



ANALYSING THE WALKABILITY THROUGH
STREETScape DESIGN ELEMENTS OF KRO STREET,
DUHOK, KURDISTAN REGION OF IRAQ

BY

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ABSTRACT

Despite the importance of street walkways, it does not receive much attention. The Literature on public spaces mostly focuses on squares, parks, and streets where different people are expected to gather for significant activities. The environmental qualities which facilitate walking determine a pedestrian's sense of comfort. This paper focuses on the walkability of urban places in the Kurdistan Reconstruction Organization (KRO) Street of Duhok. The objective of this study is to analyse the users' satisfaction level on KRO street walkways, identification of users' opinion on the improvement of KRO street walkways and to establish recommendations that will enhance walkway usage and promoting walkability in KRO street. The Mixed method of both quantitative and qualitative was adopted for this study. A total of one hundred and fifty (150) questionnaires were administered among the pedestrians in the study area by employing random systematic sampling technique. Data were processed by Statistical Package for Social Sciences (SPSS) IBM version 22 and the analysis was presented by the use of descriptive and cross-tabulation statistics. The findings indicated that most of the respondents with 50.0%, 38.7%, and 40.7% respectively were not satisfied with the condition of walkways in the KRO street particularly in terms of pedestrian facilities provided and the accessibility and the connectivity of the walkways. In contrast, field observation revealed that the KRO street walkways had poor maintenance of facilities reflected in the improper condition of walkways and street furniture. However, 94.0% of the respondents which is also the majority highly recommended for appropriate hardscape in the KRO street while 75.0% opted for the appropriate softscape. Thus, the study recommends that for both short term and long term, the allocation of the walkways dimensions for the three zones is important by the local authority, as it not only positively affects the image of the walkway and its usefulness but also benefits the whole user-experience of the community. The installation of the new hardscape and softscape should follow the recommendation above. For example, benches, street light, walkway tiles, proper signage and trash receptacles among other good things for hardscape while for softscape elements the example is, planting of new trees and shrubs. The findings from this study can be used as a benchmark for the improvement of KRO streets walkability through streetscape design elements and partly its accessibility and connectivity for the better pedestrian system in KRO street.

مُلخَصُ البَحْثِ

على الرغم من أهمية ممرات الشوارع، إلا أنها لا تحظى باهتمام كبير. غالبًا ما تُركّز الدراسات حول الأماكن العامة على الساحات والحدائق العامة والشوارع حيث من المتوقع أن يجتمع فيها عديد من الأشخاص المختلفين للقيام بأنشطة مهمة. خاصية البيئة التي تسهّل المشي، تحدد إحساس المشاة بالراحة. كما تركز هذه الدراسة على قابلية الأماكن الحضرية في شارع KRO في دهوك (Duhok) للمشبي، فالهدف من هذه الدراسة هو تحليل العوامل المادية المميزة لتحسين استخدام المشي وتشجيع السير في شارع KRO، وتحديد عناصر الشوارع الرئيسية المستخدمة في الممرات، وكذلك وضع التوصيات التي من شأنها تشجيع المشي في KRO. ولتحقيق أهداف الدراسة المذكورة، تم تبني المنهج المختلط بين الكمي والنوعي. وقد تمّ توزيع مائة وخمسين استبياناً (150) في مجال الدراسة بين المشاة عن طريق استخدام تقنية عشوائية منهجية لأخذ العينات. وتمت معالجة البيانات بواسطة برنامج الإحصائية للعلوم الاجتماعية (SPSS) IBM الإصدار 22، كما تمّ تقديم التحليل عن طريق استخدام الإحصائيات الجدولية الوصفية. وأشارت النتائج إلى أن معظم المستجيبين بنسبة 50.0% و38.7% و40.7% كلهم لم يكونوا راضيين عن حالة الممرات في شارع KRO، خاصةً فيما يتعلق بمرافق المشاة المقدّمة وسهولة الوصول إلى الممرات واتصال بعضها ببعض. وفي المقابل، كشفت الملاحظة الميدانية أن ممرات شارع KRO تُعاني من التقصير في صيانة المرافق التي تنعكس في الحالة غير المناسبة للممرات وأثاث الشوارع. ومع ذلك، فإن 94.0% من المستجيبين الذين يمثلون الأغلبية قد أوصوا باستخدام هاردسكابي (Hardscape) المناسب في الشارع KRO بينما 75.0% اختاروا سوفتسكابي (Softscape) المناسب. وبناءً عليه، توصي الدراسة على المدى القصير والبعيد بتخصيص أبعاد الممرات للمناطق الثلاث من قبل السلطة المحلية، حيث إن ذلك لا يؤثر بشكل إيجابي في صورة المشي واستخدامه فحسب، بل إنه مفيد أيضًا في تجربة جميع مستخدمي الممرات. ومن خلال القيام بذلك، يجب أن يتبع تركيب Hardscape و Softscape جديدة، مثل: وضع المقاعد، وإنارة الشارع، وبلاط المشي، واللافتات المناسبة وصناديق القمامة بين الأشياء الجيدة الأخرى ل Hardscape، ولعناصر Softscape، مثل: زراعة الأشجار والشجيرات الجديدة. ويمكن استخدام نتائج هذه الدراسة بوصفها مقياسًا لتحسين إمكانية المشي في الشوارع KRO من خلال عناصر تصميم الشوارع، وتقسيم الطرقات الموصلة إليها مع اتصالها ببعض بشكل أفضل من أجل نظام أفضل للمشاة في شارع KRO.

APPROVAL PAGE

I certify that I have supervised and read this study and that in my opinion, it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a thesis for the degree of Master of Urban and Regional Planning

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Abdul Razak Sopian
Dean, Kulliyah of Architecture
and Environmental Design

DECLARATION

I hereby declare that this dissertation is the result of my own investigations, except where otherwise stated. I also declare that it has not been previously or concurrently submitted as a whole for any other degrees at IIUM or other institutions.

Andar M. Bahaaddin Husein

Signature

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This dissertation is dedicated to my mother, Dilber M. Ziyaaddin, for her endless love, support, and encouragement and to my father (late), Prof. Dr. Mohamad Bahaaddin Husein, for setting a foundation of studies for me and blessing me with his relevant knowledge. May Allah SWT bestow his blessings upon them.

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TABLE OF CONTENTS

Abstract	ii
Abstract in Arabic.....	iii
Approval Page	iv
Declaration	v
Copyright Page.....	vi
Dedication.....	vii
Acknowledgements	viii
List of Tables.....	xii
List of Figures	xiii
CHAPTER ONE: INTRODUCTION	1
1.1 Background of the Study.....	1
1.2 Statement of the Problem	2
1.2.1 Inappropriate Streetscape (Softscape and Hardscape).....	3
1.2.2 Discontinuity and Non-Consistency of Walkway Pavement.....	4
1.3 Research Questions.....	5
1.4 Research Objectives	6
1.5 Scope of the Study	6
1.6 Structure of the Study	7
1.7 Significance of the Study	8
1.8 Conclusion.....	9
CHAPTER TWO: LITERATURE REVIEW	11
2.1 Introduction	11
2.2 Definitions of Key Terms.....	11
2.2.1 Pedestrians.....	11
2.2.2 Walkways/Sidewalks.....	11
2.2.3 Sustainable Streetscape.....	12
2.2.4 Urban Design.....	12
2.3 The Concept of Walkability	13
2.3.1 Comfort of Walking.....	14
2.3.2 Safety of Walking.....	16
2.3.3 Characteristics of a Walkable Community.....	17
2.4 Benefits of Walkability	22
2.4.1 Health Benefits.....	22
2.4.2 Environmental Benefits.....	24
2.4.3 Economical Benefits.....	25
2.4.3.1 Walkability Attracts Tourists.....	26
2.5 Streetscape as a Vital Tool to Walkability	27
2.5.1 Element of Streetscape.....	27
2.5.1.1 Sidewalks/Walkways.....	28
2.5.1.2 Trees, Landscape Strips and Planters.....	29
2.5.1.3 Street Furniture.....	30
2.5.2 Principle of Sustainable Streetscape.....	32
2.5.3 Connectivity and Accessibility.....	33

2.6	Limitations of Walkability	35
2.6.1	Limitations of walkability in Winter	37
2.6.2	Limitations of Walkability in Summer	40
2.7	Case Studies of Walkability	41
2.7.1	Walkability and the Walkability Index	41
2.7.2	Case Studies	42
2.7.2.1	Bahnhofstrasse, Zurich	43
2.7.2.2	Orchard Road, Singapore	46
2.7.3	Lessons Learnt from the Two Case Studies	50
2.8	Conclusion	51
CHAPTER THREE: RESEARCH METHODOLOGY		53
3.1	Introduction	53
3.2	Research Framework	53
3.2.1	Stage 1: Background and Theoretical Framework	53
3.2.2	Stage 2: Gathering of Data	54
3.2.3	Stage 3: Findings and Analysis of Data	54
3.2.4	Stage 4: Recommendations and Conclusion	56
3.3	Research Design	56
3.4	Sampling Procedure	56
3.5	Instrument	58
3.6	Data Collection Procedure	59
3.7	Reliability and Validity of Data	60
3.8	Data Analysis	61
3.9	Study Area	62
3.9.1	Dimensions of KRO Street Walkways	64
3.10	Conclusion	66
CHAPTER FOUR: ANALYSIS AND FINDINGS		67
4.1	Introduction	67
4.2	Socio-Demographics Profile of the Respondents	67
4.2.1	Gender of the Respondents	68
4.2.2	Age Group of the Respondents	68
4.2.3	Respondent's Frequency of Visiting KRO Street	69
4.2.4	Time Spent on KRO Street by the Respondents	70
4.2.5	Respondents' Purpose for Traveling To/Through KRO Street	71
4.2.6	Respondents' Preferred Mode of Transportation to KRO Street	72
4.3	Respondents' Level of Satisfaction with KRO Street Walkways	74
4.3.1	Respondents' Level of Satisfaction with KRO Street Walkways	74
4.3.2	Safety in KRO Street During the Day	81
4.3.3	Safety in KRO Street at Night	81
4.4	Respondents' Opinion or Suggestion Toward the Improvement of KRO Street	82
4.4.1	Respondents' Opinion or Suggestion Toward the Improvement of KRO Street	82
4.4.2	Relationship between Age and Ease of Use of the Walkways, During Winter	89

4.4.3 Relationship between Age and Ease of Use of the Walkways, in Summer	90
4.4.4 Relationship between Age and Accessibility (Wheelchair, Stoller and etc. Friendly) of the Walkway	91
4.4.5 Respondents' Frequency of Walking around KRO Street and Respondents' Overall Streetscape (Softcape and Hardscape) Level of Satisfaction with KRO Street Walkways	93
4.5 Summary of Findings and Discussion	95
4.5.1 Socio-Demographic Profile of the Respondents	95
4.5.2 Respondents' Level of Satisfaction with KRO Street	95
4.5.3 Respondents' Opinion or Suggestion toward the Improvement of KRO Street	98
4.6 Conclusion	99
CHAPTER FIVE: RECOMMENDATIONS AND CONCLUSION	100
5.1 Introduction	100
5.2 Salient Findings	100
5.2.1 Unsatisfactory of the Streetscape Elements, Accessibility, and Connectivity on KRO Street Walkways	100
5.2.2 Improvement by Local Authorities	101
5.3 Recommendations	102
5.3.1 Recommendations of Streetscape Design Elements	104
5.3.1.1 Hardscape Elements	104
5.3.1.2 Softscape Elements	109
5.3.2 Recommendations of Accessibility and Connectivity	110
5.3.2.1 Accessibility	110
5.3.2.2 Connectivity	111
5.3.3 Recommendations of Street Performance	111
5.4 Conclusion	112
REFERENCES	114
APPENDIX I: QUESTIONNAIRE	121

LIST OF TABLES

Table 2.1	Characteristics of Walkable Community Brief Summary	21
Table 2.2	Summary of Streetscape Elements Functions	32
Table 4.1	Respondents' Frequency of Visiting KRO Street	70
Table 4.2	Time Spent on KRO Street by the Respondents	71
Table 4.3	Respondents' Purpose for Traveling to/through KRO Street	71
Table 4.4	Respondents' Preferred Mode of Transportation to KRO Street	72
Table 4.5	Respondents' Level of Satisfaction with KRO Street Walkways	78
Table 4.6	Safety in KRO Street during the Day	81
Table 4.7	Safety in KRO Street at Night	82
Table 4.8	Respondents Opinion or Suggestion toward the Improvement of KRO Street	86
Table 4.9	Relationship Between Age and Ease of Use of the Walkways, During Winter	88
Table 4.10	Relationship between Age and Ease of use of the walkways, in summer	90
Table 4.11	Relationship between Age and Accessibility (wheelchair, stroller and etc. friendly) of the Walkway	92
Table 4.12	Respondents' Frequency of Walking around KRO Street and Respondents' Overall Streetscape (Softscape and Hardscape) Level of Satisfaction with KRO Street Walkways	94

LIST OF FIGURES

Figure 1.1	KRO Street Walkway Without or Inadequate Streetscape Elements	4
Figure 1.2	Pedestrians are seen Walking on the Unpaved Walkway that is Part of the KRO Street Strip	5
Figure 1.3	Scope of Study	7
Figure 2.1	Characteristics of Walkable Community Illustration	18
Figure 2.2	Illustration of Walkability Benefits	27
Figure 2.3	Toronto City Walkway	28
Figure 2.4	Trees and Landscape Trees Are Well Positioned and Selected in Ottawa Walkways	29
Figure 2.5	Quality Walkways of Brooklyn are Utmost Pedestrian Friendly	30
Figure 2.6	The Bahnhofstrasse, Zurich, Switzerland	44
Figure 2.7	The structure of the Bahnhofstrasse	44
Figure 2.8	Orchard Road, Singapore	48
Figure 2.9	Structure of Orchard Road - The Width of the Sidewalks on either Side is Equivalent to the Width of the 5-lane Street Running between them. In certain areas, this 5-lane Street Expands to Incorporate a 2 Lane by-lane, Separated by a Landscaped Median Strip	48
Figure 2.10	The landscaping along Orchard Road varies from one block to the next. The lines of trees are strategically planted to provide a sense of space around the benches / rest areas, so as to create a sense of privacy even in an open space	49
Figure 3.1	Research Framework Flow Chart	55
Figure 3.2	Map of Duhok District within the Iraq Region	63
Figure 3.3	GIS Map of KRO Street and its Vicinity. The Hatched Rectangle Shape is the 4 Kilometre KRO Street Strip the Bus	63

Figure 3.4	Dimensions of KRO Street Walkway	64
Figure 3.5	KRO Street Walkway being Dull without Streetscape Elements (Hardscape or Softscape)	65
Figure 3.6	Owner Breaching his Given Space (Transitional Zone) by Displaying Products on the Entire Walkway which End up as Protruding Objects that Pedestrians Come into Conflict with	65
Figure 3.7	The Placement of Signages isn't Appropriate; neither Does it have a Crossing Signage. As it can be seen also there aren't any Ramps or Hand Grails, or Pedestrian Crosswalk Making It Very Poor in Terms of Accessibility and Connectivity	66
Figure 4.1	Gender of the Respondents	68
Figure 4.2	Distribution of Age Group of the Respondents	69
Figure 4.3	Some Selected Shop Lots at KRO Street	73
Figure 4.4	Transport Means of Traveling Through KRO Street	73
Figure 4.5	No Greenery in a Softscape Designated Space at KRO Street	79
Figure 4.6	Poor Walkway Connectivity between Two Commercial Blocks	79
Figure 4.7	No Availability of Hardscape (Street Furniture) and Softscape (Trees and Planters)	80
Figure 4.8	Poor Connectivity and Accessibility of the Walkway	80
Figure 4.9	Inappropriate Placement of Signage's in KRO Street Walkways, it can be seen that they are too Low for Pedestrians and Misplaced as Well	85
Figure 4.10	Disconnected and Unpaved Walkway a Burden on Individuals at KRO Street	97
Figure 4.11	Broken Tiles Affect the Level of Satisfaction of Individuals with KRO Street Walkways	97
Figure 5.1	The Space Allocation into Service Zone, Free Zone, and Transition Zone in the Sidewalks of Pike District, Maryland, USA	103
Figure 5.2	Recommended space allocation into Service Zone, Free Zone, and Transition Zone in KRO Street Walkways	103

Figure 5.3	Three Sources of Street Lights in Evanston Downtown, Illinois, USA	105
Figure 5.4	The Three Recommended Sources of Street Lights Placement along the KRO Street Walkways	105
Figure 5.5	Appropriate Design, Dimensions, and Texture (Seasonal) at Granville Vancouver, Canada	106
Figure 5.6	Recommendation of Appropriate Design, Dimensions, and Texture (Seasonal) at KRO Street Walkways	107
Figure 5.7	Appropriate Positioning and Placing of Signage's in Commercial Zones of Colorado, USA	108
Figure 5.8	Recommended Positioning of Signage's in KRO Street Walkways	108

CHAPTER ONE

INTRODUCTION

1.1 BACKGROUND OF THE STUDY

Walking has been the essential method of movement for people until the point when we started to sit and ride - first on stallions and afterward in carriages, then trains and bikes, lastly automobiles and planes as opposed to go by walking (Amato, 2004). Walkways isolated from the roadway are the favoured accommodation for people on foot. Walkways give many advantages including mobility, healthier communities, and safety (FHWA, 2006). In addition, environmental qualities which encourage walking decide a pedestrian feeling of solace (Juriah and Norsidah, 2015).

However, there are certain issues when it comes to the implementation of guidelines or the development quality at commercial zones. Non-consistency and discontinuity of the pedestrian walkways are very obvious to witness or encounter. Streetscape (softscape and hardscape) lacks, and in some places, which do have these essential elements they are not well positioned or maintained. As indicated by Federal Highway Administration Research and Technology (2006), a single design feature cannot guarantee that a streetscape will be appealing to people on foot.

Rather, the best places for walking consolidate many design components to make streets that satisfy to individuals on foot. Road trees, division from traffic, seating zones, lighting, pavement design and numerous different components ought to be considered in areas where pedestrian travel is obliged and supported (FHWA, 2006). This paper raises these issues and backs it up with concrete set of questionnaires which will inspect the general view of people on the KRO Street.

Walkable places enable individuals to encounter the city by walking pleasantly; for this reason, walkability of KRO Street is of high importance, as it is one of the keys and top commercial zones in Duhok district.

The purpose of this research is to enhance walking through effective recommendations to encourage walkability in KRO Street. Service zone, free zone and transition zone are to be newly injected in KRO Street walkways. Through good streetscape elements being placed in KRO walkways and good connectivity and accessibility, they together will bolster walkability. Service zone will allow pedestrians to feel at comfort along the full strip of KRO Street. Service zone include softscape and hardscape. Softscape are the trees and other greeneries which act as the buffer zone. However, hardscape is the street furniture which includes benches, trash receptacles, lighting. Free zone is where pedestrians can manoeuvre freely without coming into conflict with protruding objects. It is designated strictly for pedestrians to feel at comfort, for instance, walking with a personal preferred pace and yet not be disrupted whether by streetscape or by other window shopping pedestrians. Transition zone is the distance in the walkway which private owners can use for their purposes.

For instance, a café owner which intends to have outdoors by the store seats for the customers, or a clothing store which would like to display offers in a stand within the transition zone. Transition zone can be used by the public for window shopping purposes as well, so there would be minimal congestion on the Free zone.

1.2 STATEMENT OF THE PROBLEM

Walking is the most natural movement around our environment (Morris and Hardman, 1997). KRO Street holds exceptionally poor walkways that are not legitimate for pedestrians to use as it is not appropriate to walk on because of various reasons, for

example, absence of shading through Softscape and Street Furniture through Hardscape, such as, street lighting, seats and other misplaced pedestrian walkway elements along the walkway, material utilized for surface, Discontinuity and Non-consistency.

1.2.1 Inappropriate Streetscape (Softscape and Hardscape)

Sustainable streetscape represents an imperative part in framing the visual picture of urban communities, as it is a standout amongst the most essential elements which helps in city achievement. Be that as it may, there are numerous urban areas whose visual picture is inadequate with regards to the nearness of right and Sustainable Streetscape, which adversely influences the visual picture of these urban areas (Rehan, 2013). Based on observation, KRO Street lacks sustainable streetscape. In terms of softscape there's lack of trees and landscape strips. In terms of hardscape, or as many would refer to as street furniture lacks, benches, proper lighting, trash receptacles, proper placing of signage's, curbs which are wheelchair, stroller, bicycles and delivery services friendly through curb ramps (refer to figure 1.1).



Figure 1.1: KRO Street Walkway Without or Inadequate Streetscape Elements
Source: Field Observation, 2017

All these issues of streetscape contribute to the discomfort or sense of insecurity to pedestrians walking on the KRO Street walkways. Therefore, as a group of important elements, they should be planned within the three main zones of a walkway, the transition zone, free zone, and service zone.

1.2.2 Discontinuity and Non-Consistency of Walkway Pavement

Connectivity and accessibility are critical criteria for pedestrian comfort (Hutabarat Lo, 2009; Vojnovic, 2006). Connectivity identifies with the simplicity of moving from starting points to destinations is the main consideration affecting the pedestrian route decision (Kumar, 2010). In KRO Street, one can easily come to the realization of walkway discontinuity; this is due to certain blocks along the commercial strip aren't constructed yet, so walkways are left for private owners to pave and install their own desired tiles, which in fact, the sidewalks of KRO Street belong to the municipality of Duhok. In KRO Street, it can also be seen that along the walkway strip, tiles vary in

design and dimensions, this is displeasing to the eye and in fact may create issues for pedestrian in winter and spring as methods used are outdated (Refer to figure 1.2).



Figure 1.2: Pedestrians are Seen Walking on the Unpaved Walkway that is Part of the KRO Street Strip
Source: Field Observation, 2017

Dimensions of tiles all along the strip should have one specific design where pedestrians feel at safe and comforted and this makes it easier for the introduction of transition zone, free zone and service zone in KRO Street walkway.

1.3 RESEARCH QUESTIONS

There are three research questions which have been established as follows:

- i. What are the physical characteristics in walkways that enhance an individual's walking experience?
- ii. What are the streetscape elements consolidating with walkable walkways?
- iii. How can the present situation at KRO Street be improved?

1.4 RESEARCH OBJECTIVES

The study aims to achieve the following objectives:

- i. To analyse the users' satisfaction level on KRO street walkways.
- ii. To identify users' opinion on the improvement of KRO street walkways.
- iii. To establish recommendations that will enhancing walkway usage and promoting walkability in KRO street.

1.5 SCOPE OF THE STUDY

The study focuses on the improper walkways in KRO Street which results in individuals not preferring to walk or their minimal utilization of the current walkways. This study is set to understand the perception of pedestrians on the walkways in KRO Street. The study is to understand the level of walkability in the walkways, also interrelating is the streetscape design elements which play a huge role in the increment of walkability by individuals. To fully have a backing on this study, pedestrians in KRO Street were asked to fill up survey questionnaires, the content of the questionnaires were on the physical conditions of the walkways that determine whether a street is walkable or otherwise. To finalize the study, recommendations will be set to enhance walkability of KRO Street walkways with streetscape design elements being the main tool.

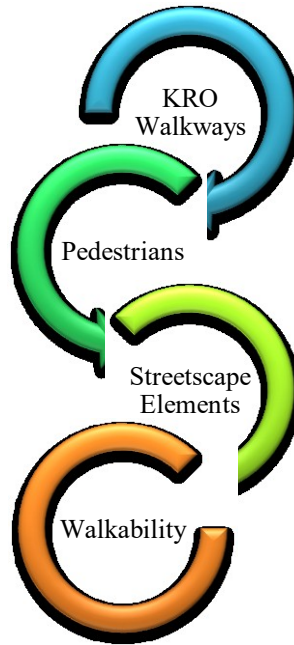


Figure 1.3: Scope of Study

1.6 STRUCTURE OF THE STUDY

This thesis is structured into five chapters and the details of the chapter are as follows:

- Chapter one examines the basics for overall overview of the study on the analysing of walkability through streetscape design components. The section gives general picture of the contents of this dissertation, and the most critical piece of this part is the introduction of the objectives, and the procedures expected to accomplish the study's objectives.
- Chapter two gives a detailed background about subjects related with the research including the key definitions, concept, benefits, limitations and case studies. This section comprises of the review of different writings with respect to walkability and streetscape components and their connection to the study. The ultimate goal of the literature review section is to give the data and theoretical framework to direct this study.

- Chapter three displays the Methodology of the research which comprise of a few procedures of the research, for example, the utilized methods, how the crucial data was gathered and in which way it was analysed. The section starts with the research design that outlines the stages starting from preliminary study, gathering of data (primary and secondary) with the total 150 number of respondents and carrying out research, data analysis and findings, and finally the recommendations and conclusions. Also, the study area is presented in this chapter to further understand the condition of the walkways.
- Chapter four introduces the analysis of the data gathered and its outcomes in view of the objectives and research questions. This section also discusses the results of the study based on the respondents' responses of the survey questionnaires which were handed out in KRO Street. The key findings were the socio-demographic profile of respondents, respondent's level of satisfaction with KRO Street, and respondent's opinion or suggestion toward the improvement the improvement of KRO Street.
- Chapter five abridges the findings of the research and presents the conclusion based on those discoveries. It is trailed by the recommendations that could be offered for the enhancement/improvement of the KRO Street walkways.

1.7 SIGNIFICANCE OF STUDY

The study and its recommendations are important for the authorities and people of the Duhok district and specifically for pedestrians of KRO Street due to the inappropriate walkway condition in terms of the physical setting, its varying levels of ground along the walkway and its elements, such as, poor streetscape, specifically softscape and hardscape. Pedestrians do not utilize the walkways due to the existing issues or

complaint that have not been attended to or addressed by the authorities. Pedestrians do not know the important factors of walkways on health, and on reducing the usage of motor vehicles. The findings and analysis of the study will raise awareness on the benefits of appropriate walkways. The usage of appropriate walkways will be easily adapted by the pedestrians of KRO Street; this is because proper walkways are more beneficial in terms of cost efficiency, a better experience of shopping or dining, and walking in general.

Cost efficiency, understanding that walking over using motor vehicles is less pricey, that's a no brainier. Walking may cost an individual a bottle of water; meanwhile, using a motor vehicle is more costly whether it is a private or public mode of transportation. Walking can be quite beneficial for one's health. According to Lee and Skerrett (2001), recent researches have demonstrated a relationship amongst walking and a reduction in deaths from all causes, ranging from 19– 30 percent relying upon the frequency and length of walking activities. Apart from walking being cost efficient and beneficial to health, an individual can also have a better experience in terms of shopping and dining. Walking can be very convenient for pedestrians if walkways include suitable streetscape design elements, and great connectivity and accessibility. So therefore, this study has a great importance to the authorities to reflect on and increase the level and quality of walkability and as well as for the pedestrians' comfort and convenience through streetscape design elements.

1.8 CONCLUSION

This chapter has displayed and discussed about the foundation of the study. It clarified proper designed walkways are vital to the pedestrians of commercial zones in Duhok, particularly the study area, KRO Street. Also, the statement of the problem was