

**EVALUATION OF SPATIAL FACTORS' IMPACT
ON PHYSICAL INTEGRATION OF INFORMAL
SETTLEMENTS: ERBIL CITY – IRAQ**

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by

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LIST OF ABBREVIATIONS

BSU	Basic Spatial Unit
CBD	Central Business District
CBS	Central Bureau of Statistics
CSO	Central Statistical Organization
DESA	Department of Economic and Social Affairs (in United Nations)
DFID	Department for International Development.
FA	Factor Analysis
GIS	Geographic Information System
Habitat	Human Settlements Programme
HAD	Housing Development Agency
IDP	Internal Displacement Person
KRG	Kurdistan Region Government
KRSO	Kurdistan Region Statistics Office
NCCI	NGO Coordination committee for Iraq
PC	Principal Component
PCA	Principal Component Analysis
SPSS	Statistical Package for the Social Sciences Software
TOAD	Temporarily Obsolete Abandoned Derelict
UNCHS	United Nations Centre for Human Settlements
UN-DES	United Nations, Department of Economic and Social
UNDP	United Nations Development Programme
UN-Habitat	United Nations Human Settlements Programme

**PENILAIAN KESAN FAKTOR RUANGAN TERHADAP INTEGRASI
FIZIKAL PENEMPATAN SETINGGAN: BANDAR ERBIL-IRAQ**

ABSTRAK

Tesis ini mengkaji salah satu topik persekitaran perbandaran di bandar yang membincangkan integrasi kawasan bandar melalui dimensi ruangan. Integrasi penempatan setinggan ini mengambilkira semua dimensi pembangunan bandar seperti sosial, ekonomi, dan ruangan. Kajian memfokuskan integrasi ruangan penempatan setinggan ini dan cara mencapai persekitaran bandar lestari di dalam bandar membangun dengan mengkaji integrasi penempatan setinggan berdasarkan impak aspek ruangan. Objektif kajian ialah mengenal pasti dan menentukan faktor ruangan penting yang mempengaruhi integrasi fizikal penempatan setinggan di Bandar Erbil iaitu menentukan integrasi fizikal di dalam kawasan kajian setinggan dan kawasan persekitarannya serta menentukan faktor ruangan berpengaruh dalam integrasi penempatan setinggan. Kajian ini menggunakan pendekatan kuantitatif dan menggunakan kaedah analisis tertentu termasuk analisis faktor untuk mengenalpasti faktor ruangan yang menjejaskan integrasi dalam kawasan kajian, sintaks ruang ke dalam GIS untuk mengukur tahap integrasi, dan regresi linear berganda yang mengukur kesan faktor ruangan dan tahap integrasi. Hasil utama kajian ialah faktor paling berpengaruh dalam mentafsir integrasi ialah “kognisi sifat ruangan di persekitaran kawasan kajian” dan “akses kepada perkhidmatan awam dan pola kediaman” pada tahap kawasan kajian dan “sistem pergerakan” dan “tanah kosong” pada tahap kawasan kajian dan kawasan kejiranan. Sumbangan kajian meliputi semua faktor ruangan menggunakan ukuran kuantitatif dan faktor ruangan mempunyai impak ke atas integrasi penempatan setinggan di bandar. Sebagai

tambahan, kajian membantu institusi bandar untuk melakar pelan pembangunan dan menentukan pelan serta mengawal kepentingan melalui standard kuantitatif yang telus bagi kawasan setinggan di bandar.

EVALUATION OF SPATIAL FACTORS' IMPACT ON PHYSICAL INTEGRATION OF INFORMAL SETTLEMENTS: ERBIL CITY – IRAQ

ABSTRACT

This thesis studies one of the distinct topics of the urban environment in cities which discusses the integration of urban areas through the spatial dimension. The integration of informal settlements considers all dimensions of the urban development such as social, economic, and spatial. This study focuses on the spatial integration of these settlements. This research is concerned with how to achieve sustainable urban environment in developing cities by investigating the integration of informal settlements on the basis of the impact of spatial aspects. The objectives of this research are to identify and specify key spatial factors that influence the physical integration of informal settlements in the urban fabric of Erbil city, to determine the physical integration within the informal study area and with surrounding neighborhoods, and to determine the most influential spatial factors on the integration of the informal settlements. This research adopts the quantitative approach. This study uses specific methods of analysis. The methods consist of factor analysis that identifies spatial factors that affect the integration in the study area, space syntax into GIS that measures the levels of integration, and multi-linear regression that measures the impact of the spatial factors on the levels of integration. The main finding of the study is that the most influential factors in interpreting the integration were “the cognition of spatial behavior of the study area’s environment” and “accessibility to public services and residential patterns” on the level of the study area and “movement system” and “vacant land” on the level of the study area with its neighboring areas. The contribution of this study lies in that it combined all the

spatial factors by using quantitative measurements and established that spatial factors have an impact on the integration of informal settlements in the urban fabric of the city. In addition, this study assists urban institutions to be able to direct the development plans and to determine planning and controlling priorities through clear quantitative standards for informal areas in the city.

CHAPTER ONE

INTRODUCTION

1.1 Introduction

Informal settlements in the city need to be integrated into the formal urban fabric of the city. The integration of these settlements considers all dimensions of urban development, including social, economic and spatial. This study focuses on the spatial integration of informal settlements. The aim of this research is to measure the impact of the spatial factors on levels of integration within these informal settlement, and informal settlements with formal layout of the surrounding neighbourhoods in the city.

This chapter intends to explain the background of the study and discusses several related studies to identify its problem statement. Based on the previous studies, the study defined the particular research problem. Accordingly, the research questions and research objectives were formulated. Then, the research methodology, scope of research and significance of research were explained. In the final section, this chapter presents the structure of the thesis, research framework, and a summary.

1.2 Research Background

Studies show that more than half of the global population with an estimation of 3.3 billion people live in urban areas (UN-Habitat, 2016). By the middle of the 21st century, the total urban population of the developing world will be double, increasing from 3.0 billion in 2015 to 5.3 billion in 2050 (Cohen, 2006; UN-Habitat, 2015; UN-Habitat, 2016). The urban growth rates are the highest in the developing world in that urban residents are growing by nearly 73 million every year. These

rates attract about five million new urban inhabitants every month and are responsible for 95 percent of the world’s urban population growth (UN-Habitat, 2008; UN-Habitat, 2013). This growth is unequally distributed among countries. In general, developed countries are characterized by a decrease in their population or slow growth, whereas developing countries have rapid population growth (Sietchiping, 2004). Therefore, the urban centers in the developing countries are now experiencing the fastest growth if compared to those in developed countries (Oucho, 2001; Kaplan & Woodhouse, 2004). This rapid growth of the urban centers leads to a significant increase in the informal settlements’ residents. As a result, predictions expect a near doubling of the worldwide population of these settlements from 1990 to 2020 (Pieterse, 2008). Thus, residents of the informal settlements estimated by roughly 30 percent of the urban population in developing countries which is equivalent to more than 880 million people living in these settlements in 2014 (UN-Habitat, 2015), as shown in table 1.1.

Table 1.1: Residents of informal settlements in developing regions: population by (thousands) and (percent). Source: (UN-Habitat, 2016).

Major region or area	1990		2000		2010		2014	
		%		%		%		%
Developing Regions	689,044	46.2	791,679	39.4	871,939	32.6	881,080	29.7
Northern Africa	22,045	34.4	16,892	20.3	14,058	13.3	11,418	11.9
Sub-Saharan Africa	93,203	70.0	128,435	65.0	183,199	61.7	200,677	55.9
Latin America and the Caribbean	106,054	33.7	116,941	29.2	112,742	23.5	104,847	21.1
Eastern Asia	204,539	43.7	238,366	37.4	249,591	28.2	251,593	26.2
Southern Asia	180,960	57.2	193,893	45.8	195,749	35.0	190,876	31.3
South-eastern Asia	69,567	49.5	79,727	39.6	84,063	31.0	83,528	28.4
Western Asia	12,294	22.5	16,957	20.6	31,974	24.6	37,550	24.9
Oceania	382	24.1	468	24.1	563	24.1	591	24.1

In addition to the rapid urbanization of developing countries mentioned above, insufficient ability to deal with the housing needs of people in the urban areas which means the number of housing supply offered by the authority deficits the number of demands by the urban population supported the expansion of the informal settlements. Hence, the amount of inadequate shelters and the number of the informal inhabitants has been increasing continuously.

Population of these settlements suffers from multiple shelter deficiencies, including lack of access to improved water and sanitation, overcrowding, non-durable housing and insecure tenure (UN-Habitat, 2008). These settlements are considered as self-organized areas. They are characterized by illegal inhabiting of the land, inappropriate layout plan and unserviced or minimally serviced land (Abbott and Douglas, 2003). Apart from physical deficiency, the informal settlements experience poor integration with the rest of the city and the social degradation attached to a poorer residential location (Lall, Suri, and Deichmann, 2006). In spite of the fact, that informal settlement arises according to location and morphological characters into inner-city settlements which appear near the city centers; and peripheral settlements grow outside the main cities, later incorporated into the planned urban areas by urban development. As a result, all became part of the urban areas in the city with a lack of integration at different levels.

Most illegal land occupation took place on government land or land of very poor quality with limited commercial value. And over time, conventional land and housing markets developed in the most illegal or informal settlements, therefore what originally appeared to be a danger to the existing order of the city ended up fully incorporated into that order (UN-Habitat, 1996). So, the informal settlements in many cities are no longer just marginalized neighbourhoods, these settlements

entered the city's urban fabric and accommodated significantly large proportions of the urban population.

Therefore, these issues have led to less clearance of these settlements in the city and slow redevelopment in dealing with them. Thus, on the one hand, the increasing prevalence of poor-quality underserved housing calls for new ways of looking at cities and the informal settlements within them. And on the other hand, understanding the spatial components of shelter deficiency and the dynamics of informal settlements development within cities is fundamental to improving the lives of these settlements' dwellers and building urban harmony (UN-Habitat, 2008).

Cities differ in a variety of dimensions, from the administration of economic and political systems to provision of basic services, which impact the way of developing the informal areas and how they get changed over time. Tsenkova (2008) stated that the informal settlements are given important regional diversity and hence different understandings behind the definition of "informal settlement" which is defined as the narrow and broad understandings of this phenomenon. The narrow understanding means when the consideration of the informal settlements is dominated by the images of poverty and self-made housing areas from the third world. While the broad understanding considers the informal settlements as certain living conditions and that their spatial appearance does not conform to formal regulations, standards, and institutions.

Moreover, Declaration of UN-Habitat in Recife Forum (1996) considered the integration of the informal settlements into the city as a critical issue and confirmed that these settlements are integral parts of the city which represent a physical part. In this context, Abbott and Douglas (2003) clarified that, if the cities of developing countries are to be sustainable, then they have to find a way of integrating the

informal settlements. Also, this can only be achieved, first, by accepting that the informal settlements are an integral part of the urban environment. Moreover, Abbott (2001, 2002) determined that upgrading of the informal settlements need to be operated at the settlement level and the metropolitan level. This idea is applied in the urban areas in general and most studies of the urban areas consider the surrounding areas to be critical for the integration process. For instance, Costa (2002) in his study on new and old harbour areas in the city focused mainly on site level and town level of integration.

On the other hand, many researchers such as Greene (2003), Sobreira (2003), Huchzermeyer (2004) and Karimi et al. (2007) mentioned that most of the studies about the improvement of the informal settlements have been oriented to the revealing of social and economic factors. But, the spatial and location factors have gained little attention in the literature. Consequently, the problem facing authorities and academics in this issue is to recognize the factors that facilitate the improvement of these settlements towards the integration with the urban fabric of the city.

1.3 Problem Statement

According to UN-Habitat (2008), one out of every three people living in cities of the developing world lives in the informal settlements. Estimates indicate that in 2005, more than half of the world's informal settlements population resided in Asia. These settlements which are unplanned parts of the cities are growing faster than the more observable, planned parts. In spite of this, they are considered as the most common type of human settlement, which led to slum cities, while in others, these settlements are small pockets of deficiency physically isolated from the rest of the city. The informal settlements suffer from lack of basic services, substandard

housing or illegal and inadequate building structures, overcrowding and high density, unhealthy living conditions, hazardous locations, insecure tenure, irregular or informal settlements, poverty and social exclusion, minimum settlement size, uncertain tenure status, poor basic services such as water and sanitation, low-grade construction and overcrowded living conditions.

The idea of the integration in the urban areas obtains different forms depending on the levels of configuration or arrangement of the city. The urban researchers suggest that this idea ranges from the relationship of city components, starting from the buildings, blocks, neighborhoods, and sectors with the surrounding fabric and with the city as a whole (Abbott, 2002; Costa, 2002; Baran, Rodríguez, and Khattak, 2008; Carmona, 2010).

However, the urban researchers focus significantly on the social integration when they discuss urban integration, and it is a multifaceted process that contains both positive and negative suggestions. Definitions of the urban integration differ according to the extent to which it includes. Thus, the urban integration is distinguished as an on-going multi-dimensional process with economic, social, cultural, physical, spatial and individual dimensions (Kahraman, 2008).

As the spatial aspect is part of this process through physical dimension, researchers have shown the importance of this aspect for the integration of the urban areas including the informal settlements in the city. Hillier and Vaughan (2007) through their research on the space syntax theory concluded that the spatial form is essential to be understood as a contributing factor in developing the patterns of integration and segregation in cities. Regarding informal settlements, Abbott, Martinez, and Huchzermeyer (2001) and Abbott and Douglas (2001, 2003) specifically discussed the subject in their researches and confirmed that the literature

does not deal with spatial relationships, either at a settlement level or the city level in the integration process of the informal settlements, once studying improvement and upgrading of these settlements.

It is turned out that the studies which have adopted the improvement strategies of the informal settlements were limited largely to the improvement process within the informal area without addressing the relationship with surrounding and urban fabric of the city. Therefore, the integration of the informal settlements with the surrounding areas and the whole city is considered a serious issue, especially after the adoption of in situ improvement and upgrading of these settlements.

Moreover, other researchers also mentioned that the spatial aspects of the informal settlements have not been sufficiently examined. Even each of limited studies that tried to establish the relationship between the informal settlements and their neighbouring areas through spatial factors, focused on specified factors (Greene, 2003; Sobreira, 2003; Karimi et al., 2007). Where a group of researchers such as, Hillier et al. (2000), Greene (2002, 2003) and (Shafiei (2007) mainly focused on the commercial land-use on the edge and inside the informal settlement as a spatial factor in relation to the movement pattern. Another group of researchers like Haferburg (2002) examined vacant land inside and on surrounding as a spatial factor for integration with neighboring areas. The third group Abbott (2001, 2002, and 2003) and Karimi et al. (2007) investigated basically road network and movement pattern factor for integration. The fourth group such as Mora (2003) focused on land use and planning pattern. The last group of researchers like Cardoso (2004) studied the availability of social services and road network in relation to the spatial organization of the settlement.

The gap of knowledge in these studies is that the way the spatial factors is used does not provide a clear and comprehensive evaluation of their impact on the integration of informal settlements due to using limited factors for each study. Therefore, the spatial factors need to be combined. In addition this case of combined spatial factors can be enhanced by additional spatial factors as revealed in studies of different urban areas related to the physical integration such as, existing urban barriers, proximity and accessibility to public facilities, accessibility to working population, accessibility to residential population, proximity to a new centrality, network of public transport to the area, the extension of main urban axes to the area, the condition of adjacent streets and continuity of public spaces. Consequently, this leads to investigate the key spatial factors that affect the physical integration of the informal settlement.

Furthermore, it is evidenced by the groups of studies mentioned above that the most of these studies have been done on the peripheral settlements; in this situation the relationship of these settlements with the urban fabric of the city is weak. These studies rarely discuss the spatial relationships of the informal settlements as incorporated in the planned fabric of the city which is considered another gap in the studies of integration of these settlements, whereas the incorporated situation of the informal settlements is entirely different from the peripheral settlements. As it is indicated by UNCHS-Habitat (1982), that these settlements are situated close to the most integrated urban areas which mostly present high densities, and have reached the limits of growth. Therefore the study of the incorporated informal area in the fabric of the city will assist the measure of integration of these areas on different levels.

In fact, this state of incorporated informal areas is obvious in the case of the informal settlements of Erbil city, which is selected as a study area of the research. where most of the informal settlements have become informal neighborhoods or parts of planned neighborhoods with applying self-improvement approach. What supports this study is the lack of the studies related to the informal settlements in Erbil city in general, especially, the physical, spatial side and their state once considered as part of the urban fabric of the city. Also, the urban planning projects of Erbil city such as, master plans and district plans -including the last Erbil master plan project in 2007- did not pay enough attention to improve these settlements and their situation in the urban fabric of the city.

1.4 Research Questions

1. What are the possible key spatial factors which affect the physical integration in general?
2. What are the factors that affect the integration of informal settlements in case of Erbil City?
3. How is the correlation between observed physical factors and factors mentioned according to perception and behaviour of residents of study area?
4. How can physical integration be measured through space syntax parameters within the informal settlement level and with surrounding areas level in Erbil city? And how is the effect of the spatial structure parameters on this integration?
5. To what extent spatial factors affect the physical integration of the informal settlements?
6. Do spatial factors have a positive or negative effect on the integration of the informal settlements?

7. Which spatial factors have the most influence value on the integration of informal settlements in both levels within the informal area and with surrounding areas?

1.5 Research Objectives

The aim of the research is to evaluate the impact of the spatial factors on levels of integration within these settlements and with the surrounding neighbourhoods in Erbil city-Iraq. The objectives of this research are as follows:

1. To identify and specify key spatial factors that influences the physical integration of the informal settlements in the urban fabric of Erbil city.
2. To determine the physical integration within the informal study area and with surrounding neighbourhoods.
3. To determine the most influential spatial factors on the integration of the informal settlements.

1.6 Research Framework

This research adopted the quantitative approach to measuring the impacts of the spatial factors on the physical integration at the study area (Badawa informal settlement in Erbil city). The steps of the research framework procedure can be briefly explained as following and as shown in Figure 1.1:

- a) The systematic review was adopted to generate research evidence from the literature on the theme of the integration that is related to the spatial aspects in the urban areas in general on the one hand and the informal settlements on the other hand. The spatial factors and variables in these studies were summarized by discussing their importance and influence of the spatial factors which facilitate the

selection of the possible key factors which can affect the integration of the informal settlements in general. By selection of these factors, the first objective of the study was achieved.

b) Measuring determined spatial factors which have been defined and explained from the literature review by using factor analysis technique in statistical package for the social sciences (SPSS) tool for more spatial variables considered basically the structure of the urban form of the study area (Badawa informal area).

And the data was collected through two methods:

1. AutoCAD and geographic information system (GIS) softwares, and observation on the site were used to measure the physical elements of the study area such as (land uses, roads network, housing patterns, and all physical characteristics.

This method resulted in physical group variables.

2. A quantitative field survey was conducted by using questionnaire form to check the spatial variables relative to residents of Badawa informal settlement and using the strata field random sample in determining spatial samples. The questionnaire group variables rose from this survey.

This analysis tends to determine the spatial factors impacting physical integration in Badawa urban community and measuring the correlation between factors as independent variables.

c) Space syntax integrated within GIS software was used as simulation instrument to calculate the local and global spatial integration values into two levels; firstly, the Badawa study area separated from surrounding context. Secondly, the Badawa area with surrounding urban area (residential neighbourhoods). These represent the dependent variable of the study. In addition, the calculation and the

interpretation of the spatial characteristics of the urban fabric of the study area were done through a number of parameters.

d) Multiple linear regression analysis in SPSS software was used to measure the differential in the spatial impacting of factors determined by factor analysis as independent variables and spatial integration values as dependent variables through two equilibriums of multiple linear regression analysis. So from this process, the impacting values of the spatial factors on the spatial integration of the Badawa area were determined.

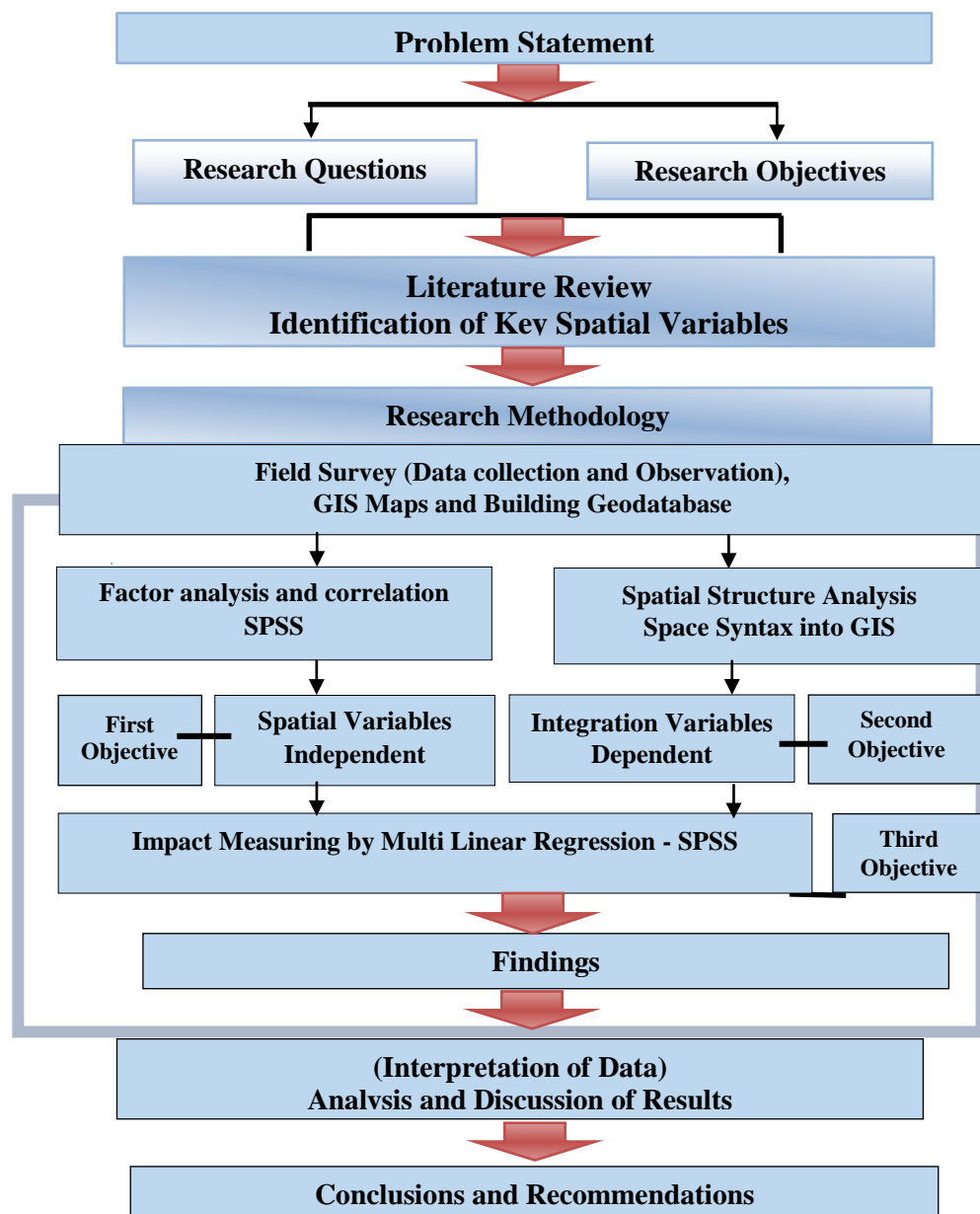


Figure 1.1: Research Framework

1.7 Scope of Research

The research focuses on the urban phenomenon of the informal settlements by measuring the influence values of the spatial factors which consist of location of the informal settlement, land uses in the area, roads network, accessibility and availability of social services, the spatial behavior of residents, vacant lands, legal and planning patterns adopted by the previous studies. Furthermore these spatial factors' correlation with syntactic structure of the urban fabric of the study area on two levels: 1) the level of study area, 2) level of study area with formal layout of surrounding neighbourhoods are measured. This procedure is applied in the attempt to explore the knowledge gap in the interpretation of the phenomenon of the informal settlements through the influence of spatial aspects, in order not to overlook the other spatial factors.

The study investigates the influences of the spatial factors on the integration of the largest informal settlement in Erbil city which has been transformed into the informal neighbourhood as a result of the city expansion. The focus is limited to the process of the physical integration of this settlement internally and with surrounding neighbourhoods.

The Erbil city is selected to be the case study of the research as it offers typical case regarding the location of its informal settlements which are surrounded by planned integrated urban areas and streets. Therefore, they are distinguished by being part of the planned urban environment of the city, but with different features of the physical and socio-economic development.

1.8 Significance of Research

This study contributes to two scales; theoretical and practical. The study contributed to scientific knowledge by developing a new understanding of the urban phenomenon of the informal settlements. The importance of this contribution lies in the quantitative measurements of integration of these settlements in the urban fabric of the city through spatial aspects. Furthermore, this study enriches the scientific knowledge regarding the physical and the spatial side to improve the development of urban areas especially in the informal settlements of developing countries' cities including Erbil city.

Concerning practical contribution, this study assists developing a new process to reshape the urban environment in Erbil city through determining the spatial and the physical factors to get integral urban areas including informal settlements. Also, this study helps to shape new strategies to improve the regulations and laws related to the development of different urban areas containing the informal areas in Erbil city to support the decision makers.

1.9 Structure of the Thesis

This research is organized into five chapters as follows:

Chapter one is a preliminary chapter displays the background of the research. It addresses the informal settlements which appeared as a result of urbanization condition in developing countries' cities. Then it studies the integration of the informal settlements and the relationship of the spatial aspects with the integration of these settlements. Furthermore, the chapter includes the problem statement, questions of the research, research objectives, research methodology, scope of the study, the significance of the research, structure of the thesis and a summary.

Chapter two represents the literature review which consists of main pillars of the study. Firstly, it studies the different aspects of the informal settlements in developing countries. The second part addresses a theoretical study of the integration process in the levels of surrounding areas and the whole city with focusing on the spatial aspects. This part includes the previous studies related to the role of spatial aspects in the integration process of the urban areas in general and the informal settlements. It discusses the spatial factors in these studies which present their importance and justified their selection. The detailed studies of selected key spatial factors and their features in the informal settlements were displayed.

Chapter three exhibits an overview of informal settlements in the study area. The first part focuses on the informal settlements in Iraq, the country of the study area. this part discusses the concept and the situation of informal settlements in Iraq. The background of emerging, growth, and policies of improving these settlements especially during the government institutions are also argued. The second part addresses the informal settlements in Erbil city which represents the urban centre of the study area. Brief background and spatial structure of Erbil city are explained. This part also consists of discussing the situation of informal settlements and the approaches practiced for dealing with these settlements. Moreover, the types of these settlements according to their location on the city's urban fabric are determined and discussed. The last part focuses on the study area (Badawa informal area) through describing the area and its relation to the spatial structure of the city. As well as reasons behind the selection of the study area are detected.

Chapter four presents the research methodology. The chapter at the beginning displays the quantitative approach to the research. It explains survey methods and sources of these data including; data collection in the study area and manipulating the

spatial data. Furthermore, the chapter indicates in details the procedures and methods of sampling. And in the end, it determined acceptable methods of analysis which consisted of methods of factor analysis, space syntax into GIS, and multiple linear regressions which applied in the next chapter.

Chapter five focuses firstly on the analysis of data and of the study. The application of factor analysis technique for analysis spatial factors, the space syntax analysis into the GIS and multi-linear regression are achieved. However, it presents the results of the research.

The chapter displays later the discussion of the study's results obtained from applying the analysis methods. This discussion consists of a critical debate of the findings and their relation to the existing literature and research in Chapter Two to determine whether this new data supports or contradicts the existing information. This discussion leads to the conclusions and recommendations in the next chapter.

Chapter six includes research conclusions. It discusses the way in which the study has achieved the objectives. The chapter also shows the range of contribution of the research in measuring the spatial factors that affect the physical integration of informal settlements in Erbil city. The last section outlines the future research of the study.

1.10 Summary

This chapter addresses the introductory part of the research which is organized into ten sections including the subsequent section discussing the summary of the chapter. The first section introduces to the chapter. The second section consists of the background of the research which addressed the informal settlements that emerged as a result of the state of urbanization in developing countries cities. Then it

studies the integration of informal settlements in the city and how is the role of the spatial aspects regarding the integration process of these settlements. From this background, the next section determines a specific problem of the informal settlements in general and in Erbil city which led to formulate of the research questions and the objectives in the next part, which is summarized in determining the spatial factors' effect on the integration of the informal settlements in the study area.

Furthermore, this chapter explains the framework of the research and determines the quantitative method as the research approach, and then it addresses the different data survey methods which consist of mainly field data collection by questionnaire and the spatial data preparation operated by GIS. Later this section briefly presents the methods which achieved the main objectives of the study, which includes the factor analysis, the space syntax technique, and the multiple - linear regression.

The scope of the research is defined and limited to investigate the spatial factors' effect on the integration of the informal settlements in the planned urban environment of Erbil city. The significance of the study is introduced with emphasizing the contribution of the expected outcome on theoretical and practical levels. Finally, this chapter focuses on the organization of the research which contained six chapters and gave a short description of each chapter in the thesis.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter discusses the main keywords in this study which are informal settlements, integration and spatial factors. Initially, the first part of this chapter consists of a study on informal settlements as a global phenomenon which includes their definitions, characteristics, types, the location and their sites. Furthermore, this part presents the formation and urban growth of informal settlements. The approaches towards the improvements of these settlements are discussed.

The second part focuses mainly on the integration relationship and the spatial dimension of the urban areas especially, the informal settlements in the city. Initially, this section presents a study of the urban physical integration concept according to the relations of different fields and dimensions of urban areas. Then, the levels of integration which contain the hierarchy of components of the urban areas in the city are investigated.

The role of the spatial factors is reviewed in studies related to the integration of the urban areas in general to show the most important factors that are used for the integration of spaces. Spatial aspects of informal settlements and their role in the integration of these settlements have been restudied through the urban planning and urban design studies in developing countries. So, these studies were done to summarize the spatial factors through discussing their importance, and then to explain their influence on the integration of informal settlements. This process assists in selecting the key spatial factors which can be used in examining the integration of

informal settlement in Erbil city. At the end of this part, the selected key factors are discussed through their indicators and variables.

2.2 Informal Settlements in Urban Areas

This part addresses the issues of informal settlements in the cities as an urban global phenomenon. It starts by debating the concepts, definitions, characteristics, and types of these settlements, followed by a background of their formation, location, and size. An overview of the urban growth of informal settlements and position of these settlements in the city are presented. Approaches towards informal settlements are also dealt with making reference to the integration of these settlements in the urban fabric of the city.

2.2.1 Informal Settlement; Concept and Definitions

Informal settlements or slums do not have a standard definition as there are some terms such as; ‘squatter’, ‘shanties’, ‘unplanned’, ‘illegal’, and ‘ghetto’ which give inaccurate meaning to the informal concept (Sirueri, 2015). Despite the fact that they are often used interchangeably, these terms actually refer to different forms of shelter, with distinctions by land tenure, building type, construction method, and legal status. as shown in Table 2.1.

A squatter settlement can generally be defined as a residential area in an urban locality inhabited by the very poor who have no access to the tenured land of their own, and hence "squat" on vacant land, either private or public (Brian & Sandhu, 1995; UN-Habitat, 2015). As these settlements are growing illegally on vacant lands, therefore, urban policies are not very active regarding the development of these areas (Taher and Ibrahim, 2014). In contrast, shanty towns are formally

defined according to the quality of the buildings; shanties are usually flimsy constructions made out of materials such as cardboard, plastic, and corrugated iron. The buildings lack access to services such as water, electricity, and sanitation (Willis, 2009).

Table 2.1 Alternative names for informal settlements

Name	Description
Squatter settlement	Housing built on the illegally occupied land.
Shantytown/shanty	Area of poor-quality housing, built from materials such as cardboard and corrugated iron. A shanty is an individual dwelling made of such materials.
Informal settlement	Area of housing which does not meet legal requirements of tenure, housing quality, and land use.
Slums	In a general context to describe a broad range of low-income settlements and poor human living conditions.
Self-help housing	Housing which has been built by the residents themselves.
Bustee/Favela/Pueblo joven/Eshwaeat,Tajawzat / Bidonville/ ghettos.	Local names in India/Brazil/Peru/Iraq/ Algeria/American Africans.
Spontaneous settlement	The settlement which has developed without formal planning. Maybe due to a land invasion or gradual growth over time.

Unplanned settlements and areas refer to housing are not in compliance with current planning and building regulations (unauthorized housing) (Jain, Chennuri, & Karamchandani, 2016). But illegal settlements are defined as settlements that arise due to the illegal encroachment of land without official land ownership certificates. Officially, it means, the person occupying the land illegally, but the literally landless person (Shrestha, Tuladhar, Zevenbergen, & Banskota, 2014). Regarding the term of “ghettos”, Urban scholars and laypersons, including the residents of the poorest urban neighbourhoods, have long referred to these neighbourhoods as “ghettos” Most social scientists who studied the so-called ghetto usually discussed these

neighbourhoods in terms of the behavioural and attitudinal shortcomings of their residents (Whitehead, 2000).

The more general term ‘informal settlement’ is used to encompass residential areas which may have doubtful land tenure, for example, when settlers buy plots of land from landowners who have subdivided and sold their property without legal permission. Informal settlements are also those where housing regulations have not been followed and the houses have been built by the occupants (hence the terms ‘self-built housing’ or ‘self-help housing’) or informally employed builders. Such settlements usually lack services early in their history due to their informal status, but this may change over time. Due to its broad scope, the term informal settlement is often used in official documents (Willis, 2009).

Some authors believe that informality is a result of fast urbanization (Kit, Lüdeke, and Reckien, 2012). Meanwhile, other authors believe that informal settlements are a result of local government’s inability to provide and plan affordable housing for a low-income sector of the urban population (Ooi and Phua, 2007; Pinfeld, 2015).

Furthermore, the term of informal settlement is used widely in the studies of the urban scholars. However, United Nation agencies such as UN-Habitat focus in their reports and studies on the term of slums and use it in a general context to describe a broad range of low-income settlements and poor human living conditions (United Nations Human Settlements, 2003, 2008). In addition of existence of a wide range of low-income group in the slum areas, the middle-income group also survives in these areas but in a limited range and their presence is due to lack of adequate housing as part of government plans of housing provision. However, the high-income

group plays the role of land speculators and irresponsible property developers in these areas (UN-Habitat, 2016b).

Since it first appeared in the 1820s, the word slum has been used to identify the poorest quality housing and the most unsanitary conditions. Today, the general term “slum” is loose and deprecatory. It has many connotations and meanings and is seldom used by the more sensitive, politically correct, and academically rigorous. But in developing countries, the word lacks the pejorative and divisive original connotation, and simply refers to the lower quality or informal housing. The term “slum” is used in the UN-Habitat reports describing a wide range of low-income settlements and poor human living conditions.

A simple definition of a slum would be “a heavily populated urban area characterised by substandard housing and squalor”. This straightforward description reflects the essential physical and social features of slums, but more meat needs to be put on these bones. Slums in the traditional sense are housing areas that were once respectable – even desirable – but which deteriorated after the original dwellers moved on to new and better parts of the city. The condition of the old homes declined as they were progressively subdivided and rented out to lower-income people. Today, slums have come to include the vast informal settlements that are quickly becoming the most visible manifestation of urban poverty in developing world cities (UN-Habitat, 2003, Lund, 2017). In addition, the slums differ in size, shape, pattern and population size (Taubenböck and Kraff, 2014).

Informal settlements are defined in general as, unplanned settlements which are situated illegally either on the public or private land in a random way without following standards or planning regulations (Ishtiyag and Kumar, 2011). However, one of the most widely used definitions of informal settlements is suggested by

United Nations Habitat Programme. According to this definition, a household is an informal settlement dweller if it lacks one or more of the five following elements: i) durable housing, ii) secured tenure, iii) access to sanitation, iv) sufficient living area and v) access to water. Figure 2.1 and Figure 2.2 show informal settlements suffer from one and multiple shelter deprivation. An advantage of this definition is that it defines informal settlement at the household level (UN-Habitat, 2003,2006).



Figure 2.1: Households in informal settlements suffer from only one shelter deprivation. Cape Town, South Africa. Source: Un-Habitat (2010).

However, most of the other definitions describe informal settlement at the neighbourhood level, for example, Neuwirth, (2016) defines the informal settlement or the slum as it is simply an overcrowded city neighbourhood with lousy housing. And its horizon of emotion and judgment comes from outside. To call a neighbourhood a slum immediately creates distance. A slum is the apotheosis of everything that people who do not live in a slum fear. To call a neighbourhood a slum establishes a set of values-a morality that people outside the slum share -and implies that inside those areas, people don't share the same principles. Thereby, the definitions make it difficult to differentiate between living conditions of the

households within the informal settlement (Roy and AlSayyad, 2004; Patel, Crooks, and Koizumi, 2012; and Neuwirth, 2016).

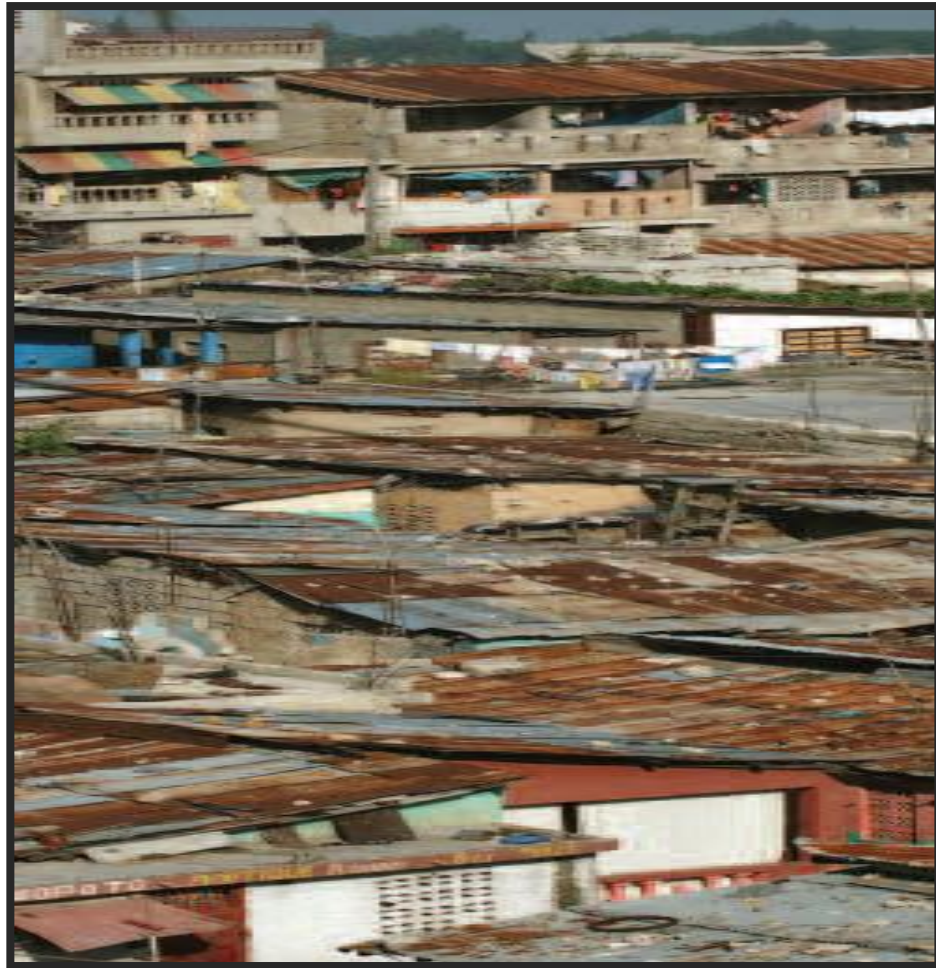


Figure 2.2: Households of informal settlements suffer from multiple shelter deprivations. Haiti. Source: UN-Habitat (2010).

There are researchers who focused on the buildings in informal settlements and considered them as housing units such as Alemie, Bennet, and Zevenbergen (2014) who mentioned that informal settlement consists of residential buildings, generally a shack, built on planned or unplanned land without formal planning approval. Moreover, Tsenkova, Badyina, and Potsiou (2008) revealed that informal settlements are often reviewed in the context of informality and high-density housing, recognizing the fact that they incorporate predominantly informal housing developments.