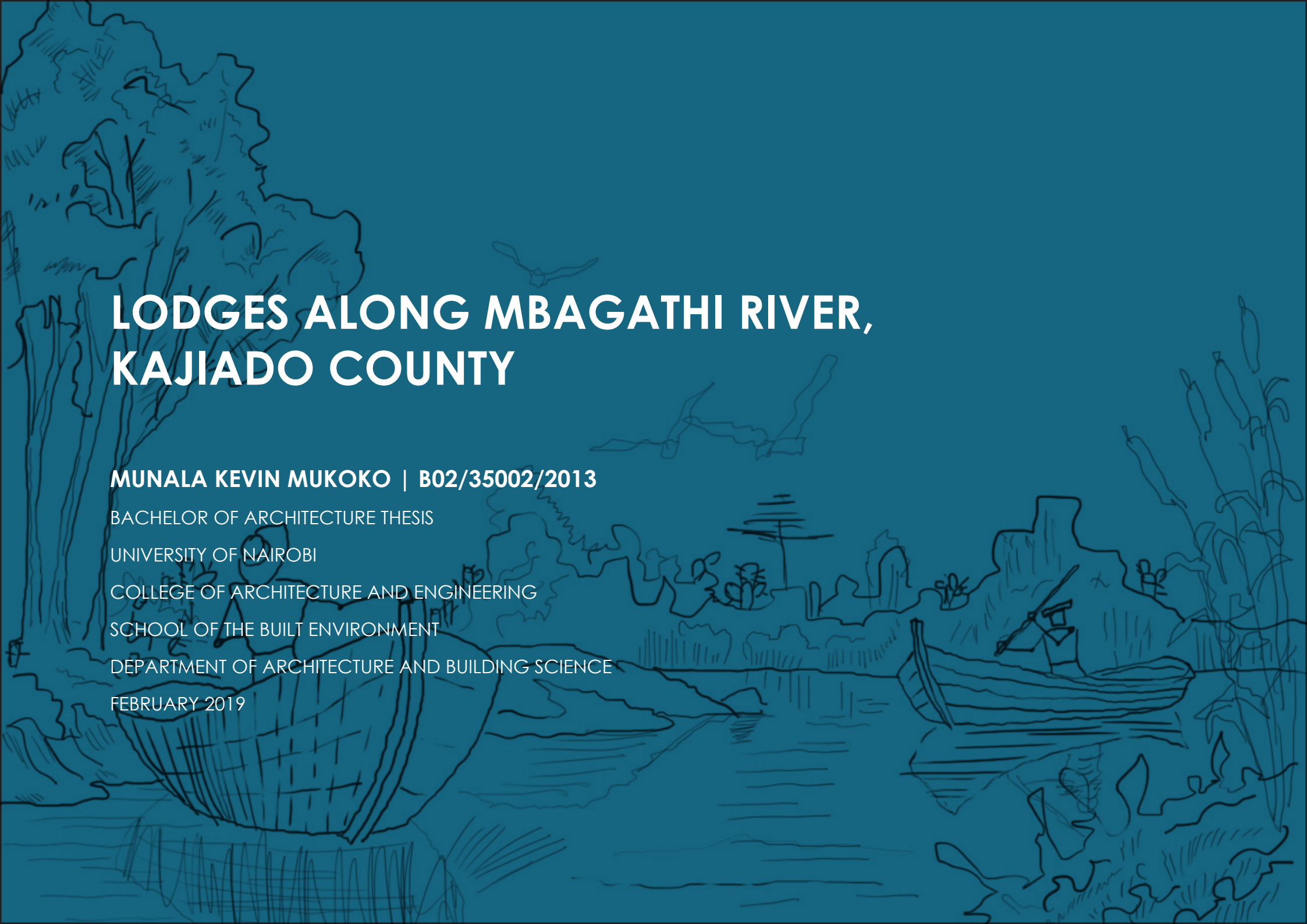

LODGES ALONG MBAGATHI RIVER, KAJIADO COUNTY

MUNALA KEVIN MUKOKO | B02/35002/2013

BACHELOR OF ARCHITECTURE THESIS

UNIVERSITY OF NAIROBI

COLLEGE OF ARCHITECTURE AND ENGINEERING

SCHOOL OF THE BUILT ENVIRONMENT

DEPARTMENT OF ARCHITECTURE AND BUILDING SCIENCE

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Dedication:

To Mum, Dad and my Brother;

Relatives, Friends and Mentors

“Think become, Keep becoming.”

Declaration

This research proposal is my original work and has not been presented for a degree in any other University. This thesis is submitted in partial fulfillment of the examination requirements for the award of the Bachelor of Architecture degree in the Department of Architecture and Building Science at the University of Nairobi.

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This thesis like everything else I have created in my life, is the result of great support. I extend my deepest gratitude and thanks to God and:

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Maasai Lodge

The front desk at Maasai lodge

Osoita lodge

The front desk at Maasai lodge

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Abstract

Even though Kajiado is recognized as a Savannah region, lodges within this context continue to develop in spite of the rising temperatures brought by climate change. Most lodges within this area are celebrated from the online reviews on Trip advisor and other sources however a few challenges on thermal comfort continue to arise as climate continues to change. Publications from Mwangi & Mutua (2015) reveal that a positive slope trend in average monthly minimum temperatures also affects this region as part of the effects of climate change. The study therefore aims to explore the passive design strategies employed in the design of the lodges along River Mbagathi, Kajiado county.

Three questions are asked and discerned with sustainable architecture as the theme. The first and second correspond to establishing the current status of the sampled lodges and appropriate passive design strategies respectively while the third corresponds to the contribution of Mbagathi river to architecture in terms of views and spatial qualities.

An examination of literature from various sources creates a foundation for the study. A brief synopsis of water in arid landscapes sets the scene to narrate the perspective of water in this context. Passive design strategies adopted in sustainable architecture around the world follow with topics relevant to the objectives expounded upon.

A case study method is employed in the research design as per Kothari and Garg (2014). The following parameters were used in undertaking the study: Planning and massing; building form; material and texture; openings and ventilation; and landscaping and ventilation . Recommendations are then proposed for designing within this area.

Keywords:
Passive design strategies, sustainable architecture, lodge, climate change, savannah climate

CHAPTER 1 | Introduction

This chapter explains the development of the effects of climate change and the influence it has had on the climate. A problem is identified in Kajiado county and the objectives are defined to guide the study.

Figure 1.1. Photo of industrial pollution increasing the rate of climate change. *Source: google images.*

Figure 1.2. Photo of a semi-arid zone with even higher temperature effects from climate change. *Source: google images.*

1.1 Background of the study

One of the greatest challenges facing human society in the 21st century is climate change. This refers to any significant change in measures of climate lasting for an extended period of time.[1]

Through the ages, men have sought, in the building of shelter to fulfill two basic human needs - Protection from the elements and provision of an atmosphere favorable to spiritual endeavor. Olgyay further states that British Columbia specifically the Hot arid zone made extreme demand on the constructors of tribal dwellings.[2]

Characterized by excessive heat and glaring sun, this area required that the shelter be designed to reduce heat impact and provide shade.[3]
In Kenya, the Arid and Semi-Arid Lands (ASAL) constitute about 80% (467,200 sq.km) of Kenya's total land mass hosting about 35% of Kenya's population. (13 million people).[4]

Every week we're seeing new and undeniable climate events, evidence that accelerated climate change is here right now. Droughts are intensifying. We are

[1] Oloutuah, 2013, p. 4.
[2] Olgyay, 1962, p. 5.
[3] Loc.cit. Olgyay, 1962.
[4] UNDP, 2013, p. 7.

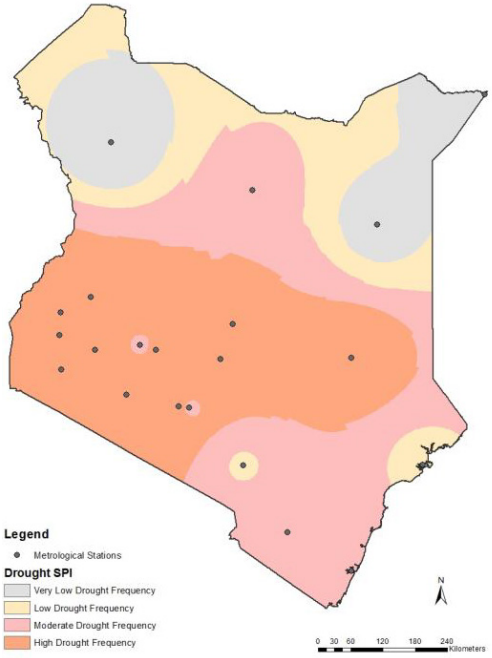

Figure 1.3. Minimum temperature trend in Kenya 1981-2011. *Source: Mwangi & Mutua (2015).*

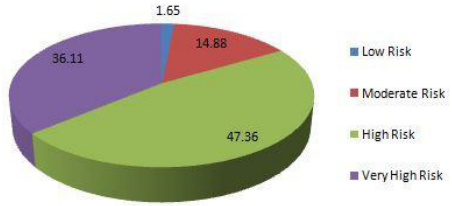

Figure 1.4. Percentage of land by area representing sensitivity to climate change in Kenya. *Source: Mwangi & Mutua (2015).*

seeing extreme weather events decades ahead of scientific projections.[5]

According to Mwangi and Mutua from the minimum temperature analysis in the years 1981 to 2011 all stations within their study reported a positive slope trend except four stations. This indicates an overall increase in the average monthly minimum temperature for the period under study as seen in Figure 2. From the minimum temperature analysis in the years 1981 to 2011 all stations reported a positive slope trend except fours stations. This indicates an overall increase in the average monthly minimum temperature for the period under study. Majority of Kenya (47.36%) has been found to be high risk and 36.11% very high risk sensitivity to climate change. This means that these areas have a low threshold to the effects of climate change and would suffer most to the effects if no adaptation mechanisms are in place. Areas with lowest risk would have a higher threshold to withstand or cope with the effects of climate change and compose the smallest area of 1.65% in Kenya. [6]

Semi-arid landscapes are particularly vulnerable to degradation because of sparse vegetative cover and the distribution of annual rainfall. Climate change temperature rise has only aggravated this semi-arid situation. [7]

Kajiado county is home to vast tracts of undisturbed natural resource which are suitable for hospitality investment positions. It is as a tourist destination even with climate change. [8]

[5] DiCaprio, 2016. Watch this documentary for a global elaboration of climate change effects and to his landmark speech at the United Nations climate summit
[6] Mwangi & Mutua, 2015, p. 5.
[7] El-Beltagy & Madkour, 2012.
[8] County government of Kajiado, 2018.

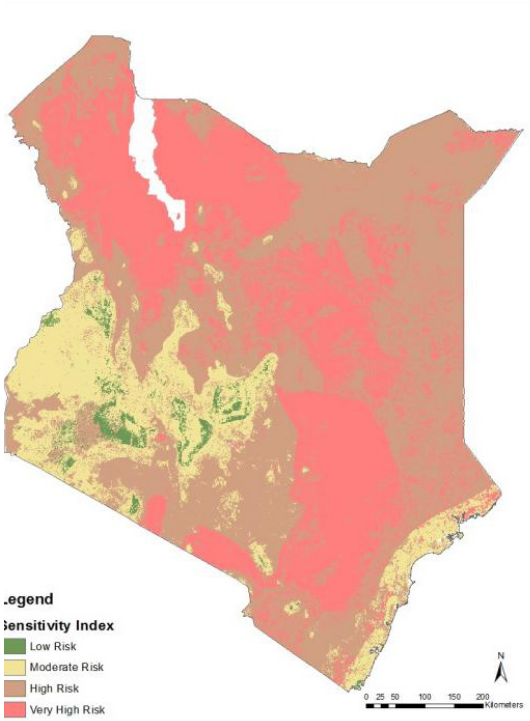

Figure 1.5. Climate change sensitivity map of Kenya Source: Mwangi & Mutua (2015).

1.2 Problem statement

According to the county government of Kajiado's trade tourism and industrialization department's vision statement, the county seeks to provide a globally competitive economy with sustainable and equitable socio economic development.[9] However, multiple online reviews reveal that tourists using these spaces complain about a lack of fans and air conditioning during the day while others complain of cold during the night.[10]

While this problem is not common to all lodges in this context a need to seek for appropriate climate design strategies within this area arises. Therefore the study intends to give appropriate passive design strategies employed along Mbagathi river, Kajiado county that can help resolve this challenge in future buildings.

1.3 Research questions

The following questions are therefore asked to guide this research:

i) What are the appropriate passive design strategies of built forms in response to tropical savanna climate?

ii) What are the existing passive design strategies employed on the lodges along River Mbagathi, Kajiado county?

iii) How has River Mbagathi, Kajiado county influenced the design of lodges along it?

iv) What recommendations can be given to design of lodge architecture along Mbagathi river, Kajiado county?

[9] Ibid.
[10] Tripadvisor, 2018.

1.4 Key Objective

The purpose of this study is to give suitable passive design strategies in response to tropical savanna climate for lodges along Mbagathi river, Kajiado county.

1.4.1 Research objectives

From the main objective the sub-objectives of this study are:

i) To understand appropriate passive design strategies of built forms in response to tropical savanna climate.

ii) To establish the status of passive design strategies employed on lodge architecture along River Mbagathi, Kajiado county.

iii) To give recommendations from the understanding and status of lodge architecture in response to the tropical savanna climate along Mbagathi river, Kajiado.

1.5 Justification of the study

The study is justified for the following reasons:

i.) The results of this study will provide some insights and information on passive design strategies for lodges along rivers within the savanna climate.

ii.) The findings of this study will establish existing passive design strategies of lodges along RIver Mbagathi, Kajiado county.

iii.) The findings of this study will propose new or better passive design strategies for built forms along River Mbagathi, Kajiado county.

iv.) The findings of this study will inform on the inspiration behind the forms.
v.) The findings of this study will reveal the contribution of River Mbagathi on architectural design responses to this natural feature.

1.6 Significance of the study

The study is significant for the following reasons:
i.) This study hopes to inform the professional consultants within the built environment on passive design strategies for the tropical savanna climate.
ii.) This study hopes to contribute knowledge in the area of riverine, climate responsive and Maasai architecture.
iii.) This study hopes to inform consultants on the importance of site selection.

1.7 Assumptions

i.) No other study has been carried out within this area.
ii.) There is insignificant difference in actual climatic conditions along the river.

1.8 Scope and limitations of the study

i.) This study will be limited to Kajiado's county.
ii.) Only built forms along the river will be Osoita lodge, Ololo Safari Lodge, Maasai Lodge, Nyati Hills Cottages and Emakoko Lodge.
iii.) The study will be limited to passive design strategies employed on the lodges along River Mbagathi, Kajiado county.

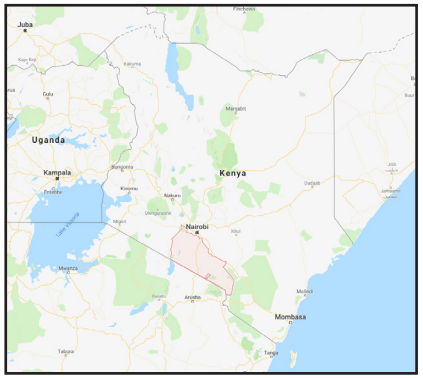

Figure 1.6. Map illustrating location of Kajiado county in Kenya. *Source: Google.com.*

1.9 Definition of terms

Lodge

A small house in a park, forest, or domain; a temporary habitation; a hut. Harris C.M.(2006)

Ecolodge

A nature dependent tourist lodge that meets the philosophy and principles of ecotourism.

Ecotourism

A nature dependent tourist lodge that meets the philosophy and principles of ecotourism.

Ecology

A nature dependent tourist lodge that meets the philosophy and principles of ecotourism.

Maasai

This is one of the nilotic pastoral communities found in Kenya and Tanzania. They form part of the forty two (42) tribes found in Kenya.

Manyatta

This is a habitation in form of a building lived in by people. In Kenya the manyatta is associated with the Maasai community in Kenya as most of their houses take the shape of a Manyatta. It is a dome-shaped semi-permanent structure build mainly using cow dung and mud (soil+ water mixture).

Thermal comfort

A sense of well-being with respect to temperature. It depends on achieving a balance between the heat being produced by the body and the loss of heat to the surroundings.

Thermal mass

Thermal mass refers to the ability of building materials to absorb, store and release heat. (Cairns regional council, 2011).

1.10 Organization of the study

Introduction	Abstract; Acknowledgements; Table of contents; List of tables and figures; Abstract
Chapter 1: Introduction	Introduction to central problem of a need for passive design strategies to deal with the rising temperatures brought by climate change.
Chapter 2: Review of related literature	Related literature on the development of the effects of climate change and the influence it has had on the climate leading to various passive design strategies employed around the world.
Chapter 3: Research methods	This chapter focuses on the research design and methods that were employed to carry out the study.
Chapter 4: Results	This chapter details what was found from the samples and what it means to the study.
Chapter 5: Discussion of findings	Significance of the results and their interpretation are presented based on the findings on site and the related literature studied.
Chapter 6: Conclusions	This chapter draws summary statemnt, conclusuions , limitations, implications of the findings
Back matter	This consists of references, appendices and glossary.

Table 1.1 Table illustrating the organization of the study. *Source: Author*