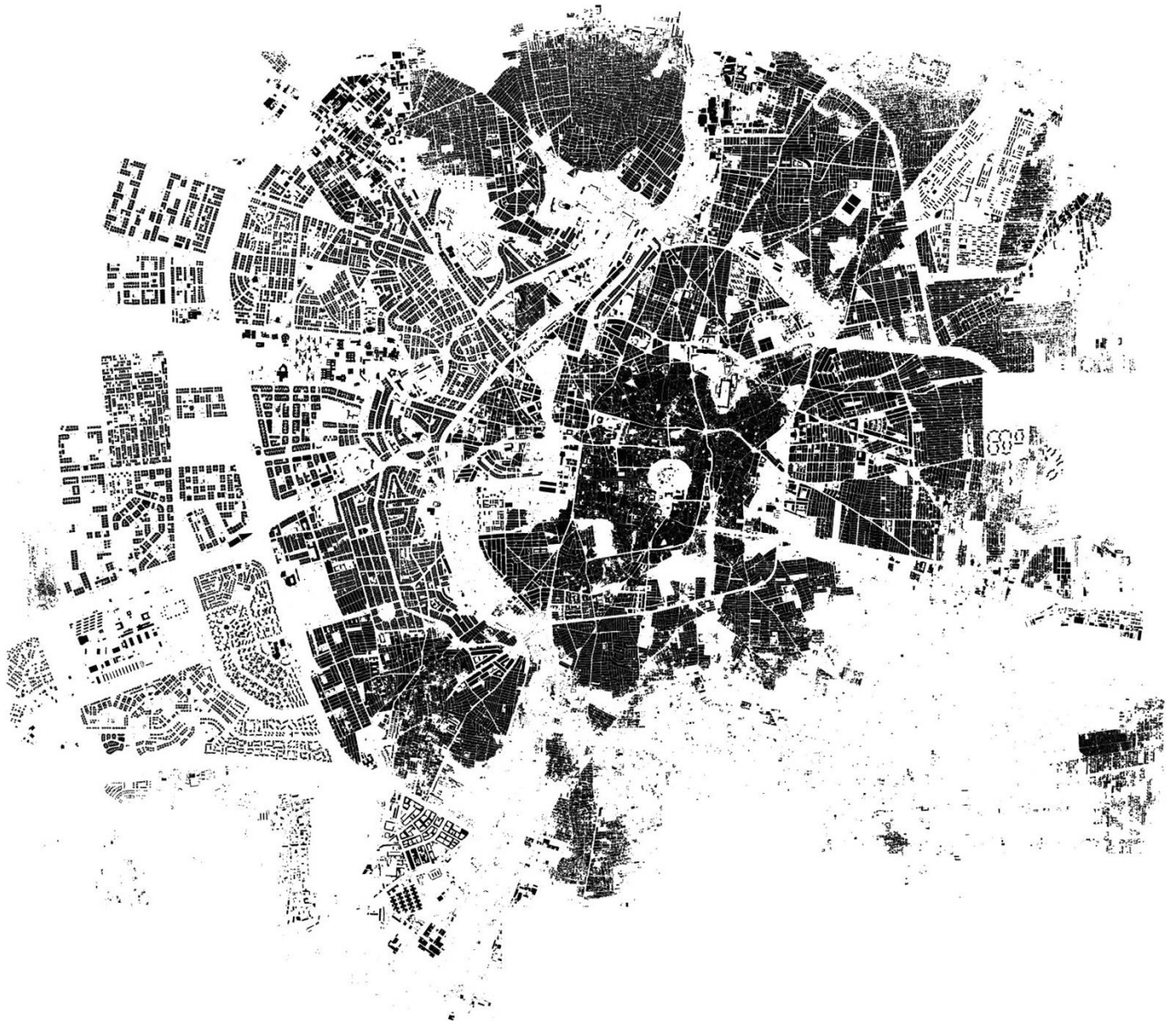


THE INFLUENCE OF URBAN FORM ON THE SOCIAL SUSTAINABILITY OF NEIGHBORHOODS IN ALEPPO

ALBARA ARAB





TECHNISCHE
UNIVERSITÄT
WIEN

DISSERTATION

THE INFLUENCE OF URBAN FORM ON THE SOCIAL SUSTAINABILITY OF NEIGHBORHOODS IN ALEPPO

ausgeführt zum Zwecke der Erlangung des akademischen Grades eines
Doktors der Technischen Wissenschaften Architektur

unter der Leitung von

Univ.-Prof. Dipl.-Ing. Dr.techn. Karin Raith

Begutachtung durch

Ao.Univ.Prof. Dipl.-Ing. Dr.techn. Erich Lehner

Ao.Univ.Prof. Arch. Dipl.-Ing. Dr.techn. Erich Raith

eingereicht an der Technischen Universität Wien

Fakultät für Architektur und Raumplanung

von

Ing. arch. Albara Arab

1428538

Wien, 29.06.2018

Zusammenfassung

Die Debatten im Zusammenhang mit der Frage der nachhaltigen Entwicklung betonen zunehmend die soziale Nachhaltigkeit und deren Ausmaß und, wie dieses von der städtischen Form gefördert werden kann. Die daraus resultierenden Forschungsergebnisse, welche in der westlichen Welt behauptet werden, bleiben jedoch unpräzise, was die Frage aufwirft, ob diese auf Entwicklungsländer anwendbar sind, die mit unterschiedlichen sozialkulturellen Veränderungen und unterschiedlichen Herausforderung der Urbanisierung konfrontiert sind.

Das Hauptziel dieser Forschung ist es, die Beziehung zwischen städtischer Form und sozialer Nachhaltigkeit auf der Ebene der Nachbarschaft zu untersuchen. Um die Triangulation der Daten zu ermöglichen, wird in dieser Studie ein auf verschiedene Verfahren basierender methodologischer Ansatz angewendet, der sowohl eine quantitative als auch eine qualitative Dimensionen berücksichtigt. Primärdaten wurden in drei Stadtteilen von Aleppo gesammelt, wobei unterschiedliche Methoden verwendet wurden, einschließlich einer Fragebogenerhebung und semi-strukturierte Interviews. Die Art und das Ausmaß der Beziehungen wurden mittels statistischer Analysen untersucht und durch die Befragung der Anwohner über deren Umgebung ergänzt.

Die Ergebnisse zeigen, dass einige Aspekte der urbanen Ausformung signifikant mit dem Ausmaß einer sozialen Nachhaltigkeit verbunden sind, doch variieren Art und Umfang der Wahrnehmung innerhalb unterschiedlicher Aspekte. Auch andere Faktoren wie lokale soziale Bedingungen können darauf einen großen Einfluss haben. Die Rolle der städtischen Form bei der Förderung der sozialen Nachhaltigkeit erwies sich daher als nicht so einfach, wie sie manchmal dargestellt wird. Desweiteren hängt sie stark von sozialen und demografischen Faktoren ab. Auf der Grundlage der Forschungsergebnisse werden zielführende Praktiken und Leitlinien vorgeschlagen, um die Schaffung von sozialverträglicheren Vierteln in Syrien zu erzielen.

Abstract

Debates within the sustainable development agenda increasingly highlight social sustainability and the extent to which urban form may promote it. Previous research outcomes, contended in the western world, remain vague, raising questions regarding their applicability to the developing countries which face different socio-cultural shifts and different urbanization challenges.

The main objective of this research is to examine the relationship between urban form and social sustainability on a neighborhood scale. In order to allow for data triangulation, the research adopts a multi-method approach, including both quantitative and qualitative methods. Primary data was collected, across three neighborhoods in Aleppo, using different methods including site surveys, household questionnaires, and semi-structured interviews. The nature and extent of relationships were investigated through statistical analysis and complemented by opinions of the residents about their surrounding built environment.

The findings reveal that some aspects of urban form are significantly associated with dimensions of social sustainability. However, the nature and extent of the relationships vary from aspect to aspect. Indeed, Other factors independent of architectural and urban conditions, such as socio-economic factors, can have a significant impact on social sustainability. Thus, the role of urban forms in promoting social sustainability was found to be not as straightforward as is sometimes portrayed and dependent on to a considerable extent on the given social and demographic factors. Based on the findings of the research, policies and guidelines are proposed to achieve more socially sustainable neighborhoods in Syria.

Contents

Zusammenfassung.....	I
Abstract	II
Acknowledgments.....	III
Contents	V
Chapter 1 Introduction.....	1
1.1. Research Motivation and Background.....	2
1.2. Research Question	3
1.3. Limitations of Research.....	3
Chapter 2 Urban Form	5
2.1. Introduction	6
2.2. Comprehending Urban Form.....	6
2.2.1 Definitions and Scales.....	6
2.2.2 Aspects and Elements.....	7
2.3. Establishing a Framework for Measurement of Urban Form.....	8
2.3.1 Density.....	9
2.3.2 Land Use	11
2.3.3 Housing and Building Characteristics	14
2.3.4 Urban Layout.....	16
Chapter 3 Social Sustainability	18
3.1. Introduction	19
3.2. The Concept of Sustainable Development	19
3.3. Defining Social Sustainability	21
3.4. Social Sustainability in an Urban Context.....	22
3.5. The 'Neighborhood'	26
3.6. Social Sustainability and Conceptual Overlaps	28
3.6.1 Social Cohesion and Social Capital	28
3.6.2 Social Equity and Social Exclusion	30
3.7. Establishing a Framework for the Assessment of Social Sustainability.....	31
3.7.1 Social Interaction.....	31
3.7.2 Feelings of Safety.....	33
3.7.3 Sense of Place Attachment.....	34

3.7.4	Access and Use of local Facilities and Services	36
Chapter 4 Urban Development of Aleppo		39
4.1.	Introduction	40
4.1.	Urban Morphology of Aleppo.....	42
4.1.1	City Origins.....	42
4.1.2	The Islamic Era: Flourishing of Urban Life	44
4.1.3	The Ottomans: Ottoman Reforms and Westernization	54
4.1.4	1918 - 1970: Urban Fabric and Socio-Political Confrontation	64
4.1.5	From 1970 Onwards: Urban Growth and Informal Settlements.....	68
Chapter 5 Research Methodology.....		78
5.1.	Introduction	79
5.2.	The Overall Methodological Approach.....	79
5.3.	Indicators and Measures	80
5.3.1	Indicators Measuring Urban Form.....	81
5.3.2	Indicators Measuring Social Sustainability	86
5.3.3	Indicators Measuring Interfering Influences	89
5.4.	Case Study Method.....	90
5.5.	Methods of Data Collection	91
5.5.1	Literature Review	91
5.5.2	Site Survey	92
5.5.3	Household Questionnaire Survey	92
5.5.4	Semi-Structured Interviews	93
5.6.	Methods of Data Analysis.....	95
5.6.1	Qualitative Analysis	95
5.6.2	Correlations	95
5.6.3	Content Analysis	96
Chapter 6 Characteristics of the Study Sites		98
6.1.	Introduction	99
6.2.	Profiles of the Case Study Sites	100
6.2.1	Al-Shahbaa.....	100
6.2.2	Al-Hamadaniyeh.....	110
6.2.3	Hanano	121
Chapter 7 Urban Form and Social Sustainability.....		129

7.1.	Introduction	130
7.2.	Social Interaction.....	131
7.2.1	Physical Form and Social Interaction	132
7.2.2	The Influence of Nonphysical Factors on Social Interaction	134
7.3.	Feeling of Safety	135
7.3.1	Physical Form and Feeling of Safety	137
7.3.2	The Influence of Nonphysical Factors on the Feeling of Safety.....	139
7.4.	Sense of Place Attachment	139
7.4.1	Physical Form and Sense of Place Attachment	141
7.4.2	The Influence of Nonphysical Factors on Sense of Place Attachment	142
7.5.	Access and Use of Local Facilities and Services.....	142
7.5.1	Physical Form and Use of Local Facilities and Services	145
7.5.2	The Influence of Nonphysical Factors on Access and the Use of Local Facilities and Services.....	147
Chapter 8 Discussion and Conclusion		149
8.1.	Introduction	150
8.2.	Summary of Research Findings	150
8.2.1	The Influence of Density on Social Sustainability	150
8.2.2	The Influence of Land Use on Social Sustainability	151
8.2.3	The Influence of Housing Characteristic on Social Sustainability	152
8.2.4	The Influence of Urban Layout on Social Sustainability	153
8.3.	Implications of the Findings for Policy and Practice	154
8.4.	Scope of Further Research	156
8.5.	Final Remarks.....	157
Bibliography		159
List of Figures		179
List of Tables		183
Appendices.....		185

Chapter 1

Introduction

1.1. Research Motivation and Background

Sustainable development is an issue that has become increasingly important over the last two decades. The concept of sustainable development, in conjunction with social, economic and environmental aspects of development, has emerged as a new development paradigm. Different approaches to sustainable development have given different priority to the three main aspects.

In Syria, rapid urban growth, coupled with strong spatial segregation in the cities, has resulted, as the case of Aleppo¹ shows, in a social crisis, with poverty, weakening social ties, as well as a deterioration in the quality of life. The social dimension has been highly under-represented, with the focus being primarily on infrastructural development and programs that aim at upgrading informal settlements, e.g., the Aleppo Urban Development Project². These facts re-emphasize that design oriented to social sustainability in cities should not just be an add-on to the environmental dimension or a technical matter of solving social issues but that it is also about enabling urban forms to build and nurture a cohesive society and sustained urban growth. As the country is preparing for the post-war reconstruction and development phase, there is a need to develop a stronger conceptual understanding of the essential social dimension of sustainable development.

One of the key challenges in applying the social dimension of sustainability in the design of cities is the lacking understating of the relationship between urban form and social sustainability. There has been extensive research and intense debates in the last few decades on sustainable cities and the extent to which their urban forms can

¹ In 2011, almost half of the population in Aleppo lived in 22 underserviced informal settlements of different types and sizes, which amount to 35% of the city's built-up area.

² The Aleppo Urban Development Project promoted sustainable urban management and development. The Aleppo City Development Strategy (CDS) process was co-funded by the Cities Alliance (2006), the Deutsche Gesellschaft für Technische Zusammenarbeit (GTZ), and the City of Aleppo. Besides an urban spatial component, it also integrated other sectors, such as local governance, urban economy and service provision.

contribute towards ensuring a socially sustainable future. However, the outcomes are less satisfactory, contradictory and more often than not, cannot be transferred to developing countries which face entirely different socio-spatial shifts and urban challenges. This causes difficulties when attempting to balance social sustainability not only at the levels of urban policy, design and implementation but also in integrating it in different spatial scales.

The lack of empirical research has made it imperative to rethink not only the basic urban design concepts but also governance policies and development guidelines. The top-down interventions thus far have not sufficiently addressed social needs at local or community level. A renewed focus on this relationship at neighborhood scale can, therefore, make it easier to implement broader policies that have remained at the city or at the national level. Empirical evidence about the influence of urban forms on social sustainability at the local level, which not only informs the design practices through bottom-up approaches but also becomes integral to development policies is essential to make the society more socially cohesive and inclusive.

1.2. Research Question

This study examines and compares different neighborhoods of Aleppo and analyses whether there are connections between their urban form and their social sustainability. The main research question is:

In what ways and to what extent does urban form contribute to the social sustainability of neighborhoods in Aleppo?

1.3. Limitations of Research

Although many of the findings presented in Chapter Seven are significant, there are several reasons why caution should be exercised in interpreting these results, as generalizations are made on the basis of a small number of neighborhoods. Moreover, it could be argued that the choice of neighborhoods for the case studies is not representative of Aleppo and that the areas of the neighborhoods, which are defined by administrative boundaries, do not correspond to what the residents understand as

their neighborhoods. However, in the initial stage of this research, I attempted to select neighborhoods that differ in date of construction, urban location, predominant building typology, and inhabitant structures (wealth, social class, etc.). Later on, my choice was limited to the newly developed areas, as traditional neighborhoods and informal settlements were destroyed and/or deserted, as a result of the war that took place in Aleppo. Therefore, it was not possible to carry out site surveys or household questionnaire surveys there.

There was a lack of incentive for respondents to reply to the household questionnaire and the lack of time and resources that would have been necessary to increase the response rate made it less possible to triangulate all the data. There were also limitations in using the telephone for conducting interviews to collect data, as most of the interviewees responded briefly to questions and refused to have their interviews recorded.

Collecting formal documents such as written documents, maps, plans of residential areas and information on land use in the neighborhoods proved tedious and time-consuming, as some departments granted only limited access to such materials due to the 'sensitivity' of this information and other security issues.

Finally, it is important to note that this research was conducted during a period in which significant unrest took place in Syria. This made it impossible for the author to return to Aleppo and carry out fieldwork personally as his own safety would have been at stake. He had to fall back on information he had already collected before the escalation of the war. Therefore, a change in the research direction and the methodological approach was made to take these circumstances into account. In addition, due to the recent conflict, some of the structural and social conditions surveyed before 2012 and documented in this study may no longer exist and the relevant information may no longer be valid.

Chapter 2

Urban Form

2.1. Introduction

This chapter examines the concept of urban form. It provides an overview of the literature on urban form, its definition, its meanings, attributes and main aspects, and its relationship to social sustainability. It also sets the framework for an empirical study of the relationship between urban form and social sustainability.

2.2. Comprehending Urban Form

2.2.1 Definitions and Scales

There seem to be various approaches to defining the term urban form. However, to date there is no single definition of the term as researchers have interpreted urban form differently. This is because in conceiving of urban form, it depends on the geographic scale from which it is being viewed and, secondly, the purpose of the analysis. This would imply that depending on the scale in which urban form is viewed, the methodological design would have to reflect this scale in undertaking any analyses. The term 'urban form' can be used simply to describe a city's physical characteristics. At a metropolitan region scale, urban form can be defined as the spatial configuration of different fixed elements (Anderson et al., 1996). This refers to the various elements such as street layout, building configurations, land use, urban spaces and so on. Lynch defined urban form as "the spatial pattern of the large, inert, permanent physical objects of the city." (2001.p. 47) Jabareen (2006 p. 39) argues that urban form is a result of aggregations of relatively repetitive and combined elements (generating urban patterns) that have strong similarities and can be grouped into concepts. Such elements of concepts might be overall shape and size, urban grains, street patterns, urban blocks, aesthetic design, typical spatial configuration, layout and more. They can also be seen as a composite of characteristics related to land-use patterns, transportation systems and design characteristics (Handy, 1996). In simpler terms, urban form is defined as size, shape, and intensity of urban settlements and the spatial organization of different types of land use (Bramley & Kirk, 2005). Barton and Tsourou (2000) defined urban form as the distribution and pattern of human settlement within the city region and described that the key variables are density, shape, the degree of dispersal or concentration and the quality of the

infrastructure for public transport. According to Tsai (2005), urban forms can be classified in three categories; density; diversity, and spatial-structure pattern.

As Clifton et al. (2008) showed, perspectives on the urban form can be classified in five categories: landscape ecology, economic structure, transportation planning, community design and urban design. Clifton further explains that these categories have eventually succeeded in providing a framework for the discussion of rapidly growing literature in the area of the sustainable urban form.

However, the definition of urban form depends on the scale on which urban form is viewed and analyzed, and has been described as the “morphological attributes of an urban area” (Williams et al., 2000). Aspects of urban form, therefore, vary, from, at a very localized scale, features such as building materials, façades, to, at a broader scale, the spatial arrangement of streets and blocks, or urban layout. Dempsey et al., (2010) underline that urban form does not only relate to physical features but also encompasses non-physical aspects such as, social and political processes in places which are physically manifested in different aspects of urban form. The scales (levels of resolution) at which urban form can be defined or measured include the individual building, street, urban block, neighborhood and city (Kropf, 1996). This hierarchical spatial view influences how urban form is measured, analyzed and eventually understood.

2.2.2 Aspects and Elements

To better understand urban form and examine its relationship to social sustainability it is necessary to comprehend what constitutes its fundamental aspects. Cozen (1960) considered land uses, building structures, plotted patterns and street patterns to be the most important elements while Karl Kropf, in his paper ‘Urban tissue and the character of towns’, acknowledged that the urban form elements could be seen according to different levels of resolution (scales) (Figure 2.1). At a very low level, the urban form includes only the streets and street blocks. At a high level of resolution, urban form might include many details such as the construction materials of a building or an open space (Kropf 1996). Jenks and Jones (eds., 2010, p. 22) identified density, land-use, transport infrastructure, layout and housing/building as broad and inter-related elements that make up urban form in a given city and are claimed to influence

sustainability and human behavior. One of the most commonly used, researched and debated components of urban form against various aspects of sustainability, is density (Jenks & Burgess eds., 2000; Williams et al., 2000). Oliveira in his extensive work on urban forms noted that generally urban forms are constituted by a set of elements; urban form-streets (including the open spaces for circulation and the open spaces for sedentary activities), street blocks, plots, and buildings. (Oliveira, 2016, p. 8). Similarly, Hemani et al., (2016), identified the open spatial network, land use, density, blocks, and built components as key elements of urban form.

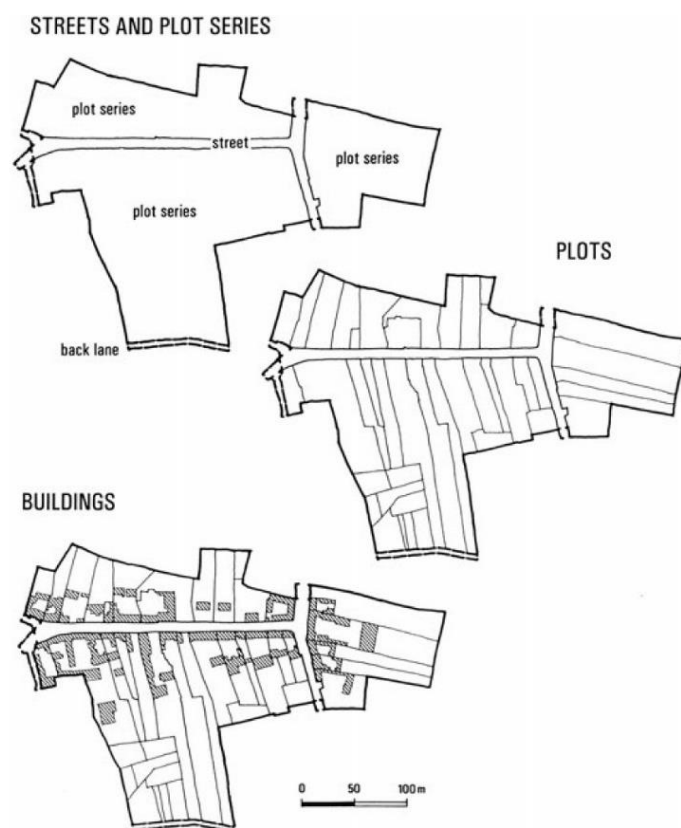


Figure 2.1 Urban form shown at increasing levels of resolution

Source: Kropf, 1996

2.3. Establishing a Framework for Measurement of Urban Form

Based on a comprehensive review of the literature, this research identifies four aspects of urban form that are theoretically relevant, are claimed to influence various aspects of social sustainability and human behavior, and for which data measurements would be available. These variables are interrelated and measured at

different scales. Therefore, they may vary in the way they are perceived, and it is difficult to isolate individual components completely. The following subsections discuss these elements in more detail and in terms of their relevance to social sustainability.

2.3.1 Density

The concept of density is claimed to be of central importance in planning, urban design, and architecture (Rapoport, 1975, p. 133). It is used to express urban morphology and the built form of existing development, to define the built environment of a new development, and to estimate infrastructure requirements. In simple terms, density can be described as the presence of people (or things) and their distribution in space (Rapoport 1975). Hence, its measurements can be defined mathematically to express the intensity of something within a space or a concentration of things within an area. When applied in the context of the built environment, density measures the degree of activity intensity; diversity refers to spatial scale or grain at which different land uses interact, such as land-use mixing and jobs-housing balance (Tsai, 2005).

However, there have been several attempts to clarify and redefine concepts of density (Churchman, 1999; Forsyth, 2003). This is because although it appears to be a simple, neutral³, objective and rational tool at the outset, the concept of density lacks clarity due to an absence of agreement on what should be taken into account and what should not in calculating or measuring it (Churchman, 1999; Forsyth, 2003). This lack of clarity arises from the fact that the variables used in the calculation of density are not standardized. The resulting complications are:

- The differences in the unit of area used (for example, square km or mile, hectare, acre).
- The difference in land uses that are included in the calculations.
- The difference in what being measured (for example, households, habitable rooms, or people).

³ It is neutral in the sense that one cannot know immediately whether a given density level has positive or negative impact.

Confusion regarding the concept of density also stems from its frequent use to express different related concepts such as population density and building density, as well as similar terms such as crowding (Churchman, 1999). In his seminal paper, Rapoport (1975) attempts to distinguish density from crowding. He argues that density, as it was used until then, was a mathematical expression of people within an area, whereas crowding is better defined as a perception of excessive density. While crowding is a personal and thus a subjective judgment (Alexander et al., 1988; Rapoport 1975) density is a more objective measurement. At the same time, the two concepts are intertwined, because when an individual feels crowded he or she is making a perceptual judgment of the physical environment in reference to cultural or social norms as well as to personal preference under different circumstances (Rapoport, 1975). Therefore, Rapoport defined density as experiential rather than just as a physical measure.

Qualitative factors such as building form or spacing between buildings can be important in the perception or experience of density. Building density can be manifested in different building forms and or spatial layouts by a simple manipulation of unit configuration and spacing. Figure 2.2 shows that the same density can be achieved by varying building height, block size and building depth.

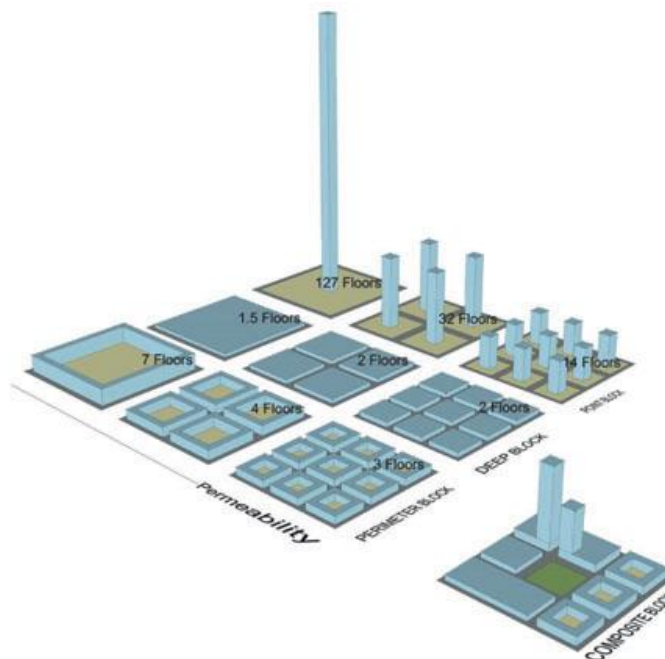


Figure 2.2 Density and urban form

Source: Llewelyn-Davies, 2007, p. 88

The influence of density on sustainability and its role in sustainable urban form have been researched the most as it has a significant impact on all dimensions of social sustainability (Bramley et al., 2009). However, results from empirical research suggest that the proposed benefits of high residential densities need to be considered alongside the disadvantages. There is a consensus, in literature and policy, that increasing the density, through efficient land use and increasing number of residents in a given area, leads to more social advantages. The prevailing view is that residents living in densely populated neighborhoods closer to their neighbors are more likely to share urban facilities (Llewelyn-Davies, 2007) and thus contribute positively to social equity by making access to service and facilities easier and more viable (Burton, 2000). This is complemented by the widespread opinion that high density contributes positively to social interaction and a feeling of safety (Talen, 1999, Jacobs, 1961), sense of community (Nasar & Julian, 1995) as well as a lower level of social segregation (Jenks et al., 1996; Williams et al. 2000). Some research has suggested that higher residential densities can reduce the use of cars (Freeman, 2001; Ferguson & Woods, 2009) and increase the use of public transport by residents (Burton, 2000).

However, higher densities have also been associated with social withdrawal, commonly due to the perception that a neighborhood is overcrowded (Freeman, 2001). The perception of crowding within a neighborhood can mean that an individual retreats to his or her home and avoids interactions with neighbors (ibid). Also, the proximity of dwellings to one another in high-density areas can lead to privacy being impaired inside a dwelling; for example, noise may be transmitted through walls and floors in terraced housing and flats (Abu-Ghazze, 1999). The proximity of buildings can also reduce using private open spaces such as gardens or balconies, as they are more likely to be overlooked by neighbors (Williams, 2005). Residents' access to open spaces may be reduced because of living in high-density areas, regardless of their level of income (Burton, 2000). Dissatisfaction with the neighborhood is often higher in areas of high residential densities (Bramley & Power, 2009).

2.3.2 Land Use

The term land use can be defined as “the total of arrangements, activities, and inputs that people undertake in a certain land cover type” (IPCC, 2000). Within the urban

context, the dominant land use tends to be residential, alongside with other functional land use such as retail, offices, infrastructure and other uses. Mixed land use is promoted as a principal element of sustainable urban environments (Burton & Mitchell, 2006).

However, there is a lack of consensus about what makes up a mixed-use built environment. There is a little mention in the literature of the most appropriate range and types of land use to be included to achieve a sustainable mixed-use neighborhood. While it is simplistic to suggest that more than one land use in a neighborhood indicates mixed-use, prescriptive theory does not discuss all land uses in recommendations for sustainable communities and neighborhoods. However, there are examples of perspective theory, which identify those land uses which should be incorporated.

Empirical research conducted in the UK identified 'everyday' services and facilities that are most frequently used when they are provided, these include; open spaces, convenience stores, post office, pub, primary school, secondary school, and supermarket. Other facilities to which theorists claimed that residents should have access to, on less frequent use, include a general medical practice, community center, pharmacy, cafe/restaurant, and a bank (Burton, 2000; Urban Task Force, 1999; Barton, 2000). In Syria, the Ministry of Housing and Utilities lists the public facilities and services that must be included in a neighborhood master plan (Table 2.1).

Although the concept of mixed land-use is well accepted in theory, it shows several limitations in policy and practice in Syria as the services and facilities in newly developed neighborhoods are still separated from residential areas according to the official master plans.

Table 2.1 Local facilities according to Ministry of Housing and utility standards

Facility	Population	Area of the land specified for the service (m² per person)
Kindergarten	6000	10m ² pp (5% of residents are considered to be kindergarten age)
Primary school	6000	10m ² pp (16% of residents are considered to be in primary school age)
Local center	6000	0,5m ² pp
Green Spaces, play areas	6000	1-4m ² (depending on the type of housing)
High school	12000	15m ² pp (7% of residents are considered to be in high school age)
Local public garden	12000	1m ² pp
Health center	12000	0,2m ² pp
Service center (pharmacy, Café, Resturant community center, worship place, Gas station)	12000	1m ² pp

One of the purported benefits of the mixed-use neighborhood is increased levels of walking by residents. Including a range of services and facilities within walking distance from residences may also help to reduce the use of cars (Barton et al., 2003; Grant, 2002). Researchers in New Zealand have found that primary school children would prefer walking to school than going by car (Mitchell et al., 2007). Walking to school would enable the children to explore their local environment and chat to friends, thus helping to develop their independence while also providing exercise. It could be argued that these three benefits apply to adults as well: being aware of the local environment may encourage residents to develop a sense of place attachment with their neighborhood (Borst et al., 2008); daily exercise in the form of walking to facilities may contribute to a person's well-being and health; and regular walking between the home and various facilities could lead to recognition between people which in turn could develop into frequent social interactions (Burton & Mitchell, 2006)

Other claimed benefits of mixed land use include providing a secure environment by generating daytime/evening activities, increasing natural surveillance and enhancing the quality of neighborhoods which in turn helps to revitalize community life by making streets, public spaces and pedestrian-oriented retail become places where people

meet. Mixed land use also creates a greater sense of place and community identity, since people perform various activities (live, shop, play and/or work) nearby, increasing the probability “to meet, greet, smile & talk thus connecting the community” (Bahadure & Kotharkar, 2012).

2.3.3 Housing and Building Characteristics

The characteristics of housing and other buildings in urban settlements can have an essential bearing on everyday life, and its influence extends beyond the density of urban form (Dempsey et al., 2010). Characteristics such as building type, height, design, and the potential for modifications and adaptability, may influence how people behave in their surrounding built environment (Holmes, 2007). This supposed to strengthen the psychological connection between the residents and their neighborhood and thus contribute positively to their sense of place attachment.

Neighborhoods that include a mixture of residential architecture types of various sizes appeal to a cross-section of society (Bailey et al., 2008). Mixed communities may be formed as a result of residents at different stages of the life cycle living in the same neighborhood (Barton, 2000; Bailey et al., 2008). It then follows that people of different ages can offer different services to the community (Barton, 2000). A balanced mix of people at different stages of the life cycle ensures that there is a constant and even pressure on facilities and amenities, for example, there is a constant supply of children for primary schools rather than there were peaks and troughs. However, Barton (2000) points out that ideally there should be a mixture of house sizes and types and gardens, such as large detached houses with small and large gardens and terraced housing with small and large gardens, therefore providing prospective residents with a range of options to suit their requirements. The likelihood of the homogenization of a neighborhood and its community may be reduced by building neighborhoods with a mix of housing types and sizes combined with a mix of tenures. People are then given a wider range of options when choosing where to live (Silverman et al., 2006). Research has indicated that the mix needs to be fine grain for mixed communities to genuinely exist and that there should be no difference in the aesthetics between the different types of housing (ibid). This can also be achieved by providing flexible buildings structure that has sufficient potential to be appropriated in various ways. For

example, apartments that can be subdivided or combined, transformed into home offices, medical practices, studios, shared flats for students or assisted living to continue accommodating an aging resident as in the 'lifetime homes' model (Holmes, 2007). However, due to the lack of empirical evidence, this approach of social mix has been criticized in recent writings. Butler (2003), pointed out that having a mixed housing in a neighborhood does not necessarily translate into social mixing between residents. While Bramley et al. (2006) noted that social sustainability could not be achieved by merely mixing people with different socio-demographic characteristic but also by ensuring that they personally interact.

Moreover, building Height was found to influence social interaction and participation in social activities (Gehl, 2011). For example, children who can see streets or immediate nearby spaces from their homes can follow what is happening outside and who is playing and thus be motivated to go out and play compared to their counterparts who live in a high-rise building (Abu-Ghazze, 1999).

Furthermore, having buildings frontages 'active' adds vitality and life to the public realm, which in turn influence the social behavior in the street. The concept of active frontages has primarily been developed through the work of Jan Gehl over the last decades but has its roots in the work of Jacobs (1961). Active frontage is defined as "the frontage or edge of a building or space that has windows and doors as opposed to blank walls, fences, and garages" (ODPM, 2004a, p. 103). Llewelyn Davies (2007) listed several attributes for active frontages, which are:

- frequent doors and windows, with few blank walls;
- narrow frontage buildings, giving vertical rhythm to the street scene;
- articulation of facades, with projections such as bays and porches incorporated, providing a welcoming feeling; and, on occasion,
- lively internal uses visible from the outside or spilling onto the street (ibid, p. 89).

Active building frontage is claimed to be essential character of buildings in a socially sustainable neighborhood. Buildings that open on to a street and have windows looking over public spaces (i.e., high levels of active frontage) provide residents with opportunities to overlook streets and enhance natural surveillance. This low-level surveillance can enhance feelings of safety on the street, particularly when compared

to streets with many blank walls (Jacobs, 1961). An awareness of the public space beyond the front door can lead to residents feeling they have a shared responsibility for that space and what happens in it (Doeksen, 1997). Levels of crime may be low as a result of the social control of residents over the space. The collective responsibility of residents for the space may increase the levels of social interactions that occur between them (ibid.). The perception of a street being safe as a result of active frontages can aid social interactions. A study of a variety of urban neighborhoods revealed that as levels of active frontage increased so did social interactions (Dempsey, 2009). Residents reported that they stop and interact with one another because they feel comfortable in areas that are overlooked.

However, too much natural surveillance may hinder social interaction (Raman, 2010). Residents whose front doors open on to areas that are heavily overlooked, both from buildings and the street, tend to have lower levels of social interaction than those with a moderate amount of surveillance (ibid.). The amount of surveillance provided by active frontages needs to be carefully balanced with levels of privacy to ensure that privacy is not impaired and opportunities for social interaction are not reduced.

2.3.4 Urban Layout

Urban layout can be defined as the spatial arrangement and configuration of streets, blocks, and buildings in relation to each other (Cowan, 2005). Its often referred to at the street scale, such as a grid or tree-like (cul-de-sac) street patterns (Dempsey et al., 2010).

Biddulph (2007) explains that the important aspect of urban layout to measure is its level of connectivity and permeability. The term permeability refers to “the amount of access that is possible within the adopted residential block structure, and it is an important quality to consider, particularly for pedestrians and cyclists.” He further explains that an area that is less permeable will have, for example, an urban form of larger blocks or a cul-de-sac layout. As a result, people have a far more limited number of routes between possible destinations, while the distances that they must travel will be longer. Such layouts tend to discriminate against both pedestrians and cyclists.

On the contrary, pedestrian movement can be aided and encouraged by a grid or deformed grid street pattern consisting of short blocks which give pedestrians varying views and options for routes (Burton & Mitchell, 2006). Shorter blocks contribute to the legibility of a neighborhood by enhancing the pedestrian's knowledge and understanding of where they are (Llewelyn-Davies, 2007). In their work on the inclusive urban design, Burton and Mitchell suggest that "street blocks should be of varying short lengths from around 60-100m to allow for variety" (2006, p. 73).

A hierarchy of street types can also aid orientation; high streets are the primary streets situated at the commercial and social center of an area or neighborhood with secondary and tertiary streets feeding into them (ibid.). A more permeable urban layout influences how lively and well-used space is (Cowan, 2005). Streets which are well-connected to facilities and services are claimed to be more frequently used than deserted ones thus making outdoor activities more feasible to take place. (Gehl, 2001; Gehl et al., 2004).

Neighborhoods with a well-connected layout are expected to have many benefits. Increasing the amount of walking does have a positive impact on people's health, both physical and mental (Burton & Mitchell, 2006). Encouraging people to walk rather than use their cars is beneficial for the environment and also for the community. Residents who regularly walk around their development may grow familiar with one another and develop relationships through social interactions as a result of frequent contact in the open public spaces. Wide pavements that are well-lit also enhance people's feelings of safety.

Chapter 3

Social Sustainability

3.1. Introduction

This chapter provides an overview of the literature on social sustainability, including the evolution of the concept within the context of sustainable development. The chapter further explores the meaning of social sustainability, identifies what characterizes it, sets out its dimensions, building a basis to develop a framework for the analysis of the concept in relation to urban form at the neighborhood level.

3.2. The Concept of Sustainable Development

The term 'Sustainable Development' or 'sustainability' has evolved over the last decades (Colantonio & Dixon, 2011) as a result of the environmental protest that slowly became a broader movement which recognized the inter-connected ecological, social and economic consequences of development (McKenzie, 2004; Cuthill, 2009).

Sustainable development became a concept at a global level in 1987 following the Brundtland report by the United Nations Commission on Environment and Development (UNCED). In this report, the concept appeared as a balance between environmental protection, social equity, economic growth and the importance of the link between them (Pearce et al., 2012, p. 23). Sustainable development was defined as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (WCED, 1987). Although this definition of sustainable development has come to be widely used, it received wide criticism, mainly due to the vagueness and lack of clarity associated with the meaning of 'needs.' The understanding of development linking the three main components of economic, environmental and social aspects together became the core of the concept of sustainable development. The concept was elaborated in a much more detailed global action plan in Agenda (also known as 'Earth Summit'), adopted by 150 countries at the United Nations Conference on Environment and Development (UNCED). It went beyond ecological sustainability to include other dimensions of sustainable development, such as: reducing the use of energy and raw materials, reducing the production of waste and pollution, protecting the ecosystem and finally, sharing the wealth and promoting equal opportunities (Pearce et al., 2012). Subsequently, the concept of social sustainability further evolved through

international discourses such as World Summit on Sustainable Development at Johannesburg in 2002, which again revised the definition of the concept of sustainable development based on three pillars – social, environmental, economic – symbolized as “People, Planet, Prosperity” (Moldan et al 2012).

The interrelationship between the social, environmental, and economic aspects of sustainability is commonly represented by one of two models. The first model often referred to as the ‘Russian Doll,’ features three concentric spheres. The ‘economic’ capital is placed at the center as the basis of wealth creation, which drives the development engine (O’Riordan et al., 2001) but at the same time is constrained by social and environmental considerations. A more recent but still widespread model of thinking, the ‘Three Pillars’ model, where sustainability is seen as the integration of economic enterprise, social well-being, and environmental integrity, to achieve a ‘dynamic equilibrium’ between human needs for development and environmental and economic cost of this development (Briassoulis, 2001). However, each of the three ‘pillars’ has its own characteristics and logic, which are interdependent and quite often also likely to clash with each other.

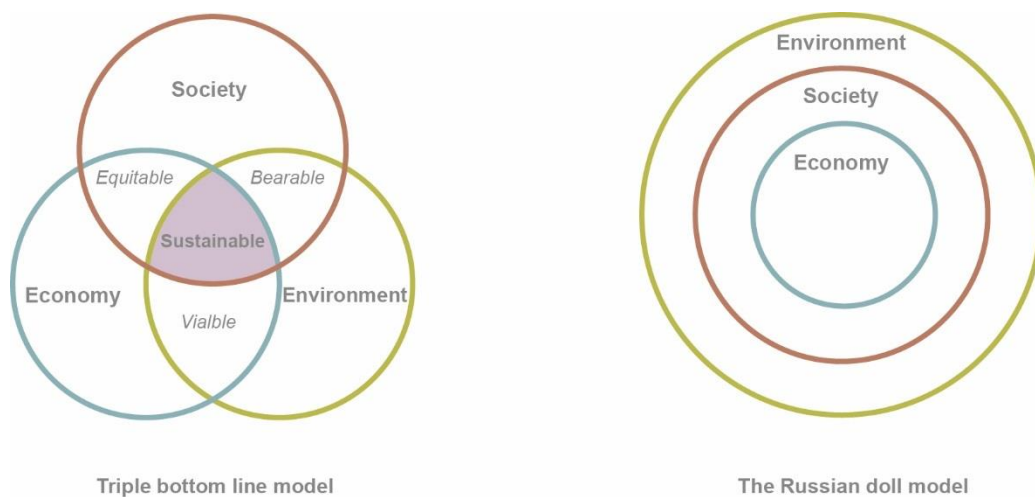


Figure 3.1 Different models representing the interrelationship between the pillars of sustainability

Source: The author, based on Elkington, 1997; O’Riordan, 2001

3.3. Defining Social Sustainability

While there is now a consensus that all the three dimensions, or pillars, of sustainability, are equally important and need to be integrated into sustainable urban development initiatives right from conception, the meaning and associated objectives of the social pillar remain vague (Dempsey et al., 2011). It is conceptually most elusive, and not given the same attention as the other two pillars (Cuthill, 2009). Colantonio and Dixon, (2011) argue that social sustainability has been under-theorized or often over-simplified in existing theoretical debates and there have been very few attempts to define social sustainability as an independent dimension of sustainable development (ibid, 2011, p. 21). They acknowledged that there is no consensus on what criteria and perspectives should be adopted in defining social sustainability. Each author or policymaker derives his or her own interpretation according to discipline-specific criteria or the particular study perspective, making a generalized definition challenging to achieve as there are various meanings associated with the term 'social' itself. Littig and Griessler (2005) argue that the difficulties in conceptualizing social sustainability result from being no clear differentiation between analytical, normative and political aspects thereof and hence people may prioritize one over the other. Sachs (1999), in a discussion of 'social sustainability and whole development,' identified some constituent elements including social homogeneity, equitable incomes and access to services, and employment.

Colantonio and Dixon (2011) argued that in recent years there has been a shift away from 'hard' themes towards 'softer' concepts within the sustainability discourse, with the traditional themes of social sustainability becoming increasingly 'complemented' or replaced by new emerging concepts that are more intangible, less measurable, and increasingly approached from a more qualitative perspective. (ibid, pp. 25-26).

Table 3.1: Traditional and emerging social sustainability key themes

Traditional	Emerging
Basic needs, including housing and environmental health	Demographic change (aging, migration, and mobility)
Education and skills	Social mixing and cohesion
Employment	Identity, sense of place and culture
Equity	Empowerment, participation and access
Human rights and gender	Health and Safety
Poverty	Social capital
Social justice	Well-being, Happiness, and Quality of Life

Source: Colantonio & Dixon, 2011, p. 25

3.4. Social Sustainability in an Urban Context

The concept of sustainability has been widely adopted in urban planning theory and practice. The social dimension of sustainability remains the most overlooked and underdeveloped dimension of sustainability, both conceptually and practically, though social aspects of sustainability offer great potential to address urban social problems. Some of the themes linked with social sustainability show the difficulty of separating social activity from the physical setting in which it takes place (McKenzie, 2004).

A comprehensive definition of social sustainability with a particular focus on urban environments was given by Polese and Stren (2000, p.15-16) which discusses the concept in terms of both the collective functioning of society as well as individual quality of life issues: “development (and/or growth) that is compatible with the harmonious evolution of civil society, fostering an environment conducive to the compatible cohabitation of culturally and socially diverse groups while at the same time encouraging social integration, with improvements in the quality of life for all segments of the population.” This definition highlights the economic (development) and social (civil society, cultural diversity and social integration) dimensions of sustainability, emphasizing the interdependence and trade-offs that exist between development and social disintegration, all which are important to the concept of sustainable development. However, they also acknowledged the importance of the physical environment (e.g., housing, urban design and public spaces) within the urban sustainability debate. Yiftachel & Hedgcock (1993) have further defined social

sustainability in an urban context as “the continuing ability of a city to function as a long-term, viable setting for human interaction, communication, and cultural development.” (ibid, p.140).

Similarly, Woodcraft et al., (2011, p.16) define social sustainability as, “a process for creating sustainable, successful places that promote well-being, by understanding what people need from the places they live and work. Social sustainability combines design of the physical realm with design of the social world – infrastructure to support social and cultural life, social amenities, systems for citizen engagement and space for people and places to evolve.” Hemani et al, (2016) defined the social sustainability of a built environment as “a combined top-down & bottom-up process for creating urban spatial forms that nurture the 4‘S’, social capital, social cohesion, social inclusion and social equity, while appreciating people’s diverse needs and desires from the places they use.”

From a housing and built environment point of view, Chiu (2003) identified three main approaches to the interpretation of social sustainability; The first interpretation, ‘development-oriented’ emphasizes social acceptability in noting that development is socially sustainable when it keeps to social relationships, structure, and values. The second ‘environment-oriented’ interpretation, refers to the social preconditions necessary to support environmental sustainability. Lastly, the third ‘people-oriented’ interpretation refers to maintaining or improving the well-being of people, equitable distribution and consumption of resources and assets, reductions in social exclusion, and decrease of social discontinuity. In her study of social sustainability and housing Chiu (2003) adopted the second and the third interpretations to provide a more comprehensive concept of social sustainability and to demonstrate that social preconditions, social relationships, acceptable quality of housing and fair distribution of housing, resources and assets are essential components of sustainable housing development.

In the current sustainable urban development context, social sustainability became increasingly associated with the sustainable community discourse. For example, McKenzie (2004, p.120) defines social sustainability as “a life-enhancing condition within communities and a process within communities that can achieve that condition”.

Bramley and Power (2006) stated that social sustainability could be defined based on two overarching concepts, at the core of the concept of social sustainability, i.e., social equity (which centers upon distribution fairness) and sustainability of community (which refers to the viability and health of society as a whole) (ibid, p 5). Jenks and Dempsey (2007) argue that the concept of sustainable communities implicitly means that a territorial dimension is applied to social sustainability and mainly relates to collective aspects of social life.

The Bristol Accord, 2005, defines sustainable communities as “places where people want to live and work, now and in the future. They meet the diverse needs of existing and future residents, are sensitive to their environment, and contribute to a high quality of life. They are safe and inclusive, well planned, built and run, and offer equality of opportunity and good services for all” (ODPM, 2005, p.6). While this definition foregrounds social equity and justice by referring to diverse needs, inclusion criteria, and opportunities, careful reading exposes a privileging of the physical environment and of how community settings enable sustainable social outcomes. This definition highlights the physical context in which communities exist and reinstates the importance of physical design for social sustainability. A similar definition of sustainable communities describes them as communities which “meet the diverse needs of existing and future residents, their children and other users, contribute to a high quality of life and provide opportunity and choice. They achieve this in ways that make effective use of natural resources, enhance the environment, promote social cohesion and inclusion and strengthen economic prosperity” (ODPM, 2004, p. 7).

Other authors did not provide a general definition of social sustainability, but suggested the main key themes, corresponding to social processes and structures, which form the basis of the analysis of this concept. Eizenberg and Jabareen (2017) acknowledged that these non-physical, factors are difficult to measure because social processes and structures are dynamic, impossible to anticipate or at least involve unanticipated developments, are difficult to enforce and control in non-dictatorial ways and are not suitable for everyone. Based on a comprehensive literature review, the building blocks of the dimensions of social sustainability, which later provide the basis upon which the framework is established are listed in Table 3.2

Table 3.2: Key themes for the operationalization of social sustainability identified in the review of the literature

Key themes/features
<ul style="list-style-type: none"> • Education and training • Social justice: inter- and intra-generational • Health, quality of life and well-being • Social inclusion (and eradication of social exclusion) • Social capital • Social mix • Fair distribution of income • Social cohesion (i.e., cohesion between and among different groups) • Social networks in the community • Social interaction with other residents • Safety and security (lack of crime and disorder) • The sense of community and belonging • Adaptability (for both individuals and communities and the ability to respond appropriately and creatively to change) • Employment • Pride /sense of place • Community stability (vs. turnover) • Use neighborhood facilities/services • Active community organizations • Participation and local democracy • Cultural traditions

Sources in no particular order: (Dempsey et al., 2011; Chan & Lee, 2008; Meegan & Mitchell, 2001; Sachs, 1999; Bramley et al., 2009; Yiftachel & Hedgcock, 1993; Urban Task Force, 1999; Littig & Griessler, 2005; Burton, 2000; City of Vancouver, 2005)

From above, it is obvious that while the literature highlights the relatively limited definitions of social sustainability, wide-ranging social objectives, frameworks and measurements have been developed, they lack the association with the physical reality and sustainability perspective except for a few recent studies. This results in difficulties in presenting the available knowledge in a way suitable for integration into sustainable design and development policies. Dempsey et al. (2011) have argued that social sustainability is neither absolute nor a constant. It is a dynamic concept that will change over time in a place. The vagueness associated with the meanings and

interpretations of the concept suggests that a better understanding of the social dimension of sustainable development is fundamental.

3.5. The ‘Neighborhood’

The term ‘neighborhood’ dates back to the fifteenth century and has been used since then to describe either a physical area or the residents living in a particular area (Jenks & Dempsey, 2007). While often employed by academics, practitioners, policymakers, and residents, the term ‘neighborhood’ lacks a generalizable interpretation (Kearns & Parkinson, 2001). There are many concepts and meanings of what neighborhood is, what it comprises, and it is, therefore, a very flexible concept in which its definition will vary depending on the research purpose or question at hand. While the idea of a neighborhood is not new, its significance has seen a revival of interest in both academic research and policy debate in recent years.

Barton (2003) explained that there is no accepted basis for defining neighborhoods and suggested five different ways that might help to define what a neighborhood is, namely, the administrative convenience; aesthetic; residents’ perception; local catchments; and the traffic calmed area approaches. In his study on the nature of neighborhoods, Galster (2001) classified the various attempts by scholars to define neighborhoods, distinguishing between purely ecological-physical perspectives and the integration of ecological and social perspectives. Similarly, (Jenks & Dempsey, 2007) argue that there are different theoretical approaches defining a neighborhood. These approaches try to grasp the neighborhood as a ‘spatial construct’, defined by the physical characteristics that connect it; as a ‘social construct’, defined by administrative boundaries; as a ‘functional construct’; and according to an all-encompassing approach with a multi-layered frame of reference.

Entirely physically or spatially based definitions of ‘neighborhood’ are rare. Theorists who interpret the ‘neighborhood’ as a spatial concept invariably state that it is widely dependent on social attributes (Galster, 2001). In physical terms, Keller (1968, p. 89 cited in Galster, 2001) defines the neighborhood as a “place with physical and symbolic boundaries.” Golab (1982, p. 72 cited in Galster, 2001) interpret it as “a physical or geographical entity with specific (subjective) boundaries.”

Likewise, Barton, in his empirical research on neighborhoods, offers a definition of 'neighborhood' based on its spatial features "an area of distinctive identity, normally named, which may coincide with either a local catchment area or an environmental area, or both, and is geared towards pedestrian/cyclist access" (Barton, 2000, p 124). Jenks and Dempsey (2007) argue that this definition depends on interpretations by users or residents, such as the size of the area investigated and the perceived identity of the place itself. Additionally, the spatial characteristics of neighborhoods can vary between and within neighborhoods. This variation depends on the transport options, mobility patterns, socio-economic characteristics and lifestyle choices of individuals who live in these neighborhoods. Thus, the term 'neighborhood' is used as both a spatial and social construct; it cannot be accurately used as a spatial construct solely (Jenks & Dempsey, 2007).

For some theorists, the term 'neighborhood' encompasses spatial and non-spatial aspects. Hallman defines the 'neighborhood' as some combination of "geographical boundaries, ethnic or cultural characteristics of the inhabitants, psychological unity among people who feel that they belong together, or concentrated use of an area's facilities for shopping, leisure and learning" (Hallman, 1984,p.15).

In addition to the interpretations of the neighborhood already discussed, Another feature recognized by theorists is how the inhabitants understand their neighborhood. Suttles (1972) argues that people interpret their neighborhood in three different but related ways depending on the context and scale on which they discuss the 'neighborhood'.

Table 3.3: A frame of reference for understanding 'neighborhood.'

'My neighborhood.'	Home, family, immediate neighbors
'Our neighborhood.'	'Localized group' defined, for example, by income or ethnicity
'The neighborhood.'	'Has a more fixed referent and usually possesses a name and some reputation known to persons other than the residents'

Source: Suttles (1972).

Based on a slight adaptation of Suttles' scheme, Kearns and Parkinson (2001) defined a neighborhood, based on three scales, – the home area, the locality, the broader

urban district or region. Each of these scales has its predominant purpose or function, but at the same time, each scale can perform each of the functions. Power and Wilson (2000) use the onion analogy to describe the levels at which 'neighborhood' exists. The authors state that "the layers of neighborhood life are like an onion with a tight core and a loose outer skin" (Power & Wilson, 2000, p.1). They maintain that neighborhoods give people a sense of familiarity and security, which break down when all the three layers – home, services, environment – are significantly 'disrupted' (ibid, p.2).

Nevertheless, there is a wide range of approaches to defining neighborhoods. However, consensus on the definition of the neighborhood does not exist, since there is neither a specific population size nor a specific function to identify a neighborhood. Dempsey and Jenks (2007) pointed out the importance of the neighborhood definition adopted in empirical research being comprehensible to different groups of people including researchers, other people who are making the decisions on the development of the neighborhood such as policymakers and developers. They also stressed that this definition should help in understanding the physical setting of the research. In my study, I adopted the administrative definition of neighborhood to analyze the selected case studies in Aleppo as this definition is relevant to most of the stakeholders involved in the research.

3.6. Social Sustainability and Conceptual Overlaps

While there is relatively limited literature on social sustainability in the context of built environment, much more has been written about overlapping concepts of, 'social cohesion,' 'social capital,' 'social equity' and 'social exclusion' (Bramley et al., 2010). The following sections do not seek to provide a complete list of definitions or an account of the inter-relationships between such concepts; but rather to discuss possible conceptual crossovers.

3.6.1 Social Cohesion and Social Capital

The role of social cohesion and social capital in the social sustainability of places and communities has received increased attention in both theory and practice in recent

years. Social capital has been increasingly considered an essential component of sustainability and a tool for improving the situation of deprived communities in social, economic, political level (Colantonio & Dixon, 2011).

Social capital has been referred to as “features of social organization such as networks, norms, and trust that facilitate co-ordination/co-operation for mutual benefit” (Putnam, 1993, p.67). Various studies have identified three types of social capital. The first is bonding social capital, which Putnam described as being personal and based on protection, referring to relationships amongst members of a network who are somehow similar to one another, such as family and friends. The second type is bridging social capital, which refers to relationships among individuals who do not necessarily belong to a homogeneous group or correspond to one another in age, economic status, or education; instead, they are brought together by other bonds, such as work relationships or shared knowledge. The third type is linking social capital, which is based on individuals’ relationships with institutions and various types of organization, such as governmental and nongovernmental institutions, political parties, and corporations (Putnam, 2000).

Social cohesion is argued to be an essential aspect of social sustainability (Burton & Mitchell, 2006, p. 12). Social cohesion has been variously described as “a state of affairs concerning both vertical and horizontal interactions among members of society as characterized by a set of attitudes and norms that includes trust, sense of belongingness, willingness to participate and help as well as their behavioral manifestations” (Chan et al., 2006, p. 290), “affective bonds between citizens” (Chipkin & Ngqulunga, 2008, p.61), and “quantity and quality of interactions among people in a community” (Cohrun, 1994p. 95). Moreover, Kearns and Forrest (2000) argue that the core of the social cohesion concept, for instance, is that a cohesive society “hangs together”: that all the parts somehow fit in and contribute to society’s collective project and well-being (ibid., p.996).

It could be argued that examining the social cohesion within the local context of a community or neighborhood can be problematic due to the wide range of external factors, outside the boundaries of a neighborhood, that may affect the nature and extent of social cohesion in any given area. This also highlights a conceptual difficulty

in reconciling definitions and interpretations of social cohesion in both, the national policy level and the small-scale community or neighborhood level.

Social capital is conceptually closely related to social cohesion to the extent that the nature and scope of the former, the relations among residents, arguably have a direct influence on the nature and scope of the latter, and the ongoing integration of behaviors of residents in a given neighborhood. The overlap between the two concepts suggests that it is difficult to separate them or to determine whether there is a causal relationship between them. Theorists state that the concepts are closely related, indicating that social capital should be incorporated in any definition of social cohesion (Forrest & Kearns, 2001).

3.6.2 Social Equity and Social Exclusion

The concepts of social equity and inclusion are strongly associated with the notion of social justice, distributive justice, i.e., “fairness in the apportionment of resources in society” (Burton, 2000, p. 1970). A considerable body of literature on social inclusion focuses on the need to remove “economic and social barriers” to the material conditions for well-being in a society by providing “fairer access to housing, education and health services” (Burton & Mitchell, 2006; Kearns & Turok, 2004), which relates closely to some accounts of social sustainability.

Some authors also pointed out that social exclusion can have a significant geographical dimension. For example, Madanipour et al. (1998) propose a definition of social exclusion that emphasizes the notion of socially marginalized neighborhoods: “[social exclusion is] a multi-dimensional process, in which various forms of exclusion are combined: participation in decision-making and political processes, access to employment and material resources, and integration into a common cultural process”, (Bramley & Power 2006). However, it is recognized that the relationship between spatial location and social exclusion is highly complex. Not only is a tendency towards the spatial concentration of social exclusion identified, but also the characteristics of location and accessibility are considered fundamental for the individual’s ability to participate in regular social institutions and processes (Power & Wilson, 2000).

An equitable society rejects any 'exclusionary' or 'discriminatory' practices that may hinder individuals from participating fully in the society, economically, socially and politically, through circumstances that he or she has not created himself or herself. (Pierson, 2002). In an urban context, social equity means paying attention to the nature and extent of access to services and facilities in a given area. Therefore, accessibility to facilities and services is commonly cited as a fundamental measure of social equity in a given area (Barton, 2000; Burton, 2000).

3.7. Establishing a Framework for the Assessment of Social Sustainability

From the above overview of social sustainability and related concepts in both academic and policy literature, three interrelated dimensions of social sustainability were selected, which are likely to be significant for a socially sustainable community. It is also interesting whether people use facilities in their neighborhood and how they feel about these facilities. Therefore, a fourth dimension was included. These dimensions are :

- Social interaction with other residents.
- Feelings of safety
- Sense of place attachment
- Access and use of services and facilities

The following sections examine the individual dimensions in more detail, while section (5.3.2) provides the detailed indicators employed in this research to measure the selected social sustainability dimensions.

3.7.1 Social Interaction

The definition and meaning of social interaction depend on the context within which it is discussed. Wirth defined social interaction as "the basic process in the formation both of human nature and of the social order" (1964, p. 17). According to Rummel "social interactions are complex in their manifestations and interrelationships. The interaction can involve smiling, talking, threatening, fighting or debating; and negotiating, discussing, or litigating. The interaction can be overt or covert, active or

passive, brief or long-lived. They can be organized, unorganized, or disorganized, direct or indirect, shallow or intense narrow or universal and so on". (Rummel, 1976). In an urban setting, Raman (2010) defined social interaction as "all verbal and non-verbal communication with neighbors that are social and cordial in nature as well as spatially located within their neighborhoods. This includes visible non-verbal gestures such as the smile and winks by which one acknowledges the recognition of a neighbor".

Social interaction, in particular, is argued to be the building block of community cohesion (Kearns & Forrest, 2000). Forrest and Kearns describe social cohesion, in part, regarding a high degree of social interaction, suggesting that a low degree of social interaction would contribute to lack of social cohesion in a given social setting (2001, p. 2128). Social interaction is also said to give residents the opportunity to communicate and integrate not only with one another but to discuss issues, problems and ideas within a community context, leading to more active community participation and also a greater sense of community in a neighborhood (Putnam, 1993; Talen, 1999), and thus increasing the social capital in the community (Putnam, 2000). These community relationships and participation are regarded as an important aspect of quality of life and, therefore, to some extent contribute to the social sustainability of neighborhood (Nash & Christie, 2003). Moreover, it has been argued that without social interaction, people living in a particular area can be described as a group of individuals with a weak sense of community or sense of place attachment (Dempsey et al., 2009).

The level of social interaction between neighbors, whether positive or negative, may be affected by a range of influences. Previous research has shown that social interactions can be impacted by the design of urban form (Abu-Ghazze, 1999; Naceur, 2013; Hemani et al., 2016). Empirical research has been carried out that suggests there is a negative correlation between density and social interaction (Bramley & Power, 2009). Moreover, informal social interactions occurring on streets and in shops, regularly used by residents, were claimed to create a vibrant neighborhood (Jacobs, 1961). The good connections residents have with one another ensure that social order is maintained and a sense of community is fostered. Shared spaces such as small semi-private access courtyards can lead to informal social

interactions between neighbors. The spaces are small enough for residents to feel proprietorially about them, resulting in them personalizing, and using, them regularly (Abu-Ghazze, 1999; Schaefer et al., 1999). Other communal spaces that are accessible from the street have also been found to facilitate social interactions between neighbors, particularly those residents who live close to the spaces (Raman, 2009).

3.7.2 Feelings of Safety

The perceived safety of a neighborhood is considered to be a fundamental dimension of social sustainability (Barton, 2000) and it tends to be dealt with as a component of social capital (Forrest & Kearns, 2001). Perceived safety is positioned within Maslow's "hierarchy of needs," with the fulfillment of basic needs (Maslow, 1943). Therefore, it is required for any positive social behavior in a neighborhood (Barton et al., 2003; Shaftoe, 2000).

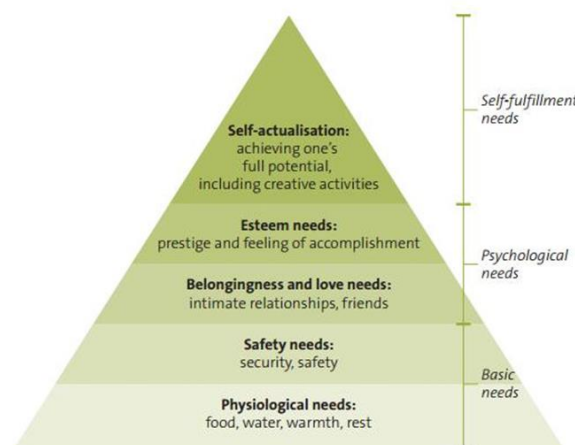


Figure 3.2 Maslow's hierarchy of needs

Source: The author, based on Maslow, 1943

Providing security and, with it, feelings of safety in a neighborhood is closely related to the other dimensions of social sustainability. For example, if the social interaction between neighbors is such that regular residents are able to impose social control over their neighborhood and this reduces the level of crime (Bellair, 1997). Moreover, in turn, if a neighborhood is free from crime and disorder, residents can feel safe in their social interactions with their neighbors and participate in community activities,

which contribute to a sense of community between residents and enhance the sense of place attachment in a neighborhood. (Nash & Christie, 2003)

Some of the noted relationships between the feeling of safety (sense of security) and the urban form include the said benefits of what is called 'eyes on the street' or natural surveillance (Jacobs, 1961), such as active frontage which is claimed to increase perceived safety when people interact with each other. Higher density, mixed land-use and walkable neighborhoods are argued to reduce opportunities for crime and improve safety in the community (Hemani et al., 2017). The quality of the local environment can have an impact on people's sense of safety (Bramley et al., 2010). Poor maintenance of built environment, boarded-up shops, graffiti, litter, and vandalism will encourage the feeling that no one is looking after the area, and consequently, no one is looking after the residents' safety which discourages residents from using public space. This is sometimes described as the "broken window syndrome"⁴, which can invite more serious anti-social or even criminal behavior (Wilson & Kelling, 1982).

3.7.3 Sense of Place Attachment

Sense of place attachment is a concept that dates back to the writings of Aristotle who viewed 'place' as the 'where dimension in people's relationship to the physical environment' (Abu-Ghazze, 1999, p. 46). It is argued by many that 'physical setting, activities, and meanings are always interrelated' (Carmona et al., 2003; Gehl, 2001). The fundamental assumption of place attachment is that it is a complex phenomenon that incorporates several aspects of people-place bonding (Altman & Low, 1992). These authors' analysis of place attachment was based on several assumptions: place attachment is an integrating concept comprising interrelated aspects; the origins

⁴ The broken windows theory is a criminological theory that visible signs of crime, anti-social behavior and civil disorder create an urban environment that encourages further crime and disorder, including serious crimes.

of place attachments are varied and complex; place attachment contributes to individual, group, and cultural self-definition and integrity (Ibid, p. 4).

This dimension is dependent on its physical built form insofar as it affects residents' sense of attachment to the place. Relph states that "to be inside a place is to belong to it and to identify with it, and the more profoundly inside you are, the stronger is this identity with the place" (1976, p. 49). While it is noted that residents' sense of place attachment is influenced by the physical environment in which they live, researchers have also acknowledged the attachment that residents have can also be related to the people living there (Hashemnezhad et al., 2013). This is often described as a 'sense of community' and is related not only to other residents, but to the social order, social communications, shared norms and, to a lesser extent, civic culture in a neighborhood (Kearns & Forrest, 2000).

According to Talen (1999), 'sense of community' can be defined as a mix of 'shared emotional contact' based on interaction as well as shared events, place attachment and a sense of membership regarding feelings of having a 'right to belong' (p. 1370). Fukuyama (2000), states that there is a direct and positive connection between sense of community and norms and values: "the deeper and more strongly held these common values are, the stronger the sense of community is" (ibid, p. 15). Such a sense of community may manifest itself through the built environment, for example, through common norms (Kearns & Forrest, 2000) such as, for example, an unwritten rule about keeping gardens tidy and clean.

The sense of place attachment is closely related to the urban form, since that such feelings can be affected by the surrounding physical environment. For example, if a place is visibly under-maintained showing high levels of litter and vandalism, this might affect people's sense of attachment to that place considerably; they may not be able to easily identify with a place that does not feel looked after (Nash & Christie, 2003, p. 47). This could then have a negative influence on the sense of security, which in turn might reduce levels of social interaction (ibid). Forrest and Kearns (2001) pointed out that the importance of the built environment should not be underestimated in relation to one's sense of belonging (2001, p. 2130). Hemani et al. (2017) noted that urban form has a significant of residents positive feeling of "functional" place

attachment, suggesting that residents with ease of access to amenities, local facilities and services felt more attached to their locale than those who have difficulties in gaining access .

3.7.4 Access and Use of local Facilities and Services

Accessibility is a multi-layered concept - not only proximity is crucial, as distance is only one of several factors. It is dependent on a number of factors including the spatial distribution of potential destinations relative to an individual's starting point, the performance of the transport system that connects to spatially distributed locations, the way the individual uses the transport system and the quality and characteristics of the services and facilities that the individual use (Liu & Zhu, 2004). Accessibility refers to the ease with which a building, place or facility can be reached by people and/or goods and services (Cowan, 2005). Lynch (2001) defined accessibility as contributing to the ability of urban residents to have good access to activities, resources, services.

Accessibility of a neighborhood is invariably described in terms of how easily its residents can reach services and facilities (Talen, 2003, p. 181). The Social Exclusion Unit (SEU) describes accessibility as the extent to which people can "get to key services at reasonable cost, in a reasonable time and with reasonable ease" (2003, p. 1). However, it does not provide a definition of "reasonable". Also, some scholars have widened the concept of accessibility to include different varieties such as; availability, accessibility, accommodation, affordability, and acceptability. Geurs (2006) identified four different approaches to measure accessibility as infrastructure-based (transport performance); location-based (distribution of facilities); person-based (individual participation) and utility-based (people benefits from accessing the facilities). Bisht et al., (2010) argued that accessibility went beyond the spatial dimension to include socio-economic and other non-spatial dimensions and proposed three main aspects of accessibility as mobility, information and development. Despite the different approaches to identifying the concept of accessibility, a consensus does not exist on the meaning of accessibility (Lotfi & Koohsari, 2009).

It has been argued that accessibility is very closely linked to other aspects of urban form, particularly the land use and layout: the services, facilities, open space, how they are arranged within the neighborhood, (Llewelyn-Davies, 2007) there is also no definitive list of accessible services and facilities. However, some theories and design guidelines have been put forward suggesting the particular distance that facilities and services should have from the housing. This is illustrated in Table 3.4 which outlines the extent of accessibility that residents should have.

Table 3.4 Access to facilities and services in a neighborhood

Facility	Local facilities and accessibility standards BREEAM 2008	Minimum reasonable accessibility standards at different gross densities (assuming bendy routes) Barton et al. 2003 p. 98			
		40 ppha*	60 ppha	80 ppha	100 ppha
Local shops	500m	500m	400m	400m	300m
Kindergarten	1000m	600m	500m	400m	400m
Primary school	6000	800m	700m	600m	500m
Community centre	1000m	800m	600m	600m	500m
Post office	1000m	800m	700m	600m	600m
Local centre	1000m	1000m	800m	700m	600m
Secondary school	-	1200m	1000m	700m	700m
Health center	1000m	1200m	1000m	900m	800m
Green open spaces	500m	Within 400m			

*people per hectare

Lotfi and Koohsari (2009) distinguished between two different ways of measuring accessibility based on objective and subjective factors; “The subjective dimension relates to the tendencies and characters of citizens, while the objective one is dependent upon the physical environment of their living place”, Lotfi and Koohsari (ibid, p.1). For Halden et al. (2005), perspectives of accessibility can be examined from two viewpoints: that of the individual (origin) and that of the service provider (destination) (ibid, p.3). Put simply, decisions on approaches to access to services must consider access for whom, access to what and access by what means (Barton, 2000). From an individual’s perspective, constraints and difficulties in accessibility

may be perceived or real, that is, there is a distinction between individual subjective experiences of constraint and what is objectively influenced and observed constraints. Some barriers to accessibility can be identified including spatial, physical, temporal, financial, environmental and informational (Wixey et al., 2005). Other authors have also linked transport-related barriers to accessibility due to the transport mode available (i.e., public transport routes; walking and cycling) (Stead et al., 2000).

Chapter 4

Urban Development of Aleppo

4.1. Introduction

Aleppo is situated in northern part of Syria, about one hundred kilometers east of the Mediterranean Sea and about fifty kilometers from the Turkish border in the north. The city lies along a north-south valley (the river-bed of Quweik). Aleppo's historical significance was mainly due to its location on the Silk Road, which connected Asia with the Middle East and southern Europe. The following sections provide an overview of the morphological development of Aleppo through different stages of its history (Figure 4.2), illustrating the various factors that influenced and shaped the fragmentation of its urban form as seen today.



Figure 4.1 Aleppo in the geographical context of Syria

Source: the author, based on Google Maps



Figure 4.2 The urban growth of Aleppo

Source: The author, after F. Balance, O. Barge, J.-C. David and H. David, 20

4.1. Urban Morphology of Aleppo

4.1.1 City Origins

The first significant phase in the formation of the urban form of Aleppo dates back to the Hellenistic period (301-281B.C) when Seleucus I founded the settlement near the Tell⁵ al-‘Akabé⁶, which came to be known as Beroea (the Greek name for Aleppo). Based on strategic consideration, the site of Beroea was chosen between the Mediterranean coast and the Euphrates, thereby, controlling the routeways of traffic and trade (Burns, 2017). The urban features of Aleppo were dependent on the site and were strongly influenced by the need for defense. The city had a fortified citadel on its periphery, which assured protection for the settlement and military control of its routes. The citadel also represents one of the richest in terms of symbolic value in Northern Syria (Figure 4.3). The urban form was mono-directional, defined by a linear east-west route linking the Tell (first settlement) and the citadel. The Agora (a large rectangular forum) and courtyard houses in (46m x 124m) blocks were aligned perpendicular to the central route. (Neglia, 2009)

At the beginning of the Byzantine period, there was no urban growth, but rather a series of reorganizations of the urban fabric and earlier plans. Aleppo was still characterized by low building density and an irregular form, due to the overlapping of four different plans, as well as the spontaneous growth of the urban fabric (Figure 4.4). The city lost its close morphological relation with its territory when the new Byzantine city walls were built (ibid).

⁵ **Tell** (Arabic) hill or mound built up by prolonged human occupation

⁶ Jean Sauvaget identified it as the site of the pre-historical settlement of Aleppo.

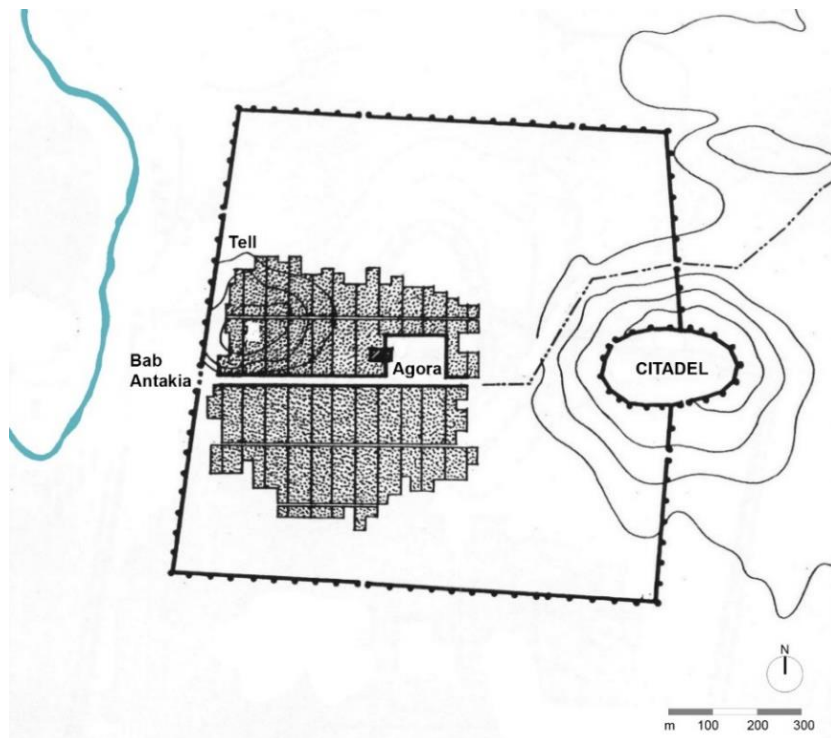


Figure 4.3 The Roman-Hellenistic city of Aleppo

Source: The author, after Sauvaget, 1941, pl. LII

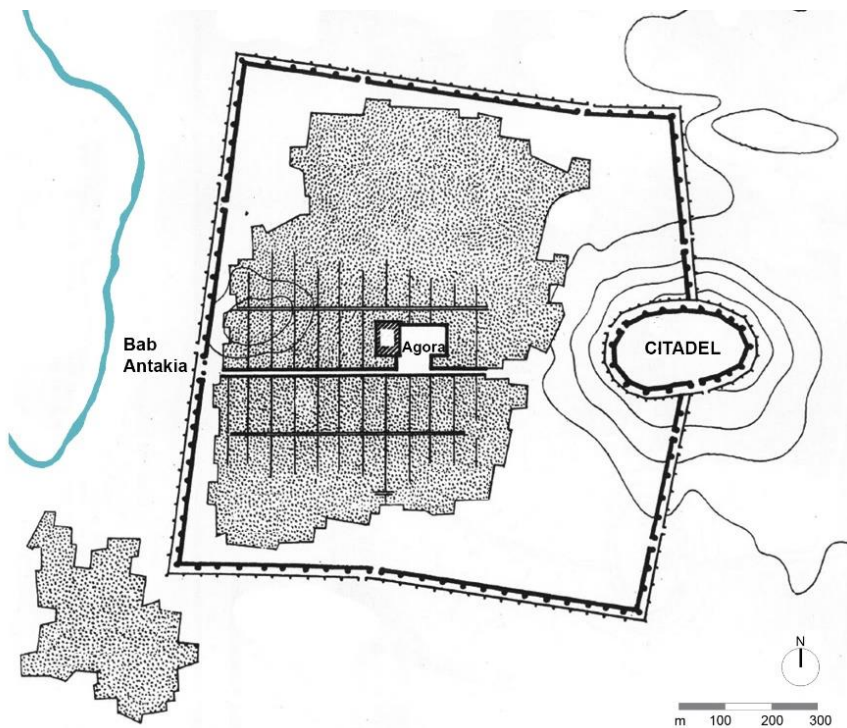


Figure 4.4 The Byzantine city of Aleppo

Source: The author, after Sauvaget, 1941, pl. LIII

4.1.2 The Islamic Era: Flourishing of Urban Life

In 637, Aleppo peacefully opened its gates to its Muslim conquerors (Kaegi, 1992, p. 146). In the first phase of the Arab conquest, (637 to the 10th century AD,) the idea of the permanence of place, and the change of meanings related to these places, became the informing principle of urban development. The first mosque of Aleppo was built near Bab⁷ Antakya, at the end of the Roman colonnaded street (Burns, 2017, p. 81). This simple intervention profoundly changed the structure of the central street axis of the city, which was marked on both sides, by the mosque on one side and by the citadel on the opposite side. The mosque gave the street a different meaning and thus transformed the colonnaded street into suqs⁸ (Neglia G., 2007). The space of the colonnade and the center lane was filled with commercial building units that transformed the main street axis of the city into two, three and four parallel commercial roads. (Figure 4.5)

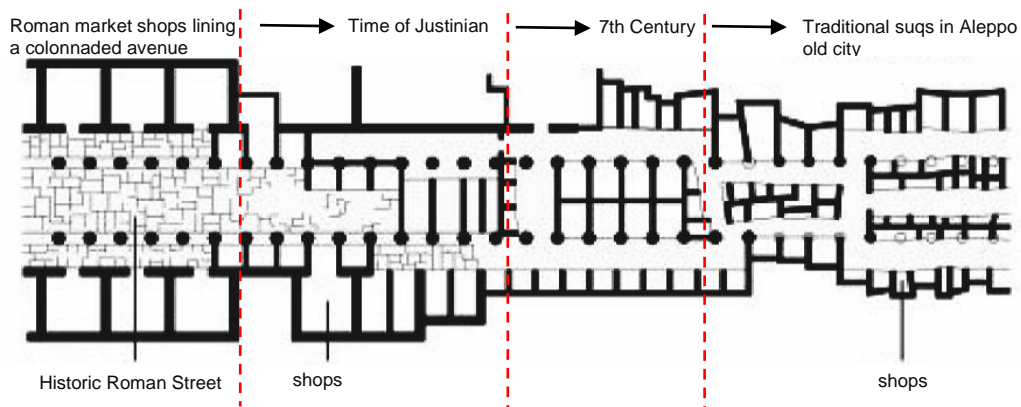


Figure 4.5 Morphological transformation of the colonnaded Hellenistic avenue in Islamic times.

Source: The author, after Sauvaget, 1941, p. 104)

When the Muslim presence in Aleppo increased, a larger mosque was needed. The Great Mosque was built on the site previously occupied by the Hellenistic agora (later

⁷ **Bab** (Arabic) gate, door

⁸ **Suq** (pl aswaq) (Arabic) market

the site of the Roman forum) and the process of spontaneous development of the urban fabric was accentuated, commerce thus began to become the most important aspect of the city. With the specialization of three sides of the Great Mosque as part of the suq, commercial activity became closely linked to public and religious activity. In this phase also, the first khans⁹ for housing merchants and their wares were built next to the suqs (Fansa, 2000).



Figure 4.6 The Great Mosque of Aleppo and the old suq behind

Source: Anas Al Rifai, 2006

The second phase of the Muslim urban development of Aleppo corresponds to the period between the 10th and 11th centuries AD, when the city no longer grew according to a homogeneous and isotropic grid system. The urban expansion was now determined by the agglomeration of individual neighborhoods (Harat) which were distinctly separate, self-contained and irregular in shape, and was derived from a different morphological process that affected the urban fabric, both residential and public (Bianca, 2000). On an urban scale, the city began to be subdivided into self-

⁹ **Khan** (pl khanat) (Persian) large courtyard complex combining provision for storage of goods and accommodation for merchants

sufficient neighborhoods, enclosed by gates and provided with basic services such as baths, mosques, madaris¹⁰ and neighborhood suqs (Neglia, 2009).

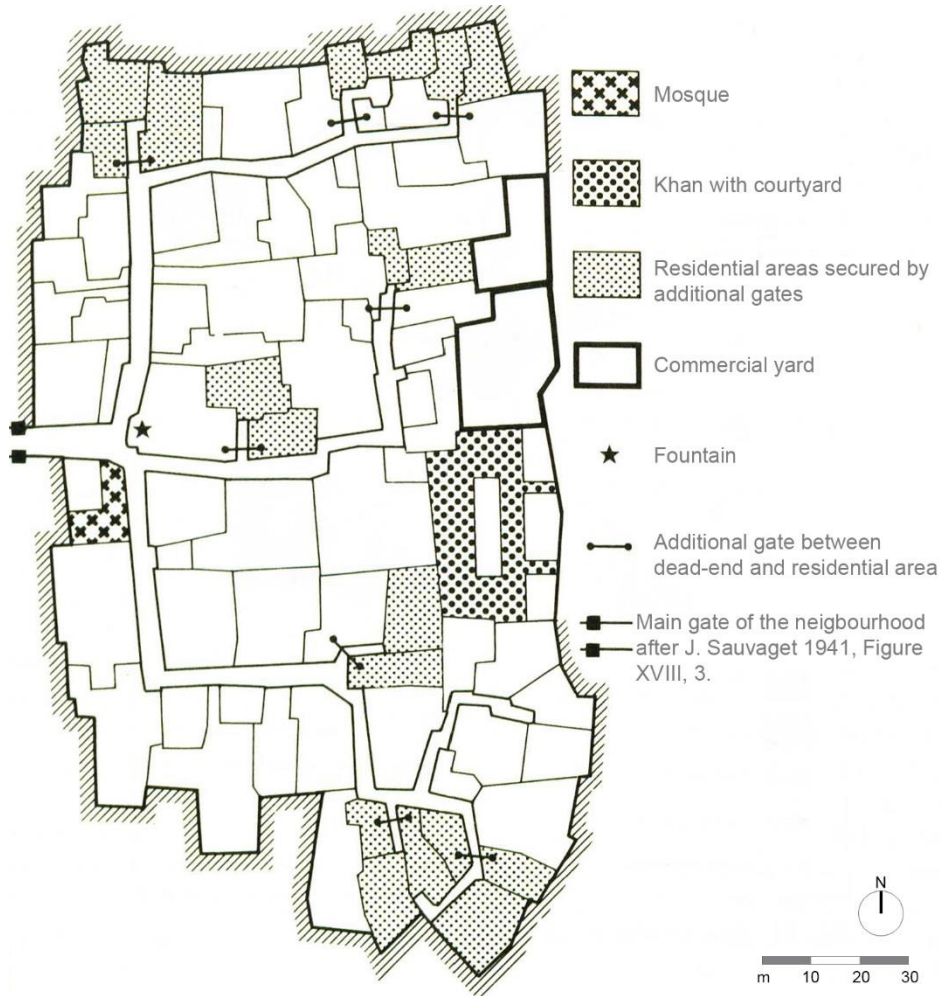


Figure 4.7 An example of an affluent residential area (east of the citadel) with only one gate

Source: The author, after E. Wirth 1982

The brightest period in the urban history of this phase began with the Ayyubid reign (1207-1260) when Aleppo became a center of Muslim resistance to the Crusaders. Its prime geographic location on a high plateau halfway between the Mediterranean

¹⁰ **Madrasa (pl madaris)** (Arabic) residential school for Islamic instruction, usually funded by a charitable endowment (waqf)

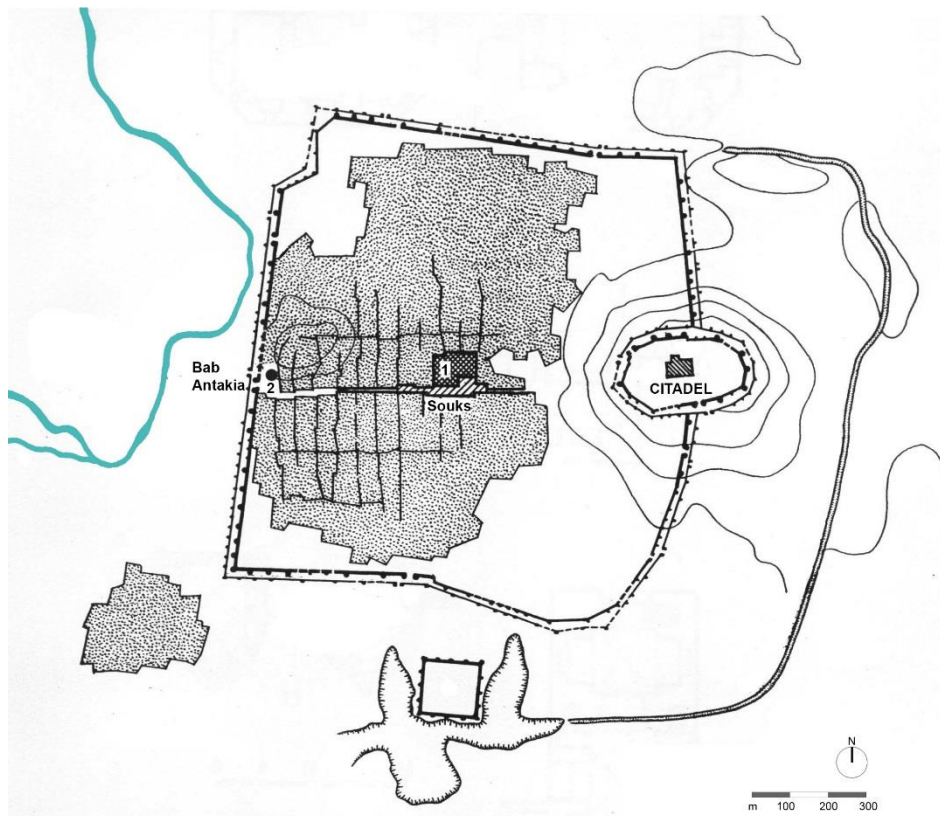
coast and the Euphrates River marked it as the crossroad of trade between Europe and Asia and pilgrimage routes, including the Silk Road (Gaube & Wirth, 1984).



Figure 4.8 Location of Aleppo and its hinterland

Source: The author, after Fansa, 2000

The Ayyubid constructed large-scale urban revitalization projects. Firstly, they enlarged Aleppo's Great Mosque, then expanded the water network and constructed some religious and civic structures, such as mosques, schools, clinics, water fountains. Furthermore, the specialization of the suqs began, with their subdivision by their main commercial functions. It was a bustling center of commerce as reflected by the many khans added to the old linear suq structures. Many western trade companies had their permanent representatives in the city which became a truly international community, with a high proportion of Christian residents (Gaube & Wirth, 1984; Fansa, 2000).



1.The Great Mosque 2. first mosque built in the city

Figure 4.9 Aleppo in the 12th Century

Source: *The author, after Sauvaget, 1941, pl.LIII*

The residential areas were spread out around the Al-Medina¹¹ and separated from it, while the population distribution in the different neighborhoods was determined not by income but by religious belief (they may include large groups of non-Muslims mixed with Muslims), geographical origin, professions, and ethnic groups, or by ramification to a mutual patron. The majority of Aleppo's population was Muslim at that time, with the presence of large groups of Christians, Jews, and Armenians Arabic-speaking. Other ethnic and linguistic affiliations were present in the city, such as non-Arab, Kurdish and Turkmen Muslims (David, 2002).

¹¹ **Al-Medina** (Arabic) literally 'the city' but often referring to the central market area

The pedestrian network assumed a tree-like structure, based on the direction of the flow of pedestrian paths with a sophisticated hierarchical system, gradually leading from the more public (city center) to the more private areas (residential areas), passing from the main thoroughfares to secondary streets and to blind alleys (*zuqaq*) which houses were clustered around. In the residential areas, the alleys were reduced to a minimum width (2-3m), occupying not more than 10% of the neighborhood's area, and were bordered by closed walls. Therefore, life within the houses was hardly discernible from the street (Bianca, 1980).



Figure 4.10 Alleys in the Old City of Aleppo

Source: The author, 2011

The pedestrian network also gave access to a wide number public services, which are not located in the neighborhoods, (e.g., *suqs*, mosques, public fountains, public baths, *maristans*¹², charitable foundations). Some of these services were intended only for Muslims; while other religious groups made use of the rest. Connected public spaces (squares) were located alongside the neighborhoods, characterized by strong male dominance. Sometimes public spaces were integrated into the neighborhoods, even in the residential areas, such as non-family male assemblies (David, 2002).

¹² **Maristan** (Persian) hospital and medical teaching institution

The traditional house in Aleppo, resemble the typical urban courtyard houses in the Islamic world. Its size and its basic structure depend on the wealth of its inhabitants and their religious background. It is usually inhabited not by a small core family, but rather by an extended family consisting of several smaller households of related persons. In an important article, published in 1977, Jean-Claude David proposed a typology of the traditional courtyard house in the old city of Aleppo, based on fieldwork and surveys. He determined four types of houses that correspond to different social classes, dimensions, decoration – from the most modest, simplest, smallest to the richest, most complete and largest.

The first type of traditional houses is the simplest one, with an average plot area of 83 m², is laid out as follows: about 1/3 of the plot area is used for the courtyard, the inhabited rooms take up 2/3 of the plot area. The larger houses of this type have a courtyard, which is rarely at the center of the built-up area: the most common plans are in L or U shape, with the rooms on two or three sides and rarely four. Usually, the courtyard is accessible directly from the street; If not, a small is a corridor required. The courtyard plays a major role in family interaction and provides thermal comfort through the natural elements, sun, shade, water, and vegetation. The house is oriented, organized along a privileged north-south axis. The variations of the house plan are based on the shape of the plots and their position in relation to the street.

The second type is relatively similar to the previous one but larger with an average size of 189 m². The courtyard's proportion is also 1/3 of the plot area. In this type, a basin of water may also be found in the courtyard. There were few decorations of certain parts found in this type of houses.

The third type, a bourgeois house of wealthy merchants, has an average area of 400 m², with a more complex courtyard (around 38% of the plot area). This type highly differentiated from previous ones, in the larger size and the decorations, and in the more elaborate decoration as well as the presence of special rooms for reception and services. The courtyard is surrounded by rooms on three sides; in the middle of the courtyard is a water basin, often with a fountain for decorative and climatization purpose. If, for the previous types, no differentiation of the rooms was made - that is, except the toilet and the kitchen, all the rooms were used for both sleeping and living.

In this house type, two new types of space for leisure and reception purposes were developed in the bourgeois houses of this type, *Iwan*¹³, and *Qa'a*¹⁴. The house is oriented and structured along a privileged north-south axis. Some of these houses have a separate courtyard for storing goods, while houses of this type have a basement under some of the rooms or extending over the entire plot.

The fourth type is the most developed one, on the architectural level, and is more a palace than a house. It has an average surface area of 900 m² on average. The elements are the same as in the third type but with larger dimensions. The rooms are distributed around two large courtyards (men/guest, women/family) and a smaller courtyard for service. The larger houses, real palaces, can include an irrigated garden, hammam (bath), stables, etc which are relatively independent of the residential spaces themselves.

¹³ **Iwan** (Arabic from Persian) room with open side looking onto a courtyard and serving as a space for entertainment or instruction

¹⁴ **Qa'a** (Arabic) formal reception room of an Arab house, composed of three alcoves on the slightly raised floor (50 cm) arranged in a cross around a central square space, on the same level as the courtyard, decorated with a basin and covered with a dome. The entrance is on the fourth side and gives direct access to the central area.

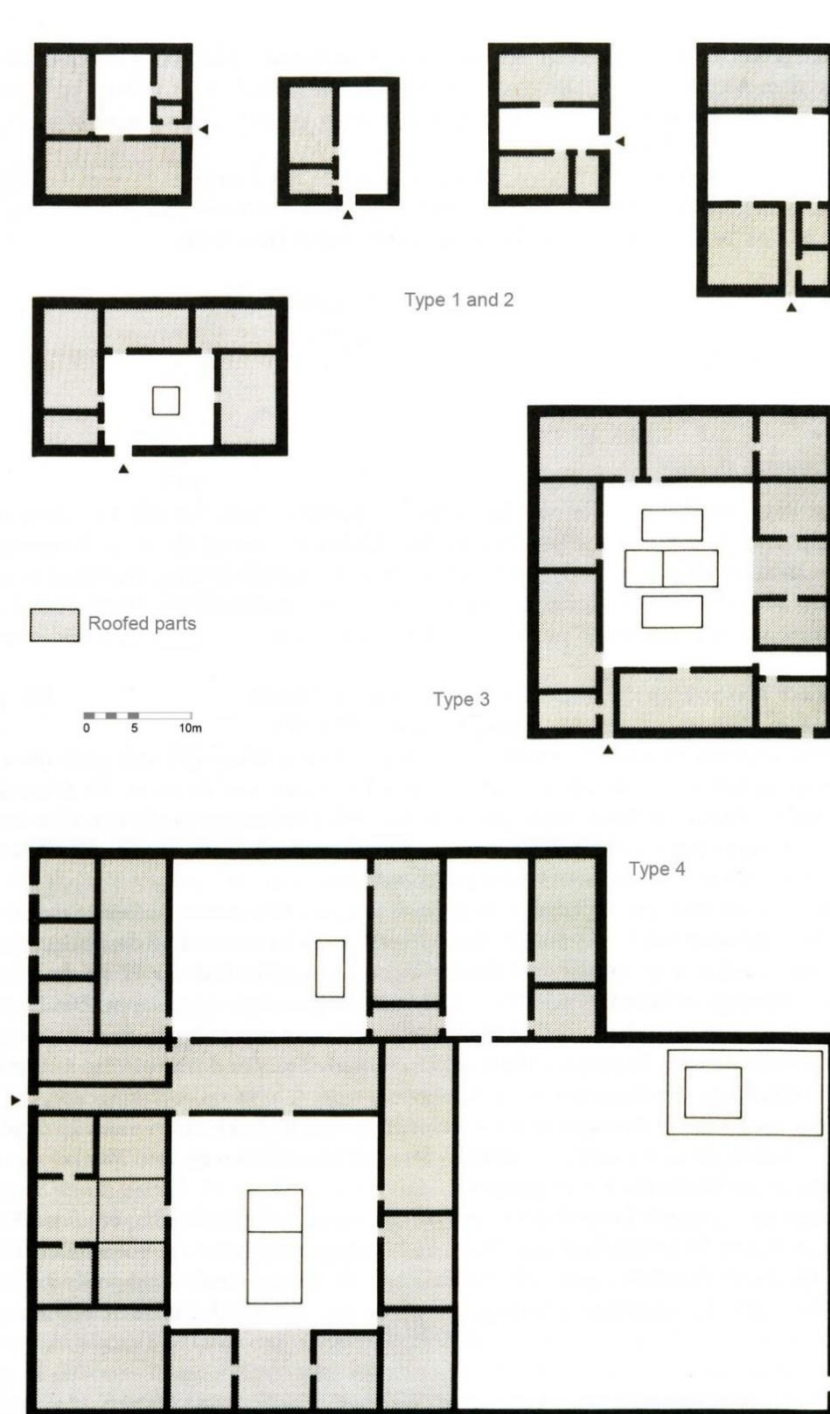


Figure 4.11 Housing types in the old city of Aleppo
Source: The author, after J.-C. David, 1997, p. 22-25



Figure 4.12 Housing types distribution in the old city of Aleppo

Source: The author, after J.-C. David, 1997

4.1.3 The Ottomans: Ottoman Reforms and Westernization

Regarding urban form, the first thirty years of Ottoman rule in Aleppo saw no radical transformation in the city's morphology. However, monument placement, and the main civic functions of the city such as the seat of administration, courts, and central suqs remained the same. Later on, during the sixteenth century, Aleppo experienced a period of tremendous urban growth. It expanded beyond the ramparts, particularly along the northeastern edge of the walled city, near the access points of the caravans coming from the desert routes, forming new suburbs such as Al-Jdeide in the north and Banqousa in the east. Linked to this urban growth was the construction of large-scale, multi-purpose building complexes (waqfs)¹⁵, commissioned by high-ranking officials in the densely occupied urban core of Aleppo during the second half of the sixteenth century. The importance of these complexes not only lies in the fact that they had a deliberate impact on the urban form and changed the public functions of the city center but also in the fact that they made the Ottoman ideological presence in Aleppo visible. They impacted the urban development of the city as well as its image and radically reoriented the functions of the city towards the center with its many new social and economic functions (Watenpaugh, 2004, pp. 50-53)

Aleppo was still a flourishing trade center in the fifteenth and sixteenth centuries. It was the third most important city in the Ottoman Empire after Istanbul, Cairo and ahead of Damascus. The city center of Aleppo, Al-Medina, emerged as a bustling commerce center and the monumental core of Ottoman Aleppo. This was reflected by many Khans, established by the Ottoman religious endowment (Awqaf), on the thoroughfares parallel to the linear suq and linked to it (Bianca, 2000). The sheer extent of the covered suqs of Aleppo, extending a total length of approximately 750 meters and reaching a width of approximately 300 meters near the Great Mosque, made it one of the largest in the world, uniformly vaulted in masonry (Watenpaugh, 2004).

¹⁵ **Waqf** (wakf, pl awqaf) (Arabic) endowment tying income from a business enterprise to support a religious, charitable or educational institution

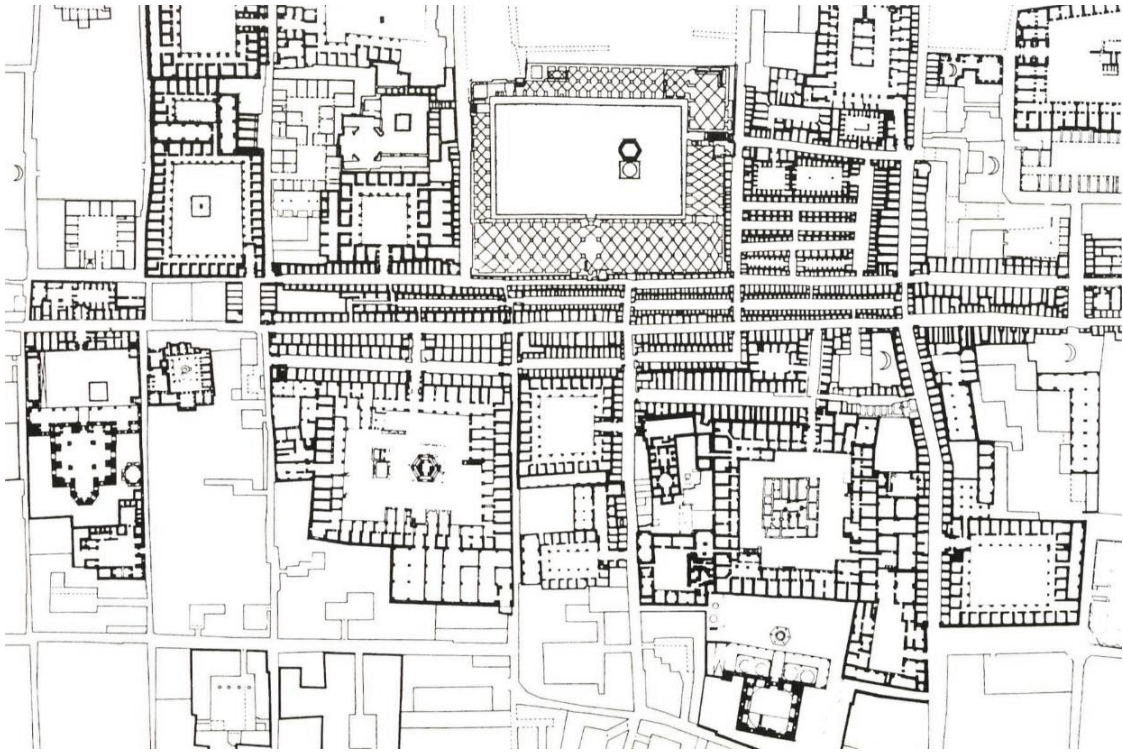


Figure 4.13 The old city center (Al-Medina)

Source: The author, after Gaube and Wirth, 1984

The main alleys connected the central area of the old city with the major gates on the surrounding walls. These alleys often became the spines of new suburb developments. As routes of pedestrian flows, they attracted commerce and public services. Mosques and hammams were often placed at major crossings or at nodes, where the alleys of the residential quarters met the main thoroughfares (David, 1987).

The decline of commerce after the 17th century, due to the gradual replacement of the traditional trade routes by new sea connections, resulted in a stagnation of urban development and the city ceased to expand until the nineteenth century (Bianca, 1980). In the Ottoman Empire, attempts and beginnings of administrative reforms

were made during the years 1820-1830, then later in 1839, the so-called Tanzimat period¹⁶ (David, 2002).

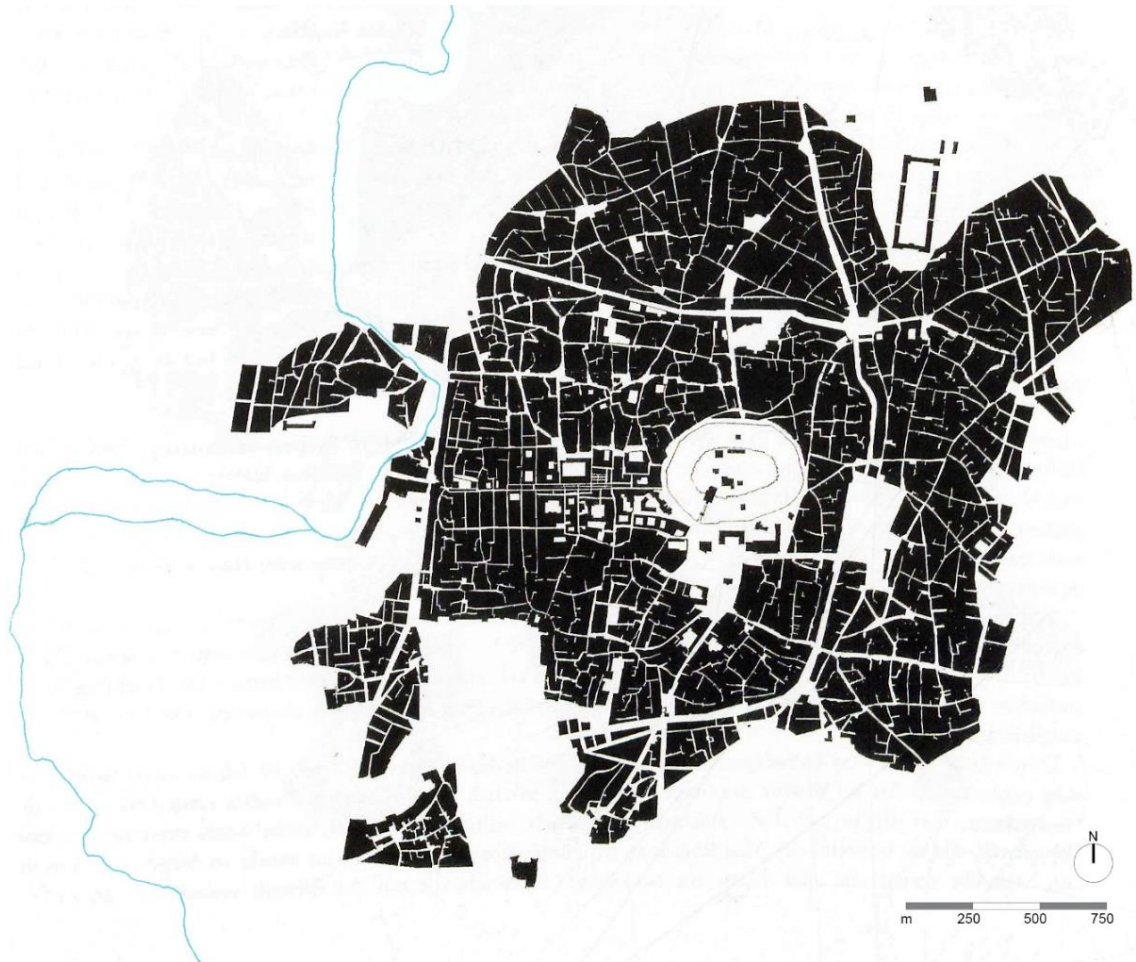


Figure 4.14 Aleppo city at the beginning of the nineteenth century

Source: The author, after Gangler, 1993, p. 35

However, the real beginnings of Aleppo's new city planning date back to 1868 when the Ottomans established the Baladiyah, a new centralized administration, in the Serail building beneath the citadel. A French architect, Charles Chartier, was appointed as the head officer of the new municipality of Aleppo for the implementation

¹⁶ The Tanzimat era began with the purpose, not of radical transformation, but of modernization, desiring to consolidate the social and political foundations of the Ottoman Empire.

of the new reforms (Miroğlu, 2005). The Ottoman administration started developing new residential suburbs such as Al-Azizieh neighborhood, laid out according to modern principles of urban planning. Between 1868 and 1873 the elite Christian families moved out of their courtyard houses into convenient, modern and relatively large houses. The best places were occupied by the wealthiest and most influential of these notables, who staged themselves in the perspective of the two main perpendicular streets. Public facilities were provided such as a garden, a police station, and a water pump supplying a public fountain (David & Baker, 1994).

Al-Azizieh neighborhood was one of the first manifestations in Aleppo of shifting and changing nature of the boundaries between public and private spaces where Christians wanted to adopt this model of mixed functions (David, 2002). Moreover, the principle of gated neighborhoods and dead-end alleys was abandoned, while traditional residential architecture, organized around inner courtyards, gradually made way to multistory buildings, single-family houses with a courtyard or a garden. Streets were wide (15-17 meters), while the urban layout became more predominantly orthogonal with cross junctions, as opposed to the situation in the old city where the alley varies between 2-4 meters. Also, facades were more open to the street by many windows, and the interiors were extended outwards by large wooden 'masharabias'¹⁷ and by fully open balconies (David & Boissière, 2014).

Later on, between 1878 and 1895, more neighborhoods sprang up to the west of the city, where the Muslim and the Jewish middle classes predominated. The gardens and orchards along the Qweiq River separated these neighborhoods from the old quarters. The density of occupancy and building density were the highest in the Jewish and Christian neighborhoods, but the economic, social and religious life continued to take place in the traditional city (Gangler, 1993).

¹⁷ **Mashrabiya** (Arabic) a type of projecting oriel window, enclosed with carved wood lattice work, located on the second story of a building or higher.



Figure 4.15 Al-Azizieh neighborhood

Source: The author, after Miroğlu, 2005

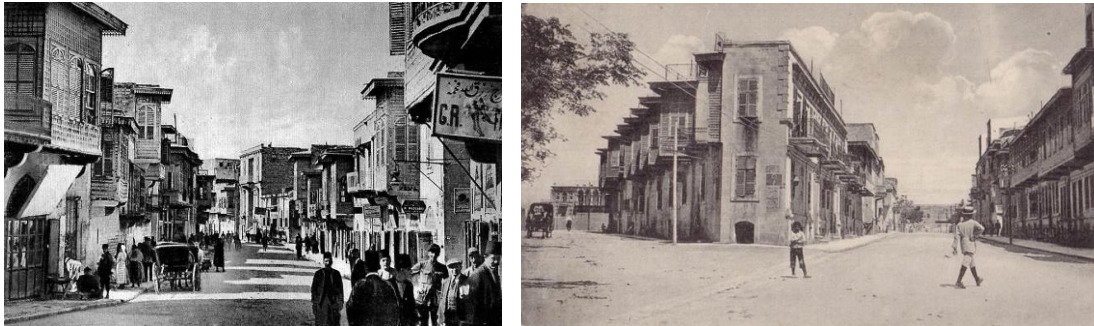


Figure 4.16 Views from Al-Azizieh neighborhood between 1898 and 1910

Source: G. Eric and Edith Matson Photograph Collection

Another important urban intervention was the filling of the old moats and the creation of vehicular carriageways to the north and west of the walled city between (1893 and 1900). Two lines of terraced houses in a hybrid Ottoman-European style framed the northern moat road. This new 14-meter street, Al-Khandaq Street, became a major west-east connection between the new trade on the periphery of the old city and the

commerce center of the old city. Also, a north-south spine, tangential to the western walls, was developed from the new quarters of Al-Azizieh towards Bab Antakia. The intersection of the two spines in the northwestern corner of the city, the square of Bab Al-Faraj, became a pivotal joint in the urban structure between the old and new city (David, 2002).

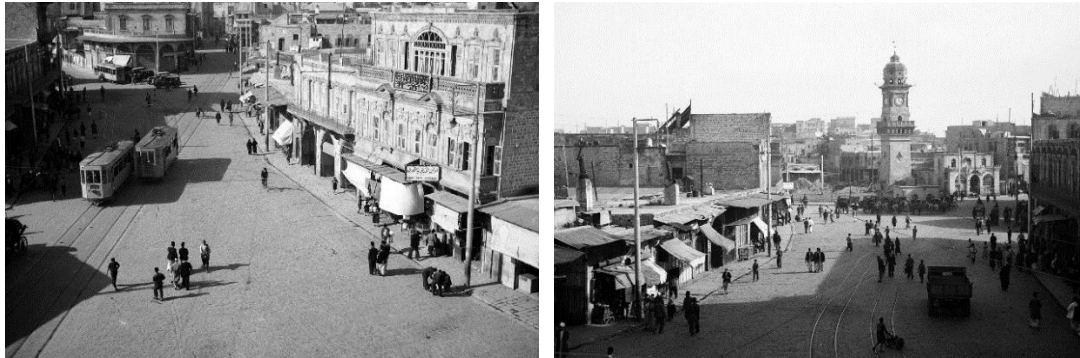


Figure 4.17 Bab Al-Faraj square in 1937 by Michel Écochard

Source: Aga Khan Trust for Culture

Aleppo thus became two cities in one. Although the old and the new parts coexisted peacefully during the first decades of our century, it would be hard to overlook the fundamental differences in their structural order. The old city had grown as an aggregation of thousands of enclosed and introverted cellular units, taking the shape of courtyard houses, mosques, and markets, all enmeshed within a coherent urban form. The alleyways, absorbed entirely by the built form, had been constructed for pedestrian circulation only, making a clear distinction between areas of public and private control. In contrast, the new city was defined by the rectilinear grid of vehicular traffic which dictated the size and shape of land subdivisions and, therefore, the character of urban form: buildings were isolated from each other and directly accessed from the streets instead from the interior courtyards. Commercial ground floors and new public spaces, interacted with the residential areas in the upper floors, which was mostly inhabited by the owner or of the tenants (David, 1975).



Figure 4.18 Aleppo city in 1930

Source: The author, after Gangler, 1993, p. 37 and Bianca, 1980, p. 18

Socially, the first changes, expressed by the free movement of women out of their neighbourhoods and their repositioning in the public space, the formation of the category of family, (a'ilat), which conditions access to and use of many public spaces, especially for leisure activities, and the use of specific services (e.g. medical practices). The new residential neighborhoods were still defined by community affiliations, (Christian neighborhoods, neighborhoods with an Armenian majority, Syriac neighborhoods, mixed Jewish and Muslim neighborhoods). Additionally, there were signs of segregation by social classes and exclusions or marginalization from rural and urban backgrounds (David, 2002).

Just before the beginning of the 20th century, new housing types inspired by traditional housing typology started to be built in the urban context of Aleppo.

The first type of housing, with a minimal courtyard, was first constructed after 1900, on relatively small (around 100 m²) aligned and very elongated plots. This type had quite a lot in common with the traditional courtyard house (the courtyard is about 30% of the site), but the rectilinear shapes of the new courtyards made it a 'standardized' version of the traditional typology. The principal feature of this type was that it had many more openings to the street than the traditional house, with windows on the ground floor and a balcony on the upper floor. Thus, the house took a more outward look. Moreover, the compact configuration of the rooms and the lighter construction were significant contributions (David & Hubert, 1982, pp. 102-104).

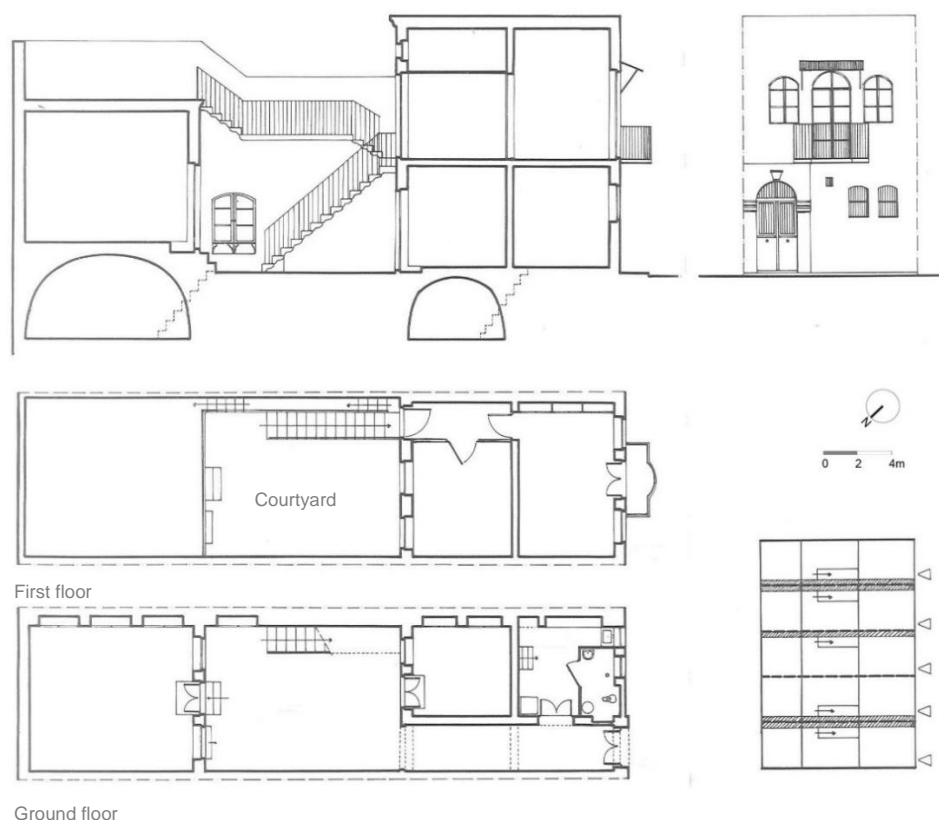


Figure 4.19 House with minimal courtyard

Source: The author, after David and Hubert, 1982, pp. 104-105

When the elite Christian families moved out of their courtyard houses to live in Al-Azizieh neighborhood they began building new houses following a model that was entirely different from the traditional house; the new housing type was, like the new

urban arrangement-, an expression of the residents' openness to the West and modernization. They reproduced a model that was considered foreign, one that imitated houses of notable European merchants and politicians (Khans).

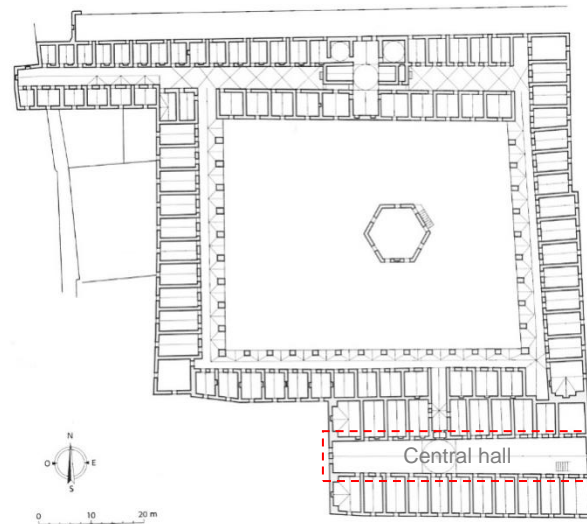
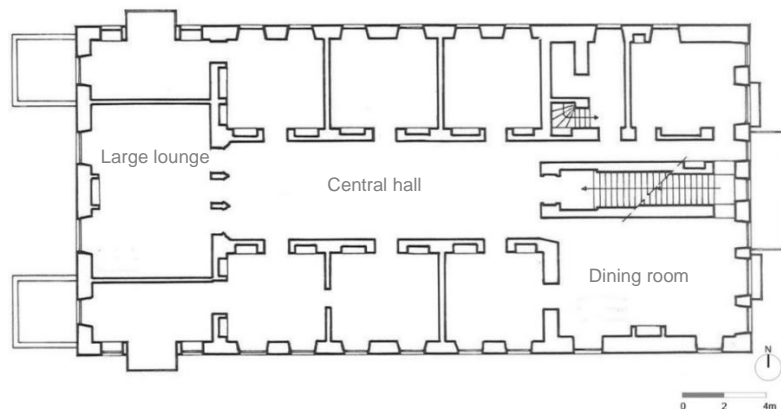


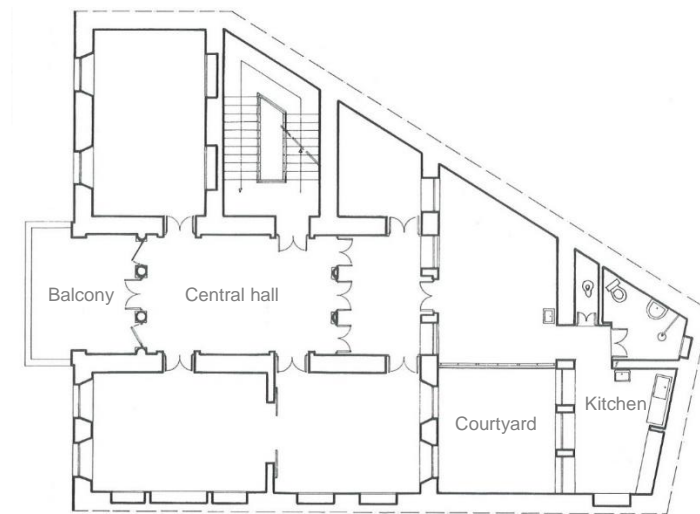
Figure 4.20 Khan Al-Goumrok first floor plan

Source: The author, after David and Hubert, 1982

The new houses occupied large lots (around 1000 m²), surrounded by three streets and on the rear by other lots. The plans were, increasingly related to the shape of the plot and the relationship to the street. The houses had an average area of about 560 m², thus leaving a vast space for a garden. With the development of the commercial activities, the lower parts of the house near the entrance were transformed into shops. The minimal exterior decoration of the first houses is as discreet as that of the habitat of the khans (David & Hubert, 1982, pp. 102-106).



Homs house, first-floor plan.



Khayat house, first-floor plan.

Figure 4.21 Central hall house types in Aleppo

Source: The author, after David and Hubert, 1982, p. 104

Another type of house, one designed for low-income people, was constructed on a small lot measuring about 60 m² which was somewhat elongated (13 m x 4.5 m). It had neither a courtyard (only a tiny place at the back) nor a central hall. The house had three floors and is usually inhabited by a single family.

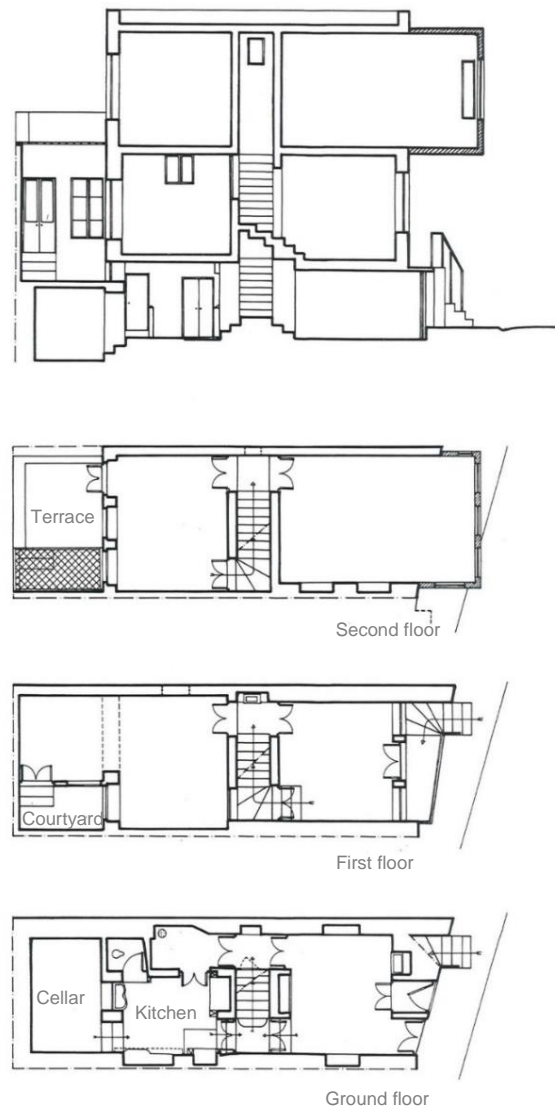


Figure 4.22 Large bourgeois corridor house with several floors. 1st. floorplan.

Source: The author, after David and Hubert, 1982, p. 104

4.1.4 1918 - 1970: Urban Fabric and Socio-Political Confrontation

Under the French Mandate (1920-1946) of Syria, modern city planning of Aleppo started with the establishment of a western type city administration in 1925 and the creation of a corresponding city planning department (Service d'Urbanisme). Comprehensive surveys began to produce an accurate map of the city. In 1930 a cadastral master plan was designed for Aleppo city (Plan d'aménagement, d'embellissement et d'extension d'Alep, by R. Danger, and Projet d'Urbanisme," by M. Ecochard), inspired by contemporary European city planning ideas, (e.g., Charte d'Athènes). These master plans were a basis for all future planning principles that

valued the grid pattern for organizing urban blocks. However, most of these planning proposals were only realized twenty years later due to the resistance of the inhabitants of the old city and the related difficulties in acquiring or expropriating a large number of real estates needed to execute the plans. Also, vehicular traffic was still not significant enough to justify the ambitious program of road construction (David, 2002).

After the independence of Syria, when traffic flows were still modest, authorities commissioned the French architect André Gutton again in 1952, to develop a new master plan. Gutton's master plan presented a continuity of the urbanism during the mandate period: it partially integrated the previous projects, including the first orientations materialized by the Chartier plan at the end of the 19th century. Gutton's master plan had much more impact on the urban development of Aleppo. In fact, the primary concern of the master plan was to stress Aleppo's position as a major node of regional, national and international road connections, by providing a transportation infrastructure to facilitate movement. The new expansion was planned around the old city; western-style residential areas were to be developed in the north and the west, and a 'new Arab town' in the south and east, to complete the circular scheme and reduce the high centralization of facilities at the city center. The plan gave some thought to the separation of housing and traffic in new residential areas, but no consideration of the future impact on the old city. It suggested that the old fabric to be crossed by two broad roads in a west-east direction to appropriately enhance the citadel as a focal point and replacing the western suburbs of the old city by a modern city center. During the period of preparing the master plan, new informal neighborhoods continued to be developed accommodating thousands of people and lacking minimum standards of infrastructure and local facilities (Bianca, 1980).

The implementation of the master plan in 1953 faced financial and administrative obstacles and was put on hold. This delay in implementation encouraged private contractors to continue expanding the existing informal neighborhoods, which resulted in scattered residential areas. Therefore, the municipality had to modify many details of Gutton Master Plan before implementing it. However, personal or group interests also affected the modification of the master plan as some of the planned green areas were converted into residential areas to benefit the developers, and parts of the green belt surrounding the city were occupied by new neighborhoods. Some

20 percent of the historic center with more than 700 houses, i.e., most of the western suburbs, were gradually demolished and partly replaced by large markets and bus terminals, without the planned new city center being built (Kandakji, 2013).

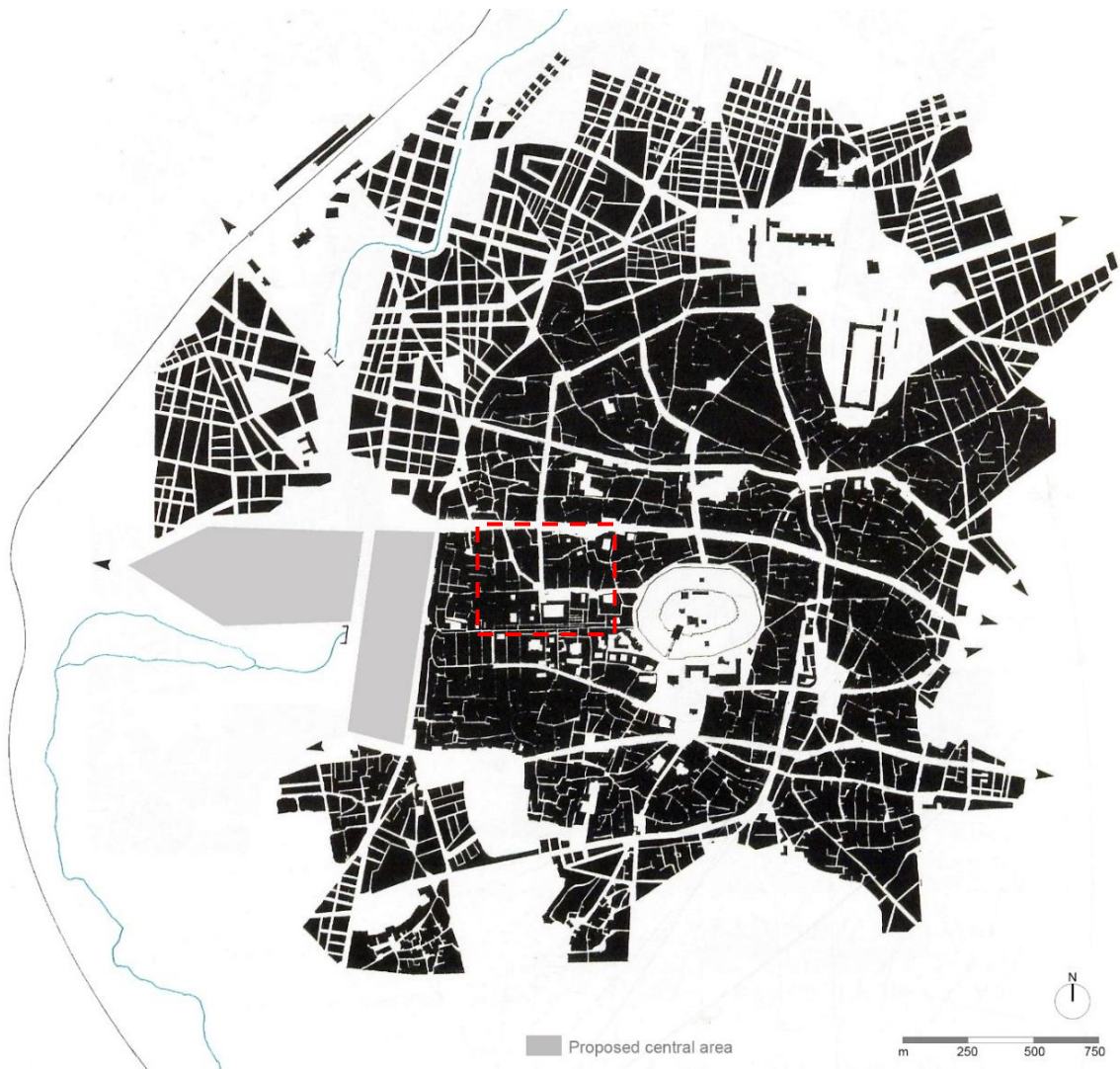
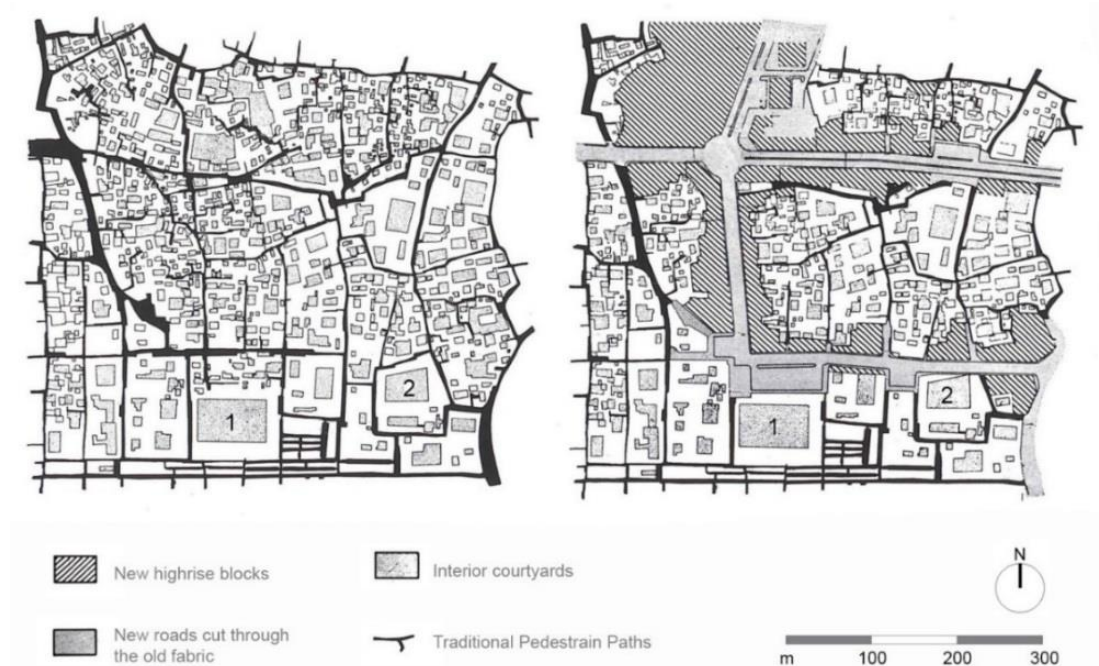


Figure 4.23 The central area and roads as proposed by André Gutton in 1954

--- Figure 4.24

Source: *The author, after Gangler, 1993, p. 39*



1. The Great Mosque - 2. Khan Al-Wazir

Figure 4.24 Comparative maps of the historic fabric to the north of the Umayyad Mosque

Source: The author, after Bianca, 1980

At that time, the industry in Aleppo experienced a period of intense dynamism, before the nationalization during the sixties and the slowdown. Demographic growth and stable economic prosperity led to an expansion of the city, with a growth of the urban area from 1,750 hectares in 1953 to 3,410 hectares in 1974 (David & Boissière, 2014).

The authorities called upon the Japanese urban planner Gyoji Bانشoya in the early 1970s to prepare a new master plan, which was approved in 1974. Preparing detailed plans started in 1974, but this was undertaken at a slow pace. The 1974 Master Plan proposes large areas of extension to the southwest. The expansion of the low-income, self-built, neighborhoods was more to the east, north, and south of the city. However, the proposed areas for the low-income neighborhoods were very insufficient as the primary focus of the Master Plan was the expansion to the west of the city, where land is more profitable for real estate investment, rather than the potential needs of a growing population with limited income that could not afford to settle in the western neighborhoods. The master plan also ignored the informal residential and industrial settlements which had evolved in some areas designated for non-residential uses (green /agriculture areas, service areas) as a result of the delayed implementation of

the official plans. At that time there were 22 informal settlements in the different parts of Aleppo (Sakkal, 2014).

According to Sakkal (2014) the seed of a divide between the wealthier and legally developed western neighborhoods, and the more deprived informally grown eastern areas may be noticed in Banshoya's master plan of 1974. The zones reserved for low-income housing, i.e., the northern, the eastern and the southern neighborhoods, correspond roughly to the informal areas' current distribution. The entire spatial and social structure of the city has been severely segregated.

Multi-storey housing developed in line with the evolution of society, in response to the increasing need for space. This housing type was widespread among the middle-class inhabitants before World War One. Later, after the First World War, the modification of the Ottoman building regulations by the French administration allowed an increase in the construction height. Therefore, a new form of apartment blocks with three levels, either separated by lateral narrow un-built strips or attached to other buildings, began to emerge in the newly developed neighborhoods. The first multi-story buildings, with independent flats on each floor instead of one house belonging to one extended family, probably appeared during the 1930s, in the neighborhood of Djamiye, to meet the demand of foreign tenants, colonial officials, and officers. The new materials, in particular, the steel beams, were also a factor in the formal evolution. They allowed for balconies to be constructed with large overhangs. In the later examples built in the forties and fifties, the buildings were mostly detached with three or four floors maximum, each having a separate flat (David & Hubert, 1982, p. 106-111). In most cases, the ground floor had shops on the street, as the commercial activity was integrated into the residential areas (Hariri, 1996).

4.1.5 From 1970 Onwards: Urban Growth and Informal Settlements

Aleppo grew dramatically in the 1970s and early 80s and showed a high urbanization rate. The urban population in Aleppo, rose from 700,000 in 1970 to 2.5 million in 2004 due to the steady and rapid migration from rural areas, mostly in Eastern Syria. The migration was partly a consequence of many factors, i.e., the inefficient agricultural reforms and four years of the worst drought in at least a century. Cutting back on support for rural communities, while encouraging urban capitalism also heightened

migration to the city were the attracting employment opportunities, created by the developing industrial sector (Lavinal, 2008). The population growth was linked to a boom in construction in both formal neighborhoods and informal settlements. In principle, the aim was to meet the very high demand for housing, in the absence of effective urban planning and construction policies, but in reality the construction movement was mainly due to the fact that the building was almost the only investment opportunity for investors – a consequence of state control over the economy at least until the early 1990s (Sakkal, 2014).

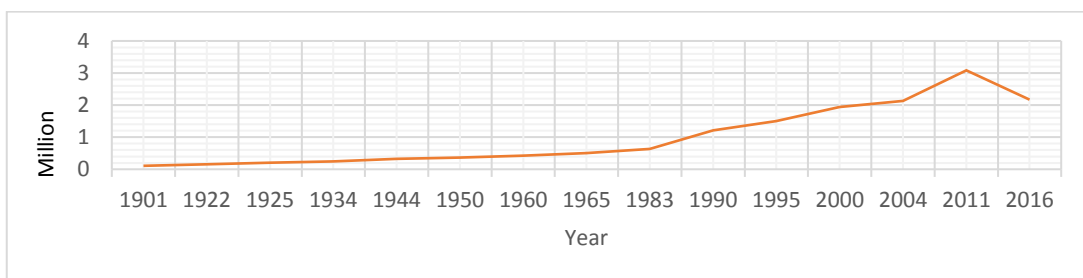


Figure 4.25 Population of Aleppo city

Source: Syrian Center of Bureau Statistics

In 2011, almost half of the population in Aleppo lived in 22 underserved informal settlements of different types and sizes, which amount to 35% of the city's built-up area. (Fernandes, 2008). The informal settlements in Aleppo were estimated to be growing by 4% per year - some 8,000 households per year- creating 160 new dwellings per week (GTZ, 2009).



Figure 4.26 Informal settlement in Aleppo

Source: Site survey, 2011

Physically informal settlements in Aleppo fall into three broad categories:

- High-density settlements (5 to 7 stories), are the poorly built structures that present a direct danger to life.
- Medium and low-density settlements (1 to 3 stories) that are structurally safe, but under-serviced and present a potential threat to health and well-being.
- Settlements are structurally and environmentally adequate but do not conform to development control legislation and local building codes.

Categories 2 and 3 include 80% of the informal settlements. In Aleppo, most of these settlements are supplied with infrastructure and only require that the title be transferred to the land, as much of it is already in public ownership, and official acceptance of their adequate standards of construction, to consider them 'formal' and legal (Wakel, 2008).

Appendix B gives a detailed example of the structure of informal settlements area in Aleppo (Tal Al-Zarazier settlement as a case study). The information provided is based on site survey during my diploma project in 2011 as a part of government plan to upgrade informal settlements of Aleppo in collaboration with the German Organization for Technical Cooperation (GTZ).



Figure 4.27: Informal settlements in Aleppo

Source: The author, based on GTZ maps 2011

The plan of the house, in almost all the informal settlements, is derived from the traditional urban courtyard house. The phases of construction correspond to the needs of households and their financial means. Most of these houses have the only ground floor, and the highest have two or even three floors, built with money put aside. Sometimes one or two floors are added later to meet new needs or even to enhance the family income by renting out space (Dahman, 1999). It is only in the districts of Ansari Gharbi, Tal Al-Zarazir, and Kroum al-Jounoubiyyé that, since the 1990s, there are five-story or six-story buildings that have been constructed without respecting the administrative regulations in Aleppo. The simplicity of architecture and construction techniques allows family self-construction or construction combined with qualified artisans (Sakkal, 2014).

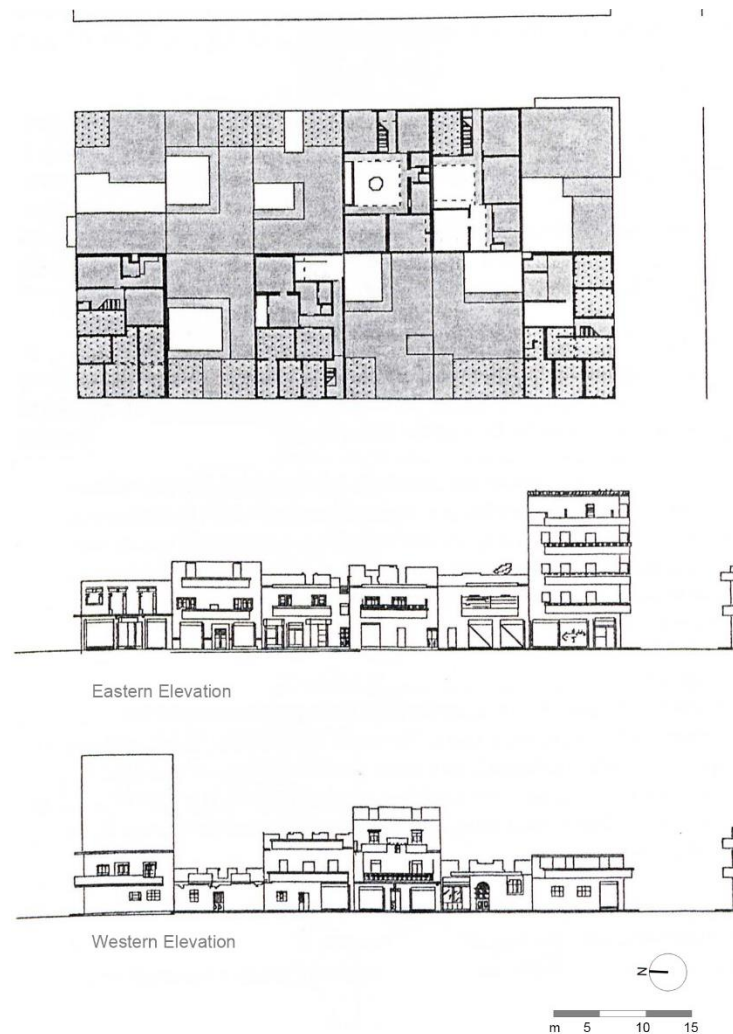


Figure 4.28 An example of informal housing construction (Al-Ashrafia neighborhood)

Source: The author, after Dahman (1999)

In her extensive work on informal settlements in Aleppo, Dahman (1999), compared some characteristics of the traditional old city and informal settlement structures in Aleppo. She observed that the informal settlements are very different from the traditional structures of the old city.

Table 4.1 Comparison of the traditional and spontaneous urban structure

The traditional neighborhood in the old city	Informal settlement
The inhabitants have been living in the city for generations and possess knowledge of building with stone and wood. Most of the time they are active in trade and commerce.	The inhabitants are farmers of rural origin and know how to build with clay. They are mostly unskilled workers or unemployed.
The house was built by a master builder.	The house is usually built in self-help or with the help of artisans.
Living and working are separate. Trade and commerce take place in the bazaar.	Living and working take place in the same place (shops or rental retails)
Introverted houses, traditional courtyard house	Formally, it consists of courtyard houses, which is gradually downsized and verticalized, resulting in a hybrid type of house.
Open central courtyard, which is used for private residential functions.	The courtyard is usually downsized and has lost its quality and role.
The blocks of houses are defined by the same residential alleys and house clusters. There are no clear outlines, and their sizes are unidentifiable.	The block of flats is orthogonal and divided into even plots.
Identity & irrevocability in parts and as a whole through the organic form.	Additive repetition in a grid; great similarities
Extensive compliance with environmental conditions, topography, and climate	Neglect of climatic conditions. Compliance with the available financial resources.
The traditional houses are first wholly built and then inhabited. As a result, the modification (enlarging the house) had become within narrow limits.	The house can be enlarged, starting with only one room but expand over several steps to a multi-story apartment block.

Source: The author, after Dahman, 1999, p. 107

Socially, the term 'informal settlement' tends to convey overtones of contempt social stigma, such as: 'social deprivation,' 'criminality,' 'unhealthy and disease-ridden,' 'unemployment,' 'lack of civic awareness and antisocial behavior.' While such

attributes exist in some informal settlements (as well as in some formal settlements) in Aleppo, in no way can they be generalized to apply for all informal settlements. On the contrary, there is significant evidence of law-abiding, diverse, socially cohesive communities in many informal settlements in the city. There are, of course, others that are not. (GTZ, 2009) However, communities living in informal settlements were often marginalized and discriminated against for socio-economic or cultural reasons, while young people have been mainly affected by the overall conditions of social exclusion and spatial segregation, along with a lack of opportunities (Kabbani, 2007).

Alongside the informal settlements, formal housing has been provided by three sectors; public, co-operative and private sectors. Each sector has provided different types of houses, for different social groups.

Public-sector Housing

The social housing, provided by the public sector (Al-Katta' Al-Amm)¹⁸, accounts for around 15% of formal housing for the middle, and low-income groups, mainly government employees, or the low-income working class in Syria. The public sector was given the main role by the government to solve the housing shortages in Aleppo, while at the same time, providing an urban and architectural vision of development, to the other sectors. For the most part, urban development concepts from socialist countries, such as former the Soviet Union and East European countries, have been copied and implemented. Therefore, there has not been much local architectural effect on the built form. Thus these concepts did not correspond to the social life of the inhabitants nor to the environmental conditions of the city (Hariri, 1996). The neighborhood arrangement, the street layout, and building types were based on Western European models and standards. Regardless of religion or ethnic groups, the new neighborhoods brought together people with the same purchasing power and

¹⁸ It consists of two agencies, the General Establishment of Housing (GEH, Al-Muassasa Al-Amma Lileskan) and the General Establishment of Military Housing (GEMH, Muassasat Al-Eskan Al-Askary).

consumption patterns. Unlike the old city neighborhoods, the segregation is no longer by cultural and religious groups, but by social and economic status (Dahman, 1999).



Figure 4.29: An example of housing provided by the public sector

Source: Aseel Al-Khalaf, 2010

Cooperative- sector Housing

Professional associations (e. g., employees of universities and municipal administrations, the government party, pharmacists, lawyers, architects, teachers, etc.) formed their own housing associations to provide housing for their members. The peak of this movement was in the mid-1970s when cooperative housing and residential areas with hundreds of housing units were established throughout Syria, amounting to around 20% of formal housing (Al-Khalaf, 2014). Cooperative housing developments thus provided an opportunity to relieve the pressure on public-sector housing programs, which were stagnating due to the state's increasing financial shortage. Over the past decade, large, modern residential districts have been created in the outskirts of Aleppo (e. g., housing for Aleppo university employees, doctors' housing, etc.) The members of academic and liberal professions form a social class in the Syrian society that can be placed between the upper and middle classes. Their social status is determined more by their western education and orientation rather than by the level of income (Sakkal, 2014).



Figure 4.30: An example of housing provided by the cooperative sector

Source: Hosambochi, panoramio.com, 2009

Private-sector Housing

This housing consists of relatively small construction companies owned by individuals (Al-Katta' Al-Khass) and responsible for providing both informal housing (informal settlements) and formal, luxurious housing, with both representing about 65% of the formal housing market. Depending on the actual building regulations and planning standards, these companies build detached or rowed, multi-story residential buildings and single-family houses. However, this is not taken into account when it comes to building informal settlements (Wakely, 2008).



Figure 4.31: An example of housing provided by the private sector (luxurious housing and informal housing)

Source: The author 2010



Figure 4.32 The different production systems of housing
 Source: The author, after S. Sakkal, J.-C. David, and H. David, 2014

Chapter 5

Research Methodology

5.1. Introduction

This chapter presents the methods and analyses employed to achieve the research aim discussed in Chapter One. The overall methodological approach is put forward, followed by a description of the development of the indicators and variables used to measure the urban form and social sustainability. The methods of data collection and analysis are discussed in further detail, with focus on the following aspects of the research:

- Overall methodological approach: a cross-sectional investigation is employing a combination of quantitative and qualitative research methods.
- Selection of indicators: measuring the aspects of urban form and social sustainability
- Method of case study: selection criteria of case study neighborhoods
- Methods of data collection: including physical site survey, household questionnaire survey, and a semi-structured interview.
- Methods of data analysis: descriptive analyses, correlation analysis, and content analysis.

5.2. The Overall Methodological Approach

The methodology adopted for my research is mainly qualitative; however, there are quantitative components employed in indicators measuring both the aspects of urban form and social sustainability. The combination of qualitative and quantitative methods is common in the social sciences (Bryman, 2016). There are two main reasons for adopting a combination of quantitative and qualitative research methods for this research. Firstly, it is a well-used method of data triangulation (Lune & Berg, 2017). Triangulation is based on “more than one method or source of data in the study of social phenomena” (Bryman, 2016, p. 386). It has been argued that triangulation offers the author “a better, more substantive picture of reality; a richer, more complete array of symbols and theoretical concepts; and a means of verifying many of these elements” (Berg, 2004, p. 5). Moreover, the multiple-method approach provides data rich in detail and can help to develop analysis (Bryman, 2016).

The research design adopted in this study is cross-sectional, which focuses on the variation among variables and the associations between them (Bryman, 2016). This design was selected over an experimental or longitudinal study approach because of time and cost constraints and its applicability to the measurement of the built environment. A cross-sectional, or social survey, research design provides a “snapshot” approach where data are collected at one point in time’ (Gray, 2014, p. 31). This approach does, however, have its limitations: while it can “reveal associations among variables” it cannot reveal causation (ibid., p. 82), since there is “no time ordering the variables because the data on them are collected more or less simultaneously” (Bryman, 2016, p. 53). If a relationship is discovered between two variables, it cannot be described with any certainty as causal because the approach does not employ features of an experimental study, which include a focus group (ibid.). Controlling for interfering, or interfering, influences is therefore also a difficulty in cross-sectional design; this is addressed in this research as such influences are measured, and their associations with social sustainability are examined alongside the aspects of urban form.

5.3. Indicators and Measures

To test the claim, that the urban form has a relationship with social sustainability, it is necessary to ‘translate’ the theoretical definitions of the urban form and social sustainability into a set of measurable indicators (Bryman, 2016, p. 152). The use of indicators is well established in social science and built environment research, practice, and policy (Yoo & Lee, 2016; Bahadure & Kotharkar, 2012; Dempsey, 2009; Skjæveland et al., 1996). Indicators allow The author to make assessments, “using limited and representative information” as well as providing a consistent device for identifying the differences between “people in terms of the characteristic in question”, and “more precise- estimates of the degree of relationship between concepts” (Bryman, 2016, pp. 152-153; Burton, 2002, pp. 228). However, Burton draws attention to “potential pitfalls” in the use of indicators; these need to be acknowledged and avoided (ibid.).

It has been argued that pragmatic considerations particular to the research play a significant role in the selection process of indicators (Burton, 2002), and, according to

Coombes and Wong, the value and practicability of potential indicators can be assessed according to four criteria (1994, p.1304).

The availability of the data required is cited as perhaps presenting the most fundamental problem that can directly influence the possibility of including a particular indicator. Coombes and Wong advise that potential indicators should be assessed according to how easily implemented they may be, and finally, and most importantly, how those indicators are to be interpreted. This interdependent relationship between the data, the data sources, and their interpretation are critical for the research, whether dependent on primary or secondary datasets. Bryman states that the reliability and validity of indicators as representations of concepts is crucial to research (2016, p. 156). For an indicator to be valid, it must “reflect the condition or experience. [it is] supposed to represent” (Burton, 2003, after Coombes & Wong, 1994). This requires careful consideration in translating the theoretical concepts into sets of multiple indicators. Due to the subjective nature of the concepts the indicators “reflect the content of the concept in question,” known as “face validity” (Bryman, 2016, p. 159). Methods of establishing face validity are fundamentally intuitive and can involve consulting people with experience and expertise in a particular field (ibid.).

To measure a concept in as reliable and valid a manner as possible, multiple-indicator measures are often used in social sciences research (Bryman, 2016). More than one indicator is used because a single indicator may- capture only part of the concept or be too general to measure the concept sufficiently (ibid, pp.153-154). Skjaeveland et al. argue that a multidimensional measure increases “the understanding of the dynamics of neighborhood social life” (1996, p. 415). The indicators were taken from several sources, where applicable, from a range of scales on which the indicators are relevant. The following sections outline the rationale for choosing these indicators.

5.3.1 Indicators Measuring Urban Form

The operationalization of the concept of urban form is fraught with difficulties as it invariably encompasses some physical and non-physical aspects. Although studies may differ in the ways they approach and measure the physical characteristics of neighborhoods, they overlap substantially regarding the indicators used. Four broad and interrelated aspects of urban form were identified after a comprehensive review

of the literature and are listed below. A set of indicators was selected for each of the features, described in the following sections.

- Density
- Land use
- Housing and street characteristic
- Urban layout

Indicators of Density

Many different indicators are used, in research and practice around the world, to measure the density of the urban form (Jenks & Dempsey, 2005). These various measures are largely inconsistent (some being of the population, others of built form) and for the most part incompatible with one another, making it difficult to convert from one to another accurately and to make comparisons (Churchman, 1999; Jenks & Dempsey, 2005, p. 291). Density measurements in the context of a built environment can be grouped into molecular measures (density within a dwelling unit) and molar measures (density of space outside the dwellings), and those focusing on qualitative features such as built form footprint and spacing between buildings (Alexander et al, 1988, p. 6). Furthermore, it has been argued that no single indicator can accurately measure the density of a given area (Berghauser Pont, 2011). For example, the gross density of an area does not provide meaningful information about its density if most of the area is made up of open space. Similarly, the density of the built-up area can give misleading information if there is a land of high-density housing in a mostly non-residential area. It is, therefore, more accurate to measure residential density by removing the area of non-residential land from the density calculations (Raman, 2010). As a result, different indicators were selected for the analysis to provide as possible a complete overview of the density in the case study areas. Table 5.1 lists the indicators used to measure density in the analysis. However, these indicators focus on actual density and not perceived density to avoid the subjectivity inherent in this measure and variations within a neighborhood which might give a false sense of similarity as to how people perceive density.

Table 5.1 Indicators measuring density

What is the variable measuring?	Indicator	Source	Scale of indicator
Gross density (Residents)	Number of persons, per hectare of the total neighborhood area.	<ul style="list-style-type: none"> • Census data • MoA maps 	Neighborhood
Coverage ratio (Land)	The ratio of residential land to open space per hectare	<ul style="list-style-type: none"> • Site survey • MoA maps 	Neighborhood
Net density (Residents)	Number of persons, per hectare of the total land area devoted to residential land use.	<ul style="list-style-type: none"> • Census data • MoA maps 	Neighborhood
Household density	Average number of persons per household	Census data	Neighborhood

Both the spatial areas of the neighborhood and the residential areas of the neighborhoods were calculated using digital maps obtained from the municipality of Aleppo and census data.

Indicators of Land Use

It is common for existing land-use indicators to focus on the provision of services and facilities in a given area and the distance that they should be from residential areas (Stead et al., 2000; Van & Senior, 2000; Barton et al., 2003). The services and facilities measured in this research cover a wide range of those recommended in policy (Syrian Planning Standards 1982), theory and design guidelines. Furthermore, two detailed maps were prepared for each neighborhood, the first showing the designated land use (according to official plans) and the second, the actual uses and subsequently developed facilities (according to site survey). Table 5.2 shows the indicators used to measure the extent of mixed use in the neighborhood in this study

Table 5.2 Indicators measuring land-use

What is the variable measuring?	Indicator	Source	Scale of indicator
Provision of services /facilities	The composition of services and facilities in the neighborhood	<ul style="list-style-type: none"> • Site survey • MoA maps 	Neighborhood

The spread of services/facilities	Distribution of services and facilities per neighborhood (average standard deviation across all services and facilities)	<ul style="list-style-type: none"> • Site survey • MoA maps 	Neighborhood
Land use ratio	Area of residential land use to all other land uses	<ul style="list-style-type: none"> • Site survey • MoA maps 	Neighborhood

The ratio of residential to non-residential land was calculated using the digital maps obtained from the Municipality of Aleppo. The spatial area of residential land-use, including garden spaces, was first calculated, followed by the spatial area of non-residential land-use. The ratio was obtained by dividing the area of residential land-use by the area of non-residential land-use.

Indicators of Housing and Building Characteristics

As this research identifies features, which are relevant at particular urban scale, mainly at the neighborhood and street scale, it was outside the scope of this research to examine individual buildings. Therefore, some aspects of urban form were omitted and the selection of housing indicators was limited to only those measuring the relationship between housing and open space. An efficient method of measuring housing characteristics for this research was to identify the predominant housing types per neighborhood. It was also useful to use the household questionnaire in measuring these characteristics such as a household's access to a balcony or a private garden. An indicator measuring the proportion of active building frontage per street was also included and was measured according to the site survey (Table 5.2).

Table 5.2 Indicators of housing characteristics

What is the variable measuring?	Indicator	Source	Scale of indicator
Housing type	Predominant housing type per neighborhood	Site survey	Neighborhood
Access to private outdoor space	Access to a large balcony or private garden	Household questionnaire	Household
Level of active frontage	Proportion of active building frontage per street	Site survey	Street

Indicators of Urban Layout

Urban layout is quite challenging to measure; therefore, theorists and practitioners have used a variety of ways through software packages such as Spatial network analysis, Space Syntax and Multiple Centrality Assessments (MCA) (Oliveira, 2016). These programs relate the connectedness of the local (here neighborhood) to the global (city) to generate a measure of integration for the smaller area. For this research, it was not considered necessary to measure the connectedness and permeability of the neighborhoods to the rest of the city. Instead, indicators were adapted from existing sources applicable at the neighborhood scale to measure connectedness and permeability more efficiently. Table 5.3 lists the indicators used in this research.

Table 5.3 Indicators measuring urban layout

What is the variable measuring?	Indicator	Source	Scale of indicator
Predominant street pattern	The overall street pattern in the neighborhood	MoA maps	Neighborhood
Degree of connectedness (Pedestrian routes per case study)	Number of junctions according to the selected point system	MoA maps	Neighborhood
Average urban block size	Approximate size of urban blocks per street	MoA maps	Street

Research conducted by Porta and Renne (2005) was based on indicators, which measure connectedness by an assessment of street junctions. Porta and Renne assigned a points system to junctions, with 4-way (or crossroad) junctions scoring most and culs-de-sac least. It would be inaccurate to count merely these junctions because that would be to overlook the characteristics of the routes that the junctions connect. Cul-de-sac, for example, do not always offer the same pedestrian route choices that cross-roads do. It is for this reason that a points system was used, based on a simple count of the number of routes emanating from any junction (after Porta & Renne, 2005).

The third indicator of connectedness and permeability is the size of the urban block. Connectedness and permeability of an urban layout are both said to be enhanced by small block sizes; (Sivam et al., 2012; Llewelyn-Davies, 2007). The indicator adopted for this research measures the average block length per street in meters. It could be argued that urban blocks can be permeable even though if they are long and offer a path for pedestrians. This was considered when calculating the length of urban blocks.

5.3.2 Indicators Measuring Social Sustainability

In Chapter Three, the inter-related dimensions of social sustainability were identified for this study. Several indicators were selected to measure the four dimensions listed below. These social indicators are based on the subjective perceptions and behaviors of residents and the data collected by using questions in the household survey and semi-structured interviews (outlined in detail in sections 5.5.3 and 5.5.4).

- Social interaction
- Feelings of safety
- Sense of place attachment
- Access and use of services and facilities

Indicators of Social Interaction

Social interaction is a concept commonly examined in empirical research of social sustainability (Chan et al., 2006; Buckner, 1988; Lev-Wiesel, 2003) and is operationalized in different ways. It can be argued that there are two main methods for measuring social interaction in social sciences research: firstly, through observation technique, i.e. examine interaction firsthand (Gehl et al., 2004,) and secondly by survey, through questions about respondents' levels of social interaction (Skjaeveland et al., 1996). The latter technique of measuring social interaction was adopted because observation techniques do not ensure that the social interaction measured involved residents alone. To measure the nature and extent of social interaction taking place in the neighborhood, three indicators were adopted. These are listed in Table 5.4.

Table 5.4 Indicators of social interaction/ networks

What is the variable measuring?	Indicator	Source	Scale of indicator
Interacting with neighbors	How many neighbors would you say that you see socially on average once a week?	Household questionnaire	Household
Chatting with neighbors	How many neighbors do you have a chat with/greet?	Household questionnaire	Household
Helping neighbors	How many neighbors would you lend food/ tools from?	Household questionnaire	Household
Knowing neighbors	How many neighbors do you know by name?	Household questionnaire	Household

Indicators of Feelings of Safety

Indicators of perceived safety and perceptions of crime in existing research commonly feature: How safe do you feel walking alone in this area after dark? (Gordon, et al., 2000) This indicator was selected for the research with the option for respondents to indicate if they never go out alone after sunset. It could also be argued that indicators of safety in this research should also measure physical safety in relation to, for example, road traffic or anti-social behavior (Nash & Christie, 2003; Barton et al., 2003). For this research, it was decided that general perception of safety to be sufficient indicator, as specific crimes or types of anti-social behavior have not been explicitly linked with the urban form in theory. The selected indicator of perceived safety is listed in Table 5.5.

Table 5.5 Indicator of perception of safety

What is the variable measuring?	Indicator	Source	Scale of indicator
Neighborhood as a 'safe place to live.'	Respondents' opinions on feelings of safety in the neighborhood	Household questionnaire	Household

Indicators of Sense of Place Attachment

Existing indicators of the sense of attachment that people have to a place are arguably related to those measuring sense of belonging. This means that there is some overlap between this dimension and the sense of community. Some definitions of a sense of

community identify place attachment as an indicator (Kearns & Forrest, 2000). Residents can feel attached to a place and/or to the people who reside in that place (Talen, 1999). In this study, the residents were asked whether they liked their neighborhood and whether they felt that they belonged to the people in the neighborhood. The indicators are listed in Table 5.6.

Table 5.6 Indicators of the sense of place attachment

What is the variable measuring?	Indicator	Source	Scale of indicator
Attachment to the neighborhood	Level of attachment to the neighborhood	Household questionnaire	Household
Neighborhood as a 'place to live.'	Respondents' opinions on their neighborhood as a place to live	Household questionnaire	Household

Indicators of Access and Use of Neighborhood Facilities and Services

How frequently a person uses a service may have little to do with quantitative aspects of urban form. As a result, exploring residents' opinions about local services and facilities is essential in some ways. Firstly, to gauge whether some aspects of urban form influence equal access, it is important to appreciate the perspective of residents in their ability to access local services. Looking at different neighborhoods, specific urban form aspects, may, or may not allow the individual to access the service as frequently as they might otherwise. The empirical method used to test this is to analyze how often an individual uses the service (Bramley et al., 2006). This can be achieved by examining quantitative data collected by a household survey. However, while this may give some evidence of usage patterns, it is not sure whether any differences in patterns of usage between different neighborhoods are a result of the urban form characteristics of each neighborhood or, whether other factors may influence usage. Therefore quantification would not be enough to address this question. There may be no relationship at all: individuals may be more or less frequent users of local services despite the characteristics of urban form in the neighborhood. Other factors which may influence access to services and the frequency of use may relate to characteristics of the services themselves, such as the quality of the service,

its management or, even the experience of trying to gain access to a service or a facility.

This study investigates the usage of convenience stores/corner shops, local shopping centers and public open spaces, as it was not considered appropriate to ask respondents to discuss a lengthy and comprehensive list of questions about services and their usage of each one in terms. These services can be reclassified in utility (essential services) or leisure (optional) services. Four indicators were employed to measure the usage of services and facilities by asking respondents how frequent they use particular facilities and their perspectives on their local services and facilities. These are set out below in Table 5.7.

Table 5.7 Indicators of use of neighborhood facilities/services

What is the variable measuring?	Indicator	Source	Scale of indicator
Access to services and facilities	perceived access to services and facilities in the neighborhood	Semi-Structured interview	Individual
The frequency of using utility facilities	How often residents use convenience store/corner shop and local shopping centers in the neighborhood	Household questionnaire	Household
The frequency of using leisure facilities	How often residents use green spaces/parks in the neighborhood	Household questionnaire	Household
Perception towards Facilities and services	Respondents' opinions on the characteristic of the services and facilities; interview quality, management, etc..	Semi-Structured interview	Individual

5.3.3 Indicators Measuring Interfering Influences

In order to fully answer the principal question of this study - the relationship between the aspects of urban form and dimensions of social sustainability in neighborhoods, other factors, and influences, which may also influence social sustainability, need to be included in the analyses. For this reason, the third set of indicators was selected (Table 5.8). These indicators have been taken from theoretical discussions and previous research and relate to factors that may have a significant impact on the relationship between a given urban form and social behavior (Abu-Ghazze, 1999; Dempsey et al., 2011; Naceur, 2013). These indicators are related to the individual characteristics of the respondent or interviewee. They include social characteristics,

age and gender of residents, and their socio-economic characteristics such as employment status, household income, and car ownership. Also included were measures relating to the household characteristics such as length of residence and plans that residents may have to move out of the neighborhood.

Table 5.8 Indicators of interfering variables

What is the variable measuring?	Indicator	Source	Scale of indicator
Social characteristic of respondent	Age	Household questionnaire	Individual
	Gender		
Socio-economic characteristic of respondent	Employment status	Household questionnaire	Individual
	Social class		
	Household income		
Household characteristic	Household composition	Household questionnaire	Individual
	Car ownership		
Household income	Level of household income	Household questionnaire	Household
Residential turnover	Length of residence	Household questionnaire	Household
	Plans to move out of the neighborhood		
Tenure	Tenure on household property	Household questionnaire	Household

5.4. Case Study Method

The case study is an empirical inquiry that investigates a contemporary phenomenon within its real-life context where the boundaries between phenomenon and context are not evident (Yin, 2018). Findings from a case study reflect the actual activities at a particular moment and can be used to build theories, especially in exploratory types of research.

One of the reasons that I chose the city of Aleppo as a case study is that has the highest density of population in Syria and it is the second most important city after the capital Damascus. Also, Aleppo is my hometown where I studied and worked. This

helped me to get more intimate and open access to data from friends and colleagues working in governmental departments. This research is conducted at the neighborhood level because the neighborhood is regarded as an essential component of the city and as one of its most humanly relevant scales (Jenks & Dempsey, 2007).

To enable comparison of areas with regard to their social sustainability, several neighborhoods with as different a character as possible were selected to address a variety of residential densities, urban layouts, housing types, land uses, which are usually associated with different socioeconomic levels. This criterion ensured that several aspects of urban form and their potential effects on dimensions of social sustainability could be measured and analyzed. Moreover, my familiarity with these neighborhoods was considered essential in the selection of the neighborhoods because it was not possible to do the site survey personally.

5.5. Methods of Data Collection

Four main methods of data collection were employed in this research and are listed below. They are discussed in the following sections.

- Literature review
- Physical site survey of each neighborhood
- Household questionnaire survey administered to a sample within each neighborhood
- Semi-structured interview conducted with a sub-sample of household questionnaire respondents

5.5.1 Literature Review

In the initial stage, a review of the literature was carried out with the aim of understanding the basic concepts, theories and methods for measuring urban form and social sustainability (see Chapters 2 and 3). The key issues, theories, and methods thus identified were adopted for this research, and used to develop the research methodology explained in this chapter. I found during the initial stages of this research that there is a significant gap in the research and understanding of social sustainability and its relationship to urban form, especially in the case of the urban

neighborhoods. Most of the literature remains vague and too general in discussing this issue. Additionally, findings of conducted researchers cannot be applied to different parts of the world without taking into account, for example, social and cultural differences.

5.5.2 Site Survey

Most of the data measuring the aspects of urban form were collected in each of the neighborhoods using a physical site survey with the help of two postgraduate students at the University of Aleppo. The objective of this site survey was to collect primary objective data about various aspects of urban form. Burton et al. argue that there is a lack of methods to measure the urban form and that some measures (such as housing characteristics) are based on perceptions or non-physical aspects, rather than on physical features (2005). They argue that there is a need for site surveys to be comprehensive and reliable because they are more likely to reveal essential relationships and provide valid guidance than site surveys which focus on a small number of urban form aspects (ibid., p. 267). The theoretical concepts used in this study were operationalized as sets of mainly objective indicators, outlined above, related to the physical environment. The site survey was found to be an appropriate and efficient method of collecting data related to these indicators. The adoption of mainly objective indicators in the site survey was advantageous because most of them arise from sources of information in the built environment which do not change significantly over a short time (if at all, as in some cases). This also meant that cross-checking the collected data was easy; no subjectivity was involved.

5.5.3 Household Questionnaire Survey

The household survey is “one of the most important tools used in contemporary social research” (Pole & Lampard, 2002, p. 89). It is widely employed on different scales, including the national, regional level, the city and the neighborhood. A standardized range of information is collected corresponding to cases, and a counting process is employed in the aggregation of the data across the cases (Pole & Lampard, 2002, pp. 89-90). The standardization of the data is key to the validity of the counting process and the resulting data (ibid., p. 90).

Household survey was employed in this study because it is a useful method for asking a number of people in a given geographical area non-sensitive, multiple-choice questions about their social life in their neighborhoods, as well as obtaining other household profile data. As with the interpretation of all indicators, caution is recommended when operationalizing theoretical concepts in survey questions (Pole & Lampard, 2002). It is argued that such operationalization by the researcher can result in an interpretation of a term that may not be understood or similarly interpreted by respondents (Bryman, 2016). Bryman also acknowledges the difficulties inherent in standardized question-wording because of the differing interpretations (or not) by respondents with regard to meanings or words used in surveys (2016, p. 222). Oppenheim (2001) argues that there will always be differences in the way that questions are understood by respondents and interpreted by researchers, but that the task of minimizing distortion is made easier through practices such as proper question-wording.

A simple random sampling approach was employed in this research to draw as a representative sample of the residents as possible. I opted for the drop and collect method of administering the household survey -a self-completion questionnaire - to households in three neighborhoods in Aleppo with the help of postgraduate students at Aleppo University.

A questionnaire along with an information leaflet on the research (Appendix A) was dropped at the households on the weekend for residents to fill out. Initially, 210, in three neighborhoods were given a questionnaire. In all cases, an attempt was made to collect the completed questionnaire over the same weekend. In the case of a non-response, a further effort was made to collect the questionnaire over the next two weekends. The aim was to get about 50-60 questionnaires completed in each case study area. Table 5.9 shows the return rates in the three selected neighborhoods.

5.5.4 Semi-Structured Interviews

A more in-depth method of data collection than the household survey is also required for this study given the nature of the questions to be asked and the data to be collected. This data is not best collected through a site survey or household questionnaire survey due to the nature of the questions involved. The semi-structured

interview was chosen as a 'follow-up' qualitative data collection method to complement and enrich data collected in the household questionnaire survey because it, on the one hand, allows respondents to elaborate on answers as they are not able to do in a questionnaire survey, and, on the other, allows The author to probe respondents for more detail in their responses. This is because the method provides "some latitude to ask further questions in response to what is seen as significant replies" (Bryman, 2016, p. 696). The aim of the semi-structured interviews was, therefore, to gain a clearer picture of how people use their local environment and to get a sense of what this environment means to them. The semi-structured interviews thus explore the nature of the relationships that have emerged from the household survey findings, as the questionnaire asks respondents what they do in their neighborhood while semi-structured interviews ask why they behave in a certain way and how they feel about their neighborhood. These two research methods (household questionnaire and semi-structured interviews) complement each other, allow data triangulation and serve to corroborate findings (Miles et al., 2014).

The semi-structured interview is frequently conducted face-to-face, widely accepted in the social sciences as a robust method of data collection (Bryman, 2016; Pole & Lampard, 2002). The advantages of the face-to-face interview include picking up non-verbal hints that researchers can use to pace up the interview and to establish a good rapport with the interviewee (Lune & Berg, 2017). Some disadvantages are associated with face-to-face interviews, in particular, the time and cost implications, as well as the influence that the interviewer can have on the interviewee. Bryman suggests that interviews conducted by telephone "may offset the likelihood of respondent's answers being affected by the interviewer" because he or she is not physically present (2016, p. 484). The telephone interview is also cheaper and easier to administer and less time-intensive (ibid.).

Since face-to-face interviews were not possible, a total of 24 telephone interviews were conducted with a sub-sample of the total sample in the in the selected neighborhoods, whom some of them took part in the household survey, constituting approximately 7% overall of the total number of surveys returned by respondents. The selection of the interviewees aims to cover the range of different household groups. The breakdown of the figures is shown in Table 5.9. The following section explains

how the data collected using this and the other methods already outlined, was analyzed.

Table 5.9 Survey and semi-structured interviews by neighborhood

	Case Study Area			
	Al-Shahbaa	Al-Hamadaniyeh	Hanano	Total
Distributed household questionnaires	70	70	70	210
Number of household questionnaires received	50	54	47	151
Number of semi-structured interviews	8	7	9	24

5.6. Methods of Data Analysis

A large quantity of data about the aspects of urban form and the dimensions of social sustainability in the three neighborhoods was collected, using the different research methods outlined above. Once these data were collected in a 'raw' form, they were, on the whole, analyzed in several stages. As mentioned earlier the study is conducted following a mixed-method approach which is mainly quantitative but also qualitative. The following sections outline these techniques.

5.6.1 Qualitative Analysis

Qualitative analyses were conducted to provide background information about the physical characteristics of the neighborhoods, such as development process, urban layout, housing form, transport and the prevalence of services.

5.6.2 Correlations

Correlation is an essential part of the analysis; it directly relates the indicators measuring the aspects of urban form to the indicators measuring social sustainability. Analyses of correlation are used to explore the strength and direction of a relationship between two variables (Bryman & Cramer, 2005). This research employed Spearman's Rank Order correlation (ρ) coefficient, designed for use with ordinal, or categorical, data (Bryman, 2016): for the interval, or continuous variables, Pearson correlation coefficient was used (Bryman & Cramer, 2005). The analyses generated coefficients for all combinations of indicators, including summary measures. The

correlation analyses were conducted with a two-tail test of significance because 'no specific prediction was made concerning the direction of the relationship between the variables' (ibid., p. 119). The value of Spearman's rho (The value of r) always varies between +1 and -1, and the closer the value generated is to 1 or -1, the stronger the relationship between two variables (Bryman 2016 p.341). Values below .29 (or -. 29) are considered to represent a small correlation, .30 to . 49 (-. 30 to -. 49) a medium correlation, while .50 and above (or -. 50 and above) represent a significant correlation between two variables (Davis, 2013). A value of zero suggests no relationship between the variables. Tests of correlation are beneficial in this research in assessing whether the claimed relationships between the features of urban form and social sustainability are confirmed, and how the interfering variables (interfering influences) are associated with the indicators of social sustainability. The partial correlation test was used to filter out the effects of each interfering variable from the relationship between urban form and social sustainability. For this, only those interfering variables that had a significant score in the first correlation test were selected.

5.6.3 Content Analysis

The semi-structured interviews provided a considerable quantity of both qualitative and quantitative data. As interviewees did not welcome recording in most of the interviews, hand notes were taken during these interviews. The data was analyzed using and coding content analysis, including coding, counting phenomena and comparing and contrasting relations between variables (Bryman, 2016). Coding data and counting phenomena they occur in the data are examples of objective and systematic techniques, which aim to minimize the author's personal biases in the research process. (ibid.)

Coding interview data is a method of organizing, retrieving and interpreting raw data (Charmaz, 2010). Such data are organized and reduced into different code categories, modified as and when necessary throughout the process, with care taken to code consistently and not lose the original meaning and sense of the data (Bryman, 2016; Pole & Lampard, 2002). The finalized categories may then appear to fall into similar groupings or consist of further subcategories, needing to be organized by the author (Pole & Lampard, 2002). Data coding is based on "grounded theory," which is,

in essence, “the discovery of theory from the data” (Pole & Lampard, 2002, p. 200). This is a suitable approach to take with the open questions asked in this research such as those relating to the opinions about the impact of different aspects of urban form on social sustainability dimensions used within their respective neighborhood.

Chapter 6

Characteristics of the Study Sites

6.1. Introduction

To examine the influence of urban form on social sustainability at the neighborhood level, an in-depth study was undertaken of three case study areas. The selected sites differ in population densities and land use, prevailing types of residential buildings, local facilities and open spaces. Aspects considered here include a description of each area's physical characteristics such as development, urban layout, housing form, transport and the prevalence of services.

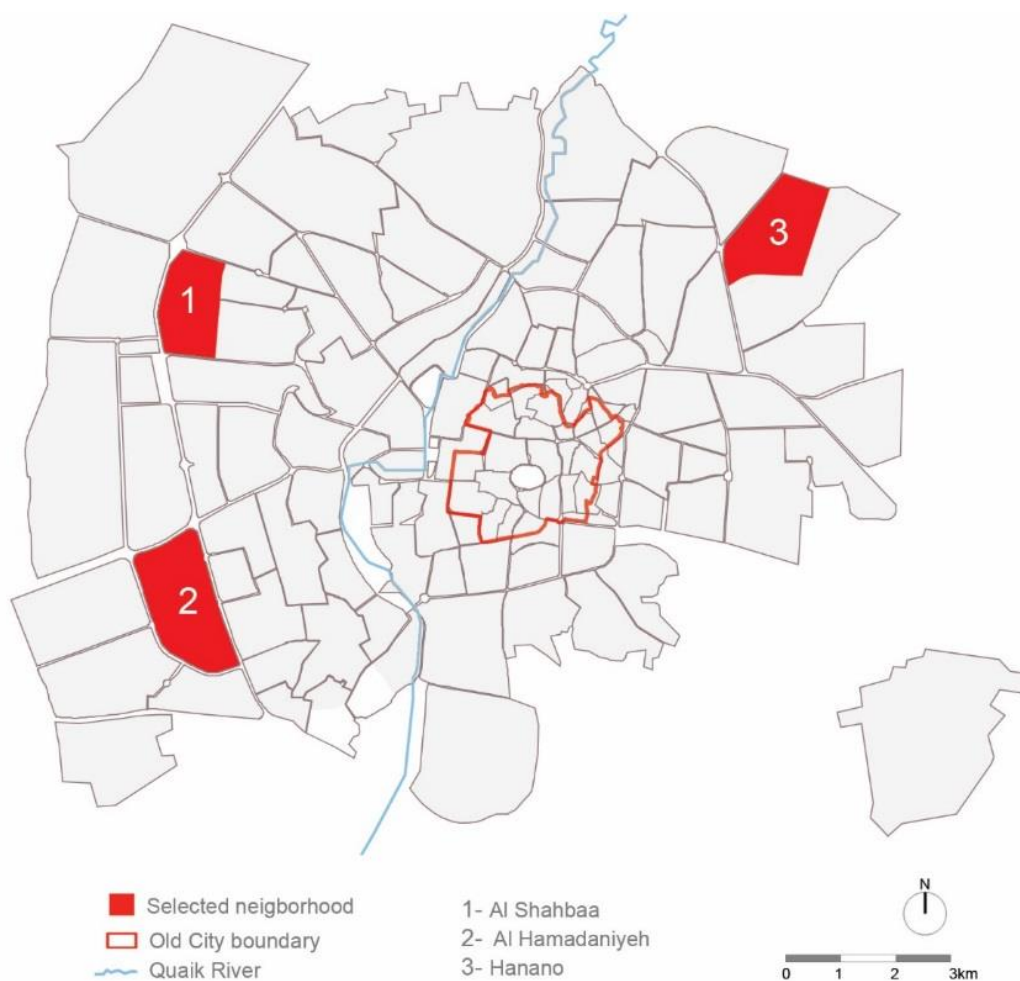


Figure 6.1.Location of selected neighborhoods

Source: The author, based on maps from the Municipality of Aleppo

6.2. Profiles of the Case Study Sites

6.2.1 Al-Shahbaa



Figure 6.2 Al-Shahbaa neighborhood and surroundings

Source: Google Earth image 2017, adapted by the author

The case study area of Al-Shahbaa is situated to the west of Aleppo city. In the 1974 Master Plan of the city, it was described as a first-class residential neighborhood with an area of about 89 ha. The development of the area was undertaken by four main housing associations throughout different periods of time. The first housing project began in the early 1980s and by 2000 the area had been entirely developed.

Al-Shahbaa neighborhood topography is generally flat with a sloping hill as the area extends into the most western part of the case study area. It is characterized by low density. Regarding the provision of facilities and services in the neighborhood, some facilities were designated in the original detailed plans of the neighborhood (Figure 6.7), while others were added later. However, the existing facilities are entirely different from the planned ones.

Regarding commercial facilities, one shopping center with several shops, a restaurant, and a few offices were to be developed on a plot of land designated for that purpose, but it remained unused (Figure 6.3). In addition to the planned commercial facilities, there were many retail stores in the neighborhood, provided by private developers, which were set up in former garages or built in ground-floor gardens of residential buildings, a total of around seventy stores, including a variety of grocery shops, pharmacies, hairdressers and brokerage offices. The provision of certain types of retail stores was based on what was seen to be profitable to the developers rather than what was deemed important to the residents. Most of these changes have received formal approval from the municipality.



Figure 6.3 Vacant shopping center

Source: Site survey, 2017

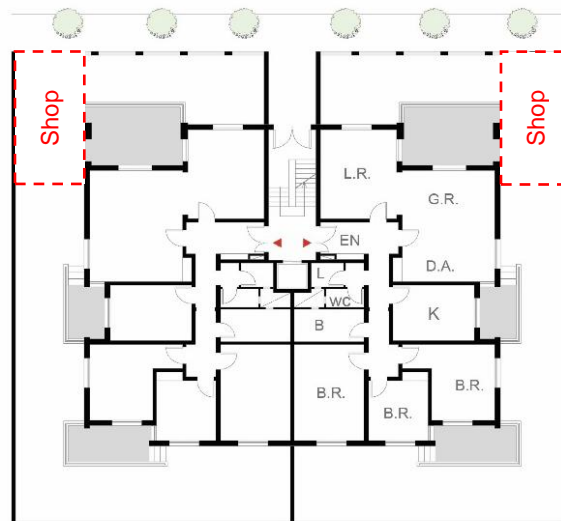


Figure 6.4 Retail shops built in the garden of a residential building

Source: Site survey, 2017

A local health center (serving not only the local residents but also residents of the surrounding neighborhoods), with some private medical practices of various specialists, is available in the neighborhood; the ground floors in residential buildings were adapted to accommodate these medical practices. Along with private medical practices, a private hospital was built on land designated for housing. Six schools were gradually added in the neighborhood, two of which worked in one shift, while

others work in two shifts¹⁹. Three of them were later changed to serve other functions at the city level such as the Business and Management Institute, Teacher Preparation Institute and Directorate of Services. Changing the use of schools was due to the fact that most of the people who moved in when the area was developed had children at school age at that time, but later on, there was less need to use all of these schools. As no public kindergartens were provided, five apartments on the ground floor of residential buildings (with private gardens) were converted into kindergartens.



Figure 6.5 Kindergartens, set up on the ground floor and in the garden of a residential building

Source: Site survey, 2017

There are three mosques in the neighborhood. Only one of them was already included in the master plan. Later on, two further mosques were added – the first on a site designated as a housing plot, and the second on a site allocated for a commercial center. The neighborhood lacks a central garden and playground for children; there are only small green spaces between residential buildings. Most of these green spaces are not well maintained, mostly fenced in and without any benches. Some residents were very involved in establishing and maintaining green spaces adjacent to their homes. However, these valuable and pleasant green spaces were planted purely for decorative purpose (Figure 6.6). All of these spaces were also fenced in and surrounded by an elevated planting bed so that no one could step on the lawn.

¹⁹ Running schools in two shifts (to response to the number of students from within and outside the neighborhood) was accepted and very widespread in Syria until 2007.



Public green areas and open spaces



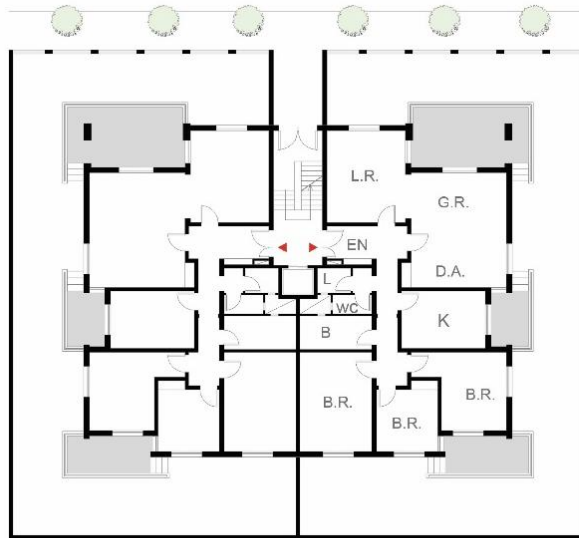
Figure 6.6 Green spaces privately maintained by residents

Source: Site survey, 2017

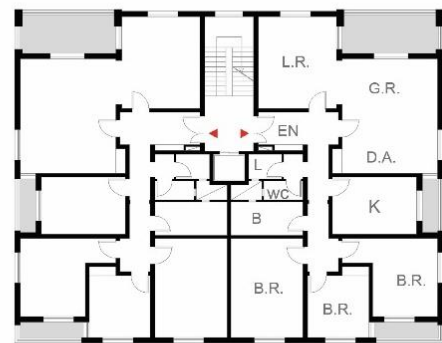


Figure 6.7 Planned and existing land use map of Al-Shahbaa
 Source: The author, based on maps from the Municipality of Aleppo and site survey

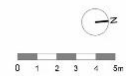
Housing types in the neighborhood vary depending on the association that built them, ranging from single-family houses with two floors to apartment buildings, with three to four floors, divided into two flats per floor. All apartments at ground floor level have a private garden, some of which were later used to erect spaces for various functions as discussed above.



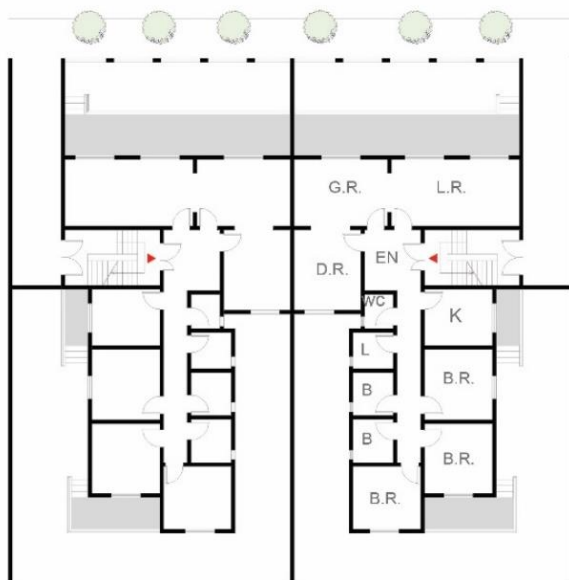
Ground Floor Plan



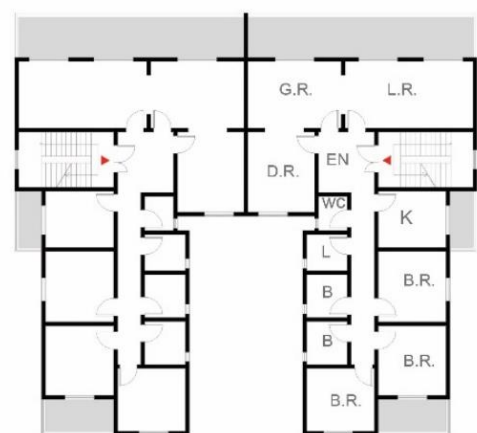
Typical Floor Plan



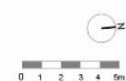
Floor plans of apartment buildings provided by engineers' association



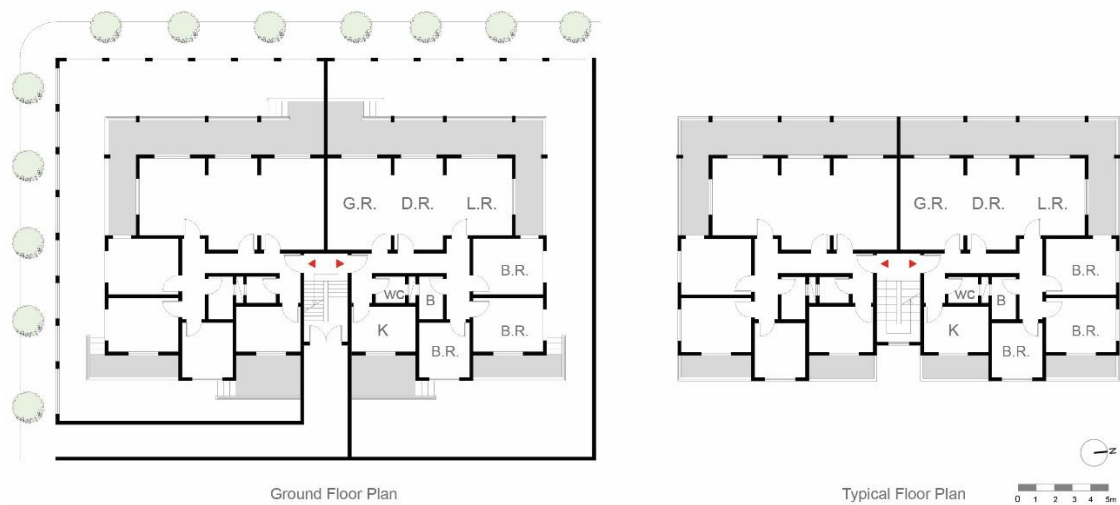
Ground Floor Plan



Typical Floor Plan



Floor plans of apartment buildings provided by defense association



Floor plans of the apartment buildings provided by doctors' association

Figure 6.8 Housing in Al-Shahbaa

Source: The author, based on site survey

Residential buildings have been arranged back to back along the streets with a private front garden on the ground floors. All blocks are accessible from the streets. This arrangement made the residents apply different solutions to prevent people from looking over the fence either by putting up a hedge or growing large plants and shrubs in the front garden (Figure 6.9), while others used different solutions to keep their safety by adding bars on the windows or additional metal doors. In some cases, the balconies were glazed to maintain privacy, also due to the proximity between residential buildings, or to integrate the balcony in the internal space and make for more useful space for living or storage purposes. Mainly the kitchen and the bedroom balconies were integrated, as they were seen by residents somewhat “wasted spaces” and rarely used.



Figure 6.9 Residents' initiatives to improve privacy

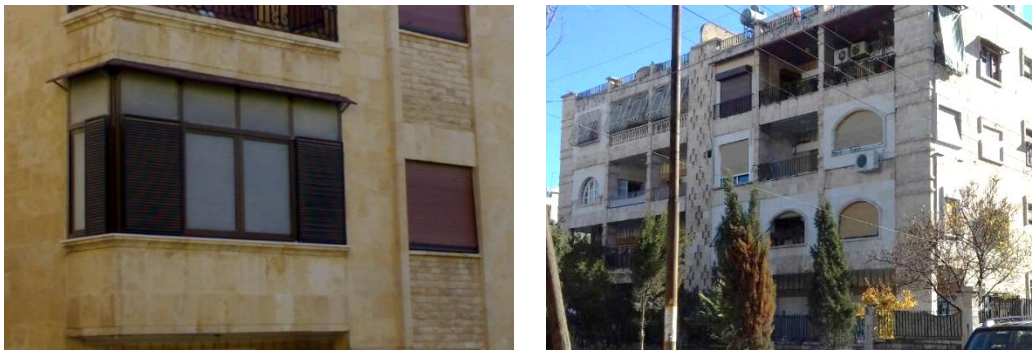


Figure 6.10 Balconies glazing or walling

Source: site survey 2017

Al-Shahbaa's urban fabric is characterized by a block structure, with the local street network defined by a grid of primary, secondary streets and dead-end streets. Overall, the neighborhoods' layout is predominately compact, gridded and orthogonal. Regarding physical delineation, Al-Shahbaa neighborhood, north and south is non-contiguous with surrounding areas on both sides. Separation of neighboring areas to the north of Al-Shahbaa is defined by a busy commuter road, Al-Nile Road, which provides quick access to and from the city center and the west of Aleppo. Heavy traffic from the surrounding areas reduces the pedestrian's connection with the other neighborhoods. As most residents in Al-Shahbaa own cars, they rely less on public transport in the neighborhood. Therefore, bus frequency was reduced by the authorities to about four buses per hour only.

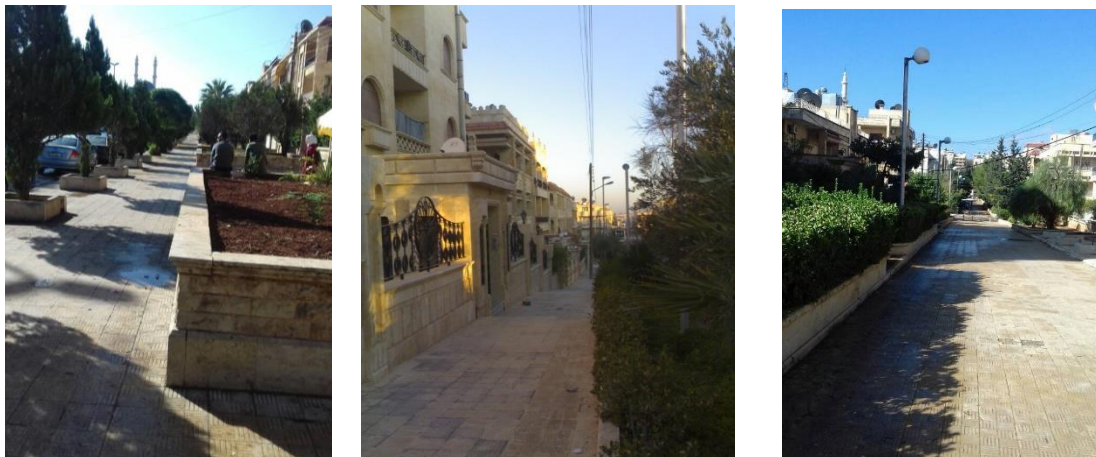


Figure 6.11 Pedestrian pathways

Source: Site survey, 2017



Figure 6.12 Accessibility and mobility in Al-Shahbaa neighborhood

Source: The author, based on based on maps from the Municipality of Aleppo and site survey

6.2.2 Al-Hamadaniyeh



Figure 6.13 Al-Hamadaniyeh neighborhood and surroundings

Source: Google Earth image 2017, adapted by the author

The case study area of Al-Hamadaniyeh is situated to the west of Aleppo city just to the west of the ring highway (Al-Mohalak). Its topography is mainly 'flat,' indicating relative homogeneity within the area. The development of the area began in 1977 as part of the government's attempt to provide new neighborhoods to meet the increasing need for housing, but, in actual fact, it was mainly developed to provide housing for members of the military. This project was initially designed, planned and executed by the GEMH in a corporation with local consultants and foreign experts mainly from the Soviet Union, Romania, and Poland. The original plan included three main residential areas, and the fourth area was designated to provide large green space and tourist facilities. The green space was later reduced, the planned tourist facilities were canceled, and the fourth area was merged with the villa area and developed as housing (Figure 6.16).

The area was developed to accommodate about 32,000 people, but in 2007 it was already inhabited by 38,000 people (Center of Bureau Statistics). Later on, the population of the neighborhoods showed a slight increase as residents of the ground floors built illegal additional small flats within their private gardens, to provide housing for their extended family members or to rent them out and, as a result, the population of the neighborhood grew to around 40,000 in 2012. The development of the neighborhood was undertaken in three phases, with one residential area being developed in each phase. The housing construction took only a short period of time compared to other neighborhoods due to the use of a prefabricated system on the site. The residents started to move into the neighborhood in the early eighties, and it was entirely occupied by the late eighties, except for the villa area, which still has some vacant houses. Since the area is close to the low-income neighborhoods, elite families hesitated for a long time to move to the area.

Regarding the facilities provided here, the original plan of the neighborhood lacked the good distribution of the facilities, as most of the public facilities were centralized in the service zone. This situation was later modified, and new plans were issued in 1999 to include even more facilities (Figure 6.16) However, the existing facilities are completely different from the planned ones.

The neighborhood's publicly provided, commercial center was not opened until the mid-1990s, due to defects in the building construction. Moreover, the center was planned to have large car parking lots, but it was later occupied by two office buildings. At the beginning, the neighborhood commercial center contained about eighty shops, a convenience store, two multipurpose halls, a military health center and a nursery, in addition to extra space with no specific uses. Of the eighty shops planned, only twenty had opened by 2010.

The small area of shops, the bad maintenance of the center and poor-quality design (i.e., long and narrow corridors with inadequate lighting) failed to attract developers to buy or rent these shops. Later on, part of the center was converted into a private school, and another part of the local center was turned into offices for a newspaper. Of the plots allocated for smaller commercial centers, many of the plots were built and have been used since the mid-1990s, while a few were left as empty land for different reasons such as particular disadvantages of the location, accessibility, real estate prices etc.

In addition to these commercial facilities, provided by the public authorities, private retail stores were gradually introduced in the neighborhood by adding premises to part of the front gardens of ground floors in residential buildings with different internal areas and exterior facades. In some cases, parts of the flats on the ground level were also transformed into shops, which changed the exterior look near the entrances of the buildings and the entire appearance of the buildings. Another twelve were built on the premises of religious buildings. This phenomenon started when a few shops were built and operated by residents of ground-floor flats and gradually became more widespread when some residents started building shops and renting them out. Illegal retail shops were considered by developers to be a better investment value than formal shops in the commercial center, due to their locations on the main streets and their proximity to the housing.



Figure 6.14 Retail shops built in the garden of a residential building

Source: Site survey, 2017

A public health center was provided by converting a ground-floor apartment in one of the high-rise buildings to serve mainly employees in the military, but it was also used to serve local residents. A specialized medical center on municipal level was also built in the neighborhood. Also, thirty two private medical practices were created by converting flats on ground floors or first floors of residential buildings, as these two floors were more accessible for patients than higher floors (most of the residential building, except the residential towers, have no lift).

Seven schools were gradually added in the neighborhood. Around a quarter of the plots assigned to schools were not built; most of this land remained empty or was partly planted. One of these schools was used as a technical college, serving a wider catchment than the neighborhood, while only one school was sometimes used to hold the annual meeting between the representative of the community, the municipality and the residents. Only one public kindergarten was built, and later on, four private ones were added by converting ground floor apartments in residential buildings. Only one public kindergarten was built in 1989, and later on, four private ones were added by converting ground-floor apartments into residential buildings. Seven mosques and one church have been gradually added in the neighborhood since 1990. Three of these mosques were built on plots allocated for green spaces based on residents' requests. Some mosques were used for weddings and funeral ceremonies.

Three of the seven plots allocated for cultural and administrative facilities were developed for a petrol station, a fire station, a bakery, and a post office and phone center. The rest of the plots remained empty. Thus, none of them are used for cultural purposes. Regarding the community center, the two halls that had potential to serve this function have been privately rented out for special occasions, e.g., weddings

The original plans for the neighborhood included a large area for green spaces; only one plot was allocated for a central public garden. The neighborhood was also surrounded by a green belt. When the plans were amended in the 1990s, some parts of these areas were allocated for other uses (schools, nurseries, religious buildings). The public park was opened to the public in the mid-nineties. It was planted with trees, plants, furnished with benches and playing areas for children. However, to access this park people have to cross major streets which sometimes show heavy traffic. Other green spaces in the neighborhood were either planted or left fallow. In the past, they were maintained and supplied with lights and benches. Some of this furniture was demolished or never maintained due to the lack of sufficient fund needed to manage and maintain these spaces. In general, most of the green spaces in the neighborhood were badly equipped, maintained, and some of them have even been fenced in and are therefore not accessible.

Some residents had helped to create and maintain green spaces between the residential blocks. However, these well-kept green spaces have even been fenced in and used as exclusive properties and were therefore not accessible to other users. Also, the green belt around the quarter was reduced in size when some plots of land were built up and used to accommodate different functions. However, no serious action was taken by the authorities to prevent the illegal conversion of the green public spaces into private ones or building flats and shops on the ground floor private gardens.

In 2010, a new plan was proposed to improve the condition of the green areas. The plan included the establishment of smaller public gardens in different parts of the neighborhood. However, this plan did not correspond to the planned land use of the neighborhood, as some of the suggested green spaces were to be laid out on plots

designated for other uses (e.g., school and kindergarten). In contrast, land designated for green spaces was used for other purposes (e.g., mosque).



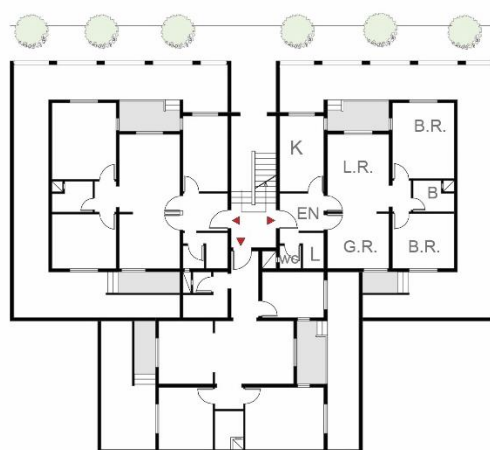
Figure 6.15 Green areas between residential buildings in Al-Hamadaniyeh neighborhood

Source: Site survey, 2017

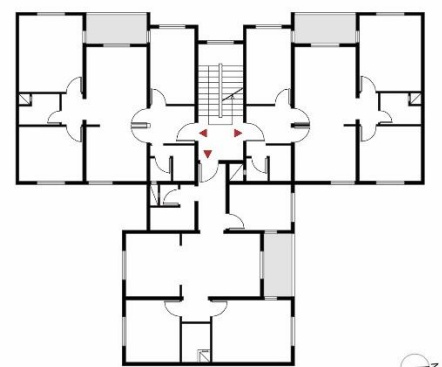


Figure 6.16 Planned and existing land use map for Al-Hamadaniyeh neighborhood
Source: The author, based on maps from the Municipality of Aleppo, GEMH documents and site survey

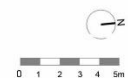
Housing types vary in the neighborhood, including an area devoted to detached villas with two to three stories, which accommodate a single family in most cases. The rest of the neighborhood is divided into three areas with terraced buildings (tenements). The first area consists of four-story buildings with a living space of about 128 m², while the second area has buildings with a living space of only 76 m². The third area consists of 4-5-story houses. The apartments have 80 m². The detached high-rise buildings are eight to thirteen floors with a living space of around 130 m². They accommodate mainly middle-income families, most of which are civil servants. All buildings are surrounded by private gardens that belong to residents of the ground floors. Most of these blocks are accessible from the green areas between the units and not from the streets. The buildings are arranged in a way that no one has a direct view into the opposite flat in another building. Moreover, the distance between residential buildings ensures good privacy for the inhabitants.

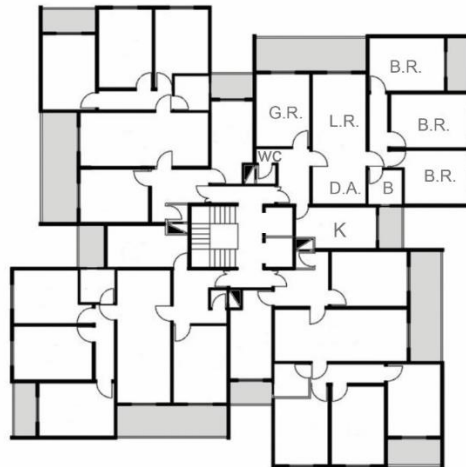


Ground Floor Plan



Typical Floor Plan

*Eight-story apartment block plans*



Highrise (13 floors) residential towers plans

Figure 6.17 Predominant housing types in Al-Hamadaniyeh neighborhood

Source: The author, based on GEMH documents

As in Al-Shahbaa, to a larger extent, external changes have been made to the building fabric, with many balconies having been glazed and new small flats or shops built in the gardens. This case was found in all the housing types, low, middle, or high-rise apartments. Moreover, some residents added windows to have extra ventilation and to get sunlight in winter or a cool north wind in summer. These changes disrupted the patterns of the facades and thus affected the aesthetic appearance of the buildings due to the different materials used.



Figure 6.18 Integrating the loggias by glazing or adding shade panels

Source: Site survey, 2017

The neighborhood has a mixed type of urban layout, deformed, clustered around green spaces thus increasing the urban space and the proportion of pedestrian paths which are separated from vehicles movement routes that were kept around the units. On-site parking around residential blocks, within cul-de-sacs, is provided for all residents and visitors on a first-come-first-serve base. Al-Hamadaniyeh has a good bus service regarding route density and frequency, although experience has shown that journeys can be slow. Vehicular access to the area is through the highways surrounding the area.

Moreover, the neighborhood is non-contiguous with the surrounding areas for pedestrians. Cut off from the main highways, any link to the surroundings is made very difficult, leaving no choice but to cross over these highways. Additionally, the area is enclosed by a green buffer zone, which is about 100 meters wide.



Figure 6.19 Accessibility and mobility in Al-Hamadaniyeh neighborhood

Source: The author, based on maps from the Municipality of Aleppo, GEMH documents and site survey

6.2.3 Hanano



Figure 6.20 Hanano neighborhood and surroundings

Source: Google Earth image 2017, adapted by the author

The area is situated in the eastern part of Aleppo city. The neighborhood was initially planned for about 30,000 inhabitants, but by 2011 there were already about 52,000 people living there, and it was expected that the population would continue to increase as some of the residential buildings were still under construction. Hanano is one of the less affluent areas of Aleppo with mostly social housing, which is both rented and owned. The area was designed in the 1974 Master Plan as a green area and was later changed into a residential area, specifically planned for lower-income residents. It is surrounded by informal settlements, built by poor people and accommodating about one hundred thousand inhabitants. The construction of the first part began in the late 1970s, and the inhabitants started to settle here in the early 1980s. Development of the rest of the neighborhood has taken place gradually. Most of the residential blocks were constructed by the late 1990s. Regarding the provision of facilities, the original plans for the neighborhood included a wide variety of services to meet the needs of the residents. However, the existing facilities are quite different from the planned ones.

On the plot specified as a local center, a small shopping center was built, which was to accommodate forty small shops, but only one-third of the business premises are in operation, due to the complexity of the letting process and the poor maintenance of the center, with the rest standing vacant. Later on, the rest of the plot was developed, planned to accommodate four hundred twenty small shops of which about three hundred fifty are open. Also, private retail shops were gradually established in the neighborhood by converting the front room balconies of ground floors into residential buildings and later a larger part of the flat of the whole flat into a wide variety of shops. This was seen much more than in Al-Shahbaa and Al-Hamadaniyeh, perhaps because of the lower income of residents in this neighborhood or the large catchment population. These conversions potentially threatened the safety of these buildings making structural changes necessary, i.e., adding windows or doors.



Figure 6.21 Conversion of ground floors flats into shops

Source: Site survey, 2017

Two healthcare centers were built in the neighborhood, the first in early 1990s and the second in 2003, both serving local residents and the surrounding informal settlements. Along with these public health facilities, forty-seven private medical practices have been created by converting apartments in the ground or first-floor apartments in residential buildings.

Ten schools were gradually added in the neighborhood between 1989 and 2010. One of these schools works in one shift, while all the others work in two shifts to accommodate a large number of students from the neighborhood itself and the surrounding informal settlements. Priority was given to primary schools to be located within the neighborhood rather than high schools. Thus, students must attend high schools outside the neighborhood.

The neighborhood has only one public kindergarten, while two more plots dedicated for kindergartens were changed for other uses. In addition to the public kindergartens, a few private kindergartens were established by reusing the ground floor of a residential building. Two mosques were built in 1997 and 2001. A third one is still under construction. Prior to the construction of these mosques, the residents of the neighborhood constructed a temporary prayer hall on part of an open space, which was used before the mosques were completed.

The main public garden was created in 2001. A few trees and other vegetation were planted here and furnished with benches and playing areas for children. Otherwise, green space is scarce in the neighborhood, with only few plants. The playground was

not built, but youngsters and local teams still use the empty area for football games. Outdoor spaces are mostly utilized as transit areas rather than as recreational areas, with most of the users of the open space coming from the informal neighborhoods.

Apartment buildings that are arranged in rows have resulted in dispersed outdoor areas. One of the major problems of such spaces relates to their size and imprecisely defined public spaces. These spaces have the character of a no-man's land because they are too big and lack of clarity. Thus, some of these spaces have been turned into dumping grounds, while others were planted and maintained by residents in the adjacent residential buildings. Interestingly, some residents have used spaces close to their homes for gardening. This was mainly during the siege of Aleppo when there was a lack of basic vegetables at the food markets. Therefore, residents planted these spaces with different types of vegetables used daily.



Figure 6.22 Small green areas between residential buildings, either used as through-out ways or used for vegetable gardening by residents

Source: Site survey, 2017

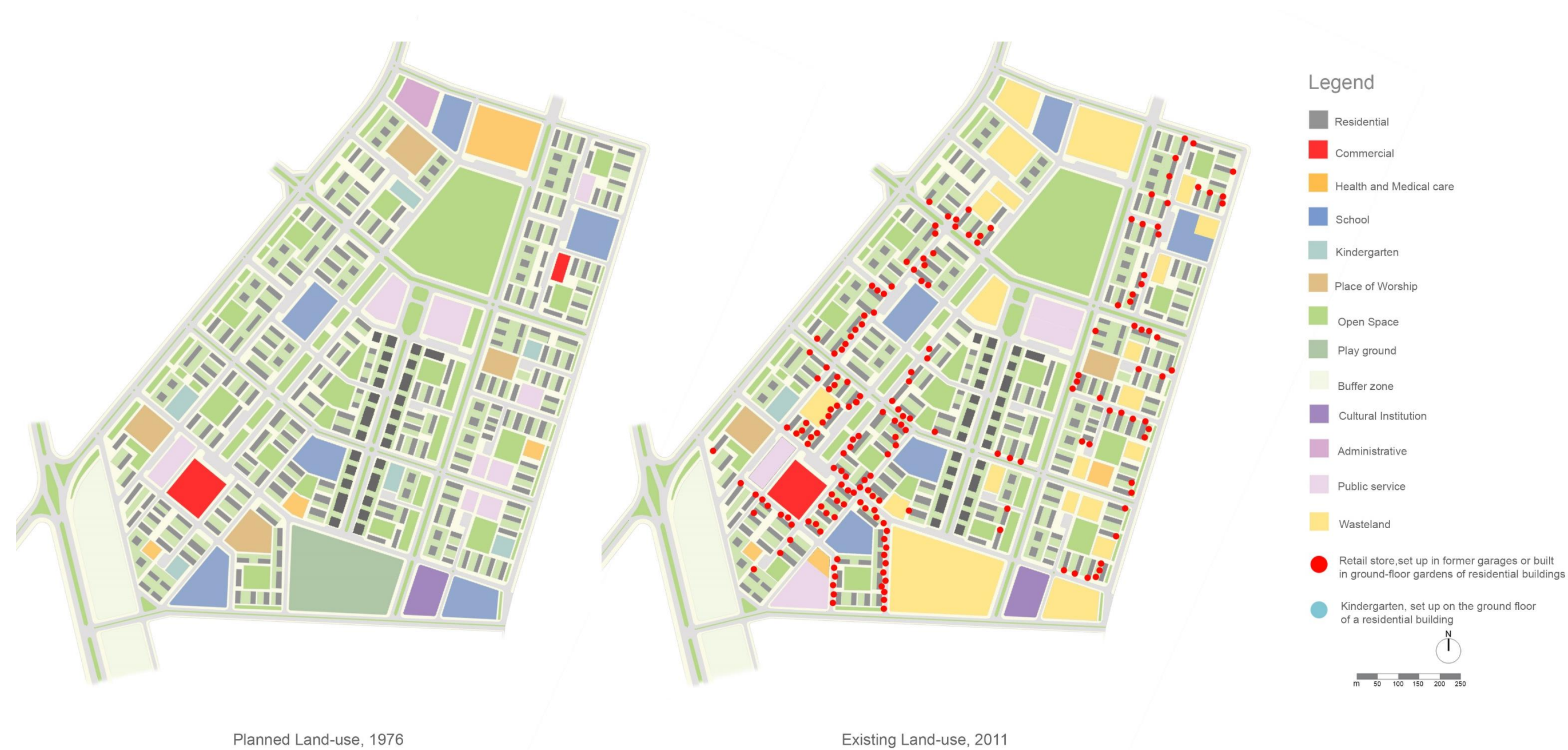


Figure 6.23 Planned and existing Land Use Map for Hanano neighborhood
Source: The author based on maps from the Municipality of Aleppo and site survey

The prevailing building types are 5-story liner apartment blocks with no private gardens at the ground level. The average of the apartments areas is between 65m² and 75m². Most of residential block entries are oriented towards the green spaces that are situated between the blocks rather than to the streets.

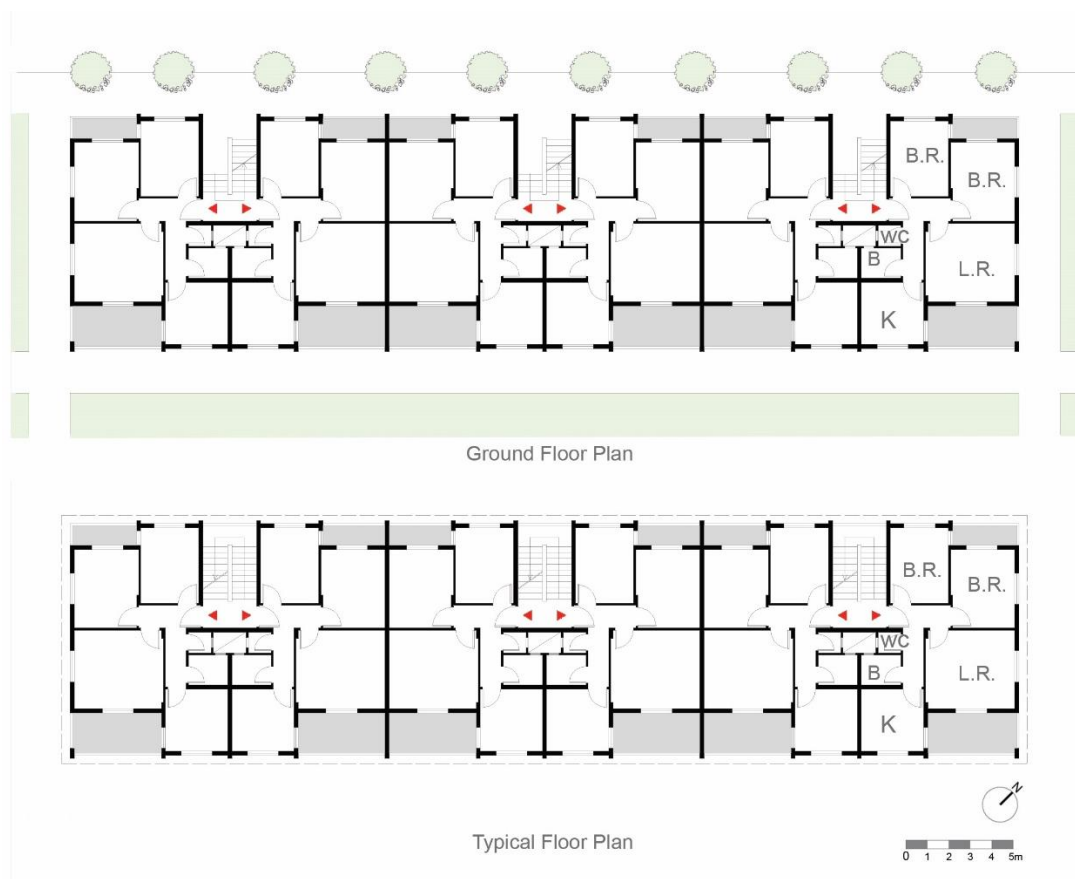


Figure 6.24 Social housing in the Hanano neighborhood

Source: The author, based on GEMH documents and site survey

Due to the small area of the flats, many residents have integrated the balconies as a living area, this time by not just glazing them but rather extending the living spaces up to the balconies parapets, and thus changing the overall appearance of the building facade.

The neighborhood layout is based on a grid plan, and the residential blocks are arranged around green spaces, either parallel or perpendicular to the street. However, the space between the blocks that results from such an arrangement is ambiguous and not clearly defined and mostly used for transit rather than for recreational activities. Some residents of ground floor apartments used the open green space adjacent to their homes for private gardening by planting some vegetables for daily use.

Public transport is quite dominant in the neighborhood, as the majority of residents do not own cars, but the public transport routes do not cover the entire neighborhood. Therefore, there are crowds during the rush hours in the morning and afternoon, and people have to wait long to get a ride. Within Hanano there is good permeability, as the area offers numerous four-way and three-way intersections, and there is still the notion of a grid-like street circulation system right up to the boundary of the entire area. Also, the urban block size is quite small, allowing for better pedestrian movement in the neighborhood.

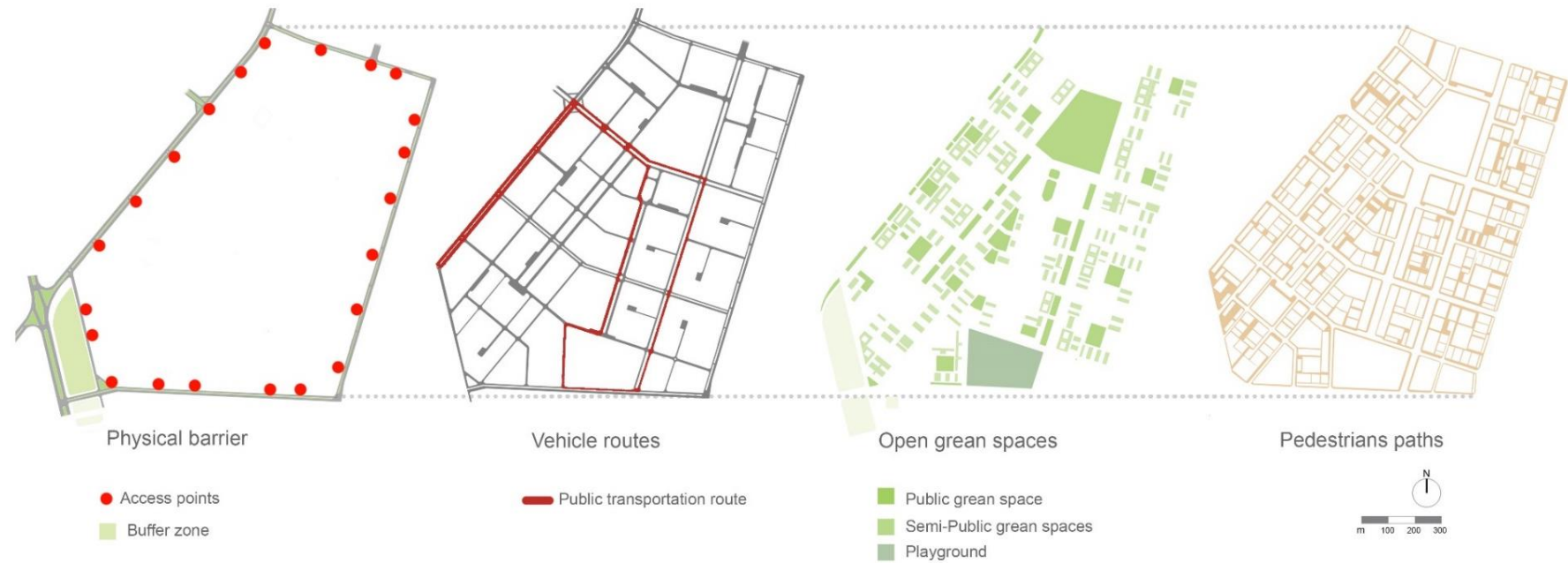


Figure 6.25 Mobility and Accessibility in Hanano neighborhood

Source: The author, based on maps from the Municipality of Aleppo, GEMH documents and site survey

Chapter 7

Urban Form and Social Sustainability

7.1. Introduction

This chapter explores whether there are indications of a relationship between aspects of urban form (Chapter Two), and the different dimensions of social sustainability (Chapter Three), and whether the various aspects of urban form have a positive or negative impact on the different dimensions of social sustainability. Finally, the significance of the aspects of urban form is examined, with the influence of interfering variables (non-physical external factors) taken into account. Tables are presented in each section of this chapter to show where evidence is found of a significant correlation between variables. These findings were then complemented, where possible, with the findings from the semi-structured interviews. Tables showing the full analysis results are listed in Appendices E-F.

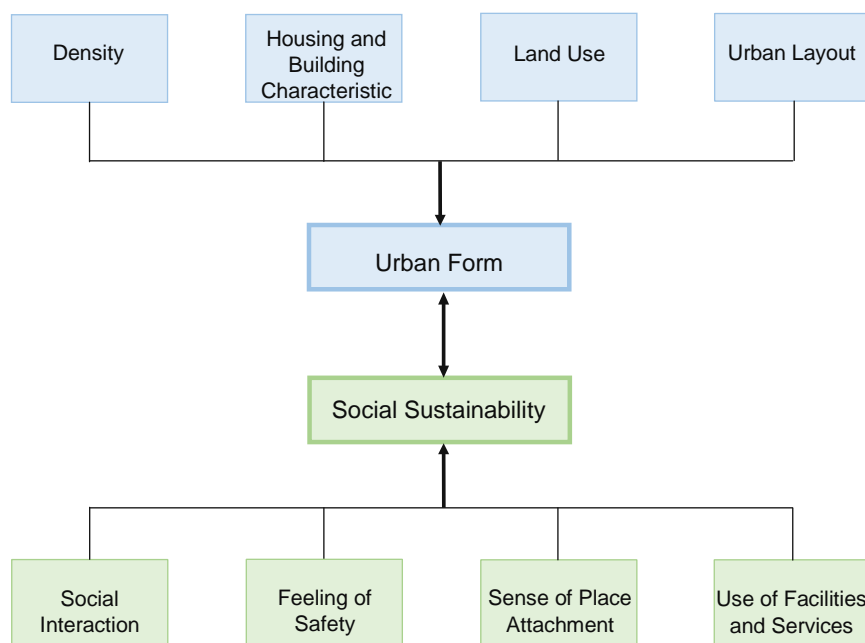


Figure 7.1 The examined relationships between urban form and social sustainability

7.2. Social Interaction

The questionnaire survey asked respondents about the extent of their social interaction with others in their neighborhood based on different scenarios. The 5-point Likert scale was used to capture the information with score 1 represents 'None,' and score 5 represents 'All', hence, a higher score represents better social interaction. Figure 7.2 reports household questionnaire data that on average, Hanano neighborhood respondents reported a higher level of social interaction than those living in Al-Hamadaniyeh and Al-Shahbaa neighborhood.

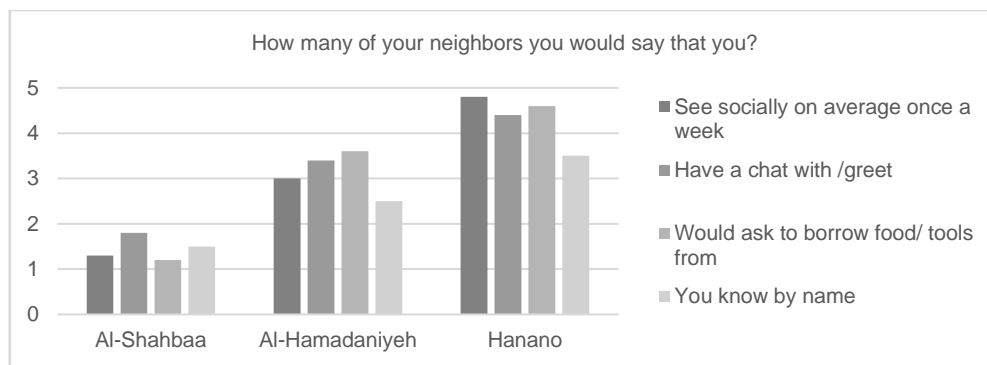


Figure 7.2 Levels of social interaction in the sample by neighborhood (mean score)

Further analysis shows a significant connection between some aspects of urban form, interfering variables and the extent of social interaction. Table 7.1 shows where evidence of relationships between the indicators occurs. Where significant correlations do not occur, the independent variable is not included in the table. Interfering variables are listed in italics. Table 7.2 shows the finding from the partial correlation analysis. The findings from both correlation analysis and semi-structured interviews are discussed in the following sections.

Table 7.1 Relationship between social interaction and other indicators

Indicator	Relationship	Nature of the relationship
Density	Significant	Positive
Housing Characteristic	Significant	Positive
<i>Household income</i>	Significant	Negative
<i>Length of residence</i>	Significant	Positive
<i>Use of facilities</i>	Significant	Positive

Table 7.2 Summarized results of partial correlations between social interaction and aspects of urban form by controlling interfering variables

Controlled variables		Social interaction
None	Density	0.202**
	Housing characteristics	0.016*
Household income	Density	0.170**
Plans to move	Housing characteristics	0.010*

** Correlation is significant at the 0.01 level (2-tailed)

* Correlation is significant at the 0.05 level (2-tailed)

- Negative relationship

7.2.1 Physical Form and Social Interaction

The correlation analyses (Appendix F: Table F.1) found that there is a significant relationship between social interaction and residential density. The correlation is mainly positive and consistently correlated with social interaction. This result indicates that as the density of the neighborhood increases, respondents are more likely to report knowing their neighbor and interacting with them, while in a less densely populated neighborhood (e.g., Al-Shahbaa) people are less likely to bump into each other partly because they are more likely to use cars instead of walking. However, the significance of the correlation decreases when other interfering variables are controlled (Table 7.2).

The analysis also revealed a weak relationship between levels of social interaction in the sample and the extent to which housing is mixed with other facilities such as cultural, consumer, educational and leisure facilities. This finding is reflected in the correlation analysis (Appendix F: Table F.2), which found a weak positive relationship between the two. In other words, in a mono-functional residential quarter, the social interaction is much less than in a varied neighborhood with mixed use. The finding also revealed that the provision of services and facilities in a neighborhood alone is insufficient to encourage people to interact, as the indicator measuring the extent of mixed land uses was not strongly correlated with social interaction, and that the extent of social interaction depends more on whether the facilities are actually used.

These findings are supported by semi-structured interviews where interviewees mentioned particular facilities that have a positive impact on social interaction. Shopping facilities (corner shops and local shopping centers) were the most cited facilities that provide a chance to meet and mingle with other residents in the neighborhood, and one might have a little chat while shopping. However, in Al-Shahbaa some interviewees reported that this only could happen if people knew each other previously and most probably in the nearest corner shops where nearby neighbors usually shop. Not surprisingly, respondents described the school as a place to meet people, as relationships between parents are established through their children and related activities. Mosques have also been described as places that make a positive contribution to social interaction between neighbors, especially after Friday prayers when people meet and talk. However, this depends very much on the frequency of visits, as men are the main users and visit the mosque daily or weekly, while women and children are less frequent users. Some residents suggested that the opportunities for social interaction would increase if there were more organized activities for all life-cycle groups (children, families, older people) in which they could participate. Open green space was not seen as a main place for social interaction as many interviewees, especially housewives, mentioned that visits between next door, the same apartment block, adjacent residential plots and conversations between neighbors at doorsteps were more important.

Moreover, accessibility to public transport and local facilities was discussed by interviewees who said it contributes to social interaction in the neighborhood. The findings generally show that the easier it is to reach public transport and local facilities on foot, the more likely it is that people will come into contact with their neighbors, as there is always an opportunity to meet people along the way.

Furthermore, a significant positive relationship was found between the indicator, which measures the extent of active frontage on streets and social interaction among the respondents. Correlation analysis shows that this relationship is significant, indicating that in streets where there is more active frontage, residents are more likely to engage in social interaction (Appendix F: Table F.3). Respondents said that they are more likely to interact with one another if they feel safe in the environment in which such interaction takes place.

Interestingly, the correlation analyses indicate no relationship between the indicator measuring connectedness and permeability of the streets network in the three neighborhoods and the social interaction (Appendix F: Table F.5). However, the existence of correlations between these indicators cannot be ruled out as the interview data indicated that hypothetically, at least, residents feel that the better connected their neighborhood is, the more likely they are to interact with neighbors, feel safe in their neighborhood, and feel attached to their neighborhood. The majority of those interviewed stated that a neighborhood, which is easy to walk around would have a positive effect on social interaction. They also mentioned that the more diverse the places are designed for pedestrians, the more opportunities people had to get to know each other, to greet each other and perhaps to develop social relationships.

Moreover, the arrangement and grouping of residential buildings and the quality of the resulting space between these buildings in the three neighborhoods played a significant role in providing people with various opportunities to meet and develop social relations. In Hanano, where the apartment blocks are arranged in rows, which resulted in small and dispersed outdoor spaces, the interviewees mentioned that there is not much to experience outside. In Al-Hamadaniyeh, by contrast, the apartment blocks are arranged in clusters and are characterized by pleasantly enclosed and sufficiently large spaces between the buildings, which encourage children to play near their homes.

7.2.2 The Influence of Nonphysical Factors on Social Interaction

Of the interfering variables included in the analysis, four are consistently significant in the correlation analysis (Table 7.1 independent variables in italics). Household income is found to be a significant predictor of social interaction, indicating that respondents from households with a lower income were more likely to engage in social interaction than other respondents. This finding was supported by semi-structured interviews as it revealed that residents in the high-income neighborhood (Al-Shahbaa) have somewhat cosmopolitan lifestyles and tend to value friends over neighbors, while the residents who belong to the middle-income and low-income neighborhoods in Al-Hamadanieh and Hanano have local lifestyles which value neighborly relationships most. Therefore, they are more 'neighborhood oriented.' In

Hanano, it was mentioned that the background of residents has a possible influence on social interaction, as many residents come from the same village or town, which might promote the social interaction in the neighborhood.

A further interfering indicator, which is a consistent predictor of social interaction, is residents' plans to move out of the neighborhood. Respondents who indicate that they are planning to move out of the neighborhood in the next few years are less likely to report engagement in social interaction with neighbors than those who are not planning to move. This indicates that community stability, regarding the slow turnover of residents moving into and out of an area, contributes positively to social activity in a neighborhood. Moreover, the closely related indicator measuring the length of residence was also found to be significantly correlated with social interaction, indicating that people who have lived in a neighborhood for a long time engage in more social interaction than more recent migrants to the neighborhood as they became familiar with the neighbors living close by. It should be noted that it may be the case that residents are planning to move in the next few years because they have not bonded with their neighbors.

7.3. Feeling of Safety

To measure the feelings of safety among the household questionnaire sample, respondents were asked how safe they felt walking alone in their neighborhood after dark. The majority of questionnaire respondents (61%) reported feeling fairly safe when walking alone in their neighborhood after dark, while almost a quarter (24%) reported feeling unsafe and 15% of the sample reported feeling very unsafe. Fig. 4.9 shows the analysis of the sample by neighborhood which suggests some variation in feelings of safety. 53% of respondents in the Al-Shahbaa neighborhood reported feeling fairly or very safe, while the proportions were higher for respondents in the Al-Hamadaniyeh (71%) and Hanano (76%) case study neighborhoods. A higher proportion of respondents in the Al-Shahbaa case study neighborhood reported feeling a bit or very unsafe when walking alone after dark (47%) than those in the Al-Hamadaniyeh (25%) and Hanano (24%) case study neighborhoods.

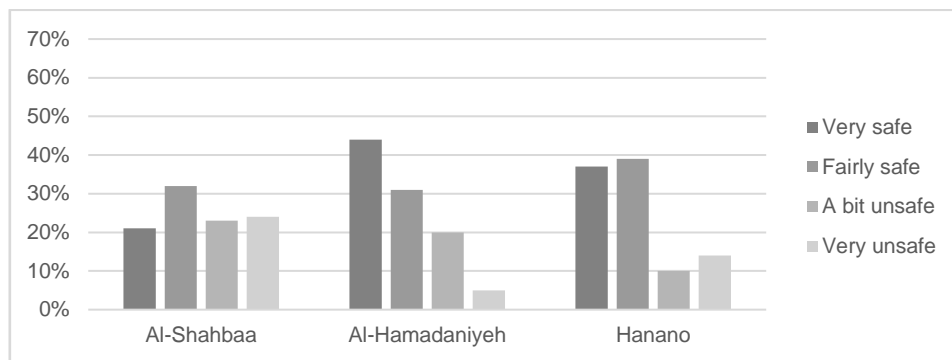


Figure 7.3 Proportion of the sample reporting feelings of safety by neighborhood

Further analysis shows a significant connection between some aspects of urban form, interfering variables and the sense of security in the neighborhoods. Table 7.3 shows that some aspects of urban form are found to have a significant correlation with feelings of safety, as are two non-physical factors. Table 7.4 shows the results of correlation and partial correlation analysis.

Table 7.3 Relationship between the feeling of safety and other indicators

Indicator	Relationship	Nature of the relationship
Density	Significant	Positive
Land Use	Significant	Positive
Housing Characteristic	Significant	Positive
Gender	Significant	Negative
Length of residence	Significant	Positive

Table 7.4 Summarized results of partial correlations between social interaction and aspects of urban form by controlling interfering variables

Controlled variables		Social interaction
None	Density	0.227**
	Land use	0.146*
	Housing characteristics	0.137*
Gender	Density	0.181**
Length of residence	Land use	0.114
	Housing characteristics	0.126

** Correlation is significant at the 0.01 level (2-tailed)

* Correlation is significant at the 0.05 level (2-tailed)

- Negative relationship

7.3.1 Physical Form and Feeling of Safety

The correlation analysis findings show that several indicators measuring the aspects of urban form are significantly correlated with feelings of safety (Appendix F). Density is found to be positively correlated with residents feeling of safety; this finding indicated that the people in higher density neighborhood respondents are more likely to report a stronger feeling of safety. The residents pointed out that more people in the neighborhood increase activity during the day and night, thus improving street surveillance and control.

Findings from the correlation analyses show that there is a significant relationship, albeit weak and positive, between variables measuring the extent of services and facilities in the neighborhood and feeling of safety, indicating that as the number of services and facilities in a neighborhood increases so do feelings of safety reported by residents (Appendix F: Table F. 2). While this association is weak and weakens further when other variables are included in the partial correlation analysis, it is statistically significant.

Possible explanations for this finding were explored, by asking interviewees on how facilities and services influence their feeling of safety in the neighborhood. In general, the majority of the interviewees mentioned that retail shops contribute to their sense of security in the neighborhood, and this mainly due to the late opening hours, with the shop windows open to the street and the lighting of shops being visible on the streets at night. By contrast, a significant number of the interviewees also found existing recreational facilities, both public gardens and smaller green spaces, having a negative impact on the feeling of safety. Reasons for that were mainly lack of lighting at nighttime and the gathering of youngsters. The design of schools, which are surrounded by high walls (generally up to 4m), creating a dead frontage, was mentioned by residents as having a negative influence on the feeling of safety while walking along it at night. The maintenance of open spaces was strongly highlighted in the interviews as an essential influence on perceived safety, indicating that secluded, overgrown foliage and bushes and poorly maintained open spaces were less likely to be used and that the built environment in poor condition (i.e., pavements,

streets, buildings, and gardens), which can take the form of vandalism, graffiti, and litter, have a negative influence on their sense of security.

A further aspect of urban form also found to be significantly correlated with the feeling of safety is the housing characteristic. According to the findings (Table 7.3; Appendix F: Table F.3), the relationship is significant but weak. The interviews revealed that respondents were less likely to feel safe when they are living in ground floor apartments. This was mentioned most in the Al-Shahbaa neighborhood where people felt they could be a target for theft due to their high social class and thus applied different solutions to maintain their security as discussed earlier. Characteristics of street layouts were also found to influence feelings of safety regardless of socio-demographic group, indicating that alley-ways and streets with 'dead frontage' without residences, windows or entrances overlooking the street and hence without natural surveillance negatively influenced respondents' feeling of safety when moving around the neighborhood.

Additionally, some street types such as back alleys, with poor street lighting, discouraged respondents from walking in their neighborhood after dark. This was often mentioned in Al-Shahbaa where some narrow back alleys are penetrating the long urban blocks to give access for pedestrians. Moreover, in all neighborhoods, respondents mentioned that having access to the residential building not oriented to the streets, but rather to the shared outdoor spaces between residential blocks reduces their feeling of safety when entering the building at night.

In the three case study areas, the relationship between urban form and children's safety was perceived as negative, mainly due to concerns brought on by speed and traffic volume in front of schools as a result of school buses. Additionally, the design of the street itself was mentioned to enhance speed in the neighborhood. The straight and wide streets, mainly in Al-Shahbaa, enhanced speed. This was mentioned by residents as a significant concern regarding the safety of children, with most accidents happening is when children are traveling to and from school or in summer when children are outside playing without supervision.

7.3.2 The Influence of Nonphysical Factors on the Feeling of Safety

There are two interfering indicators found to contribute to the feelings of safety in the correlation analyses to varying degrees. Firstly, the gender of the respondent is a significant factor associated with perceived safety, indicating that men are more likely to report positive feelings of safety than women. Women, in general, stated that they feared crime and felt unsafe when walking in the dark, so their movement was thus restricted to specific areas in the neighborhood after sunset. Another interfering variable, which is significantly and positively correlated with residents feeling safe, in the correlation analysis is the length of residence. The semi-structured interviews findings revealed that residents who lived for a long time in the neighborhood were more familiar with their physical environment and developed many social contacts which, in turn, influenced their feeling of safety positively when moving around and about their neighborhoods.

7.4. Sense of Place Attachment

The pre-final set of indicators measuring social sustainability relate to the sense of place attachment that residents feel about their neighborhood. Residents were asked whether they liked their neighborhood and whether they felt they belonged to the people in the neighborhood. Off the samples in all case study areas, 42% reported feeling attached, while 18% stated that they did not feel attached, 7% of whom did not feel at all attached.

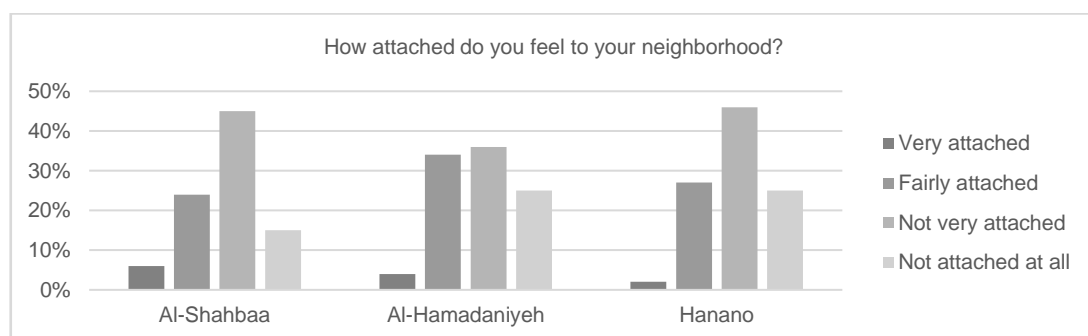


Figure 7.4 Proportion of the sample reporting feelings of attachment by neighborhood

The second indicator relates to a question posed in the household questionnaire, which asked respondents how they rated their neighborhood as a place to live (Figure

7.5). It shows that the majority of questionnaire respondents in the different neighborhoods rated their neighborhood as 'fairly good'. This proportion was lower for the Hanano neighborhood respondents (52%) than for those in the Al-Hamadaniyeh (76%) and Al-Shahbaa case study neighborhoods (78%).

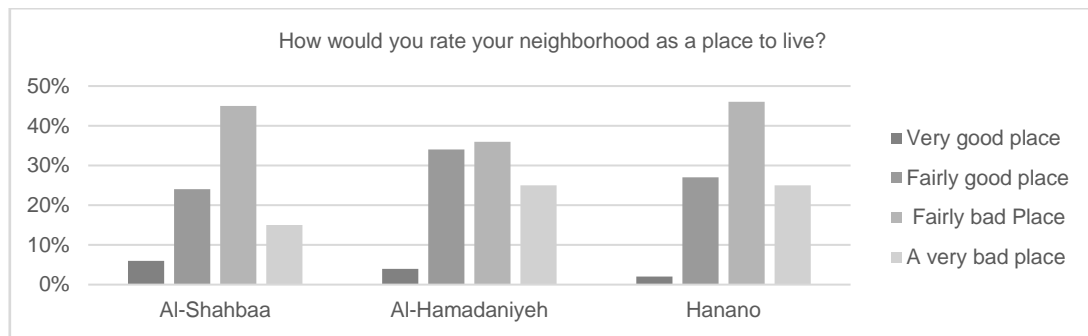


Figure 7.5 Rating of the neighborhood as a place to live by neighborhood

Some aspects of urban form are found to be significantly associated with the indicators measuring sense of place attachment as Table 7.5 and Table 7.6 show.

Table 7.5 Relationship between sense of place attachment and other indicators

Indicator	Relationship	Nature of the relationship
Density	Significant	Negative
Housing Characteristic	Significant	Positive
Gender	Nonsignificant	Positive
Length of residence	Significant	Positive
Plans to move	Significant	Negative

Table 7.6 Summarized results of partial correlations between sense of place attachment and aspects of urban form by controlling interfering variables

Controlled variables		Social interaction
None	Density	-0.204**
	Housing characteristics	0.405**
Gender	Density	-0.113**
Length of residence	Housing characteristics	0.351**
Plans to move		

** Correlation is significant at the 0.01 level (2-tailed)

* Correlation is significant at the 0.05 level (2-tailed)

- Negative relationship

7.4.1 Physical Form and Sense of Place Attachment

The correlation analyses (Appendix F: Table F. 1) found that while there is a significant relationship between sense of place attachment and residential density, it is mainly negative, weak and not consistently correlated with a sense of place attachment. The finding indicates that in higher density neighborhoods respondents are more likely to report less sense of place attachment. In other words, satisfaction with home and neighborhood decreases as density increases. However, it could be argued that this relationship between density and sense of place attachment is valid up to a certain limit value – if the density is too low, maybe place attachment decreases again.

Respondents were influenced by many issues, and most of them mentioned more than one factor influencing their sense of place attachment. In the Al-Shahbaa neighborhood interviewees mentioned positive factors relating to the physical form or why they stay in their neighborhood. Satisfaction with accommodation size, the appearance of the area (e.g., clean streets, tidy gardens, building in a good conditions), “less crowded” and “calm area” were the main factors named. While residents in Al-Hamadaniyeh and Hanano often mentioned the location of their homes in relation to the services and facilities, such as retail corner shops, schools, and mosques along with having good access to public transport in the neighborhood. Moreover, feeling safe in their neighborhood had a positive influence on their sense of place attachment.

For some respondents, moving to a larger apartment might not be an option due to the affordability of staying in the neighborhood and the high prices of apartments elsewhere; thus, increasing the amount of space in one’s home provided a solution. This was discussed in the case study neighborhoods of Hanano and Al-Hamadaniyeh in particular, where residents either built additional rooms in their private gardens or integrated the balconies to the living area and enlarged some rooms. Generally, there was a sense in Al-Hamadaniyeh and Hanano that while residents may not live in the ideal place, for them the neighborhoods functioned well, fulfilling residents’ needs to some extent and therefore constituting a good compromise for those living there.

7.4.2 The Influence of Nonphysical Factors on Sense of Place Attachment

The interfering variable which measures residents' plans to move out of the neighborhood in the next few years is found to contribute to the residents' sense of place attachment in the correlation analysis, a negative association is found between residents' plans to move and feelings of place attachment, suggesting that residents in the sample planning to move out of the neighborhood are less likely to report strong feelings of place attachment than residents not planning to move. It could be argued that high population turnover can weaken people's sense of attachment to the neighborhood. The findings also reveal that the length of residence was consistently significant a predictor of sense of place attachment as residents' plans to move out of the neighborhood.

The correlation analysis found that the length of residence is positively associated with a sense of place attachment, suggesting that the longer residents live in a neighborhood, the more likely they are to report strong feelings of attachment. This indicates differences in the extent of place attachment between residents who have lived in their neighborhood less than five years and those who have lived there for over ten years. The final interfering indicator significantly correlated with sense of place attachment is the gender of the respondent. According to the findings, women are more likely to feel a sense of place attachment than men.

The main negative reason, and indirectly related to urban form, given by interviewees for staying in the area, was not being able to afford moving to a more desirable neighborhood or larger house; thus, moving was seen by some respondents to be impossible. However, the friendliness and sociability of people living in the neighborhood, the sense of community among residents, and the mix of people living there were also more positive reasons mentioned in favor of staying in the neighborhood.

7.5. Access and Use of Local Facilities and Services

The final section relates to the residents' use of facilities and their opinions regarding them. In the survey, respondents were asked, approximately, how often they used

local shopping facilities (corner shop/convenience store and neighborhood centers) and open green spaces in their neighborhood. Analysis of the household survey data showed a significant difference in the frequency of use of services by respondents between the case-study neighborhoods. The average score for residents' use of services and facilities in the local neighborhood is higher overall in the Hanano case study neighborhood than in Al-Hamadaniyeh and Al-Shahbaa case study neighborhoods, respectively.

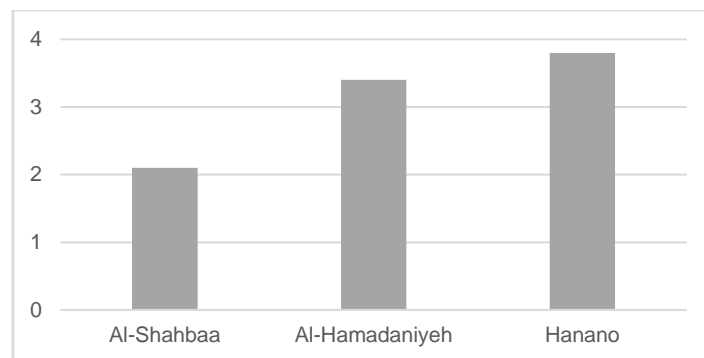


Figure 7.6 Frequency of use of local services/facilities by neighborhood (mean score)

The household survey findings showed that, on average, almost 70% of residents in the sample reported using local shops in their neighborhood at least once a week or more (Figure 7.7). This score was higher for residents in the Hanano case study neighborhood (86%) than those residents in Al-Hamadaniyeh (77%) and Al-Shahbaa case study neighborhood (35%). According to those respondents, around 8% of the total sample stated that there is no supermarket in their neighborhoods, or if there was one, they did not use it.

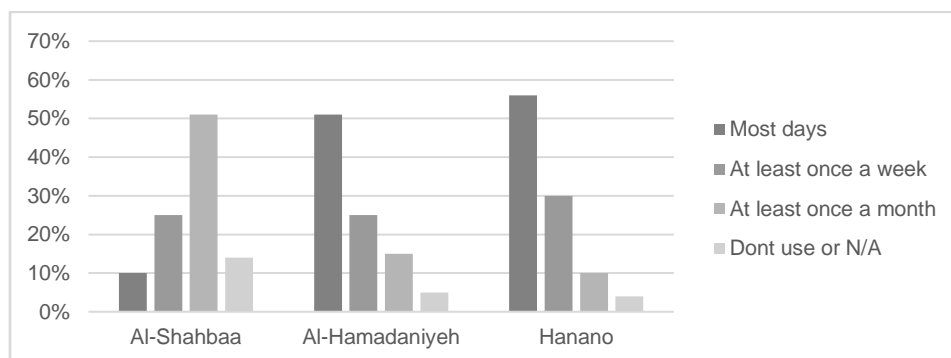


Figure 7.7 Frequency of use of local corner shop/convenience store by neighborhood

In contrast to the score of responses regarding the frequency of use of the local shop above, a majority in both Hanano (57%) and Al-Hamadaniyeh (53%) neighborhoods use their local shopping center at least once a month. As was discussed in Chapter 6, no local shopping center is available in Al-Shahbaa neighborhood.

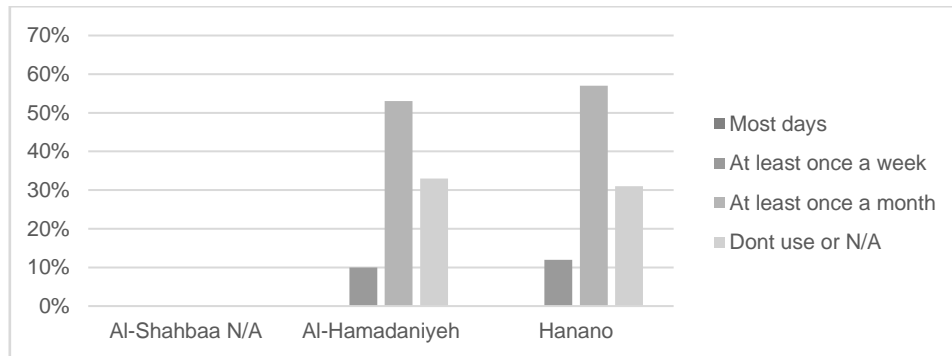


Figure 7.8 Frequency of use of local shopping center by neighborhood

Figure 7.9 shows that there is not much variation in the level of use of open green spaces by residents in the both Al-Hamadaniyeh and Hanano neighborhoods. Between 30% (Hanano) and 36% (Al-Hamadaniyeh) of respondents reported using open spaces at least once a week for recreation. Respondents in Al-Shahbaa neighborhood did, however, report never using open spaces in the neighborhood and having no access to open spaces as no park is available in the neighborhood.

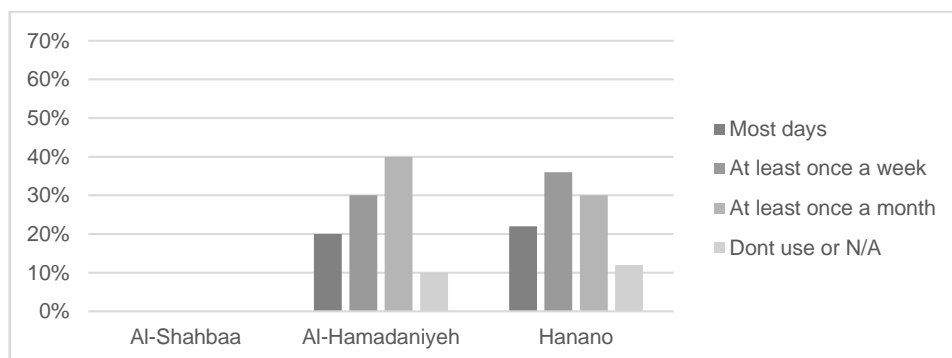


Figure 7.9 Frequency of use of open spaces/parks for recreation in the neighborhood

Further analysis showed that the frequency of using local services and facilities, as mentioned above, was found to be influenced by urban form as well as other nonphysical factors. Table 7.7 shows that some aspects of urban form are found to

have a significant association with the use of facilities and services in the neighborhood.

Table 7.7 Relationship between the use of local facilities and other indicators

Indicator	Relationship	Nature of the relationship
Density	Significant	Positive
Land Use	Significant	Positive
Household income	Significant	Negative
Car ownership	Significant	Positive

Table 7.8 Summarized results of partial correlations between social interaction and aspects of urban form by controlling interfering variables

Controlled variables		Social interaction
None	Density	0.212*
	Land use	0.153**
Household income	Density	0.189*
Car ownership	Land use	0.136**

** Correlation is significant at the 0.01 level (2-tailed)

* Correlation is significant at the 0.05 level (2-tailed)

- Negative relationship

7.5.1 Physical Form and Use of Local Facilities and Services

The finding from the correlation analysis shows a significant and positive relationship between density and the use of local facilities and services, which indicates that as density increases, access and use of facilities is more frequent. Although this finding is significant, the semi-structured interview data did not support this finding as the experience in gaining access to local services and facilities was seen to be negatively influenced by higher residential density. The majority of interviewees in Hanano and Al-Hamadaniyeh often referred to the term ‘overcrowded’ when discussing the use of particular facilities, such as health centers, schools, and open green spaces. Others relate that to the large catchment these facilities have, attracting users from outside the neighborhoods due to the lack of facilities in their neighborhoods. This was particularly mentioned in the case study of Hanano neighborhood as it is surrounded by informal settlements (Figure 6.20).

Findings from the correlation analyses show that there is a significant connection, between variables measuring the extent of services and facilities in the neighborhood and the use of these facilities and services, indicating that generally, where the service was available, it was used to some extent. This finding is supported by semi-structured interviews as the location of service and facilities around residents' homes proved to be an essential issue for residents. In Al-Hamadaniyeh and Hanano -where there is a consistently better proportion of mixed-use and provision of services and facilities than in Al-Shahbaa-, respondents commented on the convenience of having services and facilities within walking distance from their homes. Several respondents defined 'within walking distance' as 15 minutes. A negative example given by respondents was the distant location of local shopping centers in Al-Hamadaniyeh and Hanano where, as shown in (Figure 6.16 and Figure 6.23), they have a peripheral location compared to retail shops which are scattered across the neighborhood. Therefore residents prefer to use retail shops closer to their homes. This was the case of the location of the public garden in Al-Hamadaniyeh where the central public garden was seen by many interviewees as being 'isolated' and located in an area that serves only part of the neighborhood, as it is far from the rest of the neighborhood.

A relationship was also found between the location of service, the distance from residents' home, and the mode of transport used to access these facilities. Indicating that services closer to home were more likely to be reached on foot or bike, and those further away by car or by public transport. The interviews revealed that the most common reason why local services are 'easy' to use was that that respondent could walk to facilities (proximity); other less common reasons were car access, good bus service, car parking availability. Others discussed the lack of various modes of transport to reach them, especially for households with young children or physical mobility issues and had no car access.

Regarding the use of public green spaces, the findings from semi-structured interviews show that respondents were less likely to feel comfortable using public open spaces if they were not well maintained. Other factors influencing participants' use of public open space are related to perceived safety. Respondents were less likely to report using open spaces if they perceived them to be unsafe. The findings show

that this was cited as a reason for non-use, along with a general perceived lack of comfort (i.e., not having enough trees to provide shade) and, to some extent, privacy when using the public space. The lack of appropriate infrastructure (i.e., toilets and cafes), furniture (i.e., benches, trash bins) and playing areas for children and youngsters also emerged as an important issue for residents in Al-Hamadaniyeh and Hanano. Moreover, a significant difference of views about maintaining responsibilities was evident between the authorities and the residents; each claimed that the full responsibility of maintaining the public green spaces should be taken by the other.

Moreover, findings show that the frequency of using open green spaces can be associated with other factors rather than the location and quality of open spaces. The different housing characteristics between the investigated neighborhoods where the size of the dwelling and the access to a balcony or private garden varies played a significant role in using open green spaces. This finding indicates that residents who have access to a balcony or a private garden are less likely to use the open public spaces. This was reflected in the correlation analysis where the indicator measuring access to a private garden or large balcony was significantly associated with the use of public green spaces (Appendix F: Table F.3). Even though the majority of interviewees reported a limited use of their private gardens (front yards) and balconies, due to privacy concerns about being observed by neighbors or the small size of these spaces, residents in all case study neighborhoods still prefer the house with balconies or a front yard.

Additionally, some respondents raised the issue of where the children spend their time when around and about in the neighborhood referring to a general expression “there is nowhere for them to go,” indicating the inadequacy and the poor quality of playgrounds for children and youngsters. Interestingly, many respondents stated that their children play in the car parking lots, dead-end streets and moreover “illegally” using the schoolyards to play football during the weekends or after working hours.

7.5.2 The Influence of Nonphysical Factors on Access and the Use of Local Facilities and Services

There are some non-physical, interfering variables, which, as the results show, have a significant influence on the access and use of local facilities and services. A

significant and negative correlation is found between use of facilities and car ownership. A possible explanation for this finding was explored: reasons cited include the availability of multiple services and facilities on the way to and from and around the workplace or in the city center, combining shopping trips with family visits outside the neighborhood or just preferring to go shopping at a particular place.

Household income was also found to be negatively correlated with the use of local facilities and services in the neighborhood. This suggests that people with higher household income are less likely to use local facilities and services. Additionally, the interviews revealed that the actual usage of shopping facilities is influenced by other factors, which are more important than proximity, such as product quality, a variety of goods available or the differences in the prices of goods (affordability) compared with shopping facilities outside the neighborhood. Likewise, the ability to afford using other leisure facilities like outdoor cafes and private playing areas influences the use of local green spaces.

Chapter 8

Discussion and Conclusion

8.1. Introduction

This final chapter discusses the findings of my research with the goal of identifying implications and developing recommendations for designers and planners. In the chapter, the potential to influence future policies and design guidelines is also addressed and topics requiring further research identified. The chapter sums up the final observations of my research.

8.2. Summary of Research Findings

This section brings together evidence from the previous chapters and offers a summary of the main conclusions from the evidence gathered and to answer the main research question of the research.

In what ways and to what extent does urban form contribute to the social sustainability of neighborhoods in Aleppo?

8.2.1 The Influence of Density on Social Sustainability

Overall, the findings reveal some relationships between residential density and aspects of social sustainability. Residential density influences residents' social interaction, feelings of safety and feelings of place attachment. Analysis of the household questionnaire found that social interaction and feeling of safety tended to be stronger in higher-density neighborhoods, than lower density ones. Moreover, as housing density increases, respondents were less likely to report feelings of place attachment. However, it could be argued that these findings are valid up to a certain density level, if the density is too low or too high, social interaction, feeling of safety and sense of place attachment among residents might decrease again. Broadly speaking, residents of more dense neighborhoods and their associated housing types, are rather dissatisfied with their neighborhoods. At the same time, in denser neighborhoods, there are more problems of social coexistence, but this is also related to the residents' sociodemographic composition, as in the case of, the informal settlement, Tal Al-Zarazier (Appendix B). On the other hand, the density of built form

is found to have a negative influence on privacy due to the proximity between buildings which may, in turn, hinder social interaction between neighbors.

Although higher residential density appeared to have a positive correlation with the frequency of using local facilities and services in the neighborhood, the experience in gaining access to these services and facilities revealed that facilities and services in the high-density neighborhoods are used more intensively, often even overused, which again makes access to them more difficult. A possible explanation for that could be the inadequate amount of services compared to the large catchment it has. Moreover, access to services is generally better in denser urban areas, because the facilities are within easy walking distance. Those services closer to home were more likely to be reached on foot or by bike, and those further away by public transport or by car. This points out that urban form, regarding the location of the services and facilities in relation to the residential areas, is more important than socio-demographic composition in that case.

8.2.2 The Influence of Land Use on Social Sustainability

The findings show that existing local facilities and services in the investigated neighborhoods were quite different from planned ones. Planned local facilities had been only partially implemented while unplanned local facilities that had been later improvised and supplemented by the residents in a bottom-up procedure were more dominant, resulting in a new urban form that significantly differed from basic standards and master plans. Additionally, the findings show that one of the main reasons for changing the land use pattern was the delay in providing services and facilities. Neighborhoods were developed and inhabited first, and then facilities and services were added gradually at a very slow pace due to different factors, such as lack of resources or corruption and personal assets. This made residents try to get their needs fulfilled in other neighborhoods or remedy the deficits in their own neighborhood in a self-organized manner by converting apartments or private gardens to accommodate different functions.

The quantitative analysis findings show that the extent to which housing is mixed with other facilities such as cultural, consumer, educational and leisure facilities, contributes to the social sustainability in the neighborhood. The correlation analyses

provide weak evidence suggesting that the extent of services and facilities in a neighborhood influences social interaction in the neighborhood, the feeling of safety, sense of place attachment, and the frequency of local facility use. This weakness shows that the relationship between the provision of local facilities and social sustainability is not straightforward. This further indicates that not only the construction of certain facilities in the neighborhoods is important. Accompanying policies also play an important role in their functioning and acceptance by the population. Moreover, the use of local facilities and services, which have a considerable influence on several dimensions of social sustainability, is found to be influenced by various factors independent of architectural and urban conditions, such as personal preference, quality, as well as individual experiences of access and usage.

The use and social benefits derived from public green spaces are not just based on design but also dependent on the maintenance and supervision of these spaces. Perceptions of safety within open spaces are crucial to their use and linked to maintenance. However, the responsibility for maintaining open spaces was recognized to be twofold, which calls on both the local authority and the individual user. A further finding indicates that formal arrangements for maintaining and managing shared open spaces could be more successful than informal action on the part of residents. Overall, residents played a negative role in maintaining and managing the open spaces, either because they did not use it adequately or because most of the residents did not show a will to maintain the green spaces adjacent to their homes if they are not able to turn them into private spaces.

8.2.3 The Influence of Housing Characteristic on Social Sustainability

The Syrian government has planned residential neighborhoods so that they are separated according to social strata, thus increasing social segregation. Large neighborhoods have been built on behalf of the government, mainly by public authorities, and almost all the dwellings that have been built are flats with one or two bedrooms and minimal access to private or communal outdoor space. These types of housing lack architectural and functional qualities and are less suited to households with dependent children than those without. Larger detached and semi-detached

houses were developed by private builders (or housing associations) but are not affordable for the majority. This results in homogenous populations to the detriment of the concept of mixed communities.

The physical aspect of safety of the built environment was found to be positively associated with social interaction, suggesting that as the extent of natural surveillance (active frontage) of the built environment increases, so too does the extent of residents' engaging in social interaction. Moreover, residents indicated that feeling safe in a neighborhood, as a result of natural surveillance, have a positive influence on how attached they feel to that neighborhood. On the other hand, buildings and back alleys with 'dead frontage' without residents, windows or entrances overlooking the street and hence without natural surveillance reduced their sense of security when moving around the neighborhood.

Residents with access to a large balcony or private garden are somewhat satisfied with their house and feel more at home. However, since they found the design, orientation and ratio of balconies to the size of the house unsatisfactory, most residents have installed various types of shutters, curtains, awnings and blinds to prevent outside view of the balconies and apartments, to protect their privacy and thereby make better use of the balconies.

8.2.4 The Influence of Urban Layout on Social Sustainability

In the correlation analysis, connectedness and permeability of the streets network, overall, had very weak to negligible correlations with indicators measuring the dimensions of social sustainability. The interview data, however, do not support these statistical findings as the majority of interviewees said that a neighborhood which is easy to walk around have a positive influence on their feelings of safety in the neighborhood, and that the more diverse the places designed for pedestrians, the more opportunities people had to get to know each other, to greet each other and perhaps to develop social relationships which in turn influence their feelings of place attachment. It might be the case that interviewees may have been considering the legibility or the accessibility to, for example, services and facilities, when answering this question. On the other hand, urban layout regarding the housing forms and how they have been configured, accessed, as well as the resulting spaces between the

residential buildings had a major influence on the social interaction and feeling of safety among residents.

8.3. Implications of the Findings for Policy and Practice

Urban forms of cities and neighborhoods are dynamic, not just physical objects frozen in time and space, but rather very much changing and evolving. They are always influenced by what are spontaneous or planned, top-down and bottom-up approaches, thus, making them complex environments. The consequence of the change depends on the flexibility of the urban form and the ability of both individuals and communities to respond appropriately and creatively to change. People tend to self-organize and start building communities through bottom-up approaches right from the occupation of an urban form which give evidence on what factors could enable reaching larger social goals. Therefore, the social needs and potential problems of future residents should be understood for effective implementation and long-term success of social sustainability development. As social sustainability and success cannot be straightforwardly prescribed in the same way that the standards for green building or environmental sustainability can, a more flexible approach is needed that leaves room to reflect local circumstances and the diverse nature of the community and its residents.

As a result of the research findings discussed above it is possible to make some recommendations for policy and design guidance by combining both bottom-up and top-down approaches, to benefit from the integration strengths of both approaches, in order to create synergies between the broader planning policies with more specific and contextual local actions. Evidence was found of relationships between some physical features and social sustainability dimensions. Including these policies and design guidelines in new housing developments could facilitate more sustainable and cohesive communities. Recommendations for policy, planners, developers and urban designers are:

Table 8.1 Design and policy recommendation for urban neighborhoods

Social services and facilities
<ul style="list-style-type: none"> • Early provision of basic social infrastructure, multi-function/flexible spaces with co-located services, shop, community center, healthcare provision, green space (temporary provision if permanent not initially feasible) that support the resident's every-day needs and encourage both organized and spontaneous sociability. • Good public transport and communications connections
Social design
<ul style="list-style-type: none"> • Safe and easy access to destinations that encourages walking, cycling and use of public transport, suggesting not only type of mobility but also type of sociability with other neighbors. • Adequate distances between buildings to enhance privacy, this can be achieved through the design of the buildings themselves. • Connected and integrated network of streets that provide many routes for movement thus, reducing congestion and journey distances while encouraging walking and use of alternative modes of transport. • Pedestrian-friendly layouts (e.g., pedestrian zones, traffic calming techniques, buildings with active frontages, well-lit areas) • Mixed residential types, one-bedroom apartment to family house, to allow accommodation of diverse socio-economic groups, thus make communities more tolerant and neighborhoods more inclusive.
Flexible use of land and buildings
<ul style="list-style-type: none"> • Flexible Master-planning, e.g., enabling participation in planning of the later phases through intensive public consultation on built environment proposals. • Flexible and adaptable housing, apartments that can be subdivided or combined, transformed into home offices, medical practices, studios, shared flats for students or assisted living, etc. – structures that have sufficient potential to be appropriated in various ways in order to maintain resident in their neighborhoods while family needs change. • Temporary use of public buildings or housing to meet various needs (e.g., schools can also provide a center for community services or community groups, either in the short-term while other facilities are being developed; or long-term by co-locating children's centers,

play facilities in the yards.)

- Meanwhile use of vacant spaces, wasteland and green spaces in the neighborhoods to accommodate various functions (e.g., community gardening, community play spaces)

Cooperative social form

- Residents can influence, e.g., public service delivery at the neighborhood level, design, develop or manage physical spaces and places and thus, reflect their functional needs, desires, and socio-cultural aspects. This can be achieved by electing community or management team.
-

8.4. Scope of Further Research

There is considerable scope for extending this research. Section 0 outlined the limitations of this research which, in themselves, present opportunities for future research. The research could be extended to include more neighborhoods with greater variation in their urban form and, at a smaller scale, different housing types, densities, and street layouts, in order to examine more fully their associations with social sustainability.

Other methods of analysis, such as multilevel analysis, could be applied to the dataset to examine the influence of between-neighborhood and within-neighborhood differences, as well as to account for the difference in scale of the indicators involved, particularly if more neighborhoods are examined. Adapting the research design to include a broader range of indicators measuring residents' perceptions about each aspect of urban form, could strengthen the overall research design.

It is clear that there are other non-physical, influences on social sustainability alongside the urban form. This research could be developed further to focus on these other influences in order to gain a fuller understanding of the concept of social sustainability in the neighborhood; this understanding could also be built on to increase knowledge of how social sustainability occurs and develops on different scales and settings.

Moreover, while some characteristics such as the age, gender and economic status of residents were taken into account in this research, there is scope for examining the effect that the aspects of urban form have on specific users in a neighborhood. Such users include children, teenagers, as well as disabled people including wheelchair users and blind people, upon whom the built environment may have a particular impact.

8.5. Final Remarks

The review of the literature revealed that there is a paucity of evidence, which has specifically examined the role of urban forms, neighborhoods, local service access issues, and social outcomes. This research has contributed to revealing some of the various dynamics in the relationship between these aspects of urban form and social outcomes. The findings suggest that who lives where within the urban form, and with what resources and choices he or she has, may be more critical to making urban communities work and have a more significant impact on these outcomes than urban form. However, it cannot be assumed that developers, urban designers, planners, and architects will have, or will reach, the overriding goal of achieving social sustainability in neighborhoods when designing, constructing or regenerating the built environment. This research suggests that there are other ways of achieving social sustainability in neighborhoods, not explicitly involving the urban form. Social sustainability can be achieved (or, at least, not hindered) through improving the quality of life for all citizens. This should be addressed in policies and strategies developed and provided by the government.

If policy and practice aim to achieve social sustainability in neighborhoods, it is essential that the relationships between social behavior, physical and nonphysical aspects of a neighborhood be identified and understood. This research has considered one such aspect and goes some way to identify what supports, or hinders, the day-to-day functioning of neighborhoods in Aleppo. While it is not the only factor involved, the urban form has been shown to have a relevant relationship with social sustainability in a neighborhood. It is, therefore, the case that this research supports the assertions made in theory and practice that residents' feelings about where they

live, and how they live their lives, are affected by the physical environment around them.

Bibliography

Anderson, W. P., Kanaroglou, P. S., & Miller, E. J. (1996). Urban Form, Energy and the Environment: A Review of Issues, Evidence and Policy. *Urban Studies*, 33(1), 7-35.

Abu-Ghazze, T. (1999). Housing layout, social interaction, and the place of contact in Abu-Nuseir, Jordan. *Journal of Environmental Psychology*(19), 41-73.

Al Khalaf, A. (2014). The Production of New Affordable Housing in the Syrian Cities:. Ph.D. Thesis, Heriot-Watt University, School of the Built Environment.

Alexander, E. R. (1993). Density measures: A review and analysis. *Journal of Architectural and Planning Research*, 10(3), 181-202.

Alexander, E. R., Reed, K. D., & Murphy, P. (1988). Density Measures and Their Relation to Urban Form. University of Wisconsin Milwaukee.

Al-Kodmany, K. (2000). Women's visual privacy in traditional and modern neighborhoods in Damascus. *Journal of Architectural and Planning Research*, 17(4), 283-303.

Al-Sabouni, M. (2016). The Battle for Home.The Vision of a Young Architect in Syria. London: Thames & Hudson.

Altman, I., & Low, S. (Eds.). (1992). Place attachment. New York: Plenum Pr.

Bahadure, S., & Kotharkar, R. (2012). Social Sustainability and Mixed Landuse, Case Study of Neighborhoods in Nagpur, India. *Bonfring International Journal of Industrial Engineering and Management Science*, 2(4), 76-83.

Bailey, N., & Manzi, T. (2008). Developing and sustaining mixed tenure housing developments: Round-Up: Reviewing the Evidence. York: Joseph Rowntree Foundation.

Barton, H. (Ed.). (2000). Sustainable communities: the potential for eco-neighborhoods. London: Earthscan.

Barton, H., & Tsourou, C. (2000). Healthy urban planning: a WHO guide to planning for people. London: Spon.

Bellair, P. E. (1997). Social Interaction and Community Crime: examining the importance of neighbor networks. *Criminology*, 35(4), 677-703.

Berghauser Pont, M. (2011). Measuring urban form. *Atlantis*, 22(2).

Bianca, S. (2000). Urban form in the Arab world: past and present. Zürich: ETH Zürich.

Bianca, S. (Ed.). (1980). The Conservation of the Old City. Paris: UNESCO.

Biddulph, M. (2007). Introduction to residential layout. Oxford: Butterworth-Heinemann.

Bisht, S. S., Mishra, V., & Fuloria, S. (2010). Measuring Accessibility for Inclusive Development: A Census-Based Index. *Social Indicators Research*, 98(1), 167-181.

Bramley, G., & Kirk, K. (2005). Does planning make a difference to urban form? Recent evidence from Central Scotland. *Environment and Planning A*, 37(2), 355-378.

Bramley, G., & Power, S. (2009). Urban form and social sustainability: the role of density and housing type. *Environment and Planning B: Planning and Design*, 36(1), 30-48.

Bramley, G., Brown, C., Dempsey, N., Power, S., & Watkins, D. (2010). Social Acceptability. In M. Jenks, & C. Jones (Eds.), *Dimensions of the sustainable city* (pp. 105-128). London: Springer.

Bramley, G., Dempsey, N., Power, S., & Brown, C. (2006). What is sustainability and how do existing urban forms perform in nurturing it? UCL, LONDON: Bartlett School of Planning.

Bramley, G., Dempsey, N., Power, S., Brown, C., Brown, D., & Watkins, D. (2009). Social Sustainability and Urban Form: Evidence from Five British Cities. *Environment and Planning A*, 41(9), 2125-2142.

Briassoulis, H. (2001). Sustainable Development and its Indicators: Through a (Planner's) Glass Darkly. *Journal of Environmental Planning and Management*, 44(3), 409-427.

Bryman, A. (2016). *Social Research Methods*. Oxford: Oxford University Press.

Bryman, A., & Cramer, D. (2005). *Quantitative Data Analysis with SPSS 12 and 13: Guide for Social Scientists*. East Sussex: Routledge.

Bückle, M. (1993). *Traditionelle Wohnviertel in Aleppo : eine empirische Untersuchung*. Bonn: Holos.

Buckner, J. C. (1988). The development of an instrument to measure neighborhood cohesion. *American Journal of Community Psychology*, 16(6), 771-791.

Burns, R. (2017). *ALEPPO: A History*. London: Routledge.

Burton, E. (2000). The Compact City: Just or Just Compact? A Preliminary Analysis. *Urban Studies*, 37(11), 1969-2006.

Burton, E. (2002). Measuring urban compactness in UK towns and cities. *Environment and Planning B: Planning and Design*, 29, 219-250.

Burton, E. (2003). Housing for an Urban Renaissance: implications for social equity. *Housing Studies*, 18(4), 537-562.

Burton, E., & Mitchell, L. (2006). *Inclusive Urban Design: Streets for Life*. Amsterdam: Elsevier.

Burton, E., Weich, S., Blanchard, M., & Prince, M. (2005). Measuring Physical Characteristics of Housing: The Built Environment Site Survey Checklist (BESSC). *Environment and Planning B: Planning and Design*, 32(2), 265-280.

Butler, T. (2003). Living in the Bubble: Gentrification and its 'Others' in North London. *Urban Studies*, 40(12), 2469-2486.

Carmona, M., Tiesdell, S., Oc, T., & Heath, T. (2003). *Public Places Urban Spaces: The Dimensions of Urban Design*. Oxford: Architectural Press.

Cerasi, M., Petruccioli, A., Sarro, A., & Weber, S. (Eds.). (2007). *Multicultural urban fabric and types in the South and Eastern Mediterranean*. Würzburg: Ergon-Verlag.

Chan, E., & Lee, G. (2008). Critical factors for improving social sustainability of urban renewal projects. *Social Indicators Research*, 85(2), 243-256.

Chan, J., To, H.-P., & Chan, E. (2006). Reconsidering Social Cohesion: Developing a Definition and Analytical Framework for Empirical Research. *Social Indicators Research*, 75(2), 273-302.

Charmaz, K. (2010). *Constructing grounded theory: a practical guide through qualitative (1. publ., reprint. ed.)*. Los Angeles: SAGE.

Charmaz, K. (2012). *Constructing grounded theory a practical guide through qualitative analysis*. Los Angeles: SAGE.

Chibli, M. (2008). *Housing Strategy In Aleppo City*. Euro-Syrian Cities Congress. Aleppo: Municipal Administration Modernisation (MAM).

Chipkin, I., & Ngqulunga, B. (2008). Friends and Family: Social Cohesion in South Africa. *Journal of Southern African Studies*, 34(1), 61-76.

Chiu, R. (2003). Social sustainability, sustainable development and housing development: the experience of Hong Kong. In R. Forrest, & J. Lee (Eds.), *Housing and social change: East-west perspectives* (pp. 221-239). London, New York: Routledge.

Churchman, A. (1999). Disentangling the Concept of Density. *Journal of Planning Literature*, 13(4), 389-411.

City of Vancouver. (2005). *A Social Development Plan for the City of Vancouver: Moving Towards Social Sustainability*. Administrative Report A7, Vancouver.

Clerc, V. (2014). Informal settlements in the Syrian conflict: urban planning as a weapon. *Built Environment Arab cities after 'the Spring,'* 40(1), p.34-51.

Clifton, K., Ewing, R., Knaap, G. J., & Song, Y. (2008). Quantitative analysis of urban form: a multidisciplinary review. *Journal of Urbanism*, 1(1), 17-45.

Cohrun, S. E. (1994). Understanding and Enhancing Neighborhood Sense of Community. *Journal of Planning Literature*, 9(1), 92-99.

Colantonio, A., & Dixon, T. (2011). *Urban regeneration & social sustainability: best practice from European cities*. Chichester: Wiley-Blackwell.

Conzen, M. R. (1960). *Alnwick, Northumberland: A Study in Town-Plan Analysis*. London: the Institute of British Geographers 27.

Coombes, M., & Wong, C. (1994). Methodological Steps in the Development of Multivariate Indexes for Urban and Regional Policy Analysis. *Environment and Planning A*, 26(8), 1297-1316.

Cowan, R. (2005). *The Dictionary of Urbanism*. Streetwise Press.

Cuthill, M. (2009). Strengthening the 'social' in sustainable development: Developing a conceptual framework for social sustainability in a rapid urban growth region in Australia. *Sustainable Development*, 18(6), 362-373.

Dahman, F. (1999). Informelle Siedlungsstrukturen und Wohnungstypologien : Selbsthilfe-Wohnungsbau in Aleppo und Mexiko-Stadt im Vergleich. PhD Thesis, Stuttgart University.

David, J. C. (1975). Alep, dégradation et tentatives actuelles de réadaptation des structures urbaines traditionnelles. *Bulletin d'études orientales*(28), 19-56.

David, J. -C. (2002). Les espaces publics à Alep depuis la fin du XIXe s. Urbanisme et pratiques des usagers. *Géocarrefour*, 77(3), 235-244.

David, J.-C. (1982). Urbanisation spontanée et planification. Le faubourg ancien nord d'Alep (XVe-XVIIIe siècle). *Les cahiers de la recherche architecturale* 10/11, p.14-17.

David, J.-C. (1987). Syrie : système de distribution des espaces dans la maison traditionnelle d'Alep. *Les cahiers de la recherche architecturale*(20/21), p.38-47.

David, J.-C. (1993). L'habitat spontané dans les quartiers périphériques d'Alep. *Histoires de développement*(22), p.27-31.

David, J.-C. (2002). Alep. Paris: Flammarion.

David, J.-C., & Baker, F. (1994). Élaboration de la nouveauté en Architecture en Syrie. (A. Petruccioli, Ed.) *Environmental Design: European Houses in the Islamic Countries*(1-2), 50-73.

David, J.-C., & Boissière, T. (Eds.). (2014). ALEP ET SES TERRITOIRES: Fabrique et politique d'une ville (1868-2011). Presses de l'Ifpo.

David, J.-C., & Hubert, D. (1982, April). Maisons et immeubles du début du XXe siècle à Alep. *Les cahiers de la recherche architecturale*(10/11), 102-111.

Davidson, K., & Wilson, L. (2009). A critical assessment of urban social sustainability. South Australia: School of Natural Built Environment.

Davis, C. (2013). SPSS step by step: essentials for social and political science. Bristol: Policy Press.

Dayoub, D. (2015). Wartime Coping And Its Re-Configuration Of The Urban Space The Case Of Aleppo City During The Protracted Syrian Conflict. Stuttgart: University of Stuttgart.

Dempsey, N. (2008). Does quality of the built environment affect social cohesion? Proceedings of the Institution of Civil Engineers - Urban Design and Planning, 161(3), 105-114.

Dempsey, N. (2009). Are good-quality environments socially cohesive?: Measuring quality and cohesion in urban neighborhoods. Town Planning Review, 80(3), 315-345.

Dempsey, N., Bramley, G., Power, S., & Brown, C. (2009). The social dimension of sustainable development: Defining urban social sustainability. Sustainable Development, 19(5), 289-300.

Dempsey, N., Bramley, G., Power, S., & Brown, C. (2011). The social dimension of sustainable development: Defining urban social sustainability. Sustainable Development, 19(5), 289-300.

Dempsey, N., Brown, C., Raman, S., Porta, S., Jenks, M., Jones, C., & Bramley, G. (2010). Elements of Urban Form. In M. Jenks, & C. Jones (Eds.), Dimensions of the Sustainable City (pp. 21-51). London: Springer.

Doeksen, H. (1997). Reducing crime and the fear of crime by reclaiming New Zealand's suburban street. Landscape and Urban Planning, 39(2-3), 243-252.

Edwards, B. (Ed.). (2006). Courtyard housing: past, present and future. London: Taylor & Francis .

Eissa, B., Awwad, R., Awwaad, R., & Furlan, R. (2015). Neighborhoods and Social Interactions: The Case of Al-Najada Area in Doha. *American Journal of Sociological Research*, 5(4), 119-133.

Eizenberg, E., & Jabareen, Y. (2017). Social Sustainability: A New Conceptual Framework. *Sustainability*, 9(1), 68.

Elkington, J. (1997). *Cannibals With Forks: The Triple Bottom Line of 21st Century Business* (Vol. 23). Oxford: Capstone.

Emmanuel, R. (Ed.). (2015). *Sustainable buildings*. Abingdon: Routledge.

Fansa, M. (Ed.). (2000). *Damaskus - Aleppo : 5000 Jahre Stadtentwicklung in Syrien*. Mainz am Rhein: Philipp von Zabern.

Farrell, S., Aubry, T., & Coulombe, D. (2003). Neighborhoods and neighbors: Do they contribute to personal well-being? *Journal of Community Psychology*(1), 9-25.

Fernandes, E. (2008). *Informal settlements in Syria: a general framework for understanding and confronting the phenomenon*. Syrian Ministry of Local Administration.

Forrest, R., & Kearns, A. (2001). Social Cohesion, Social Capital and the Neighbourhood. *Urban Studies*, 38(12), 2125-2143.

Forsyth, A. (2003). *Measuring density: Working definitions for residential density and building intensity* (Vol. 8). Minneapolis: Design Center for American Urban Landscape, University of Minnesota.

Freeman, L. (2001). The Effects of Sprawl on Neighborhood Social Ties: An Explanatory Analysis. *Journal of the American Planning Association*, 67(1), 69-77.

Galster, G. (2001). On the Nature of Neighbourhood. *Urban Studies*, 38(12), 2111-2124.

Gangler, A. (1993). Ein traditionelles Wohnviertel im Nordosten der Altstadt von Aleppo in Nordsyrien. Tübingen: Wasmuth.

Gaube, H., & Wirth, E. (1984). Aleppo : historische und geographische Beiträge zur baulichen Gestaltung, zur sozialen Organisation und zur wirtschaftlichen Dynamik einer vorderasiatischen Fernhandelsmetropole. Wiesbaden: Reichert.

Gehl, J. (2011). Life between buildings: using public space. Washington, DC: Island Press.

Gehl, J. (2010). Cities for people. Washington, DC: Island Press.

Gehl, J., & Svarre, B. (2013). How to study public life. Washington, DC: Island Press.

Geurs, K. (2006). Accessibility, land use and transport: Accessibility evaluation of land-use and transport developments and policy strategy. Delft: Uitgeverij Eburon.

GIZ (Ed.). (2012). The Aleppo Archive. Aleppo.

Gordon, D., Levitas, R., Pantazis, C., Patsios, D., Payne, S., Townsend, P., . . . Williams, J. (2000). Poverty and social exclusion in Britain. York: Joseph Rowntree Foundation.

Grant, J. (2002). Mixed Use in Theory and Practice: Canadian Experience with Implementing a Planning Principle. Journal of the American Planning Association, 68(1), 71-84.

Gray, D. E. (2014). Doing Research in the Real World (3 ed.). London: Sage.

GTZ. (2009). Informal Settlements In Aleppo. Aleppo: Aleppo Urban Development Project (UDP).

Handy, S. (1996). Methodologies for exploring the link between urban form and travel behavior. Transportation Research, 1(2), 151-165.

Hariri, V. (1996). Evaluation of the Housing Architecture Change Process in Syria (Case Study Aleppo): Analyses, Criticisms and Proposals. Ph.D. Thesis, Middle East Technical University, Ankara.

Hashemnezhad, H., Heidari, A., & Hoseini, P. M. (2013). "Sense of Place" and "Place Attachment" (A Comparative Study). *International Journal of Architecture and Urban Development*, 3(1).

Hawkes, J. (2001). *The Fourth Pillar Of Sustainability*. Melbourne: Cultural Development Network (Vic).

Hemani, S., Das, A. K., & Chowdhury, A. (2016). Influence of urban forms on social sustainability: A case of Guwahati, Assam. *URBAN DESIGN International*, 22(2), 168-194.

Holmes, C. (2007). New opportunities for an ageing population. *Town & Country Planning*, 74(11), 382-384.

IPCC. (2000). *Land Use, Land-Use Change, and Forestry. Special Report of the Intergovernmental Panel on Climate Change*. (R. T. Watson, I. R. Noble, B. Bolin, N. H. Ravindranath, D. J. Verardo, & D. J. Dokken, Eds.) Cambridge: Cambridge University Press.

Jabareen, Y. R. (2006). Sustainable Urban Forms: Their Typologies, Models, and Concepts. *Journal of Planning Education and Research*, 26(1), 38-52.

Jacobs, J. (1961). *The Death and Life of Great American Cities*. New York: Vintage Books .

Jenks, M., & Dempsey, N. (2005). The Language and Meaning of Density. In M. Jenks, & N. Dempsey (Eds.), *Future forms and design for sustainable cities* (pp. 287-309). London: Routledge.

Jenks, M., & Burgess, R. (Eds.). (2000). *Compact cities: sustainable urban forms for developing countries*. London: Spon.

Jenks, M., & Dempsey, N. (2007). Defining the neighborhood: Challenges for empirical research. *Town Planning Review*, 78(2), 153-177.

Jenks, M., & Jones, C. (Eds.). (2010). *Dimensions of the Sustainable City*. Dordrecht: Springer.

Jenks, M., Burton, E., & Williams, K. (Eds.). (1996). *The compact city: A sustainable urban form?* London: E & FN Spon.

Kaegi, W. (1992). *Byzantium and the early Islamic conquests*. Cambridge; New York: Cambridge University Press.

Kandakji, L. (2013). *Design Transformations of Residential Architecture In the Syrian Cities since Independence Till Now-Case Study: Aleppo City*. Ph.D. Thesis: Aleppo University.

Karuppannan, S., & Sivam, A. (2011). Social sustainability and neighborhood design: an investigation of residents' satisfaction in Delhi. *Local Environment*, 16(9), 849-870.

Kearns, A., & Forrest, R. (2000). Social Cohesion and Multilevel Urban Governance. *Urban Studies*, 37(5-6), 995-1017.

Kearns, A., & Parkinson, M. (2001). The Significance of Neighbourhood. *Urban Studies*, 38(12), 2103-2110.

Kearns, A., & Turok, I. (2003). *Sustainable Communities: Dimensions and Challenges*. Department of Urban Studies, University of Glasgow,.

Kropf, K. (1996). Urban tissue and the character of towns. *Urban Design International*(1), 247-263.

Lavinal, O. (2008). The challenges of urban expansion in Syria: The issue of informal housing. *Villes en développement*(n°79), p.7-8.

Lev-Wiesel, R. (2003). Indicators constituting the construct of 'perceived community cohesion'. *Community Development Journal*, 38(4), 332-343.

Littig, B., & Grießler, E. (2005). Social sustainability: a catchword between political pragmatism and social theory. *Int. J. Sustainable Development*, 18(1/2), 65-79.

Liu, S., & Zhu, X. (2004). Accessibility Analyst: An Integrated GIS Tool for Accessibility Analysis in Urban Transportation Planning. *Environment and Planning B: Planning and Design*, 31, 105-124.

Llewelyn-Davies. (2007). *Urban Design Compendium*. London: English Partnerships.

Lotfi, S., & Koohsari, M. J. (2009). Measuring objective accessibility to neighborhood facilities in the city (A case study: Zone 6 in Tehran, Iran). *Cities*, 26(3), 133-140.

Lund, H. (2002). Pedestrian Environments and Sense of Community. *Journal of Planning Education and Research*, 21(3), 301 - 312.

Lune, H., & Berg, B. L. (2017). *Qualitative research methods for the social sciences* (9th ed.). Harlow: Pearson.

Lynch, K. (2001). *Good city form*. Cambridge: MIT Press.

Madanipour, A. (2005). *Public and private spaces of the city*. London: Routledge.

Madanipour, A. (2007). *Designing the city of reason: foundations and frameworks*. London: Routledge.

MadaniPour, A. (1996). *Design of Urban Space: An Inquiry into a Socio-Spatial Process*. Newcastle upon Tyne: Wiley.

Madanipour, A. (2003). *Public and private spaces of the city*. London: Routledge.

Malfroy, S., & Gianfranco, C. (1986). *Die morphologische Betrachtungsweise von Stadt und Territorium*. Zurich: ETH, Lehrstuhl f. Städtebaugeschichte.

Maslow, A. H. (1943). A theory of human motivation. *Psychological Review*, 50(4), 370-396.

McKenzie, S. (2004). *Social Sustainability: Towards some definitions*. Magill: Hawke Research Institute, University of South Australia.

Meegan, R., & Mitchell, A. (2001). 'It's Not Community Round Here, It's Neighbourhood': Neighbourhood Change and Cohesion in Urban Regeneration Policies. *Urban studies*, 38(12), 2167-2194.

Miles, M. B., Huberman, A. M., & Saldaña, J. (2014). *Qualitative data analysis: a methods sourcebook* (3rd ed.). Los Angeles, Calif.: SAGE Publ.

Miroğlu, E. A. (2005). *The transformation of urban space at the conjunction of the old and new districts: the city of Aleppo*. Ankara: Middle East Technical University.

Mitchell, H., Kearns, R. A., & Collins, D. C. (2007). Nuances of neighbourhood: Children's perceptions of the space between home and school in Auckland, New Zealand. *Geoforum*, 38(4), 614-627.

Moldan, B., Janoušková, S., & Hák, T. (2012). How to understand and measure environmental sustainability: Indicators and targets. *Ecological Indicators*, 17, 4-13.

Morton, N., & Whitehand, J. (2003). Fringe Belts and the Recycling of Urban Land: An Academic Concept and Planning Practice. *Environment and Planning B: Planning and Design*(30), 819-839.

Naceur, F. (2013). Effects of outdoor shared spaces on social interaction in a housing estate in Algeria. *Frontiers of Architectural Research*, 2(4), 457–467.

Nakabayashi, I. (1989). Urban structure of Islamic city and its modern transformation: a case study of Aleppo, Syria. *Geographical Reports of Tokyo Metropolitan University*(24), 1-14.

Nasar, J. L., & Julian, D. A. (1995). The Psychological Sense of Community in the Neighborhood. *Journal of the American Planning Association*, 61(2), 178-184.

Nash, V., & Christie, I. (2003). *Making Sense of Community*. London: Institute for Public Policy Research.

Nedovic-Budic, Z., Knaap, G. J., Shahumyan, H., Williams, B., & Slaev, A. (2016). Measuring urban form at community scale: Case study of Dublin, Ireland. *Cities*, 55, 148-164.

Neglia, G. (2007). An interpretation of the urban fabric: the structure of pre-Islamic Aleppo. *Urban Morphology*, 11.1, 43-58.

Neglia, G. (2009). *Aleppo: processes of formation of the medieval Islamic city*. Bari: POLINA Press.

Neuman, M. (2005). The Compact City Fallacy. *Journal of Planning Education and Research*, 11-26.

Ng, Edward. (2010). *Designing high-density cities: for social and environmental sustainability*. London: Earthscan.

Njoh, A. J. (2016). *French Urbanism in Foreign Lands*. Springer International Publishing.

ODPM (Office of the Deputy Prime Minister). (2004). *The Egan Review: Skills for Sustainable Communities*. London: ODPM. Retrieved February 11, 2018, from <http://rtsa.ro/tras/index.php/tras/article/viewFile/75/71>

ODPM (Office of the Deputy Prime Minister). (2004a). *Safer Places: The planning system and crime prevention*. London: ODPM.

ODPM (Office of the Deputy Prime Minister). (2005). *Conclusions of Ministerial Informal on Sustainable Communities in Europe*. London: ODPM.

Oliveira, V. (2016). *Urban morphology: an introduction to the study of the physical form of cities*. Cham: Springer.

Omeir, W. (2013). *Urban Design Guidance for Benghazi, Libya: Linking Urban Form and Local Culture for Social Housing Regeneration in Libya*. Ph.D. Thesis, University of Strathclyde.

Oppenheim, A. N. (2001). *Questionnaire design, interviewing and attitude measurement* (New ed., repr ed.). London: Continuum.

O'Riordan, T., Cameron, J., & Jordan, A. (2001). *Reinterpreting the precautionary principle*. London: Cameron May.

Pearce, A., Han Ahn, Y., & HanmiGlobal. (2012). *Sustainable Buildings and Infrastructure: Paths to the Future*. London: Routledge.

Pierson, J. (2010). *Tackling social exclusion* (2nd ed.). London: Routledge.

Pinho, P., & Oliveira, V. (2009). Cartographic analysis in urban morphology. *Environment and Planning B: Planning and Design*, 36, 107-127.

Pole, C., & Lampard, R. (2002). *Practical Social Investigation: Qualitative and Quantitative Methods in Social Research*. Harlow: Prentice Hall.

Polese, M., & Stren, R. (2000). *The social sustainability of cities: diversity and the management of change*. Toronto: University of Toronto Press.

Porta, S., & Renne, J. L. (2005). Linking urban design to sustainability: formal indicators of social urban sustainability field research in Perth, Western Australia. *URBAN DESIGN International*, 10(1), 51-64.

Power, A. (2004). *Neighbourhood Management and the Future of Urban Areas*. London: Centre for Analysis of Social Exclusion, London School of Economics.

Power, A., & Wilson, W. J. (2000). *Social Exclusion and the Future of Cities*. London: London School of Economics.

Putnam, R. (1993). *Making Democracy Work: Civic traditions in modern Italy*. Princeton, NJ: Princeton Univ. Press.

Putnam, R. (2000). *Bowling Alone: The Collapse and Revival of American Community*. New York: Simon and Schuster.

Ragette, F. (2003). *Traditional domestic architecture of the Arab region*. Fellbach: Menges.

Raman, S. (2010). Designing a Liveable Compact City: Physical Forms of City and Social Life in Urban Neighbourhoods. *Built Environment*, 36(1), 63-80.

Rapoport, A. (1969). *House form and culture*. Englewood Cliffs: Prentice-Hall.

Rapoport, A. (1975). Toward a redefinition of density. *Environment and Behavior*, 7(2), 133-158.

Rapoport, A. (1982). *The meaning of the built environment: a nonverbal communication approach*. Thousand Oaks, Calif: Sage Publ.

Relph, E. (1976). *Place and placelessness*. London: Pion.

Renner, R. (2017). *Urban Being: Anatomy & Identity of the City*. Salenstein: Niggli Verlag.

Sachs, I. (1999). Social sustainability and whole development: Exploring the dimensions of sustainable development. In E. Becker, & T. Jahn (Eds.), *Sustainability and the Social Sciences: A cross-disciplinary approach to integrating environmental considerations into theoretical reorientation* (pp. 25-36). London: Zed Books.

Sakkal, S. (2014). Croissance et contrôle de l'espace. L'informel et l'urbanisme, la municipalité et l'État. In J.-C. David , & T. Boissière (Eds.), *ALEP ET SES*

TERRITOIRES Fabrique et politique d'une ville (1868-2011) (pp. p. 197-228). Beirut - Damascus: Presses de l'Ifpo, Institut français du Proche-Orient.

Sauvaget, J. (1941). Alep : essai sur le développement d'une grande ville syrienne, des origines au milieu du XIXe siècle. Paris: Geuthner.

Silverman, E., Lupton, R., & Fenton, A. (2006). A Good Place for Children? Attracting and Retaining Families in Inner Urban Mixed Income Communities. York: Joseph Rowntree Foundation.

Sinjab, K. (1965). Das arabische Wohnhaus des 17. bis 19. Jahrhunderts in Syrien. Aachen: Techn. Hochsch., Dissertation.

Sivam, A., Karuppanan, S., & Mobbs, M. (2012). How "open" are open spaces: evaluating transformation of open space at residential level in Adelaide – a case. *Local Environment*, 17(8), 815-836.

Skjæveland, O., Gärling, T., & Mæland, G. J. (1996). A multidimensional measure of neighboring. *American Journal of Community Psychology*, 24(3), 413-435.

Sluglett, P. (2002). «Aspects of Economy and Society in the Syrian Provinces: Aleppo in Transition, 1880-1925». In L. Tarazi Fawaz, & C. Alan Bayly (Eds.), *Modernity and Culture from the Mediterranean to the Indian Ocean* (pp. p.144-157). New York: Columbia University Press.

Social Exclusion Unit. (2003). *Making the Connections: Final Report on Transport and Social Exclusion*. London: Social Exclusion Unit.

Stead, D., Williams, J., & Titheridge, H. (2000). Land Use, Transport and People: identifying the connections. In K. Williams, E. Burton, & M. Jenks (Eds.), *Achieving Sustainable Urban Form* (pp. 174-186). London: E&FN Spon.

Stockhammer, D., & Wild, N. (2009). *The French Mandate City: A footprint in Damascus*. Contemporary City Institute, The Middle East Studio. Basel: ETH Studio Basel.

Suttles, G. (1972). *The social construction of communities*. Chicago: University of Chicago Press.

Tabbaa, Y. (1997). *Constructions of power and piety in medieval Aleppo*. University Park, Pa: Pennsylvania State Univ. Press.

Talen, E. (1999). Sense of Community and Neighbourhood Form: An Assessment of the Social Doctrine of New Urbanism. *Urban Studies*, 36(8), 1361-1379.

Talen, E. (2003). Neighborhoods as service providers: a methodology for evaluating pedestrian access. *Environment and Planning B: Planning and Design*, 30, 181-200.

Terao, M. (1995). Traditional structure of The old city, Aleppo: The multiple composition and the vertical Articulation of the urban community in Aleppo. *Keio economic studies*, Vol.32(No.1), p.77-104.

Towers, G. (2005). *An introduction to urban housing design: at home in the city*. Architectural Press.

Tsai, Y.-H. (2005). Quantifying Urban Form: Compactness versus 'Sprawl'. *Urban Studies*, 42(1), 141-161.

UBERBAU, & GTZ. (2010). *ALEPPO DIVERSE | OPEN CITY: An Urban Vision for the Year 2025*. Final Report, Aleppo.

UN-Habitat. (2014). *City profile of Aleppo*. UN.

Urban Task Force. (1999). *Towards an Urban Renaissance*. London: Dep. of the Environment, Transport and the Regions.

Urban Task Force. (1999). *Towards an Urban Renaissance*. London: Spon.

Vallance, S., Perkins, H. C., & Dixon, J. E. (2011). What is social sustainability? A clarification of concepts. *Geoforum*, 342-348.

Van, U.-P., & Senior, M. (2000). The Contribution of Mixed Land Uses to Sustainable Travel in Cities. In K. Williams, E. Burton, & M. Jenks (Eds.), *Achieving Sustainable Urban Form* (pp. 139-148). London: E& FN Spon.

Watenpaugh, H. (2004). *The image of an Ottoman city : imperial architecture and urban experience in Aleppo in the 16th and 17th centuries*. Boston: Brill.

WCED. (1987). *Our Common Future, the World Commission on Environment and Development*. New York: Oxford University Press.

Whitehand, J. (2001). British urban morphology: the Conzenian tradition. *Urban Morphology*, 2(5), 103-109.

Whitehand, J. (2007). Conzenian urban morphology and urban landscapes. 6th International Space Syntax Symposium. Istanbul: Istanbul Technical University.

Williams, J. (2005). Designing Neighbourhoods for Social Interaction: The Case of Cohousing. *Journal of Urban Design*, 10(2), 195-227.

Williams, K., Burton, E., & Jenks, M. (Eds.). (2000). *Achieving sustainable urban form*. London: Spon Press.

Wilson, J. Q., & Kelling, G. L. (1982). Broken Windows: The Police and Neighborhood Safety. *Atlantic Monthly*(March), 29-38.

Wixey, S., Jones, P., Titheridge, H., & Christodoulou, G. (2005). *Measuring Accessibility as Experienced by Different Socially Disadvantaged Groups*. Working Paper 3, Transport Studies Group, University of Westminster.

Woodcraft, S., Bacon, N., Caistor-Arendar, L., & Hackett, T. (2011). *Design for Social Sustainability*. London: Social Life Ltd.

Yiftachel, O., & Hedgcock, D. (n.d.). Urban social sustainability: The planning of an Australian city. *Cities*, 10(2), 139-157.

Yin, R. (2018). *Case Study Research and Applications* (6th ed.). Los Angeles: SAGE Publications, Inc.

Yoo, C., & Lee, S. (2016). Neighborhood Built Environments Affecting Social Capital and Social Sustainability in Seoul, Korea. *Sustainability*, 8(12), 1346.

List of Figures

Figure 2.1 Urban form shown at increasing levels of resolution	8
Figure 2.2 Density and urban form	10
Figure 3.1 Different models representing the interrelationship between the pillars of sustainability	20
Figure 3.2 Maslow's hierarchy of needs.....	33
Figure 4.1 Aleppo in the geographical context of Syria	40
Figure 4.2 The urban growth of Aleppo.....	41
Figure 4.3 The Roman-Hellenistic city of Aleppo	43
Figure 4.4 The Byzantine city of Aleppo	43
Figure 4.5 Morphological transformation of the colonnaded Hellenistic avenue in Islamic times.....	44
Figure 4.6 The Great Mosque of Aleppo and the old suq behind	45
Figure 4.7 An example of an affluent residential area (east of the citadel) with only one gate.....	46
Figure 4.8 Location of Aleppo and its hinterland	47
Figure 4.9 Aleppo in the 12 th Century	48
Figure 4.10 Alleys in the Old City of Aleppo.....	49
Figure 4.11 Housing types in the old city of Aleppo	52
Figure 4.12 Housing types distribution in the old city of Aleppo	53
Figure 4.13 The old city center (Al-Medina)	55
Figure 4.14 Aleppo city at the beginning of the nineteenth century	56
Figure 4.15 Al-Azizieh neighborhood.....	58
Figure 4.16 Views from Al-Azizieh neighborhood between 1898 and 1910.....	58
Figure 4.17 Bab Al-Faraj square in 1937 by Michel Écochard	59
Figure 4.18 Aleppo city in 1930	60
Figure 4.19 House with minimal courtyard.....	61

Figure 4.20 Khan Al-Goumrok first floor plan	62
Figure 4.21 Central hall house types in Aleppo.....	63
Figure 4.22 Large bourgeois corridor house with several floors. 1st. floorplan.	64
Figure 4.23 The central area and roads as proposed by André Gutton in 1954	66
Figure 4.24 Comparative maps of the historic fabric to the north of the Umayyad Mosque	67
Figure 4.25 Population of Aleppo city	69
Figure 4.26 Informal settlement in Aleppo	69
Figure 4.27: Informal settlements in Aleppo.....	71
Figure 4.28 An example of informal housing construction (Al-Ashrafia neighborhood)	72
Figure 4.29: An example of housing provided by the public sector	75
Figure 4.30: An example of housing provided by the cooperative sector	76
Figure 4.31: An example of housing provided by the private sector (luxurious housing and informal housing)	76
Figure 4.32 The different production systems of housing.....	77
Figure 6.1. Location of selected neighborhoods	99
Figure 6.2 Al-Shahbaa neighborhood and surroundings.....	100
Figure 6.3 Vacant shopping center.....	101
Figure 6.4 Retail shops built in the garden of a residential building.....	102
Figure 6.5 Kindergartens, set up on the ground floor and in the garden of a residential building.....	103
Figure 6.6 Green spaces privately maintained by residents.....	104
Figure 6.7 Planned and existing land use map of Al-Shahbaa.....	105
Figure 6.8 Housing in Al-Shahbaa	107
Figure 6.9 Residents' initiatives to improve privacy.....	107
Figure 6.10 Balconies glazing or walling	108

Figure 6.11 Pedestrian pathways	108
Figure 6.12 Accessibility and mobility in Al-Shahbaa neighborhood	109
Figure 6.13 Al-Hamadaniyeh neighborhood and surroundings	110
Figure 6.14 Retail shops built in the garden of a residential building	113
Figure 6.15 Green areas between residential buildings in Al-Hamadaniyeh neighborhood	115
Figure 6.16 Planned and existing land use map for Al-Hamadaniyeh neighborhood	116
Figure 6.17 Predominant housing types in Al-Hamadaniyeh neighborhood	118
Figure 6.18 Integrating the loggias by glazing or adding shade panels	118
Figure 6.19 Accessibility and mobility in Al-Hamadaniyeh neighborhood ..	120
Figure 6.20 Hanano neighborhood and surroundings	121
Figure 6.21 Conversation of ground floors flats into shops	123
Figure 6.22 Small green areas between residential buildings, either used as through-out ways or used for vegetable gardening by residents	124
Figure 6.23 Planned and existing Land Use Map for Hanano neighborhood	125
Figure 6.24 Social housing in the Hanano neighborhood	126
Figure 6.25 Mobility and Accessibility in Hanano neighborhood	128
Figure 7.1 The examined relationships between urban form and social sustainability	130
Figure 7.2 Levels of social interaction in the sample by neighborhood (mean score)	131
Figure 7.3 Proportion of the sample reporting feelings of safety by neighborhood	136
Figure 7.4 Proportion of the sample reporting feelings of attachment by neighborhood	139
Figure 7.5 Rating of the neighborhood as a place to live by neighborhood	140
Figure 7.6 Frequency of use of local services/facilities by neighborhood (mean score)	143

Figure 7.7 Frequency of use of local corner shop/convenience store by neighborhood143

Figure 7.8 Frequency of use of local shopping center by neighborhood ...144

Figure 7.9 Frequency of use of open spaces/parks for recreation in the neighborhood144

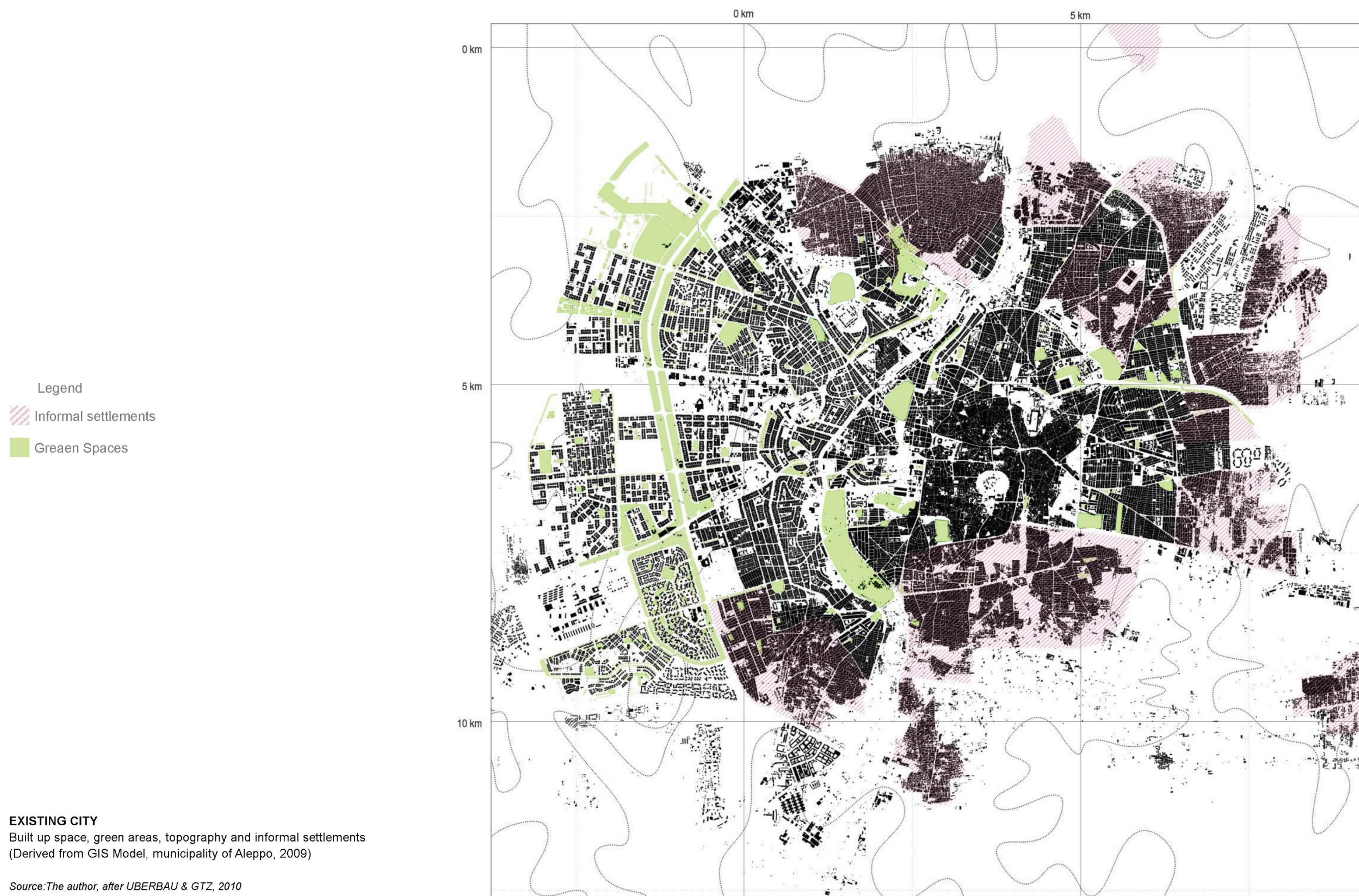
List of Tables

Table 2.1 Local facilities according to Ministry of Housing and utility standards	13
Table 3.1: Traditional and emerging social sustainability key themes	22
Table 3.2: Key themes for the operationalization of social sustainability identified in the review of the literature	25
Table 3.3: A frame of reference for understanding 'neighborhood.'	27
Table 3.4 Access to facilities and services in a neighborhood.....	37
Table 4.1 Comparison of the traditional and spontaneous urban structure..	73
Table 5.1 Indicators measuring density	83
Table 5.2 Indicators measuring land-use	83
Table 5.3 Indicators of housing characteristics.....	84
Table 5.4 Indicators measuring urban layout.....	85
Table 5.5 Indicators of social interaction/ networks	87
Table 5.6 Indicator of perception of safety	87
Table 5.7 Indicators of the sense of place attachment	88
Table 5.8 Indicators of use of neighborhood facilities/services	89
Table 5.9 Indicators of interfering variables.....	90
Table 5.10 Survey and semi-structured interviews by neighborhood.....	95
Table 7.1 Relationship between social interaction and other indicators.....	131
Table 7.2 Summarized results of partial correlations between social interaction and aspects of urban form by controlling interfering variables ..	132
Table 7.3 Relationship between the feeling of safety and other indicators	136
Table 7.4 Summarized results of partial correlations between social interaction and aspects of urban form by controlling interfering variables ..	136
Table 7.5 Relationship between sense of place attachment and other indicators.....	140
Table 7.6 Summarized results of partial correlations between sense of place attachment and aspects of urban form by controlling interfering variables.	140

Table 7.7 Relationship between the use of local facilities and other indicators	145
Table 7.8 Summarized results of partial correlations between social interaction and aspects of urban form by controlling interfering variables ..	145
Table 8.1 Design and policy recommendation for urban neighborhoods ...	155

Appendices

Appendix A
Aleppo City
Urban Form Analysis



Legend

CENTERS

- Old city
- Subcenters, Housing with 1/3 of commerce
- District centers

RESIDENTIAL LAND-USE

- Tradional housing
- Public, Labour, First and second modern
- Existing villages
- Housing with 350-300 person/ha
- Housing with 250 person/ha
- Housing with 200 person/ha
- Housing with 100 person/ha
- Housing with 60 person/ha

NON-RESIDENTIAL LAND-USE

- Public services
- University and scientific research
- Industry and investment
- Non-polluting industry
- Commercial

ROAD DEVELOPMENT

- Ribbon development level 1
- Ribbon development level 2
- Shopping at ground floor
- Mixed use A
- Mixed use B

TRANSPORT AND INFRASTRUCTURE

- Bus and train stations, Aiport
- Infrastructure(Water tretment, tanks, power plants etc.)
- Railways

GREEN AREAS

- River Quweik
- Green spaces, forest
- Tourisim areas, parks
- Cemetries, vineyards and orchards

EXISTING AND PLANNED CITY

Masterplan and aerial of contemporary Aleppo.
(Google Earth, 2009 and Municipality of Aleppo, 2010)

Source:The author, after UBERBAU & GTZ, 2010



Appendix B
Informal Settlement
Tal Al-Zarazier

Tal Al-Zarazier



Figure 0.1 Tal Al Zarazier neighborhood and its surrounding

Source: The author, based on Google Earth photo

Originally, this area was privately owned land where olive and pistachio trees were grown here. Around half of the area was subsequently expropriated by the government. The settlement began to develop when much of the area was occupied by developers who built high-rise blocks of flats, which they then sold to very poor people. In the southern part of the settlement, individuals bought plots of land and built their own houses (often with weak foundations on loosely compacted garbage measuring, in some places up to 20m in depth). The settlement, with a surface area of approximately 98.5 hectares, is located to the southwest of Aleppo and was inhabited by around 48,044 people. It was considered as one of the densest and most compact informal settlement in Aleppo.



Figure 0.2 General view of Tal Al-Zarazier settlement

Source: Site survey, 2011

The area was dominated by informal high-rise apartment blocks. They were built illegally by private developers or incrementally by individuals building traditional floors on top of existing buildings or by replacing traditional courtyard houses with apartment blocks. The areas of the plots were, on average 120 m² large, and there were usually two flats on each floor of the blocks. The sub-soil was not stable (much of it was reclaimed marshland) and construction standards were generally low. Therefore, buildings were in danger of collapsing, especially in the south of the area where the land is sloping and had been reclaimed. On the other hand, there were a few housings projects in the area, built by GEMH for military-members, which account for about 6.6% of the residential buildings in the settlement.



Figure 0.3 Addition of one floor to an informal residential building

Source: the researcher 2011

Regarding public services and facilities, schools were well distributed in the area but overcrowded and difficult to access. Some small mosques were located on the secondary streets. In addition to the available facilities, there were many 'informal' retail stores scattered along the main streets as well as on secondary streets. There were many ground floors where sewing and handicraft workshops can be found, many of which were run by people who live outside Tal Al Zarazier.

There were also small factories located in the southern part of the settlement (old Ramousa), some of which were compatible with the residential function of the buildings but have a negative impact on the inhabitants and the settlement due to the various types of emissions and contamination. The settlement had no medical practices or health centers; therefore, residents had to travel to the neighboring area of (Al Sekari) where the services offered are considered to be substandard. Generally, the area lacked recreational facilities as green areas accounted for only 0.1% of the land.

However, vast green areas (fields and seasonal orchards) are located on the south side of the settlement, which had a positive environmental impact on the neighborhood. There were some open spaces, but they were used for dumping solid waste, storage and for lorry parks. The government owns part of the undeveloped land, while a single family owns another part. The poor quality of education and the lack of health services, of a playground (that would keep children off the dirty streets), of a bakery and of a center for the disabled were perceived as the main problems.



Figure 0.4 The fields surrounding the settlement from the western side

Source: Site survey, 2011

The settlement is well connected with the city center, markets and industrial areas. The urban layout was predominately gridded and orthogonal, simulating the original ownership plans. Streets were narrow and poorly paved or un-surfaced. They became very muddy and flooded when it rains, and street lighting was inadequate. The percentage of paved streets was about 10%, while the dirt roads account for about 90%. Most roads were seven to eight meters wide and others were six and ten meters wide, while the width of the main street is about twenty meters.



Figure 0.5 The condition of the streets in the settlement

Source: Site survey, 2011

Socially, there was a lack of cohesion in the settlement and little sense of community as conflicts between different groups were common due to the varied geographical origins of the inhabitants (many from the north and northwest) and ethnic backgrounds (Arabs, Kurds and other tribes). Most of the residents were poor, some very poor and dependent on handouts and charities to survive. There were some influential groups, but their influence reflects social or tribal identity rather than income level.

Particularly the southern part of Tal al Zarazier suffered from gang and drug-related violence and conflicts between different social groups, though only on a very limited extent. There was also a low degree of smuggling, robberies and alcohol-related problems. Crime was limited to some areas of the settlement, and on the whole, it was a reasonably safe place for ordinary people. Women felt that they can move around freely.

There were no formal or informal community organizations or leaders. Any collective activities to improve the neighborhood operated at the level of the street or alley, where some neighbors have organized street cleaning, (clearing away mud after heavy rain) and even street paving. There was a common understanding of 'self-help' as the people felt that the municipality will never do anything for them.

Over 50% of men were unemployed, with the remainder only able to find part-time employment, at best. Most of those who do have jobs worked outside of the settlement. Occupations include construction labor, public sector employment, and factory work. High rates of school dropouts, physical and mental disability, illiteracy and child labor stood out among the social problems. Residents also lacked civic awareness, tolerating the poor environmental conditions and the buildup of solid waste in the streets. At the same time, the limited strong social ties within groups of people, especially long-term residents, represented an asset. In 2010, the proposed plan envisaged a complete demolition of the site and redevelopment based on current planning principles.



Figure 0.6 Mobility and Accessibility in Hanano neighborhood

Source: The author, based on MoA maps, 2011



Figure 0.7 Land use map of Tal Al-Zarazier informal settlement

Source: The author, based on Municipality of Aleppo maps, 2011



Figure 0.8 Housing types in Tal Al-Zarazier informal settlement

Source: The author, based on Municipality of Aleppo maps, 2011

Survey Findings



Figure 0.9 Age composition in Tal Al-Zarazier informal settlement

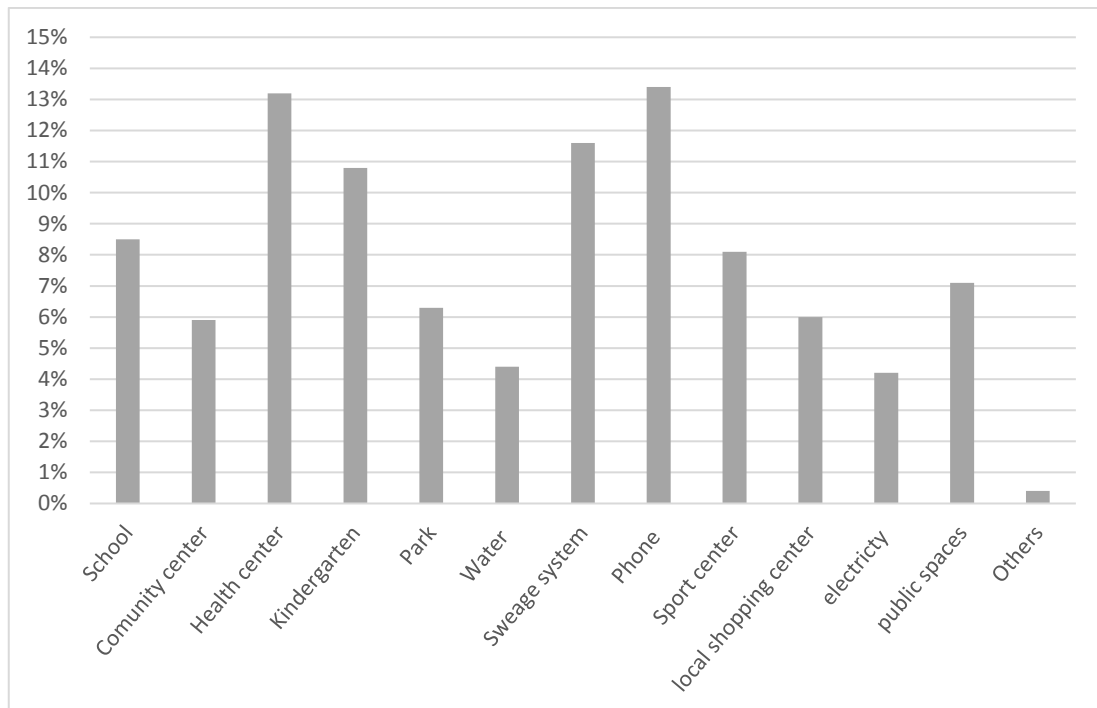


Figure 0.10 Priorities of services in Tal Al-Zarazier informal settlement

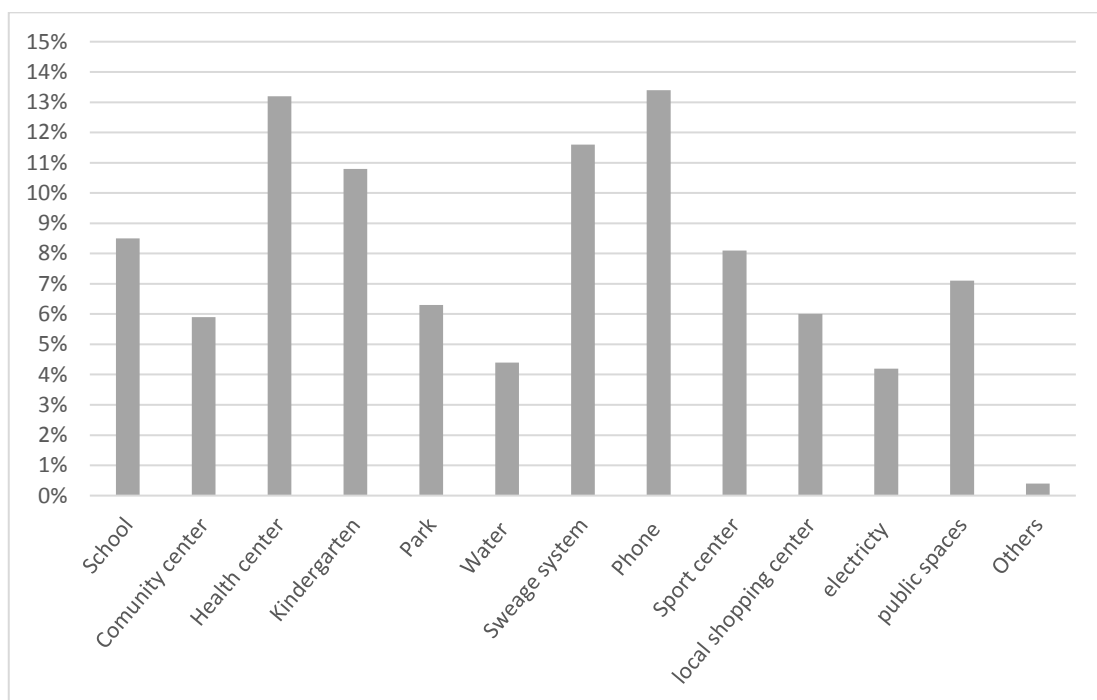


Figure 0.11 Main Problems in Tal Al-Zarazier informal settlement

Appendix C

Household Questionnaire Survey

Your Urban Living Experience Questionnaire



TECHNISCHE
UNIVERSITÄT
WIEN
Vienna University of Technology

Dear Sir/Madam,

I am a Ph.D. researcher at Vienna University of Technology, Austria and I am conducting a study among the residents of your neighborhood. The objective of the study is to obtain information related to the social life in your neighborhood. The study is part of the academic research and results of the study will help guide the local authorities to better plan and improve the urban living in your neighborhood, so I would to kindly ask you or your spouse to complete this questionnaire

I would very much appreciate your time and effort in filling out this questionnaire. This will only take a short amount of your time and your responses will be treated confidentially and anonymous. If you are unhappy answering any questions, please leave them blank.

Thank you very much in advance for your help.

For further information please contact Albara Arab Faculty of Architecture and urban planning, Vienna University of Technology. Email: e1428538@student.tuwien.ac.at

Neighborhood Name.....

Questionnaire Reference No.

Please use ticks to answer the questions ☒

SECTION I: Personal and household information

1. Are you:

☐ Male ☐ Female

2. Please tick your age group

☐ 15 to 24 years ☐ 25 to 34 years

☐ 35 to 44 years ☐ 45 to 60 years

3. Which of the following best describes your economic status?

☐ Employed

☐ Self-employed/freelance

☐ Unemployed/seeking work

☐ Housewife (Looking after family/home)

☐ Student

☐ Other

4. How many people are there in your household, including yourself?

Please write number: persons

5. Which of the following best describes your monthly household income?

☐ Low-Income

☐ Middle-income

☐ High-income

6. Is there a car are available to members of the household for personal use?

☐ Yes ☐ No

7. How long have you lived in this neighborhood?

..... years

8. Do you expect to move from your home within the next few years?

☐ Yes ☐ No

9. How do you and your household members usually travel to the facilities listed in the table below? Please answer only about the facilities located in your neighborhood.

facilities within your neighborhood	Usual Method of Travel		
	Walk/cycle	Public transport	Car
Retail shops	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Local shopping center	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Outdoor public open space, park or play areas	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

SECTION 2: BACKGROUND ON YOUR RESIDENCE**10. Do you (or another household member) own or rent your home?**

- ☐ Own with mortgage
- ☐ Own outright
- ☐ Rent

11. Do you have access to? (Please tick all that apply)

- ☐ A private garden
- ☐ A roof terrace or large balcony
- ☐ None of the above

12. How satisfied are you with the following aspects of your home?

	Very satisfied	Fairly satisfied	A little dissatisfied	Very dissatisfied
Number of Rooms	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Size of Rooms	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Condition of dwelling	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Privacy	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Overall satisfaction	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

SECTION II: PERCEPTIONS TOWARDS YOUR NEIGHBORHOOD**13. How many of your neighbors would you say that?**

	None	A few	Some	Most	All
You see socially on average once a week	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
You have a chat with /greet	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
You would ask to borrow food/ tools from	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
You know by name	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

14. How safe do you feel walking alone in your neighborhood after dark?

- ☐ Very safe
- ☐ Fairly safe
- ☐ A bit unsafe
- ☐ Very unsafe

15. In your neighborhood, how much of a problem is the following?

	Not a problem	Minor Problem	Serious Problem
Noise from neighbors	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Disturbance from children or youngsters	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Safety	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Lack of parking	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Amount of traffic	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Litter	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

16. How attached do you feel about your neighborhood?

- ☐ Very attached
- ☐ Fairly attached
- ☐ Not very attached
- ☐ Not attached at all

17. How often you use the following services and facilities within your neighbourhood?

		Most days	At least once a week	At least once a month	No access/ not available
Corner shops /convinche store	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Local shopping center	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Public open spaces/parks	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

18. If you wish, please use this space to make any additional comments.

Thank you very much for your time and help filling out this questionnaire

Appendix D

Semi-Structured Interview Guide

Social interaction

1. Where do you meet/bump into neighbors? What things prevent interaction?

2. Are there other, non-physical factors which influence social interaction?

Feeling of safety

3. What physical features of the neighborhood influence your feelings of safety?

4. Are there other, non-physical factors which influence your feelings of safety?

Place attachment

5. What physical features of the neighborhood influence your feeling of place attachment?

6. Are there other, non-physical factors which influence your feeling of place attachment?

7. Why do you stay in your area? What are the positive or negative factors keeping you in a place or encouraging you to move away?

Use of facilities and services

8. Do you use the facilities somewhere else? Why?

9. What physical features of the neighborhood influence your perceptions/use of services and facilities in the neighborhood?

10. Are there other, non-physical factors which influence your perceptions/use of services and facilities in the neighborhood?

11. How do the local services and facilities and services contribute to the social interaction?

12. How do the local services and facilities and services contribute to the feeling of safety?

13. How do the local services and facilities and services contribute to the feeling of place of attachment?

This is the end of the questions. I would like to thank you very much for giving up your time to do this. It is greatly appreciated.

Appendix E
Quantitative Analysis

Urban Form Analysis

Table E.1 Indicators of residential density by neighborhood

Indicator of density	Al-Shahbaa	Al-Hamadanyeh	Hanano
Gross density-persons per hectare	160.7	408.6	502
Coverage ratio of built land to open space	2.56	1.75	1.92
Net density-persons per hectare	297	590.2	630.6
Persons per household	4	5	6

Table E.2 Indicators of land use by neighborhood

Indicator of land use	Al-Shahbaa	Al-Hamadanyeh	Hanano
Provision of services and facilities	108	475	658
Ratio of residential to non-residential land	3.93	2.56	2.44
Spread of services / facilities	0.21	2.06	3.51

Table E.3 Indicators of housing characteristics by neighborhood

Indicators of housing characteristics	Al-Shahbaa	Al-Hamadaniyeh	Hanano
Prodminant house type	Detached	Appratment blocks	Row housing
House size (average)	200m ²	90m ²	70m ²
Level of active frontage *	B	A	A

*Levels of active frontage are graded thus: A: >25 doors & windows every 100m, B: > 15 doors & windows every 100m, C: >6 doors & windows every 100m, D: >3 doors & windows every 100m, F: <2 doors & windows every 100m

Table E.4 Access to a private garden or large balcony by neighborhood (%)

Do you have access to a large balcony or private garden?	Al-Shahbaa	Al-Hamadaniyeh	Hanano
yes	90	76	61
no	10	14	39

Table E.5 Indicators of urban layout by neighborhood

Intersection type	Al-Shahbaa	Al-Hamadaniyeh	Hanano
Predominant urban layout	Orthogonal Grid	Cul-de-sac	Distorted grid
Average of urban block size (m)	105	73	60
Degree of connectedness	49.67	65.31	93.03

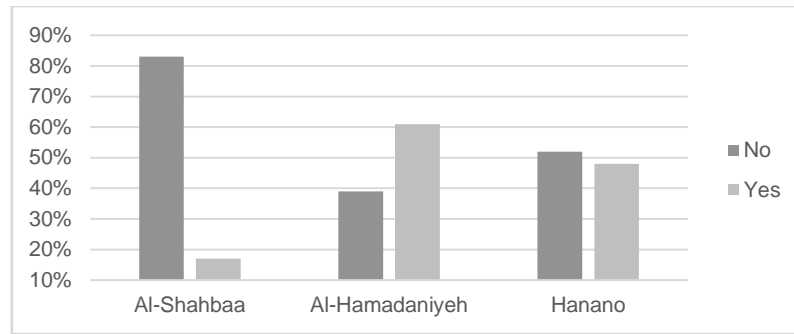


Figure 0.12 Plans to move to a new house by neighborhood

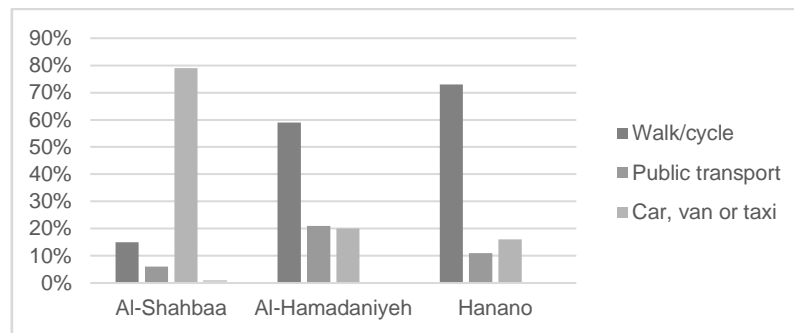


Figure 0.13 Method of transport used to access retail shops and local shopping center by neighborhood

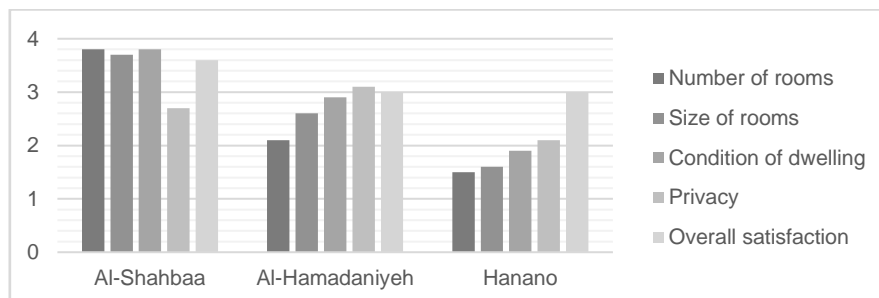


Figure 0.14 Satisfaction with home (on scale of 1-4) by neighborhood

Socio-economic characteristic of the sample

Carastistcis	Al-Shabaa	Al-Hamadaniyeh	Hanano	Total
Gender				
Male	22	25	27	74
Female	28	29	20	77
Age				
15-24	6	8	7	21
25-34	12	9	15	36
35-44	24	25	16	65
45-60	8	12	9	29
Employment status				
Employed	39	37	23	99
Unemployed	9	15	20	44
Retired	2	2	4	8
Household income				
Low-Income	0	14	39	45
Middle-income	0	36	8	24
High-income	50	4	0	15
Tenure				
Own house	46	28	11	85
Own with mortgage	4	11	15	30
Rent	0	15	21	26
Car ownership				
Own a car	40	30	22	92
Don't own car	10	24	35	69

Appendix F

Correlation Analysis

Table F.1 Relationship between density and dimensions of social sustainability

Spearman's rho correlation coefficient

Social sustainability variables		Density variables			
		Gross density	Net density	Ratio built to open spaces	Household density
Social interaction	See neighbors	0.202**	0.188**		
	Chat with neighbors	0.117*	0.095**	0.099**	0.100**
	Borrow tools/food from neighbors		0.104**		
	Knowing neighbors by name	0.130**	0.178**	0.089**	0.125**
Perceived Safety	Feeling of safety		0.081*		
Sense of place attachment	Rating the neighborhood as a place to live	-0.0191*	-0.111**		0.114**
	Feeling attached to the neighborhood	-0.132*	-0.082*		0.088*
Use of facilities	Frequency of using local shopping facilities	0.191**	0.227**	0.114**	
	Frequency of using public green spaces	0.129**	0.161**		0.073*

** correlation is significant at the 0.01 level (2-tailed)

* correlation is significant at the 0.05 level (2-tailed)

- negative relationship

Table F.2 Relationship between land use and dimensions of social sustainability

Spearman's rho correlation coefficient

Social sustainability variables		Land use variables		
		composition of services and facilities	Ratio of housing to services and facilities	Spread of services and facilities
Social interaction	See neighbors	0.097**		
	Chat with neighbors		0.077**	0.181**
	Borrow tools/food from neighbors	0.105**		0.119**
	Knowing neighbors by name	0.074*		
Perceived Safety	Feeling of safety	0.087**	0.095**	
Sense of place attachment	Rating the neighborhood as a place to live	0.111**		0.071*
	Feeling attached to the neighborhood	0.069*		
Use of facilities	Frequency of using local shopping facilities	0.0125**		0.172**
	Frequency of using public green spaces	0.069*		0.090**

** correlation is significant at the 0.01 level (2-tailed)

* correlation is significant at the 0.05 level (2-tailed)

- negative relationship

Table F.3 Relationship between housing characteristics and dimensions of social sustainability

Spearman's rho correlation coefficient

Social sustainability variables		Housing Characteristic variables		
		Access to a balcony or a private garden	Active frontage proportion	Number of household
Social interaction	See neighbors		0.156**	
	Chat with neighbors	0.078*	0.167**	0.084*
	Borrow tools/food from neighbors			
	Knowing neighbors by name			
Perceived Safety	Feeling of safety	0.081*	0.121**	
Sense of place attachment	Rating the neighborhood as a place to live	-0.111**		0.114**
	Feeling attached to the neighborhood	-0.082*		0.088*
Use of facilities	Frequency of using local shopping facilities	0.227**	0.166**	0.118**
	Frequency of using public green spaces	0.275**		0.215*

** correlation is significant at the 0.01 level (2-tailed)

* correlation is significant at the 0.05 level (2-tailed)

- negative relationship

Table F.4 Relationship between urban layout and dimensions of social sustainability

Spearman's rho correlation coefficient

Social sustainability variables		Urban layout variables	
		Degree of connectedness	Urban Block size
Social interaction	See neighbors	0.071*	0.090*
	Chat with neighbors		0.108**
	Borrow tools/food from neighbors		
	Knowing neighbors by name		0.104**
Perceived Safety	Feeling of safety	0.095*	0.104**
Sense of place attachment	Rating the neighborhood as a place to live		-0.083*
	Feeling attached to the neighborhood	0.085*	
Use of facilities	Frequency of using local shopping facilities	0.072*	
	Frequency of using public green spaces		-0.079*

** correlation is significant at the 0.01 level (2-tailed)

* correlation is significant at the 0.05 level (2-tailed)

- negative relationship

Table F.5 Relationship between interfering variables and dimensions of social sustainability

Spearman's rho correlation coefficient

Social sustainability variables	Interfering variables (1)			
	Age	Gender	Employment status	Household income
Social interaction				-0.177*
Perceived Safety	-0.095*	-0.119**	-0.106*	
Sense of place attachment		0.066*		
Use of facilities				-0.206**

** correlation is significant at the 0.01 level (2-tailed)

* correlation is significant at the 0.05 level (2-tailed)

- negative relationship

Table F.6 Relationship between interfering variables and dimensions of social sustainability

Spearman's rho correlation coefficient

Social sustainability variables	Interfering variables (2)			
	Car ownership	Tenure	Length of residence	Plans to move house
Social interaction		-0.155*	0.083*	-0.164*
Perceived Safety			0.129*	0.104*
Sense of place attachment			0.087**	-0.167*
Use of facilities	-0.042*			

** correlation is significant at the 0.01 level (2-tailed)

* correlation is significant at the 0.05 level (2-tailed)

- negative relationship