709.
- Del Vecchio, P., Passiante, G., Vitulano, F., & Zampetti, L. (2014). Big data and knowledge-intensive entrepreneurship: trends and opportunities in the tourism sector. *Electronic Journal of Applied Statistical Analysis: Decision Support Systems and Services Evaluation*, 5(1), 12-30.
- Design Integrations (2010). *Research and collaboration: Poggenpohl, Sharon, Sato, Keiichi*. Retrieved <https://www.amazon.com/Design-Integrations-Collaboration-Sharon-Poggenpohl/dp/1841502405>
- Diebold, F. X., Cheng, X., Diebold, S., Foster, D., Halperin, M., Lohr, S., ... & Shin, M. (2012). A Personal Perspective on the Origin (s) and Development of “Big Data”: The Phenomenon, the Term, and the Discipline.
- Ekbia, H., Mattioli, M., Kouper, I., Arave, G., Ghazinejad, A., Bowman, T., ... & Sugimoto, C. R. (2015). Big data, bigger dilemmas: A critical review. *Journal of the Association for Information Science and Technology*, 66(8), 1523-1545.
- Every Action and Hub post (2018). The state of data in The Non-Profit –Sector .PDF document Retrieved from <https://cdn2.hubspot.net/usercontent10.net/hubfs/433841/>
- Fan, W., & Bifet, A. (2013). Mining big data: Current status and forecast to the future. *SIGKDD Explorations*, 14(2), 1-5.
- Feldman, B., Martin, E. M., & Skotnes, T. (2012). Big data in healthcare hype and hope. *Dr. Bonnie*, 360, 122-125. Retrieved from https://www.ghdonline.org/uploads/big-data-in-healthcare_B_Kaplan_2012.pdf
- Fuller, M. (2017). Big data, ethics and religion: New questions from a new science. *Religions*, 8(5), 88.
- Gandomi, A., & Haider, M. (2015). Beyond the hype: Big data concepts, methods, and analytics. *International Journal of Information Management*, 35(2), 137-144.
- Garavelli, A. C., Petruzzelli, A. M., Natalicchio, A., & Vanhaverbeke, W. (2013). Benefiting from markets for ideas—an investigation across different typologies. *International Journal of Innovation Management*, 17(06), 13-16.
- Gartners Special Report. (2013). *Big data, bigger opportunities: Investing in information and analytics*. *gartners-big-data-definition-consists-of-three-parts-not-to-be-confused-with-three-vs/formation management strategy*. Retrieved from <https://www.forbes.com/sites/gartnergroup/2013/03/27/>

- Hanft, J., Iyer, S., Levine, B., & Reddy, A. (2016). Transforming bus service planning using integrated electronic data sources at NYC transit. *Journal of Public Transportation, 19*(2), 89-108.
- Hirokawa, R. Y. (1994) Communication and the managerial function: Some suggestions for organizational communication. *Communication, 8*(1), 83-95.
- Jin, X., Wah, B. W., Cheng, X., & Wang, Y. (2015). Significance and challenges of big data research. *Big Data Research, 2*(2), 59-64.
- Jones, P., & Holmes, D. (2011). *Key concepts in media and communications*. London, UK: Sage.
- Kaisler, S., Armour, F., Espinosa, J. A., & Money, W. (2013). *Big data: Issues and challenges moving forward*. Retrieved from https://www.researchgate.net/publication/261226107_Big_Data_Issues_and_Challenges_Moving_Forward
- Karl E. Weickinrez (1996). *Sense making in organizations*. Retrieved from <https://us.sagepub.com/en-us/nam/sensemaking-in-organizations/book4988>
- Kauper, P. G., & Ellis, S. C. (1973). Religious corporations and the Law, 71 Mich. L. Rev, 1499, 1510. Retrieved from <https://doi.org/10.2307/1287672>
- Kimalu, P. K., & Marimba, K. (2014). *Research methods monitoring and evaluation*. Nairobi, Kenya: Kamumi Enterprises.
- Kitchin, R. (2014). The real-time city? Big data and smart urbanism. *Geo-Journal, 79*(1), 1-14. doi: 10.1007/s10708-013-9516-8.
- Kitchin, R. (2015). *Data-driven, networked urbanism*. Retrieved from <https://www.springer.com/gp/book/9783030173111>
- Kothari C. R. (2008). *Research methodology Methods 7 techniques*. Delhi, India: New Age International Ltd.
- Kothari, C. R. (2004). *Research Methodology: Methods and Techniques* (2nd Ed.). Delhi, India: New Age International.
- Krejci, R. V., & Morgan, D. W., (1970). *Determining sample size for research activities*. Retrieved from https://home.kku.ac.th/sompong/guest_speaker/KrejcieandMorgan_article.pdf
- Labaree, D. F. (2013). A system without a plan: Emergence of an American system of higher education in the twentieth century. *IJHE Bildungsgeschichte–International Journal for the Historiography of Education, 3*(1), 46-58.

- Loebbecke, C., & Picot, A. (2015). Reflections on societal and business model transformation arising from digitization and big data analytics: A research agenda. *The Journal of Strategic Information Systems*, 24(3), 149-157.
- Loebbecke, C., & Picot, A. (2015). Reflections on societal and business model transformation arising from digitization and big data analytics: A research agenda. *The Journal of Strategic Information Systems*, 24(3), 149-157.
- Massie, J. L. (1960). Automatic horizontal communication management. *Journal of the Academy of Management*, 3(1), 87-91.
- Mayer-Schönberger, V., & Cukier, K. (2013). *Big data: A revolution that will transform how we live, work, and think*. Boston, MA: Houghton Mifflin Harcourt.
- Mbwesa, K. J. (2006). *Introduction to management research, a student handbook*. Nairobi, Kenya: Jomo Kenyatta Foundation.
- Mckinskey digital (2017). *Big data the next frontier for innovation*. Retrieved from <https://www.mckinsey.com/business-functions/mckinsey-digital/our-insights/big-data-the-next-frontier-for-innovation>.
- Memon, A. R. (2018). Predatory journals spamming for publications: what should researchers do? *Science and Engineering Ethics*, 24(5), 1617-1639.
- Mishra, J. (1990). Managing the grapevine. *Public Personnel Management*, 19(2), 213-228.
- Mugenda, O., & Mugenda, A. (2003). *Research methods: Quantitative and qualitative methods*. Nairobi, Kenya: Acts, Press.
- Ndambo, D. (2016). *Big data analytics and competitive advantage of commercial banks and insurance companies In Nairobi, Kenya* (Unpublished doctoral dissertation), University of Nairobi, Nairobi, Kenya.
- Ohlhorst, F. J. (2012). *Big data analytics: Turning big data into big money*. Hoboken, NJ: Wiley.
- Ollila, S., & Elmquist, M. (2011). *Policy making and big data*. Retrieved from <https://www.smartdata.how/wpcontent/uploads/2018/06/BigdataforopeninnovationonSMEslargecorporation>.
- Ooms, W., Bell, J., & Kok, R. A. W. (2015). Managing open innovation: Exploring challenges at the interfaces of an open innovation arena. *Creativity and Innovation Management*, 20(2), 273-283.
- Orodho, J. A. (2009). *Writing research proposal and report: A handbook for beginning research*. Nairobi, Kenya: Jomo Kenyatta foundation

- Oso, W. Y., & Onen, D. (2005). *A general guide to writing research proposal and report: A handbook for beginning researchers*. Kisumu, Kenya: Option Press and Publishers.
- Patton, W. (2007). Connecting relational theory and the systems theory framework: Individuals and their systems. *Australian Journal of Career Development*, 16(3), 38-46.
- Provost, F., & Fawcett, T. (2013). *Data science and its relationship to big data and data*. Retrieved from <https://www.liebertpub.com/doi/10.1089/big.2013.1508>
- Robson, C. (2002). *Real world research: A resource for social scientists and practitioner-researchers* (2nd ed.). Oxford, UK: Blackwell Publishers.
- Ruesch, J., & Bateson, G. (2008). *The social matrix of psychiatry*. England, UK: Routledge.
- Rukwaru, M. (2015). *Social research methods: A complete guide*. Santa Monica, CA: Eureka Publishers.
- Saunders, A., Core, L. J., Sutcliffe, C., Lis, J. T., & Ashe, H. L. (2013). Extensive polymerase pausing during *Drosophila* axis patterning enables high-level and pliable transcription. *Genes & Development*, 27(10), 1146-1158.
- Schlenker, B. R., & Weigold, M. F. (1990). Self-consciousness and self-presentation: Being autonomous versus appearing autonomous. *Journal of Personality and Social Psychology*, 59(4), 820.
- Schoenborn, D. (2011). Organization as communication: A Luhmannian perspective. *Management Communication Quarterly*, 25(1), 663-689.
- Secundo, G., Del Vecchio, P., Schiuma, G., & Passiante, G. (2017). Activating entrepreneurial learning processes for transforming university students' idea into entrepreneurial practices. *International Journal of Entrepreneurial Behavior & Research*, 23(1), 465-485.
- Secundo, G., Dumay, J., Schiuma, G., & Passiante, G. (2016). Managing intellectual capital through a collective intelligence approach: An integrated framework for universities. *Journal of Intellectual Capital*, 3(1), 65-85.
- Selamat, M. H., Wahab, M. S. A., & Samsudin, M. A. M. (2007). Developing organizations through developing individuals: Malaysian case study. *Asian Social Science*, 4(1), 51. Retrieved from https://www.researchgate.net/publication/41846432_Developing_Organizations_through_Developing_Individuals_Malaysian_Case_Study

- Shields, P. M., & Rangarajan, N. (2013). *A playbook for research methods: Integrating conceptual frameworks and project management*. Stillwater, OK: New Forums Press.
- Stacks W., D. (2011). *Premier of public relations research* (2nd ed.). New York, NY: Guilford Press.
- Swanson, E. (2018). *Big Data and the church: Helping churches do five things amazingly well Leadership*. Retrieved from <https://leadnet.org/big-data-church-helping-churches-five-things-amazingly-well/>
- Tang, V., Choy, K. L., Ho, G. T., Lam, H. Y., & Tsang, Y. P. (2019). An IoMT-based geriatric care management system for achieving smart health in nursing homes. *Industrial Management & Data Systems*, 119(8), 1819–1840. Doi: 10.1108/IMDS-01-2019-0024.
- Van Dijck, J. (2014). Datafication, dataism and dataveillance: Big data between scientific paradigm and ideology. *Surveillance & Society*, 12(2), 197-208.
- Walsh (2015) *Analytics and big data in: Smarter, slicker and more useful - Post on 18-Jul-2015*. Retrieved from <https://fddocuments.in/amp/document/analytics-and-big-data-in-2015>.
- Weber, M. (1930). *The Protestant ethic and the spirit of capitalism*. London, UK: Allen & Unwin.
- WeichertMehner.com (2017). Big data and AI in corporate communications. Real time drives communication with Big Data. Retrieved from <https://www.weichertmehner.com/en/insights/big-data-in-ai-in-corporations> on 02/23/2021.
- Weick, K. (1969). *The social psychology of organizing*. Reading, MA: Addison.
- Weick, K. E. (1995). *Sensemaking in organizations*. Thousand Oaks, CA: Sage.
- Weick, K. E. (2012). *Making sense of the organization, The impermanent organization*. New Jersey, NJ: John Wiley & Sons.
- Weick, K. E. (2015). Ambiguity as the Grasp: The reworking Sense. *Journal of Contingencies and Crisis Management*, 23(2), 117-123.
- Weinberg, B. D., de Ruyter, K Dellarocas, C. Buck, M & Keeling, D. I. (2013). Destination of social business: Exploring an organization journey with social media, collaborative community, and expressive individuality. *Journal of Interactive Marketing*, 27(4), 299-310.
- Weiner, M., & Kochhar, S. (2016). *Irreversible: The public relations big data revolution. IPR Measurement Commission. Recuperado de*. Retrieved from

http://www.instituteforpr.org/wpcontent/uploads/IPR_PR-Big-Data-Revolution_3-29.pdf.

- Wiencierz, C., & Röttger, U. (2017). The use of big data in corporate communication. *Corporate communications: An International Journal*, 22(3), 1-31
- Wiesenberg, M., & Zerfass, A. (2016). Big data and algorithms: Empirical study on the status Quo in Germany and Europe. *PR magazine*, 47(9), 42-47.
- Zerfass, A. (2008). *Corporate communication revisited: Integrating business strategy and strategic communication*. Retrieved from https://link.springer.com/chapter/10.1007/978-3-531-90918-9_5
- Zerfass, A., Verčič, D., & Wiesenberg, M. (2016). Managing CEO communication and positioning: A cross-national study among corporate communication leaders. *Journal of Communication Management*, 20(1), 37-55.

DAYSTAR UNIVERSITY

APPENDICES

Appendix A: Key Information Interview (KII) Guide Instructions

I am a researcher from Daystar University at the post graduate level (Alex Okware Ekodere). Research entitled *“An exploration of alternative ways the Catholic Church in Kenya can communicate big data to clergy and congregants: A study of the Catholic Diocese of Kakamega”*.

The research aims at assessing awareness levels of large sets of information flows among the clergy and congregants in the Catholic Diocese of Kakamega. The Catholic Bishops of Kenya umbrella body as policy makers will be provided with useful information that will show gaps through which big data is not being utilized. Thereby inform the Catholic Bishops in Kenya on evidence based on policy formulation with respect to utilization of big data.

The researcher would appreciate your willingness to participate in the study by filling the KII

The research has received ethical approval from Daystar University Ethics and Review *DU- ERB /10/05/2021/000514* and Government permit from the National Commission for science, Technology and Innovation *NACOSTIREFENCE NUMBER 918698*

Information given in this questionnaire will be treated in confidence. To increase confidentiality, please do not write your name or any information that could identify you in this KII.

We thank you in advance for your willingness to participate in this research

Conducted through the research assistant

Instructions

Your availability is highly appreciated.

This study focuses on answering the objective questions to the alternative ways the Catholic Church will communicate her big data to her clergy and congregants.

All information is consensual. Anonymity while recording the information was guaranteed and all views are accepted.

The KII Participation Number and Gender will be recorded. The following questions are to be answered.

1. Are there large sets of information flows in the Catholic Diocese of Kakamega (Yes or No)?
2. What kind of information flow?
3. How accessible are the large sets of information flows?
4. What kind of large sets of information flows in the Catholic Diocese of Kakamega.
5. What instruments are used to access larges sets of information flows and
6. In what form do large sets of information flow in the Catholic Church?
7. Do your fellow congregants access large sets of information flows in the Catholic Church?
8. Does the flow of large sets of information affect your participation in church?
9. In which way does it affect you?
10. Do you think that the channels through which the large flows of data reach you should be reviewed?

11. What do you think are the benefits of large sets of information flow in the Catholic Diocese of Kakamega?

12. Would you recommend the Catholic Church to explore alternative ways of communicating her large sets of information flows to clergy and congregants?

Thank you for your Time

Research)

(June 2021 Month of

DAYSTAR UNIVERSITY

Appendix B: Questionnaire on Large Sets of Information Flows

Dear participant,

This questionnaire seeks to explore alternative ways that the Catholic church in Kenya can communicate big data to clergy and congregants: A study of the catholic diocese of Kakamega. Your parish is among those randomly selected for this research, and I hereby request for your participation.

Your responses will be treated with confidentiality.

Answer the questions below:

Do not write your name or that of your Parish anywhere on this questionnaire.

The questionnaire has Six sections;

Section I seek for Social -demographic factors,

Section II will seek find out proportions of Catholic clergy and congregants who are aware of large sets of information flows in the Catholic Diocese of Kakamega,

Section III will seek Clergy and congregants, who access large sets of information flows in the Catholic Diocese of Kakamega,

Section IV will find out ways large sets of information flows are communicated in the Catholic Diocese of Kakamega.

Section V will seek to identify large sets of information flow that is available in Catholic Diocese of Kakamega.

Section VI will address the challenges and solutions of large sets of information flows usage by the Catholic Church.

I am a researcher from Daystar University at the post graduate level (Alex OkwareEkodere). A research entitled *“An exploration of alternative ways the Catholic Church in Kenya can communicate big data to clergy and congregants: A study of the Catholic Diocese of Kakamega”*.

The research aims at assessing awareness levels of large sets of information flows among the clergy and congregants in the Catholic Diocese of Kakamega. The Catholic Bishops of Kenya umbrella body as policy makers will be provided with useful information that will show gaps through which big data is not being utilized. Thereby inform the Catholic Bishops in Kenya on evidence based on policy formulation with respect to utilization of big data.

The researcher would appreciate your willingness to participate in the study by filling the questionnaire.

The research has received ethical approval from Daystar University Ethics and Review *DU- ERB /10/05/2021/000514* and Government permit from the National Commission for science, Technology and Innovation *NACOSTI REFERENCE NUMBER 918698*

Information given in this questionnaire will be treated in confidence. To increase confidentiality, please do not write your name or any information that could identify you in this questionnaire.

We thank you in advance for your willingness to participate in this research

Questionnaire Number.....Study ID.....

Date.....

SECTION I: SOCIAL -DEMOGRAPHIC FACTORS

These questions are about you: respond by marking the appropriate box with a tick or x.

They contain both closed ended and Open-ended questions

1. What is your gender?

* Female * male * transgender

2. What is your age?

a) Over 55 b) 40-49 c) 30-39 d) 25-29 e) below 24

3. What is your level of education?

- a) None?
- b) Certificate
- c) Diploma
- d) Degree
- e) Post graduate diploma
- f) Masters
- g) Doctorate

5. Have you ever heard of large sets?

Of information flows

1. Yes 2 No

6. If yes, where did you hear from

A. Media

B. Religious space

C. Friend

D. Other

7. How many times do you access large sets of information flows in the Catholic Church and through which instrument?

Once Twice Thrice More None
□□□□□

SECTION II: PROPORTIONS OF CLERGY AND CONGREGANTS WHO ARE AWARE OF LARGE SETS OF INFORMATION FLOWS IN THE CATHOLIC DIOCESE OF KAKAMEGA,

This section consists of statements clergy and congregants understanding big data

9. Are you aware of large sets of information flows in the Catholic Church?

Yes

No . If no, why?

..... (Optional)

10. If yes to Q9 (above), which large sets of information flows are you aware of?

.....

11. What does the phrase 'large sets of information flow' mean?

A=A continuous and ever-increasing flow of information from individuals to an organization via multiple sources that can't be processed by traditional means.

B=large amount of information flowing to an organization from a variety of sources.

C=Don't know

D=Other

12. How accessible are the large sets of information flows?

A= Anytime Clergy and Congregants attend masses

B=Small Christian community meetings

C=Diocesan communications office

D=Don't know

E=Other

13. Do most congregants access large sets of information flows in the Catholic Church and by what means?

SECTION III: CATHOLICS CLERGY AND CONGREGANTS WHO ACCESS LARGE SETS OF INFORMATION FLOWS IN THE CATHOLIC DIOCESE OF KAKAMEGA

By degree of variance - scale questions answer appropriately

This section consists of statements with a scale in the grid varying from "Strongly Agree" to "Strongly Disagree". It is about Catholic congregants who access large sets of information flows in the Catholic Church?

June 2021 (Month of Research)

14. To what degree would you say that the Catholic church has large sets of information flows?

<i>Statement on large sets</i>	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
A) The Catholic Church has large sets of information flows.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
B) The Catholic Church has large sets of information flows in form of texts, audio and videos.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
C) There is an accessibility of large sets of information flow by clergy and congregants.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

D) There are preferences on the Catholic large sets of information flows uptake.

E) Clergy determines what type of large sets of information flows.

SECTION IV: WHAT CHANNELS ARE USED FOR THE FLOW OF LARGE SETS OF INFORMATION IN THE CATHOLIC DIOCESE OF KAKAMEGA

14. What ways is large sets of information flows communicated in the Catholic Church?

- A) Word of mouth
- B) Print publications
- C) Social media
- D) Don't know
- E) other _____

June 2021 (Month of

Research)

SECTION V: WHAT ARE THE LARGE SETS OF INFORMATION FLOWS THAT IS AVAILABLE IN THE CATHOLIC DIOCESE OF KAKAMEGA

Suggest some of the challenges for the large sets of information flows usage by the Catholic Church?

1.
2.
3.
4.

- 5.
.....
- 6.
.....
- 7.
.....
- 8.
.....
- 9.
.....
- 10.
.....

Thank you for your participation

DAYSTAR UNIVERSITY

Appendix C: Observation Schedule

Participant observation acted as a supplementary research tool in obtaining information about the flow of big data in the diocese. The researcher retrieved data from respondents through taking part in meetings, events and attending mass. The researcher focused on the non-verbal aspects of communication in retrieving the data. The researcher created an observation schedule showing the activities the respondents and researcher took part in.

Background

Participant observation proved to be significant in retrieving information that informants hid or did not reveal through the other research tools. Some opportunities that proved observation to be a favorable research tool were aspects of data awareness and accessibility in relation to the sources, channels and structures of communication that were embraced in the Catholic diocese of Kakamega.

The following aspects were observed in relation to big data utility:

- (a) Verbal-the usage of words while delivering a message to intended group.
- (b) Written-documents, letters, chats, intake forms, reports, short messages and anything conveyed in written symbols.
- (c) Social media platforms' embraced by clergy and congregants.
- (d) Oral- varies from video calls to face communication, informal - grapevine, conferences, workshops, retreats, recollections and lectures.
- (e) Nonverbal-Intonation, tone and voice quality
- (f) Visual communication –paintings, graphics and symbols.

- (g) Appearance-grooming style
- (h) Space language-with respect to rankings and structures embraced by clergy and congregants.

The availability of participants and the type of activities were easily recorded

Summary of the Observation table

The researcher evaluated that the clergy adhered to the liturgical calendar in terms of their vestments and church ornaments but they did not use the church's graphics and symbols as sources of data awareness or access. All congregants also displayed lack of knowledge towards the colors used in the liturgy for paintings, graphics and symbols. For example, the Legionaries were mainly in charge of arranging the altar they were aware of the different colors to use because of a shift in the liturgical calendar but they did not display any knowledge as to why the specific colors were used in relation to communication. The same aspect was observed at Lutonyi with regards to their painted church. The researcher also noticed that none of the respondents embraced the church symbols as sources of data awareness and acquisition except for that of the sign of the cross and that of Blessed Virgin Mary-for legionaries during any church related activities yet each parish had its patron saint most parishes did not even have the statues. The researcher also established that most parishes had different colors for their gates-but they were within the liturgical colors which had written programs and orders of mass. The researcher also observed that the use of gestures in the Catholic Church was very common especially in relation to the liturgical patterns this cut across all respondents and

that catechism classes laid the foundation so were the different recitation patterns of the Gospel and responsorial Psalm.

The researcher also established that the clergy rarely attended the devotional and small Christian meetings. Congregants held their meetings at least once a week which were characterized by both formal and informal interactions. Internal communication was therefore dominant compared to external communication. The horizontal structure was the most embraced by both clergy and congregants and was used to construct most of the devotional groups in the Catholic Church. Diagonal communication was mainly embraced during sermons. The most common language used was Kiswahili due to the mixed audience this proved a challenge for the elderly congregants. The same problem was observed in the church's publications. The researcher also established that although most congregants had phones they were not used to access and retrieve church data. Space as a form of non-verbal communication was very dominant in the Catholic Church especially interactions that included both clergy and congregants. Congregants were not allowed to enter some parts of the church unless they were authorized-sacristy, the alter was used by the clergy and mass servers only during mass. Most of the activities that the researcher observed among the specific parishes cut across all parishes in the diocese.

Date	Activity	Place	Observation
15 th June			

/day

Tuesday	Formal / informal structures of communication and aesthetics (paintings, graphics and symbols)	Lutonyi parish	The researcher focused on face-face communication since it was the most commonly embraced method by the clergy and congregants of Lutonyi. Sermons, church announcements and meetings-devotional and small Christian meetings were held within these structures. The researcher established that the most common way of creating awareness and accessing church data was through attending mass and participating in church activities. It was also evident that most interactions between clergy and congregants were on a formal basis. Church data was mainly conveyed by word of mouth and translated from the language that the content was (Kiswahili) to
---------	--	----------------	---

mother tongue. The use of written materials was also common in the form of intake forms, church announcements, print outs for daily mass, budget, there was also the order of mass and other church programs at the church's entrance. Phones were the most embraced instrument in accessing and creation of data awareness in Lutonyi parish after church announcements from mass attendance. The researcher established Lutonyi had WhatsApp as their social media platform of official church communication. On the other hand the informal communication was embraced at minimal levels amongst the clergy and congregants but was the most popular amongst interactions that comprised of congregants only. As a result, grapevine (gossip) surfaced

as the most common informal structure of communication. The researcher observed that information was underutilized unless it was from either the clergy or very few leaders who were considered credible for it to be acted upon. The researcher observed that although verbal/oral was the most effective method a lot of information was filtered due to many channels and disparity in interpretation of the large sets of information since leaders sent to meetings or seminars would be the ones informing the congregants and the information would be relayed according to an individual's priorities for example the

Bishop's letter to all congregants most clergy and church leaders relayed a summary in the form of

greetings instead of addressing what the letters content had.

The researcher observed that the consumption and accessibility of written material was poor. Most congregants didn't carry Bibles. Letters and books were translated and transmitted orally. For example the CJPC manual that was used to train congregants on social justice - were only available in English and very few in numbers - 1 per parish. Due to this it was hard for all people to access the actual copies and had to rely only on what the leader told them. Language barrier also presented itself as an issue when translating the information. The print outs on readings which were mostly in Swahili didn't favor the illiterate as well as economic-related reasons and very few

congregants bought them this meant that data was underutilized.

In relation to aesthetics the researcher established that most congregants were not aware that the use of colors-apart from vestment and church liturgy was a form of communication. None of the respondents associated liturgical colors with communication they embraced it as a form of decoration.

Friday	Use of gestures	Mutoma,Eshisiru	The researcher observed the use of the most common form of gestures embraced by the Catholic church. This were the sign of the cross, kneeling, bowing and gestures that accompanied by songs (praise). The researcher established that those respondents who frequently attended mass had adjusted to the
18 th June	Tone, Intonation and artifacts.	parishes	

new liturgical patterns since most of the time the church adjusts its patterns depending with the church calendar. The researcher observed a consistency in the patterns embraced by the Catholic church in the use of body language for example the sign of the cross was an example of the most common signs which congregants used but had little to no knowledge of its origin.

Paralanguage was also seen in reciting most parts of the mass. Different occasions required different ways of putting across the message.

The use of artifacts originally applied to the clergy but in the recent years all groups had developments and almost each group had a common uniform -.

The clergy's vestments were tailored to specific parts of the liturgical calendar and so did the color yet congregants didn't understand the origin and the reason why specific colors were used yet data explaining all this exists and is not utilized during catechism classes.

The use of paintings and color was often underestimated by both the clergy and congregants due to ignorance most of them failed to realize that colors were used as part of communication.

Friday Horizontal Shibuye
18th June /diagonal ;Internal
structures

Meetings, retreats, conferences ranging from the small Christian communities to the bishops' meetings were the most common conventional avenues of data awareness and access. The researcher established that the

Catholic diocese of Kakamega embraced the horizontal structure to create most of its devotional groups. All devotional groups were formed on the basis of members who had similar traits .Most of them were gender based except for the YCAs and PCAs that comprised of congregants from both genders. The researcher observed that horizontal communication was an effective channel of interaction especially when one needed feedback. The researcher observed that this structure cut across and applied to the social media platforms. Parish walls were formed on this structure among both clergy and congregants.

Diagonal communication was the most common during sermons .Accessing and creating awareness

about church data on social media platforms once a message was published/uploaded there was no hierarchy in accessing it.

Internal communication originated from the bishop through the communication office either through the use of letters, newsletters which set up deanery meetings or congregational meetings through the clergy. There was a lot of internal communication displayed through interactions that involved incoming and outgoing messages within the clergy and congregants of this diocese.

Saturday 19th June Downward and Eregi upward ;external Cathedral structures parishes and The researcher observed that most data access and awareness was based on hierarchy and church policy. The researcher observed that the downward structure was the

most embraced with information from the diocese flowing from the bishop to the clergy through the diocesan communications office then to the congregants. The researcher observed that this was also the case at parish level. The clergy exploited small Christian community and parish council leaders in data delivery to all congregants. This channel proved to be ineffective. The researcher assessed the financial contributions at the parishes and there were variances. The same pattern was also observed at the Cathedral during the YCS mass. This attribute cut across all church programs. As such, the researcher realized that using too many leaders in data delivery was what led to the variances.

Upward communication was mostly embraced by congregants when communicating to the clergy through their leaders'. This was also the case for clergy members. This was also seen when clergy members interacted with clergy when they attended the small Christian community meetings and seminars. This structure was attributed to feedback since these interactions addressed challenges that congregants faced.

The researcher also observed that external structures of communication were only limited to the consulate of the local ordinary. Clergy and congregants displayed insufficient relations with the external structure they only implemented themes set for church events for e.g. the Lenten campaign

and World Communications Day
themes.

DAYSTAR UNIVERSITY

Appendix D: Consent Form

AN EXPLORATION OF ALTERNATIVE WAYS THAT THE CATHOLIC CHURCH
IN KENYA CAN COMMUNICATE BIG DATA TO CLERGY AND
CONGREGANTS: A STUDY OF THE CATHOLIC DIOCESE OF KAKAMEGA

Informed Consent Form

Daystar University

Nairobi Campus

Dear Sir/Madam,

RE: REQUEST FOR PARTICIPATION IN AN ACADEMIC RESEARCH

I am a Postgraduate student at Daystar University carrying out a research *on the alternative ways of communicating big data to Clergy and congregants within the Catholic Diocese of Kakamega in Kenya.*

I would like you to grant me permission to conduct it. All the information provided in this study will be used for the purpose of this research only, and handled with anonymity and great confidentiality.

The research has received ethical approval from Daystar University Ethics and Review *DU- ERB /10/05/2021/000514* and Government permit from the National Commission for science, Technology and Innovation *NACOSTE REFERENCE 918698*

Thank you in advance.

Yours Sincerely,

.....

Ekodere Alex Okware

Instructions and its purpose.

This study seeks to explore alternative ways that the Catholic Diocese of Kakamega can adopt to effectively communicate to her clergy and congregants by use of the available big data. The study will come up with alternative ways through which policy making can match delivery in the Catholic Church by properly utilizing the available data.

Procedures

By accepting to participate, you will fill questionnaires through the assistance of a researcher. The questions entail your know-how on large sets of information flows. The following aspects will be assessed in the study: The accessibility of large sets of information flows, ways large sets of information flows are communicated in the Catholic Diocese of Kakamega and identification of large sets of information flows that is available in the Catholic Diocese of Kakamega.

Risks

In the course of answering the questions only fill in what makes you comfortable. At no point are you going to be affected physically.

Benefits

The information provided to the investigator will shed light for the Catholic Church to explore alternative ways to communicate her big data to her clergy and congregants. This will assist the Catholic Church Bishops, Diocesan communications offices on how to improve the utilization of large sets of data when effectively administering her clergy and congregants.

June 2021 (Month of Research)

Other Information

Considering all ethical factors all information will be treated with anonymity and confidentiality. The research instruments will only be accessed by the principal investigator whose phone number is 0720811811 or the chair of Ethics, Daystar University.

P.O BOX 44400-00100

RESPONDENTS

As a participant out of my own free-will and having read this form voluntarily want to take part in this research

1. Participant Name

sign

date

Researcher 2021

Name

sign

date

DAYSTAR UNIVERSITY

Appendix E: Focus Group Discussion Guide

Instructions to participants: Verbal and administered before the discussion.

Dear Sir/Madam

I am Alex Okware Ekodere, from the communication department of Daystar University undertaking a postgraduate for the award of a master's degree in strategic and organization communication by conducting a study on exploration of alternative ways that the Catholic Church can communicate Big Data to clergy and congregants within Kakamega Diocese.

Your participation in this study is highly valued study. The focus on the objective questions to answer on how the Catholic Church can explore alternative ways to communicate Big Data to her clergy and congregants. Your experiences and willingness to take part as a congregant are very relevant in assessing the topic. The groups consist of 6-12 people who discuss ideas and present them which are not inclusive of any personal information. It is moderated by the researcher and their assistant sticking to the objective of the study.

Through the consent of participants, the discussion that is expected to last an hour will be recorded. Only respond to what feels comfortable. Your insights will help the catholic church utilize her large sets of data more effectively.

The research has received ethical approval from Daystar University Ethics and Review *DU- ERB /10/05/2021/000514* and Government permit from the National Commission for science, Technology and Innovation *NACOSTIREFENCE NUMBER 918698*

Privacy and confidentiality from the researcher are guaranteed. By all means the identification will be protected and the raw data will be destroyed at the completion of the study.

Other Instructions

Are you willing to participate in this study?

Does anyone require clarity on any aspect of this research?

June 2021 (Month of Research)

GROUP MODERATOR

By signing it certifies your acknowledgment towards willingly participating in this study.

Name of moderator

Signature

date

Instructions

- Role of explaining to the participant that it is a recorded session and the reason for recording. Then offer an open forum for questions or concerns.
- Then the informed consent process
- Climate setting by introducing yourself and the research topic.
- The discussion will utilize the research instruments to retrieve information on knowledge, availability, adequacy and utilization of big data in the Catholic Church clergy and congregants'
- Assess coded names to participants.

Facilitator: “Explains what big data is in the Catholic Church. The Catholic Church has large sets of information flows via social media, word of mouth and publications. Then by referring to the research’s objective. The following questions are to be answered.

1. Are large sets of information flows in the Catholic Diocese of Kakamega (Yes or No)?

What kind of information?

2. How accessible are the large sets of information flows?

3. What instruments are used to access large sets of information flows and

4. In what form do large sets of information flow in the Catholic Church?

5. Who is involved in the dispatch of large sets of information flows in the Catholic Church?

6. Does it pose as a challenge to access the large sets of information?

7. Do congregants access large sets of information flows in the Catholic Church?

8. Does the flow of large sets of information affect your participation in church?

9. In which way does it affect you?

10. Do you think that the channels through which the large flows of data reach you should be reviewed?

11. What do you think are the benefits of large sets of information flow in the Catholic Diocese of Kakamega?

12. Would you recommend the Catholic Church to explore alternative ways of communicating her large sets of information flows to clergy and congregants

As a participant out of free will kindly answer the questions in due honesty.

Position in the Church.....

Age

Thank you for your time.

THE END

DAYSTAR UNIVERSITY

Appendix F: Ethical Clearance

VERDICT: APPROVAL WITH COMMENTS
Daystar University Ethics Review Board

Our Ref: **DU-ERB/10/05/2021/000514**

Date: 10th May 2021

To: Alex Okware Ekodere

Dear Alex,

RE: AN EXPLORATION OF ALTERNATIVE WAYS THAT THE CATHOLIC CHURCH IN KENYA CAN COMMUNICATE BIG DATA TO CLERGY AND CONGREGANTS: A STUDY OF THE CATHOLIC DIOCESE OF KAKAMEGA

Reference is made to your ERB application reference no. 300321-01 dated 30th March 2021 in which you requested for ethical approval of your proposal by Daystar University Ethics Review Board.

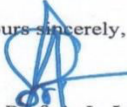
We are pleased to inform you that ethical review has been done and the **verdict is to revise to the satisfaction of your Supervisors before proceeding to the next stage**. As guidance, ensure that the attached comments are addressed. Please be advised that it is an offence to proceed to collect data without addressing the concerns of Ethics Review board. Your application approval number is **DU-ERB-000514**. The approval period for the research is between **10th May 2021 to 9th May 2022** after which the ethical approval lapses. Should you wish to continue with the research after the lapse you will be required to apply for an extension from DU-ERB at half the review charges.

This approval is subject to compliance with the following requirements.


- Only approved documents including (informed consents, study instruments, MTA) will be used.
- All changes including (amendments, deviations, and violations) are submitted for review and approval by Daystar University Ethics Review Board.
- Death and life threatening problems and serious adverse events or unexpected adverse events whether related or unrelated to the study must be reported to Daystar University Ethics Review Board within 72 hours of notification.
- 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 Daystar University Ethics Review Board within 72 hours.
- Clearance for export of biological specimens must be obtained from relevant institutions.
- 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.
- Submission of a signed one page executive summary report and a closure report within 90 days upon completion of the study to Daystar University Ethics Review Board via email [duerb@daystar.ac.ke].

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

Yours sincerely,


Sr. Prof. A. L. Lando PhD
Chair, Daystar University Ethics Review Board

Encl. Review Report

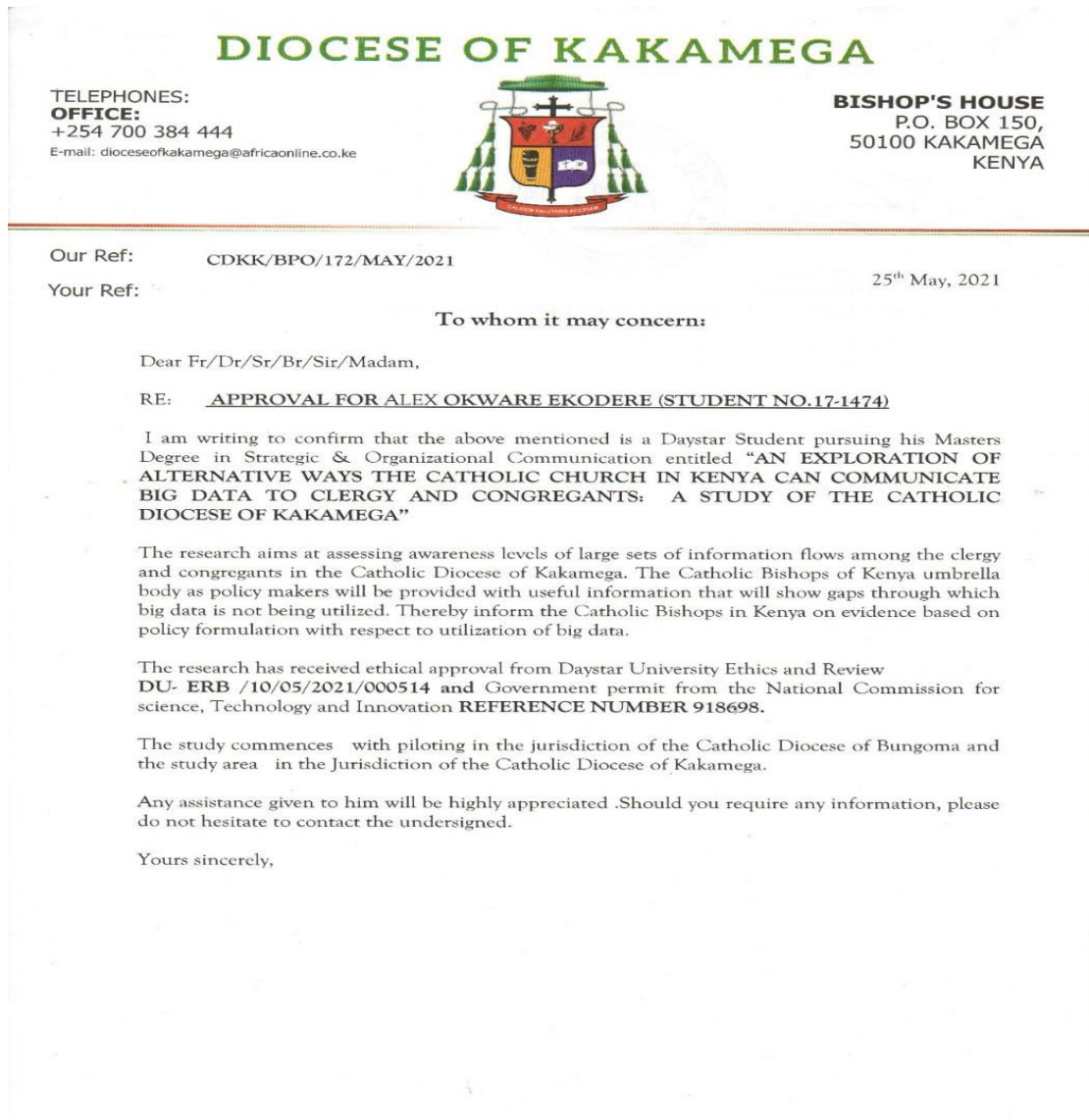

P. O. Box 44400 – 00100,
NAIROBI

PO. Box 44400-00100 Tel: (020) 2723002/3/4 Fax: (020) 2728338 Nairobi or P. O. Box 17-90145 Tel: (045) 22601/2/3 Fax: (045) 22420 Athi River
E-mail: info@daystar.ac.ke Website: www.daystar.ac.ke

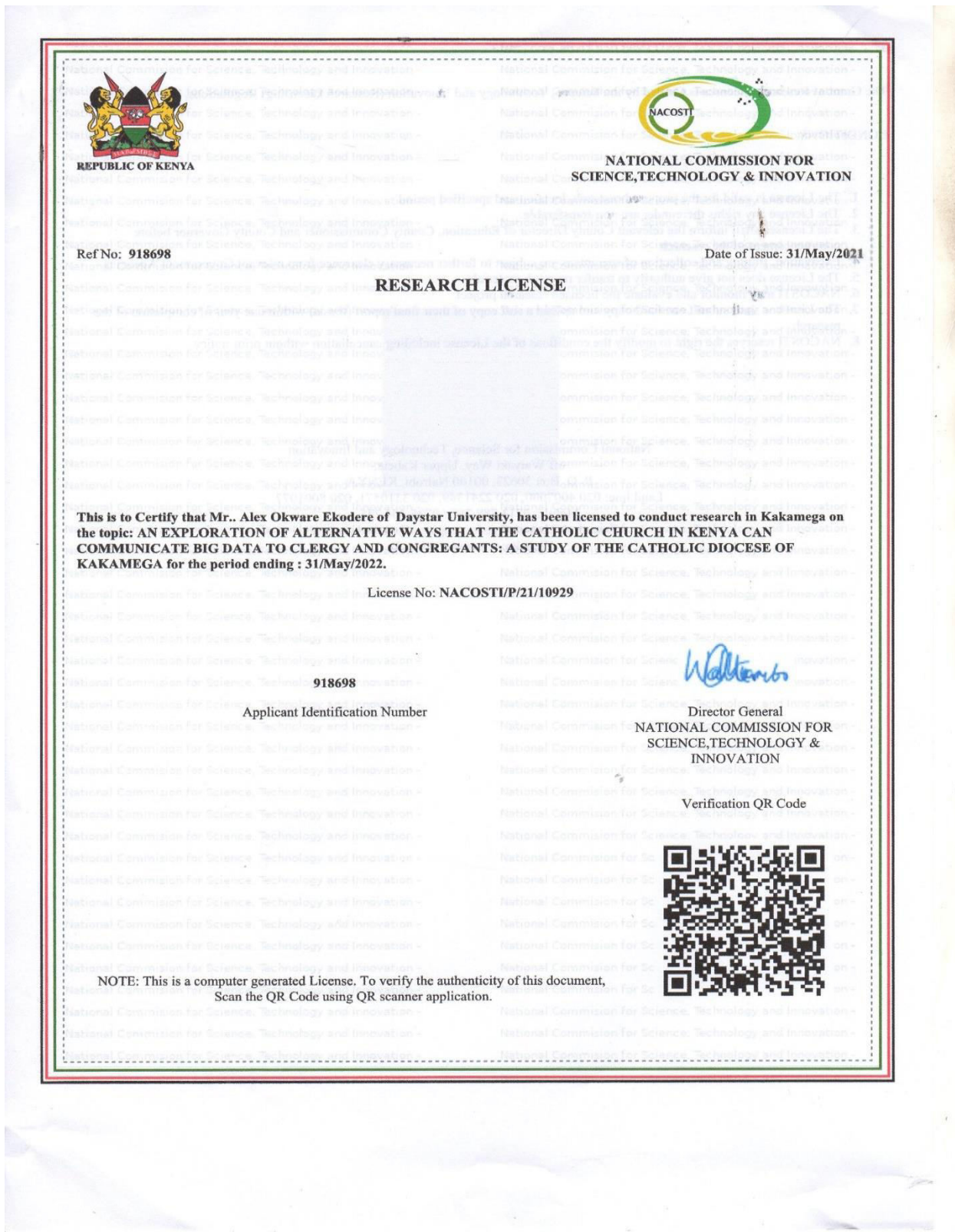
Appendix G: Researcher's Introduction Letter from Daystar University



Appendix H: Approval Letter to Conduct Research



Appendix I: Research Permit



Appendix J: Map of Kakamega Diocese

