

# Social wellbeing and the residential environment:

The influence of design on inhabitants' wellbeing in Doha

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#### Abstract

Health and wellbeing have been key considerations in designing sustainable environments. However, most research on built environments and wellbeing has been conducted in Western communities, with very little research in the context of Middle Eastern countries. This study aims to fill the gap by investigating the impact of the residential built environment on social wellbeing in the cultural context of Doha, the capital of Qatar.

The research studied six neighbourhoods in Doha. The research involved interviews and spatial models (space syntax), complemented by questionnaires and an observation survey. The data were analysed separately; however, they are thematically discussed in this thesis.

The research corroborates the findings of a great deal of previous work on neighbourhoods' social wellbeing, while the association between residential environment layout and inhabitants' privacy was unique to Doha. The analysis found that household privacy was influenced by: 1) the flexibility of neighbourhoods' layouts and 2) the dwellings' layouts. The Qatari dwelling layouts facilitate social cohesion and interaction without compromising households' privacy. Furthermore, the dwelling layout flexibility allows expanding when families grow in size without relocating, allowing stronger relationships and mutual support between family members and neighbours.

As for the impact of spatial use on social wellbeing, this research broadly supports the work of other studies in this area, linking public spaces with the inhabitants' casual interactions. However, this research found that some uses have a higher impact than others. In Doha, mosques significantly influenced inhabitants' social interaction, especially for men. The social relationships between neighbours were maintained in private spaces – *Majles*-. *Majles had the lowest integration value compared to other spaces in the dwelling, which ensures household privacy*.

Based on the findings of this investigation, recommendations are made and guidelines developed for future residential developments in Qatar and the surrounding region to ensure the social wellbeing of communities.

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And He is Allah: there is no god but He. To Him be praise, at the first and at the last: for Him is the Command, and to Him shall ye (all) be brought back (Al-Qasas, verse 70). Praises to God for everything he has blessed me with, including the opportunity to pursue my studies.

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# Chapter 1 Introduction

#### 1. Introduction

Winston Churchill (1943) said, 'We shape our buildings, and afterwards our buildings shape us', encapsulating the relationship between the built environment and its users' behaviour. This relationship is 'interactive', as people create and are influenced by their own creations (Lawrence and Low 1990). The increase in health issues associated with lifestyle factors has contributed to the emergence of wellbeing research (Davies-Cooper et al. 2014). Hence, enhancing general population wellbeing is now a goal in many countries. Governments have invested in measuring and quantifying their nations' wellbeing. Many scholars are promoting wellbeing as the basis for public policy (Mouratidis 2017). The United Nations (UN) measures average levels of happiness in its member countries, using six indicators: freedom, generosity, health, social support, income, and trustworthy governance (Helliwell et al. 2017). Some researchers also use gross domestic product (GDP) as an indicator of happiness and wellbeing. Whilst Allin and Hand (2014) observe that the GDP was never intended for use as a general indicator of wellbeing, some studies do suggest that GDP gives limited clarity on social wellbeing. (Alatartseva and Barysheva 2015). In addition, factors such as family, relationships, and community should not be ignored (Allin 2014). The movement towards social indicators was a response to the one-sided focus on economic security (Kamp et al. 2003).

As scholars tend to be interested in typical 'large city' issues of isolation, traffic, neighbourhood degradation, and so on, concepts such as quality of life, quality of space, liveability, residential evaluation, satisfaction, and sustainability have emerged and usually are used as synonyms, as their meanings overlap (Kamp et al. 2003; Mouratidis 2017). Kostas (2017) argues that these concepts come from subjective wellbeing perspectives. Section 2.2 clarify the overlap between these concepts, with the aim of defining 'wellbeing' for use in this research. The origin of these notions can be traced to multiple research studies on health, safety, wellbeing, residential satisfaction, and urban physical environment (Kamp et al. 2003).

Wellbeing, in built environment research, has been categorised as either objective or subjective (Western and Tomaszewski 2016), as the built environment context has both direct and indirect influences on many aspects of wellbeing (Evans 2003a; Mouratidis 2017b; Figure 1.1). The direct

impacts have been found to affect inhabitants' objective wellbeing – for example, the influence of toxic building materials on physical health (Lawrence, 2012). The direct impact of the built environment can be measured through 'quality of life assessments', as well as physiological measures and tangible indicators. In contrast, the indirect influence on the inhabitants has an impact on their subjective wellbeing, which includes two types of psychological wellbeing. The first is long-term wellbeing, defined as functioning well (eudemonic wellbeing) and being purposeful, having meaning in one's life, and experiencing self-realisation. The second is shortterm wellbeing, evidenced by feeling good (hedonic wellbeing; Steemers 2015).



Figure 1.1 Illustration of the relationships between wellbeing and the built environment (source: Steemers 2015) Previous research has shown that aspects of physiological wellbeing (Klepeis et al. 2001; Coombes et al. 2010; Fraser and Lock 2011; Thompson Coon et al. 2011; Townshend 2014); psychological wellbeing (Evans 2003; Miles et al. 2011; Mitchell 2012; White et al. 2013; Mitchell et al. 2015); and social wellbeing (Miles et al. 2011; Allin 2014; Brown and Lombard 2014; Ellaway 2014) are influenced by the design and condition of one's surrounding environment (Hartig and Lawrence 2003; Cooper 2014). While, it is believed that wellbeing types – physiological, psychological and social - are associated with each other.

Wellbeing is relevant on various levels, including the wellbeing of individuals (Smith et al. 1969; Fuller et al. 1993; Hanson 1999; Thompson Coon et al. 2011; Lawrence 2012) and the wellbeing of communities or nations (Keyes 1998; Hartig and Lawrence 2003; Kruger 2011; Montford 2013; Mitchell et al. 2015; Wiedmann, Salama, Ibrahim 2016). It is also discussed in relation to the physical context: for example, the wellbeing of users in a personal space or in public spaces and in administrative areas such as neighbourhoods, districts, municipalities, states, nations, and so on. The residential use occupy majority of city land (Biddulph 2007; Morris 2009). Furthermore, the design of the residential context can contribute to – or discourage – the sustainability of the community (Teghe and Rendell 2005). Therefore, this research investigates those spaces in which people spend most of their time: the residential context. People spend a considerable amount of time in the built environment especially residential environments, and this forms an essential aspect of their daily routine (Brasche and Bischof 2005; Biddulph 2007)). Indeed, developments in technology and changes in lifestyle have only contributed to increasing the time people spend in the built environment. Previous research has found that, in the 1990s, people spent an average of almost 60% of their time at home in Germany (Brasche and Bischof 2005). In 2001, the national human activity pattern survey (NHAPS) declared that the US population spent 68.7% of their time in their residence.

#### 1.1. The impact of the built environment on wellbeing – an overview

Most wellbeing studies focus on emotional, mental, and physiological wellbeing (Evans 2003; Miles et al. 2011; Van Lente et al. 2012; Mitchell 2012; White et al. 2013). Common terminologies used in mental wellbeing research include 'happiness', 'life satisfaction', 'quality of life', and 'emotional wellbeing' (Montford 2013). Previous research investigated the impact of greenery exposure, density, proximity, maintenance, or perceived quality; however, few studies have looked beyond a single variable of the physical environment (Abass et al. 2020).

Several studies have investigated the impact of greenery exposure on mental health (Coombes et al. 2010; White et al. 2013; McEachan et al. 2016). Studies report a positive relationship between proximity to the natural environment and engagement in physical activity (Coombes et al. 2010; Fraser and Lock 2011; Thompson Coon et al. 2011; Saeed and Furlan 2017). However, it is also understood that results vary according to socioeconomic status, age, and gender (White et al. 2013). The methods used to study urban parks and their effect on the mental health of residents based on the quantity and quality of the greenery (Mitchell 2013; McEachan et al. 2016; Van Dillen et al. 2012; Cooper, 2014). Nevertheless, the impact and amount of greenery required were not explored in different climatic zones.

Moreover, studies suggest that walking can influence social wellbeing (Thompson Coon et al. 2011). Mobility independence and neighbourhood accessibility are crucial, especially for seniors' social wellbeing (Oswald et al. 2007). Neighbourhood design features – affecting the distance to one's daily destinations, direct routes, the sidewalks, and the availability of attractions along the roads – all influence people's activity routines (Handy et al. 2002; Cooper 2014; Townshend 2014). Previous researchers have advised the integration of different public gathering spaces into the street fabric, as these have been found to improve various aspects of social wellbeing (Brown and Lombard 2014; Cooper 2014; Qawasmeh 2014). However, there has been limited research investigating the negative impact of public spaces location on inhabitants' wellbeing.

Walkability is associated with neighbourhood density, and scholars have explored the significance of neighbourhood density. In the Western context, higher densities seem to be better for social interaction, personal relationships, wider social networks, and frequent socialisation, which are all considered components of social support (Bramley and Power 2008; Montford 2013; Mouratidis 2018a). However, in other contexts, higher density was not found to contribute to social isolation (Muzayanah et al. 2020), whilst density negatively affects wellbeing when the ratio of car usage to land area increases (Miles et al. 2011). Density research has lacked a focus on the cultures and traditions of users, as people from different cultural backgrounds may prefer different levels of density.

Few studies have combined neighbourhood physical environment analysis with social wellbeing outcomes, especially in the Middle Eastern context. Bertha (2011) investigated the effect of neighbourhood social networks on wellbeing and found that proximity to extended family members or one's own ethnic group helped to reduce stress, encouraged people to interact, and reduced isolation and loneliness. Although this research did not quantify proximity, people living in these circumstances reported receiving emotional and material support and help with household maintenance and child welfare (Ochieng 2011). Judith (2013) concludes that a good social life improves mental wellbeing.

Following investigations of dwelling scale, there is a significant body of evidence showing the impact of noise, light levels, access to natural views, air quality, and crowding in dwellings on the physiological and psychological wellbeing of adults (Fuller et al. 1993; Coombes et al. 2010; Thompson Coon et al. 2011; Lawrence 2012; Cooper 2014). Dissatisfaction with these qualities reduces the time spent in the dwelling (Hartig & Lawrence, 2003). Inhabitants are differently influenced by indoor qualities, depending on their own demographic characteristics (Evans 2003; Lawrence 2012; Cooper 2014). Fuller et al. (1993b) found that psychological issues can consequently affect physiological health.

Maintenance is another significant issue investigated in relation to dwelling scale. Lawrence (2012) and Cooper (2014) found that mould growing in a home poses risks to the inhabitants' health. It causes problems such as asthma, chronic bronchitis, nasal allergies, and eczema. In addition, inadequate sewage maintenance can cause infectious diseases (Lawrence, 2012).

Less attention has been given to the role of the dwelling in the social wellbeing of the inhabitants. Judith (2013) suggests that some characteristics at the building scale increase interaction between neighbours. These characteristics include the spatial arrangement, function and physical distance, and multi-purpose spaces. Some of these characteristics, such as the spatial arrangement, affect the social wellbeing of the household. Levels of privacy and frequency of interactions vary for different housing typologies. Scholars have found that apartment buildings reduce social networking, which results in loneliness for women and restricts children from playing outside the residential unit (Evans 2003). Studies have also identified spatial arrangement as a variable that can influence inhabitants' wellbeing. Burton (2014) believes that a gradual transition between the public and private through buffer zones helps to maintain the household's privacy and the wellbeing of the residents. Additionally, the house's capacity to control contact with others sustains a positive social psychological context (Lawrence 2012). As some behaviours require privacy, it is essential to control the interaction between the people inside and outside the house. Failure to do so could detrimentally influence the psychological and social wellbeing of the inhabitants (Hartig and Lawrence 2003). Nevertheless, there is a lack of understanding of the role of spatial organisation in the transition from public to private and in controlling interaction, especially in conservative communities.

#### 1.2. The built environment and the socio-culture of Doha city

Generally, the creation of regions is based on grouping neighbouring countries that have similar culture, history, economy, and physiography (Culcasi 2010). However, researchers further clustered regions such as the Middle Eastern countries based on economic, geographical, institutional, and social characteristics (Kuncic 2016). While others found that oil-versus-non-oil categorisation is the most stable and regular classification of Middle Eastern countries (Kuncic 2016). Khalaf (2006) argues that the influence of oil production on the physical structure formation and social composition differs from a Middle Eastern country to another as they differ in weather, income per capital, population and size. Kuncic (2016) argue that the Gulf Cooperation Council countries (GCC) -Saudi Arabia, Kuwait, Bahrain, Qatar, UAE and Oman- is the most homogeneous in all dimensions.

The GCC share the climatic conditions, ecology, history, language, religion, demographic characteristics, norms and culture (Khalaf 2006). The GCC also shared similar explosive urban growth followed by the discovery of the "black gold" (Khalaf 2006; Saeed and Furlan 2017). The urban planning strategies followed global guidelines to produce 'westernised' settings to attract foreigners to invest in the GCC capitals, threatening Islamic culture and traditions (Furlan 2016). On the other hand, Saeed and Furlan (2017) argue that a decline followed the rapid urban growth in Doha in wellbeing and quality of life. The following paragraphs illustrate the physical environment, socio-cultural and socioeconomic developments of Doha city chronologically.

Before the oil discovery, Doha city was a small fishing village located east of Qatar, and its name was derived from the circler shoreline shape (Adham 2008). Doha's location was determined by the water source in Wadi Sail and the shape of the coastline, which protects it from sea attacks (Adham 2008). It was claimed that Doha had no local architecture during the 1930s as it witnessed poverty and famine (Wadi and Furlan 2017). In contrast, others argue that the urban pattern during this period was derived from social relations, which emphasised blood and tribal relations (Adham 2008). Alleyways between these neighbourhoods led to a public space which

consisted of markets, a shipyard, and a formal meeting room (Adham 2008). In the first half of the 20th century, Doha's population was a mixture of Almaadhid tribe, Persian immigrants and East-African workers (Wiedmann et al. 2013). Some neighbourhoods in Doha were named after dominant families in an area (Nagy 2006). After the Japanese discovery of cultured pearls, the pearl industry dropped, and consequently, Doha's population was reduced as people were looking for other jobs elsewhere (Adham 2008).

Oil was discovered in 1939, while the production was delayed due to World War II. The 1950s marked the start of the population and construction boom due to oil production (Nagy2006). Around 1955, rods were constructed, and electric and desalination plants were built, which led to city expansion (Adham 2008). Nagy (2006) found that the local families felt that Doha's expansion was an obstacle to family interaction. Furthermore, it was claimed that living in a diversified community has reduced the interaction between neighbours in the context of Doha (Nagy2006).

Doha city began to take shape by the end of the 1960s, and new housing typologies, such as apartment buildings, were introduced to the city (Adham 2008). Furthermore, the department of social housing was established for low-income Qataris. The waterfront of Doha was designed and shaped by an American firm in 1970, which is still maintained and outlines the skyline of Doha (Rizzo 2014). After that, the ministry of urban planning employed the British consultant Llewelyn Davis to do the urban plan of Doha in 1971 (Gharib and Salama 2014). Formal urban development started in 1972 after the independence (Adham 2008). Later in 1979, the master plan was updated to satisfy the evolution in the coming 20 years (Rizzo 2014). Large demolishing programs took action to provide wider roads and public infrastructure (Rizzo 2014). The proposed design was based on a ring rods system interconnected by radial rods, placing the old centre in the middle and distributing functions and land uses around it. The objective of the design was to establish a modern city centre and increase the commercial, governmental, and high-rise residential buildings in the city's centre (Adham 2008). Thus, the Ministry of Municipal Affairs purchased old houses and lands from the local population and relocated them to new suburban developments (Gharib and Salama 2014). Qataris were mostly provided with lands and an interest-free building grant to design and construct their houses (Nagy 2006). Therefore, different dwellings' layouts and forms can be noticed. Often Qataris design their houses as twostories detached homes enclosed between high walls to ensure privacy. These low-density housing areas are located outside the city centre (Nagy 2006). In the process of creating Doha, many old neighbourhoods were demolished and replaced by high-rise residential buildings. However, some old houses were occupied by low-income immigrant groups (Ismail 1993).

The construction activities slowdown in the early 1980s following oil prices, while the population growth kept increasing. Much of the construction was in the New Doha district, including Qataris housing projects and residential compounds for expatriates and employees (Adham 2008). The value of the old centre was rediscovered in the late 1990s. Therefore few old houses and neighbourhoods are under conservation and restoration as heritage sites.

Since the 1970s, Doha has been characterised by a large population mix due to external and internal migration (Nagy 2006). Now 90% of Qatar's population lives in Doha, and the majority are a mixture of cultures who come for work temporarily (Rizzo 2014). The flow of migrants challenges the socio-cultural compositions. The ethnography study of Nagy (2006) found that Qataris considered the neighbour's social characteristics more than the dwelling quality. The interviews in Nagy's (2006) research showed two reasons for Qataris' movement from their old homes: 1) people were uncomfortable with the excessive foreigners' occupation in the neighbourhood concerning behaviour and practices, or 2) the government purchased the lands.

The world's largest gas field was discovered in the 1970s in northern Qatar, while liquified natural gas production began in the 1990s. The oil and gas revenue turned Qatar into one of the wealthiest countries (Wadi and Furlan 2017). As a result, an explosive growth of the city, including the building of megaprojects, skyscrapers, malls, gated communities, museums, libraries, sports facilities, artificial lakes and islands (Adham 2008). These were planned to attract tourism, global firms, and highly skilled professionals. Agatino (2014) believe that physical and social segregation resulted from megaprojects. Furthermore, the oversupply of world-class projects increases the affordable housing shortage (Rizzo 2014). Wiedmann and Salama (2019) believe that the current development dynamics resulted in a lack of social integration developments.

The physical characteristics of the neighbourhoods and social formation of Doha city impacted the case study selection criteria and participants' sampling methods of this research -refer to section 4.2-.

#### 1.3. Gaps in Research

Whilst many urban designers and researchers seek to produce socially sustainable neighbourhood design, other built environment professionals overtake the importance of many factors of human life and society. Sociologists argue that non-environmental factors such as shared values, complex social networks, homogeneity, and the demographic characteristics of inhabitants have a greater influence on community wellbeing (Talen 1999). Furthermore, there is no standard design that can be used worldwide to enhance the social quality of a neighbourhood, as people behave differently depending on their cultural background (Cozens and Hillier, 2008). In contrast, others believe that the physical environment facilitates social wellbeing by providing context for casual interaction between inhabitants (Abass et al. 2020). Although previous research found several physical characteristics that impact social wellbeing, the layout was an independent variable (Cozens and Hillier 2008; Ozbil et al. 2011). Dursun and Saglamer (2003) observe that some spaces are shared across cultures but configured differently to suit specific cultural needs. Therefore, it could be argued that built environment design might influence wellbeing, irrespective of the culture and norms of inhabitants. Indeed, there is no empirical evidence indicating a lack of influence of physical context on the social aspects of wellbeing. Many studies have combined socio-demographic factors and neighbourhood qualities when discussing the relationship between social wellbeing and neighbourhood physical context (Abass et al. 2020).

Since the discovery, production, and export of oil and gas, Qatar has gone through tremendous and rapid transformation, both economically and socially (Furlan 2016; Saeed and Furlan 2017; Wadi and Furlan 2017). This construction boom has increased lifestyle-related health and wellbeing issues (Kelishadi et al. 2008) and affected peoples' behaviour (Salama 2016).

Furthermore, international standards and globalisation have changed the spatial form of the residential environment design in Qatar, which has consequently influenced socio-cultural patterns (Al Mohannadi et al. 2019). Additionally, studies on this topic have been Eurocentric (Fuller et al. 1993). The lack of research into the new lifestyle of the native community has created a disconnect between socio-cultural needs, real-world design, and housing supply. This research looks at social wellbeing and the residential built environment design to clarify the relationship between the two in the cultural context of Doha, the capital of Qatar. The findings of this research could potentially serve a wider region with a similar climate and culture to Doha.

This research provides knowledge beyond the neighbourhood scale and fills the gap in the literature on Qatari dwelling design and spatial organisation. Research on family wellbeing is very limited, compared to that on general wellbeing and quality of life (Wollny et al. 2010). The few previous studies on the Qatari community have been descriptive or limited to questions of socio-economic status (Sobh and Belk 2011) and were conducted by researchers from different social-cultural backgrounds (Nagy 2006; Salama 2016). However, this research was conducted by a local researcher, giving advantages and access to data along with reducing misinterpretation probability. Furthermore, This research expands on the existing literature by considering the Qatari cultural context to investigate the impact of neighbourhood and dwelling spatial organisation and spatial use on the social wellbeing of residents.

#### 1.4. Research aims and questions

This research investigates the influence of the residential built environment on social wellbeing in the cultural context of Doha. This study identifies the relationship between aspects of the Qatari residential built environment design and social wellbeing outcomes through a conceptual model of theory that measures this relationship. To serve this purpose, three research questions were posed. These are as follows:

1. Do designs of the residential environment result in different spatial qualities and distinctive social behaviours?

- 2. How does the layout of the residential environment influence inhabitants' social wellbeing in the social context of Doha?
- 3. How does the pattern of use of spaces in the residential environment influence the inhabitants' social wellbeing in the context of Doha?

The research aim, questions, and methods are illustrated in Figure 1.2. These are further linked to the methods and chapters of each research question.



Figure 1.2 Research diagram

#### 1.5. Scope and limitation

This research investigates the impact of the residential built environment design on the social wellbeing of the inhabitants. The study is limited to the cultural context of Doha city, with its Middle Eastern culture and climatic region. The residential built environment in this research consists of open spaces, streets, squares, gardens, and facilities such as shops in a walkable neighbourhood and the private dwellings. The neighbourhood boundaries are the physical boundaries that may prevent use and therefore reduce social activities. Hence, the administrative definition of the neighbourhood was avoided whilst selecting and defining the neighbourhoods for consideration in this study.

In this research, 'wellbeing' is defined from the social and cultural perspective. As there are different levels of social capital (Lochner et al. 1999), this research focuses on community social wellbeing, which concerns daily social interactions between neighbours and family members. Social policies are beyond the scope of this research, as they are classified as country-level social capital. The methods used in this research respected the local values, with multi-methods used to describe the social behaviour of the inhabitants, without the use of photography.

#### 1.6. Overview of chapters

#### 1.6.1. Chapter 2: Defining and measuring wellbeing

An extensive literature review was conducted to define 'wellbeing' by unpacking its definitions and meanings from many different disciples and theories, as well as the overlapping terminologies. This chapter starts with an overview and brief definitions of the overlapping concepts. It then focuses on the social aspects of wellbeing and the various methods used to measure inhabitants' wellbeing status. These measures are critically reviewed to identify suitable ways of examining the social wellbeing of inhabitants in the context of Doha.

#### 1.6.2. Chapter 3: Defining and measuring the built environment

This chapter defines the residential physical environment and its boundaries, using various research theories. The two scales used in this research (that is, the neighbourhood and the dwelling scale) are explored, with consideration of their definitions and their design features that influence the social wellbeing of residents. In addition, there is an exploration of the methods used in previous studies to evaluate the quality of the residential built environment on those two scales. Based on the findings of the literature review, this chapter concludes by presenting a set of indicators used to measure the built environment in this research.

#### 1.6.3. Chapter 4: Methodology

This chapter describes and provides justifications for the research methods and data collection tools used in this study. It also outlines the selection criteria for the case study neighbourhoods. This research used multi-methods to achieve a comprehensive overview of the relationship between the built environment design and the social wellbeing of inhabitants. The methods are described in detail, and these include questionnaires, open-ended interviews, behavioural observations, built environment mapping, and space syntax modelling. There is then a discussion of the data analysis methods (statistical, thematic, and spatial).

#### 1.6.4. Chapter 5: Case studies and fieldwork data

This chapter answers the first research question: namely, "Do different residential environment designs result in different spatial qualities and distinctive social behaviours?". The chapter describes the different physical qualities of the various neighbourhood designs and illustrates the associated variation in the social behaviour of the residential environment users. This chapter also provides a description of the general contextual social and built environment data gathered from the case studies. It then briefly describes the design features and land uses of the case study neighbourhoods.

#### 1.6.5. Chapter 6: Residential layout and social wellbeing

This analytical chapter addresses the second research question: namely, "How does the residential environment layout influence inhabitants' social wellbeing in the social context of Doha?" To answer this question, the residential environment layouts were modelled and

analysed using space syntax. The analysis resulted in spatial quality data, which could be compared to the social data collected by questionnaires, interviews, and observations.

#### 1.6.6. Chapter 7: Pattern of space use and social wellbeing

This analytical chapter addresses the third research question: namely, "How do spatial uses in the residential environment influence the inhabitants' social wellbeing in the context of Doha?" To answer this question, the physical qualities of separate residential spaces were associated with the social data collected by questionnaires, interviews, and observations.

#### 1.6.7. Chapter 8: Designing for community's social wellbeing

The final chapter discusses the findings of the research and places them in the broader context. It also identifies the contributions of this work and makes recommendation for the residential construction field. This chapter concludes the research highlighting the limitations of this study and proposing further studies on the relationship between wellbeing and the built environment

# Chapter 2 Defining and measuring wellbeing

### 2. Defining and measuring wellbeing

#### 2.1. Introduction

Wellbeing has a substantial impact on various aspects of life. For the community, overall wellbeing is associated with physical health, mental functioning, social capital, material living conditions, and other quality of life (QOL) variables (Allin and Hand 2014). The physical advantages of wellbeing for individuals reduce health costs for governments (lvković *et al.* 2014). It is believed that social and environmental conditions are associated with medical problems such as cardiovascular disease, diabetes, asthma, and various chronic conditions (Barton 2009). In addition, the psychosocial benefits of wellbeing are seen in increased social capital and cooperation, more frequent pro-social behaviour, and an increases in social relationships and networks (Biswas-Diener *et al.* 2015). Wellbeing variables also correlate with population safety and security (Karuppannan and Sivam 2011; Farahani 2016; Morgan and Boxall 2020).

At the national level, wellbeing assesses the government performance (Allin and Hand 2014). Wellbeing is an essential variable of a sustainable community; and Mouratidis (2017a) suggests that measures of wellbeing should be used in public policy formation. Furthermore, national economic growth is related to wellbeing due to improved individual and population performance and productivity at work and increased liveability and happiness (Cummins *et al.* 2009; Bakar *et al.* 2015; Biswas-Diener *et al.* 2015)

The intention of this chapter is to define 'wellbeing' in the context of the study. Wellbeing is a multidisciplinary subject; thus, this chapter briefly explains wellbeing from various perspectives and clarifies the overlap with other concepts in the literature on the residential built-environment context. This chapter identifies the factors that impact social wellbeing in the residential built environment and reviews various methods of measuring social wellbeing to select an appropriate measure for the unique cultural context of Doha.

#### 2.2. Wellbeing definitions

The literature explores the multidimensionality, complexity, and instability of wellbeing (Forgeard et al. 2011). There is no universally agreed-upon definition of wellbeing – nor a methodology for researching the subject – due to the concept's subjective character (Teghe and Rendell 2005; Alatartseva and Barysheva 2015; Anderson et al. 2021). 'Wellbeing' is defined in the Oxford English Dictionary as, 'The state of being or doing well in life; happy, healthy, or prosperous condition; moral or physical welfare (of a person or community)'. Philosophers describe wellbeing as intrinsically, ultimately, or non-instrumentally beneficial to a person for their own purpose (Margolis et al. 2020). Many studies use the World Health Organization (WHO) definition of wellbeing: 'The state of complete physical, mental and social wellbeing and not merely the absence of disease or infirmity'. Dodge et al. (2012) observe that the definitions used in some studies consist of lists of wellbeing components, rather than meanings as such; and they suggest a state of equilibrium between available resources and challenges that an individual encounters as a comprehensive and straightforward definition (Dodge et al. 2012). This definition developed by Dodge et al. is very broad, and the 'state of equilibrium' can be applied to several study areas alongside wellbeing. Other definitions are more specific and include contextual elements of wellbeing, such as that proposed by Bakar et al. (2015): Wellbeing is a positive physical, social and mental state which stems from a host of collective goods and relations with people and places'. Concepts of wellbeing, QOL, liveability, life satisfaction, happiness, and sustainability are usually associated with one another (Davis and Fine-Davis 1991; Kamp et al. 2003; Dodge et al. 2012; Teghe and Rendell 2005; Wollny et al. 2010; Leung et al. 2011). The following paragraphs briefly discuss these concepts, highlighting the overlap between them and noting the inconsistent use by researchers.

The WHO-QOL group defines QOL broadly as 'an individual's perception of his/her position in life in the context of the culture and value systems in which he/she lives and about his/her goals, expectation, standards and concerns'. Das (2008) further divides QOL into categories of *subjective* and *objective*. The external, tangible conditions of life – including the quality of the physical environment – are described as 'objective QOL',

whilst individuals' evaluations of their objective living situations are represented via subjective indicators. Diener (2006) disagrees with this, arguing that QOL is objective and that wellbeing, as a concept, is subjective. Furthermore, it is argued that QOL is not an accurate reflection of users' wellbeing, which requires consideration of social capital (Das 2008). Wadi and Furlan (2017) propose that QOL depends on inhabitants' sociological and psychological wellbeing, while Das (2008) claims that 'subjective wellbeing' comes under the heading of 'objective QOL'. For Therfilou (2013), 'objective life conditions' are categorised under 'wellbeing', although QOL is limited to subjective life assessments. Subjective indicators of QOL are based primarily on psychological responses, such as life satisfaction and happiness (Das 2008).

- The concept of 'life satisfaction' appears in many wellbeing studies and measures. Life satisfaction has various definitions, though most researchers define it as a person's evaluation of their life as a whole (Diener 2006). Theofilou (2013) expands this to include satisfaction with one's current, past, and future life and the desire to change one's life. Felce and Perry (1995) highlight several links between life satisfaction and QOL. They note that personal satisfaction can result from one's living conditions or personal satisfaction is a long-term measure, providing a more stable assessment (Helliwell and Putnam 2004b). Keyes (2016) argues that wellbeing correlates with life satisfaction, as indicators of happiness and dysphoria. Some studies say that life satisfaction is a subsection of wellbeing, specifically emotional wellbeing (Diener 2006; Montford 2015; Mouratidis 2017).
- 'Happiness' is discussed in many studies of psychological wellbeing (Ryff 1989). Burton (2014) defines happiness as an adequate achievement of every dimension of the Gross National Happiness Index, which is based on a wellbeing assessment. According to a definition provided by Diener (2006), happiness can mean a positive mood, life satisfaction evaluation, and a good life. Leung *et al.* (2011) use 'happiness', 'life

satisfaction', and 'wellbeing' interchangeably. Happiness is influenced by external factors such as income, employment, community, governance, values, religion, and personal features (e.g., mental and physical health, family experiences, education, gender, and age) (Leung *et al.*, 2011). However, Leung *et al.* (2011) conclude that social capital is the critical predictor of happiness. Happiness is not wellbeing, but its measures can be incorporated into a broader framework to better understand a nation's wellbeing (Allin and Hand 2014).

The International Union for Conservation of Nature (IUCN) defines sustainability as 'development that improves the quality of human life whilst living within the carrying capacity of supporting ecosystems' (Kamp et al. 2003). Flores *et al.* (2000) define it as 'long-term liveability'. Sustainability is a future-oriented notion, whilst wellbeing is present-oriented (Neumayer 2004; Bakar *et al.* 2015). Being a present-oriented concept, wellbeing measures neglect questions of inequity, climate change, natural resource shortages, and so on (Bakar *et al.* 2015). In other studies, wellbeing has been considered the fourth component of sustainability – alongside the economy, the environment, and society (Karuppannan and Sivam 2011). Kostas (2017) argues that subjective wellbeing is an element of social sustainability that can be used for sustainable development design.



Figure 2.1. The relationship between these concepts and terminologies (Source: author)

From these debates, it is evident that these concepts overlap substantially, making it difficult to distinguish between them. Researchers have various opinions about the type, scale, and nature of the concepts. A general understanding of the relationships between them is provided in Figure 2.1, but the literature does not strictly differentiate between them.

#### 2.3. Wellbeing domains

Historically, there are two traditions in the study of wellbeing: the hedonic approach (which is concerned with happiness, positive affect, low negative affect, and life satisfaction) and the eudaimonic approach (good psychological functioning and human growth) (Dodge *et al.* 2012; Allin and Hand 2014; Alatartseva and Barysheva 2015; Steemers 2015). The hedonic and eudaimonic approaches are components of subjective wellbeing (Margolis *et al.* 2020), while Western and Tomaszewski (2016) suggest that objective wellbeing is represented by the elements of a 'good life'. The Organisation for Economic Co-operation and Development (OECD) defines two pillars of wellbeing levels over time (OECD 2011). In their literature review, Felce and Perry (1995) observe that four types of wellbeing have been distinguished: physical, material, social, and emotional. Material wellbeing includes wealth and income. Allin and Hand (2014) summarise the domains of wellbeing as physical, material, social, development and

activity, and emotional wellbeing. Kruger (2011) proposes five types of wellbeing: career, social, financial, physical, and community. Although psychological wellbeing is not among these categories, many researchers have investigated aspects of psychological and emotional wellbeing (Evans 2003; Miles et al. 2011; Mitchell 2012; White et al. 2013; Mitchell et al. 2015). From a psychological point of view, Seligman (2018) argues that the elements of wellbeing are positive emotion, engagement, relationships, meaning, and accomplishment. Notably, this view includes emotional and social aspects but excludes physical health. Researchers have stated that it is difficult to distinguish between different types of wellbeing, and domains of wellbeing correlate with one another (Allin and Hand 2014; Margolis et al. 2020). Various studies have confirmed that wealth and gross domestic product alone are not sufficient for wellbeing (Teghe and Rendell 2005; Allin 2014). Other studies have shown that people can have high levels of subjective wellbeing, regardless of their objective wellbeing (Western and Tomaszewski 2016). Teghe and Rendell (2005) note that wellbeing is subjective and commonly measured against a set of societal standards, which indicates the importance of social factors to overall wellbeing. At the same time, social wellbeing bridges and impacts other categories of wellbeing (Van Lente et al. 2012). The following section introduces social wellbeing as a focus of this research, providing a definition and describing its scales, variables, and influencing factors.

#### 2.4. Social wellbeing: definition and scales

Keyes (2016) defines social wellbeing as satisfaction with one's situation and involvement in society, arguing that it correlates with other indicators of life satisfaction, happiness, and dysphoria. In the study of Kruger (2011), inhabitants defined social wellbeing as having access to an attractive setting, social offerings, and the acceptance of different cultures. Putnam (2000) states that social wellbeing is characterised by 'features of social organisation such as networks, norms, and social trust that facilitate coordination and cooperation for mutual benefit'. Social capital is a concept widely used in social wellbeing studies. Menon *et al.* (2015) define it as the characteristics of social life that allow people to work together more effectively to achieve

common goals. Social capital – alongside other forms of capital – is considered a sustaining element of wellbeing (OECD 2011).

There are two kinds of social capital: bonding and bridging (Helliwell and Putnam 2004b). People from the same social categories (e.g., ethnicity, age, social class) share bonding social capital, whilst people from different categories experience bridging social capital. Accordingly, there is no single definition of social capital, and scholars define it based on its nature and the research context (Claridge 2004). Muzayanah *et al.* (2020) state that scales of social capital are debated. For Lochner *et al.* (1999), there is national-scale, community-scale, and family-scale social wellbeing. National-scale social capital is concerned with economic policies, whilst neighbourhood social capital concerns daily interactions between neighbours (Lochner *et al.* 1999). In addition, as Wollny *et al.* (2010) note, little attention has been given to family-scale social wellbeing. Previous social wellbeing studies have focused on European communities (Fuller *et al.* 1993).

Social capital can be established in different spatial contexts (e.g., residential units, neighbourhood communities, and between work colleagues) and it can exist in non-spatial contexts (e.g., between virtual community members; Helliwell and Putnam 2004a). However, some researchers have suggested that virtual communities tend to emerge from or be related to physical contexts (Farahani 2016). Small and Adler (2019) state that the correlation between distance and social interaction remains strong, notwithstanding the availability of low-cost virtual communication. This research investigates the residential context and therefore the following sub-sections (section 2.4.1 and 2.4.2) discuss the notions of 'community' and 'household' and their relationship to wellbeing, before moving onto variables of social wellbeing in section 2.5.

#### 2.4.1. Defining community-scale social wellbeing

Place, mutual ties, and social interaction are integral to many definitions of community, suggesting three types of community: one of place, one of interest, and one of occupation (Farahani 2016). Traditionally, the community of interest is the local community. However, in recent years, physical context has become increasingly less central to definitions of the
community (Lochner *et al.* 1999). In contemporary societies, many social relationships are created beyond neighbourhood boundaries, and the significance of neighbourhoods as social spaces has become debatable (Lochner *et al.* 1999). Today, people can join the place-less (virtual) communities that suit their interests (Farahani 2016). Studies have explored whether physical surroundings can influence the social aspects of a community (Talen 1999), while it is claimed that virtual communities have been created to maintain place-based communities (Farahani 2016). Sociologists conclude that the decline in the sense of community is due to a reduction in social interaction, as well as weaknesses in the design of the neighbourhood's physical environment (Farahani 2016).

# 2.4.2. Defining household-scale social wellbeing

It has been said that 'those living within the same household are considered as a family unit' (Wollny et al. 2010). Usually, definitions of 'household' concern the physical context, whilst definitions of 'family' refer to kinship relationships and blood ties (Mughal 2015). Other definitions describe the family in terms of a 'legal relationship', 'biological connections', 'emotional bonds', 'households', 'economic units', 'health insurance unit', and 'caring for children' (Wollny et al. 2010). Family wellbeing is similar to individual wellbeing and has several domains – such as the psychological, physical, social, and economic (Wollny et al. 2010). Some family studies have used objective data available from the census and concerning income, education, work, housing, and health (Cotterell et al. 2008). Menon et al. (2015) report that family-unit wellbeing is a matter of bonding social capital, as wealth and education do not impact the level of happiness within the family. Wollny et al. (2010) define family wellbeing as the fulfilment of functions and needs. Kostas (2017) suggests that subjective wellbeing is affected by time spent with one's family members and the enjoyment of marriages and romantic relationships. The Islamic religion emphasises social relationships between family members, as the family unit is the building block of society (Mortada 2003). The Qur'an and the prophet Muhammad identify family members' duties to one another as sustaining family cohesion and ties (Mortada 2003).

# 2.5. Social wellbeing variables

Wellbeing is the result of interactions between many variables (Teghe and Rendell 2005). The variables of social wellbeing depend on the definition applied and the scope of the particular study. From a sociological point of view, Keyes (2016) suggests that social integration, acceptance, contribution, actualisation, and coherence are dimensions of social wellbeing. Teghe and Rendell (2005) propose that self-acceptance and actualisation are related to psychological wellbeing; whilst it is argued that social integration and cohesion are promoted by qualities of the physical environment (Keyes 1998). Jansen (1952) argues that social interaction, unity, coherence, integration, and solidarity are interlinked. Koo et al. (2016) note that components of social wellbeing are personal, relational, and societal. Accordingly, collective family wellbeing depends on the wellbeing of individual members, family relationships, and outside economic and social influences (Wollny et al. 2010). High social wellbeing correlates with overall life satisfaction, strong social contacts, and a functioning community (Koo et al. 2016). Cohen et al. (2000) add that social wellbeing requires activities and resources. Unity and social cohesion are maintained in the family by regular gatherings, such as eating together to provide opportunities for conversation (Valentine 1999). Others have argued that social capital comes from social networks and social support (Lochner et al. 1999), while some studies have claimed that social wellbeing is achieved through social interaction, trust, mutual understanding, and shared values and behaviours (Claridge 2004; Abass et al. 2020). Hommerich and Tiefenbach (2018) indicate that variables of social wellbeing require mediating factors to exert an influence. The following section (section 2.6) introduces some of the influencing factors that impact social wellbeing.

#### 2.6. Factors that impact social wellbeing

Several demographic variables have been found to have a direct and robust effect on subjective wellbeing. These include gender, age, health status, social status, personal factors, culture, and

population homogeneity (Talen 1999; Williams 2006; Cozens and Hillier 2008; Koo et al. 2016). Whilst Claridge (2004) argues that there is a weak understanding of the relationship between gender and social capital, the OECD (2011) reports significant differences in social wellbeing along the lines of age and gender. Helliwell and Putnam (2004b) also found that health is a crucial variable with a significant impact on social wellbeing as unwell people tend to socialise less than healthy people. The social elements of health listed by Canadian Health include the physical environment, as well as other demographic, material, and social factors (Bowra and Mashford-Pringle 2021). Differences in social status were also found to impact social wellbeing. Cummins *et al.* (2009) conclude that people who live with a family member (e.g., a partner and children) tend to have higher subjective wellbeing.

Further studies have identified employment status, socio-economic status, religious faith, and trust as influencing factors of social wellbeing (Helliwell and Putnam 2004b). Alatartseva and Barysheva (2015) cite education, income, stability, condition of residence, social and natural environment, and safety and security as objective wellbeing indicators. However, the focus on wealth and income as an indicator of wellbeing has been replaced by concern with other nontangible goals, such as work achievements, sense of belonging, and health (Davis and Fine-Davis 1991; Forgeard *et al.* 2011). This movement toward social indicators is in response to a single-minded focus on economic security (Kamp *et al.* 2003). These interfering variables were considered when selecting case studies and collecting and analysing the data for the current research (see chapter 4).

Good planning can improve inhabitants' wellbeing by enhancing street liveability, safety, social communication, and cohesion (Barton 2009). Sociologists argue that education level promotes social wellbeing and indirectly determines residential environment quality (Keyes 2016). At the same time, neighbourhood quality promotes residential stability, which drives community cohesion and social solidarity (Ross et al. 2000; Hudson et al. 2007). Based on the findings of their literature review, Teghe and Rendell (2005) emphasise the importance of the residential context as an influencing factor on wellbeing. The importance of the residential built environment lies in its role in connecting residents with the surrounding social and functional world (Marans 1976). Stemeers (2015) highlights a limitation of dwelling-scale wellbeing

studies, arguing that good design plans for moments of interaction and behavioural opportunities (Dempsey 2009). Saleh (1997) claims that social interaction, safety, and security are the primary elements of social wellbeing, and these are successfully addressed by the physical design of the Islamic neighbourhood. In the socio-anthropological research conducted by Ismail (1993), the findings show that changes in the urban form of Doha's neighbourhoods resulted in superficial and shallow relationships between inhabitants. Relationships of interest and caution replaced relationships of affection, trust, and social solidarity. Furlan (2016) argues that modern neighbourhood planning in Doha has neglected the need for *liveability*. Kostas (2017) claims that social wellbeing in the residential context can be influenced by social capital, sense of community, neighbours' ties, and social interaction. This discussion has highlighted the impact of the built environment on inhabitants' social wellbeing, and Chapter 3 reviews some specific elements of the built environment that contribute to this impact.

# 2.7. Measuring social wellbeing

A comprehensive measurement of wellbeing requires consideration of complex interacting variables that affect individuals and communities in a cultural setting (Claridge 2004; Teghe and Rendell 2005). Allin and Hand (2014) believe that any measure of wellbeing depends on its definition, and Wollny *et al.* (2010) note that there is no well-established method. Furthermore, it is believed that there is no direct measure of social capital, leaving researchers to rely on proxies or indicators of social capital outcomes (Claridge 2004). For example, indicators of family wellbeing include individual wellbeing, family resources and needs, quality of relationships, and social and cultural context (Wollny *et al.* 2010).

Although Davis and Fine-Davis (1991) show that subjective indicators are more valuable than objective measures for studying wellbeing, a combination of the two provides a unique opportunity to link reported objective features with perceptual and affective reactions in the same people (Forgeard *et al.* 2011; Ivković *et al.* 2014). Claridge (2004) notes that indicators concern behaviour or expectations: behavioural expressions are objective, as activities can be recorded and reported, whilst expectations are subject to interpretation.

Some studies used large-scale survey data, such as the WHO 100 Survey, the European Social Survey's Personal and Social Well-Being Module (Forgeard *et al.* 2011). Wollny *et al.* (2010) list various government surveys that can be used to extract wellbeing data, including the Millennium Study of Poverty and Social Exclusion, the Family Resources Survey, and the British Household Panel Survey. Other national wellbeing measurements concern society and the environment, as well as the economic aspects highlighted by the OECD, the Human Development Index, and – in France – the Commission on the Measurement of Economic Performance and Social Progress (Allin 2014). Menon *et al.* (2015) used data collected by the Italian International Centre of Family Studies to conduct computer-assisted telephone interviews assessing several aspects of family wellbeing.

Wellbeing has been measured in smaller-scale studies using other methods such as interviews (Ochieng 2011; Aryani and Wahyuningsih 2015; Menon *et al.* 2015; Anderson *et al.* 2021); questionnaires (Fuller *et al.* 1993; Abu-Ghazzeh 1999; Wood *et al.* 2012; Abass *et al.* 2020); behavioural observations (Dawson 2006; Raman 2010; Karuppannan and Sivam 2011; Brown and Lombard 2014; Aryani and Wahyuningsih 2015; Poortinga *et al.* 2017); photography (Aryani and Wahyuningsih 2015; suggest that the most common method of measuring wellbeing is to take a snapshot of indicators at one time – or at several moments – and in one place.

# 2.7.1. Wellbeing indicators

Based on the discussion in section 2.5, social cohesion and social integration were selected as indicators to assess social wellbeing, due to their association with the built environment (Figure 2.2). Privacy was also included, as it is considered crucial in the investigated community (Sobh and Belk 2011; Al Mohannadi *et al.* 2019). These indicators are reviewed and defined below.



Figure 2.2. Measures of social wellbeing in the community and household scales (Source: author)

#### Social cohesion

Berman and Phillips (2004) argue that social wellbeing relies on social cohesion, which acts as the glue of society. Social cohesion is defined as different populations from diverse backgrounds – cultural, religious, and ethnic – living together in a neighbourhood (Hudson *et al.* 2007). Previous studies have defined 'social cohesion' as solidarity, connectedness, and the absence of conflict (Kawachi and Berkman 2000). Social cohesion indicators are place-based, and Stafford *et al.* (2003) found that trust, place attachment, social support, and respect were suitable for to study social cohesion in English and Scottish neighbourhoods. Other researchers have argued that social cohesion leads to social solidarity and shared identity (Kawachi and Berkman 2000; Berman and Phillips 2004). The Islamic religion stresses social solidarity between neighbours and advises mutual visits, social support, and generosity (Mortada 2003). Social interaction, social networks, and social support are subsets of social cohesion and determinants of social capital (Kawachi and Berkman 2000; Hudson *et al.* 2007). Friedkin (2004) concludes that high-density social networks and ties result in social cohesion. To this, Berman and Phillips (2004) add the factors of social relations, norms, values, trust, and identity.

Social cohesion is usually examined with questionnaire surveys. Previous studies have investigated social cohesion by asking about the likelihood of asking a neighbour for help with a moral or material matter and the willingness to cooperate for the benefit of the neighbourhood (Stafford *et al.* 2003; Cramm *et al.* 2013). Brissette *et al.* (2000) propose the Welin Activity Scale to collect data on social activity engagement, distinguishing between social activities, home activities, and outside home activity. In contrast, other indicators – such as norms and values – are measured less directly, usually through involvement in voluntary work (Berman and Phillips 2004).

#### Social integration

Social integration concerns a person's involvement in a wide range of social relationships (Cohen *et al.* 2000). Others define it as a feeling of belonging and of shared values with one's neighbours (Keyes 2016). According to a definition provided by Brissette *et al.* (2000), social integration is social interaction between individuals. Berkman and Glass (2000) observe that researchers tend to use 'social networks', 'social support', 'social ties', and 'social integration' loosely and interchangeably. Appau *et al.* (2019) measured social integration using the frequency of interaction, belonging, length of residence, and trust; while Cohen *et al.* (2000) list four categories of social integration measures: role-based, social participation, perceived integration, and a complex indicator that combines all three types. A role-based measure involves counting a participant's active relationships to investigate the size of their social network. Social participation measures are employed to examine the frequency of participant engagement in various social activities.

The variables of social status, opportunities to meet people, number of friends, and frequency of visits have been used to measure the level of social interaction (Karuppannan and Sivam 2011; Mouratidis 2018a). However, multiple methods can be used to understand social integration patterns and context (Cohen *et al.* 2000). Montford (2013) captured social interaction using surveys, interviews, and 'cognitive mapping'. Keyes (2016) conducted telephone interviews to investigate social integration, using 'perceived neighbourhood safety' and 'trust' as indicators of social integration.

#### Social interaction

Different definitions of social interaction are found in different study contexts. In social psychology, social interaction is described as a natural behaviour that depends on culture,

norms, and past social experiences (Argyle 2017). In the residential context, Smith *et al.* (1969) define 'family interaction' as more than one household member sharing a space – a definition that does not necessitate any shared activity between people. In comparison, Raman (2005) defines social interaction as:

'all verbal and nonverbal communication with neighbours that are [*sic*] social and cordial in nature as well as spatially located within their neighbourhoods. This includes visible non-verbal gestures such as the smiles and winks by which one acknowledges the recognition of a neighbour'.

It is argued that social interaction can be quantified according to time spent socialising (Smith *et al.* 1969; Menon *et al.* 2015; Mouratidis 2017a). Additionally, frequency and type of interaction (positive and negative) are commonly recorded in social interaction surveys (Bossard 1951; Fuller *et al.* 1993; OECD 2011; Brown and Lombard 2014). In addition, interviews, observations, and footage are qualitative methods used to collect social interaction data (Aryani and Wahyuningsih 2015). Eissa *et al.* (2015) used walking tour assessments and behavioural observations to collect social interaction data in a public urban setting.

Dawson (2006) recorded spatial use and social activities in a longitudinal study of random unplanned observational visits by participants. De Lauwe (1961) suggests the need for experiments that investigate social life within dwellings. Few studies in the European context have used observations of selected dwellings to collect social data (De Lauwe 1961). A description of daily spatial-usage patterns is a method of obtaining information about the inner life that is difficult to gather using other methods (Smith 1971). This kind of analysis can reveal whether isolation is an issue for family members. In addition to social data, spatial data are included in the description of daily spatial-usage patterns. One study (Jansen 1952) measured family solidarity using eight measures: agreement, cooperation, concern, enjoyment, affection, admiration, interest, and trust between family members. All were found to be almost equal in terms of usefulness as indicators of family solidarity (Jansen 1952). In this study, the participants were asked to rate their families' social lives. Unlike other methods, this did not include objective measures of space use, number of occupiers, number of contact hours, etc.

Social network

A social network is a group of nodes and ties, where nodes can be individuals, families, and organisations (Cohen *et al.* 2000). Berman and Phillips (2004) define the social network as an indicator of social cohesion, which is a critical aspect of the definition of social capital. There are various types of social network – horizontal, vertical, and cross-cutting (bounding and bridging; Berman and Phillips 2004). Stafford *et al.* (2003) categorise social networks as family ties, friend ties, formally organised associations, and integration into the wider community. Sociologists argue that social networks increase sense of safety, as they result in lower crime rates (Helliwell and Putnam 2004a; Badland *et al.* 2017). Equally, the strength of social networks has been linked to QOL and found to promote social support (Allin and Hand 2014). Social support as an indicator of enhanced social wellbeing is discussed in the following section.

Network analyses can be conducted to investigate 'outside-in', using large-scale questionnaire data, whilst an 'inside-out' network analysis employs qualitative methods (Bridge 2002; Mouratidis 2018a). A questions about the number of close relationships that a participant has in their neighbourhood can be asked to measure social networks. The network can then be analysed based on the number of nodes, which indicates the size of their network and thus the participant's level of social integration (Cohen *et al.* 2000). Other studies examined integration within the network based on the distance between social network members (Stafford *et al.* 2003). 'Social network listing' is a method used to estimate network density and to relate this to health outcomes: this involves listing friends and family with whom the participant communicates at least twice a month, which indicates mutual relationships between the groups (Cohen *et al.* 2000). This method has been applied differently in various studies. Social networks are represented in the form of matrices or sociograms (Cohen *et al.* 2000).

# Social support

Social support is a component of social capital and is strongly related to social networks (Mortada 2003; Montford 2013). Mouratidis (2017a) argues that the level of social support depends on the number of close relationships and the frequency of visits. Social support is delivered by the participant's social network in different forms, categorised as either received or perceived (Cohen *et al.* 2000). Tardy (1985) states that social support moves in two directions

(i.e., support received and support given), whilst most research has focused on the receipt of support. Support can be emotional, involving the expression of feelings and discussions. Instrumental support includes childcare or the lending and borrowing of tools, whilst informational support can be providing advice, companionship (engaging in activities together), and validation. The ability to ask neighbours for help and support characterises a socially cohesive community (Cramm *et al.* 2013). Bertha (2011) investigated the effects of neighbourhood social networks on wellbeing. The findings confirm that living near one's extended family members or within an ethnic group helps to reduce stress, encourages people to interact with one another, and prevents isolation and loneliness. Although the research did not quantify 'proximity', people living in these circumstances report receiving emotional and material support, including with household maintenance and childcare (Ochieng 2011).

Typically, participants are asked in questionnaire surveys and interviews about their perceived and received social support. Pearson (1986) lists several survey tools used to assess social support, including the social support scale, the Norbeck social support questionnaire, and the personal resource questionnaire. Perceived social support is concerned with the availability of social support, whilst received social support is about the frequency with which social support is received (Cohen *et al.* 2000). Some ethnographic scholars have used open-ended interviews, with questions on intervening factors such as demographic information, health status, and lifestyle (Rossi and Weber 1996; Hartig and Lawrence 2003; Lawrence 2005; Ochieng 2011).

#### Privacy

The complexity of privacy in the residential context is due to the relationships between people and changes in economic and social circumstances (Scarth 1964). McDougall and Hansson (2002) reviewed and compared definitions of 'privacy' in western and Chinese communities, concluding that, in all societies, privacy includes a sense of shame or modesty around matters of sex and elimination. In European society, privacy revolves around the idea of self-ownership and thresholds (McDougall and Hansson 2002). There are different types of privacy: visual, physical, and acoustical (Mortada 2003). Visual privacy is defined by Al-Kodmany (1999) as the ability to practise one's daily activities without being exposed to strangers. The regulation of

access to the dwelling and interaction between neighbours and the family are considered a matter of physical privacy (Smith 1971).

Smith *et al.* (1969) suggests three scales of privacy: personal, group members, and family. Privacy need is influenced by the household's cultural and socio-economic background (Smith *et al.* 1969; Mughal 2015). For instance, the Islamic religion emphasises gender segregation to maximise privacy (Mortada 2003). In Greek society, privacy at home is necessary for women, though Nevett (1994) criticises studies that claim Greek culture excludes women from public life.

Al-Kodmany (1999) observes that there are levels of privacy. Psychological comfort indicates a balance between the privacy *required* and that *achieved*. A poor level of privacy (i.e., less than the required amount) is 'crowding'. Social isolation and loneliness result from exceeding the required amount of privacy (Smith et al. 1969; Al-Kodmany 1999). Privacy status is usually traced by inviting participants to respond to questionnaires or interviews on their experiences of personal and household privacy (Smith *et al.* 1969; Sobh and Belk 2011; Tomah *et al.* 2016). In a comparison study of traditional and modern neighbourhoods, Al-Kodmany (1999) investigated visual privacy through interviews concerning architectural elements such as windows, fences, and courtyards. The interviewees were thus able to discuss their respective levels of privacy and their feelings in their own words .

# 2.8. Conclusion

This chapter explained the importance of social wellbeing and individual satisfaction for the sustainability and liveability of a city. This research investigated social wellbeing on two scales: community social wellbeing and household social wellbeing. A community of high social wellbeing is a cohesive social network, with shared values and mutual trust, which enjoys integration and social support. Household social wellbeing is defined as positive interaction and the absence of conflict between family members, visitors, and servants within the dwelling limits. Social wellbeing was measured in terms of cohesion, integration, interaction, networks,

and support. Privacy was also added to this list of indicators, due to its value in the culture and norms of the Qatari community.

Social wellbeing indicators are interlinked and correlate with one another, as shown in this chapter. Below is a list of the social wellbeing indicators and variables to be used in this research, with some highlighted as dominant in the scale:

- Social cohesion:
  - o Belonging
  - o Sense of community
- Social integration
  - Number of relationships
  - o Social interaction
- Social interaction
  - o Time spent socialising
  - Frequency and type of interaction
- Social network
  - Number of contacts
  - o Social relationship strength
- Social support
  - o Social network
  - o Emotional and material support
  - o Providing advice
- Privacy
  - o Personal privacy
  - o Family privacy

Other intervening variables such as demographic characteristics, health, and residency duration were also considered in this research.

Based on the findings of the discussion in section 2.6, the residential context was chosen as the mediating factor in this research, as there has been little previous investigation of this area, particularly in the cultural context of Doha. Chapter 3 reviews the elements of the residential built-environment that have been found to impact social wellbeing.

Regarding measures and methods, the use of a multi-methods design ensures data reliability. The data were collected using three approaches to enable confidence in the findings. The quantitative data on social wellbeing were collected using questionnaires and observational surveys for broad comparative analysis across case studies. The qualitative data were collected from interviews, enabling an in-depth understanding of the built environment's impact on social wellbeing in Doha. Chapter 4 discusses the research methods and provides justification for the choices.

Chapter 3

# Defining and measuring the built environment

# 3. Defining and measuring the built environment

# 3.1. Introduction

Chapter 2 presented the importance of the built environment as a contributor to social wellbeing. Researchers have highlighted that the residential environment has a more significant influence than other uses, due to the time spent within and around this space. This chapter discusses the residential environment's scales, characteristics, and measuring methods to identify the indicators and potential ways of measuring, mapping, and analysing the physical features of the neighbourhood and its dwellings.

# 3.2. Defining the built environment

In general, the built environment is all planned, man-made environments – including softscape – that make up a settlement (Barton 2009). Consequently, the residential environment is defined as the part of the built environment that has residential and non-residential use and facilitates the daily needs of its inhabitants (Földi 2006). Bhonsle and Adane (2013) define the residential environment as a physical and social space occupied by a population group as residents.

The urban residential environment contains several scales or bundles of the residential environment within the wider built environment (Menchik 1972; Xiaoyu et al. 2007; Burton et al. 2011). It is argued that the residential environment comprises three dimensions: the dwelling, the neighbourhood, and the neighbours (Földi 2006). Just two of these dimensions are physical, whilst neighbours are considered the social scale of the residential environment. Bonaiuto (2004) and Garau and Pavan (2018) subdivide the residential environment into the neighbourhood, buildings, and houses. Buildings and houses represent different typologies of the dwellings scale or use. This research investigates the physical dimensions of the residential environment (neighbourhoods and dwellings), and these are reviewed below.

#### 3.2.1. Neighbourhood as the meso-scale of the residential environment

The neighbourhood concept is dynamic, meaning it is continually disassembled and reassembled in the literature, according to the field and focus of the study (Kallus and Law-Yone 2000; Stafford *et al.* 2003; Spielman and Yoo 2009).

It is argued that limiting the definition of the 'neighbourhood' to the physical environment helps to prevent confusion across disciplines (Farahani 2016). Lee (1968) claims that it is essential not to neglect the neighbourhood's physical factors and focus only on the social aspects. In line with this, Song and Knaap (2004) describe the neighbourhood as the building block of the urban structure. In contrast, Bonaiuto and Alves (2012) define the 'neighbourhood' as an intermediate environmental scale that combines the private and the public. Farahani (2016) describes the neighbourhood as 'the physical place – blocks, streets, and organisation in a city – rather than a set of nodes in a network'.

Other definitions emphasise the social aspect of the neighbourhood. Finlay *et al.* (2019) propose that the neighbourhood is where social and physical environments converge. The neighbourhood is defined by Garau and Pavan (2018) as a small independent area of dwellings with a mix of uses, home to inhabitants who are familiar with their immediate environment through their lifestyles and social and economic attitudes. Finlay *et al.* (2019) define it as a place in which people live, work, entertain, and receive care. However, this definition does not consider the transportation that facilitates living, working, and entertaining beyond the neighbourhood boundary.

The conclusions of previous studies depend heavily on the neighbourhood's spatial boundaries and size (Duncan *et al.* 2014). The boundaries of the neighbourhood can be physical or social. Physical boundaries can be natural or man-made barriers. A physical boundary can be based on participant home range or on streets as edges that substitute the administrative boundaries (Bhonsle and Adane 2013). Duncan *et al.* (2014) mark these boundaries using the notion of the 'egocentric neighbourhood', which begins with the participant's location and draws a buffer or limits around them. The buffer can be defined by a fixed circular distance or a street distance. Large-scale investigations that use administrative zoning or census scale are generally criticised

for their low inhabitant heterogeneity (Farrell *et al.* 2004). Wickes *et al.* (2019) suggest that social interaction is limited by physical boundaries (e.g., high-speed streets, waterways, railways) that fragment a neighbourhood.

Conversely, a neighbourhood boundary can be defined by residents using social parameters, such as a sense of community (Jenks and Dempsey 2007). Additional customisation may include individual characteristics and personal experiences that influence the inhabitants' definitions of neighbourhood boundaries (Sastry *et al.* 2002; Spielman and Yoo 2009).

Traditionally, neighbourhoods were classified based on inhabitants' ethnicity, class, wealth, business, and religion (York *et al.* 2010). Researchers describe this phenomenon as 'discriminatory segregation' and promote the social benefits of heterogenic neighbourhoods (York *et al.* 2010). The most common classifications of modern neighbourhoods are urban, suburban, and rural, as noted by Feijten *et al.* (2008). Wandl *et al.* (2014) claim that population density-based classification overlooks the in-between urban settings.

Another classification is based on street network design (Han *et al.* 2020). Rifaat *et al.* (2012) argue that a grid layout was common in the past for its safety, speed, and reliability when moving from one place to another. The curvilinear layouts were developed after World War II under the 'garden city' movement, primarily in the suburbs. This layout includes several forms, such as loops, cul-de-sacs, and lollipops or 'lollipops on a stick' (Rifaat *et al.* 2012). The change from the grid layout to a curvilinear layout occurred with the shift from city centre to suburban locations (Han *et al.* 2020).

# 3.2.2. Dwellings as the micro-scale of the residential environment

'Home', 'house', 'dwelling', and 'residence' are various names – albeit with differences in meaning – for the places in which people live. A dwelling is a sub-section of the larger system of the residential environment (Coolen 2006). 'Dwelling' is a general term that describes the physical structure in which people live, and this can include slums, huts, cabins, and tents (Coolen and Meesters 2012). Hartig and Lawrence (2003) argue that the terms 'residence',

'home', and 'dwelling' include not only the housing unit and the activities conducted within it but also the surroundings of these.

Whilst a 'house' is a physical structure that is lived in, Coolen and Meesters (2012) note that not every dwelling is a house, as a 'house' is a certain western-style dwelling. Lawrence and Hartig (2003) argue that 'housing' is different from a 'residence', as the former refers only to shelter or lodging, while a 'residence' is a place (usually a house) and the term refers to the fact and act of residing within that place.

'Home' commonly describes a place of birth, a motherland, where one lives, where a person is coming from, or where a person is going (Dekkers 2011). Dekkers (2011) observes that 'home' is linked to various concepts of origins, house, environment, family, dwelling, intimacy, privacy, protection, security, comfort, sacredness, and paradise. Home is related to people's relationships with the physical space (Coolen and Meesters 2012; Al Mohannadi *et al.* 2019). Dekkers (2011) shows that the literature of 'home' contains metaphors for the positive feelings associated with being at home and with psychological and bodily wellbeing.

In this research, 'dwelling' is used in relation to the micro-scale residential environment, as it is subjective and includes various typologies. The following section describes typologies of dwellings.

Variation in dwelling typology concerns the features of the space (Coolen 2006). In an investigation of dwelling typology and fear of crime, Rollwagen (2014) used the number of floors in a dwelling to categorise typology. In his research, the high-rise dwellings were defined as those with five or more floors, whilst low-rise dwellings had fewer than five floors. In a study of satisfaction and privacy, Day (2000) classified dwellings into attached dwellings (townhouses) and detached dwellings. The English Housing Survey Housing Stock Report lists several dwelling typologies, including terraced houses, semi-detached houses, detached houses, bungalows, flats, core and clustered accommodation, and shared/unshared dwellings (Department of Communities and Local Government 2016). The Ministry of Development Planning and Statistics lists nine types of dwellings in Qatar: palace/villa, public house/popular house/ elderly house,

additional building, apartment, separate room, part of a building/establishment, and beach house/other (Ministry of Development Planning and Statistics 2015). The characteristics of these different typologies are discussed further in the following section.

# 3.3. Characteristics of the residential environment

The characteristics of the residential environment are categorised as spatial features (architecture and urban planning), human and social features, functional features, and contextual features (Bonaiuto 2004). Das (2008) relates the quality of the physical environment to subjective and objective QOL elements (Figure 3.1). The physical characteristics of the residential environment refer to the objective components of the physical environment such as the built environment form and layout (Menchik 1972; Song and Knaap 2004; Burton et al. 2011; Rezvani et al. 2013; Chan et al. 2019; Muzayanah et al. 2020), whereas the social and contextual features are described as 'perceived characteristics' (Fernández et al. 2003; Bonaiuto 2004; Dempsey 2009; Leyden et al. 2011; Adams 2013; Rezvani et al. 2013; Townshend 2014; Farahani 2016; Mouratidis 2018b). Few studies have combined physical and perceived characteristics (Bhonsle and Adane 2013; Rezvani *et al.* 2013), but it is believed that they interrelate to facilitate daily life (Földi 2006).



Figure 3.1. The relationship between quality of life (QOL) and physical environment (Source: Das 2008)

#### 3.4. Characteristics of the perceived environment

The 'perceived' characteristics of the residential environment are also referred to as 'subjective' characteristics (Rezvani *et al.* 2013). They consist of range of elements, such as noise (Adams 2013; Bhonsle and Adane 2013; Rezvani et al. 2013; Mouratidis 2018b; Mouratidis 2020); safety (Shields and Wooden 2003; Bhonsle and Adane 2013; Mouratidis 2018b; Chan et al. 2019; Mouratidis 2020); quality (Fernández *et al.* 2003; Dempsey 2009; Townshend 2014; Farahani 2016; Mouratidis 2020); water quality (Rezvani *et al.* 2013); air quality (Adams 2013); cleanliness (Rezvani *et al.* 2013; Mouratidis 2020); aesthetics (Bhonsle and Adane 2013; Mouratidis 2018b; Chan et al. 2018b; Chan et al. 2019; Muzayanah et al. 2020; Ministry of Housing Communities and Local Government 2021); maintenance (Dempsey 2009; Leyden *et al.* 2011; Rezvani *et al.* 2013; Townshend 2014; Farahani 2016; Chan *et al.* 2019); materials and details, such as doors, windows, porches, lighting, colour, and texture (Burton *et al.* 2011; Ministry of Housing Communities and Local Government 2021); street and traffic conditions (Adams 2013; Rezvani *et al.* 2013); sidewalk condition (Burton *et al.* 2011; Chan *et al.* 2019); convenience (Bhonsle and Adane 2013); and mobility (Fernández *et al.* 2003).

Some studies have included social dimensions amongst the perceived neighbourhood characteristics, such as community development activities (Bhonsle and Adane 2013); life satisfaction elements (Shields and Wooden 2003); social network and social integration (Fernández *et al.* 2003); and social composition (Menchik 1972b).

Fernández *et al.* (2003) included perceived characteristics in their dwelling-scale investigation, such as privacy, home functionality, level of home adaptation, personalisation of home, living space satisfaction, and building and space satisfaction. Furthermore, satisfaction with housing condition and quality of building (Fernández *et al.* 2003; Das 2008; Lawrence 2012; Rezvani *et al.* 2013); acoustics and light quality (Hartig and Lawrence 2003; Miles *et al.* 2011; Lawrence 2012; Cooper 2014); natural views (Lawrence 2012; Cooper 2014); and indoor air quality (Lawrence 2012; Cooper 2014) were deemed 'perceived elements' of the residential environment.

# 3.5. Characteristics of the physical environment

The physical characteristic of the built environment include spatial features and functional features. The spatial elements include the layout of the residential environment (Song and Knaap 2004; Burton *et al.* 2011; Muzayanah *et al.* 2020; Ministry of Housing Communities and Local Government 2021); connectivity (Bonaiuto 2004; Burton *et al.* 2011; Muzayanah *et al.* 2020); the built environment form (Bonaiuto 2004; Burton *et al.* 2011; Bhonsle and Adane 2013; Ministry of Housing Communities and Local Government 2021); density (Bonaiuto 2004; Song and Knaap 2004; Burton *et al.* 2011; Muzayanah *et al.* 2020); location (Burton *et al.* 2011; Ministry of Housing Communities and Local Government 2021); dwelling features, such as type and form (Menchik 1972; Burton *et al.* 2011; Bhonsle and Adane 2013; Ministry 074; Das 2008; Burton *et al.* 2011; Bhonsle and Adane 2013; Communities and Local Government 2021); dwelling features, such as type and form (Menchik 1972; Burton *et al.* 2011; Bhonsle and Adane 2013; Ministry of Housing Communities 2014; Bhonsle and Adane 2013; Ministry 074; Das 2008; Burton *et al.* 2011; Bhonsle and Adane 2013; Ministry of Housing Communities 2014; Bhonsle and Adane 2013; Ministry 074; Das 2008; Burton *et al.* 2011; Bhonsle and Adane 2013; Ministry 074; Bonaiuto 2004; Das 2008; Burton *et al.* 2011; Bhonsle and Adane 2013; Ministry 074; Bonaiuto 2004; Das 2008; Burton *et al.* 2011; Bhonsle and Adane 2013; Ministry 074; Bonaiuto 2004; Das 2008; Burton *et al.* 2011; Bhonsle and Adane 2013; Ministry 074; Bonaiuto 2004; Das 2008; Burton *et al.* 2011; Bhonsle and Adane 2013; Ministry 074; Bonaiuto 2004; Das 2008; Burton *et al.* 2011; Bhonsle and Adane 2013; Ministry 074; Bonaiuto 2004; Das 2008; Burton *et al.* 2011; Bhonsle and Adane 2013; Ministry 074; Bonaiuto 2004; Das 2008; Burton *et al.* 2011; Bhonsle and Adane 2013; Ministry 074; Bonaiuto 2004; Das 2008; Burton *et al.* 2011; Bhonsle and Adane 2013; Ministry 074; Bhonsle 2014; Bhonsle and Adane 2013; Ministry 074; Bhonsle

The functional characteristics of the residential environment include the availability of services and facilities (Menchik 1972; Bonaiuto 2004; Das 2008; Bhonsle and Adane 2013; Rezvani et al. 2013; Muzayanah et al. 2020) such as leisure facilities (Das 2008; Burton *et al.* 2011; Muzayanah *et al.* 2020) and transportation and accessibility (Handy and Clifton 2001; Bonaiuto 2004; Song and Knaap 2004; Das 2008).

The residential environment layout is an independent variable that impacts inhabitants' behaviour (Cozens and Hillier 2008; Ozbil *et al.* 2011). Furthermore, the layout is responsible for generating other spaces with various uses in between residential units (Biddulph 2007). Different uses within the neighbourhood is an essential element of QOL and social wellbeing (Raman 2010; Ozbil *et al.* 2011). Moreover, few empirical studies have considered the impact of multi-physical attributes of the residential environment on community social wellbeing. Therefore, this research studies' layout' and 'spatial-use' and discusses their impact on social wellbeing.

#### 3.5.1. Residential environment layout

Researchers have investigated layout using different names: 'street network', 'circulation system', 'street pattern', 'grain', 'urban plan', 'spatial organisation', and 'spatial configuration'. The Ministry of Housing Communities and Local Government (2021) defines 'layout' as the arrangement of routes and development blocks and their relationships, which produce streets, and open spaces. Small and Adler (2019) use 'spatial configuration' to describe the segmentation of space created through the arrangement of pathways and barriers.

#### Residential environment layout typologies

There are two major types of neighbourhood layout, distinguished by the 'street connectivity' they provide – these are grid and tree networks (Han *et al.* 2020). Ancient settlements in Europe used a square grid layout, and this is still used in modern urban patterns, but growing populations have led to the evolution of contemporary layouts such as cul-de-sacs, loops, and lollipop patterns (Háznagy and Fi 2016). Therefore, street network layouts now differ according to their location, with grid networks in city centres and tree networks in the suburbs (Han *et al.* 2020). Contemporary layouts have a clear street hierarchy that distinguishes inner streets and boundary streets (Stangl and Guinn 2011). It is claimed that the hierarchy of street width and landmarks facilitate space legibility (Ministry of Housing Communities and Local Government 2021) and pedestrian movement distribution (Ozbil *et al.* 2011). In contrast, Saleh (1997) argues that modern building regulations and neighbourhood design have marginalised the neighbourhood's social dimensions. Contemporary neighbourhood layouts are designed for vehicular use (Stangl and Guinn 2011), and the lengthy, confusing, curved streets and discontinuity with local services discourage pedestrian movement (Grammenos *et al.* 2002), increase pollution, and decrease sense of community (Song and Knaap 2004).

As for dwelling layout typologies, Rapoport (1969) argues that socio-cultural factors are the primary influencing factor. These socio-cultural factors include religious belief, household structure, social organisation, and social relations (Rapoport 1969; Dursun and Saglamer 2003). Hillier and Hanson (1989) also add inhabitants' lifestyles to the factors that impact spatial

configuration. For example, some cultures arrange dwelling spaces according to their functions (i.e., backstage and frontstage activities), whilst others organise the spaces based on the gender or age of the users (Smith 1971).

Thus far, it has been shown that dwelling layout is not stable, as incremental physical changes reflect inhabitants' social changes (family life stages) (Aryani and Wahyuningsih 2015; Mughal 2015; Pinard 2016). Muslims refer to prophet Muhammad's advice to his friend, who complained about overcrowding, that he should not leave his extended family dwelling but rather extend the dwelling space vertically (Mortada 2003). Dynamic changes in the domestic space make socio-spatial relationship analysis a challenging task (Mughal 2015). While Lawrence and Low (1990) claim that spatial layout is a direct expression of household organisation, it does not predict inhabitants' behaviour (Diaz 2017). The residential environment allows a variety of possibilities, and manipulation (spatial and social reshaping) depends on the cultural background of the inhabitants (Rapoport 1969; Diaz 2017). Pearson and Richards (2003) agree that inhabitants give the space a purpose and then act upon this.

#### Residential environment layout impact on social wellbeing

Previous studies of layout typologies have focused on connectivity, hierarchy, and layout structure (Han *et al.* 2020); legibility (Stangl and Guinn 2011; Ministry of Housing Communities and Local Government 2021); and proximity (Small and Adler 2019) as common qualities of residential environments. This section discusses the impact of residential environment layout on inhabitants' social wellbeing.

#### Social interaction

A socio-anthropological study conducted in the 1990s found that inhabitants of Doha's new neighbourhood layouts were dissatisfied with them and their impact on their social life:

[The] new houses are far from each other. The width of the [old] streets was not enough for two [people], but now the streets are big. Before, people [built] next to each other, so they [saw] and visit[ed] each other. Now, [...] the houses are far apart [and...] communication [has] reduced and [...] telephone calls [have] replaced visits (Ismail 1993).

On the city scale, layouts that creates a firm physical separation between the neighbourhood and the city, which has been found to cause isolation and prevent contact (Abu-Ghazzeh 1999). However, on the neighbourhood scale, Grammenos et al. (2002) and Stangl and Guinn (2011) suggest that grid layout is legible and provides connectivity, as in a traditional American suburban city. Cul-de-sac and loop layouts maintain safety, enhance social wellbeing, and are efficient for transportation and land development (Grammenos et al. 2002). Dependence on cars is common in suburban neighbourhoods, which reduces the sense of community (Rogers and Sukolratanametee 2009). However, a suburban study of neighbourhood layout design in Australia found no link with sense of community and attachment, while layout design combined with tree coverage and the availability of open space did impact social interaction (Abass et al. 2020). Karuppannan and Sivam (2011) found that social interaction in a medium-density cul-desac neighbourhood was higher than in a low-density grid neighbourhood, due to the presence of a common entrance. Farrell et al. (2004) claim that the proximity of dwellings' entrances affects sense of community. Proximity is defined by Small and Adler (2019) as the distance (number of feet, blocks, miles) between two nodes. Furthermore, proximity correlates with social interaction, with higher levels of interaction associated with more compact designs that promote physical and visual connectivity (Raman 2010; Muzayanah et al. 2020). Physical proximity promotes daily interaction and consequently influences sense of community, due to a common interest in the physical surroundings (Farahani 2016). Proximity depends on factors such as spatial composition, which ensure fixed places for social meetings (Small and Adler 2019). Some studies argue that a grid layout facilitates greater proximity than cul-de-sac layout (Abass *et al.* 2020). The effect of proximity on relationships can be traced in the Qatari proverb: 'Al-bad an al ayni baid an alqalbi', translated as 'out of sight out of mind'. Social and physical proximity enhance social interaction (Raman 2010). Proximity also impacts wellbeing in other ways, including psychologically and emotionally (Small and Adler 2019).

According to Smith (1971), spatial arrangement and the proximity of spaces in the dwelling level impact family social interaction. In the same vein, the conditions of connectedness and separation depend on household preferences (Smith *et al.* 1969). Others have highlighted that different residential-building typologies have distinct influences on the inhabitants' interactions and feelings of loneliness (Evans 2003; Lawrence 2005; Montford 2013; Montford 2015). Others argue that participation in family activities reduces physical distance but may not reduce social distance, though mutual satisfaction enhances the ties between inhabitants (Jansen 1952). Smith (1971) is more concerned with territories, and he suggests that family activities and social interaction must consider 'territory' to prevent conflict or the disturbance of privacy. It has been argued that family interaction and privacy depends on the spatial arrangement, family lifestyle, and lifecycles (Smith 1971).

#### Privacy

A well-connected space promotes a healthy social life; whilst a deep, single-access space enables control and privacy (Pinard 2016). The capacity to control contact with others has been found to facilitate positive social psychological processes (Hartig and Lawrence 2003; Lawrence 2012). A broader perspective has been adopted by many authors who argue that people need to enjoy their privacy – in addition to their social interactions – and physical spatial arrangements and planning uses can regulate and satisfy both needs (Smith et al. 1969; Hanson 1999; Butterworth 2000; Tomah et al. 2016). Jackson (2003) found that residents preferred the privacy offered by cul-de-sac and loop neighbourhoods, whilst reporting a greater sense of community and neighbour friendliness in grid neighbourhoods. Mortada (2003) points out that the traditional Islamic neighbourhood layout prioritises dwelling privacy, with close clusters and variations in street width.

The literature on dwelling privacy (visual, physical, and acoustic) has focused on special arrangements, zoning, the managing of openings, and thick walls to ensure privacy (Mortada 2003). Jackson (2003) claims that on-street housing in grid layouts threatens privacy. This view is supported by Burton (2014), who recommends a gradual transition from public to private

spaces. Private amenities – such as gardens and balconies – are said to provide privacy by separating the living area and the public spaces (Montford 2015; Ministry of Housing Communities and Local Government 2021). Mughal (2015) points out that inner and outer dwelling separation boundaries impact privacy levels and are maintained through culture, norms, and other intervening demographic characteristics. Additionally, the inward-looking structure of traditional Islamic dwellings has been found to satisfy social requirements for privacy (Nevett 1994). However, Hanson (1999b) suggests that the force of the institutional control system today restricts cultural representation in the dwelling layout.

#### Safety

The existing literature on sense of safety is extensive and focuses on 'layout legibility', which refers to the perceived quality of the neighbourhood, intelligibility, visual connectivity, and pedestrian movement (Mahdzar et al. 2019). Burton et al. (2011) found that adults' perceived safety was higher in curvilinear looped layouts than in distorted grid layouts. This view is supported by Mahdzar et al. (2019), who conclude that a visually coherent environment promotes safety by encouraging interaction among neighbours and between passing by inhabitants. Similarly, Muzayanah et al. (2020) found that street connectivity impacted bridging trust and social networks in the Indonesian context. Well-connected streets are more accessible and record less crime, due to their higher number of users (Mahdzar et al. 2019). Likewise, Burton (2014) explains that maintaining street surveillance through pedestrian movement increases the sense of safety and security. In the same vein, Ozbil et al. (2011) note that neighbourhood layout is the key independent variable in population movement. Other researchers, however, report an inconsistent and contradictory relationship between layout type and sense of safety; indeed, it has been found that social behaviours in a single layout differ depending on the inhabitants' cultural background (Cozens and Hillier 2008). A broader perspective is adopted by Jackson (2003), who argues that urban configurations that facilitate informal contact also reduce crime, provide better places for children, and report greater inhabitant satisfaction.

Much of the current literature on residential layout integration value pays particular attention to spatial-use location (Ozbil *et al.* 2011; Ministry of Housing Communities and Local Government 2021). Inhabitants' movement is a goal of sustainable urban forms and is influenced by mixed land-use and neighbourhood layout (Hillier *et al.* 1993; Jabareen 2006).

#### 3.5.2. Residential environment communal space

Researchers have investigated the question of residential environment spatial use under different names: 'land mix-use', 'communal spaces', 'public space', 'third space', and 'fixed space'. The Ministry of Housing Communities and Local Government (2021) defines communal space as public space used as a setting for most inhabitant movements. Communal space includes streets and squares designed as multi-purpose and multi-user. Small and Adler (2019) refer to communal spaces as 'fixed spaces' and define them as sites for unplanned social and direct interaction. Finlay *et al.* (2019) identify communal space as a 'third space' with a wide range of uses, in which people can meet beyond home and work. Third spaces have a substantial impact on social interaction, social support, social network, sense of community, and belonging (Finlay *et al.* 2019). The mixed uses include the local services, facilities, and functions available in the neighbourhood, supporting the daily lives of inhabitants (Földi 2006; Ministry of Housing Communities and Local Government 2021). The Ministry of Housing Communities and Local Government 2021). The Ministry of Housing Communities and Local Government stages of life.

#### Residential environment communal space typologies

A number of authors have considered how combining residential use with a variety of services and facilities can promote a sustainable environment (Hillier *et al.* 1993; Földi 2006; Jabareen 2006; Ministry of Housing Communities and Local Government 2021). Wickes *et al.* (2019) categorised spatial-use typologies into four groups. These are shown in Table **3.1**, along with the nature of the interactions that occur within the space and the types of interactions. Wickes *et al.* (2019) claim that collective community identity and social cohesion differ, as some inhabitants who use the space have no interest in its social role.

Type of land use	Nature of interaction	Type of interaction	Example
Anchoring sites	Scheduled and routinised opportunities for copresence	Frequent interactions between a regular group of users	Schools, libraries, health clubs
Local exposure sites	Unscheduled	Frequent interaction which encourages acquaintanceship ties between regular users	Park
Scheduled conduits sites	Scheduled activities for different users	Unplanned interaction between same users	Train stations, Cinemas
extra-local exposure sites	Unscheduled and sporadic interaction	Sporadic interaction with diverse users	Shopping mall

Table 3.1. Wickes et al. (2019) categorisation of communal spaces

On the dwelling scale, different uses are grouped according to the physical or social characteristics of the space. For example, in a comparative study of English and Australian dwellings, Lawrence (1981) categorises spatial use into clean and dirty, front and back, public and private, and day and night. Rosselin (1999) emphasises the neutral zone or threshold (such as the entrance hall) and its essential role in separating private and public spaces. Cieraad (2006) used time-based zoning and age-based zoning to describe different spatial uses in relation to the space users. Furthermore, Cieraad (2017) suggests that domestic spatial uses can be zoned based on gender. The impact of common space on inhabitants' social wellbeing is discussed in the following section.

# Impact of spatial use on inhabitants' social wellbeing

As noted by Finlay *et al.* (2019), communal spaces are associated with QOL, health, and wellbeing. The academic literature on the impact of communal space on social wellbeing

examines 1) the characteristics of the neighbourhood's layout design, as well as its functions and the user's proximity to them (Williams 2006; Montford 2013; Wickes et al. 2019) and 2) the location, accessibility, and visibility of the communal space (Abu-Ghazzeh 1999; Williams 2006; Karuppannan and Sivam 2011; Francis et al. 2012; Cooper 2014). It is argued that street syntactic accessibility influences land-use mix, as some uses – such as retail – benefit from high levels of pedestrian movement (Ozbil et al. 2011), while short and direct routes encourage short distance walking (Ozbil et al. 2011; Stevenson et al. 2016). Other researchers point out that integrating public gathering spaces into the street fabric enhances inhabitants' copresence at different times and for various purposes that facilitate constant street monitoring (Brown and Lombard 2014; Wickes et al. 2019; Ministry of Housing Communities and Local Government 2021). It is claimed that communal spaces are a critical motivator for frequent and spontaneous social interaction between inhabitants (Jackson 2003b; Francis et al. 2012; Mouratidis 2018a), which found to subsequently increases place attachment (Zhu and Fu 2017) and lead to social support (Finlay et al. 2019). It is argued that living in close proximity to a communal space results in denser social networks (Small and Adler 2019). Additionally, Francis et al. (2012) found that the social interaction that results from a mix of land use enhances community cohesion and, therefore, creates a stronger sense of safety. However, social cohesion may be negatively affected if the neighbourhood includes communal spaces that attract large numbers of strangers, as this can reduce local interaction between inhabitants (Wickes et al. 2019).

However, spatial-use impact cannot be generalised, as Muzayanah *et al.* (2020) found no correlation between mixed-use density and social capital variables in Indonesian metropolitan cities. Historically, in Middle Eastern culture, the mosque has been a critical communal space (Mortada 2003). The mosque has been used as a multi-purpose space that unifies and strengthens relationships and facilitates conflict resolution (Mortada 2003). However, recent literature on land use has failed to emphasise the role of the mosque as a critical social space in the residential environmental context.

Spatial use and its impact on inhabitants' social wellbeing on the dwelling scale has not been sufficiently explored. This may be because domestic spaces and their locations are not fixed or universal, as different societies highlight certain spaces over others (Smith 1971). Circulation

spaces have been found to be good for social interaction, therefore they should be designed as enjoyable spaces rather than functional spaces (Wheeler *et al.* 2016). Smith (1971) claims that social interaction is not limited to a specific use; rather, it occurs due to the copresence of inhabitants. This copresence can be accidental or planned, depending on the spatial use typology (Smith 1971). For example, preparing food and eating together in the kitchen positively impacts the family's social interaction and strengthens bonds (Talen 1999; Wheeler et al. 2016), whereas social behaviours are discouraged by the television while inhabitants are eating in the living room (Wheeler *et al.* 2016). Smith (1971) claims that an open-plan dwelling layout supports the integration of the housewife and facilitates surveillance of the children and interaction with family members while cooking. However, the kitchen has traditionally been considered a workplace, with entry thus restricted, which left the housewife isolated from other family members (Smith 1971). Therefore, it can be concluded that spaces cannot predict identical behaviour, as space use may vary upon the inhabitants' cultural background.

# 3.6. Physical-environment characteristics measuring methods

#### *3.6.1.* Layout measuring methods

As seen in section 3.5.1, layout characteristics in terms of connectivity, proximity, legibility, spatial arrangement, and depth impacted various aspects of inhabitants' social wellbeing. This section discusses the methods used in previous studies to measure, record, and analyse layout features.

Layout connectivity is considered a critical feature of layout design, and many methods of measurement have been proposed. Mouratidis (2017a) examined neighbourhood connectivity to the city by measuring the distance between the neighbourhood centroid and the city centre. This method is relatively simple, but it gives only a general sense of neighbourhood connectivity. Ozbil *et al.* (2011) used the average attributes of street networks – such as density of street junction per area, block size per area, cul-de-sacs per road mile or per area – to measure neighbourhood layout connectivity. Similarly, Song and Knaap (2004) measured street

connectivity by counting intersections and cul-de-sacs, the ratio of blocks and housing units, and the median length of the cul-de-sac. Other researchers specified the street network attribute count to square mile (Stangl and Guinn 2011). This approach is called 'LEED-ND', and it has been criticised as it examines limited areas size (Stangl and Guinn 2011).

To explore dwelling-level connectivity, some studies have used the spatial index for family interaction (Bossard 1951). This is a mathematical method that divides the number of potential interactions within the dwelling by the available living space (Bossard 1951). Some studies specify eight square metres per inhabitant as the threshold for positive interaction (De Lauwe 1961). It has been found that dwellings that do not satisfy the floorspace threshold – and are thus considered 'overcrowded' – create tension between family members, especially between adults and children (De Lauwe 1961; Cooper 2014). However, Smith *et al.* (1969) suggest that the relationship between space and interaction is more complicated than Bossard (1951) suggests, indicating that other factors should be considered – such as lifestyle, family cycle, and other spatial characteristics. Qualitative methods (e.g., interviews) have invited participants to explain the socio-physical reality of this issue, resulting in a body of research on in-depth residential ethnography (Bonaiuto 2004).

To analyse residential environment layouts, recent studies have used computational tools such as space syntax (Dursun and Saglamer 2003; Raman 2010; Wiedmann *et al.* 2013; Al-Jokhadar and Jabi 2017) and geographic information system (GIS; Raman 2010; Ozbil *et al.* 2011). Space syntax is a set of techniques for analysing spatial configurations of all kinds, especially where the spatial configuration is a significant aspect of human affairs – as it is in buildings and cities (Hillier and Hanson 1989). The space syntax method is more objective because it considers the layout type, as well as measuring various other spatial indicators such as integration and choice (Al-Jokhadar and Jabi 2017). Ozbil *et al.* (2011) explain that space syntax entails assessing the accessibility of all sections of a network from the perspective of each individual roadway element. Hillier *et al.* (1993) confirm that space syntax is able to calculate integration value, which is a vital measure for the mean depth of every element in the system. However, to clarify subjective matters such as the need for privacy of women and the family, Nevett (1994) used spatial data and archaeological materials to find the rationale behind the spatial configuration.

Rezvani *et al.* (2013) show that subjective methods result in more valuable feedback. While spaces such as the courtyard may be found around the world, the local culture determines the order of the spaces and their value (Dursun and Saglamer 2003).

'Proximity' concerns the closeness of two objects' influence areas, marking an imaginary zone around the object (Brennan and Martin 2012). The intersection of the two objects' zones marks proximity, the object zone depends on the object type (Brennan and Martin 2012). Proximity has been measured in previous studies using indirect and general proxies such as adjacency and copresence in a built environment. Small and Adler (2019) claim that counting the number of units separating pairs is more common than actual distance measurement. In contrast, other researchers have combined spatial and social proximity to investigate crime in the residential environment (Kelling *et al.* 2021).

Residential environment safety has been found to correlate with layout connectivity, network density, and the number of cul-de-sacs (Han *et al.* 2020). Mahdzar *et al.* (2019) measured safety with a layout-legibility correlation test using space syntax. They found that well-connected and integrated streets lead to a legible network that is highly rated for safety. Other studies have measured safety and security using the inhabitants' subjective judgements of the neighbourhood (Rezvani *et al.* 2013; Chan *et al.* 2019). Maintenance, cleanliness, and quality are elements of the perceived environment that impact sense of safety (Burton *et al.* 2005).

#### 3.6.2. Communal spaces measuring methods

As seen in section 3.5.2, communal spaces – including indoor and outdoor public spaces – impact various aspects of inhabitants' social wellbeing. Previous authors have measured, recorded, and analysed communal spaces in various ways, and this section discusses the methods used in the residential context.

The questionnaire is one of the most commonly used tools for determining inhabitants' satisfaction with the communal spaces in their residential environment (Fuller *et al.* 1993;

Djebarni and Al-Abed 2000; Qawasmeh 2014; Zhu and Fu 2017; Mahdzar *et al.* 2019). The advantage of the questionnaire is that it facilitates a quick, systematic, and broad understanding of the participants' satisfaction with various indicators (Bonaiuto 2004). However, Dunstan *et al.* (2013) claim that the objective approach of these satisfaction measures means that they are subject to bias, otherwise unhappy participants are likely to evaluate their neighbourhood more negatively. Bhonsle and Adane (2013) identify two approaches to satisfaction assessment: the first uses the choice to move out as a behavioural predictor of satisfaction, and the second uses factors that affect residential satisfaction, such as length of residence, type of tenure, physical characteristics of the dwelling, and social bonds within the neighbourhood (Bhonsle and Adane 2013). Bonaiuto (2004) used two methods to assess residential environment satisfaction – namely, open-ended interviews and questionnaires or checklists.

The use of qualitative methods is well-established in communal-space analysis. One of the bestknown methods of assessing spatial use is to measure the usage within a set boundary. Mouratidis (2017a) and Mouratidis (2020) counted the uses found within a metre-radius of the centre of a neighbourhood and applied an algorithm to ensure normal distribution. To examine the sufficiency of communal spaces quantity in a residential environment, Song and Knaap (2004) measured land-use mix with the ratio of communal space to number of housing units. However, the location of the communal space is as important as the quantity (Ellaway 2014). Therefore, Francis *et al.* (2012) developed a more comprehensive spatial-use assessment method, applying GIS data to investigate the size, quantity, and proximity of public spaces. The same method was used by Van Dillen *et al.* (2011) to assess urban green quantity and quality in the residential environment.

Zhu and Fu (2017) suggest combining questionnaires, interviews, and systematic observation to comprehensively assess communal-space satisfaction. The walkthrough observation method has been used in many previous studies (Ewing *et al.* 2006; Wadi and Furlan 2017). Guided observation methods may be applicable for various residential environments and cultural contexts, as they *describe* rather than *evaluate* the environment (Burton *et al.* 2011). The built environment site survey checklist is an example of an observational checklist developed to explore the impact of regeneration on inhabitants' mental wellbeing (Burton *et al.* 2005). The

checklist concerns objective measures of housing environment characteristics, categorised in four groups: 1) building characteristics, 2) space around the building, 3) accessibility and facilities, and 4) security and safety. Building access, density, building height, dwelling per entrance, and building age are elements described as 'building characteristics'. To assess the space around the building, the surveyor describes the ownership nature of the space – privet or public-, the vegetation, any balconies and private gardens, the permeability and legibility of pedestrian access, and the parking arrangements. The third category includes access to amenities and the availability of playgrounds. Vandalism, graffiti, territorial functioning, and an 'eye on the street' are safety and security measures (Burton *et al.* 2005). The neighbourhood design characteristics checklist (NeDeCC) is a reliable tool for objective assessment, and this includes three scales for the residential context: participant dwelling, immediate neighbourhood (street), and the wider neighbourhood (Burton *et al.* 2011).

Anthropology is one of the best-known tools for assessing dwelling spatial use and family social wellbeing (Cieraad 2006; Mughal 2015). Anthropology has enabled a rich understanding of the studied subject, yet they require longer time for data collection and analyses (Bryman 2016). Tomah *et al.* (2016) assessed the impact of spatial use on family privacy using various methods: floor plan analyses, observations, and in-depth interviews with inhabitants. The floor plan analysis was conducted to distinguish between family, guest, and stranger spaces, whilst the observations involved photography to record the inhabitants' behaviour in relation to privacy in the dwelling. The photographs were used to analyse features of the windows, openings, and doors.

#### 3.7. Conclusion

This chapter argued that the relationship between the built environment and people's behaviour is interactive, as people create environments and are then influenced by their own creations. There have been few studies of the residential environment in Middle Eastern countries, where the used international building guidelines marginalised local cultural needs

and norms. This research investigated two scales of the residential environment: the neighbourhood and the dwelling. Based on a review of existing theories and concepts, this research defines the 'neighbourhood' as public spaces such as streets and communal areas (indoor and outdoor). The boundaries of the neighbourhood depend on 1) the walkable distance (which is affected by weather conditions and physical barriers such as main roads); 2) the homogeneity of the dwelling typologies; and 3) the socio-economic characteristics of the neighbourhood. In this research, a dwelling is a detached building that is owned and occupied by a single-family or extended family.



Figure 3.2. Physical neighbourhood variables and their impact on social wellbeing (Source: author)

The residential environment has physical, perceived, and social characteristics. In this research, layout and spatial use are the physical characteristics used to objectively assess the case-study built environment (Figure 3.2 and Figure 3.3 ). The other characteristics (perceived and social) were used to measure inhabitants' satisfaction with the residential environment. Intervening variables – such as gender, work, social status, and so on – were considered but not extensively investigated, as the research was time-limited.



Figure 3.3 Dwelling design indicators and their impact on social wellbeing (Source: author)

Urban form is a complex element that requires both subjective and objective measurement (Muzayanah *et al.* 2020). Adams (2014) notes that a single measure cannot fully convey the notion of environment quality. Indeed, different residential environment satisfaction evaluations if the same case study may result in different and even opposite results. Therefore it is advised to use both subjective and objective assessment methods (Bonaiuto 2004; Bonaiuto and Alves 2012; Bakar *et al.* 2015). This research adopts a multi-method approach. Its measures and methods include both computational analysis of the residential physical characteristics and fieldwork (e.g., mapping activities) to assess the inhabitants' wellbeing. The methods and tools are described in the following chapter (chapter 4).
## Chapter 4 Methodology

### 4. Methodology

#### 4.1. Introduction

The previous chapters have extensively reviewed the notions of social wellbeing and its indicators (Chapter 2), the residential environment and its physical characteristics (Chapter 3), and the measuring methods used in earlier research. This chapter describes the methodology used here to investigate the influence of the residential environment design on the social wellbeing of the inhabitants. The chapter expands on the framework discussed in the literature review and describes the case-study selection criteria, the development of the tools, and the data-analysis methods.

The nature of the indicators identified in Chapters 2 and 3 suggests the need for both qualitative and quantitative methods. Combining qualitative and quantitative data in a single study is called mixed methods (Hanson et al. 2005). The mixed-methods methodology enriches the results and allows a comprehensive study by integrating data in different stages of the research, such as subjective and objective data (Bonaiuto 2004; Hanson et al. 2005; Bonaiuto and Alves 2012; Rezvani et al. 2013; Bakar et al. 2015; Creswell and Creswell 2018). Furthermore, mixed methods allow data triangulation that strengthens the research design and clarifies the phenomenon of interest (Hanson et al. 2005; de Vries 2020). In addition, mixed methods reduce the research limitation resulting from using one method (Creswell and Creswell 2018).

As for wellbeing and social studies, Bryman (2016) argues that social behaviour alone cannot predict meanings. In other words, data collected using quantitative methods must be combined with qualitative data to reveal the meaning of the observed behaviour. Wellbeing scholars emphasized using subjective and objective data (Bonaiuto 2004; Bonaiuto and Alves 2012; Rezvani et al. 2013; Bakar et al. 2015). This study investigates the influence of the residential built environment on social wellbeing, where case study and mixed methods are combined to fulfil the need for objective and subjective data and to ensure a comprehensive analysis of this unique cultural context. This research follow (Creswell and Creswell 2018) case study mixed method procedure (showed in Figure 4.1) as a reference to develop the research framework presented in this chapter.



Figure 4.1 Case study mixed method framework (source: Creswell and Creswell 2018)



Figure 4.2. Scales and methods used in the research (Source: author)

Figure 4.2 illustrates the source of the primary data collected for this research, using the residential environment scale under investigation. All methods and tools used in this research were approved by the Welsh School of Architecture ethics committee (see Appendix A). A questionnaire and spatial analysis were used to collect quantitative data. They comprise the deductive work of this investigation and produced numeric data. Interviews and behavioural observations were inductive tools used to collect qualitative data. Further descriptions of the tools and methods used can be found in section 4.3.



Figure 4.3. Research framework (Source: author)

The methodology was designed to answer the research questions of this study (see section 1.4). A case-study method was used to compare the spatial use and layout design of different residential environments and to identify their impact on inhabitants' social wellbeing in the cultural context of Doha. The cross-sectional data were collected using several methods, and these are described in more detail in section 4.3. The main research framework comprises several steps, and these are illustrated in Figure 4.3 and described below:

- A literature review was conducted to explore the relevant spatial and social concepts in relation to the built environment and wellbeing theories. The review also identified and critically evaluated methods of mapping and measuring the physical characteristics of the built environment. Furthermore, the literature review identified variables for quantifying wellbeing in dwellings and neighbourhoods contexts.
- 2. Residential neighbourhoods in Doha were identified to investigate the impact of spatial design and use on inhabitants' social wellbeing of inhabitants.
- **3.** Research tools were identified, developed, piloted, and validated in preparation for fieldwork.
- 4. Fieldwork was carried out to collect primary data on the physical attributes of the built environment and social behaviour within the selected neighbourhoods and dwellings.
- 5. Computational spatial analysis was conducted to explore neighbourhood configurations and the dwelling layouts, using space syntax to identify spatial variables for further analysis.
- 6. Data analysis was conducted to produce answers to the sub-questions and by extension the main question in this thesis (see section 1.4).
- **7.** Recommendations and guidelines were developed for architects, urban designers, and planners seeking wellbeing enhancement in residential neighbourhoods in Doha.

#### 4.2. Case-study selection criteria

This research investigates the relationship between the design of the residential environment and inhabitants' social wellbeing in Doha, Qatar. The literature review identified a gap in the knowledge that justified the focus on this city (see section 1.2). Doha city comprises 55 zones, which vary in density, population, and residential-building typologies. Doha metropolitan boundaries were avoided, and Doha city was favoured to control the variables and ensure comparability of locations and cultural variables. The criteria were developed in response to the research question (see section 1.4) and informed by the literature review presented in Chapters 2 and 3. Table 4.1 summarises the zone-shortlisting criteria, neighbourhood-selection criteria, dwelling-scale selection criteria, and participant-sampling methods. The selection criteria and justification are discussed further in the following subsection.

Scale		Se	lection strategy	Jus	stification
	Zone	-	Medium-to-low	-	Doha's housing is dominated by
			residential-building		medium-to-low residential density
			density.		(Planning and Statistics Authority
					2015; Wiedmann and Salama 2019).
				-	Building-permission applications
					predict the proliferation of low-
					density neighbourhoods (Planning
					and Statistics Authority, 2018).
				-	Qatar national masterplan promotes
					medium-to-low density
					neighbourhoods (Ministry
					Municipality of Environment, 2017).
	Neighbourhood	-	Ensure comparable	-	To control variables of location and
			travel distance to the		culture.
			city centre.		
Ð		-	Variety of residential	-	To enable comparative analysis of the
scal			layout design.		influence of different physical-
poo					environment characteristics on
ourh					inhabitants' social wellbeing.
ghbc		-	Public facilities within	-	To ensure equal opportunities for
Nei			walkable distance.		social interaction.

Dwelling scale	Building typology	-	Detached dwellings. Occupied for five years or more with the same inhabitants.	-	It is the predominant dwelling typology in new residential developments in Doha (Planning and Statistics Authority, 2018). Focus on one typology to eliminate major design differences between typologies. To be able to investigate a variety of layout designs within this typology in detail.
Participant	<ul> <li>Survey</li> <li>participants</li> <li>Interview</li> <li>participants</li> </ul>	-	Random inhabitants. Volunteering participants with 5 or more years of residency.	-	To obtain a wide range of responses. To ensure residential stability and sufficient time to interact with neighbours.

Table 4.1. Case-study selection criteria and justification

#### 4.2.1. Neighbourhood-selection criteria

The neighbourhoods were selected on the basis of the conclusions of the literature review concerning the physical characteristics of neighbourhood design that influence inhabitants' social wellbeing (Figure 4.4).



Figure 4.4. Neighbourhood physical factors and the influence on inhabitants' social wellbeing (Source: author)

From a shortlist of 15 neighbourhoods, six neighbourhoods were selected based on the following criteria:

- Layout: Various neighbourhood spatial layouts were included (e.g., gridded, looped, culde-sac).
- Public space: A variety of communal spaces are available within walking distance.
   Walkable distance is defined as 480 metres (a 5-minute walk), based on the climate change strategy for the urban development sector in the state of Qatar (Ministry of Municipality and Environment, 2020).
- Size: The neighbourhoods each comprise between 100 and 200 dwellings. This is to ensure sufficient survey responses for statistical sampling, as well as for mapping social relationships and the networks between inhabitants.
- Boundaries and consistency: The boundary of the neighbourhoods satisfies the requirements of 1) a walkable distance (concerning weather conditions and physical barriers such as main roads), 2) the homogeneity of dwelling typologies, and 3) the socio-economic characteristics of the neighbourhood (see Chapter 2 for discussion of neighbourhood boundaries).

#### Identifying neighbourhoods for study

Desk-based research was conducted to gather secondary data from the Ministry of Development Planning and Statistics, and 15 potential Doha neighbourhoods were identified. Table **4.2** presents details of the residential-building density, with the number of detached dwellings per hectare. Census data were used to calculate the neighbourhoods' estimated residential density, as the available data were calculated per zone. For land use, the national masterplan for Doha was considered during the selection and analysis, and the researcher also referred to online GIS data for the current land use in the neighbourhoods. The neighbourhood shortlisting was finalised after an initial site visit, which is detailed below.

Zone number	Zone name	Zone area (hectare)	Location	Total number of houses*	Zone residential density (dwelling per hectare)	Case- study area** (hectare)	Number of dwelling s	Case-study residential density (dwelling per hectare)
65	Onaiza	210	Ν	1248	5.94	31.03	136	4.38
63	Onaiza	200	Ν	4256	21.28	28.47	129	4.53
64	Lejbailat	140	Ν	616	4.4	26.37	149	5.65
67	Hazem Almarkhiya	420	Ν	1002	2.38	30.33	140	4.61
30	Duhail	680	Ν	1012	1.48	33.49	166	4.95
34	Madinat Khalifa South	260	N	4698	18.06	17.8	153	8.59
47	Al Thumama	330	S	2065	6.25	42.38	203	4.78
44	Nuaija	320	S	2301	7.19	13.2	121	9.16
43	Nuaija	480	S	2726	5.67	16.16	117	7.24
34	Madinat Khalifa South	260	Ν	4698	18.06	13.74	131	9.53
66	Onaiza / Leqtaifiya /	2610	N	1003	2.04	42.20	202	4 70
66	Al Qassar	2610	IN C	/	3.84	42.38	203	4.78
40	New Slata	350	5	2703	1.12	16.47	140	8.50
44	Nuaija	320	S	2301	7.19	18.23	130	7.13
43	Khulaifat	480	S	2726	5.67	13.83	130	9.39
32	Dahl Al Hamam	240	Ν	580	2.41	18.59	117	6.29

Table 4.2. Study sites – size and built-environment density

\* Source: Ministry of Development Planning and Statistics

\*\* Source: Calculated using Google Earth

Residential density was calculated using data from the Ministry of Development Planning and Statistics, Qatar. The ministry categorised the residential densities into five groups 1) low density is 0–1,000 housing units per zone 2) low to medium density is 1,000–2,500 housing units

per zone 3) medium density is 2,500–5,000 housing units per zone 4) medium to high density is 5,000–10,000 housing units per zone 5) high density is 10,000–28,000 housing units per zone. The average zone size is 1047 hectares. In contrast, the Qatar National Master Plan propose five densities concerning the number of persons per hectare: 1) low density is 1-60 persons per hectare, 2) low to medium density is 61-120 persons per hectare, 3) medium density is 121-240 persons per hectare 4) medium to high density is 241-300 persons per hectare 5) high density is 300-360 persons per hectare. Woking Borough Council (2000) illustrates three methods of calculating residential density; the first method uses the number of dwellings per area, the second one concerns population density per area, and the third method is plot ratio which is the gross floorspace per total site area. This research refers to the Ministry of Development Planning and Statistics' method of residential density, which is the number of dwellings per area.

When comparing Doha to a regional city such as Riyadh, the highest density is 41 dwellings per hectare (Ledraa 2015), whereas the highest density in Doha city is 44 dwellings per hectare (Planning and Statistics Authority 2015). In contrast, residential densities significantly vary when comparing cities worldwide. For instance, the highest residential density in Barcelona is 400 dwellings per hectare. Similarly, some cities are exceptionally dense such as Hong Kong, where the residential density is 1250 dwellings per hectare (Towers 2002).

#### Case-study shortlisting

The neighbourhoods were shortlisted following a site visit and assessment of their general physical qualities, including the conditions of the public spaces (parks, sidewalks, and streets), the dominant residential typology, and actual land use. Table **4.3** summarises the neighbourhoods' perceived physical qualities, as considered during the initial site visits. To control the intervening socio-economic variables and focus on physical-design variation, only owner-occupation neighbourhoods built through governmental grants were selected. The majority of the dwellings or land in the selected neighbourhoods had been granted to the inhabitants (national citizens).

cond. Public street pavement House typology Residential use Car parking Mix uses walkway cond lighting feature space Case study Onaiza Х Onaiza Х Lejbailat Hazem Almarkhiya Duhail Х Madinat Khalifa South Al Thumama Х Nuaija Х Nuaija Х Madinat Khalifa South Х Onaiza / Leqtaifiya / Al Qassar Х New Slata Х Nuaija Khulaifat Dahl Al Hamam

Built environment features

Table 4.3. Summary of the findings of the pilot study conducted to identify appropriate case studies

The colour code represents the evaluation of the neighbourhood quality as follows:

- Excellent maintenance: 70%–100% of streets are paved in excellent condition, the sidewalks are tiled, and the public spaces are in very good condition.
- Streetlights are available and working.
- Car parking spaces are available.
- The dominant dwelling typology is detached residential units.

- Good maintenance: 40%–69% of streets are paved, some sidewalks are tiled, and the public spaces are in good condition.
   Some streets have working street lighting and some parking
  - Some streets have working street lighting and some parking spaces.
  - 40%–69% of the properties are detached residential dwellings.
  - Poor maintenance: less than 39% of the streets are paved, sidewalks are not tiled, and the public spaces are in bad condition.
  - There is no street lighting, or it is not working, and there is a lack of parking spaces.
  - Less than 39% of properties are detached residential dwellings.

#### 4.2.2. Dwelling-selection criteria

Of the typologies available in Qatar (section 3.2.2), the detached dwelling typology was selected as the main focus of this research for physical and socio-economic reasons. The physical reasons included 1) the wide layout variation, which allows a better understanding of the impact of different configurations on the social wellbeing of inhabitants, and 2) the percentage of detached dwellings and the proposed national masterplan for Doha city, which indicate the dominance of and preference for low-density neighbourhoods and detached dwellings (Ministry of Development Planning and Statistics – Qatar, 2017). Detached dwellings were also found to be the preferred typology of the native population of Doha. As for the socio-economic factors, owner-occupied detached dwellings 1) have a longer tenure, which ensures sufficient time for the evolution of social relationships within the neighbourhood (Lawrence 2005) 2) studying single typology eliminate the impact of affordability variation.

#### 4.2.3. Selection of participants

This study used two methods to reach participants. The first was random participant-selection for the questionnaire, targeting inhabitants who pass by the neighbourhood's public realm. The second was the snowballing method used to find interviewees. The researcher contacted local networks to introduce the research and invite volunteers to participate, with snowball sampling then used to reach other residents who might be willing to participate. Participation was restricted to residents who had lived in the neighbourhood for at least 5 years. The demographic characteristics of the selected participants were vetted to ensure the inclusion of a range of social groups, age groups (>16 years), genders, and work statuses. However, the snowballing method limited the variation in the demographic profiles of the volunteers.

#### 4.3. Development of research tools

The research tools employed in this research were developed on the basis of extensive literature on physical-environment characteristics and social wellbeing variables (see Chapters 2 and 3). The tools include a questionnaire survey, interviews, datasheets for observations and mapping of physical quality and social activities, as well as a space syntax tool for analysing spatial configurations. Primary data were collected through fieldwork conducted during the winter season of December 2018 and April 2019 to avoid the harsh hot climate that can affect social activities and public space use patterns. See Appendix C for the tools and map templates used in this research. Figure 4.5 summarises the various tools used for data collection. It also explains the triangulation of the data by which each aspect was investigated using three or more methods, thereby ensuring reliability and confidence. The data collection tools included primary or secondary methods, depending on the nature of the measured indicator. Table 4.4 summarises the rationale for each of the tools.





Method	What	Why
Questionnaire	Collect socio-economic info, social	Identify the opinions of residents using
	patterns, and neighbourhood	closed questions.
	perceptions.	
Interviews	Trace lifestyles and map social	Unveil the hidden social norms of
	networks within the neighbourhood	neighbourhoods and identify whether
	using open-ended questions.	the built environment influences their
		formation.
Observation	Document the built environment	Identify associations between
	and map social behaviour.	behaviours and spatial qualities.
Spatial	Digitally analyse the spatial quality	Link the neighbourhood design to other
modelling	of the neighbourhood layout.	datasets, such as observed behaviours
		and sociograms of the interviewees.

Table 4.4. Research tools and purpose of use

As shown in Figure 4.6, the plan for the fieldwork began with an exploration of the basic socioeconomic and physical characteristics of the neighbourhoods. This activity was followed by the mapping of social behaviour, which was a structured process conducted over several periods consisting of at least one weekday and one weekend in each neighbourhood. Most observations were conducted on clear sunny days. After the observation mapping had been completed, a questionnaire survey was disseminated to residents in the public space. The last fieldwork activity was the interviewing of the inhabitants. The methods are discussed in turn in the following sections.



Figure 4.6. Fieldwork activities flow chart (Source: author)

#### 4.3.1. Structured observational surveys

#### *4.3.1.1. Physical mapping of the neighbourhood*

A survey was conducted to map the physical attributes during the daytime of each neighbourhood. For this activity, the researcher walked along each street and through the public spaces in the neighbourhoods. An A2-sized map was used for the physical mapping to record the condition of the streets and sidewalks, street furniture, car parking, vegetation, actual land use, cabins, and tents. The mapping also included some elements of the dwelling that affected community social wellbeing, such as gate location and raised fences. A short survey concerning the local park also formed part of the mapping activity (see Appendix C for the map template). For documentation, photographs were taken to record the conditions of public spaces, streets, and sidewalks.

#### 4.3.1.2. Observation of social behaviour

Social activities were recorded at regular intervals on a second set of maps. This was done during a typical day and on a weekend in each chosen neighbourhood. As with the physicalenvironment mapping, the researcher walked through the neighbourhoods to record behavioural observations in the public spaces. A snapshot method was used, whereby the researcher stopped at regular intervals (every five minutes) in each street to record the social activities. The observations were carried out twice: once in the morning (between 8 am and 10 am) and once in the evening (between 6 pm and 8 pm). This process was repeated on a weekday and during a weekend. All recording was done on an A2 map, using predetermined symbols to record the number and type of users and activities (see Appendix C for the sample map template). Methods such as photography or video recording were avoided due to cultural sensitivities.

#### 4.3.2. Questionnaires

The questionnaire was piloted twice. The first pilot study involved staff and students at Cardiff University in the UK, and the goal was to improve the clarity and order of the questions. The second pilot study was conducted in Doha, with a translated version used to ensure the cultural sensitivity of the questions.

The questionnaires were part of the fieldwork conducted in the winter season – December 2018 to April 2019 - to avoid the harsh climatical conditions of other seasons in Qatar. The questionnaires were distributed randomly to inhabitants who pass by the neighbourhood's public realm. The survey protocol involved a self-completion questionnaire, with assistance available if required. Furthermore, the survey was offered as a hard copy and on a digital platform. The questionnaire gave a brief description of the research and was provided with a consent form. At the end of the questionnaire, participants were invited to take part in a detailed interview.

The questionnaire contained questions taken from previous research (Montford, 2015; Poortinga *et al.*, 2017) and the general health SF-36 survey (Guite *et al.*, 2006) (section 1 questions 5 and 6, section 2 question 7, sction 3 question 1). The rationale for this was to allow a comparison of the data and findings with those of previous studies. The questions were designed to achieve the aims of this research, focusing on characteristics of the research site, the design of the houses (section 2, question 5.15), the ease of accommodating guests without disturbing other family members (section 3, question 4), and the social networks within the

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neighbourhoods (section 4, questions 7-11). The indicators and measures used in the questionnaire are summarised in sections 2.8 and 3.7. The questionnaire consisted of 75 questions and five sections. These sections are detailed below (see Appendix C for full questionnaire form):

Section 1: General information about the demographic profile of the respondents (e.g., age, gender, nationality, marital and employment status, household size, and overall health and emotional wellbeing rating).

Section 2: Details of dwelling (e.g., building tenure and ownership, satisfaction with design quality and elements of the dwelling).

Section 3: Family's social patterns (e.g., type, location, and frequency of social activities within the dwelling).

Section 4: Levels of satisfaction with physical features of the neighbourhood (e.g., maintenance, density, and services and facilities provided).

Section 5: Opinions about social qualities of the neighbourhood (e.g., social patterns, sense of safety, sense of community, and social support).

#### 4.3.3. Interviews

Initially, the interviews were to be conducted at the participants' homes to allow the researcher to walk through and assess the dwellings. However, ultimately, this was not possible, as some interviewees preferred to be interviewed in other locations (such as their workplace or a neighbour's house). The participants received a written and oral description of the research, and they were informed that they could withdraw their consent at any time or refuse permission for the conversation to be recorded (either partially or fully). The researcher also guaranteed that all data would be kept confidential and that no identities would be included in any reports. The researcher is local, which enabled a better understanding of the targeted community (Ochieng 2011). However, conducting interviews with male participants proved to be a challenge. For cultural and religious reasons, the male participants were uncomfortable being interviewed by the female researcher. To overcome this challenge, the primary researcher recruited a male assistant to collect the data from male interviewees. The primary researcher then listened to the interview recordings or, in some cases, listened to them live over the telephone.

In-depth interviews were conducted to provide a deeper understanding of the inhabitants' patterns of use of space and their social activities, as well as their points of view. These interviews involved open-ended questions with four main themes of discussion. The first section involved general questions about the demographic profile of the participant. The second set of questions concerned the relationship between the participant and their immediate environment (i.e., the street on which they lived). The participant was asked about their perception of the quality, design, and maintenance of the street. This section was followed by questions about social relationships with their neighbours. The participant was asked to mark on an A3 map those neighbours whom they considered themselves to be close to, indicating those with whom they enjoyed mutual visits and social support, as well as those whom they recognised but did not know well. The map was also used to annotate daily destinations, walking routes, and favourite places within the neighbourhood. The set of questions was repeated in the next section for the broader neighbourhood scale. The aim was to explore perceptions of and satisfaction with the physical surroundings, whilst tracing the hidden social norms of the neighbourhood. The final set of questions concerned the dwelling design and the family's routines and social patterns. In this section, the participant was asked to sketch their house plan or allow the researcher to walk through the dwelling to sketch it. Based on this sketch, the interview explored the design quality and the participant's satisfaction with the house and mapped their routines and social activities within the indoor spaces (see Appendix C for the full interview questions).

#### 4.4. Methods of data analysis

Various methods of analysis were employed to answer the research questions (Figure 4.7). Data were analysed using multiple methods to clarify the relationship between physical elements and social aspects, as seen from various angles. The following sections discuss the step-by-step processes of each method of analysis.



Figure 4.7. Methods of analysis (Source: author)

#### 4.4.1. Statistical analysis

Statistical analysis was carried out using SPSS software to perform correlation tests between interviews, surveys, and spatial variables. The statistical analysis procedure comprised the following steps:

- 1. The questionnaire collected both dwelling and neighbourhood scale data, which were then separated to simplify the analysis. Neighbourhood scale data were sorted based upon the case study, whilst dwelling-scale data were sorted based upon their tenure and design typology.
- 2. Irrelevant cases were excluded from the data; for example, participants with fewer than five years of residency and rented dwellings were eliminated.

- 3. The key indicators of social wellbeing and physical-environment design were statistically tested to identify patterns in the data relevant to the research question and objectives.
- 4. Ordinal variables were analysed using the Spearman correlation test, which is the nonparametric version of the Pearson correlation test. The Chi-square test was used to identify the significant correlation between nominal and ordinal variables. Concerning built environment research, a P-value of 0.05 or less was taken to indicate significant relationships. (Refer to Appendix L for a full correlation table)
- 5. Further partial correlation and Chi-square tests were used to investigate the intervening variables identified in Chapters 2 and 3 as potentially influencing the relationship between physical-environment design and the social wellbeing of inhabitants.

#### 4.4.2. Thematic analysis

A thematic analysis was conducted for the interview data. The thematic analysis is a flexible, easy, and quick method of analysis that compares and summarises large volumes of data (Braun and Clarke 2006). In this research, the thematic analysis involved inductive and deductive approaches, comprising the following steps:

- 1. During the fieldwork, the researcher constructed themes that were used for initial coding, and they were refined and extended in later phases of analysis.
- 2. The interview scripts were coded manually in two phases. The first phase focused on the priorities from the interviewees' points of view, highlighting why they were essential to the interviewees.
- 3. Phase two of the coding was conducted based on findings from the literature and other methods used in this research (i.e., questionnaires and observations).
- 4. Codes were grouped into categories, and the categories were sub-sections of broader themes. Interviewees' quotes were used to support the themes.
- 5. The findings of the thematic analysis were compared and associated with onsite social behaviour observations, statistical analysis, and spatial analysis.

#### 4.4.3. Spatial analysis

Desk-based research was conducted to explore those spatial qualities of the neighbourhood that have been found to affect the social wellbeing of the inhabitants (see section 3.5). The layout – or spatial configuration – was analysed using space syntax methods and tools. Space syntax is a well-established method developed to represent, model, and analyse configurations (Hillier and Hanson 1984). Osman and Suliman (1994) note that the advantages of the space syntax method are that it is simple, objective, and replicable, whilst its subjectivity, the complexity of the interpretation, and its controversiality are its disadvantages. The spatial analysis involved an analysis of the overall spatial quality of the neighbourhood, as well as a location-based quality analysis that linked the dwelling location quality and the social patterns of the inhabitants. The connectivity, accessibility, and visibility of spaces were the spatial variables used to compare the layouts of the neighbourhoods and dwellings. The following sections discuss the spatial tests conducted for the different scales.

#### 4.4.3.1. Neighbourhood scale spatial analysis



The neighbourhood spatial study comprised two significant analyses: axial maps and visual graph analysis (Figure 4.8).

- - - - Comparison between different methods outcome

Figure 4.8. Space syntax analysis methods used for neighbourhood investigation (Source: author)

Axial map (Axmap): Axial models use the longest visible and accessible line of sight in space to identify the relationships between spaces. In this research, the axial model of Doha city developed by Major and Tannous (2018) was used to contextualise the case-study neighbourhoods. Variables such as average connectivity and integration were extracted from this model. Previous studies have found that integration and connectivity values positively correlate with pedestrian movement (Ozbil et al. 2011), while intelligibility value indicates a sense of safety due to clarity of navigation (Mahdzar et al. 2019). The correlation between global integration and connectivity (intelligibility) was used to compare wayfinding for different neighbourhood layouts, with the correlation between global and local integration values (synergy) revealed the internal structure of the different layout designs concerning the largerscale system in which they are embedded (the city). This analysis predicted the sense of safety in the area in addition to the pedestrian movement of non-inhabitants. The spatial variables of the neighbourhood were compared to data from other tools, such as the pedestrian movement observed whilst conducting the behavioural observation. Spatial integration was compared to the social networks of the interviewees. The number of contacts that the interviewees had was compared to the spatial integration of the dwelling locations. A comparison of the neighbourhoods revealed the influence of layout design and dwelling location on the social networks of the inhabitants. Axial maps of the neighbourhoods can be found in Appendix F.

**Visibility graph analysis maps (VGA):** Using the Doha masterplan collected from the Ministry of Municipality of Urban Planning, the neighbourhood and the boundary streets were included for VGA analysis. Hillier (2007) found that the visibility of spatial configuration correlates with fear of crime and social networks. The VGA was conducted for two scales in this research: overall neighbourhood visibility and visual step depth from the interviewee's dwelling location. The neighbourhood visual analysis was used to assess the visibility of the layout (see Appendix G). A test of correlation was conducted for average neighbourhood visual integration and an average number of social contacts. The detailed visual analyses included separate VGA maps from each interviewee's dwelling location, and both metric and visual step depth were calculated and compared to the sociogram of the interviewee. This comparison revealed the impact of the

neighbourhood layout design on the visual steps required to reach contacts within the neighbourhood. An overlap of VGA maps and sociograms can be found in Appendix H.

#### 4.4.3.2. Dwelling-scale spatial analysis

It is argued that dwelling spatial arrangement is insufficient to represent the social dimension of the community, as it must also incorporate social and cultural analysis (Osman and Suliman 1994). This research combined spatial analysis of the dwellings with thematic analysis of the household-member interviews.

The dwelling layouts drawn during the interviews were used to study and interpret the sociological significance of the dwellings. The plans were simplified into elements and relations and drawn as justified graphs. The spaces were represented as circles (nodes), and links between spaces – such as doors and openings – were represented as lines to create a network graph. The graphs included the exterior of the house (the street) as a crossed circle. It was important to include the outside when looking in towards visitor-household interaction.

Data were sorted to compare the layouts of owner-designed dwellings with those of developerdesigned dwellings. The spatial arrangement analysis – represented in the justified graphs – was conducted in three stages:

- 1. Analysis of the layouts as spatial arrangements, eliminating the spatial use. In this stage, the descriptive analysis compared the form characteristics across different typologies.
- 2. Investigation of the logic of the spatial arrangements (see Appendix J). The social content of the spaces correlates with their integration/segregation value (Hanson, 1999). Therefore, the functions of the spaces were sorted based on the space integration value (see Appendix K). Sorting the spatial use according to the integration value helped to trace the different lifestyles and moods of interaction within the family and the wider social interaction with the community. In this stage, thematic and statistical analyses were conducted to support the results of the spatial analysis.

3. Exploration of the relationships between spatial uses, seeking a repeated spatial organisation unique to the cultural context.

#### 4.5. Conclusion

This chapter describes the methods and tools used in this research to measure social wellbeing and the residential environment, in light of the discussion in Chapters 2 and 3.

Table 4.5 summarises the multiple methods and measures used to investigate social wellbeing and residential environment design in this research.

Indicators		Measure	Tool
	Social cohesion	Belonging Sense of community	Questionnaire Interview
social wellbeing	Social integration	Number of relationships Social interaction	Questionnaire Interview
	Social interaction	Frequency interaction Type of interaction	Interview Behavioural observation
	Social network	Number of contacts Social relationship strength	Questionnaire Interview
	Social support	Emotional and material support Providing advice Social network	Questionnaire Interview
	Privacy	Personal privacy Family privacy	Interview Physical environment mapping
tesidential environment	Layout	Connectivity Intelligibility Proximity	Spatial analysis
	Spatial use	Quantity Quality Proximity	Physical-environment mapping



The chapter also outlined the case-study selection procedure and sampling strategy for different scales and participants. This was followed by an in-depth description of the measures and data collection tools used to answer the research questions. The collected data were combined and analysed statistically, thematically, and spatially. The statistical analysis investigated whether the design of the residential environment has an impact on social wellbeing. This was combined with other forms of analysis to conduct partial Chi-square tests. The combined thematic analysis and spatial analysis were intended to identify the impact of spatial qualities on inhabitants' social behaviour, in relation to the norms and culture of Doha city. The analysis methods were combined to avoid repetition and ensure a comprehensive argument, rather than sorting the analysis according to the type of data.

Chapter 5 details the implementation of the methods, alongside a preliminary analysis of the data that attempts to answer the first research question: '*Do different residential environment designs result in different spatial qualities and unique social behaviours?*'.

Chapter 5

# Case studies and fieldwork data

#### 5. Case studies and fieldwork data

#### 5.1. Introduction

The previous chapter introduced the methods and tools used in this research, and this chapter applies the data collected by these methods. The initial data analysis in this chapter answers the first research question: '*Do designs of the residential environment result in different spatial qualities and distinctive social behaviours?*' The analysis considers the physical characteristics of the residential environment to investigate their impact on inhabitants' overall satisfaction and wellbeing. Before presenting the data, this chapter briefly introduces the six case studies selected for the study. The findings of the descriptive analysis are then presented, with the spatial and fieldwork data from the various case-study neighbourhoods. Chapters 6 and 7 combine the spatial and social data to test for significant correlations between physical characteristics and social variables from the interviews, observations, and surveys.

The variables and terminologies used to discuss the data in this chapter (and the following chapters) are introduced and defined in Table 5.1 and Table 5.2.

Social wellbeing	Variables
Social interaction	Frequency of talking, visits, and casual meetings with neighbours
	(behavioural observation, survey and interview).
Social networking	Quantity and type of relationship (survey and interview).
Privacy	Personal and family privacy from strangers (spatial analysis and
	interview).
Social support	Emotional and material support (survey and interview).
Sense of safety	Children's mobility, safety of personal property, and fear of crime
	(survey, spatial analysis, and interview).

Table 5.1. Key variables of social wellbeing

Terminology	Definition
Step depth	The number of steps from the root space needed to reach other spaces
	in the system.
Visual step depth	A value extracted from the visual analysis graph, representing the
	number of visual fields between two points.
Metric step depth	A value extracted from the visual analysis graph (space syntax),
	representing the distance of the shortest path from the selected point
	to all other points.
Intelligibility	The correlation between global integration and connectivity.
Synergy	The correlation between global and local integration.
Integration	A measure that gives information about the depth of space compared
	to other spaces in the system: 'the normalised version of the mean
	depth' (Turner 2004).
High integration	A value greater than the mean integration.
Moderate	A value around the mean integration.
integration	
Low integration	A value less than the mean integration.
Connectivity	The number of directly connected spaces (Al-Sayed 2014).
Sociogram	An illustration that shows a person social network graphically.
Ring	A spatial organisation in which the several spaces are connected and
	create a loop.
Internal ring	An indoor spaces connected in a loop form.
External ring	Outdoor spaces (different yards and gardens) connected in a loop form
	within the dwelling fence.
Justified graph	Also called a 'J-graph', a method used to simplify the layout, where
	spaces are represented as nodes and connections are represented as
	lines between nodes.
Workspaces	Spaces such as the kitchen, laundry room, ironing room, etc.
Circulation spaces	Spaces that connect rooms (e.g., lobby, corridors, stairs).

- Personal spacesSpaces used by individuals (e.g., bedroom, hobby room, studio, office).Family spacesSpaces used by the household for gathering (e.g., living room,<br/>playroom, dining room, library). Some dwellings have more than one<br/>living room on different floors for various uses (i.e., formal and daily<br/>gatherings) and users (e.g., extended family, nuclear family).
- Visitor space Spaces used to host visitors such as the *Majles* (sitting room), dining room, tent. Some dwellings have a bedroom for visitors who are spending several days with the family.

Table 5.2. Terminology definitions

5.2. Introducing the case studies



Figure 5.1. Shortlisted neighbourhood across Doha city (Source: author)

The six shortlisted neighbourhoods (shown in Figure 5.1) (refer to Appendix I for a higher resolution neighbourhood map)are introduced in this section, with a description of the location,

building density, layout form, residential plots average size, land use, and neighbourhood boundaries of each. The neighbourhoods vary in size from 117 to 203 dwellings. This ensured sufficient diversity in the responses to the survey, and adequate neighbourhood size to contain inhabitants' social networks.

The neighbourhoods selected for this study are as follows:

- Onaiza (district 65)
- Hazem Almarkhiya
- Duhail (North Duhail district)
- Al Thumama (district 47)
- Al Khulaifat (district 43)
- Dahl Alhamam (North Khalifa City district)

#### Onaiza

Onaiza is a typical, subdivided neighbourhood, located in the northern part of Doha. It is a low-density neighbourhood of 31.03 hectares, with 4.38 houses per hectare, arranged in a cul-de-sac layout (Figure 5.4). The majority of the lands (average size 1,100 m2) were granted by the government to senior Qatari employees. The designs of the houses vary, but two-floor detached houses are dominant. The neighbourhood has its own park, a playground, and a mosque (Figure 5.3). The other uses are listed in Table 5.3. The adjoining boundary of the neighbourhood consists of fenced compound villas, schools, a grocery store, and the main road (Figure 5.2).





Figure 5.3. Public park of Onaiza neighbourhood (Source: Google Earth, v7.3)



Figure 5.4. Cul-de-sac in Onaiza (Source: author)

Туре	Quantity
Dwellings	136
Apartment buildings	0
Mosques	2
Educational buildings	3
Governmental buildings	5
Retail buildings	2
Healthcare buildings	1
Under construction	2
Empty land	6
Table 5.3. Land-use observation summary – Onaiza	

Figure 5.2. Onaiza neighbourhood land-use map (Source: author)

#### Hazem Almarkhiya

Hazem Almarkhiya is a typical, subdivided neighbourhood, located in the northern part of Doha. It is a low-density neighbourhood of 30.33 hectares, with 4.61 houses per hectare, arranged in a cul-de-sac layout (Figure 5.5). The majority of the lands (average size 1,180 m2) were granted by the government to senior Qatari employees and some were single-floor detached dwellings (low-income granted dwellings). The designs of the houses vary, but two-floor detached houses are dominant. The neighbourhood has its own park, a playground, and a mosque (Figure 5.6). The other uses are listed in Table 5.4. The adjoining boundary of the neighbourhood consists of *Al Khafji* main street from the north and 15-metre-wide streets on the other three sides.



Figure 5.5. Hazem Almarkhiya neighbourhood land-use map (Source: author)



Figure 5.6. Public park of Hazem Almarkhiya neighbourhood (Source: Google Earth, v7.3)



Figure 5.7. A street view of Hazem Almarkhiya (Source: author)

Туре	Quantity
Dwellings	140
Apartment buildings	0
Mosques	2
Educational buildings	2
Governmental buildings	0
Retail buildings	1
Healthcare buildings	0
Under construction	6
Empty land	11
Table 5.4. Land-use observation summary – Hazem Alma	arkhiya

#### Duhail

Duhail is a low-density neighbourhood of 33.49 hectares, with 4.95 houses per hectare, arranged in a loop layout located in the northern part of Doha (Figure 5.8). The majority of the lands (average size 1,000 m2) were granted by the government to senior Qatari employees, and some were single-floor detached dwellings (low-income granted dwellings). The designs of the houses vary, but two-floor detached houses are dominant. The neighbourhood has its own park, a playground, and a mosque (Figure 5.9). The other uses are listed in Table 5.5. The adjoining boundary of the neighbourhood consists of Al Khafji main street from the south, a gated community from the west, and a row of schools from the east.



Figure 5.8. Duhail neighbourhood land-use map (Source: author)



Figure 5.9. Public park of Duhail neighbourhood (Source: Google Earth, v7.3)



Figure 5.10. Street view of Duhail (Source: author)

	aachor)
Туре	Quantity
Dwellings	166
Apartment buildings	0
Mosques	2
Educational buildings	4
Governmental buildings	0
Retail buildings	2
Healthcare buildings	0
Under construction	9
Empty land	7

Table 5.5. Land-use observation summary – Duhail

#### Al Thumama

Al Thumama is a typical, subdivided neighbourhood, located in the southern part of Doha. It is a lowdensity neighbourhood of 42.38 hectares, with 4.78 houses per hectare, arranged in a semi-gridded layout (Figure 5.11 and Figure 5.13). The majority of the lands (average size 1,100 m2) were granted by the government to senior Qatari employees. The designs of the houses vary, but two-floor detached houses are dominant. The neighbourhood has its own park, a playground, and a mosque (Figure 5.12). The other uses are listed in Table 5.6.





Figure 5.12. Public park of Al Thumama neighbourhood (Source: Google Earth, v7.3)



Figure 5.13. Street view of Al Thumama neighbourhood (Source: author)

Figure 5.11. Al Thumama neighbourhood land-use map

Туре	Quantity
Dwellings	203
Apartment buildings	0
Mosques	2
Educational buildings	1
Governmental buildings	4
Retail buildings	2
Healthcare buildings	1
Under construction	14
Empty land	23
Table 5.6. Land-use observation summary – Al Thumama	

#### Al Khulaifat

Al Khulaifat neighbourhood is in the southern part of Doha and was named after a Qatari family who are still occupying some of the houses. The neighbourhood is 13.83 hectares, with 9.39 houses per hectare, arranged in a loop layout (Figure 5.14). The majority of the lands (average size 780 m2) were granted by the government. The designs of the houses vary, but detached houses of one and two floors are dominant (Figure 5.16). The neighbourhood has two parks, a playground, and a mosque (Figure 5.15). The other uses are listed in Table 5.7.







Figure 5.15. Public park of Al Khulaifat neighbourhood (Source: Google Earth, v7.3)



Figure 5.16 Street view (Source: author)

Туре	Quantity	
Dwellings	130	
Apartment buildings	0	
Mosques	3	
Educational buildings	2	
Governmental buildings	0	
Retail buildings	23	
Healthcare buildings	0	
Under construction	0	
Empty land	1	

Table 5.7. Land-use observation summary – Al Khulaifat

#### Dahl Alhamam

This neighbourhood is located in the northern part of Doha. The layout is semi-gridded (Figure 5.17). The neighbourhood covers an area of 18.59 hectares, with a residential density of 6.29 houses per hectare. The average piece of land is 800 m2. Low-rise dwellings are dominant in this neighbourhood. Some of the land in this area was granted by the government to senior Qatari employees. The neighbourhood has two parks – a large national park and a small park without a playground area (Table 5.8).





Figure 5.18. Street in Dhal Alhamam neighbourhood (Source: author)

Figure 5.17. Dahl Alhamam neighbourhood land-use map (Source: author)

Туре	Quantity
Dwellings	117
Apartment buildings	1
Mosques	2
Educational buildings	4
Governmental buildings	3
Retail buildings	2
Healthcare buildings	2
Under construction	4
Empty land	14
Table 5.8. Land-use observation summary – Dahl Alhamam	
# 5.3. Comparing spatial qualities of different residential environment designs

This section explores the unique spatial qualities to the various neighbourhood designs. The layouts were analysed using several tests, including axial maps, justified graphs, and VGA facilitated by a space syntax tool. Spatial use was measured using questionnaires and physical-environment mapping. The following section discusses social behaviour within the residential environment, presenting the findings of several fieldwork methods.

### 5.3.1. Layout-design variation

### Synergy and intelligibility of neighbourhood layout

As described in Chapter 4, the axial model includes all spaces within the neighbourhood that are publicly accessible to the residents (see Appendix F for axial maps). The purpose of the axial map analysis is as follows:

- to identify the relationship between the neighbourhood and the city as a whole
- to study the variation in the spatial qualities of different layouts by comparing global and local integration, connectivity, intelligibility, and synergy

Table 5.9 summarises the variation in the spatial qualities of each neighbourhood. Synergy describes the neighbourhood connectivity to its context (the city). Al Thumama – a semi-gridded neighbourhood – has the highest global synergy value, followed by Khulaifat – a looped neighbourhood. In contrast, Hazem Almarkhiya, with its cul-de-sac layout, has the lowest synergy value. However, in some cases, the semi-gridded and looped neighbourhoods had equal synergy values.

Wayfinding and spatial readability are measured through intelligibility. Al Thumama has the highest intelligibility value, whilst Hazem Almarkhiya has the lowest. Indeed, Al Thumama has more than double the intelligibility of Hazem Almarkhiya, making it both more legible and more accessible. Looped neighbourhoods such as Khulaifat and Duhail have moderate intelligibility values. Chapter 6 compares the physical and social attributes to assess the impact of spatial layout design on inhabitants' social wellbeing.

Case	Layout	Global	Local	Connectivity	Intelligibility	Synergy
	design	integration	integration			
Al Thumama	Semi- gridded	0.635	0.343	0.055	0.871	0.971
Onaiza	Cul-de- sacs	0.488	0.263	0.041	0.603	0.854
Hazem Almarkhiya	Cul-de- sacs/loops	0.429	0.232	0.033	0.377	0.708
Duhail	Loops	0.547	0.198	0.033	0.558	0.854
Dahl Alhamam	Semi- gridded	0.646	0.323	0.046	0.582	0.876
Khulaifat	Loops	0.643	0.279	0.046	0.582	0.876

Table 5.9. Spatial values of the neighbourhoods

### Visibility of neighbourhood layout

The VGA for the public spaces within the neighbourhoods and surrounding streets were mapped using DepthmapX (see Appendix G for the VGA maps). The analysis revealed the visual connectivity of the public spaces within the neighbourhoods. Table 5.10 summarises the data collected from the sociograms of the interviewees. The average visual integration of the neighbourhood was compared with the visual step depth and metric step depth of the interviewees and their contacts who lived in the neighbourhood. Dahl Alhamam – a semi-gridded neighbourhood – has the highest integration value, whilst Hazem Almarkhiya – a culde-sac and loop neighbourhood – has the lowest. The average visual step depth, however, was not found to correspond with the neighbourhoods' visual integration. Onaiza, a cul-de-sac, has the highest average visual step depth, whereas Duhail – with a loop layout – has the lowest.

Case	Layout design	Visual	Average visual	Average metric
		integration	step depth	step depth
Al Thumama	Semi-gridded	6.35	1.94	40.87
Onaiza	Cul-de-sac	3.51	2.86	45.05
Hazem	Cul-de-sac/loop	3.05		
Almarkhiya			2.46	40.55
Duhail	Loop	4.81	1.33	15.76
Dahl Alhamam	Semi-gridded	6.57	2.34	38.10
Khulaifat	Loop	4.00	2.17	39.01

Table 5.10. Visual graph analysis values

Visual graph analysis was not possible for private dwelling units, as the sketched plans drawn by the participants were not accurate. Therefore, these sketched plans were converted into justified graphs for spatial analysis.

## 5.3.2. Spatial organisation of dwellings layout

The spatial organisation of the dwelling layouts was analysed using A-graph software to reveal the links between different spaces in a network. Thirty-four dwellings located across the neighbourhoods were analysed using this method. Table 5.11 compares the dwellings' respective spatial complexity. It shows that owner-designed dwellings had larger numbers of spaces (cells) and greater average depth than developer-designed dwellings.

Dwelling design	Avg. total							
typology	no. of					Avg.		
	cells	Avg.	Avg. no.	Avg. no.	Avg. no.	tree	Avg.	Avg.
	(witho	no. of	of	of	of	depth	no. of	no. of
	ut	outdoo	circulatio	function	entrance	(street	intern	extern
	street)	r cells	n cells	al cells	S	)	al rings	al rings
Owner-								
designed dwelling	46	4	6	36	2	9.7	1	1

Developer-								
designed	28	3	3	22	1	8.4	0	0.5
dwellings								
Table 5.11. Spatial characteristics comparison								

The A-graph analysis was also used to find the spatial integration value of different spaces in the dwelling. The dwelling layout design resulted in various spatial qualities, and this research was interested in the integration value of these spaces. Sorting spaces based on their integration value allowed tracing of the spatial patterns that reflect the family background and lifestyle (refer to Appendix K for the space and integration value table). Repeated spatial patterns indicate the genotype of the dwellings' layouts in the studied community (see section 6.7).

## 5.3.3. Spatial-use variation in the neighbourhood

As shown in Table **5.12**, the neighbourhoods are predominantly residential, with few mixed-use buildings that serve the community. Khulaifat has the largest number of public buildings, whilst Hazem Almarkhiya has very few. The sidewalk maintenance was found to be excellent in Hazem Almarkhiya, Dahl Alhamam, and Al Thumama. In contrast, 64% of the Khulaifat sidewalk is untiled and used mainly for parking spaces. As for the street furniture, Al Thumama and Duhail neighbourhoods have more than twice as many benches as Hazem Almarkhiya. Tents were observed in the public space for male gatherings, and only Al Thumama and Duhail neighbourhoods had no tents in public spaces.

Case study	Layout	Typical design	Dwelling count	Average residential plot size (m²) Other uses count	Seats	Water fountain	Cabin	Tent	Sidewalk problem
Al Thumama	Semi-gridded	Yes	203	1100 10	19	10	5	0	1%
Onaiza	Cul-de-sacs	Yes	136	1100 13	15	3	3	1	0%

Hazem	Cul-de-sacs	Yes	140	1180	5	7	7	3	2	7%
Almarkhiya	Loops									
Duhail North	Loops	No	166	1000	8	22	5	4	0	23%
Dahl Alhamam	Semi-gridded	No	117	800	13	9	11	5	1	0%
Khulaifat	Loops	No	130	780	28	9	4	4	2	64%

Table 5.12. Summary of the physical features of the neighbourhoods

Although mixed-use density varied significantly, levels of satisfaction with communal spaces across all six neighbourhoods were comparable. Satisfaction with outdoor spaces was relatively similar in Al Thumama, Onaiza, and Duhail (

Figure 5.19). However, the lowest satisfaction with outdoor spaces and leisure facilities was in Hazem Almarkhiya, which reflects the low numbers of social activities observed in the neighbourhood (Table 5.15). Furthermore, residents of Hazem Almarkhiya were the least likely to gather in public spaces in the neighbourhood (Figure 5.20). In the answers they categorised as 'other places', the male participants from Hazem Almarkhiya, Duhail, Dahl Alhamam, and Khulaifat mentioned the *Majles* of their own or their friends' houses as popular meeting spaces in the neighbourhood.





Figure 5.19. Satisfaction with communal spaces

Figure 5.20. Preferred locations for gathering with neighbours

The perceived qualities of the neighbourhood were investigated using satisfaction measures. In Residents in Al Thumama and Duhail expressed high rates of satisfaction with neighbourhood maintenance (Figure 5.21). Satisfaction with neighbourhood quality was similar among the neighbourhoods, but sense of safety varied. Residents of Al Thumama and Duhail scored their neighbourhoods at least 16% higher for 'sense of safety' than residents of other neighbourhoods did (Figure 5.22).







Figure 5.22. Neighbourhood perceived safety

### 5.4. Comparison of social behaviour within different residential environment designs

This section discusses the fieldwork data concerning the behaviours practised in distinct areas of the residential environment. The social wellbeing indicators discussed in Chapter 2 were measured through fieldwork, using methods including observational surveys, questionnaires, and interviews.

The sample size of the questionnaires aims to achieve a minimum of 15% of the dwellings of each case study. Two hundred fifty-seven participants in six neighbourhoods completed the questionnaire survey. The questionnaire was offered in hard copy or digital form. Data from the survey were compiled and analysed using SPSS. As shown in Table 5.13, the response rates were

comparable across the neighbourhoods, at 23%–40% of the dwellings. The response rates were lowest in the large neighbourhoods with more dwellings.

Case study	Layout	Residentia	I	Number	Case-	Number	Response
		density*		of	study	of	rate
		(zone)		dwellings	area	responses	
					(hectare)		
Thumama	Semi-	Low to	C	203	42.38	51	2E 1
	gridded	medium					23.1
Onaiza	Cul-de-sacs	Low		136	31.03	39	28.7
Hazem	Cul-de-sacs	Low		140	30.33	36	25.7
Almarkhiya	Loops						23.7
Duhail	Loops	Low		166	33.49	47	28.3
Dahl Alhamam	Semi-	Low to	С	117	18.59	33	20.2
	gridded	medium					28.2
Khulaifat	Loops	Medium		130	13.83	51	39.2
Total						257	

Table 5.13. Response rates for each case study

\* Residential density was calculated using the data from the Ministry of Development Planning and Statistics.

A total of 39 volunteers participated for the detailed, open-ended interviews. The interviewees had the freedom to withdraw at any time and were not expected to provide any information that they did not feel comfortable talking about. Around 59% of the participants were female, and around 41% were male (Table 5.14). The disproportionate number of female participants was due to the influence of the researcher's gender. Of the 39 interviewees, 12 were husbands, 18 were wives, eight were adult children, and one was a daughter-in-law.

Total Gender Interviewee

							Daughter-
Ν	Male	Female	Husband	Wife	Son	Daughter	in-law
39	16	23	12	18	4	4	1

Table 5.14. Interviewee profiles

### 5.4.1. The variation in inhabitants' social interactions

The behavioural observation was conducted during different periods of the day and week to track the variation in social activities. As shown by the total observed social contact over the day, the neighbourhoods were more active during the weekend, with larger numbers of people moving, static, and in groups (Table 5.15). In addition, in most cases, social behaviours increased after sunset. The total number of activities (moving, static, and in groups) observed in Al Khulaifat was more than triple that in Hazem Almarkhiya. During a weekend night, only 276 inhabitants were observed in public spaces in Hazem Almarkhiya, whilst in Al Khulaifat, 984 inhabitants were observed in public spaces in the neighbourhood. Al Thumama, Dhal Alhamam, and Al Khulaifat had the highest numbers of social interactions (groups) during the night, on both weekdays and weekends. There were between 300 and 324 people in groups during the weekdays and between 156 and 348 on the weekends. As for individual activities (static and moving), high rates were observed in Al Thumama, Dhal Alhamam, and Al Khulaifat. As can be seen in Table 5.15, cul-de-sac neighbourhoods reported lower numbers of observed activities than the other two typologies.

		Wee	kday					Wee	kend				
		AM			РМ			AM			РМ		
Layout		<u>.</u>	ving	dn	<u>.</u>	ving	dr	ĿĊ.	ving	dn	<u>.</u>	ving	dn
typology	Case study	Stat	Mov	Groi	Stat	Mov	Groi	Stat	Mov	Groi	Stat	Mov	Groi
Semi-	Thumama	204	708	120	120	552	300	24	468	264	96	516	276
gridded	Dhal	108	288	144	48	924	324	60	564	144	36	480	156
0	Alhamam												
	Onaiza	120	48	96	60	216	120	36	576	168	516	312	36

Cul-de-	Hazem	01	100	01	70	160	60	156	70	06	70	100	150
sac	Almarkhiya	04	108	04	72	108	00	120	12	90	12	108	130
Loon	Duhail	36	156	84	36	216	108	84	264	84	108	264	72
LOOP	Khalifate	180	648	156	180	696	312	228	828	60	108	780	348

Table 5.15. Quantifying social interaction, activities, and pedestrian movement in different cases studies

## 5.4.2. Social cohesion and network

There were marked differences in perceptions of the friendliness of the neighbourhoods. Al Thumama, Hazem Almarkhiya, and Duhail residents reported a strong sense of community (Figure 5.23). The cultures blend well together in Hazem Almarkhiya and Duhail, twice as well as they do in Dahl Alhamam and Khulaifat. There were noticeable differences in sense of community, as reflected in the number of social interaction measures (Table 5.16). The questionnaire asked the participants to quantify their social contacts, categorised as weak (recognise), moderate (know), or strong (close). Weak bonds were found to be more common in Khulaifat and Hazem Almarkhiya, whilst close relationships were more common in Dhal Alhamam and Hazem Almarkhiya.



Figure 5.23. Measures of community spirit

	Al		Hazem	Duhail	Al			
Case study	Thumama	Onaiza	Almarkhiya	North	Khulaifat	Dahl Alhamam		
Number of know	n people in th	e neighbo	urhood			-		
None	4	5	2	6	6	2		
Few	12	10	8	13	11	11		
Quite few	16	7	5	11	16	5		
A lot	7	7	12	7	7	7		
Most of them	8	6	9	8	9	5		
Number of close relationships in the neighbourhood								
None	6	9	5	8	10	4		
Few	15	7	6	13	13	7		
Quite few	15	10	7	11	13	7		
A lot	4	5	13	6	7	9		
Most of them	7	4	3	7	6	3		
Number of recog	nisable neighl	oours						
None	5	2	3	4	8	4		
Few	12	9	8	14	10	6		
Quite a few	15	11	3	13	12	6		
A lot	7	7	14	6	9	8		
Most of them	8	7	8	8	10	7		

Table 5.16 Comparison of rates of social interaction

Dwelling units are a sub-element of the wider residential built environment. The questionnaire confirmed that the average duration of residence was longer for owned properties than for

rented dwellings, as expected, with an average of more than 5 years in all six neighbourhoods. Consequently, the in-depth investigation focused on owner-occupied dwellings. The study included 104 developer-designed dwellings and 146 owner-designed dwellings. In general, the respondents reported higher levels of satisfaction for owner-designed residences than for dwellings designed and provided by the government (Figure **5.24**). The statistical analysis found that owner-designed dwellings had more spaces than developer-designed dwellings. Furthermore, participants who had designed their dwellings reported higher levels of personal and family privacy (Figure 5.25). The outdoor spaces in owner-designed dwellings provided twice the privacy of those in developer-designed dwellings. As for spatial use, living rooms had higher gathering frequency than other spaces in both owner-designed and developer-designed dwellings (Table 5.17).







Figure 5.25 Dwelling privacy satisfaction

## Developer-designed

	dwellings (number of	Owner-designed dwellings
Gathering space	participants)	(number of participants)
Garden	23	36
Kitchen	9	19
Living room	89	130

#### 5.4.3. Place attachment and residential stability

Almost half (48.7%) of the interviewees had spent between 5 and 20 years in their neighbourhood. Around 31% had stayed for 21–30 years, while 20% had lived in the neighbourhood for more than 30 years (Table 5.18). The longest average period of stay was in Al Khulaifat, where participants lived for an average of 39 years. More than 50% of the dwellings were extended family dwellings occupied by at least one nuclear family.

(years)	Average contact (person)
13	21
27	14
19	20
15	18
39	21
22	15
	(years) 13 27 19 15 39 22

Average residence duration

Table 5.18. Average residence duration

## 5.5. Conclusion

This chapter introduced the selected case studies and presented primary and secondary data to investigate whether different residential designs have different physical qualities. The chapter also presented an analysis of the social behaviours practised in these physical contexts. Comparing residential environment features, the research found that the layouts affected spatial integration, connectivity, legibility, synergy, and visibility. The impact of spatial use was traced by the inhabitants' social behaviour, general satisfaction, sense of safety, and interaction. The collected data reveals distinct behaviours in different environments. For example, Al Thumama was found to have a higher axial integration value than Hazem Almarkhiya. Similarly, the observation survey recorded more inhabitant movement in Al Thumama than in Hazem Almarkhiya. This chapter argued that Doha's residential environment design influences its inhabitants' social wellbeing. Chapters 6 and 7 will explore the nature of this relationship in more detail.

# Chapter 6 Layout design and social wellbeing

# 6. Residential layout and social wellbeing

### 6.1. Introduction

This chapter aims to establish the characteristics of the residential-environment layout that may impact the social wellbeing of inhabitants, addressing the second research question:

How does the layout of the residential environment influence inhabitants' social wellbeing in the social context of Doha?

As stated in Chapter 3, the layout configuration of the residential environment was found to have an independent impact on the social wellbeing variables (Table 5.1). The descriptive analysis discussed in Chapter 5 showed evidence of the variety of qualities that different residential layouts have, along with the variation in social behaviour observed in these physical contexts. The space syntax method was used to examine the layout qualities of the residential environment, whilst social outcomes were analysed using thematic and statistical methods. The subsections of this chapter discuss the social wellbeing indicators affected by the layout of the residential environment. See Table 5.1 and Table 5.2 for the variables and the definitions of the terminologies.

### 6.2. Impact of spatial layout on social interaction

This section examines the relationship between the layout design of the residential environment and three levels of social interaction. The three levels of interaction are community interaction in public spaces, community and household interaction in private spaces, and household interaction in private places. Regarding community interaction, the statistical analysis suggests no significant correlation between frequency of social interaction (or meeting new people) and the neighbourhood layout typology. Similarly, there is no significant correlation between dwelling design (owner-designed and developer-designed) and social interaction between inhabitants. In other words, the variation in layout design in general did not contribute to interaction between inhabitants. However, the research found that specific layout features, such as the integration value of the spaces, did have an impact on community and household social interaction. The following subsections discuss the different scales of layout design and social interaction in further detail, incorporating various forms of data.

## 6.2.1. Neighbourhood layout and community interaction

Previous studies have suggested that the dominance of automobiles in suburban neighbourhoods negatively affects social interaction (Rogers and Sukolratanametee 2009). The behavioural observation survey conducted for this research revealed that inhabitants predominantly used cars for transportation in the six cases. Consistent with the literature, this research found that an increase in car ownership was negatively correlated with social interaction (Spearman correlation coefficient: 0.230, p-value 0.000).

There is a considerable body of literature indicating a positive correlation between neighbourhood walkability and social interaction (Abu-Ghazzeh 1999; Wood *et al.* 2012; Townshend 2014). However, the statistical analysis in this research found no significant correlation between walking activities in different neighbourhood layouts and social interaction (Table 6.1). The likelihood of walking to a daily destination was related to facility and service location, as discussed in section 7.2.1. Differences in the pedestrian movement were noted when comparing the behaviour observation maps of different layout designs (Figure 6.1). The sidewalk as a space for social interaction is investigated in section 7.2.1.

	Layout typology	Case study	Number of known neighbours	Number of close relationships in the neighbourhood
	Semi-gridded	Al Thumama	0.368 0.225	0.123 0.077
Walk to daily destination		Dahl Alhamam	0.066 0.022	0.798 0.793
	Cul-de-sacs	Onaiza	0.231 0.127	0.217 0.191

	Hazem Almarkhiya	0.907 0.900	0.068 0.040
Loops	Duhail	0.316 0.302	0.824 0.822
	Khulaifat	0.764	0.312
		0.753	0.290

Table 6.1 Correlation between the likelihood of a person walking to daily destination and social interaction





Cul-de-sac layout weekday observationSemi-gridded layout weekday observationFigure 6.1 Comparison of pedestrian movement and activities between two layouts

Investigating the frequency of social interaction, the research found that inhabitants frequently interacted with their neighbours in private spaces, rather than engaging in casual interaction in public spaces (

Table **6.2**). This might be influenced by the harsh climatic conditions of Doha. Some interviewees explained their preference for gathering locations as follows:

'Most of our gatherings are in our homes, around our kids. I do not like gatherings in cafes' (female, 40s, cul-de-sac layout).

'I have a Majles for the men. It is open 24 hours. If I am away, my son is here to welcome visitors. I meet my neighbours at the mosque and in the Majles – my Majles or the neighbours' Majles' (male, 50s, owner-designed dwelling).

'Mostly we meet in the mosque or here in my Majles, or I visit them in their Majles. I know more neighbours but don't know where their houses are, as we meet only at the mosque' (male, 50s, cul-de-sac layout).

The following section explains how dwelling layout facilitates social interaction between neighbours.

	Location	Al Thumama	Onaiza	Hazem Almarakhiya	Duhail	Khulaifat	Dahl Alhamam	Participants (total count)
Preferred	At home	32	15	23	16	21	14	121 *
place for								
meeting with	Public space within the	5	8	5	9	8	7	42
neighbours	neighbourhood							
	Outside the neighbourhood	10	14	6	16	17	11	74

Table 6.2 Different neighbourhood layouts and preferences for gathering locations with neighbours\*Significant Chi-square correlation p-value of 0.05 or less.

## 6.2.2. Dwelling layout and community interaction

The layout designs of both dwelling typologies (owner-designed and developer-designed) positively correlate with social interaction. A comparison of the two typologies was not possible, as the owners of many developer-designed dwellings had made changes that had increased the properties' similarities to the spatial layout of the owner-designed dwellings.

Visitor spaces are vital in Qatari dwellings, owing to the importance of hospitality in this cultural context (Al Mohannadi et al. 2019). Qatari dwellings devote spaces to hosting communal social gatherings (*Majles*). The importance of the *Majles* is evidenced by its ubiquity and its strategic location in all the studied cases. Indeed, some dwellings had more than one Majles, used for different gender or age groups. The location of the Majles facilitates communal interaction and household privacy. Figure 6.2 shows that the men's *Majles* is located as close as possible to the public space (the street) and has a weak relationship to the main family space (the living room). Using the integration value, an analysis of the dwellings' layout found that the male Majles had the lowest integration values (see Appendix K for the full space and integration value order table), whilst the women's Majles had a high integration value with the family gathering space (Figure 6.3). The men's Majles were also visually connected to the public space, using more permeable material and shorter fences (Figure 6.4).



Figure 6.2 Locations and number of *Mailes* spaces

ground floor living room first floor living room second floor living room bathroom washing kitchen roof / terrace stairs store lobby / corridor front vard left yard right yard back yard dining MM men majles wM women majles

changing room library office driver room garden play room garden room hobby room enterance tent GYM Pool

bedroom

BD

С LB

ο

DR

G

P

GR

н Е

π

GY

SW

- laundry/ ironing room EC extention for married
- children
- balcony R animal place

High									Low
Integration									Integration
Family living room	Women Majles and dining	Guest bedroom	Nuclear family living room	Kitchen	Female servant bedroom	Single children bedroom bedrooms	Male servant bedroom	Married children bedrooms	Men Majles and dining

Figure 6.3 Sequence of spaces, based on integration value



Figure 6.4 Physical characteristics that distinguish the men's Majles

The analysis of the spatial organisation identified two methods of arrangement: ring spatial organisation (Figure 6.5) and linear spatial organisation (Figure 6.6). Living rooms, kitchens, dining rooms, *Majles*, and bedrooms were common elements of both the ring and linear order (Figure 6.6). Just under half of the case studies (47%) were found to have an internal ring. Rings were more common in the owner-designed dwellings, with very few in the developer-designed dwellings. Those with rings had more highly integrated spaces (Figure 6.7) than dwellings with linear space organisation (Figure 6.8).

The statistical analyses found that satisfaction with dwelling layout was positively correlated with the ease of inviting guests (developer-designed: spearman correlation coefficient of 0.437, p-value 0.002; owner-designed: spearman correlation coefficient of 0.189, p-value 0.031). An extended social network of inhabitants was found to have an impact on the inhabitants' dwelling design. Some interviewees had added spaces to their dwelling design to better serve their social activities:

'We have many visits to one another's houses [the neighbours] for advice and meetings. They come to my Majles regularly, so I enlarged my Majles many times' (male, 50s, loop layout)

'My neighbours built Majles for the men, and I felt that our dwelling-gate location was annoying them. So, I closed it and opened another one. My neighbour is shy and I did this as a kind of respect' (female, 40s, cul-de-sac layout).

Building, expanding, and changing one's dwelling design to maintain positive interactions with one's neighbours was a unique practice in the Qatari community. The following section discusses dwelling layout and household social interaction, and the dwelling spatial use analysis findings are reported in Chapter 7.



Figure 6.5 Ring spatial arrangement



Figure 6.6 Linear spatial arrangement



Figure 6.7 Convex map of a dwelling layout, with ring spatial organisation and integration graph



Figure 6.8 Convex map of a dwelling layout, with linear spatial organisation and integration graph

## 6.2.3. Dwelling layout and interactions within household

The previous section identified the role of dwelling layout in regulating social interaction within the household and the community. This section presents justified graphs to illustrate the impact

of dwelling layout on social interaction within the household. All the justified graphs of the studied dwellings are described and presented separately in Appendix J.

The spatial integration analysis found that the living room had the highest integration value of all spaces. The statistical analysis showed that the living room is frequently used for household social interaction and gathering (Table 7.8). The thematic analysis of the interviews indicated the frequent use of the living room as the main location for household interaction. Section 7.2.3 discusses how the living room is used by inhabitants for social interaction, whilst this section notes the physical properties of the living room (e.g., size, location, visual connectivity).

The thematic analysis found that the size of the living room influenced the regular use of the space. Many dwellings were found to have multiple living rooms. The spatial analysis found that multiple living rooms were more common in dwellings that had one *Majles*. The living rooms each had different uses for different occasions. The interviewees preferred 'cosy' living rooms for daily family use, and some were used to host visitors in informal settings. Spacious living rooms were used for large gatherings of relatives and extended family or for occasions such as breaking fast during Ramadan. One interviewee living in a multi-living-room dwelling expressed her preference for a specific living room:

'Everybody likes the small living room. It is cosy, we chat, we ask each other for advice, we watch TV together. My daughters and I spend most of our time together there' (female, 40s, developer-designed dwelling).

Another quality of the living room that was found to affect social interaction was visual connectivity. Connectivity to the exterior environment (the yard) and to other spaces in the dwelling was found to provide control, though it was not preferred if it disturbed the privacy of the family space. The interviewees reported a need for privacy from non-family members, including visitors, people in the street, and domestic servants. Several interviewees expressed opinions about the visual connectivity of their living rooms:

'The positive thing is I have an open-plan living room. If you sit in the living room, you are visually connected to other places inside and outside, which is psychologically pleasing' (male, 60s, owner-designed dwelling).

'The living room, the heart of the house. From the living room, you can supervise everything. My living room is double-height, so you can hear when somebody is walking or talking upstairs. There is connectivity' (female, 50s, owner-designed dwelling).

'I am unsatisfied with the living room privacy, as the door directly opens to the outdoors, and we always keep the dwelling gates open' (female, 70s, owner-designed dwelling).

'After we changed the layout to open-plan, the living room faced the maids' bedroom, disturbing their privacy. My dad always asks to close their door when he is using the living room. He wishes to block this door and open another one at the rear. I would move the maids' room and the laundry to the second floor if it were my decision. For my mum and me, it is ok; but my dad doesn't feel comfortable' (female, 20s, developer-designed dwelling).

The living room location was frequently described as the 'centre', for its physical qualities and social function (Figure 6.9). Regular household interaction occurs in the living room, and it is used as a dining space in many cases. The interviewees discussed the use of the living room and the activities that took place there:

'Mostly, we use the living room. The place is very good because it is enough for family members and visiting relatives. Its location is central in the house, surrounded by the rooms. Let's say it is the interaction place' (male, 20s, owner-designed dwelling).

'The living room is the activity centre. It is not enough space for gatherings, so it requires separating the grandchildren, but it is slightly linked. Total separation of the kids results in an emotional separation between the kids and their parents' (male, 60s, ownerdesigned dwelling).

'I am home all day, mostly on the ground-floor living room with my parents. We watch TV, chat, and I do some reading. The TV is in the living room. The main setting is in the living room. If anybody enters, I can see them from the living room' (female, 50s, developer-designed dwelling).



Figure 6.9 Spatial centrality of the living room

In light of the layout design and social interaction analysis, this research found as follows:

- The layout of the neighbourhood excluding the locations of facilities and services has no significant impact on social interaction within the wider neighbourhood.
- The inhabitants prefer to interact with their neighbours in private spaces.
- Qatari dwelling layout design ensures social interaction on the community and household levels through 1) the low integration value of the men's *Majles* and 2) the high integration value of the living room.

The following section discusses the impact of residential-environment layout on the social networking of inhabitants.

### 6.3. Impact of spatial layout on social networking

This section examines the relationship between the layout of the residential environment and social networks. The spatial analysis of this research found that physical and visual proximity had significant relationships with neighbourhood layout. Table 6.3 compares neighbourhood layout quality and social network size. As can be seen in the table below, the lowest average visual-step depth between an interviewee and their social contacts was found in the loop-layout

neighbourhood, Duhail (1.33 step). In other words, for inhabitants of Duhail neighbourhood, the majority of their contacts are within their immediate neighbourhood. Furthermore, Duhail inhabitants had the second-largest social network, with an average of 20 contacts each. In contrast, the highest average visual-step depth (2.86) was found in a cul-de-sac layout, Onaiza. This means that inhabitants of Onaiza neighbourhood must take 2–3 visual steps to reach their contacts. Onaiza's inhabitants have a small social network, with an average of just 13 contacts each.

Case study	Layout	Case study area (hectare)	Average social contact (neighbour)	Average visual-step depth	Average Visual-step depth among layout typology	Average social network distance (m)	Average social network distance among layout typology
Thumama	Semi-	42 3	21	19		40 8	
	gridded	1210		110	21	1010	39.4 m
Dahl	Semi-	185	11	23	2.1	381	
Alhamam	gridded	10.5	14	2.5		50.1	
Onaiza	Cul-de-sac	31.0	13	2.8		45.0	12.8 m
Hazem	Cul-de-sac	20.2	20	2.4	2.6	10 5	42.0111
Almarkhiya	Loop	50.5	20	2.4		40.5	
Duhail	Loop	33.4	20	1.3	1 7	15.7	27.3 m
Khulaifat	Loop	13.8	17	2.1	1./	39.0	

Table 6.3 Influence of the layout of the neighbourhood on the visual and actual contact of interviewees

A more detailed analysis calculated the average number of contacts for each step depth to explore differences resulting from variation in layout design (Figure 6.10). The chart shows that the number of contacts in a semi-grided layout decreases with an increase in visual-step depth. In contrast, the number of social connections increases with an increase in visual-step depth in

the cul-de-sac layout. Inhabitants of semi-grided neighbourhoods had more contacts in their immediate neighbourhood than those of the loop and cul-de-sac neighbourhoods (Figure 6.11 and Figure 6.12). In comparison, those in cul-de-sac and loop layout neighbourhoods had more contacts in the third and fourth visual-step streets. The third and fourth visual-step streets in the loop and cul-de-sac layouts are usually the neighbourhood entrances, which are not found in semi-grided layouts. See Appendix H for the sociograms relating to the step-depth analyses of the interview data.



Figure 6.10 Average number of contacts in relation to visual-step depth



Figure 6.11 Visual-step depth in semi-gridded layout



Figure 6.12 Visual-step depth in cul-de-sac layout



The interviews and sociogram analysis revealed that the frequency of gatherings was influenced by distance from others. The interviews revealed that proximity increases the frequency of interaction between neighbours.:

'I visit my relatives – or they visit me – once or twice a month, and I see them on some special occasions as well. But at the mosque, I meet my neighbours and friends at least two or three times a day' (male, 50s, cul-de-sac layout).

'I have regular visits scheduled with my neighbours. Daily visits to neighbours who live in my block, monthly visits to the neighbours living in further blocks (behind the park)' (female, 60s, cul-de-sac layout).

The thematic analysis found that othervariables may affect the frequency of the gatherings include personal and family responsibilities, work circumstances, and gender. These factors were found to reduce the level of social interaction and gathering frequency between neighbours.

In light of the findings of the layout design and social network analysis, this research concludes as follows:

- Physical and visual proximity have an impact on social networks:
  - Inhabitants of semi-gridded neighbourhoods tend to have more contacts in their immediate neighbourhood, whilst the average number of contacts decreases with an increase in visual-step depth.
  - Inhabitants of cul-de-sac neighbourhoods have fewer contacts in their immediate neighbourhood. In contrast, their average number of contacts is higher on the wider neighbourhood scale.

- The households' social network has an impact on the visitor space and dwelling design.

This research found that the *Majles* was an essential space in every case study in this cultural context. The importance of the *Majles* is due to the significance of community interaction and networking. The space also plays a role in maintaining household privacy. The following section discusses the residential-environment layout and its impact on privacy.

## 6.4. Impact of spatial layout on privacy

This section examines the relationship between residential layout and privacy. Privacy was found to have a significant statistical correlation with frequency of visits (Spearman correlation coefficient of 0.141, p-value 0.026). However, there was no significant statistical correlation between neighbourhood layout design and privacy satisfaction. The physical environment mapping highlighted that cul-de-sac neighbourhoods had a high percentage of dwellings with raised fences (Table 6.4 and Figure 6.13). In contrast, the lowest percentage of raised fences was found in loop layout neighbourhoods. Some interviewees said that their privacy was compromised by neighbours overlooking their private outdoor spaces:

'We share a wall with our neighbour, and once they had a labourer to fix something, and he climbed down to our house! They should have asked or informed us before doing that' (female, 20s, cul-de-sac layout).

'I want to make the fence higher, but this is the maximum height we can reach. We have a partition for the sidewalls, as the neighbours' windows overlook our house' (female, 50s, semi-gridded layout).

Case	Layout design	Percentage	
Al Thumama	Semi gridded	1.47	
Dhal Al Hamam	Semi-gridded	4.27	
Onaiza	Cul-de-sac	8.08	
Hazem Almarkhiya		7.14	
Duhail	Loop	3.61	
Al Khulaifat		0	

Table 6.4 Percentage of dwellings with raised fences

This finding contradicts previous studies that have suggested a positive impact of permeable or low private yard fences on neighbours' social interaction. In Doha's cultural context, visual connectivity with neighbours is not preferred and negatively affects yard privacy.



Figure 6.13 Example of cul-de-sac neighbourhood physical mapping

Building regulations for dwellings in Qatar require setbacks from all four sides. The yard created by the setbacks forms an outer spatial ring. In some cases, the yard had several entrances from the street, depending on the location of the plot. The built environment mapping activity revealed that dwellings had two and four gates, and each gate had a different user group. Multiple points of access serve different users and purposes. One frequently reported problem was the entrance orientation for the male *Majles* or the male servants' room oppositethe neighbour's family entrance. This issue was noted in the interviews with residents:

'I wish I could kick out a neighbour. He opened his driver's room door toward our family entrance. They do not respect our rights as neighbours' (female, 40s, cul-de-sac layout).

Regarding the impact of dwelling layout on household privacy, two types of privacy were discussed: indoor and outdoor. As described above, outdoor (yard) privacy was affected by the visual accessibility of private spaces. The layout of the dwelling also affected yard privacy, giving physical access to strange men (visitors and servants). Some dwellings located the male spaces by the dwelling fence, with access from the street and no access to the family yard, thereby maximising privacy. Below are some interviewees' comments on yard privacy:

'I am satisfied with the yard privacy. It was my choice because I liked to ride the bike around the house when I was young. Back then, I had more freedom, as we didn't have a driver. Privacy depends on whether the driver is in the house, and I can't use the entire outdoor space. Otherwise, it's ok' (female, 30s, owner-designed dwelling).

'The doors of the drivers' rooms open to the street. They don't enter the outdoor space. They ask before entering if they want to take the car out. I get annoyed when I see houses that don't use the outdoor space because of the lack of privacy. I go out and walk in my outdoor space. I know that nobody overlooks our outdoor space' (female, 50s, semigridded layout).

Satisfaction with the level of privacy on the dwelling scale was found to be significantly correlated with ease of inviting guests (developer-designed: Spearman correlation coefficient

of 0.437, p-value 0.002; owner-designed: Spearman correlation coefficient of 0.189, p-value 0.031). The yard, *Majles*, and dining room were the spaces that most influenced household privacy. The location of the *Majles* played a critical role in maintaining the privacy of the household. Dwellings with a single visitor space were managed either by time or physically, with doors, partitions, and transitional spaces used to ensure privacy for the household and visitors. The living rooms in these dwellings were used to host casual visits between friends, close neighbours, and relatives. Other dwellings had multiple visitor spaces for use depending on the number of visitors, the visitors' gender, their relationship to the household, and the formality of their visits. The spatial analysis revealed that the women's *Majles* was usually located in the main dwelling spatial ring, while the majority of the interviewees said that the men's *Majles* were located away from the family space, in a separate building by the fence of the dwelling (Figure 6.14). The yard is considered a buffer between the men's *Majles* and the private indoor family space. The interviewees talked about visitor spaces and privacy management:

'There is no conflict with family privacy, as we make sure that my brothers and father are not at home during the visits' (female, 30s, owner-designed dwelling).

'Formal visitors in the Majles. If we have female and male visitors, we use the living room for females and the Majles for males' (female, 40s, owner-designed dwelling).

'We built a men's Majles in the outdoor space, with a dining room and toilets. The Majles inside the house, we changed it to women's Majles, because the old women's Majles was a very small room and not enough space. Also, when the men's Majles was in the house, we [girls and women] needed to keep quiet; when they built the exterior Majles, both of us were comfortable and happy' (female, 50s, owner-designed dwelling).



Figure 6.14 Spatial arrangement of visitors' spaces and family spaces

Although the spatial analyses of the dwellings identified the dining room as a key space in the Qatari dwellings, the interviewees who had separate spaces for dining reported irregular use of them. The dining room usually mediates the living room and the *Majles*. Its relationship to the *Majles* influenced its use as part of the visitors' space, rather than as a daily household space. The dining room facilitates household privacy by separating the visitor space and reducing direct access.

In light of the findings of the layout design and privacy analysis, this research concludes as follows:

- The privacy of the household is influenced by neighbourhood and dwelling layout (Figure 6.15).
- The location of the *Majles*, yard, and dining room have an impact and a role in maintaining the indoor privacy of the household.
- Yard privacy is affected by several physical variables, such as the neighbours' sightline, the dwelling-gate location, the fence height, and the access of strange men to the yard.



Figure 6.15 Factors that impact household privacy (Source: author)

# 6.5. Impact of spatial layout on social support

This section examines the relationship between residential layout and social support. This research found that layout has an indirect impact on social support. Section 6.3 examined the impact of layout on social network, whilst social network variables (number of close relationships, recognised neighbours, known neighbours) were found to be significantly correlated with social support (Table 6.5). A comparison of different neighbourhood layouts and levels of social support found no significant statistical correlation. Social support was more evident in the spatial and thematic data, and it was stronger on the household scale than on the neighbour scale.

	Receipt of social	Ability to ask	Ability to ask
	support from	neighbours for	neighbours for
	neighbours	help	personal advice
Number of close	0.354	0.452	0.592
relationships	0.000	0.000	0.000
Number of known	0.367	0.425	0.470
neighbours	0.000	0.000	0.000
Number of recognised	0.272	0.454	0.501
neighbours	0.000	0.000	0.000

Table 6.5 Correlation between degrees of social relationships and social support

The thematic analysis of social support found different patterns for different demographic groups. Unsurprisingly, older people who do not have young children reported less need for help with childcare. The younger adults who had young children discussed various forms of social support, including emotional and practical:

'When it was my daughter's wedding, I didn't have to prepare anything. My neighbours helped me' (female, 50s, cul-de-sac layout).

'It depends on the neighbour. Some of them, I talk to them about my children problems; otherwise, I would explode. I ask them for advice and they won't tell anybody. I consider my neighbours' children as my own, and the other way round. We care about each other. This is not common these days. I don't know what's wrong with people' (female,40s, culde-sac layout).

'Yes, we lend each other clothes. Whenever you ask for something, you will get it right away. When I have had occasions, every neighbour has come with something they cooked. When my family from Saudi Arabia visit me, they were amazed by the relationships I have with my neighbours' (female,50s, semi-gridded layout).

The statistical analysis revealed that social networks had a broader impact on community-level social support. There was a positive correlation between the number of recognisable neighbours and the friendliness of the neighbourhood (Spearman correlation coefficient of 0.409, p-value 0.000). Getting along well together as neighbours regardless of cultural background positively correlated with the number of recognisable neighbours (Spearman correlation coefficient of 0.390, p-value 0.000). Community-level social support was apparent in the inhabitants' behaviour, such as maintaining and providing facilities for the community:

'My husband likes to do annual maintenance for the mosque, although the Ministry of Endowments and Islamic Affairs take care of the mosques. But he enjoys doing that. He feels that the mosque is part of our house. The mosque makes us love the house more' (female, 50s, semi-gridded layout). 'We built the water fountains. Our neighbours built the shading for the parking area, the lighting is good. We do not need anything more, we collaborate. I don't have anything in mind, but once I thought about placing a food fridge, so we can put in the extra food for workers, as charity; but we haven't implemented this idea yet' (female, 50s, cul-de-sac layout).

Dwelling layout design was found to influence family-scale social support. The use of flexible layout designs in some dwellings reflects the importance of family cohesion. It is common practice in Qatar for a newly married son and his wife to live with his family. More than 47% of the case studies were extended family dwellings hosting at least one nuclear family. Whereas some dwellings hosted nuclear families, but they moved out. Extended families were found more often in owner-designed dwellings. More than 52% of the cases included married children living with their parents. Forty per cent of the developer-designed dwellings were extended family dwellings.

Family growth and changes in family structure were reflected in the use of the spaces in the dwellings. The spaces and the form of the dwelling undergo dynamic change, as a household ages (Hanson 1999). The justified graph of an extended family dwelling can be distinguished from others by the nuclear family spatial presence. The spatial links of the nuclear and extended families in owner-designed and developer-designed dwellings differed (Figure 6.16). The number of steps from the main living room to the nuclear family space is a measure of the families' privacy. Between one and four steps separated the main dwelling's living room and the nuclear family living room in the owner-designed dwellings. However, this was only two steps in the developer-designed dwellings.


Figure 6.16 Comparison of the spatial links between the main family space and the nuclear family space in different design typologies

The accommodation of the nuclear families took three forms. The first form pre-empted family growth, with each dwelling having bedrooms for single children and suites for them to move into when they got married (Figure 6.17). The second method involved re-arranging or changing some dwelling features to host nuclear families (Figure 6.18). The third method was to build an extension (vertical or horizontal) when children get married (Figure 6.19). The three methods vary in the privacy they afford and the manner in which they integrate the nuclear family into the extended family. Nevertheless, all methods of accommodating nuclear families ensure more frequent family interaction than when the nuclear family moves out of the dwelling. The correlation test revealed a significant relationship between emotional wellbeing and frequency of gatherings with the household (Spearman correlation coefficient of 0.176, p-value 0.045). Many of the senior interviewees expressed feelings about the frequency of the gatherings with their married children:

'My married son and my daughter-in-law are in their own flat upstairs. They are busy with their life and work. I see them once a day only. On Fridays, we have lunch for all my children who live with me or in their own houses' (male, 60s, owner-designed dwelling).

'I regret that we hadn't considered family growth. Now, I see my grandchildren once a week. I wish they were around me' (female, 60s, owner-designed dwelling).









Figure 6.18 Minor changes to accommodate family growth



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Figure 6.19 Horizontal extension built in preparation for the son's marriage

The analysis of the interviews found that dwelling-design decisions and modifications of extended family dwellings were made to promote solidarity. Changes to the use of rooms, dwelling extensions, and changes in the occupation of the dwellings all served to keep family members together for the longest possible time. The length of the nuclear family's stay depended on the space allotted to them. Some owners planned for family growth during the dwelling-design phase, whilst others made changes or extended their dwellings later when needed. In many cases, a *Majles* was converted to a suite for newly married children, and this was common in dwellings with multiple guest spaces. Other interviewees expressed dissatisfaction with the size of their yards when they were unable to extend their dwellings to accommodate family expansion. This dissatisfaction resulted in moving out of the neighbourhood to find places in which it was possible to live next to one's children in a cluster.

'My children moved to suite rooms after their marriages' (male, 60s, owner-designed dwelling).

'My house is rectangular with five bedrooms. Two of them were joined to make a flat for my married son, and recently he left. After my children left the house, one room was converted to a playroom for my grandchildren' (female, 60s, owner-designed dwelling).

'We have removed the garden and built an extension for my son after his marriage' (female, 60s, owner-designed dwelling).

'The exterior men's Majles was converted into a flat for my married son. Once he left, we returned it to a Majles' (male, 60s, owner-designed dwelling).

'I am unsatisfied with the size of the yard. I want a larger yard. I want my children to be around me. I don't want them to go away' (male, 60s, owner-designed dwelling)

Berman and Phillips (2004) believe that norms and values are less direct to measure, and social support is usually assessed through voluntary work involvement. Although voluntary work might be common in the West, people in the Middle East tend to show social cohesion through social solidarity and support.

In light of the findings from the layout design and social support analysis, this research concludes as follows:

- Layout design has an indirect impact on social support, via the number of contacts.
- A higher number of contacts correlates with higher social support within the neighbourhood.
- Social support in the community was found to include both emotional and practical support.
- Extended dwellings provided social support for senior parents and young nuclear families, as well as strengthen social cohesion.
- Social support at the household level meant providing young couples with accommodation in their early married life, along with advice and support when they had children of their own. Equally, parents require support as they age; and having their children and grandchildren around them provides both emotional and physical support. Extended family dwellings facilitate regular interaction between different generations.

#### 6.6. Impact of spatial layout on sense of safety

This section examines the relationship between residential layout and sense of safety. Layout has a direct and indirect impact on sense of safety, and these are discussed separately in the following sections.

#### 6.6.1. The direct impact of layout on inhabitants' sense of safety

The neighbourhood's physical characteristics – such as street width, integration, intelligibility, and synergy – have a direct impact on the inhabitants' sense of safety. In a comparison of the three layout types, semi-gridded neighbourhoods were found to produce the highest sense of safety, with high integration, intelligibility, and synergy (Table 6.6). In contrast, the sense of

safety was lowest in cul-de-sac neighbourhoods, due to low integration, intelligibility, and synergy.

Layout type	Case study	Average visual integration [HH]	Global integration (R9) (axial analysis) inside the neighbourhood	Local integration (R3) (axial analysis)	Connectivity	Average pedestrian movement	(weekend) Correlation between pedestrian movement and integration (Rn)	Intelligibility (correlation between global integration and connectivity )	Synergy (correlation between global and local integration)
Semi-	Al Thumama	6.35	0.635	0.343	0.055	97	0.593*	0.871	0.971
gridded									
	Dahl	5.77	0.646	0.323	0.046	109	0.639*	0.582	0.876
	Alhamam								
Cul-de-	Onaiza	3.38	0.488	0.263	0.041	42	0.591*	0.603	0.854
sac									
	Hazem	3.04	0.429	1.463	0.033	23	0.193	0.377	0.708
	Almarkhiya								
Loop	Al Khulaifat	4.00	0.643	0.279	0.046	155	0.475*	0.582	0.876
	Duhail north	4.78	0.547	0.198	0.033	29	0.268	0.558	0.854

Table 6.6 Syntactic properties of all spaces in the neighbourhood

A common view amongst the interviewees was that children were at risk of road accidents. Parents or grandparents were asked whether they allowed their children to independently play in or move around the immediate neighbourhood (i.e., the street in which they lived). One interviewee answered: 'My grandchild plays in the outdoor space only. He is not allowed to play beyond the fence of the dwelling. I am afraid of crazy people who drive very fast. And I want them to place speed bumps to reduce the cars' speed' (female, 50s, loop layout).

The layout of the neighbourhood and the width of the street were said to have an impact on driving speeds. Most of the case study neighbourhoods had wide, two-lane streets and parking lanes on both sides, which posed a threat to the safety of children when crossing the street. Furthermore, the physical mapping activity observed cars parked on both sides of the road and sometimes on the sidewalks (see the physical environment maps in Appendix D). This limited the drivers' visual field, meaning they could not see the children until they were already on the street. Many inhabitants stated a need for speed bumps, which they hoped would reduce the driving speeds (Figure 6.20).



Figure 6.20 Physical condition of a typical street (weekday morning) (Source: author)

Another concern of the parents was crime, including sexual harassment and kidnapping of children. These worries were derived from previous incidents that had occurred in the neighbourhood, and as a result, the participants limited their children's social activities to the dwelling boundaries. The data from various sources show that people in cul-de-sac layout neighbourhoods had reported more previous incidents, and they were more concerned about children being kidnapped and harassed. A layout-visibility investigation revealed that the lowest

visual integration value (3.04) was found in the cul-de-sac neighbourhood, which corresponds with the interview findings concerning the low sense of safety amongst inhabitants of this neighbourhood. In contrast, the most visually integrated neighbourhoods were semi-gridded (integration value of 6.35; Table 6.6). The observation maps show more pedestrian movement in highly integrated streets, with less movement observed in the dead ends of the layouts. Table 6.6 shows that neighbourhoods with high synergy value (higher connectivity with the city) report less fear of crime. None of the interviewees living in Al Thumama neighbourhood (synergy value of 0.971) shared concerns about crime. However, in Hazem Almarkhiya neighbourhood (synergy value of 0.708), many residents expressed a fear of crime. Good spatial connectivity to the city allows a flow of strangers to the neighbourhood, which maintains street surveillance and therefore a sense of safety (Hillier 2007).

A high sense of safety amongst adults was linked to active pedestrian movement, which is consistent with the findings of other studies. Previous studies have indicated that layout synergy has a positive impact on pedestrian movement The correlation in spatial data was tested to investigate the case studies' synergy and compare the results to the behavioural observations and pedestrian count. The lowest average axial integration value was found in the cul-de-sac layout (0.429), and the average pedestrian movement observed during the weekend was 23 per hour. In contrast, the highest average integration value was 0.646, found in a semi-gridded layout, where the average pedestrian flow during the weekend was 109 per hour (Table 6.6).

A comparison of neighbourhood layouts revealed that isolated streets (shown in dark-blue colour) are found in loop and cul-de-sac neighbourhoods, whilst streets in semi-gridded layout neighbourhoods have a higher integration value (Table 6.7). The axial map of the case studies shows that the boundary streets generally have a higher integration value than the internal streets. Integration was found to influence pedestrian movement more clearly in semi-gridded layouts, whilst the association was less noticeable in the loop and cul-de-sac layouts.





Impact of intelligibility on sense of safety

Wayfinding and navigation in the neighbourhood were associated with intelligibility value, which was calculated using space syntax. The analysis revealed that Hazem Almarkhiya (with a cul-de-sac layout) had the lowest intelligibility value of the neighbourhoods (Table 6.6), which explained the inhabitants' description of the neighbourhood as a maze. The internal street network had the lowest connectivity to the city (0.708). Al Thumama neighbourhood (a semi-gridded layout) had the highest intelligibility value (0.871), and the internal street network had high connectivity to the city (0.971). Ease of navigation was also noted by the researcher whilst conducting the behavioural observation mapping.





Table 6.8 Scattergram of integration to pedestrian movement, sorted by case study (weekend)

Interestingly, some physical features reflected the inhabitants' feelings of safety. Inhabitants with a high sense of safety kept their property gates open at all times, and this was more common in looped layout and semi-gridded layout neighbourhoods (Figure 6.23 and Figure 6.24). In contrast, neighbourhoods with a lower sense of safety kept their dwelling gates closed and had CCTV security systems, and this was more common in cul-de-sac layout neighbourhoods (Figure 6.21 and Figure 6.22). sense of safety was repeatedly expressed in the interviews with residents and it was related to the condition of the dwelling gates:

'Our house gates are open at all times. If you pass by the house at 4 o'clock in the morning, you will find them open' (male, 50s, cul-de-sac layout).



Figure 6.21 CCTV security system reflects the inhabitants' low sense of safety (Source: author)



Figure 6.22 Signs of a low sense of safety (Source: author)



Figure 6.23 Signs of high sense of safety (Source: author)

Figure 6.24 Keeping dwelling gates wide-open reflects inhabitants' high sense of safety (Source: author)

#### 6.6.2. Indirect impact of spatial layout on inhabitants' sense of safety

The social network of the inhabitants was found to have an indirect impact on their sense of safety (see section 6.3 for impact of layout on social networks). The statistical analysis revealed a significant correlation between sense of safety and number of neighbours known to the resident. Both the number of social contacts and the quality of the relationships positively influenced the sense of safety, meaning that – as the number of contacts and the strength of the relationships increases – people report stronger feelings of safety in their neighbourhoods (Figure 6.25).



Figure 6.25 The relationship between sense of safety and social network and connection with neighbors

An example showing the relationship between social network and sense of safety is illustrated in Table 6.9. The statistics indicate that people who recognise their neighbours feel safer and have higher levels of trust.

	Ability to leave	The need to	Need for	Ability to walk
	belongings safely in	lock doors	monitoring	safely in the
	the neighbourhood		systems for	neighbourhood
	(a g care parada)		dwallings	
	(e.g., cars, parceis)		uwenings	
Number of	0.286	-0.209	-0.157	0.239
Number of recognised	0.286 0.000	-0.209 0.001	-0.157 0.015	0.239 0.000

neighbours

Table 6.9 Impact of high 'neighbour recognition' on adults' sense of safety

The interview participants related their experiences of social networks between neighbours with their feelings of safety:

'When I travel, all my neighbours ask me if I need anything. For example, they call me if they notice something in my house, like a water leak, or somebody will ask about me when I am away. They receive my parcels and keep them safe. This is Qatari customs and traditions' (male, 50s, loop layout).

'Our neighbourhood is safe because men in the neighbourhood regularly go to the mosque together. So, any stranger who comes would know that the neighbourhood's men are here; so, that is why we can keep the house gates open whilst we are asleep' (female, 50s, cul-de-sac layout).

In light of the findings from the layout design and sense of safety analysis, this research concludes as follows:

- Neighbourhood layout has both a direct and an indirect impact on inhabitants' sense of safety.
- Street width, sidewalk conditions, intelligibility, synergy, and connectivity are physical variables that directly affect sense of safety.
  - Low visual visibility in cul-de-sac neighbourhoods reduces parents' sense of safety and restricts children to the dwelling boundaries.
  - High integration values increase pedestrian movement in the neighbourhood, which consequently increases adults' sense of safety. Semi-gridded layout neighbourhoods had the highest integration values, whilst cul-de-sacs have the lowest.
  - Ease of navigation (measured using synergy value) encourages pedestrian movement. Neighbourhoods with low synergy value are described as a maze.
- The numbers of recognised neighbours, known neighbours, and close relationships are affected by neighbourhood layout and influence inhabitants' sense of safety and trust.
  - An extended social network promotes sense of safety.
- The inhabitants' sense of safety is represented physically by the presence of CCTV security systems and dwelling-gate conditions (open vs. closed).

#### 6.7. Conclusion

This chapter explored the impact of residential-environment layout on the social wellbeing of inhabitants. The findings show that the form, flexibility, proximity, visibility, and accessibility of the residential layout affect variables of social wellbeing, including social interaction, social network, privacy, sense of safety, and social support. The chapter highlighted unique aspects that are exclusive to the studied cultural context. Furthermore, it has been shown that the layout highly influences spatial use, and this will be investigated separately in the following chapter.

The spatial analysis in this research identified that maximising the visual connectivity between the neighbours through design and layout encourages people to interact with their neighbours. The analysis found that a larger number of contacts positively correlated with a higher sense of safety. These results reflect those of Cohen et al. (2000) and Farahani (2016) who also highlighted the importance of social interaction and integration for maintaining the place attachment, safety, and mental wellbeing of inhabitants. However, the impact of neighbourhood layout on household privacy has not previously been studied. In this study, privacy was found to be related to the orientation of the dwelling and its gates, which is associated with the neighbourhood layout.

The analysis in this chapter concludes that the spatial arrangement of the dwelling influences four aspects of social wellbeing: 1) social interaction within the household, 2) social interaction of household and visitors, 3) personal and household privacy, and 4) social cohesion between the extended families. Confirming Hanson's saying 'Architecture can carry culture' (Hanson 1999), the spatial arrangement of Qatari dwellings reflects the community culture and norms, including promoting hospitality and privacy. These results further support the idea of dwelling design dynamic and depend heavily on family structure, economic status, beliefs, and background (Rapoport 1969; Lawrence and Low 1990; Dawson 2006). This research found that large extended dwellings are a physical representation of social cohesion and social support, even after children are married. Previous studies found that multi-generation dwellings were essential for the elderly population to maintain social networks and community ties (Hadjri et al. 2019). This research added that the dynamic changes in space in response to family development satisfy the social need for cohesion and support of the younger population. The findings confirm Hanson's (1999) conclusions that the personal privacy of individuals and interaction with other family members is managed by the sequencing of spaces and space integration value.



Figure 6.26 Justified graph representing the typical layout of Qatari dwelling

Based on the findings of this chapter, the justified graph in Figure 6.26 depicts the typical Qatari dwelling layout. A solid ring spatial organisation, with a central living room, increases casual interaction between inhabitants. In most cases, the *Majles* included in the ring is for female visitors, being approximate to the family space but not directly connected to it. The dining room has a strategic location between the visitor and family spaces, which reduces its daily use but works very well as a buffer between the two spaces. The spaces for male strangers are located close to the street (public) and separated physically by a buffer zone (the yard). Personal spaces (bedrooms and married children's suites) are kept private by locating them in the most segregated spaces. The flexibility of the dwelling layout accommodates the extended family and results in family solidarity and social support for both senior parents and the young nuclear family.

## Chapter 7

# Patterns of space use and social wellbeing

### 7. Patterns of space use and social wellbeing

#### 7.1. Introduction

Previous studies have suggested a positive impact of public multi-user space on inhabitants' social interactions. Chapter 6 discussed the impact of various spatial arrangements on inhabitants' social wellbeing, and this chapter concerns the availability of spaces for specific uses and the impact on social wellbeing. The investigation used subjective and objective methods to answer the third research question:

How does the pattern of use of spaces in the residential environment influence the inhabitants' social wellbeing in the context of Doha?

The chapter explores different spatial uses and how they contribute to social interaction between neighbours and households in this unique cultural context. Furthermore, it investigates the impact of spatial uses and inhabitants' residential stability on both the dwelling and neighbourhood scales.

#### 7.2. Impact of patterns of space use on social interaction

In this research social interaction of the inhabitants was investigated on the communal and household levels. Public spaces within the neighbourhood were categorised as indoor or outdoor facilities. No significant correlation was found between the total number of public buildings and the interviewees' average number of social contacts (Table 7.1). The uses in the private dwellings were found to affect social interaction on both the community scale and the household scale. Some demographic characteristics (discussed below) were found to affect the relationship between spatial use and social wellbeing.

Layout	Case study area (hectare)	Average number of social contacts (neighbour)	Total number of public buildings
Semi- gridded	42.3	21	10
Semi- gridded	18.5	14	13
Cul-de-sacs	31.0	13	13
Cul-de-sacs, Loops	30.3	20	5
Loops	33.4	20	8
Loops	13.8	17	28
	Layout Semi- gridded Semi- gridded Cul-de-sacs Cul-de-sacs, Loops Loops Loops	Layout $ext{base}$	Layoutsea hpp seauuuuSemi- gridded42.3211Semi- gridded18.5141Cul-de-sacs31.0131Cul-de-sacs, Loops30.3201Loops13.8171

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Table 7.1 Comparison of the total number of mix-uses and average number of contacts

The statistical analysis found that gender is a significant intervening factor that affects social interaction location and frequency. Men have more frequent interactions than women (Table 7.4). Male interviewees reported more frequent meetings with neighbours, interacting in the mosque after prayers:

'We always gather in my neighbour's Majles. Also, we meet at the mosque or when we are walking to or from the mosque' (male, 50s, cul-de-sac layout).

Gender			Male	Female
Frequency of	Never		3	9
gatherings within the	Occasionally		21	38
neighbourhood	Once a month		8	14
	Once a week		16	21
	Twice a week or mo	re	37	16
Pearson chi-square		0.001		

Table 7.2 Gender and frequency of gatherings between neighbours

Another demographic factor found to affect the frequency of interaction between neighbours was the presence of children. The interviewees reported more frequent interaction with neighbours who had young children, confirming that they came to know other people through their children, who went to the same school or played in the park as their own children. The statistical analysis confirmed that the frequency of meeting with neighbours was positively correlated with the number of children in the household (Spearman correlation coefficient of 0.174, p-value 0.006). Below are some examples of interviewees mentioning the influence of children on their relationships with neighbours:

'I know people who come to the mosque and people whose children go out with my children' (male, 50s, loop layout).

'We do not have young children. Maybe that is why there is no interaction with our neighbours' (female, 30s, loop layout).

Other differences in social interaction associated with spatial use are discussed in the following sections.

#### 7.2.1. Outdoor spaces and social interaction

In general, satisfaction with outdoor spaces was found to correlate with more frequent gatherings between neighbours (Spearman correlation coefficient of 0.151, p-value 0.017) and create more opportunities for casual interaction (Spearman correlation coefficient of 0.130, p-value 0.042). Table 7.3 shows the influence of satisfaction with outdoor spaces on social interaction and network. The following subsections discuss sidewalks and public parks as outdoor spaces and their impact on social wellbeing.

	Number of known	Number of close	Number	of	recognised
	neighbours	relationships	neighbours		
Satisfaction with	0.185	0.163	0.149		
outdoor spaces	0.004	0.011	0.021		

Table 7.3 Spearman correlation test on the relationship between satisfaction with outdoor spaces and social network

Sidewalks

The impact of sidewalks was investigated using several data analysis methods. The correlation test found that, in general, satisfaction with the sidewalks in the neighbourhood had a significant positive relationship with various indicators of networking and social interaction (Table 7.4). Furthermore, the statistical analysis revealed that the quality and conditions of the sidewalks influence their use and therefore the inhabitants' sense of safety in the neighbourhood (Table 7.5).

	Number of known	Number of close	Frequency	of	chatting	to
	neighbours	relationships	neighbours			
Satisfaction with	0.227	0.201	0.198			
the sidewalks	0.000	0.002	0.002			

Table 7.4 Sidewalk satisfaction correlation with social variables

The interview analysis revealed intervening factors that affected sidewalk use – such as the season, distance, and destination. The quotes below concern walking patterns and the influence of the neighbourhood's physical quality:

'I used to walk to the grocery store and the health centre, but now I am afraid of falling as the road has been dug up. So, I use the car' (female, 50s, semi-gridded layout).

'The main daily destination is the mosque. I walk in the neighbourhood, especially after sunrise. My path depends on what is the shortest and the quickest. Sometimes in winter, puddles make me avoid some paths' (male, 60s, owner-designed dwelling).

The physical environment condition mapping revealed that the sidewalks in most neighbourhoods were used for parking space (Figure 7.1 and Figure 7.2). The elderly and families with young children used the sidewalks less often than other populations. The neighbourhood observation confirmed that the walking population was primarily young men (see the larger maps in Appendix E). Additionally, the researcher faced difficulties when conducting behavioural observations, as the parked cars reduced the visual field. This reduced visibility might limit casual interaction between neighbours. The statistical analysis found a significant positive correlation between sidewalk satisfaction and safety measures (Table 7.5).

	Own safety	Child safety	Walk any time in the
	satisfaction	satisfaction	neighbourhood
Satisfaction with the	0.515	0.379	0.271
sidewalk	0.000	0.000	0.000

Table 7.5 Influence of sidewalk satisfaction and sense of safety



Figure 7.1 Sidewalk condition in Khulaifat neighbourhood (Source: author)

Figure 7.2 Sidewalk used as a parking space Vehicle

Although the statistical analysis confirmed the influence of communal spaces on social interaction in general, the data suggest insignificant differences between the case studies. A further analysis using the observational survey data illustrated the impact of the public spaces' location and quantity on pedestrian movement. Distinct pedestrian distribution and movement can be seen across neighbourhoods. For instance, pedestrian movement was more widely distributed in Khulaifat neighbourhood, which has several small shops (Figure 7.3), whilst in Dahil Alhamam neighbourhood, it was concentrated around a large grocery store (Figure 7.4). Moreover, neighbourhoods with fewer communal spaces – such as Duhail – were found to have less pedestrian movement (see Appendix E for all behavioural observation maps).





Figure 7.3 Khulaifat neighbourhood

Figure 7.4 Dahil Alhamam neighbourhood

S Shop E Educational A Authority C Clinic X Empty land ▲ Pedestrian movement The behavioural observation survey and the spatial analysis of the neighbourhood layouts suggest that visually integrated spaces have higher levels of pedestrian movement. Nevertheless, some of the spatial uses located in a low visual integration street attracted inhabitants (Figure 7.5). The interviewees said that they had no reason to avoid spaces in the neighbourhood, but they only used the spaces that they needed.



Figure 7.5 Observed movement around public spaces, overlaid with the visual integration analysis

Public parks

Previous research has extensively explored the impact of public parks on residents' physical, mental, and social wellbeing. The weather conditions in Doha are an obvious limitation on inhabitants' use of outdoor spaces. In addition, the thematic analysis found that the size of the park was an obstacle, limiting the activities that could be practised there and restricting the use of the park by both sexes at the same time. In this cultural context, distance between men and women is crucial for maintaining personal privacy. Therefore, inhabitants tend to use the park at different times to maintain cultural norms. Many interviewees reported that they avoided using the park in case privacy were not possible.

'I go to many parks – not only the one in our neighbourhood. I use the park approximately every week. Sometimes I find the park full of women, so I go to another park; if the park is small, I don't use it. I go to Al Rayan park and Aspire park once or twice a week to do my exercise there' (male, 50s, loop layout).

'Sometimes I use the park — once or twice a month. It depends on the weather. The problem in this park that limits our use is that it has football pitches, and some companies bring their employees (single) to play here' (female, 40s, cul-de-sac layout).

'My neighbours walk as a group during the night, but I don't join them. They walk in the park and they ask me to turn off the house lights, so they have their privacy when exercising. When my children were young, they used to go to the park. I used to watch them from my room window. Only during summer, when it is very humid, we don't want to go to outdoor spaces. It is only because of the weather, not for any other reason. My husband and the neighbours (men) who are retired gather in the park after the Fjeer prayer. Also, they gather during the weekend to work out in the park. Women use the park during the night. Kids always play football in the park. During the weekends, some strangers come to use the park, as Dhal Alhamam park gets crowded' (female, 50s, semigridded layout).

Men tended not to change their places of gathering in response to a change of season, with the *Majles* and the mosque used for interaction all year round. However, the women's gathering

spaces were influenced by the season. During the winter season, women reported doing more outdoor activities with neighbours.

'My neighbourhood is perfect. In my opinion, there is none better than my neighbourhood. My neighbours visit me and I visit them. We share food, and we share occasions too, same as the old days. My neighbour's house is my favourite place. During winter, we gather at Dhal Alhamam park from 4 pm to 12 am with people of all nationalities and communities. During summer, we gather at houses' (female, 50s, semigridded layout).

The investigation found that the park was used for certain activities by specific populations. Inhabitants with young children or grandchildren tended to use the park more frequently than others. The statistical analysis revealed the importance of public parks as family spaces within the neighbourhood for children's safety (Spearman correlation coefficient of 0.503, p-value 0.000). The senior population used the park for exercise, whilst the younger generation preferred the large national parks in the city.

#### 7.2.2. Indoor public spaces and social interaction

#### Positive social interaction and the influence of indoor public spaces

The thematic analysis of the interviews found that some public buildings had more positive social influence than others in Doha's neighbourhoods. Almost all the male participants mentioned the mosque and the *Majles* as regular locations for meetings and interactions between neighbours. However, some said that they also met with neighbours in other public buildings, such as the grocery store. In contrast, women reported seasonal use of the mosque during the holy month of Ramadan for Tarawih prayer. But they did not report the use of any public buildings for regular interaction with their neighbours. Shopping facilities, for example, had a statistically significant correlation with social interaction and networks for men, but not for women (Table 7.6). In addition, the behavioural observation documented more men than women interacting in communal spaces (see Appendix E).

		Number of known	Number of close	Number of recognised
	Gender	neighbours	relationships	neighbours
Satisfaction with	Female	0.0132	0.139	0.210
shopping		0.133	0.113	0.016
facilities	Male	0.2940	0.378	0.096
		0.002	0.000	0.322

Table 7.6 Sex and interaction with neighbours in communal spaces

Interviewees indicated the importance of the mosque for initiating social interaction between neighbours:

'I meet the neighbours at home. My mum sometimes meets her neighbours in the park, but not me. We also meet at the mosque during Ramadan' (female, 20s, cul-de-sac layout).

'Mostly we meet in the mosque or here in my Majles, or I visit them in their Majles. I know more neighbours but don't know where their houses exactly as we meet at the mosque' (male, 50s, cul-de-sac layout).

'As men, mostly we meet in the mosques. We have visits to neighbours' Majles, we know people who come to masque. We used to have a public Majles next to the mosque. It was supposed to be for us (neighbours), but they took it and gave it to "Mowater Qatar" – a centre under the Ministry of Youth and Sports. We need a common Majles for happy and sad occasions. I saw this idea in Oman; they have big halls next to the mosque' (male, 60s, cul-de-sac layout).

Whilst people met at their neighbours' *Majles*, many – male and female – stated the need for a communal *Majles* for the neighbourhood. They said that this would expand their social networks, as it would resolve some constraints, such as the need to know the *Majles*' owner and the location of the *Majles* frequently used for gatherings with neighbours.

The women had other non-spatial methods for initiating and maintaining relationships, as they did not meet regularly in person. The first method involved sharing food with their neighbours. This practice increased during the holy month of Ramadan. Although this behaviour was not a

kind of social support in this context, the women reported sharing food to initiate social contact with new neighbours and to maintain relationships with old neighbours. Another method involved 'virtual communication' via social media. Many of the neighbours are members of a WhatsApp group. Here are some quotes from the inhabitants:

'We talk to each other on the phone and via WhatsApp. During Ramadan, we interact more and we send food to each other. Our neighbour at the back – we share a wall – we pass things over the wall' (female, 50s, cul-de-sac layout).

'We have a WhatsApp group. We don't meet regularly, but we are always connected. Whenever one of us has an occasion – sad or happy – we arrange a day to visit her. There are no formalities between us, we are all one heart. During Ramadan, we exchange food. Every house shares its food with neighbours. My neighbours wait for my soup in Ramadan. I hope this tradition doesn't stop' (female, 50s, semi-gridded layout).

'The most interesting thing in our neighbourhood is that even if we do not socialise regularly, we communicate through food. We always share food' (female, 40s, loop layout).

Although the use of social media for communication between neighbours is common worldwide these days, sharing food is a characteristic method of communication in this cultural context. The difference between the two methods is that a new neighbour needs to know a group member before they can join the virtual network. In contrast, food-sharing gives individuals the chance to form a network themselves.

#### Indoor public spaces and neighbours' negative interaction

Some interviewees, however, expressed dissatisfaction with some uses that they said caused disturbance, including noise, traffic, and infringement on private property. For example, schools, embassies, and parks have been associated with annoyance of the local inhabitants. Below are some comments from inhabitants who live near schools:

'I don't think that there is better than this neighbourhood. It is very tidy, the park is nearby, the only noise is this school. It should be illegal to open a school in the middle of a neighbourhood. There should only be a nursery. They park cars in our private parking area. The school should have its own parking area' (female, 60s, cul-de-sac layout).

'The condition of the street changes depending on the time of the day. For example, you will hate it in the morning. If you want to get out using your car, you need an hour because of the school traffic. There are more than five schools near the house' (female, 30s, loop layout).

Although previous studies have shown public buildings to have a positive impact on inhabitants' social interaction, in this context, they were found to have either a negative impact or none at all. When inhabitants were asked where they usually met and talked to their neighbours, the *Majles* was the most common response from the male participants, with female participants citing private dwellings. The following section discusses the different ways in which men and women maintain positive relationships in their private dwellings.

#### 7.2.3. Private indoor spaces and social interaction

Chapter 6 listed key spaces in the Qatari dwellings by analysing the layout design features. The spatial location and integration values determined the spaces' significance in the dwellings in this cultural context. This section investigates the particular uses of the key spaces (i.e., the living room, *Majles*, and dining room) and their impact on the social interaction of the inhabitants. Table 7.7 confirms the significance of the key uses, comparing the use availability in different dwelling typologies. The similarities are the result of the owners' modifications, made to accommodate the inhabitants' social needs. The following sections describe the impact of spatial use on social interaction, as revealed by the spatial analysis of the interviewees' dwellings.

		Owner-designed	Developer-designed
Spaces		dwelling	dwellings
Visitor	Separate men's spaces (men's Majles)	68.4%	66.6%
space	Separate women's spaces (women's Majles)	57.8%	53.3%
	Guest bedrooms	94.7%	26.6%
Family	Ground-floor living room has the highest	61.9%	66.6%
spaces	integration value		
	First-floor living room has the highest	26.3%	6%
	integration value		
Extended	Percentage of dwellings that house a nuclear	63%	46%
family	family		

#### Design typology

Table 7.7 Comparison of spatial use availability in different dwelling typologies

Visitor spaces are essential in this cultural context, as they facilitate social interaction with the wider community, ensure both household and visitor privacy, and consequently enhance overall social wellbeing. The spatial analysis of the dwelling designs found that the dwellings had at least two spaces dedicated to hosting guests (*Majles* and the dining space). Large dwellings had several spaces for guests, categorised according to gender, the relationship with the visitor, and the formality of the visit. Dwellings with limited visitor spaces suffered from limited privacy for inhabitants.

'We built the male Majles in the yard, with a separate dining room and toilets. The old Majles located in the main dwelling building is used for female visitors, because the women's Majles was a tiny room and not enough. Also, when the male Majles was in the main dwelling building, we (women) needed to keep quiet. When they built the exterior Majles, both of us were comfortable and happy' (female, 50s, owner-designed dwelling).

The living rooms had the highest integration value of any space in the dwelling, indicating their importance for the family (see section 6.3 for the living room spatial quality analysis). The chi-

square test for frequency and location of gatherings revealed the living room to be the most commonly used space for family gatherings (Table 7.8). The living room brought all the inhabitants together for different activities (Table 7.9). The spatial analysis found that some dwellings had several living rooms (Figure 7.6). The thematic analysis revealed that these included extended family living rooms, daily living rooms, and nuclear family living rooms. They varied in terms of integration, with different privacy levels and uses. The presence of multiple living rooms revealed the importance of household social interaction at the different levels – namely, the extended family scale and the nuclear family scale.

	Interaction per day	Garden	Kitchen	Living room
Frequency of	Never	7	2	6
gathering with	Once or twice	19	9	83
own household	More than twice	34	17	132
	Pearson chi-square	0.007	0.687	0.001

Table 7.8 Household gathering frequency and space used

	Activity	Chat	Eat and drink	Watch TV	Play
Location of household	Living room	178	138	131	68
gathering	Garden	56	38	35	24
gathering	Kitchen	25	25	17	13

Table 7.9 Location and household activity chi-square test

Note: Shaded cells indicate a significant correlation (p-value < 0.05)



Figure 7.6 Number of the living rooms in different case studies

In light of the findings of the spatial use and social interaction analysis, this research concludes as follows:

- Weather conditions influence the use of public outdoor spaces. Fewer outdoor activities are reported in the summer season.
- Pedestrian movement is influenced by the quantity and location of communal spaces, as well as sidewalk condition and visual integration values.
- The condition of the sidewalks and their use for parking space limit their use by pedestrians and reduce inhabitants' sense of safety.
- The size of the park limits its use by men and women at the same time.
- Mosques are the key public indoor spaces, positively affecting social interaction in this cultural context.
- Public indoor spaces influence male inhabitants more than female.
- The *Majles* is an in-between space that facilitates communal interaction in a private setting.
- Public spaces have a minimal impact on women's social interactions; and women initiate and maintain relationships using non-spatial methods.
- The importance of household social interaction is reflected by the integration value of the living space and the number of living rooms in the Qatari dwelling.

#### 7.3. Impact of patterns of space use on residential stability and mobility

This research uses the Ross *et al.* (2000) definition of residential stability, which is concerned with the flow of the population in and out of the neighbourhood. Data in this research were collected from stable inhabitants who had lived in the same neighbourhoods for more than 5 years. It was crucial to know the reason for residential stability, as this affects the formation of social relationships and overall neighbourhood social wellbeing. The interviewees' given reasons for residential stability were categorised as either physical or social (Figure 7.7). The physical factors included satisfaction with dwelling characteristics and neighbourhood advantages, while the social factors were related to social ties, neighbouring relatives, and extended family matters.



Figure 7.7 Reasons for population stability (Source: author)

A total of 132 questionnaire respondents shared their reasons for remaining in their neighbourhoods. More than 56% of the responses were related to the dwelling or neighbourhood environment quality and maintenance, noise levels, location, services, or the facilities available in the neighbourhood. A further 31% were related to social aspects, such as ethnicity, proximity to relatives, good neighbours, and a sense of safety. The neighbours with whom participants had social relationships were classed as either 'neighbours' or 'relatives and extended families'. Participants used 'sisters', 'kind', 'friends', 'like a family', 'like relatives', 'gold', 'like old-days neighbours', 'good', 'interconnected', and 'fraternal' to describe the quality

of their relationships with their neighbours. Below are some of the social reasons given for the interviewees' stability:

'This has been our house since 1998, and my neighbours cannot be replaced. Nothing would make me move out of the neighbourhood' (female, 50s, cul-de-sac layout).

'This land was granted by the government, and I built my lifetime home. God gave us neighbours who are like relatives' (female, 50s, semi-gridded layout).

'We have spent 21 years in this house. My husband always thinks about moving out to a bigger house, but I think neighbours are more important than the house size. "Al jar qabl aldar" ['the neighbour before the house'], and my neighbourhood is very good' (female, 40s, cul-de-sac layout).

Table 7.10 shows that the social reasons for residential stability (the desire to live close to one's immediate family and relatives) correlate with other aspects of social wellbeing, such as social networks, social interaction, sense of safety, and social support.

	Social quality	Spearman correlation
Living close to family and	Social network	coefficient 0.241
relatives		p-value 0.000
	Social interaction	coefficient 0.323
		p-value 0.000
	Sense of safety	coefficient 0.207
		p-value 0.001
	Social support	coefficient 0.142
		p-value 0.028

Table 7.10 Impact on social wellbeing of living close to one's relatives

The analysis found that residential instability – or increased mobility of inhabitants – begins when dwelling crowding increases due to family development or extension. If married children expressed the need for more space for their nuclear families, whilst parents wanted to maintain proximity to their children, many interviewees would move out – or wish to move out – to

suburban areas, where they could find land suitable for their extended family. Below are some supporting quotes from the interviewees:

'In the current time, no; my son got married, and I built him an exterior extension. If I want to move out, it would be for my children to have lands next to each other' (male, 50s, owner-designed dwelling).

'I plan to move out when I get married' (female, 20s, developer-designed dwelling).

'I don't think about moving out of this house, except if have a big piece of land for my children and me altogether in the same place. Otherwise, there is no way I will leave my neighbourhood. I don't think I'll find a similar neighbourhood' (female, 50s, owner-designed dwelling).

Physical quality of the residential built environment

Satisfaction with neighbourhood facilities and services – such as schools, grocery stores, and health centres – has a statistically significant impact on population stability (Table 7.11). Below are some quotes from the interviewees regarding the reasons for their long tenure in their neighbourhoods:

'The availability of facilities like grocery stores and mosques. With time, other relatives started to move into this neighbourhood. There is no reason to move out of the neighbourhood' (male, 20s, semi-gridded layout).

'I own this house and don't have any other option. I am happy with the area. I have known my neighbours for a long time, and the mosque is good. The health care and other services encourage me to stay here and not to leave. In the short-term, I am not planning to move to any other area nor house' (male, 60s, semi-gridded layout).

	Physical qualities	Spearman correlation
Participants' place attachment	Outdoor spaces	coefficient 0.136
		p-value 0.033
	Leisure facilities	coefficient 0.200
		p-value 0.002
	Shopping facilities	coefficient 0.183
		p-value 0.004
	Sidewalks	coefficient 0.223
		p-value 0.000

Table 7.11 Place attachment and quality of neighbourhood communal spaces

A positive correlation was found between neighbourhood attachment and satisfaction with neighbourhood physical quality, as represented by maintenance satisfaction (Spearman correlation coefficient of 0.272, p-value 0.000) and neighbourhood quality satisfaction (Spearman correlation coefficient of 0.170, p-value 0.009).

Regarding dwelling quality and residential stability, dwelling ownership was the key reason cited across all the case studies. The inhabitants who owned their dwellings were less likely to be considering moving out of the neighbourhood. Dwelling size and design were also reasons for inhabitant stability:

'I have lived in the same house for 15 years. I continue living here because I own the house. I cannot build another house, and – thank God – I am happy in this neighbourhood. The neighbours are respectful, and the Qatari norms and traditions are practised' (male, 50s, loop layout).

'The house is small now. When we moved in, we had only four children. Now, we have six, and the children are growing and need more room. We bought this house and we are procrastinating over building our land' (female, 40s, loop layout).

Although the statistical analysis revealed a significant correlation between mixed uses and residential stability, most of the interviewees referred primarily to the social qualities of the

neighbourhood. In contrast, the inhabitants who wished to move out cited solely social reasons – namely, a desire to be close to family members.

#### 7.4. Conclusion

Although the layout and the distribution of uses are two distinct characteristics of a residential environment, they get tangled due to the spatial qualities of the layout. This chapter detailed the impact of spatial use on inhabitants' social wellbeing and showed evidence that the type of use has different impacts on Doha's inhabitants.

Prior studies have established the importance of neighbourhood's mixed land use for social interaction as an element of wellbeing and, therefore, sustainability (Jackson 2003a; Jabareen 2006; Mouratidis 2018a). The statistical analysis in section 7.2 confirmed the findings of previous studies on the impact of communal spaces on social wellbeing (Raman 2010; Brown and Lombard 2014; Cooper 2014). This study found that the presence of services and facilities within the neighbourhood increases casual interactions between residents. The available facilities in the neighbourhood are opportunities for the residents to interact while using these spaces. This finding is consistent with that of Cabrera and Najarian (2015), who found that inhabitants who use communal spaces have more social contacts than those who do not. However, this research found that social interaction is influenced differently depending on nature and the function of the public space:

• Indoor public spaces:

The climatic conditions affected inhabitants' preferences for indoor spaces for interaction. In addition to the nature of mosques being an indoor spaces, their frequent daily use has a significant role in fostering social interaction, especially for men. The frequent use of mosques was found to help men to establish and extend their social networks. The frequent movement to the mosque also helps the natural surveillance of streets and, therefore, enhances safety.

Social relationships initiated in mosques are maintained through further gatherings in the Majles. Majles in the Gulf region is considered as men's hubs in the neighbourhood. Since the

Majles is a private space and may be limited to the owner's social network, the interviewees cited the need for a public Majles near the mosque, which everybody could use without conditions. In other cultures, coffee shops and pubs aided the same need and positively impacted social wellbeing (Finlay et al. 2019).

Majles use and location in the dwelling are protective of household privacy. This chapter found that household social interaction occurs primarily in the living room. The location and the number of spaces used as living rooms reflect the importance of social interaction in this cultural context.

#### • Outdoor public spaces:

This research found that parks are primarily used seasonally by women, children, nannies, and seniors. It was also found that men and young adults are less likely to use the parks due to the limited size of parks that do not support their activities needs. This finding is consistent with that of Ryff (1989) and Western and Tomaszewski (2016) who noticed behavioural differences between men and women in public spaces. Furthermore, this research found that women's desire for privacy in public spaces is maintained by physical distance. The lack of privacy in public spaces – besides the mosque – to establish relationships with neighbours, whilst women rarely used public spaces in this way. Instead, women used their dwellings and other non-spatial forms of communication to initiate and maintain relationships with neighbours.

The previous research encouraged walking to daily destinations, as pedestrian movement enhances sense of safety and social interaction (Wood et al. 2012). Furthermore, sidewalk quality is associated with greater casual interaction between adults and children, which enhances social wellbeing (Mouratidis 2019). In Doha, private vehicles are the most common mode of transportation. However, the exponential growth in the number of cars and untreated sidewalks results in the improper use of the sidewalk. The interviews in this research found that social interaction between children often leads to interactions between their parents. However, the neighbourhood's environment was perceived as unsafe by parents who restricted children's

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mobility in the neighbourhood, resulting in less social network between parents. In addition to sidewalk quality that discouraged walking, the pattern of space use and neighbourhood layout further impacted walking habits. For example, the deep cul-de-sac layout and central service area discouraged daily walking.

Satisfaction with the services and facilities within the neighbourhood was strongly associated with long tenure and residential stability in the neighbourhood. Longer tenure is fundamental for belonging and social cohesion (Van Bergeijk et al. 2008). Consequently, this research found that belonging and social cohesion enhance the sense of safety, as inhabitants participate in maintaining street surveillance (Lochner et al. 1999). Other inhabitants cited social reasons for remaining in the area, such as living with an extended family or proximity to relatives. This is similar to previous studies that suggest the quality of human relationships contributes to the impact of the physical environment (Davis and Fine-Davis 1991).

On the other hand, this study found that some public functions disturb nearby neighbours' personal spaces, such as visitors using personal parking spaces, noise and traffic, which negatively impact inhabitants' personal wellbeing. However, this was beyond the scope of this study and would require further investigation.

Chapter 8

# Designing for the community's social wellbeing

# 8. Designing for the community's social wellbeing

#### 8.1. Introduction

This final chapter discusses the findings from this research that illustrate the influence of the residential environment on the social wellbeing of inhabitants in Doha. The chapter presents recommendations for designing a residential built environment to improve social wellbeing considering the sensitivity of the Qatari cultural context. Furthermore, this chapter discusses the limitations of this work that should be considered when designing future studies, identifies potential design guidelines and policy, and highlights essential avenues for further study.

The design of the built environment has been found to influence various aspects of residents' wellbeing, including social wellbeing (Lochner et al. 1999; Lawrence 2012; Brown and Lombard 2014; Townshend 2014; Eissa et al. 2015; Saeed and Furlan 2017). However, some argue that there is no direct relationship between the built environment and wellbeing. They argue that other non-environmental variables – such as the social characteristics of inhabitants – have a far stronger influence on social wellbeing (Talen 1999). However, there is a distinct lack of evidence for this claim.

Social wellbeing is vital for maintaining the mental and physical health of inhabitants (Montford 2013); therefore, it is essential to consider the social aspects of daily life activities when designing a healthy environment for the community. Previous research has found that the design of the built environment can encourage social interaction between residents (Sampson 2003; Raman 2010; Wood et al. 2012; Brown and Lombard 2014; Alitajer and Molavi Nojoumi 2016; Dong and Qin 2017; Finlay et al. 2019; Abass et al. 2020). However, there are no universal design standards that result in better social wellbeing for all cultural backgrounds (Smith 1971; Cozens and Hillier 2008).

This research explored the relationship between variables of social wellbeing and the design of the residential environment, giving consideration to the demographic characteristics of the inhabitants of the case studies. Social relationships, social networks, sense of safety, social

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support, and privacy were the social wellbeing variables used to compare and contrast to understand the impact of the physical characteristics of neighbourhoods. Six neighbourhoods with different spatial layouts and patterns of use of space were selected for this investigation. In addition, almost 40 detached owner-occupied households were analysed to explore the relationship between their physical characteristics of dwellings and social wellbeing outcomes. Statistical, thematic, and spatial analyses were conducted to answer the following questions:

- Do designs of the residential environment result in different spatial qualities and distinctive social behaviours?
- How does the layout of the residential environment influence inhabitants' social wellbeing in the social context of Doha?
- How does the pattern of use of spaces in the residential environment influence the inhabitants' social wellbeing in the context of Doha?

The use of various methods in this study enabled validation of data and reliability of findings. As a result, the empirical evidence here can be taken to show that residential environment design and social wellbeing have both positive and negative relationship in the case of Doha.

#### 8.2. Summary of research findings

#### Residential environment design – spatial qualities and variation in social behaviours

In the analysis chapter (Chapter 5), different layouts typologies were found to have different spatial qualities. Quantitative modelling and analysis using the space syntax tool of the spatial configuration of neighbourhoods and dwellings highlighted differences in spatial variables such as integration, connectivity, legibility, synergy, and visibility. Furthermore, the descriptive data gathered during the fieldwork indicated a variation in social behaviour in different neighbourhoods. Mapping of social behaviour in neighbourhoods of different densities revealed some of the impacts of the physical context of residential neighbourhoods. There was a negative influence of spatial layout on the distribution of pedestrian movement in the low mix-use density neighbourhoods. In comparison, the influence of spatial use on the distribution of

pedestrian movement was apparent in the neighbourhoods with higher mix-use density. The most important mediating demographic characteristic was gender. Different gender behaves differently in the residential environment. Whilst the most influential physical factor was the spatial layout and spatial use where they were found to impact the amount and the spread of the inhabitants' relationships across the neighbourhood.

#### The influence of spatial layout on inhabitants' social wellbeing in the context of Doha

This investigation identified proximity, intelligibility, synergy, and connectivity as key spatial factors that most strongly influence the social wellbeing of inhabitants. The most significant finding to emerge from the analysis is that spatial and visual proximity between neighbours positively correlates with a larger number of social contacts one has. Similarly, a wider social network that people have correlates positively with social support people experience in the neighbourhood. The research also found that the spatial layout of neighbourhoods influences social networks and their characteristics like distribution and density. Furthermore, the analysis found that the size of one's social network and the quality of one's relationships positively impact one's sense of safety. The analysis also found that the physical indicators of sense of safety to be spatial intelligibility and synergy. Previous research has found higher intelligibility (high integration correlation with high connectivity) facilitates easy navigation (Mahdzar et al. 2019), whilst layout with high spatial synergy (the correlation between local and global integration of spaces) neighbourhoods have strong pedestrian flow and a better sense of safety (Burton 2014). The investigation found that children's safety was influenced by low visual connectivity as well as wide streets which reduce perceived children's safety.

Another significant finding from this research is that the inhabitants' privacy is compromised by layouts- where the gates of dwellings result in overlooking by neighbours' private space. The analysis also indicated that a lack of privacy also compromised the level of social interactions between neighbours.

By analysing over 40 dwellings, it was clear that the living room, dining room, and Majles formed the footprint of the Qatari dwelling, their relative position within the dwelling influenced three aspects of inhabitants' social wellbeing: social interaction, privacy, and social cohesion. Large extended dwellings were critical in facilitating social cohesion and providing informal social support between households. A multi-generation dwelling provides emotional and material support for the household in different stages of their life. Furthermore, this study found that hospitality, social relationships, and family privacy are maintained through different uses' spatial organisation and integration value. For example, the relative isolation -low integration value- of social spaces used to host visitors facilitate hospitality without impacting household activities or privacy.

#### The influence of spatial use and inhabitants' social wellbeing in the residential context of Doha

This study found that patterns of use of spaces have different impacts on inhabitants' social wellbeing. A key finding that emerges from the analysis is that Doha's harsh weather conditions result in many people using indoor public spaces more frequently than outdoor spaces. Furthermore, the use of public space is influenced by the users' gender. Chapter 7 presented evidence of the vitality of mosques as a public space in social interaction, especially for men. Most of the men's social contacts are formed in public spaces, whilst women's social contact with their neighbours are less influenced by public spaces, relying instead on nonspatial forms of communication for initiation and maintenance. Services and facilities in the neighbourhood were shown to increase residential tenure and therefore stability. A considerable number of the participants cited their extended families and social ties within the neighbourhood as the key reasons for their choice to remain within the neighbourhood

The analysis also showed that the men's *Majles* played an essential role in maintaining social relationships between neighbours while maintaining privacy for remaining members of the household. The living rooms were found to play a vital role in maintaining social interaction amount the members of the household. The living room's social significance for the family was evident in its size, strategic location, and multiple living rooms within the same household.

#### 8.3. Contribution to knowledge

Wellbeing studies are becoming more popular worldwide for their significant impact on various aspects of life (Mouratidis 2017). The rationale of this research was the absence of wellbeing research in the Middle Eastern context in general and in the GCC specifically. This study has developed a detailed understanding of how residential environment design can positively enhance social wellbeing, especially in Doha. This research's findings may apply to other cities and towns in the GCC. Indeed, this research emphasizes the role of cultural, climatic conditions and demographic characteristics in shaping inhabitants' behaviour and social wellbeing within the residential neighbourhoods.

This research used a novel approach of mixed methods to explore the cultural context of Doha. Most of the previous studies used either qualitative or quantitative methods. Combining qualitative and quantitative methods in this research has proven helpful in expanding our understanding of how residential environmental design affects the social wellbeing of inhabitants in a conservative community. The use of thematic analysis has unveiled the cultural perspective of inhabitants' social behaviour. While the spatial analysis objectively measured and reported the actual physical environment quality of the neighbourhood. The combination of different methods strengthened the research and provided reliable collective conclusions.

Previous studies have recommended using privet outdoor properties – such as yards and porches – to maintain street surveillance and enhance social interaction between neighbours (Burton et al. 2011). This research found that the visual connectivity of private spaces to the public has a negative impact on inhabitants' social wellbeing in Doha's cultural context. Visual exposure resulting from the neighbourhood's layout characteristics increases the possibility that neighbours overlook one's private spaces due to facing doors or overlooking windows. Residents in this context have responded to the lack of privacy by raising the fence's height. However, the spatial layout of the neighbourhood was less influential when neighbours had strong ties (having had long relationships, for example, or neighbouring relatives).

Previous studies have shown that public spaces have a vital role in social interaction (Raman 2010; Karuppannan and Sivam 2011; Montford 2015; Zhu and Fu 2017). This research found that, in this cultural context, some public spaces have a more significant influence than others. The thematic analysis in this research reveals that outdoor public spaces have a weak impact on the social wellbeing of inhabitants due to the harsh climatic conditions of Doha. Inhabitants prefer indoor public spaces, similarly, a variation in use is noticed for different indoor public spaces. In this context, mosques are used daily for prayers which facilitate frequent interaction, especially for men. Relationships that evolve in the mosque are maintained through regular visits and gatherings in privet spaces. The harsh climate and untreated outdoor spaces increase the importance of indoor social spaces. Qataris created Majles as an in-between environment in which neighbours can network indoors without interrupting the privacy of the household. The *Majles* has a significant role in social interaction, social cohesion, and sense of safety. *Majles* is a crucial space in every Qatari dwelling, with a prominent location and relationship to other spaces.

Researchers emphasized the importance of the co-presence of inhabitants for social interaction (Raman 2010). In this cultural context, the physical distance between opposite genders determines co-presence. This research found that small public spaces inhibit the co-presence of the opposite genders, as the personal distance is thought to maintain privacy. Therefore, as a form of respect, men avoid spaces that are used primarily by women. Men are more present in public spaces year-round, while women use public spaces seasonally. Women have other methods of initiating and maintaining relationships with their neighbours. Qatari women share food to welcome new neighbours and exchange dishes to keep in touch with older relationships.

This thesis provides deeper insights into the role of the Qatari dwelling in social cohesion. Most of the dwellings in this study are multi-generation. This research found that multi-generation dwelling facilitates social support in multiple ways. Extended dwellings have a substantial impact on the social and emotional wellbeing of senior people. They also provide financial support for newly married children. In this study, families unable to stay together due to overcrowding expressed dissatisfaction with their homes, and some had plans to move out to suburban areas where they are able to expand and keep their families together. In other words, the flexibility of the Qatari dwelling is an important feature, accommodating family growth and sustaining social wellbing.

These specificities are significantly important for the formation of social networks, engaging inhabitants, maintaining the privacy and, subsequently, inhabitants' wellbeing. The findings of this research project will be of interest to the city authority and stakeholders, the residential construction industry in Qatar and future architects' education and training. The socially-oriented design recommendation in section 8.4 could enhance the current national master plan for urban planning in Doha, incorporating consideration of the local culture and norms. The findings of this study contribute to our understanding of social wellbeing on the dwelling scale, providing the basis for a Qatari dwelling blueprint for architects and dwelling owners. Satisfaction with dwelling design reduces the need for modifications and occupant turnover, resulting in a longer tenure and a more cohesive community.

The research also contributes to the contemporary academic discourse on Doha, which has tended to focus on future developments and contemporary modern and postmodern interventions rather than on understanding and evaluating the consequences of the existing built environment. This research found a distinctive impact of the residential environment characteristics on the social wellbeing of the inhabitants, which should be part of future architects' education to avoid repeating mistakes. Furthermore, this research lays the groundwork for future research into Qatari culture and norms and their relevance to the residential built environment context.

#### 8.4. Recommendations

The findings from this study allowed developing of recommendations for the design of neighbourhoods and dwellings to enhance social wellbeing in the GCC in general and in Qatar particularly. Social wellbeing is a component of general health in modern societies (Keyes 1998).

Section 8.2 reported the key findings from spatial layout analysis (Chapter 6) and pattern of spatial use analysis (Chapter 7). The recommendations from this research are categorised below using the residential scale: neighbourhood scale and dwelling scale.

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- 1. Design of neighbourhood for wellbeing.
- 1.1 Increase the visual connectivity of the neighbourhood's public spaces without impacting the privacy of the household.

Visual connectivity is primarily influenced by the neighbourhood layout. Deep spaces – such as dead ends and cul-de-sacs – have limited visual and physical accessibility and connectivity. Higher visual connectivity can be achieved by:

- Avoid designing deep and segregated streets, which can increase the fear of crime.
- Study and distribute public spaces to increase visual connectivity between and to public spaces in order to attract pedestrians and increase movement
- Avoid wide sidewalks to prevent parking cars which reduces visibility for pedestrians.
- Control dwelling orientation and regulate dwelling gates by limiting entrance possibilities to prevent visual connectivity to neighbours' private spaces.

# 1.2 Prioritise pedestrians by creating walking-friendly streets.

This research on Doha's neighbourhood found that the demand for car use reduced social interaction opportunities between neighbours. Therefore neighbourhood design should consider the following :

- Reducing the width of the streets and taking the climatic conditions into account.
- Locating services and facilities such as shops, schools, and health centres within walking distance of residential properties encourages the inhabitants to walk to their daily destinations.
- Avoid wide unfinished sidewalks as they are inevitably used for parking cars.
- A mix of land use is encouraged, as it promotes pedestrian movement and social interaction.

# 1.3 Provision of communal men's Majles.

This research revealed differences in the value of specific communal spaces for social interaction in this community specifically. Attending the mosque several times a day for worship, the male participants highlighted the importance of the space as a place to meet their

neighbours. Visits to private *Majles* are an opportunity to maintain the relationships initiated in the mosque.

 Accessible Majles and close to commonly used facilities such as mosques increases social interaction. The proposed communal *Majles* would be a hub for all inhabitants, with no restrictions – unlike a private *Majles*, where one must know the owner.

# 1.4 Consider local cultural values when designing and locating leisure facilities.

This research found that the size and location of local parks should reflect the cultural values and ensure the privacy of men and women in public spaces. Women reported feeling uncomfortable using public parks located next to mosques, which leaves them exposed to men.

- Locate leisure facilities that are commonly used by women apart from facilities that men frequently use.
- The design of the leisure facility should ensure privacy for both genders to use at the same time.

# 2. Design of dwelling for wellbeing

# 2.1 The dwelling layout should be flexible and enable family extensions.

This research found that family cohesion and support are represented physically in the extended family dwelling. Dwellings that do not satisfy family growth are associated with reduced social cohesion, social support, and place attachment.

- The dwelling layout should consider future building extensions to host nuclear families.
- Dwelling should be flexible in changing spatial use or minor changes in the layout to maintain satisfaction and residential stability.

# 2.2 The dwelling layout should respect cultural norms of gender separation.

This research found that Qatari dwellings are designed primarily in response to religious and cultural values. Consideration of the need for gender separation is thus vital when planning for the movement of men who are not family members (e.g., visitors and servants) through the dwelling.

• The visitor spaces and male servants' rooms should have low integration value, giving no direct access to the family spaces.

**2.3 The dwelling layout should facilitate household social interaction and maintain privacy.** Chapter 7 concluded with an illustration of the typical spatial organisation of a Qatari dwelling. The justified graph illustrates that the strategic location of the living room and its connection to other spaces encourages vital social interaction within the private setting of the household.

- The living room should be separated from visitors' spaces by either circulation space or intermediate use, such as the dining room.
- Limit the visual, acoustical, and physical connectivity of male visitors from the daily family spaces.

# 2.4 Privacy in outdoor spaces should be ensured by spatial arrangements rather than the raising of fences.

Some inhabitants in this study had raised their dwelling fences to gain privacy in their yards. However, yard privacy should be considered during spatial planning to ensure no exposure to neighbours' windows.

• The inward-facing, traditional Qatari layout provides a method of preventing visual connectivity to private household spaces.

# 8.5. Limitations

Some limitations due to time available for this study, sample size and focusing on a single city should be considered in the generalisation of its conclusions and its ability to transfer the findings to other locations. The investigation was limited to Doha's city boundaries and studied a single wellbeing dimension (social wellbeing). The small number of respondents – due to resource and time constraints – is another limitation. Nevertheless, the use of multiple methods of data collection enabled a comparison of the findings and reliable conclusions. The study used cross-sectional methods to explore the relationship between residential built environment design and social wellbeing, which indicates associations, rather than causality. The long-term

impact of residential environment design on social wellbeing cannot be fully captured using cross-sectional data. The outcomes of this research do not represent overall wellbeing, as shown by indicators of education, employment, energy, environment, health, human rights, income, infrastructure, national security, public safety, and recreation. Some physical characteristics of the neighbourhood (e.g., maintenance, quality, and built form) were assessed using satisfaction levels, which is a fair overall indication of environmental quality, but it has certain limitations. As it might be unable to explain the influence of the built environment on social wellbeing, the key physical characteristics were assessed using several methods.

There were also limitations related to data collection and fieldwork, such as the following:

- The fieldwork was conducted during the winter season to reduce the effect of the climatic conditions. However, the results – especially those of the observations – may have differed during the summer season.
- This research did not include participants from different cultural backgrounds, as it concerned only participants who had lived in the same dwelling or neighbourhood for more than 5 years.
- 3. Social data could not be linked to precise locations, as the participants chose to complete the electronic form of the survey, rather than the hard copy.
- 4. The online booking system for interview participation did not receive many responses, thus another method was used to reach the community. Contacts with local networks and the snowballing method ensured a larger number of respondents, but there were sampling difficulties, as the interviewees referred solely to other potential participants of the same gender, ethnicity, and age group as themselves.
- 5. For cultural reasons, the female researchers could not interview male participants; therefore, a male researcher was recruited to collect these data. The primary researcher listened to recordings of the interviews or, in some cases, heard them live over the telephone. This reliance on a research assistant prevented follow-up questions being asked, leaving the interviews restricted to the set of questions provided by the primary researcher. Moreover, in some cases, the researcher could not assess or tour the dwelling, as some interviewees were interviewed in a neighbour's house or their

workplace. Some interviewees refused to sketch their dwelling plan or to allow the researcher to tour their house, whilst others had poor sketching abilities. As a result, the spatial modelling was limited to justified graph analysis.

6. Comparison of the owner-designed dwellings and developer-designed dwellings was difficult due to modifications having been made to the developer-designed dwellings by the occupiers. However, the modifications revealed a unique spatial arrangement that was commonly used in this community.

#### 8.6. Opportunities for future research

This research investigated the impact of the residential environment on social wellbeing in the Qatari context, using six neighbourhoods as case studies. However, it is crucial to expand this investigation to include examples of neighbourhoods with a mix of dwelling typologies and greater variation in cultural background. Furthermore, the six neighbourhoods had similar accessibility to central facilities; thus, further research should include more diverse locations to enable a comparison of varying levels of connectivity to the city and their impact on social wellbeing.

Whilst semi-gridded neighbourhoods were found to be associated with greater social wellbeing, additional research is required to verify the impact of building density and the combination of dwelling typologies and forms. Further research should examine the links between neighbourhood layout and household privacy. Much previous research has focused on social interaction and safety, with fewer studies of the impact of neighbourhood layout on privacy.

The findings highlight the significance of the mosque and the *Majles* as spaces for social interaction in this cultural context, and future researchers might consider the specific physical qualities of these spaces. The location and quantity of the mosques and *Majles* should be investigated to understand their impact on social network formation and maintenance. Furthermore, future studies should focus on the type of impact -positive or negative- resulted by different public spaces and how much it influence the social wellbeing of inhabitants.

One significant difficulty that arose during this research was in the linking of spatial data and social data. Future work should consider tools that could link social data to physical locations within the neighbourhood. This would facilitate a deeper understanding of the precise impact of physical context on the social wellbeing of the respondents.

Regarding the dwelling-scale research, further longitudinal studies should consider Qatari dwelling design production and reproduction in relation to the growth of the family. Future studies could also consider changes in spatial organisation over time and alongside the evolution of the household structure, the influence of these changes on spatial integration and isolation, and the relationship with social wellbeing. Access to accurate dwelling plans would facilitate a more in-depth analysis of spatial qualities such as visibility and accessibility.

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# Appendices

### A. Ethical form

- B. Doha national master plan
- C. Research tools templet
- D. Physical mapping of neighbourhoods
- E. Behavioural observation maps
- F. Axial map of neighbourhoods
- G. VGA map of neighbourhoods
- H. Overlap of VGA map and sociograms of interviewees
- I. Shortlisted neighbourhood locations
- J. Dwelling justified graphs and description
- K. Space/integration value order table of the dwellings
- L. Raw data:
  - a. Statistical analysis:correlation test
  - b. Anonymised questionnaire
  - c. Anonymised interview

#### A. Ethical form

#### EC1810.390 WELSH SCHOOL OF ARCHITECTURE ws ETHICS APPROVAL FORM FOR STAFF AND PHD/MPHIL PROJECTS □ STAFF Tick one box: PHD/MPHIL Understanding the impact of the residential built environment design on inhabitants' Title of project: social wellbeing - Doha as a case study Name of researcher(s): Hameda Janahi Name of principal investigator Hameda Janahi Contact e-mail address: Janahih@cardiff.ac.uk Date: 26 September 2018 Participants YES NO N/A Does the research involve Children (under 16 years of age) X participants from any of the People with learning difficulties Х following groups? · Patients (NHS approval is required) Х · People in custody Х People engaged in illegal activities Х · Vulnerable elderly people Х · Any other vulnerable group not listed here Х

 When working with children: I have read the Interim Guidance for Researchers Working with Children and Young People (http://www.cardiff.ac.uk/archi/ethics\_committee.php)

Consent Procedure	YES	NO	N/A
<ul> <li>Will you describe the research process to participants in advance, so that they are informed about what to expect?</li> </ul>	X		
<ul> <li>Will you tell participants that their participation is voluntary?</li> </ul>	X	1	
<ul> <li>Will you tell participants that they may withdraw from the research at any time and for any reason?</li> </ul>	Х		
<ul> <li>Will you obtain valid consent from participants? (specify how consent will be obtained in Box A)<sup>1</sup></li> </ul>	×		
• Will you give participants the option of omitting questions they do not want to answer?	X		
<ul> <li>If the research is observational, will you ask participants for their consent to being observed?</li> </ul>		×	
<ul> <li>If the research involves photography or other audio-visual recording, will you ask participants for their consent to being photographed / recorded and for its use/nublication?</li> </ul>	X		

Х

Possible Harm to Participants	YES	NO	N/A
<ul> <li>Is there any realistic risk of any participants experiencing either physical or psychological distress or discomfort?</li> </ul>		×	
<ul> <li>Is there any realistic risk of any participants experience a detriment to their interests as a result of participation?</li> </ul>		Х	

Data Protection	YES	NO	N/A	
• Will any non-anonymous and/or personalised data be generated or stored?				1.075
<ul> <li>If the research involves non- anonymous and/or personalised</li> </ul>	gain written consent from the participants	X		-
data, will you:	<ul> <li>allow the participants the option of anonymity for all or part of the information they provide</li> </ul>	×		
Health and Safety	or part of the information they provide	VEC		

Health and Safety Does the research meet the requirements of the University's Health & Safety policies? (http://www.cf.ac.uk/osheu/index.html)	YES		
Research Governance	YES	NO	N/A
Does your study include the use of a drug? You need to contact Research Governance before submission (responsive clac.uk)	120	X	0.00
Does the study involve the collection or use of human tissue? You need to contact the Human Tissue Act team before submission (hta@cf.ac.uk)		X	

<sup>1</sup> If any non-anonymous and/or personalised data be generated or stored, written consent is required.

las due regard be given to the 'Prevent duty', in particular to prevent anyone being drawn nto terrorism? <u>ttps://www.gov.uk/government/uploads/system/uploads/attachment_data/file/445916/P</u> event_Duty_Guidance_For_Higher_Education_England_Walespdf	event Duty	YES
event Duty Guidance For Higher Education England Wales .pdf	a due regard be given to the 'Prevent duty', in particular to prevent anyone being drawn terrorism? ps://www.gov.uk/government/uploads/system/uploads/attachment_data/file/445916/P	X
	ent Duty Guidance For Higher Education England Wales .pdf	

If any of the shaded boxes have been ticked, you must explain in Box A how the ethical issues are addressed. If none of the boxes have been ticked, you must still provide the following information. The list of ethical issues on this form is not exhaustive; if you are aware of any other ethical issues you need to make the SREC aware of them.

Box A The Project (provide all the information listed below in a separate attachment)

1. Title of Project

2. Purpose of the project and its academic rationale

3. Brief description of methods and measurements

4. Participants: recruitment methods, number, age, gender, exclusion/inclusion criteria

5. Consent and participation information arrangements - please attached consent forms if they are to be used

6. A clear and concise statement of the ethical considerations raised by the project and how is dealt with them

7. Estimated start date and duration of project

All information must be submitted along with this form to the School Research Ethics Committee for consideration

project to have neg ecklist have been to	ligible ethica icked).	I implications (can onl	ly be used if none of the grey	
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Advice from the School Research Ethics Committee

#### STATEMENT OF ETHICAL APPROVAL

This project had been considered using agreed Departmental procedures and is now approved

Signature

Name GAGMERA ZAPARA-LAWGAMER Date 30/10/18

-

Chair, School Research Ethics Committee

Title of Project							
Understanding the	e impact of the resident	tial built environm	nent design on inhabitants' social wellbeing - Doha a				
a case study							
Purpose of the pro	oject and its academic r	ationale					
The aim of the res environment desig understanding of	earch is to contribute w gn on inhabitants' socia the relationship in the c	vith empirical evic I wellbeing, Furth ultural context of	lence to assess the impact of the residential built ermore, the work which will provide a better Doha.				
Brief description of	of methods and measure	ements					
Method	Measurements						
Questionnaire	Social Wellbeing	Dwelling scale	Family social activities, patterns and perception or the spaces they have for socializing.				
		Neighborhood scale	Inhabitants social behavior that is measured in for themes; connection, trust, social support and safety.				
	Built environment	Dwelling scale	Inhabitants' satisfaction on the dwelling design, spatial arrangement, quality, and privacy.				
		Neighborhood scale	Inhabitants' perception of the neighborhood, its safety, density, satisfaction of its quality and availability of services and maintenance				
Interview	Social Wellbeing	Dwelling scale	Deeper understanding of the family social behavio with the chance to see and sketch the spaces they describe.				
	-	Neighborhood scale	Deeper understanding of interviewee relations to the neighbors and investigate the social support aspect. Use map to mark daily destinations and roots				
	Built environment	Dwelling scale	Assess belonging and attachment to the place the live in. Their perception of the design and if they made any changes or wish to make.				
-		Neighborhood scale	Evaluate their satisfaction about the area they live in terms of safety, facilities, density, and investigate the reasons of using/ not using public spaces.				
Observation	Social Wellbeing	Mainly observe t using a space, w spaces, and whe following on a m not include phot	the connection between neighbors. Identify who is hat are the activities being done in the public re people socialize. Mapping activity will record the ap: activities, age group, locations. This activity will ography nor video recording.				
	Built environment	Record the quali the urban space. quality of the bu facilities and urb photography nor	ty of the neighbourhood and how people are using Mapping activity will record the following: the ilt environment (streets, walk ways, public spaces), an furniture. This activity will not include video recording.				
articipants: recruit	ment methods, number	r, age, gender, ex	clusion/inclusion criteria				
urvey	People from the sele will be selected syste survey aim to reach	cted case studies ematically. The ca 50% of each site	will be invited to fill the questionnaire. Participants se study size is around 150-200 houses, and the				
nterviews	survey aim to reach 50% of each site. By the end of the survey, people will be asked if they would like to participate further in the research by conducting 20-30 minutes interview. The interview shall be in their own houses in order to have the opportunity to sketch and photograph the house design for further spatial analysis.						

Survey	People from the case st	udy sites will be selected systematically and will be approached by				
	knocking their doors. Th	ne first page of the survey works as an introductory page to the				
	research and questionn	aire and ask for the participant consent-Please see below They				
	will have the opportuni	ty to choose to fill an electronic version on the iPad, fill a hard				
	copy, or the surveyor he	elp them to do the questionnaire. By the end of the survey they				
	will be asked if they wo	uld like to participate in a 20-30 minutes interview. If they				
	accepted, then the surv conduct the interview in	eyor will arrange a meeting date and time to visit them and their dwelling.				
Interview	At the beginning of the interview, interviewee will be given a brief discretion of the					
	project and its aim. The	n they will be asked to sign a consent form - please see below-				
9	prior of the interview. By signing the consent, the participant agrees on voluntarily take					
	part in the study which i	ncludes recording the interview, sketch their dwelling,				
	photograph, analyse. Als any time if they are unha	to they will be informed that they have the right to withdraw at appy.				
A clear and concise s	tatement of the ethical co	nsiderations raised by the project and how is dealt with them				
Consent Procedure	<ul> <li>The observation activities in this research shall be conducted in the neighborhood scale which considered as a public space.</li> </ul>					
Data Protection	Data such as the question responses to the location only in the data analysis	nnaire and the interview will be coded in order to relate the n of the house and the neighborhood analysis. Yet, this shall be phase.				
Estimated start date	and duration of project					
Start date: Decembe	r 2018	Duration: two months: December 2018and April 2019.				

#### Interview consent form

#### Consent:

By consenting to take part in this study, I understand and accept the following :

- I voluntarily accept to take part in this study and can withdraw at any time
- I do not have to answer any question I am unhappy with
- I can request that the whole interview or part of it are not recorded
- My details, name, identity, address and location will be kept confidential and not recorded in any part of this study including in transcripts, publications, presentation, and discussions.

#### Please tick the following :

I agree to participate in this study

I agree that the information I give can be used for the reasons and purposes specified

I agree and give my permission for this interview to be recorded

I allow my house to be sketched, photographed, analyzed

#### Details

Name of the participant:
Signature:
Date:
Signature of the researcher:
For further information, please contact
Hameda Janahi. Email: janahih@cardiff.ac.uk

Shibu Raman. Email: ramans@cardiff.ac.uk

#### Questionnaire consent form

#### Dear Sir/ Madam,

I would like to invite you to participate in this research questioner and highly appreciate your support. This investigation is part of an academic research project for a Ph.D. degree.

This research aims to investigate how the design of the residential built environment influence the social wellbeing of inhabitants in Doha city. Different designs and layouts of the built environment have a different impact on the inhabitant's behaviour. This questioner will help to understand the complex relation between built environment design features and the social behavior of residence.

This questioner is therefore based on the following sections:

- 1. Personal information: who are you?
- 2. Dwelling scale design features
- 3. Dwelling scale social life
- 4. Neighbourhood scale design features
- 5. Neighbourhood scale social life

The information you provide will be treated confidentially, anonymously and that your name will NOT be associated with the completed questionnaire.

For further information, please contact

Hameda Janahi. Email: janahih@cardiff.ac.uk

Shibu Raman. Email: ramans@cardiff.ac.uk

#### By consenting to take part in this study, I understand and accept the following :

- I voluntarily accept to take part in this study and can withdraw at any time
- I do not have to answer any question I am unhappy with
- My details will be kept confidential

Signature: .....

- A. Ethical form
- B. Doha national master plan
- C. Research tools templet
- D. Physical mapping of neighbourhoods
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- K. Space/integration value order table of the dwellings
- L. Raw data:
  - a. Statistical analysis:correlation test
  - b. Anonymised questionnaire
  - c. Anonymised interview

### c. Research tools templet Questionnaire



Dear Sir/ Madam,

I would like to invite you to participate in this research questioner and highly appreciate your support. This is part of an academic research project for a doctoral thesis.

This research aims to investigate how the design of the residential built environment influences the social wellbeing of inhabitants in Doha city. Different designs and layouts of the built environment have a different impact on the inhabitant's behaviour. This questioner will help to understand the complicated relationship between built environment design features and the social behaviour of residence.

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The information you provide will be **treated confidentially**, **anonymously and that your name will NOT be associated with the completed questionnaire**.

For further information, please contact me

Hameda Janahi. Email: janahih@cardiff.ac.uk

Or my supervisor

Dr Shibu Raman. Email: ramans@cardiff.ac.uk

By consenting to take part in this study, I understand and accept the following :

- I voluntarily accept to take part in this study and can withdraw at any time
- I do not have to answer any question I am unhappy with
- My details will be kept confidential
- Signature: .....

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	Õ	45-49			
		Over 50		10	How do you travel to work/ university?
	$\bigcirc$	over 50		~	(select all applicable answers)
			5 (	$\bigcirc$	Walking
	2	Gender	4 (	$\bigcirc$	Cycling
	$\bigcirc$	Female 2 Male	3 (	$\widetilde{}$	Bus
				$\simeq$	Driving
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	4	Marital status	5 (	$\leq$	
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	$\bigcirc$	Single		_	
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			2		How many bedrooms does your house have?
	6	In general, do you have any emotional	1 (	$\overline{)}$	2-3 bedrooms
		problems that interfered your normal		$\leq$	1 6 hodrooms
		social activities with family or neighbours?		$\prec$	
	$\bigcirc$	Not at all	3 (	)	More than 6 bedrooms
	Õ	Slightly			
	$\widetilde{\bigcirc}$	Moderately	3		Do you have outdoor space (ex. garden,
	$\leq$	Course			yard, porch, balcony)
	$\bigcup$	Severe	2 (		Yes No
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			4		
	7	Household size (number of people in the		$\sum$	Own
		house)	1 (	)	Rent
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		household (Age range 0 years to 18)	1 (	)	Not applicable
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		, , ,			

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- a private landlord
- ou by the employer
- ole

	7	With whom do you live (select all applicable		$\bigcirc$	Mostly satisfied
		answers)		Õ	Neither/ nor satisfied
	$\bigcirc$	Spouse		Ŏ	Mostly unsatisfied
	$\bigcirc$	Parents / Parents in law		Ŏ	Unsatisfied
	$\bigcirc$	Friends		Ŭ	
	$\bigcirc$	Group of families		16	Are you satisfied wi
	$\bigcirc$	Alone			your house
				$\bigcirc$	Satisfied
	8	How long have you been in this house		$\bigcirc$	Mostly satisfied
	$\bigcirc$	Less than 5 years		$\bigcirc$	Neither/ nor satisfied
	$\bigcirc$	Between 6 to 9 years	2	$\bigcirc$	Mostly unsatisfied
	$\bigcirc$	More than 10 years	1	$\bigcirc$	Unsatisfied
	9	Would you prefer to move to another		17	How do vou feel ab
		neighbourhood			(garden, vard, parki
	$\bigcirc$	Yes 3 No 20 Maybe		$\bigcirc$	Satisfied
	$\cup$	Why?	4	$\widetilde{\bigcirc}$	Mostly satisfied
					Neither/ nor satisfied
	10	Would you prefer to move to another house			Mostly unsatisfied
	$\bigcirc$	Yes 3 ONO 2 O Maybe	1		, Unsatisfied
	-	Why?		$\bigcirc$	
				18	How do you feel ab
	11	Would you like to make some changes in			in your outdoor spa
		your house design? ( add wall, window,		~	porch, balcony)
	$\frown$	enlarge or add rooms, )		Q	Satisfied
	$\bigcirc$	Yes 2 No 1 Maybe	4	$\bigcirc$	Mostly satisfied
				$\bigcirc$	Neither/ nor satisfied
	12	How do you go to daily destinations in the	2	$\bigcirc$	Mostly unsatisfied
		neignbournood (ex. snop, mosque,) (select	1	$\bigcirc$	Unsatisfied
	$\bigcirc$	Walking			
	$\left \right\rangle$	Cycling		19	How do you feel ab
	$\left \right\rangle$	Driving			in your house ( indo
	$\left \right\rangle$	Other:		$\bigcirc$	Satisfied
	$\bigcirc$	other.	4	$\bigcirc$	Mostly satisfied
	13	How do you feel about your house location		$\bigcirc$	Neither/ nor satisfied
	$\bigcirc$	Satisfied	2	$\bigcirc$	Mostly unsatisfied
		Mostly satisfied	1	$\bigcirc$	Unsatisfied
	ŏ	Neither/ nor satisfied		20	Have da way for 1.1
		Mostly unsatisfied		20	How do you feel ab
		Unsatisfied		$\bigcirc$	Space in your nouse Satisfied
	$\bigcirc$		1	$\leq$	Mostly satisfied
	14	How do vou feel about vour house design in	2	$\leq$	Neither/nor satisfied
		general?		$\leq$	Mostly unsatisfied
	$\bigcirc$	Satisfied	۲ 1	$\geq$	Instiction
	Õ	Mostly satisfied	±	$\bigcirc$	GIBAUSHEU
	Ŏ	Neither/ nor satisfied			
	Ŏ	Mostly unsatisfied	223	Th	ird: Your social
	ŏ	Unsatisfied		ر را را م الم	
	$\bigcirc$			aw	reiling ievel
	15	How satisfied are you with the original		1	How many times a d
		height of your house fence			your nousehold me
	$\bigcirc$	Satisfied	4	$\frown$	with them)

y unsatisfied isfied ou satisfied with the original layout of house ed v satisfied er/ nor satisfied y unsatisfied isfied do you feel about your outdoor space en, yard, parking space) ed y satisfied er/ nor satisfied y unsatisfied isfied do you feel about the privacy you have ur outdoor space (ex. garden, yard, n, balcony) ed y satisfied er/ nor satisfied v unsatisfied isfied do you feel about the privacy you have ur house ( indoor) ed y satisfied er/ nor satisfied y unsatisfied isfied do you feel about your own private in your house ed y satisfied er/ nor satisfied v unsatisfied isfied

## our social life at the g level

- many times a day do you gather with household members (people you live them)
- Never ( )

	$\bigcirc$	Once to twice a day		4	Opportunities you have to meet new
	$\bigcirc$	More than twice a day		~	people in the neighbourhood
				$\bigcirc$	Never
	2	Where in your house do you like to gather		$\bigcirc$	Occasionally (Eid, celebrations,)
		with your household members (select all		$\bigcirc$	Once a month
		applicable answers)		Õ	Once a week
	$\bigcirc$	In the garden, yard		$\widetilde{\bigcirc}$	Twice a week or more
	$\bigcirc$	In the kitchen		$\bigcirc$	
	Õ	In the living room		5	Where can you meet/talk to new people
	$\widetilde{\bigcirc}$	Other:			within the neighbourhood (select all
	$\bigcirc$				applicable answers)
	3	What activity you like to do with your own		$\bigcirc$	Around the house entrance
	-	household members (select all applicable		$\widetilde{\bigcirc}$	Public area: supermarket, mosque, park
		answers)		$\leq$	None
	$\bigcirc$	Talking		$\leq$	Other:
		Fating or drinking		$\bigcirc$	other
		Watching TV		6	How often do you mat or chat with your
	$\leq$	Plaving		0	neighbour?
	$\mathbb{Z}$	Othory		$\bigcirc$	Never
	$\bigcirc$	Other:		$\leq$	Occasionally (Fid. colobrations)
		Deserve have all success to invite success	2	$\leq$	
	4	Does your nouse allow you to invite guest	3	$\bigcirc$	Once a month
	$\bigcirc$	easily Vec	4	$\bigcirc$	Once a week
	$\bigcirc$	Yes 1 No	5	$\bigcirc$	Twice a week or more
	5	Do you think that the house has a design		7	How many neighbours can you recognize?
		feature that might create conflict between	5	$\bigcirc$	Most of them
		the household member ( number of rooms,	4		Alot
		parking spaces, allocation of some activates)	3	$\leq$	Quit few
	$\bigcirc$	Yes 2 No	2	$\leq$	fow
	$\cup$		1	$\leq$	Nere
				$\bigcirc$	None
2	Fo	rth: Your social life at the		8	How many people do you know in the
	ne	ighbourhood level			street you live in
	1	Did you have relatives or friends in your	5	$\bigcirc$	Most of them
	_	area before/after moving to the area	4	Õ	A lot
		(excluding people you live with them)	3	$\widetilde{\bigcirc}$	Quit few
	$\bigcirc$	Yes	2	$\widetilde{\bigcirc}$	few
	$\bigcirc$		1		None
	2	Where do you prefer to gather with your	-	$\bigcirc$	
	-	friends or relatives?		9	number of close relationships in the street
	$\bigcirc$	In the house		5	vou live in
	$\left \right\rangle$	Public place within the neighbourhood	5	$\bigcirc$	Most of them
	$\leq$	Public place outside the neighbourhood	<u>с</u>	$\leq$	A lot
	$\bigcirc$	rubic place outside the neighbourhood	т 2	$\leq$	
	2	Frequency of gatherings within the	2	$\leq$	four
	5	nequency of gamerings within the	2	$\geq$	lew Neme
		excluding people you live with them)		$\bigcirc$	NOTE
	$\bigcirc$	Never		40	Harrison and the second second second
	X	Occasionally (Eid. colobrations )		10	How many person do you know in your
	X	Once a month	_	$\bigcirc$	neighbournood
	$\bigcirc$		5	$\sum$	iviosi of them
	$\cap$				
	$\bigcirc$	Once a week	4	$\sum_{i=1}^{n}$	A lot
	$\bigcirc$	Once a week Twice a week or more	4	Õ	A lot Quit few

$\bigcirc$	None
<b>11</b> 00000000000000000000000000000000000	number of close relationships in your neighbourhood Most of them A lot Quit few few None
12	Do you receive social support from people in your neighbourhood ( ex. Taking care of kids, home, give advice,) Yes No
13 A 00000000000000000000000000000000000	How do you agree or disagree with the following statements: I can ask for help/favour from my neighbours Strongly agree Agree Neither/ nor agree Disagree Strongly disagree
B 0000000	I have neighbours that I can ask for advice on personal issues Strongly agree Agree Neither/ nor agree Disagree Strongly disagree
<b>c</b> 00000	I can leave my personal property safely outside. (ex. Car, delivery package) Strongly agree Agree Neither/ nor agree Disagree Strongly disagree
D 000000	I need to lock my door while I am in the house Strongly agree Agree Neither/ nor agree Disagree Strongly disagree
E	I need a monitoring system to keep my house safe from breaking in Strongly agree

0000	Agree Neither/ nor agree Disagree Strongly disagree
<b>F</b>	Neighbours look after each other's in this neighbourhood Strongly agree Agree Neither/ nor agree Disagree Strongly disagree
<b>G</b>	I can walk safely in this neighbourhood at any time Strongly agree Agree Neither/ nor agree Disagree Strongly disagree
<b>H</b> OOOOO	This is a friendly neighbourhood to live in Strongly agree Agree Neither/ nor agree Disagree Strongly disagree
<b>-</b>	Different people from different background get well together in this neighbourhood Strongly agree Agree Neither/ nor agree Disagree Strongly disagree
	Fifth: Your Neighbourhood How satisfied are you with the outdoor spaces in your neighbourhood (ex: Park) satisfied

- 4

# Î

4

3

3

- Mostly satisfied Õ
- Neither/ nor satisfied
- Ŏ Mostly unsatisfied
- unsatisfied
  - How satisfied are you with the leisure 2 facilities you use in your neighbourhood (recreational, sports facilities)
- Ο satisfied 4
  - Ŏ O O O Mostly satisfied
  - Neither/ nor satisfied
  - Mostly unsatisfied

0	unsatisfied
3 0 0 0 0	How satisfied are you with the maintenance of your neighbourhood public spaces (neat, tidy, clean,) satisfied Mostly satisfied Neither/ nor satisfied Mostly unsatisfied unsatisfied
4	How satisfied are you with the quality of you neighbourhood satisfied Mostly satisfied Neither/ nor satisfied Mostly unsatisfied unsatisfied
5 00000	How satisfied are you with this neighbourhood as a place to live? satisfied Mostly satisfied Neither/ nor satisfied Mostly unsatisfied unsatisfied
6 00000	How satisfied are you with your safety in the neighbourhood? satisfied Mostly satisfied Neither/ nor satisfied Mostly unsatisfied unsatisfied
7 00000	How satisfied are you with children safety in the neighbourhood? satisfied Mostly satisfied Neither/ nor satisfied Mostly unsatisfied unsatisfied
8	How satisfied are you with the things that you can do together with your family at your neighbourhood ? satisfied Mostly satisfied Neither/ nor satisfied Mostly unsatisfied unsatisfied

° 00000	How satisfied are you with the shopping facilities satisfied Mostly satisfied Neither/ nor satisfied Mostly unsatisfied unsatisfied
10	How satisfied are you with the sidewalks in the neighbourhood satisfied Mostly satisfied Neither/ nor satisfied Mostly unsatisfied unsatisfied
11 00000000000000000000000000000000000	How satisfied are you with the population density of the neighbourhood satisfied Mostly satisfied Neither/ nor satisfied Mostly unsatisfied unsatisfied
12 0 0 0	How satisfied are you with the building density of the neighbourhood satisfied Mostly satisfied Neither/ nor satisfied Mostly unsatisfied

O Unsatisfied

This is the end of the questions. Thank you for your participation.

Would you like to participate further in this research by taking part in an interview which takes around 20 minutes?

Please book an appointment between 15th Dec to 5<sup>th</sup> Jan using this link https://hyj.youcanbook.me

#### Interview consent form

### Consent:

### By consenting to take part in this study, I understand and accept the following :

- I voluntarily accept to take part in this study and can withdraw at any time
- I do not have to answer any question I am unhappy with
- I can request that the whole interview or part of it are not recorded
- My details, name, identity, address and location will be kept confidential and not recorded in any part of this study, including in transcripts, publications, presentation, and discussions.

#### Please tick the following :

I agree to participate in this study	
I agree that the information I give can be used for the reasons and purposes specified	
I agree and give my permission for this interview to be recorded	
I allow my house to be sketched, photographed, analyzed	

#### Details

Name of the participant:
Signature:
Date:
Signature of the researcher:

.....

# Interview questions

## Introduction for the interviewee

This interview aims to distinguish social behaviour within the physical context of the neighbourhood and the dwelling. Further, deeply understand the users' perception of the spaces and places in the neighbourhood.

This interview shall cover dwelling design and its effect on the occupants as individuals, family, and their relation with the society. In addition to neighbourhood design and its effect on social connection, trust, safety, social support.

General Questions			
Who is the interviewee?	Husband, wife, sons?		
	Gender?		
	Age group?		
How would you describe your	What is your neighbourhood boundaries	Х	
neighbourhood?			
Why did you choose to live in this	Location, facilities, services, relatives,		
neighbourhood?	schools?		
How long have you lived:	If more than 5 years		
<ul><li>In this house</li><li>In this neighbourhood</li></ul>	What kept you here? do you plan to move		
6	If less than 5 years		
	Where did you move from and why? Can you		
	compare between the old and the current		
	neighbourhood? Do you plan to move		
Immediate neighbourhood			
Can you tell me about your home	Street and neighbours		
surroundings?			
How well do you know your	Whom do you do things together?	Х	
neighbours?	Whom do you chat with?	Х	
	Whom do you know by name?	Х	
	Whom do you have no contact with?	Х	
	Whom do you avoid them? Why?	Х	
Do you trust your neighbours?	Ask them for help, lend things, child care,		
	school run, social activity, visit?		
Where do you usually meet or talk	Entrance, street, garden, walkway, parking	Х	
with your neighbours? Why?	area, stairwell, corridors, common areas		
Do you allow your children to play	In the house garden, yard, street, inside the	Х	
in your immediate neighbourhood?	house? Why?		
Wider neighbourhood			
What are your daily destinations in	What are the routes you take usually?	X	
your neighbourhood	walking/ driving	Х	
	Where mostly do you bump into people?		

How often do you use public spaces like the park? Why? Do you have any relatives live in your area? Allocate them on the map	Distance, children, meeting, relaxation How often you met or visited them? Do they visit you? Go together somewhere	х
How well do you know your neighbours?	How many do you have contact with? How many do you know by name? Face? How many do you have mutual visits?	X X X
Do you have any concern about neighbourhood safety?	Crime, accidents, robbery,?	
Are there any places in your neighbourhood that you don't use in a particular season?	Why?	Х
What are your favourite places in the neighbourhood?	Why?	Х
What do you think about living in a more/less dense area? More houses, more people	Do you think it would influence Social connection, trust, social support	
What would like to add/ change in your neighbourhood?	Why?	

**Dwelling Scale Questions** Sketch the dwelling plan -if not available- for marking and annotation

What are the factors that contributed to	
your design decisions: size, uses, family plans	
Overall house characteristics: Location, size,	
no chose.	
What was added, why?	Х
Your dwelling fence?	
Your outdoor space?	
your special indoor layout?(compact/waste	
of spaces/disturb the privacy)	
The privacy you have in your house	
(indoor/outdoor)	
Why?	
Room number, garden, spacious living area,	
visitors room, façade design, size, orientation	
? Kids zone	
	<ul> <li>What are the factors that contributed to your design decisions: size, uses, family plans Overall house characteristics: Location, size, no chose.</li> <li>What was added, why?</li> <li>Your dwelling fence?</li> <li>Your outdoor space?</li> <li>your special indoor layout?(compact/waste of spaces/disturb the privacy)</li> <li>The privacy you have in your house (indoor/outdoor)</li> <li>Why?</li> <li>Room number, garden, spacious living area, visitors room, façade design, size, orientation? Kids zone</li> </ul>

What are the negative things that your house have? (Design wise)	The drainage system, noise, parking areas, ventilation, daylight, entrance, a conflict between people, household members?	
What are the changes/addition you would like to do in the house	Why?	
How long do you spend daily in the house? (Hours)	Where do you spend this time? (Spaces) With whom? (each space )	Х
What is your favourite place, space in the house?	What do you do in these spaces (activates) Why?	Х
What are the spaces that you use on your own? alone	For how long? AM. PM Describe the space available for you , use, disturbance, privacy, size, location, physical and visual accessibility	Х
What are the spaces that you share with your family members?	What do you think about the space available for gathering/activities that you can do in the house with/without your family members For how long? AM. PM Describe them: use, disturbance, privacy, size, location, physical and visual accessibility	X
What are the spaces that you share with the guests? How often do you	For how long? AM. PM Describe them: use, disturbance, privacy,	Х
Do you have spaces which is not used?	Why?	Х
Can you draw the plan of your house?	Can you tell me using the map family routine	х

Thank you for your participation. Would you mind if I sketch your house plan and take some photos? Would you please show me the spaces that we have talked about? Common areas

The interview will need:

- Map of Doha city
- Wider neighbourhood map
- Interviewee street map
- Interviewee dwelling plan ( if available )
- Dwelling observation checklist
- Interviewee consent form

## Dwelling observation

Case study	Date of	Week day		Weekend		Time	
code	observation						
Dwelling No	Indoor thermal	Hot	lot normal		cold	AM	РМ
Street No	assessment						

Exterior								
Туре	Owner led		Developer led				Other/	
			Deta	Detached		Semi-detached		comments
Property	Very bad	Bad		Neith	ner	Good	Very good	
maintenance	condition	condit	ion	/ nor		condition	condition	
Garden	Very bad	Bad		Neith	ner	Good	Very good	
maintenance	condition	condit	ion	/ nor		condition	condition	
Privet garden	Very bad	Bad		Neith	ner	Good	Very good	
conditions	condition	condit	ion	/ nor		condition	condition	
Space in front	NA	Not Pa	Not Paved		d	Well	Moderate	
of the house						green	green	
(semi-public)	olic)							
Space outside	sitting/playir	sitting/playing/ par		/storag	ge /	Unused	Public walk	
front door use	beatification	ion driv		iver room			way	
(semi-public)								
Privet outdoor	sitting/playir	וg/   p;	rking /storage /		ge /	Unused	NA	
space use	beatification	n driver r		room				
(private)								
Fence height	No fence	No fence Below		eye level		Above	Very high	
						eye level		
Fence design	Solid brick wall Perf		erforat	ted Com		nbination	Green	
		W	wall				boundary	

interior											
Property	Very bad Bad			Ne	either /	Good			Very good		
maintenance	condition	conditio	on	nc	or	ition	tion condition				
Kitchen	Connected to	living/		Se	eparated	but	S	ep	parated		
location	eating area			in	side the	house	0	ut	side the house		
Boundaries	No Transpare				Solid o	bened		5	Solid closed		
between	boundaries boundarie				bounda	aries		k	oundaries		
common	(Open plan) (below eye				/e (Opened door				closed doors,		
spaces	level, glass)				s) moveable				valls, partition		
			ns)		)						
Window View	Open – visua	l connec	tion	Pa	artially	Blind	ed- c	clo			
quality	to the exterio	or		op	ben	visua	l con	ne	ection to the		
						exter	ior				
Furniture	Several settir	ng areas	One	e m	ain settii	ng	No	СС	ommon setting		
layout in the		area	а		are	а					
common											
setting area											

## Social observation map templet

Case Study number						Temperature	22		Time		Secie
Climatic Condition	Clear	Cloudy	Rainy	Dusty	Windy	Observation Date	Week Day	Weekend	АМ	PM	Socia
				I						- select	
Moving male	Static m	ale 📕 R	» O.	TOUD							
∧	O CONTRACTOR			517722							
A Moving female	Static fer	nale 🔲 G	ers :								

ial behaviour mapping

## Built environment mapping templet

Case Study number		·				Temperature			Time	-								Built E
Climatic Condition	Sunny	Cloudy	Rainy	Dusty	Windy	Observation Date	Week Day	Weekend	MA	РМ								
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Car M	Door	Tent	Street	Problem	• w	later Fountain C	Clinic J	M Religiou	us A	Authority	RX Empt	ty house	RX En	npty house	e RH	Residentia	House	e 
Tree i Ext	ended fence	Cabin	R Sidew	alk Problem	n 🧶 Cł	sair S	Retail	E Educati	ional UC	Under Constructio	on X Empt	ty Land	X En	npty Land	RA	A Apartment	•	

nvironment Design Mapping

# Appendices

- A. Ethical form
- B. Doha national master plan
- C. Research tools templet
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- K. Space/integration value order table of the dwellings
- L. Raw data:
  - a. Statistical analysis:correlation test
  - b. Anonymised questionnaire
  - c. Anonymised interview







#### **Built Environment Design Mapping** RH RH RH RH UC RH RH ᠴᢂᢂ RH **A** RH H 1 1 1 VH RH ┭₩ RH RH RH RH RH RH RH RH UC RH RH 귋 RH RH RH RH **T**K ſ R RH RH X UC RH RH RH UC স .... RH X RH RH RH RH RH RH RH RH RH ╤┸╢┢ RH RH







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Case Study number	Al Thumama	a			_	Temperature	20	Time							
Climatic Condition	Sunny	Cloudy	Rainy	Dusty	Windy	Observation Date	Week Day W	eekend AM	РМ						
			T												
			e					A A				I I			
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												Washing car		Gard	ening
				<u>]</u> [#		Gardening									
									<b>?</b>		Cycling	The second secon	Clea	aners	
			STREET.						Gardening						
												Gardeni	i i i		
												Gardening		Н	F
		F					H			T	4				
Moving male	Static m	ale B	oy	Group	~	11.14					\				
Moving female	O Static fee	male 🔲 G	irl												



Case Study number	Al Thumama	1				Temperature	22		Time								
Climatic Condition	Clear	Cloudy	Rainy	Dusty	Windy	Observation Date	Week Day	Weekend	АМ	PM							
	The second secon	A A															
					T								I I			II II	T
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										T					0	Cycling	
		F	ood delivery -							ç Al	K	Getting	nto car Gettin the car	g off_		ľ	
			Self-						$\neq$								
		J.											F. Jacob	ê jî	· Las	and the second	
											~/ //				Н		F
Moving male	Static ar			Group	K		F								T		
				gioup													
▲ Moving female	💛 Static fer	male 🖵 🤇	Girl														



Case Study number	Al Thumama				Temperature	18	Time				
Climatic Condition	Sunny C	loudy Rain	Dusty	Windy	Observation Date	Week Day Weekend	рам рм				
		1		- Un		Washing car					A
	Workman							ł		H	
					Builder					Workman	Workman
									E A	- Alass	
										Н	Workman 1
				7	114					T	
Moving male	Static male	Boy	Group								
△ Moving female	O Static fema	le 🔲 Girl									






























# Social behaviour mapping ┍┲╍╓╧╍╍╧╍╍┲┥──┰ Ŷ 1 Dellet $\sim$ 'mm · Crem man the man Throwing garbage > Sport 1 TI P Ŷ A PARTIE T E I T `@` Ø χO



## Social behaviour mapping ┍┲╍╓╧╍╍╧╍╍┲┥──┰ Ŷ 1 Delet $\sim$ ·\_\_\_\_ · Crow Thomas thurning / Talking on the phone Chatting Getting into car 5 T Taking things to neighbor Throwing garbage Þ Ŷ Cycling . T E I FAL (کر 6 χO



# Social behaviour mapping ┍┲╍╓╧╍╍╧╍╍┲┥──┰ Ŷ 1 Dellet $\sim$ mm/ " Cron Thomas NYNYYYY Workmar Useing the ATM 1 FFL Cycling Þ Getting into Ŷ AR F T E I Washing o FAL (کر 6 χO



# Social behaviour mapping ┍┲╍╓╧╍╍╧╍╍┲┥──┰ Ŷ $\sim$ · Cren Thomas manne $\int$ Þ Ŷ Throwing garbage Harman A.P. P. Washing car T FAL (کر 6 χO









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## F. Axial map of neighbourhoods















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### G. VGA map of neighbourhoods















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  - b. Anonymised questionnaire
  - c. Anonymised interview
# H. Overlap of VGA map and sociograms of interviewees

## Visual step depth











### Case Study: Al Thumama

## House code: 015


































































# Metric step depth










































































- A. Ethical form
- B. Doha national master plan
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### I. Shortlisted neighbourhood locations



## Appendices

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### J. Dwelling justified graphs and description Owner designed dwellings

Internal ring: a ring in the interior of the dwelling External ring: is an outdoor ring within the dwelling fence. A ring that connect different yards and gardens.

Workspaces: kitchen, laundry and ironing room Circulation: lobby, corridors, stairs Servant spaces: bedrooms, Living room, kitchen Social spaces: spaces that the family spend time together such as living room, playroom, dining room, library, gym or swimming pool, and tent Personal spaces: bedroom, office, hobby room. Visitor space: women Majles -setting room-, men Majles- setting room- dining room, tent.

### Dwelling discretion

The first observation on the justified graph is that it takes the tree-like layout, more obvious when excluding the first-floor graph. The ground floor can be accessed from two entrances, yet they are connected through a ring connection. Another ring can be found connecting the yards forming an exterior ring in this dwelling. There are no internal rings in this dwelling. The interior of the dwelling can be accessed from three entrances, two are placed at the front of the dwelling and one from the back of the dwelling. As for the first floor, the justified shows a bush-like special configuration form when excluding married child suite. a corridor central layout connects single children bedrooms. As can be noticed from the graph, men Majles - setting room- can be directly entered from the street without the accessing the privet yard of the dwelling. As for female visitors, they enter the women Majles - setting room- by using the family entrance, passing through the front yard to the Majles. Female guests have no direct connection to the privet interior family space. The back yard access links the work spaces – kitchen, lundry-, maid room, and storage spaces to the interior of the dwelling.

LR	living room	BD	bedroom
GLR	ground floor living room	С	changing room
FLR	first floor living room	LB	library
S LR	second floor living room	0	office
Т	bathroom	DR	driver room
W	washing	G	garden
Κ	kitchen	Р	play room
R	roof / terrace	GR	garden room
S	stairs	Н	hobby room
ST	store	Е	enterance
L	lobby / corridor	TT	tent
FY	front yard	GY	GYM
LY	left yard	SW	Pool
RY	right yard	Ι	laundry/ ironing room
BY	back yard	EC	extention for married
D	dining		children
MM	men majles	В	balcony
WM	women majles	Α	animal place

#### Justified graph



DURATION OF RESIDENCY: MOVE IN YEAR: 2015 The justified graph of this dwelling is bush-like layout. It is very complex configuration as it is a extended family house, which occupy to nuclear families. Looking into the ground floor, the dwelling can be accessed from the street from two entrances. The entrances led to outdoor yards, which are directly connected and part of the exterior ring. There is only one internal ring. The interior of the dwelling can be accessed from five entrances. The entrances are categorized by users. An entrance lead to the married children flats' lobby and staircase, one directly opens into the main living room, another entrance for female visitors, an entrance for male visitors, and the last entrance link the exterior bedroom and kitchen to the interior of the dwelling. Visitors - female and male- should access the yard in order to access there setting spaces. Visitors have no direct access to the family spaces. As for the first-floor layout, it is a bush-like configuration were bedrooms are distributed around the first floor living room. The first floor living room is part of the interior ring which links the married child flat in the first floor to the rest of the family spaces.

The next house is relatively smaller and have a bush-like layout organization for both the ground floor and the first floor. The dwelling has a single entrance which leads to the front yard. The front yard is part of the exterior ring. The front yard is used by female visitors to access the women Majles. It is also used by the driver to access his bedroom. The left yard led to both the interior family space and men Majles. The yard itself act as a buffer zone between men guest space and privet family space. Although the ground floor living room has a high integration value, yet the family daily living room is more privet as it is separated from guest spaces by 2 to 3 steps. There is no internal ring in this layout. The first floor is corridor cantered plan, which link bedrooms and the living room together. Nuclear family occupy suite in the first floor located next to the single children bedrooms.



DURATION OF RESIDENCY: mare than 10 years MOVE IN YEAR: 2008





This case study is a tree-like layout. Unlike the previous dwellings, this dwelling is occupied with one family. The dwelling has one entrance from the street and three to the interior of the dwelling. The front yard which is the first space in the dwelling is part of the exterior ring and led to the driver room. Different users of the dwellingfamily and visitors- have the same spatial experience as they access from the same entrance. The lobby they approach is used to control users' access. The second access to the dwelling is located in the backyard. That entrance is used as service entrance as it connects the exterior kitchen and stores to the interior of the dwelling. The third entrance link the living room and the garden. The ground floor has two rings connecting different setting areas. Yet the first floor living room has a higher integration value. The first floor is room cantered plan. Bedrooms are arranged around the living room. The library and the toilets are the lest integrated spaces in this floor.

This case study is an extended family dwelling. The entire ground floor is bush-like layout, yet the interior dwelling is tree-like layout. There is only one ring in the exterior part of the ground floor. The dwelling can be accessed from two entrances. Male visitors have their own separated entrance to the Majles. Men entrance led to the driver bedroom too, which insure maximum privacy for the family yard. As for the family access, it opens to the front yard which led to the main dwelling entrance. It is also connected to the right yard which led to married child extension, men Majles, maids' room and the service spaces. The most integrated family space in the ground floor is the grandchildren playroom. It can be noticed that there is no Majles in the interior of the dwelling. The first-floor justified graph is a bush-like layout. The married children suites are arranged around the living room, the integration value of the living room is high respectively.



CASE STUDY NUMBER: 014 DURATION OF RESIDENCY: MOVE IN YEAR: 2000



CASE STUDY NUMBER: 015 DURATION OF RESIDENCY: MOVE IN YEAR: 2013

The justified graph of this case study is a bush-like layout. This dwelling is inhabited by one family. There is one external ring formed by the surrounding yards, and one internal ring. The dwelling has three entrances, two of them open to the yards, and the third one is for the driver room. The interior of the dwelling can be accessed through two entrances, from the front yard and from the left yard. There is only one Majles for both gender in the main structure of the dwelling. The ground floor is corridor centre layout, which makes it highly integrated. The services spaces kitchen and storages- and the maid bedroom are in the left yard, the yard itself work as a buffer zone. The first floor is arranged on a bush-like layout. The bush is room centre plan. All bedrooms in the first floor have direct access to the first floor living room which makes it more integrated than the ground floor living room.

The first observation on the justified graph is that it has the tree-like layout, more obvious when excluding the first floor. This dwelling is used by senior couple and their servants. The ground floor has two internal rings and no external rings. The dwelling has only one entrance, the interior of the dwelling can be accessed using three entrances, one is located in the front and two are from the left yards. The services and male servant rooms are located in the left yard. However, the female servant bedrooms are located in the interior of the dwelling, yet the integration value of their rooms are very low. The circulation in the ground floor is mostly passing through spaces rather than corridors. The first floor is a tree-like layout too. The first floor living room has a higher integration value than the ground floor living room. The first floor has two suites, one is used for the grandchildren and the second is used for the owner of the house and his wife.



CASE STUDY NUMBER: 016 DURATION OF RESIDENCY: MOVE IN YEAR:2005

CASE STUDY NUMBER: 023

DURATION OF RESIDENCY: 22 years MOVE IN YEAR: 1997

This case study has a tree-like configuration layout. It is an extended family dwelling as an extension for the married child is observed in the ground floor. The first floor also has a suite for the other married child. The dwelling has two entrances from the front and right yard. The interior of the dwelling ca be accessed from three entrances. The entrance located in the front yard is used by the family members and female visitors, the entrance located in the backyard is used by servants as it connects the workspaces in the backyard to the interior of the dwelling. The third entrance from the right yard leads to the storage space - from the interview: it used to be an entrance to the men Majles before converting the Majles into a storage space-. The ground floor has one exterior ring and one interior ring. Moving to the first floor, the layout has a bush-like layout. The first floor living room has a pivotal location within the floor and has a higher integration value than the ground floor living room. The living space of the married child suite has a high integration value too.

The first observation on the justified graph is that it has the bush-like layout. It is an extended family dwelling as a married child extension can be found in the ground floor level. There is one exterior ring and two interior rings in this floor. The dwelling has one entrance from the street, and two entrances to the interior of the dwelling. All visitors and family members have the same spatial experience as they enter through the same entrance. Men visitors enter the dwelling form the men Majles entrance. Female visitors access the dwelling from the family entrance, however a reception lobby controls the access to the privet family space. The nuclear family extension can be reached by using the exterior ring, and the integration value is less than the mean value of the dwelling. The first floor j-graph is a bush-like layout. it is a room centre plan, were the first floor living room is a pivotal space and the bedrooms are surrounding it.



CASE STUDY NUMBER: 026 DURATION OF RESIDENCY: MOVE IN YEAR: 1981



CASE STUDY NUMBER: 024 DURATION OF RESIDENCY: MOVE IN YEAR: 1987

This case study has a bush-like layout. it is an extended family dwelling, as an extension for the married child is found in the ground floor level and can be accessed from the exterior ring. There is only on exterior ring in the ground floor level. The dwelling has two entrances, one is a family access and the second one is dedicated for men access. Men entrance lead directly to the men Majles and male servant bedroom. Men Majles can be accessed from the privet yard as well. The interior of the dwelling can be accessed from three entrances. One entrance is for female visitors, another on is for the family members, the last one from the backyard to the dwelling which link the back yard workspaces to the interior of the dwelling. Female servant rooms are located in the backyard next to the main workspaces. The first floor is a bush-like layout, it is a corridor centre plan. A corridor links the bedrooms. There is no family interaction space in the first floor level.

The justified graph of this case study is a bush-like layout, clearer when excluding the first floor level. The dwelling has only one access, the interior of the dwelling has two entrances. The main family entrance is from the front yard, the second entrance is from the back yard. Male servant bedroom is located in the front yard. The dwelling has two rings, one is an exterior ring and one a n interior ring. Visitors have the same spatial experience as the family, a reception lobby is used to control the access to privet family spaces. The ground floor living room and the daily living room have a high integration value of all other spaces in the dwelling. The first floor has a bush-like layout. It is a room centre plan, were all bedrooms are surrounding the living room. The integration value of the first floor living room is higher than the mean value of the dwelling.



CASE STUDY NUMBER: 033 DURATION OF RESIDENCY: 19 years MOVE IN YEAR: 1998



CASE STUDY NUMBER: 035 DURATION OF RESIDENCY: 13 years MOVE IN YEAR:1999

The first observation on the justified graph is that it takes the bush-like layout, more obvious when excluding the first-floor graph. It is a single-family dwelling. The ground floor has one extenal ring. The dwelling has one entrance which lead to the front yard. The front yard is part of the external ring and the male servant bedroom is located in the front yard. The interior of the dwelling can be accessed from three entrances, one from the front yard, the second one is from the left yard, the third one link the living room to the garden. The front entrance is used by the family members and the visitors, a reception lobby is used to control the access of different users. The second entrance is used by female servants to access the dwelling from their own bedrooms in the left yard. As for the first floor, it has a bush-like layout with a room centre plan. The first floor living room is the central spaces which is surrounded by the bedrooms.

This case study is an extended family house made of three floor. The ground floor level has one external ring that link the yards. The dwelling has a single entrance from the street. The interior of the dwelling can be accessed using three entrances. Two entrances from the front yard, the first entrance is for visitors and lead to the Majles. The second entrance is for the household. One entrance is from the backyard which is a service entrance used by servants. The male visitor spaces are linked to the family interior through the dining room. The ground floor living room has a lower integration value than the first floor living room. A married child is occupying a suite in the ground floor. The first floor has a bush-like layout, and it is a room centre plan. Bedrooms of single children and married child suite are surrounding the first floor living room. The second floor is occupied by a married child as well. It has bushlike layout, but it is a corridor centre plan. The spaces are distributed along a corridor.



CASE STUDY NUMBER: 042 DURATION OF RESIDENCY: MOVE IN YEAR: 1975



CASE STUDY NUMBER: 044 DURATION OF RESIDENCY: 30 years MOVE IN YEAR: 1989

The justified graph of this case study is a bush-like layout, clearer when excluding the first floor level. This dwelling is an extended family dwelling. The ground floor has one internal ring. The dwelling can be accessed using three entrances from the street. First entrance is from the front yard, the second entrances is from the right yard, the third entrance is from the left yard. The front yard entrance is used mainly by the household and female visitors. The front yard is used as a connection and a buffer zone in the same time for the married child extension. The right entrance is car access. The left entrance is used by male visitors and it leads directly to the men Majles. There is no direct access from the men section to the privet family yard. The interior of the dwelling can be accessed using two entrances. The front door is for female visitors and household. A reception lobby is used to control access of different users. The back yard door is used as a service door and mainly by servants. Moving to the first floor, it is a bush-like layout and it is corridor centre plan.

The next house is relatively smaller than the previous one as it is a single family dwelling. It has a tree-like layout organization for the ground floor and a bush-like layout for the first floor. The dwelling has no rings. The dwelling has only one access from the street, which is used by all users. The interior of the dwelling can be accessed using three entrances. one entrance is for the household, the second entrances is for female visitors, and the third access is for male visitors. Male Majles can be accessed from the interior family space through the dining room. Unlike the men Majles, women Majles cannot be accessed from the interior of the dwelling. The first floor is room centre plan, were rooms are arranged around the first floor living room. The integration value of the first floor living room is higher than the mean integration value of the dwelling.



CASE STUDY NUMBER: 051 DURATION OF RESIDENCY: 15 years MOVE IN YEAR: 2004

CASE STUDY NUMBER: 055 DURATION OF RESIDENCY: 8 years MOVE IN YEAR: 2011 The justified graph of this dwelling is bush-like layout. the dwelling has one interior ring and another exterior ring. The dwelling can be accessed using two entrances. one entrance is for family members and female visitors, the second one is for male visitors and lead directly to the men Majles. The interior of the dwelling can be accessed through three entrances. The entrance from the front yard is used by the household and the female visitors, a reception lobby function as a control point for the users access. The second access from the right yard is used to link women Majles to the exterior dining hall by passing through the yard. The third access is from the back yard and used by servants mainly as it links the main dwelling building and the back yard workspaces. The first floor is a bush-like layout and it has a room centre plan. all the bedrooms are surrounding the first floor living room.

The first observation on the justified graph is that it takes the bush-like layout, more obvious when excluding the first-floor graph. It has one exterior ring and two internal rings. The dwelling has three entrances; the first one is used by male visitors, the second one is used by family members, the third one used for services. Men Majles can be accessed from the privet yard through the dining room, which allow serving guests and access of the household without using the street. Female visitors pass through the same spatial experience as the household, a reception lobby control the access to the privet family space. An access from the women Majles dining space to the family spaces allow service for the guests. The first floor is a bush-like layout and it is a room centre plan. The bedrooms are surrounding the first floor living room. the integration value of the first floor living room is as high as the ground floor living room integration.



CASE STUDY NUMBER: 061 DURATION OF RESIDENCY: MOVE IN YEAR: 2006



CASE STUDY NUMBER: 062 DURATION OF RESIDENCY: MOVE IN YEAR: 1994 This case study is an extended family dwelling. The ground floor level is a tree-like layout. it has one interior ring and one exterior rings. The dwelling has two entrances, one is for the household and visitors, the second one is for the married child leading to his nuclear family extension directly. The main dwelling building has two entrances, one in the front yard and the second from the left yard. Both are used by family members and visitors. Lobbies are used as a buffer zone between visitors' spaces and family space. In this case study, visitors' spaces are more integrated than family living rooms.

The first floor is a bush layout and it is a corridor centre plan. bedrooms and first floor living room is arranged along a corridor.

This dwelling is a single family dwelling. The justified graph is a tree-like layout. The ground floor has a one exterior ring and no internal rings. The dwelling can be accessed from a single entrance. From the front yard men visitors can enter the external men Mailes, however women visitors would use the same household entrance to enter women majels. A reception lobby work as a control for users' access. The left yard has all the service spaces and the servant's bedrooms, they can access the main dwelling interior from the kitchen access. The first floor is a bush like layout, and it is a corridor centre plan. All spaces in the first floor are connected through the corridor. Children bedrooms have higher integration value than the first floor living room.

This case study is a single family dwelling. The dwelling has a bush-like layout. the ground floor has one external ring and no internal rings. The dwelling have two entrances from the street. One entrance is for family members, and the second one is leading directly to the men Majles. The men Majles can be accessed from the front yard as well. The interior of the dwelling can be accessed using two entrances. the front entrance is used by the family members, the back yard entrance link the exterior workspaces and maids bedrooms to



DURATION OF RESIDENCY: MOVE IN YEAR: 2000



CASE STUDY NUMBER: 064 DURATION OF RESIDENCY: more Than 5 years MOVE IN YEAR: 2003



the interior of the dwelling. The first floor has a bush-like layout, and it is a corridor centre plan. all the spaces are distributed along a corridor.

This justified graph has a bush-like layout for both the ground floor and the first floor. This dwelling is occupied by an extended family. The ground floor of the dwelling has one internal ring and no external rings. The dwelling can be accessed from a single entrance. The married child extinction can be accessed from the right yard. The main dwelling interior can be accessed from two entrances. One access is used mainly by family members and visitors. A reception lobby is used to control users access to different spaces. The second entrance lead to the workspaces and servants bedrooms. As for the first floor, it has a bush-like layout and it is a corridor centre plan. It has one ring connecting the master bedroom to a child bedroom.



CASE STUDY NUMBER: 067

DURATION OF RESIDENCY: more than 25 years MOVE IN YEAR: 1994

#### Developer designed dwellings

The justified graph of this case study has a treelike layout. The ground floor has one exterior ring and three internal rings. The dwelling can be accessed from two entrances, one entrance lead to the front yard, and the other one lead to the men Majles directly. The interior of the dwelling can be accessed from two entrances; the front yard entrance lead to reception lobby which direct users to the living room or women Majles. The second access is from the backyard, which is used to link the services spaces, maid rooms, and men Majles to the interior of the dwelling. The ground floor living rooms is part of three rings and its integration value is the highest. The first floor takes a bush-like layout, and it is a room centre plan. All the bedrooms are surrounding the first floor living room.



CASE STUDY NUMBER: 022 DURATION OF RESIDENCY: MOVE IN YEAR: 1990

This case study is an extended family dwelling. The justified graph has a tree-like layout. The ground floor has one internal ring and no external rings. The dwelling can be accessed from two entrances, one leads to the front yard of the dwelling, the second one leads directly to the male visitors' spaces. The men spaces can be accessed form the interior of the dwelling through the dining space. The interior of the dwelling can be accessed from four entrances; men dining room, front yard entrance which is used by family members and women visitors, back yard entrance which is used for services, and left yard entrance which is used by maids. The first floor has a bush like layout. It is a room centre plan were all the bedrooms are surrounding the living room. The only buffer zone between the married child bedroom and the family space in the first floor is a lobby, yet it is the most segregated space when looking into the integration value.

This dwelling is occupied by an extended family. The dwelling has a tree-like layout. The ground floor has no internal or external rings. The dwelling can be accessed from two gates. One is used for the family member access, the second one is used by men visitors and it leads to the men Majles directly. Men Majles has another access from the family yard. The interior of the dwelling can be accessed from three entrances. The first entrance is from the left yard to the family dining room, the second entrance is from backyard to the family dining room, the third entrance is from the right yard to the master bedroom changing space. The first floor has a bush-like layout and it is a room centre plan. single children bedrooms and married children suites are surrounding the first floor living room.



CASE STUDY NUMBER: 025 DURATION OF RESIDENCY: MOVE IN YEAR: 1986



This cases study is one floor dwelling occupied by a single family. The justified graph of the dwelling is a tree-like. The dwelling has one external ring and no internal rings. The dwelling can be accessed from one entrance that leads to the front yard. The interior of the dwelling can be accessed from three entrances. The first entrance from the front yard lead to the family living room, the second entrance from the left yard lead to the men Majles, the third entrance from the back yard lead to a circulation lobby. The Majles in this case study has a higher integration value than the living room.

This case study is an extended family dwelling, were a married child has a privet suite for the nuclear family. The dwelling has no internal nor external rings. The dwelling has two entrances from the street, one leads to the front yards, the second one leads directly to the men Majles. Men Majles can be accessed from the family yard too. The interior of the dwelling can be accessed from four entrances. The first entracse is used by the female visitors as it leads to the women Majles, the second entrance is for family members as it open to the living room, the third entrance is a service entrance to the women dining room, the forth entrance is service entrance to the kitchen. Women Majles is connected to the privet family space through the dining room. The ground floor has three living rooms with different integration values. The first floor has a bush-like layout with a room centre plan. single children bedrooms and married child suite is arranged around the first floor living room.

CASE STUDY NUMBER: 032 DURATION OF RESIDENCY: MOVE IN YEAR: 1998



CASE STUDY NUMBER: 034 DURATION OF RESIDENCY: 21 years MOVE IN YEAR: 1998

This case study is an extended family dwelling. The layout of the dwelling has a bush-like layout, more obvious when excluding the first floor. The dwelling has one exterior ring and no internal rings. The dwelling has three entrances, the first one is a household entrance, the second is male servant access to his own bedroom, the last one is male visitors' access to the men Majles directly. Men Majles ca be accessed from the yard. The interior of the dwelling can be accessed using three entrances. The front yard entrance is used by female visitors which lead to the women Majles directly. The right yard entrance is used by the household to access the living room. The third access is an entrance that links the work spaces to the interior of the dwelling. The ground floor living room has a high integration value, it is also the main access to the married child extension. The second floor has bush-like layout and it is room centre plan. The first floor of the married child extension is not linked to the main dwelling first floor level.

This case study is single floor dwelling which is occupied by elderly couple and adult children. The dwelling has a bush-like layout. The dwelling has one exterior ring and no internal rings. The dwelling has two entrances, one is directly open to the male servant bedroom, the second lead to the family yard. The interior of the dwelling can be accessed from four entrances. Three from the front yard; an entrance lead to the living room, the second lead to male child bedroom, the third entrance lead to the Majles, the last entrance from the back yard lead to the kitchen. Majles can be accessed from the interior of the dwelling.



CASE STUDY NUMBER: 036 DURATION OF RESIDENCY: MOVE IN YEAR: 2000



CASE STUDY NUMBER: 043 DURATION OF RESIDENCY: 40 years MOVE IN YEAR: 1979 This case study is a single floor dwelling. The justified graph of the dwelling has a bush-like layout, the interior of the dwelling is room centre plan. the dwelling has one exterior ring and no internal rings. The dwelling can be accessed from single access. The interior of the dwelling can be accessed from three entrances. The front yard of the dwelling is used by visitors and family members, yet they use different entrances to access different spaces. Visitors use the Majles entrance to access the seating area, however household access from the living room entrance. The third entrance is from the kitchen.

The first observation on the justified graph is that it takes the bush-like layout, more obvious when excluding the first-floor graph. The dwelling has no external nor internal rings. The dwelling has three entrances; an entrance for the male servant to access his room directly, an access for the male visitors to access men Majles, and a family member entrance. Men Majles can be accessed from the interior of the dwelling. The interior of the dwelling can be accessed using four entrances. Two entrances from the right yard, one serve the kitchen and the second for the household and female visitors. Female visitors have same spatial experience as the family members. The other two entrances are the Majles entrance and an entrance from the lefty vard leads to a circulation lobby. The first floor graph is a bush-like layout, and it is a corridor centre plan. Bedrooms are arranged along the corridor.



CASE STUDY NUMBER: 053 DURATION OF RESIDENCY: MOVE IN YEAR: 2000



CASE STUDY NUMBER: 054 DURATION OF RESIDENCY:19 years MOVE IN YEAR: 1998

The justified graph of this case study has a treelike layout. This case study is an extended family dwelling. It has one external ring and no internal rings. The dwelling has only one entrance for all The interior of the dwelling can be users. accessed from two entrances; an entrance to the Majles for visitors and another access for the family members to the daily living room. The Majles has a high integration value as it can be accessed from the interior of the dwelling too. The married child extension can be accessed from the left yard. The first floor has a bush-like layout and it is room centre plan. The first floor living room has the central location and connect all single children bedrooms.

The first observation on the justified graph is that it takes the bush-like layout, more obvious when excluding the first-floor graph. The dwelling has no external rings and one internal ring. The dwelling has one access for all type of users to the front yard. Male servant room can be accessed from the front yard. The interior of the dwelling can be accessed from four entrances. Three front vard entrances lead to the Mailes, office, and to the ground floor living room. The living room has another entrance from the back yard. the Majles can be accessed from the interior of the dwelling through the dining room. The first floor has a bush-like layout, and it is corridor centre plan. the bedrooms and the first floor living room are distributed along a corridor.

This case study is a one floor dwelling. The justified graph has a bush-like layout. the dwelling has no rings. The dwelling can be accessed from two entrances. the first entrance is for male visitors to access the men Majles directly. The Majles has another access from the dwelling yard. the second entrance is family member entrance and it leads to the front yard. the front yard work as a reciption lobby as it directs different users to different entrances. The interior of the dwelling can be accessed from two entrances from the front yard and another one from the back yard.



CASE STUDY NUMBER: 056 DURATION OF RESIDENCY: 11 years MOVE IN YEAR: 2008



CASE STUDY NUMBER: 021





CASE STUDY NUMBER: 041 DURATION OF RESIDENCY: MOVE IN YEAR: 2005 The backyard entrance is a service entrance as it link the dwelling with work spaces in the backyard. Children bedroom are separated by a circulation lobby.

This case study is a one floor dwelling. The justified graph has a bush-like layout. It has no rings in the interior nor the exterior of the dwelling. The dwelling can be accessed from one entrances to the front yard of the dwelling. The interior of the dwelling can be accessed form three entrances, two from the front yard and one from the back yard. An entrance is dedicated for men access to the Majles, the second one is for family members and female visitors. The backyard entrance is a service entrance to the work spaces of the dwelling. The interior of the dwelling is corridor centre plan, were all the spaces are arranged around the corridor.



CASE STUDY NUMBER: 052 DURATION OF RESIDENCY:15 years MOVE IN YEAR: 2004

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K. S	oatial o	rder ba	ased or	n the in	tegra	tion va	lue													
cases	<b>Own</b> Integ	er desig	<b>gned dv</b> value or	<b>vellings</b> rder	;															Mean
011	Playroom	First floor LR	WM dining	Ground LR	Maid BR	MM	Kitchen	Guest BR	Master BR	MM dining	S Child BR	S Child BR	S Child BR	S Child BR	S Child BR	WW	Married son BR	Grand children BR		
	8.94	7.27	7.24	6.87	6.8 7	6.84	6.57	6.51	6.23	6.01	5.62	5.58	5.83	5.41	5.05	5.0	4.98	4.72		6.36
12	Ground LR	First floor LR	S Child BR	M child LR	MM Dining	LR	Inner K	Guest BR	Maid BR	Exterior BR	M child LR	First floor K	Library	WM	Exterior K	S Child BR	M child K	M child BR	MM	
0	12.2	11.1	8.67	8.67	8.5 6	8.5	8.5	8.34	8.29	8.23	8.13	7.89	7.89	7.63	7.57	7.23 7.23 7.2 7.16	7 6.65	6.06 6.01	6.0 1	7.49
013	Ground LR	WM Dining	First floor LR	Guest BR	LR	S Child BR	MM	MM	¥	Maid BR	Daily LR	S Child BR	S Child BR	Driver Room	M Child BR					
	9.21	7.2	6.96	6.92	6.5 8	6.58	6.28	6.12	6.03	5.46	5.46	5.39	5.21	4.64	4.53					5.7
014	Inner K	First floor LR	Ground LR	Majless Dining	LR	Σ	Maid BR	Exterior K	Guest BR	Guest BR	Library	S Child BR	S Child BR							

	026		024		023		016		015	
7.79	First floor LR	8.46	First floor LR	8.17	Dining	9.36	First Floor LR	7.19	Inner K	9.17
7.55	MM	7.1	WM Dining	6.69	First floor LR	7.75	Σ	6.77	Playroo m	9.09
7.07	INNER K	7.03	Guest BR	6.63	Ground LR	7.62	Guest BR	6.61	First floor LR	9.02
6.82	Ground LR	6.96	MM	6	Master BR	7.5	Inner K	5.6	Ground LR	8.11
6.7 3	M Child	6.7 5	Ground	5.6 6	Daily	7.3 9	Ground	5.6 1	M child	6.8 7
6.51	WM Dining	6.5	Inner K	5.36	Inner K	6.75	Firs floor BR	5.5	M child BR	6.71
6.07	M Child LR	6.16	MM	5.2	Servant LR	5.83	Office	5.18	M child BR	6.71
5.78	Maid BR	6.06	S Child BR	5.05	Maids LR	5.83	Maid BR	5.18	M child LR	6.06
5.53	Exterior K	5.05	M Child extensio	5.05	Exterior K	5.83	Exterior K	5.15	Maid BR	5.81
5.53	Maid BR	4.59	S Child BR	4.28	Maid BR	5.8	Majless Dining	5.15	Exterior K	5.64
5.29	M Child BR	4.59	S Child BR	4.28	Maid BR	5.76	Maid BR	4.4	MM	5.52
5.18	M Child K	4.18	Exterior K	4.26	Playroo m	5.37	Driver Room	4.14	M child BR	5.42
5.02	S child BR			4.15	M Child BR	5.16	Firs floor BR	3.79	Driver Room	5.33
5.02	Master BR			4.15	M Child LR					
4.92	Hobby room									
4.82	S child BR									
5.73		5.84		5.28		6.21		5.13		6.27

033	Ground LR	MM	Daily LR	MM	M Child	Guest BR	Office	First Floor LR	S child BR	Exterior K	M Child BR	Driver Room	M Child BR						
	9.08	7.33	7.22	6.6	6.3 8	5.78	5.78	5.46	5.4	5.35	5.07	4.95	4.4						5.22
035	Ground LR	LR	First floor LR	Σ	×	Guest BR	Child BR	Child BR	Child BR	Child BR	Child BR	Child BR	Child BR	Child BR	Driver Room				
	10.4	9.06	8.21	6.84	6.8 4	6.84	6	5.82	5.82	5.13	5.06	5.06	4.9	4.78	4.48				5.83
051	Ground LR	Inner K	Guest BR	WM Dining	MM	M Child LR	Master BR	S Child BR	Tent	First Floor LR	M Child BR	Exterior K	M Child BR	S Child BR	S Child BR	S Child BR	MM		
	9.67	7.61	6.83	6.72	6.0 2	5.81	5.74	5.74	5.59	5.59	5.28	5.28	4.55	4.55	4.55	4.55	4.08		5.58
055	Ground LR	First Floor LR	Guest BR	MM Dining	S Child	MM	×	Maid BR	MM	S Child BR	S Child BR	S Child BR	Tent						
	7.9	6.49	5.3	4.78	4.6 2	4.3	4.06	4.06	4.02	3.99	3.91	3.84	3.75						4.47
042	Groun d LR	¥	First Floor	Guest BR	Σ	Σ	Driver Room	Master BR	Child BR	Child BR	Child BR	Child BR							
	9.19	6.84	6.6	5.96	5.7 8	5.55	5.29	4.92	4.83	4.75	4.75	4.41							5.32

_	064		063		062		061		044
10	Ground LR	9.24	M Dining	9.18	Ground LR	10.5	Ground LR	8.43	First Floor LR
8.29	Inner K	8.51	Σ	7.89	First floor LR	8.61	MM	7.31	Ground LR
6.66	Guest BR	8.34	Guest BR	7.39	MM	8.55	lnner K	5.89	Guest BR
6.29	MM	8.26	Ground LR	7.39	lnner K	8.44	First floor LR	5.79	S Child BR
6.2 4	S Child	7.8 4	LR	7.3 5	Granny	7.6 3	Guest BR	5.7 9	S Child
6.24	S Child BR	7.21	Aunt BR	6.83	WM Dining	7.16	Guest BR	5.5	M Dining
6.24	First floor LR	7.21	Driver Room	6.09	Master BR	6.71	Occasion s Dining	4.97	¥
6.24	s Child BR	7.04	First floor LR	5.96	Library	6.47	s Child BR	4.89	Maid BR
6.09	WM Dining	6.98	S Child BR	5.93	Driver Room	6.47	s child BR	4.59	Σ
5.73	MM	6.98	S Child BR	5.88	Exterior K	6.4	s Child BR	4.59	S Child BR
5.41	Driver Room	6.53	Exterior K	5.7	Girls M	6.28	Tent	4.59	S Child BR
5.41	Maid BR	6.24	Maid BR	5.54	MM Dining	6.28	Exterior K	4.53	Master BR
5.41	Exterior K	6.24	Maid BR	5.34	Guest BR	5.95	MM	4.35	Guest BR
4.87	S Child BR	5.36	M child LR	5.29	Tent	5.2	s Child BR	3.98	Second floor LR
4.87	S Child BR	4.56	M child BR	4.92	s Child BR	5.2	s Child BR	3.98	M Child BR
4.87	s Child BR	4.53	M child K	4.62	MM	5.16	Master BR	3.98	M Child BR
6.08		6.59		6.22		6.42		5.24	

065	Ground LR	Guest BR	First Floor LR	Master BR	S Child B	Master BR	×	MM	S Child B	S Child B	S Child B									
	8.63	5.84	5.84	5.5	5.5	4.63	4.59	4.34	4.34	4.34	4.34									4.99
067	Ground LR	Inner K	Guest BR	Σ	First	Kids BR	Diver Room	Maid BR	S Child BR	S Child BR	Exterior K	M child LR	Master BR	S Child BR	S Child BR	M child BR	M child BR	M Dining		
	7.61	7.01	6.1	5.78	5.7 1	5.43	5.35	5.32	5.32	5.32	5.27	5	4.72	4.6	4.6	4.18	4.15	3.93		5.16
Dev	/eloper	Design	ed Dwe	ellings																
056	Ground LR	Σ	Daily LR	First Floor LR	S Child	S Child BR	S Child BR	S Child BR	Tent	×	S Child BR	S Child BR	M Child BR	M Child BR	M Child					
	7.65	6.34	6.34	5.5	4.7 2	4.72	4.72	4.72	4.41	4.41	4.41	4.24	4.24	4.24	4.24	4.24	3.48	3.48	3.5 4	4.65
053	LR	¥	M Child BR	Master BR	S Child	Σ	S Child BR	Driver Room	Maid BR											
	13.3	8.16	7.02	6.48	6.4 8	6.17	6.17	5.38	4.6											6.21
054	Ground LR	MM	×	M Dining	Master	S Child BR	S Child BR	Guest BR	Office	Maid BR	S Child BR	S Child BR	Maid BR	Σ	Driver Room					
	9.3	7.16	6.1	6.06	5.8 6	5.78	5.78	5.75	5.67	5.67	5.64	5.64	5.6	5.04	4.58					5.66

	025		032		031		034		036
9.85	Ground LR	7.51	М	7.56	Wm Dining	8.6	Ground LR	11.5	Ground LR
8.15	First floor LR	7.08	LR	7.11	Master BR	7.34	WM Dining	8.11	First floor LR
7.69	Inner K	5.83	s child BR	7	First floor LR	6.73	First floor LR	7.96	M Child LR
7.05	MM Dining	5.7	Family Dining	6.18	Granny BR	6.63	Master bedroom	7.66	Guest BR
6.4 3	MM	5.0 6	Master	6.1 8	Ground	6.3 5	Maid BR	7.0 6	MM
6.18	Maid BR	5.01	Tent	6.18	Library	6.35	Maid BR	6.66	MM
5.91	Guest BR	4.96	S Child BR	5.69	MM	6.14	Daily LR	6.5	×
5.34	MM	4.86	S Child BR	5.5	M Child LR	5.94	MM	6.5	Maid BR
5.19	S Child BR	4.86	s child BR	5.5	M Child LR	5.94	¥	5.98	S Child BR
5.19	S Child BR	4.27	¥	5.31	S Child BR	5.25	M Child LR	5.98	Master BR
5.08	S Child BR	4.2	Maid BR	5.11	Exterior K	5.25	S Child BR	5.98	S Child BR
4.97	M Child BR	3.72	Maid BR	4.73	S Child BR	5.25	S Child BR	5.54	Σ
4.87	M Child BR			4.57	MM	5.18	Master BR	4.73	M Child LR
4.7	Exterior K			4.52	Driver room	5.13	S Child BR	4.5	Driver room
4.7	Driver Room			4.48	M Child BR	4.56	Driver Room	3.88	M Child BR
				4.48	M Child BR	4.25	M Child BR		
				4.4	S Child BR	3.89	MM		
				4.4	Girls LR				
				3.7 8	Driver K				
5.63		5.37		5.34		5.43		6.09	

022	Ground LR	Inner K	First floor LR	WM Dining	MM	Driver Room	MM	Maid BR	Library	Exterior K	MMK	S Child BR	S Child BR	S Child BR	Master BR			
	8.28	6.56	6.05	5.94	5.7 7	5.29	5.04	4.7	4.59	4.59	3.98	3.75	3.75	3.75	3.75			5.14
)43	M	LR	×	Maste r BR	Driver	s child BR	Dining	S Child BR	s child BR									
	9.54	8.07	5.83	5.25	5	5	5	5	5									5.52
064	Ground LR	Inner K	Guest BR	MW	S Child	S Child BR	First floor LR	S Child BR	WM Dining	MM	Driver Room	Maid BR	Exterior K	S Child BR	S Child BR	S Child BR		
	10	8.29	6.66	6.29	6.2 4	6.24	6.24	6.24	6.09	5.73	5.41	5.41	5.41	4.87	4.87	4.87		6.08
065	Ground LR	Guest BR	First Floor LR	Master BR	S Child B	Master BR	×	MM	S Child B	S Child B	S Child B							
	8.63	5.84	5.84	5.5	5.5	4.63	4.59	4.34	4.34	4.34	4.34							4.99
041	LR	S Child BR	GYM	Driver Room	MM	×	MM	Maid BR	S Child BR	S Child BR	S Child BR	S Child BR	Office	Master BR				
	14.6 2	7.02	7.02	6.5	6.3 8	6.26	6.26	5.48	5.48	5.48	5.48	5.48	5.01	4.87				6.65
052	Master BR	LR	MM	S Child BR	S Child	S Child BR	Maid BR	M	Swimmin g pool	Maid BR	Exterior K							

	7.5	7.24	7.24	7	7	7	6.17	5.83	5.83	5	5							7.21
021	Ground LR	Daily LR	M Dining	First floor LR	Master	S child BR	Office	Office	Σ	Guest BR	M Child BR	M Child BR	¥	Maid BR	Tent			
	10.5 7	7.48	7.31	6.34	6.1 1	6.11	6	5.89	5.79	5.41	4.86	4.72	4.44	4.44	4.38			5.76

# Appendices

- A. Ethical form
- B. Doha national master plan
- C. Research tools templet
- D. Physical mapping of neighbourhoods
- E. Behavioural observation maps
- F. Axial map of neighbourhoods
- G. VGA map of neighbourhoods
- H. Overlap of VGA map and sociograms of interviewees
- I. Shortlisted neighbourhood locations
- J. Dwelling justified graphs and description
- K. Space/integration value order table of the dwellings
- L. Raw data
  - a. Statistical analysis: correlation test
  - b. Anonymised questionnaire
  - c. Anonymised interview

### L. Raw data: statistical analysis - correlation test

		Case study Age group Ge nde r Nationa lity	Maria Istatues General health Bimotional problems that thirtoferd normal social activities with family or no inhoses	ne gutoors House hold s ize	Number of children in the household Employment status Walk to work'university Cock in work'university	y are the bas to work/ Use the bas to work/ Drive to work/ university fave to work/ university is not typicable Number of case owned by Number of case owned by	Dwelling type Number of bedrooms Availabilty of outdoor space House tenure	Own property Rente d property Residence duration	Would like to move to another neighborhood Would like nove to another house Would like to make some changes in the house design House location satisfaction	General hous e design satis lection Sa the fact of the original he ght of the house fance Original house fance satis faction	Oukloor space satisfaction Satisfaction of the privacy in the outdoor space Satisfaction of the privacy in your house Own privet space in the	house satisfaction Frequency of gathering with own household members Ease of inviting guests to the	nouse House design create conflict between the housechold member Relatives or thiends in the Relatives or thiends in the Terrounner of athermoving in	requency or game mass requestory or game mass extended people you live opportunities to me of people in the mighborhood Prequencies or three sing of the mighborhood of the mighborhood of the mighborhood of persons known in the sect beed in	Number of close relationships in the street hved in Number of pers ons known in your neighborhood Number of close relationships in the are ighborhood	weithbors weithbors Receiving social support from people in the end weithborhood I can ask for he plv fa wer from my neighbors	ask for advice in personal ask for advice in personal ssues. I can leave my personal property sale you side. (e.x. Car, delivery packago) I need to bed ny door while I am in the bloss e	Inced monitoring system to keep my house as from how king in Neighbors Jook after each Neighbors Jook after each Meighborhood at any time meighborhood at any time This is a frendly	Diffèrent people from diffèrent back ground get well together in this neigh borhood Satis fac tion on the outdoor spaces in your neighborhood	Sa tis fine tion on the leikure the clifties you use in your ne globorhood Sa tis faction on the shopping the clifties Sa tis faction on the showa fast with ensishborhood	Sa this fac tion on the mainte man e of your me the hordnoce of yours (terset idy, elsan) Sa the fac tion on the quality of your regulatorhood Sa this cion on this me the hordnood as a place to	satis satis the neighborhood Batis fac tion on vour sa kety in Satis fac tion on children Satis fac tion on the durgs Satis fac tion on the durgs that you can do together with	your tamiy at your ne it horhood Sa tis fac ion on the building Ga tis fac ion on the Sa tis fac ion on the population dens iy of the
Case study	Sig. (2-tailed)	1.000 -0.061 -0.044 0.102 0 0.332 0.491 0.107 0 252 252 251 250	0.055 0.038 -0.00 0.388 0.552 0.92 252 252 24	06 0.061 28 0.337 49 250	-0.091 -0.092 -0.009 -0.0 0.156 0.150 0.889 0.7 246 248 246 2	20 0.103 0.004 -0.023 0.009 -0.0 59 0.108 0.945 0.720 0.891 0.3 46 246 246 246 246 249	057 0.051 -0.074 -0.10 366 0.426 0.240 0.09 251 250 251 250	07 -0.012 .153 -0.097 01 0.854 0.021 0.125 00 238 228 250	-0.093 -0.028 -0.095 -0.12 0.142 0.656 0.134 0.05 250 248 249 24	4 -0.063 0.029 -0.058 -0.0 1 0.327 0.655 0.365 0. 8 245 246 246	083 -0.046 0.088 0. 196 0.475 0.170 0. 247 247 247	02 -0.001 0.01 074 0.982 0.78 047 250 24	8 -0.041 -0.018 2 0.518 0.777 0 249 248	0.049 -0.019 -0.054 0.009 0.441 0.760 0.396 0.886 251 251 250 244	-0.022 -0.016 0.021 0.739 0.800 0.742 243 242 240	0.010 0.056 0.029 0.872 0.382 0.648 244 249 243	-0.016 -0.013 0.06 0.800 0.835 0.29 243 244 24	8 -0.074 -0.006 0.011 -0.099 2 0.247 0.924 0.861 0.126 4 244 242 241 241	0.015 -0.045 0.817 0.477 242 246	0.021 0.009 -0.06	5 -0.119 -0.019 0.000 4 0.064 0.765 0.998 5 245 241 245	0.544 0.503 0.	97 -0.055 -0 132 0.391 0.153 244 243 244
Age group	Correlation Coefficient Sig. (2-tailed)	-0.061 1.000 .138 <sup>*</sup> 140 <sup>*</sup> 4 0.332 0.029 0.027 0	404 <sup>***</sup> 320 <sup>***</sup> 0.08 .000 0.000 0.18	84 0.116 84 0.066	.147 <sup>*</sup> .141 <sup>*</sup> 0.044 0.0 0.021 0.026 0.489 0.3	60 0.086 0.025 -0.096170 <sup>**</sup> 1 45 0.178 0.698 0.134 0.007 0.0	146 <sup>°</sup> 0.108 .164 <sup>°°</sup> .188 <sup>°</sup> 020 0.089 0.009 0.003	3"         .154"        266"         .229"           13         0.018         0.000         0.000	0.051 .128 <sup>°</sup> .236 <sup>°°</sup> 0.03 <sup>°</sup> 0.419 0.044 0.000 0.53	9 0.120 0.054 0.082 0.1 8 0.061 0.402 0.199 0.1	013 0.080 -0.001 0. 843 0.213 0.992 0.	60 0.026 0.03 48 0.685 0.40	3 0.088 .156 <sup>°</sup> 16 0.169 0.014	0.024 0.038 .235 <sup>st</sup> .216 <sup>st</sup> 0.702 0.549 0.000 0.001	.262 <sup>**</sup> 0.124 .139 <sup>*</sup> 0.000 0.054 0.032	0.116 0.054 0.038 0.071 0.400 0.551	.130 <sup>*</sup> 0.021 0.05 0.043 0.739 0.40	3         -0.091         -0.033         0.031         0.011           9         0.156         0.606         0.631         0.863	-0.073 -0.035 0.255 0.586	-0.029 -0.118 -0.06 0.651 0.066 0.31	5 -0.099 -0.117151 2 0.124 0.069 0.018	145 <sup>*</sup> 133 <sup>*</sup> -0. 0.023 0.037 0.	121 -0.100134 059 0.119 0.035
Marital statues	N N	252 252 251 250 252 252 251 250	252 252 24 252 252 24	49 250 49 250	246 248 246 2 246 248 246 2	46         246         246         249         2           46         246         246         246         249         2	251 250 251 250 251 250 251 250	i0         238         228         250           i0         238         228         250	250         248         249         243           250         248         249         243	8 245 246 246 . 8 245 246 246 .	247         247         247           247         247         247	247 250 25 247 250 25	i0         249         248           i0         249         248	251 251 250 244 251 251 250 244	243 242 240 243 242 240	244         249         243           244         249         243	243 244 24 243 244 24	4 244 242 241 241 4 244 242 241 241	242 246 242 246	245 245 24 245 245 24	5 245 241 245 5 245 241 245	245 245 245 245	44         243         245           244         243         245
General health	Correlation Coefficient Sig. (2-tailed)	0.038 - 320** 0.123 - 178** . 0.552 2E-07 0.052 0.005 0 252 ##### 251 250	128* 1.000 .13: .042 0.03 .252 2.52 2.4	5* 0.122 33 0.054 49 250	-0.083 -0.009 0.046 0.1 0.194 0.891 0.470 0.1 246 248 246 2	00 -0.005 -0.120 0.095140* -0.0 16 0.932 0.060 0.139 0.028 0.0 46 246 246 246 246 249	031 .160* 0.005 .143 624 0.011 0.943 0.024 251 250 251 250	3* 0.093 -0.068 0.054 14 0.153 0.310 0.398 30 238 228 250	0.124 -0.006 -0.044 .129 0.051 0.924 0.494 0.043 250 248 249 243	9*-0.061 0.031 0.047 0.0 3 0.341 0.631 0.465 0.0 8 245 246 246	052 0.074 0.107 0. 414 0.246 0.094 0. 247 247 247	40 .171 0.10 27 0.007 0.10 47 250 24	0.082 -0.087 0.199 0.173 0 249 248	.172** 0.102 0.053 .130* 0.006 0.109 0.402 0.043 251 251 250 244	.138" .229" .223" 0.031 0.000 0.001 243 242 240	.227" 0.110 0.111 0.000 0.083 0.083 244 249 243	0.090 .150*186 0.162 0.019 0.00 243 244 24	" 0.054 .200" .166" .233" 4 0.401 0.002 0.010 0.000 4 244 242 241 241	.262*** 0.026 0.000 0.682 242 246	0.024 .130* 0.03 0.706 0.043 0.59 245 245 24	4 0.124 .152* .180* 3 0.052 0.018 0.005 5 245 241 245	0.112 0.024 0. 0.080 0.704 0.	94 .158* .211** 145 0.014 0.001 244 243 244
Emotional problems that interfered normal social	Correlation Coefficient	-0.006 0.084 0.040 0.009 -	.143" .135" 1.00	00 .143*	0.027 -0.068 0.009 -0.0	40 0.059 0.003 -0.016 -0.041 -0.0	032 0.100 0.034 .130	0* -0.005 -0.076 0.081	.163" .208" .137" .241	··· .221 ··· 0.019 .168 ··· 0.	113 .163* 0.015 .1	·6** .198** .15	5* .227** -0.040	0.092 0.013 .168** .233**	.170" .143" .220"	.128* .142* 0.101	.147* 0.079 -0.01	1 -0.038 .216" 0.059 .168"	.132* 0.084	.147* .145* .166	0.125 0.057 .160	.140* .133* .1	63 <sup>*</sup> .208 <sup>**</sup> .182 <sup>**</sup>
activities with family or neighbors	Sig. (2-tailed)	0.928 0.184 0.528 0.887 0	0.024 0.033 249 249.000 24	0.025	0.673 0.288 0.893 0.5 243 245 243 2	31 0.357 0.960 0.799 0.525 0.4 43 243 243 243 243 246 2	613 0.118 0.590 0.042 248 247 248 247	2 0.937 0.255 0.202 17 235 225 247	0.010 0.001 0.031 0.000	0 0.001 0.770 0.009 0.0 5 242 243 243	079 0.011 0.814 0. 244 244 244	06 0.002 0.01 44 247 24	5         0.000         0.536           47         246         245	0.147 0.841 0.008 0.000 248 248 247 241	0.008 0.027 0.001	0.047 0.026 0.118	0.023 0.222 0.86	3 0.558 0 1 241 239 238 238	239 243	242 242 24	2 242 238 242	242 242	241 240 242
Household size	Sig. (2-tailed)	0.061 0.116 0.121337 0. 0.337 0.066 0.056 0.000 0	.006 0.122 .14 .931 0.054 0.02	25	0.017 -0.028 .142 0.0	92         0.009         -0.075         -0.003        414         0.3           49         0.890         0.241         0.962         0.000         0.3	023         .459         0.045         .360           722         0.000         0.481         0.000	0 .187314 .258 10 0.004 0.000 0.000	.161         .190         -0.003         .177           0.011         0.003         0.967         0.003	5 0.589 0.990 0.488 0.	466         0.546         0.009         0.009         0.009	67 0.075 0.05	0.058 .245 0.368 0.000	.135 .162 .185 .355 0.034 0.010 0.004 0.000	.260 .313 .211 0.000 0.000 0.001	0.000 0.935 0.083	0.037 0.081 0.25	4186 .215 0.008 .158 3 0.004 0	.159 -0.021	-0.038 -0.003 -0.06.	-0.017 0.013 -0.015	-0.035158 0.	65 0.086 0.126
Number of children in the	N Correlation Coefficient	250 250 249 249 -0.091 .147* -0.002 -0.067 0	250 250 24 .007 -0.083 0.02	47 250 27 0.017	245 247 245 2 1.000 -0.078 0.116 0.0	45 245 245 245 248 2 58 -0.083143* 0.117 0.035 -0.0	249 248 249 248 037 0.012 .194 <sup>***</sup> 0.070	18 237 226 248 10 0.084 -0.061 0.008	248 246 247 240 -0.004 0.064 0.004 -0.01	6 243 244 244 2 0 0.066 0.032 0.034 0.0	245 245 245 245 055 0.064 0.048 0.	12 0.010 0.05	8 247 247 1 0.018 0.107	249 249 248 242 0.115 0.066 .174** 0.044	241 240 238 0.021 -0.025 -0.023	242 247 241 0.019 -0.037 0.067	241 242 24 0.040 0.101 -0.05	2 242 240 239 239 7 -0.037 0.103 -0.056 -0.071	240 244 0.034 0.078	243 243 244 .153 <sup>*</sup> 0.039 0.03	3 243 239 243 1 0.032 0.015 0.010	243 243 243 0.009 0.	42 241 243 080 -0.005 0.016
household	Sig. (2-tailed)	0.156 0.021 0.973 0.300 0	.917 0.194 0.67 246 246 24	73 0.790	0.223 0.072 0.3	73 0.197 0.027 0.070 0.583 0.1	560 0.858 0.002 0.270	0.201 0.365 0.898	0.955 0.321 0.951 0.870	6 0.313 0.621 0.598 0.3	397 0.326 0.462 0.	182 0.873 0.42	0.784 0.098	0.071 0.300 0.006 0.496	0.744 0.699 0.725	0.775 0.565 0.304	0.534 0.119 0.37	6 0.569 0 9 239 237 236 237	237 241	240 240 24	240 236 240	240 240	230 238 244
Employment status	Correlation Coefficient	-0.092141 <sup>*</sup> 165 <sup>**</sup> 0.084 .1	177 <sup>**</sup> -0.009 -0.06	68 -0.028	-0.078 1.000 -0.060 0.0	54127 <sup>*</sup> .339 <sup>**</sup> 313 <sup>**</sup> -0.002 .1	142* -0.032 0.021 -0.021	18 -0.097 -0.038 0.037	-0.020 -0.120 0.010 0.063	2 -0.080 .137* 0.066 0.0	010 -0.029 -0.045 -0.	20 0.023 -0.01	4 -0.055 0.025	0.015 -0.071 -0.056 -0.026	-0.079 0.059 0.030	0.023 -0.025 0.031	0.009 0.004 -0.01	8 0.046 0.011 -0.017 -0.001	-0.103 0.026	-0.065 -0.039 -0.09	5 -0.047 -0.054 -0.011	-0.015 -0.020 0.	021 0.038 0.001
	S ig. (2-tailed)	0.150 0.026 0.009 0.188 0 248 248 247 246	.005         0.891         0.28           248         248         24	88 0.661 45 247	0.223 0.351 0.4 245 248 243 2	06         0.049         0.000         0.000         0.979         0.0           43         243         243         243         246         2	026 0.614 0.744 0.660 247 246 247 240	i6         0.140         0.575         0.568           i6         235         224         246	0.750 0.060 0.876 0.33 246 244 245 24	6 0.216 0.033 0.303 0.3 4 241 242 242	873         0.648         0.489         0.3           243         243         243         243         3	0.718 0.25 043 246 24	0 0.395 0.703 6 245 244	0.815 0.264 0.378 0.694 247 247 246 240	0.222 0.364 0.648 239 238 236	0.725 0.698 0.631 240 245 239	0.893 0.954 0.78 239 240 24	6 0.475 0 0 240 238 237 238	238 242	241 241 24	1 241 237 241	241 241	240 239 241
Walk to work/ university	Correlation Coefficient Siz. (2-tailed)	-0.009 0.044 -0.079187** 0. 0.889 0.489 0.217 0.003 0	0.022 0.046 0.00	09 .142* 93 0.026	0.116 -0.060 1.000 -0.0	08 -0.020265" -0.055 -0.104 0.0	018 .145° .212 <sup>***</sup> .217 <sup>**</sup> 777 0.023 0.001 0.00	" 0.054 -0.112 -0.001 1 0.411 0.093 0.989	0.066 0.023 -0.030 0.11	7 0.030 0.051 0.023 0.0 9 0.646 0.434 0.723 0.1	025 .142 <sup>*</sup> 0.093 0. 703 0.028 0.150 0.	19 0.070 .211 66 0.277 0.00	0.055 .175**	.181 <sup>**</sup> 0.041 .139 <sup>*</sup> 0.111 0.004 0.521 0.030 0.088	0.103 0.109 0.112 0.113 0.093 0.087	.166 <sup>*</sup> 0.002 .161 <sup>*</sup> 0.010 0.981 0.013	0.081 0.004 0.02	9 -0.039 0.064 -0.018 0.126 6 0.551 0	0.065 0.007	0.032 0.063 -0.03	2 -0.009 0.005 0.046	0.062 -0.053 0.	08 0.076 0.083
Curls to make missionity	N Completion Coofficient	246 246 245 244	246 246 24	43 245	241 243 246 2	46 246 246 246 244 2	245 244 245 244	14 233 224 244	244 242 243 243	2 239 240 240	241 241 241	241 244 24	4 243 242	245 245 244 238	237 236 234	238 243 237	237 238 23	8 238 236 235 235	236 240	239 239 23	239 235 239	239 239	238 237 239
Cycle to work university	Sig. (2-tailed)	0.759 0.345 0.372 0.588 0	.501 0.116 0.53	31 0.149	0.373 0.406 0.898	0.875 0.039 0.670 0.250 0.0	042 0.190 0.669 0.55	i2 0.529 0.081 0.356	0.038 0.133 0.342 0.64	4 0.383 0.465 0.367 0.	415 0.502 0.349 0.	42 0.056 0.66	is 0.131 0.459	0.110 0.210 0.172 0.976	0.725 0.994 0.832	0.917 0.088 0.691	0.805 0.260 0.26	3 0.150 0	-0.030 -0.039	10.072 10.003 10.03	5 -0.048 -0.043 -0.036		03 -0.009 -0.003
Use the bus to work/ university	N ty Correlation Coefficient	246 246 245 244 0.103 0.086 .142* -0.035	246 246 24 160 <sup>*</sup> -0.005 0.05	43 245 59 0.009	241 243 246 2 -0.083127 <sup>*</sup> -0.020 -0.0	46         246         246         246         244         241           10         1.000        191 <sup>***</sup> -0.068         -0.013         0.0	245         244         245         244           039         0.096         0.005         0.084	14         233         224         244           16         0.089        136*         0.072	244         242         243         243           -0.015         0.039         0.026         0.003	2 239 240 240 2 2 0.127 0.093 0.059 -0.0	241 241 241 023 0.088 .165* 0.	01 -0.030 .15	14 243 242 1 <sup>*</sup> 0.010 -0.063	245 245 244 238 0.079 -0.026 0.061 0.078	237 236 234 .165* 0.011 0.080	238 243 237 0.081 0.032 0.030	237 238 23 .130 <sup>*</sup> 0.020 0.00	8 238 236 235 235 8 -0.036 -0.036 0.048 0.074	236 240 0.119 -0.012	239 239 23 0.081 0.003 0.04	239 235 239 1 -0.024 -0.054 0.022	239 239 -0.016 0.070 -0.	38 237 239 001 -0.020 0.067
	Sig. (2-tailed)	0.108 0.178 0.026 0.587 0	0.012 0.932 0.35 246 246 24	57 0.890 43 245	0.197 0.049 0.751 0.8	75 0.003 0.291 0.838 0.3	545 0.135 0.937 0.183 245 244 245 244	2 0.178 0.042 0.262	0.815 0.550 0.683 0.97	2 0.051 0.151 0.359 0. 2 239 240 240	720 0.173 0.010 0. 241 241 241	17 0.637 0.01 41 244 24	8 0.877 0.330	0.217 0.688 0.342 0.228	0.011 0.862 0.221	0.216 0.616 0.645	0.045 0.763 0.90	3 0.584 0 8 238 236 235 235	236 240	239 239 23	239 235 239	230 239	238 237 239
Drive to work/university	Correlation Coefficient	0.004 0.025165** .303** -0	.062 -0.120 0.00	03 -0.075	143 .33926513	81 <sup>*</sup> 191 <sup>**</sup> 1.000880 <sup>**</sup> 0.030 0.0	073 -0.088221**237	.146° .195° -0.079	164 <sup>*</sup> 226 <sup>**</sup> 0.003 0.01	1132* -0.010 -0.037 -0.0	039 -0.099186** -0.	-0.01816	3*129* -0.058	156" -0.103 -0.099 -0.087	131*149* -0.115 -	0.091 -0.048 0.042	-0.060 -0.026 0.05	1 -0.032 0.007 0.044 -0.079	-0.105 0.039	-0.005 0.058 -0.03	4 -0.052 -0.116 -0.087	0.062 0.029 0.	07 0.026 -0.063
	Sig. (2-tailed)	0.945         0.698         0.010         0.000         0           246         246         245         244	246 246 246 24	50 0.241 43 245	0.027         0.000         0.000         0.0           241         243         246         2	39         0.003         0.000         0.639         0.1           46         246         246         246         244         1	254         0.169         0.000         0.000           245         244         245         244	0 0.026 0.003 0.220 14 233 224 244	0.011 0.000 0.957 0.859 244 242 243 243	9 0.041 0.879 0.564 0.3 2 239 240 240	548         0.125         0.004         0.           241         241         241         241         241         241         241         241         241         241         241         241         241         241         241         241         241         241         241         241         241         241         241         241         241         241         241         241         241         241         241         241         241         241         241         241         241         241         241         241         241         241         241         241         241         241         241         241         241         241         241         241         241         241         241         241         241         241         241         241         241         241         241         241         241         241         241         241         241         241         241         241         241         241         241         241         241         241         241         241         241         241         241         241         241         241         241         241         241         241         241         241 <td>0.775 0.01 41 244 24</td> <td>1 0.045 0.366 14 243 242</td> <td>0.014         0.109         0.122         0.180           245         245         244         238</td> <td>0.044 0.022 0.079 237 236 234</td> <td>0.161 0.460 0.524 238 243 237</td> <td>0.356 0.692 0.43 237 238 23</td> <td>4 0.626 0 8 238 236 235 235</td> <td>236 240</td> <td>239 239 23</td> <td>239 235 239</td> <td>239 239</td> <td>238 237 239</td>	0.775 0.01 41 244 24	1 0.045 0.366 14 243 242	0.014         0.109         0.122         0.180           245         245         244         238	0.044 0.022 0.079 237 236 234	0.161 0.460 0.524 238 243 237	0.356 0.692 0.43 237 238 23	4 0.626 0 8 238 236 235 235	236 240	239 239 23	239 235 239	239 239	238 237 239
Travel to work/ university is not applicable	ot Correlation Coefficient Sig. (2-tailed)	-0.023 -0.096 .157 <sup>*</sup> 243 <sup>**</sup> 0. 0.720 0.134 0.014 0.000 0	.113 0.095 -0.01 .077 0.139 0.79	16 -0.003 99 0.962	0.117313" -0.055 -0.0 0.070 0.000 0.391 0.6	27 -0.068880 <sup>***</sup> 1.000 -0.010 -0.1 70 0.291 0.000 0.874 0.0	119 0.024 .159 <sup>*</sup> .138 062 0.707 0.013 0.03	8 <sup>*</sup> 0.096 -0.106 0.070 2 0.142 0.112 0.276	.126 <sup>*</sup> .204 <sup>**</sup> -0.008 -0.06 0.050 0.001 0.900 0.35	0 0.101 -0.024 0.028 0.0 4 0.119 0.714 0.662 0.0	052 0.044 .146 <sup>*</sup> 0. 419 0.498 0.024 0.	018 -0.010 0.00 083 0.874 0.31	0.109         0.020           0.090         0.752	0.074 0.091 0.022 0.017 0.250 0.154 0.738 0.798	0.052 0.119 0.059 0.424 0.068 0.372	0.017 0.070 -0.078 0.799 0.277 0.229	0.017 0.038 -0.05 0.796 0.559 0.38	6 0.052 -0.009 -0.050 0.016 8 0.422 0	0.084 -0.033	-0.009 -0.074 0.04	5 0.082 .140 <sup>*</sup> 0.085	-0.029 -0.007 -0.	07 -0.042 0.049
Number of cars owned by the	N Correlation Coefficient	246 246 245 244 0.009 - 170*** -0.071 415*** -0.	246 246 24	43 245	241 243 246 2 0.035 -0.002 -0.104 0.0	46 246 246 246 244 2 74 -0.013 0.030 -0.010 1.000 0.0	245 244 245 244 039 - 485 <sup>***</sup> - 201 <sup>***</sup> - 474	14 233 224 244	244 242 243 243 -0.072 . 238** -0.042 -0.00	2 239 240 240 3 1 -0.116 -0.073 -0.014 -0.0	241 241 241 3 059 -0.101 -0.081 . 1	41 244 24	4 243 242	245 245 244 238 -0.008 -0.119 0.005 - 230**	237 236 234	238 243 237	237 238 23	8 238 236 235 235 0 133 <sup>*</sup> -0.092 0.059 -0.082	236 240	239 239 23 0.096 0.094 0.07	239 235 239 5 0.046 -0.002 0.046	239 239 3 0.093 127 <sup>*</sup> 0.	138 237 239 018 0.011 -0.058
household	S ig. (2-ta ile d)	0.891 0.007 0.267 0.000 0	0.229 0.028 0.52	25 0.000	0.583 0.979 0.105 0.2	50 0.838 0.639 0.874 0.2	545 0.000 0.001 0.000	0.000 0.000 0.000	0.259 0.000 0.517 0.98	3 0.072 0.258 0.823 0.	358 0.115 0.207 0.	02 0.739 0.00	0 0.203 0.015	0.902 0.062 0.934 0.000	0.000 0.000 0.018	0.006 0.041 0.440	0.204 0.482 0.43	7 0.039 0					
Number of bedrooms	N Correlation Coefficient	249         249         248         247           0.051         0.108         .183**        472**         0.	249 249 24 .118 .160* 0.10	46 248 00 .459 <sup>**</sup>	244 246 244 2 0.012 -0.032 .145* -0.0	44         244         244         244         249         1           84         0.096         -0.088         0.024        485***         0.0	248         247         248         247           049         1.000         .259**         .524*	17 236 226 247 .333 <sup>***</sup> 434 <sup>***</sup> .374 <sup>***</sup>	247 245 246 24 .172 <sup>***</sup> .270 <sup>***</sup> 0.022 .129	5 242 243 243 2 9 0.125 0.062 0.034 0.0	244 244 244 244 244 244 244 244 244 244	44 247 24 4 <sup>41</sup> 0.102 .313	17 246 245 .167" 0.125	248 248 247 241 .229** .262** .251** .407**	240 239 237 .360 <sup>***</sup> .429 <sup>***</sup> .357 <sup>***</sup>	241 246 240 .366 <sup>***</sup> 0.075 .200 <sup>***</sup>	240 241 24 .180 <sup>***</sup> .208 <sup>***</sup> 144	1 241 239 238 238 -0.091 .295" 0.109 .212"	239 243 .329 <sup>***</sup> -0.014	242 242 243 -0.033 0.039 0.05	2 242 238 242 3 0.084 0.095 0.012	242 242 0.020 -0.069 0.	41 240 242 065 0.119 .165
	Sig. (2-tailed) N	0.426 0.089 0.004 0.000 0 250 250 249 248	0.062 0.011 0.11 250 250 24	18 0.000 47 248	0.858 0.614 0.023 0.1 244 246 244 2	90 0.135 0.169 0.707 0.000 0.4 44 244 244 244 244 247 2	442         0.000         0.000           250         250         250         249	0 0.000 0.000 0.000 19 237 228 249	0.006 0.000 0.733 0.04 249 247 248 24	3 0.051 0.338 0.597 0.4 7 244 245 245	492         0.005         0.042         0.0           246         246         246         246         246	00 0.110 0.00	0 0.009 0.051 18 247 246	0.000 0.000 0.000 0.000 249 249 248 243	0.000 0.000 0.000 242 241 239	0.000 0.241 0.002 243 247 241	0.005 0.001 0.02 241 242 24	5 0.159 0 2 242 240 239 239	240 244	243 243 24	3 243 239 243	243 243	242 241 24?
House tenure	Correlation Coefficient	-0.107 .188** 0.041763** -0.	.018 .143* .13	0 .360	0.070 -0.028 .217** -0.0	38 0.086237 <sup>**</sup> .138 <sup>*</sup> 474 <sup>**</sup> -0.0	048 .524 <sup>***</sup> .359 <sup>***</sup> 1.00	0 .561"866" .541"	.137" .265"" -0.012 0.10	6 .181 <sup>***</sup> 0.053 0.118 .1	157 <sup>*</sup> .268 <sup>**</sup> .128 <sup>*</sup> .2		0.120 .271"	.157 0.100 .163 .435**	.411" .399" .317"	.275 .139 .164	.268 .139201	······································	.227** -0.035	-0.018 0.000 .143	* .136 <sup>*</sup> 0.102 -0.010	0.024132* 0.	81 0.085 .151
	N	250 250 249 248	250 250.000 247.00	00 248	244 246 244 2	44 244 244 244 247 2 44 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000	250 249 250 250	0 237 227 249	249 248 248 24	7 244 245 245	246 246 246	46 248 24	18 247 246	249 249 248 243	242 241 239	243 247 241	241 242 24	2 242 240 239 239	240 244	243 243 24	3 243 239 243	243 243	242 241 243
Own property	Sig. (2-tailed)	-0.012         .154         0.082        454         -0.           0.854         0.018         0.211         0.000         0	.015 0.093 -0.00 .819 0.153 0.93	05 .187 37 0.004	0.201 0.140 0.411 0.5	41         0.089        146         0.096        409         -0.1           29         0.178         0.026         0.142         0.000         0.0	122         .333         .268         .561           060         0.000         0.000         0.000	0 0.000 0.000	.177         .256         .147         0.07.           0.006         0.000         0.024         0.263	3         .342         0.077         .232         .17           8         0.000         0.242         0.000         0.1	76         .295         .190         .2           007         0.000         0.003         0.	8 0.081 .243 00 0.213 0.00	.248 .213 0 0.000 0.001	0.070 .140 0.107 .283 0.286 0.031 0.102 0.000	.248 .236 .136 0.000 0.000 0.041	0.022 0.242 0.938	0.167 0.389 0.55	3 0.001 0	0.129 0.051	0.027 0.032 0.08	s 0.108 0.039 0.007	0.017 0.038 0.	.58 0.066 0.094
Rented property	N Correlation Coefficient	238 238 237 236 .153*266** -0.022 .664** 0.	238 238 23 .017 -0.068 -0.07	35 237 76314 <sup>***</sup>	234 235 233 2 -0.061 -0.038 -0.112 -0.1	33 233 233 233 236 2 17136* .195** -0.106 .407** -0.0	238 237 238 23 013434329866	7 238 215 237 ••• -539** 1.000517**	237 235 236 23 172**293** -0.006143	5 232 233 233 3 3* -0.130 -0.045 -0.0921	234 234 234 157*217** -0.1112	234 236 23 11" -0.125293	6 235 234 -0.114275**	237 237 236 231 -0.115 -0.079198**370**	230 229 227 344 <sup>***</sup> 311 <sup>***</sup> 228 <sup>***</sup> -	231 235 230 .226** -0.099150*	230 231 23 278*** -0.093 .145	1 231 229 228 228 .232 <sup>m</sup> .199 <sup>m</sup> 0.095 .182 <sup>m</sup>	229 234 161* 0.019	233 233 233 0.046 0.017 -0.10	3 233 229 233 3 -0.115 -0.059 0.066	233 233 0.036 0.093 -0.	233 231 233 035 -0.032 -0.114
	S ig. (2-ta ile d)	0.021 0.000 0.746 0.000 0	.800 0.310 0.25 228 228 22	55 0.000 25 226	0.365 0.575 0.093 0.0	81         0.042         0.003         0.112         0.000         0.8           24         224         224         224         226         2	847 0.000 0.000 0.000 228 228 228 228	0 0.000 0.000	0.009 0.000 0.932 0.033	2 0.051 0.505 0.170 0.0	018 0.001 0.098 0.	01 0.061 0.00	0 0.088 0.000	0.083 0.236 0.003 0.000	0.000 0.000 0.001	0.001 0.137 0.026	0.000 0.166 0.03	2 0.001 0	219 222	222 222 22	222 218 222	222 222	221 220 221
Residence duration	Correlation Coefficient	-0.097 .229 <sup>**</sup> 0.086431 <sup>**</sup> 0.	.056 0.054 0.08	81 .258**	0.008 0.037 -0.001 -0.0	59 0.072 -0.079 0.070421** 0.0	031 .374" .218" .541	······································	0.076 .194** 0.027 0.06	6 .131* 0.086 0.093 0.0	090 .208** 0.062 .2	2 0.021 .244	.197	0.090 -0.001 0.123 .426**	.384" .372" .328"	.288 .133 .209	.254** 0.104135	·128 <sup>*</sup> .200 <sup>**</sup> 0.000 0.078	0.106 0.051	-0.021 -0.010 0.06	0.059 0.090 -0.112	-0.056141* 0.	024 0.012 0.064
	Sig. (2-tailed)	0.125         0.000         0.177         0.000         0           250         250         249         248	250 250 24	02 0.000 47 248	0.898 0.568 0.989 0.3 244 246 244 2	56         0.262         0.220         0.276         0.000         0.0           44         244         244         244         247         2	629         0.000         0.001         0.001           250         249         250         249	0 0.000 0.000 19 237 228 250	0.234 0.002 0.673 0.293 249 247 248 24	8 0.041 0.179 0.145 0. 7 244 245 245	160         0.001         0.336         0.1           246         246         246         246         3	00 0.736 0.00 46 248 24	0 0.129 0.002 18 247 246	0.155 0.986 0.052 0.000 249 249 248 243	0.000         0.000         0.000           242         241         239	0.000 0.037 0.001 243 247 241	0.000 0.108 0.03 241 242 24	6 0.046 0 2 242 240 239 239	240 244	243 243 24	3 243 239 243	243 243	242 241 243
Would like to move to another neighborhood	Correlation Coefficient Sig. (2-tailed)	-0.093 0.051 0.049131* 0 0.142 0.419 0.444 0 0	.017 0.124 .16 .784 0.051 0.01	3* .161* 10 0.011	-0.004 -0.020 0.066 .13 0.955 0.750 0.306 0.0	33 <sup>*</sup> -0.015164 <sup>*</sup> .126 <sup>*</sup> -0.072 0.0 38 0.815 0.011 0.050 0.259 0.3	001 .172" .127 .137 981 0.006 0.045 0.03	7 <sup>*</sup> .177 <sup>**</sup> 172 <sup>**</sup> 0.076 1 0.006 0.009 0.234	1.000 .568 <sup>**</sup> 0.120 .367 <sup>*</sup> 0.000 0.059 0.00	".209" 0.119 .193" .19 0 0.001 0.062 0.002 0.0	97 <sup>***</sup> .264 <sup>***</sup> 0.121 .2 002 0.000 0.058 0.	1 <sup>11</sup> .132 <sup>*</sup> .12	9 <sup>*</sup> .151 <sup>*</sup> 0.106 3 0.018 0.098	.158 <sup>*</sup> .169 <sup>**</sup> .325 <sup>**</sup> .253 <sup>**</sup> 0.013 0.008 0.000 0.000	.198 <sup>***</sup> .199 <sup>***</sup> .222 <sup>***</sup> 0.002 0.002 0.001	0.111 .171 <sup>**</sup> 0.117 0.083 0.007 0.070	0.119 0.113 -0.10 0.064 0.079 0.09	9 -0.060 .211 <sup>***</sup> .174 <sup>***</sup> .246 <sup>***</sup> 2 0.355 0.001	0.122 .136	.200 .183 .223	······································	.161 .194 .2	9 <sup>°°</sup> .204 <sup>°°</sup> .231 <sup>°°</sup>
Would like to move to another	N Correlation Coefficient	250 250 249 248.000 -0.028 128° 130° - 172° 0	250 250 24 033 -0.006 208	47 248	244 246 244 2 0.064 -0.120 0.023 0.0	44 244 244 244 247 2 97 0 039 - 226 <sup>11</sup> 204 <sup>11</sup> - 238 <sup>11</sup> - 0	250 249 250 249 010 270 220 265	19 237 227 249	250 248 249 248 568 <sup>°°</sup> 1 000 211 <sup>°°</sup> 288	8 245 246 246 3	247 247 247	147 249 24	9 248 247	249 249 248 243 0.087 185" 175" 244"	242 241 239 200 <sup>11</sup> 154 <sup>2</sup> 212 <sup>11</sup>	243 247 241 0.105 1.43* 1.39*	241 242 24 211 <sup>11</sup> 0.108 -0.05	2 242 240 239 239 8 -0.046 241 <sup>11</sup> 0.119 234 <sup>11</sup>	240 244 0.124 0.063	243 243 24 0.084 0.103 1.88	3 243 239 243 " 204" 0.115 180"	243 243	(42 241 243
house	S ig. (2-ta ile d)	0.656 0.044 0.042 0.007 0	.600 0.924 0.00	01 0.003	0.321 0.060 0.720 0.1	33         0.550         0.000         0.001         0.000         0.3	870 0.000 0.000 0.000	0 0.000 0.000 0.002	0.000 0.001 0.000	0 0.000 0.002 0.000 0.0	000 0.000 0.000 0.	00 0.038 0.00	01 0.000 0.013	0.175 0.003 0.006 0.000	0.002 0.018 0.001	0.103 0.025 0.031	0.001 0.097 0.37	3 0.473 0					
Would like to make some	N Correlation Coefficient	-0.095 .236 <sup>**</sup> .160 <sup>*</sup> 0.082 -0.	248 248 24 .092 -0.044 .13	45 246 7* -0.003	242 244 242 2 0.004 0.010 -0.030 0.0	42         242         242         242         245         2           61         0.026         0.003         -0.008         -0.042         -0.0	248         247         248         248           031         0.022         0.051         -0.012	18 235 225 247 12 .147 <sup>*</sup> -0.006 0.027	248 248 247 240 0.120 .211 <sup>***</sup> 1.000 0.120	6 243 244 244 : 0 .412 <sup>***</sup> .232 <sup>***</sup> .329 <sup>***</sup> .1	245 245 245 1 164 <sup>*</sup> .251 <sup>**</sup> .240 <sup>**</sup> .3	145 247 24 15 <sup>***</sup> -0.099 0.09	17 246 245 15 .273 <sup>***</sup> -0.018	247 247 246 241 -0.036 0.032 0.048 0.061	240 239 237 0.102 0.025 0.082	241 245 239 0.044 0.045 0.035	239 240 24 0.041 0.089 0.07	0 240 238 237 237 3 0.081 0.081 0.009 0.069	238 242 0.049 0.059	241 241 24 0.034 0.028 0.02	1 241 237 241 1 -0.044 -0.056 0.052	241 241 -0.003 0.118 0.	40 239 241 059 0.125 0.073
changes in the nouse design	S ig. (2-ta ile d) N	0.134 0.000 0 0.199 0 249 249 248 247	.148 0.494 0.03 249 249 24	31 0.967 46 247	0.951 0.876 0.647 0.3 243 245 243 2	42 0.683 0.957 0.900 0.517 0.0 43 243 243 243 243 246	624 0.733 0.427 0.854 249 248 249 244	4 0.024 0.932 0.673 8 236 226 248	0.059 0.001 0.060 249 247 249 243	0 0.000 0.000 0.000 0.0 8 245 246 246	010 0.000 0.000 0. 247 247 247	00 0.120 0.13	0.000 0.775 0 248 247	0.570 0.620 0.456 0.345 249 249 248 243	0.115 0.697 0.207 242 241 239	0.494 0.480 0.587 243 247 241	0.526 0.169 0.25 241 242 24	8 0.209 0.210 2 242 240 239 239	240 244	243 243 24	3 243 239 243	243 243	242 241 24?
House location satisfaction	Correlation Coefficient	-0.124 0.039 0.005 -0.049 0	.042 .129* .241	1 .177	-0.010 0.062 0.117 -0.0	30 0.002 0.011 -0.060 -0.001 -0.0	093 .129* 0.124 0.10	16 0.073143* 0.066	.367** .288** 0.120 1.00	0 .320 <sup>***</sup> .294 <sup>***</sup> .342 <sup>***</sup> .21	83 <sup>***</sup> .229 <sup>***</sup> .170 <sup>***</sup> .2	.179" 0.05	2 .191 0.071	.154" 0.108 .196" .228"	.148 .189 .189	.209*** 0.096 .139*	.142" 0.088 -0.05	1 -0.020 .170 <sup>**</sup> 0.122 .349 <sup>**</sup>	.148" .236"	.174 .191 .237	.372** .181** .263*	.236** .177** .1	.292 .300
<u> </u>	N On the On White	248 248 247 246	248 248 24	45 246	242 244 242 2	42 242 242 242 245 2	248 247 248 247	17 235 225 247	248 246 248 24	8 244 246 246 :	246 246 246	46 248 24	8 247 246	248 248 247 242	241 240 238	242 246 240	240 241 24	1 241 240 238 238	239 243	242 242 24	2 242 238 242	242 242	241 241 242
satisfaction	Sig. (2-tailed)	-0.063 0.120 0.108 -0.078 0. 0.327 0.061 0.091 0.224 0	.036 -0.061 .221 .571 0.341 0.00	0.035	0.313 0.216 0.646 0.3	57         0.127        132         0.101         -0.116         -0.0           83         0.051         0.041         0.119         0.072         0.4	050 0.125 0.118 .181 440 0.051 0.064 0.00:	.342 -0.130 .131 15 0.000 0.051 0.041	.209 .272 .412 .320 0.001 0.000 0.000 0.000	1.000         .427         .649         .39           0         0.000         0.000         0.0	92 .418 .382 .5 000 0.000 0.000 0.	00 0.892 0.00	.315 0.039 00 0.000 0.546	0.094 .185 0.029 .178 0.142 0.004 0.647 0.006	.176 .130 .199 0.006 0.045 0.002	.164         0.040         0.113           0.011         0.532         0.082	0.073 0.044 0.04 0.262 0.493 0.46	7 -0.107 .142 -0.074 0.084 7 0.099 0	.163 .141	.169 0.027 .164	0.081 0.017 0.122	.161 .266 .1	33 .205 .223
Satisfaction of the original	N Correlation Coefficient	245 245 244 243 0.029 0.054 0.046 -0.012 0	245 245 244 .086 0.031 0.01	42 243 19 -0.001	239 241 239 2 0.032 .137 <sup>*</sup> 0.051 -0.0	39         239         239         239         242         239           47         0.093         -0.010         -0.024         -0.073         -0.0	245 244 245 244 018 0.062 0.097 0.05	14 232 225 244 3 0.077 -0.045 0.086	245 243 245 24 0.119 .196 <sup>**</sup> .232 <sup>**</sup> .294	4 245 244 244 : .427" 1.000 .530" .3.	245 245 245 245 24 <sup>41</sup> .467 <sup>41</sup> .441 <sup>41</sup> .3	245 245 24 3 <sup>***</sup> 0.004 .180	5 244 243 0.099 -0.004	245 245 244 241 0.019 0.104 0.071 .131*	240 239 238 0.116 0.106 0.116	241 244 239 0.101 0.098 .219"	239 240 24 0.078 .231 <sup>***</sup> -0.11	0 240 238 237 237 8 0.024 0.102 .201 <sup>***</sup> .279 <sup>***</sup>	238 241 .189 <sup>***</sup> .188 <sup>**</sup>	241 241 24 .147 <sup>*</sup> .164 <sup>*</sup> .319	1 241 237 241 .218 <sup>**</sup> .232 <sup>**</sup> .263 <sup>**</sup>	241 241 . .199 <sup>**</sup> .253 <sup>**</sup> .1	40 239 241 59 <sup>***</sup> .330 <sup>***</sup> .313 <sup>**</sup>
height of the house fence	Sig. (2-tailed)	0.655 0.402 0.469 0.846 0	.178 0.631 0.77	70 0.990 43 244	0.621 0.033 0.434 0.4	65 0.151 0.879 0.714 0.258 0.7 40 240 240 240 243	777 0.338 0.130 0.403	18 0.242 0.505 0.179	0.062 0.002 0.000 0.00	0 0.000 0.000 0.	000 0.000 0.000 0.	00 0.944 0.00	05 0.121 0.947	0.767 0.104 0.268 0.041	0.072 0.102 0.073	0.117 0.126 0.001	0.229 0.000 0.06	7 0.711 0	239 242	242 242 24	242 238 242	242 242	241 241 241
Original house layout satisfaction	Correlation Coefficient	-0.058 0.082 -0.005 -0.066 0.	.076 0.047 .168	8 0.045	0.034 0.066 0.023 -0.0	58         0.059         -0.037         0.028         -0.014         -0.0	058 0.034 .126 0.111	8 .232 <sup>***</sup> -0.092 0.093	.193" .308" .329" .342	.649 <sup>°°</sup> .530 <sup>°°</sup> 1.000 .5	44" .415" .460" .5	i4 <sup>**</sup> 0.090 .226	.304" 0.025	0.087 0.075 0.007 .149*	.167" 0.093 .163	0.107 0.097 0.121	0.106 0.086 -0.08	201         200         200         200           3         -0.015         0.093         0.024         0.093	0.013 .214"	.244" 0.120 .233	.219" 0.109 .196	.214** .343** .2	8" .358" .333"
	S ig. (2-tailed) N	0.365 0.199 0.939 0.305 0 246 246 245 244	237 0.465 0.00 246 246 24	09 0.488 43 244	0.598 0.303 0.723 0.3 240 242 240 2	67 0.359 0.564 0.662 0.823 0.3 40 240 240 240 240 243 2	367         0.597         0.048         0.066           246         245         246         245	i6         0.000         0.170         0.145           15         233         224         245	0.002 0.000 0.000 0.000 246 244 246 244	0 0.000 0.000 0.0 6 244 246 246	000         0.000         0.000         0.000           246         246         246         246	00 0.158 0.00 46 246 24	00 0.000 0.695 6 245 244	0.175 0.241 0.918 0.021 246 246 245 242	0.009 0.151 0.012 241 240 238	0.097 0.128 0.061 242 245 240	0.103 0.184 0.19 240 241 24	7 0.813 0 1 241 240 238 238	239 242	242 242 24	2 242 238 242	242 242	241 241 242
Outdoor space satisfaction	Correlation Coefficient Sig. (2-tailed)	-0.083 0.013 0.018 -0.092 0. 0.196 0.843 0.784 0.151 0	0.098 0.052 0.11	13 0.047 79 0.466	0.055 0.010 0.025 -0.0 0.397 0.873 0.703 0.4	53 -0.023 -0.039 0.052 -0.059 -0.0 15 0.720 0.548 0.419 0.358 0.2	037 0.044 .237 <sup>**</sup> .157 559 0.492 0.000 0.014	7 <sup>*</sup> .176 <sup>**</sup> 157 <sup>*</sup> 0.090 4 0.007 0.018 0.160	.197 <sup>***</sup> .297 <sup>***</sup> .164 <sup>**</sup> .283 <sup>**</sup> 0.002 0.000 0.010 0.000	".392".324".544" 1. 0 0.000 0.000 0.000	000 .362 <sup>***</sup> .480 <sup>***</sup> .3	0 <sup>**</sup> 0.099 .206	.298 <sup>th</sup> 0.029	0.046 0.068 -0.049 0.110 0.472 0.286 0.443 0.086	0.079 0.076 .149*	0.115 0.036 .173"	0.082 0.072159	-0.056 .152 <sup>*</sup> 0.000 0.104 3 0.387 0	0.027 .182**	.130 .152 .238	.236** 0.126 .234*	.268** .283** .2	0 .284 .303
Satisfaction of the privacy in	N Correlation Coefficient	247 247 246 245	247 247 24	245	241 243 241 2	41 241 241 241 244 2	247 246 247 246	16 234 225 246	247 245 247 24	6 245 246 246	247 247 247	47 247 24	246 245	247 247 246 243	242 241 239	243 246 241	241 242 24	2 242 240 239 239	240 243	243 243 24	3 243 239 243	243 243	242 241 243
the outdoor space	Sig. (2-tailed)	0.475 0.213 0.394 0.000 0	.338 0.246 0.01	0.546	0.326 0.648 0.028 0.5	02 0.173 0.125 0.498 0.115 0.4	.180         .237         .268           648         0.005         0.000         0.001	0.000 0.001 0.001	0.000 0.000 0.000 0.000	0 0.000 0.000 0.000 0.000	000 0.000 0.	00 0.484 0.00	0 0.000 0.359	0.054 0.081 0.005 0.001	0.026 0.015 0.037	0.055 0.270 0.002	0.165 0.006 0.11	9 0.989 0	.220 .175	.240 .235 .331	.279 .240 .261		
Satis faction of the privacy in	N Correlation Coefficient	247 247 246 245 0.088 -0.001 .144* -0.062 0	247 247 24 0.089 0.107 0.01	44 245 15 .166 <sup>***</sup>	241 243 241 2 0.048 -0.045 0.093 -0.0	41         241         241         241         244         241           61         .165*         .186**         .146*         -0.081         -0.0	247 246 247 244 034 .130* 0.103 .128	16         234         225         246           8*         .190**         -0.111         0.062	247 245 247 24 0.121 .234** .240** .170	6 245 246 246 .382 <sup></sup> .441 <sup></sup> .460 <sup></sup> .4	247 247 247 . 80** .448** 1.000 .4	247 247 24 4** -0.027 .183	246 245 .238 <sup>th</sup> 0.004	247 247 246 243 .141* 0.101 0.071 .126*	242 241 239 .183** .145* .147*	243 246 241 .152* 0.005 0.116	241 242 24 .149* .157*142	2 242 240 239 239 * 0.021 .133* 0.102 .166*	240 243 0.076 0.051	243 243 24 0.081 0.055 .140	243 239 243 0.106 0.076 .206*	243 243 .167** 0.105 0.	42 241 243 051 .205 <sup>**</sup> .264 <sup>*</sup>
your hous e	Sig. (2-tailed) N	0.170 0.992 0.024 0.334 0	.165 0.094 0.81 247 247 24	14 0.009 44 245	0.462 0.489 0.150 0.3 241 243 241 2	49         0.010         0.004         0.024         0.207         0.3           41         241         241         241         244         3	595 0.042 0.105 0.04 247 246 247 246	15 0.003 0.098 0.336 16 234 225 246	0.058 0.000 0.000 0.003 247 245 247 24	8 0.000 0.000 0.000 0. 6 245 246 246	000 0.000 0. 247 247 247	00 0.669 0.00	0.000 0.945 07 246 245	0.026 0.113 0.270 0.049 247 247 246 243	0.004 0.024 0.023 242 241 239	0.017 0.933 0.071 243 246 241	0.021 0.015 0.02 241 242 24	7 0.750 0 2 242 240 239 239	240 243	243 243 24	3 243 239 243	243 243	242 241 245
Own privet space in the house satisfaction	e Correlation Coefficient	0.002 0.060 0.073160* 0.	.105 0.040 .176	6 0.089	0.112 -0.020 0.119 -0.0	50 0.101 -0.074 0.018198 <sup>***</sup> -0.0	033 .274" .187" .227	······································	.241 .398 .395 .296	".543".353".554".3	80 .520 .474 1	00 0.096 .344	.373 0.047	0.102 0.074 0.107 .252**	.188 .196 .268	.209" .153" .183"	0.116 .235" -0.12	3 0.054 .210 <sup>°°</sup> .128 <sup>°</sup> .199 <sup>°°</sup>	.228 .164	.145 .185 .251	.185" .141" .158	.199** .247** .2	.283 .297
	Sig. (2-taned) N	0.974 0.348 0.253 0.012 0 247 247 246 245	247 247 247 24	0.167	0.082 0.757 0.066 0.4 241 243 241 2	42 0.117 0.250 0.783 0.002 0.8 41 241 241 241 241 244 2	247         246         247         246	0.000         0.001         0.000           16         2.34         2.25         2.46	247 245 247 24	6 245 246 246	247 247 247	0.132 0.00	0.000 0.464 17 246 245	0.109         0.245         0.095         0.000           247         247         246         243	242 241 239	243 246 241	241 242 24	2 242 240 239 239	240 243	243 243 24	3 243 239 243	243 243	242 241 243
Frequency of gathering with own hous chold members	Correlation Coefficient Sig. (2-tailed)	-0.001 0.026 -0.004 -0.021 -0 0.982 0.685 0.950 0.736 0	.065 .171 <sup>44</sup> .198 .303 0.007 0.00	8 0.113 02 0.075	0.010 0.023 0.070 0.1 0.873 0.718 0.277 0.0	23 -0.030 -0.018 -0.010 -0.021 -0.0 56 0.637 0.775 0.874 0.739 0.1	076 0.102 0.055 0.09 232 0.110 0.387 0.15	01 0.081 -0.125 0.021 3 0.213 0.061 0.736	.132 <sup>*</sup> .132 <sup>*</sup> -0.099 .179 <sup>°</sup> 0.038 0.038 0.120 0.00	-0.009 0.004 0.090 0. 5 0.892 0.944 0.158 0.	099 0.045 -0.027 0. 121 0.484 0.669 0.	96 <b>1.000</b> 0.05 32 0.39	.169 <sup>***</sup> 0.090           03         0.008         0.156	.221" 0.060 .161 .147 0.000 0.348 0.011 0.022	.131 <sup>°</sup> .231 <sup>°°</sup> .228 <sup>°°</sup> 0.042 0.000 0.000	.202" .143 .151 0.002 0.024 0.018	.155 <sup>°</sup> 0.110132 0.016 0.087 0.04	0.004 0.119 0.048 .157 0 0.952 0	.183 .246	.183 .233 .272	.299" .193" .132	.203 0.090 .2	2" .195" .236"
Ease of inviting guests to the	N Correlation Coefficient	250 250 249 248 0.018 0.053 0.006 - 246** -0	250 250 24 .021 0.102 15	47 248 5° 0.122	244 246 244 2 0.051 -0.074 212*** -0.0	44 244 244 244 247 2 28 .151*163* 0.065245** -0.0	249 248 249 248 017 .313 <sup>°°</sup> .331 <sup>°°</sup> 347 <sup>°</sup>	18 236 226 248	249 247 249 244 .129° .216° 0.095 0.05	8 245 246 246 2 2 .297 .180 226 2	247 247 247 06 <sup>***</sup> .347 <sup>***</sup> .183 <sup>***</sup> .3	47 250 23	0 249 248 0 312 <sup>10</sup> 0.109	250 250 249 243	242 241 239 .149 <sup>°</sup> .169 <sup>°°</sup> 175 <sup>°°</sup>	243 248 242 .185 <sup>***</sup> .135 <sup>**</sup> 0.087	242 243 24 .162 <sup>*</sup> .128 <sup>*</sup> -0.00	3         243         241         240         240           4         0.059         0.093         0.041         0.047	241 245	244 244 24 0.032 -0.031 0.03	4 244 240 244 1 -0.053 0.047 -0.001	-0.034 0.038 0	43 242 244 025 0.079 1.43
house	Sig. (2-tailed)	0.782 0.406 0.924 0.000 0	.743 0.106 0.01	15 0.055	0.429 0.250 0.001 0.6	68 0.018 0.011 0.313 0.000 0.3	796 0.000 0.000 0.000	0 0.000 0.000 0.000	0.043 0.001 0.137 0.41	1 0.000 0.005 0.000 0.0	001 0.000 0.004 0.	00 0.393	0.000 0.087	0.005 0.114 0.020 0.000	0.020 0.009 0.007	0.004 0.034 0.175	0.011 0.047 0.95	1 0.361 0					
	14	250 250 249 248	250 250 24	248	244 246 244 2	44 244 244 247 2	247 248 249 243	230 226 248	249 247 249 24	0 245 246 246	247 247 247	250 22	249 248	230 230 249 243	242 241 239	245 248 242	242 243 24	3 243 241 240 240	241 245	244 244 24	244 240 244	244 244	45 242 244

House design create conflict between the household member	Correlation Coefficient	-0.041 0.088 .196 -0.050 0.029	0.082 .227"	0.058	0.018 0.055 0.055 0.055 0.079 0.010 .122° 0.109 0.062 -0.102 1.67° 0.016 0.120 2.48° 0.114 0.099 1.151 311° 273° 1.91° 315° 0.099 3.04° 298° 3.34° 238° 3.37° 1.69° 3.12° 1.000 0.082 0.124 0.076 1.33° 0.100 0.082 0.066 0.003 0.056 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005	.158 0.119 .208 .214
	Sig. (2-tailed)	0.518 0.169 0.002 0.432 0.647	0.199 0.000	0.368	0.754 0.395 0.394 0.131 0.877 0.45 0.99 0.203 0.111 0.09 0.097 0.661 0.00 0.088 0.129 0.018 0.00 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000	
	N	249 249 248 247 249	249 246	247	243 245 243 243 243 243 243 243 243 243 243 246 248 247 245 246 248 247 248 246 248 247 244 245 245 246 246 246 246 246 246 246 246 246 246	243 242 241 243
Relatives or friends in the area before/after moving in	Correlation Coefficient	-0.018 .156 0.011287 -0.072	-0.087 -0.040	.245	0.107 0.025 175 -0.048 -0.026 -0.058 0.020 -155 0.098 0.022 -155 0.098 0.025 217 271 213 -275 197 0.106 159 40.18 0.071 0.039 40.04 0.025 0.029 0.059 0.004 0.047 0.090 0.109 -0.052 100 -333 0.099 237 237 241 279 217 1.88 0.061 142 270 0.061 -0.014 -207 0.096 -0.056 0.005 0.038 0.033 0.004 0.0491 -148 -0.056 40.094 -161 -0.014 -0.056 -0.056 0.005 0.048 0.041 -0.044 -0.056 -0.056 0.005 0.048 0.041 -0.044 -0.056 -0.056 0.005 0.044 -0.041 -0.044 -0.056 -0.056 0.005 0.044 -0.044 -0.056 -0.056 0.005 0.044 -0.044 -0.056 -0.056 0.005 0.044 -0.044 -0.056 -0.056 0.005 0.044 -0.044 -0.056 -0.056 0.005 0.044 -0.044 -0.056 -0.056 0.005 0.044 -0.044 -0.056 -0.056 0.005 0.044 -0.044 -0.056 -0.056 0.005 0.044 -0.044 -0.044 -0.044 -0.046 -0.056 -0.056 0.005 0.044 -0.044 -0.046 -0.056 -0.056 -0.044 -0.046 -0.056 -0.056 -0.056 -0.044 -0.046 -0.056 -0.056 -0.056 -0.044 -0.046 -0.056 -0.056 -0.056 -0.044 -0.046 -0.056 -0.056 -0.056 -0.044 -0.046 -0.056 -0.056 -0.056 -0.044 -0.046 -0.056 -0.056 -0.056 -0.044 -0.045 -0.056 -0.056 -0.056 -0.044 -0.045 -0.056 -0.056 -0.044 -0.045 -0.046 -0.046 -0.046 -0.046 -0.046 -0.046 -0.046 -0.046 -0.046 -0.046 -0.046 -0.046 -0.046 -0.046 -0.046 -0.046 -0.046 -0.046 -0.046 -0.046 -0.046 -0.046 -0.046 -0.046 -0.046 -0.046 -0.046 -0.046 -0.046 -0.046 -0.046 -0.046 -0.046 -0.046 -0.046 -0.046 -0.046 -0.046 -0.046 -0.046 -0.046 -0.046 -0.046 -0.046 -0.046 -0.046 -0.046 -0.046 -0.046 -0.046 -0.046 -0.046 -0.046 -0.046 -0.046 -0.046 -0.046 -0.046 -0.046 -0.046 -0.046 -0.046 -0.046 -0.046 -0.046 -0.046 -0.046 -0.046 -0.046 -0.046 -0.046 -0.046 -0.046 -0.046 -0.046 -0.046 -0.046 -0.046 -0.046 -0.046 -0.046 -0.046 -0.046 -0.046 -0.046 -0.046 -0.046 -0.046 -0.046 -0.046 -0.046 -0.046 -0.046 -0.046 -0.046 -0.046 -0.046 -0.046 -0.046 -0.046 -0.046 -0.046 -0.046 -0.046 -0.046 -0.046 -0.046 -0.046 -0.046 -0.046 -0.046 -0.046 -0.046 -0.046 -0.046 -0.046 -0.046 -0.046 -0.046 -0.046 -0.046 -0.046 -0.046 -0.046 -0.046 -0.046 -0.046 -0.046 -0.046 -0.046 -0.046 -0.046 -0.046 -0.046 -0.046 -0.046 -0.046 -0.046 -0.046 -0	0.100 -0.006 -0.086 -0.048
2	Sig. (2-tailed)	0.777 0.014 0.863 0.000 0.258	0.173 0.536	0.000	0.098 0.703 0.006 0.459 0.330 0.366 0.752 0.015 0.13 0.051 0.000 0.002 0.098 0.013 0.775 0.259 0.546 0.947 0.695 0.550 0.359 0.945 0.444 0.156 0.087 0.198 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.348 0.344 0.001 0	
	N	248 248 247 247 248	248 245	247	242 244 245 242 242 242 242 242 242 242	242 241 240 242
Frequency of gatherings within the neighborhood (extended	Correlation Coefficient	0.049 0.024 .185181 -0.042	.172 0.092	.135	0.115 0.015 1.81 0.102 0.079 -1.56 0.074 -0.008 0.049 229 0.101 1.57 0.070 -0.115 0.090 1.58 0.087 -0.036 1.54 0.094 0.019 0.087 0.046 0.123 1.41 0.102 221 1.76 0.124 323 1.000 339 468 312 310 330 344 374 238 215 314 0.065 -0.016 -0.007 1.98 0.089 1.48 1.35 1.51 1.55 0.052 0.055 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.035 0.0	0.041 0.083 0.041 0.123
family or friends )	Sig. (2-tailed)	0.441 0.702 0.003 0.004 0.504	0.006 0.147	0.034	0.071 0.315 0.004 0.110 0.217 0.014 0.250 0.902 0.444 0.000 0.110 0.013 0.256 0.083 0.155 0.013 0.15 0.013 0.15 0.013 0.15 0.013 0.15 0.013 0.15 0.013 0.15 0.013 0.15 0.013 0.15 0.013 0.15 0.013 0.15 0.013 0.15 0.013 0.15 0.013 0.15 0.013 0.15 0.013 0.15 0.013 0.15 0.013 0.15 0.013 0.15 0.013 0.15 0.013 0.15 0.013 0.15 0.013 0.15 0.013 0.15 0.013 0.15 0.013 0.15 0.013 0.15 0.013 0.15 0.013 0.15 0.013 0.15 0.013 0.15 0.013 0.15 0.013 0.15 0.013 0.15 0.013 0.15 0.013 0.15 0.013 0.15 0.013 0.15 0.013 0.15 0.013 0.15 0.013 0.15 0.013 0.15 0.013 0.15 0.013 0.15 0.013 0.15 0.013 0.15 0.013 0.15 0.013 0.15 0.013 0.15 0.013 0.15 0.013 0.15 0.013 0.15 0.013 0.15 0.013 0.15 0.013 0.15 0.013 0.15 0.013 0.15 0.013 0.15 0.013 0.15 0.013 0.15 0.013 0.15 0.013 0.15 0.013 0.15 0.013 0.15 0.013 0.015 0.015 0.013 0.015 0.013 0.015 0.013 0.015 0.013 0.015 0.013 0.015 0.013 0.015 0.013 0.015 0.013 0.015 0.013 0.015 0.013 0.015 0.013 0.015 0.013 0.015 0.013 0.015 0.013 0.015 0.013 0.015 0.015 0.015 0.015 0.015 0.015 0.015 0.015 0.013 0.015 0.015 0.015 0.015 0.015 0.015 0.015 0.015 0.015 0.015 0.015 0.015 0.015 0.015 0.015 0.015 0.015 0.015 0.015 0.015 0.015 0.015 0.015 0.015 0.015 0.015 0.015 0.015 0.015 0.015 0.015 0.015 0.015 0.015 0.015 0.015 0.015 0.015 0.015 0.015 0.015 0.015 0.015 0.015 0.015 0.015 0.015 0.015 0.015 0.015 0.015 0.015 0.015 0.015 0.015 0.015 0.015 0.015 0.015 0.015 0.015 0.015 0.015 0.015 0.015 0.015 0.015 0.015 0.015 0.015 0.015 0.015 0.015 0.015 0.015 0.015 0.015 0.015 0.015 0.015 0.015 0.015 0.015 0.015 0.015 0.015 0.015 0.015 0.015 0.015 0.015 0.015 0.015 0.015 0.015 0.015 0.015 0.015 0.015 0.015 0.015 0.015 0.015 0.015 0.015 0.015 0.015 0.015 0.015 0.015 0.015 0.015 0.015 0.015 0.015 0.015 0.015 0.015 0.015 0.015 0.015 0.015 0.015 0.015 0.015 0.015 0.015 0.015 0.015 0.015 0.015 0.015 0.015 0.015 0.015 0.015 0.015 0.015 0.015 0.015 0.015 0.015 0.015 0.015 0.015 0.015 0.015 0.015 0.015 0.015 0.015 0.015 0.015 0.015 0.015 0.015 0.015 0.015 0.015 0.015 0.015 0.015 0.015 0.015 0.015 0.015 0.015 0.015 0.015 0.01	
	N	251 251 250 249 251	251 248	249	245 247 245 245 245 245 245 245 245 245 246 250 249 237 227 249 249 247 249 248 245 246 246 247 247 247 247 247 247 247 250 250 249 248 251 251 250 244 248 242 240 244 242 240 244 244 242 241 241 242 246 245 245 245 245 245 245 245 245 245 245	245 244 243 245
Opportunities to meet people in the neighborhood	n Correlation Coefficient	-0.019 0.038 .328"125" 0.028	0.102 0.013	.162*	0.066 -0.071 0.041 0.080 -0.025 -0.103 0.091 -0.119 0.044 262 0.095 0.100 140 -0.079 -0.001 169 185 0.014 0.075 0.068 0.111 0.10 0.074 0.060 0.10 0.076 0.090 333 120 333 231 263 291 317 259 173 135 133 170 -0.080 -0.009 250 155 177 273 192 158 0.114 1.39 0.093 149 233 184	.181" .206" .153" .183"
	Sig. (2-tailed)	0.760 0.549 0.000 0.048 0.654	0.109 0.841	0.010	0.300 0.264 0.521 0.210 0.688 0.109 0.154 0.062 0.484 0.000 0.136 0.114 0.031 0.26 0.986 0.008 0.009 0.004 0.104 0.241 0.286 0.981 0.113 0.245 0.348 0.114 0.232 0.158 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.	
	N	251 251 250 249 251	251 248	249	245 247 245 245 245 245 245 245 245 245 245 245	245 244 243 245
Frequency of meeting or chatting with a neighbor	Correlation Coefficient	-0.054 .235" .356"134"129"	0.053 .168	.185	174 4056 139 0.088 0.061 -0.099 0.022 0.005 -0.015 251 0.123 163 0.107 -198 0.123 325 175 0.048 196 0.29 0.071 0.007 -0.049 178 0.071 0.107 1.61 147 1.33 237 468 383 1000 485 435 469 406 4.38 307 336 337 315 1.66 -0.102 363 261 344 275 1.30 0.122 0.091 1.98 1.33 0.125 0.109 0.025 0.091 0.007 -0.049 1.78 0.071 0.017 -0.049 1.78 0.071 0.017 -0.049 1.78 0.071 0.017 -0.049 1.78 0.071 0.017 -0.049 1.78 0.071 0.017 -0.049 1.78 0.071 0.017 -0.049 1.78 0.071 0.017 -0.049 1.78 0.071 0.017 -0.049 1.78 0.071 0.017 -0.049 1.78 0.071 0.017 -0.049 1.78 0.071 0.017 -0.049 1.78 0.071 0.017 -0.049 1.78 0.071 0.017 -0.049 1.78 0.071 0.017 -0.049 1.78 0.071 0.017 -0.049 1.78 0.071 0.017 -0.049 1.78 0.071 0.017 -0.049 1.78 0.071 0.017 -0.049 1.78 0.071 0.017 -0.049 1.78 0.071 0.017 -0.049 1.78 0.071 0.017 -0.049 1.78 0.071 0.017 -0.049 1.78 0.071 0.017 -0.049 1.78 0.071 0.017 -0.049 1.78 0.071 0.017 -0.049 1.78 0.071 0.017 -0.049 1.78 0.071 0.017 -0.049 1.78 0.071 0.017 -0.049 1.78 0.071 0.017 -0.049 1.78 0.071 0.017 -0.049 1.78 0.071 0.017 -0.049 1.78 0.071 0.017 -0.049 1.78 0.071 0.017 -0.049 1.78 0.071 0.017 -0.049 1.78 0.071 0.017 -0.049 1.78 0.071 0.017 -0.049 1.78 0.071 0.017 -0.049 1.78 0.071 0.017 -0.049 1.78 0.071 0.017 -0.049 1.78 0.071 0.017 -0.049 1.78 0.071 0.017 -0.049 1.78 0.071 0.017 -0.049 1.78 0.071 0.017 -0.049 1.78 0.071 0.017 -0.049 1.78 0.071 0.017 -0.049 1.78 0.071 0.017 0.017 0.017 0.017 0.017 0.017 0.017 0.017 0.017 0.017 0.017 0.017 0.017 0.017 0.017 0.017 0.017 0.017 0.017 0.017 0.017 0.017 0.017 0.017 0.017 0.017 0.017 0.017 0.017 0.017 0.017 0.017 0.017 0.017 0.017 0.017 0.017 0.017 0.017 0.017 0.017 0.017 0.017 0.017 0.017 0.017 0.017 0.017 0.017 0.017 0.017 0.017 0.017 0.017 0.017 0.017 0.017 0.017 0.017 0.017 0.017 0.017 0.017 0.017 0.017 0.017 0.017 0.017 0.017 0.017 0.017 0.017 0.017 0.017 0.017 0.017 0.017 0.017 0.017 0.017 0.017 0.017 0.017 0.017 0.017 0.017 0.017 0.017 0.017 0.017 0.017 0.017 0.017 0.017 0.017 0.017 0.017 0.017 0.017 0.017 0.017 0.017 0.017 0.017 0.017 0.017 0.017 0.017 0.017 0	0.008 .167 0.100 0.123
	Sig. (2-tailed)	0.396 0.000 0.000 0.035 0.041	0.402 0.008	0.004	0.006 0.378 0.030 0.172 0.342 0.122 0.738 0.394 0.813 0.000 0.052 0.010 0.102 0.003 0.052 0.00 0.006 0.456 0.002 0.477 0.268 0.918 0.443 0.005 0.270 0.95 0.011 0.20 0.037 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.00	
	N	250 ##### 249 248 250	250 247	248	244 246 244 244 244 244 244 244 244 244	244 243 242 244
Number of persons known in the street lived in	Correlation Coefficient	0.009 .216 .247363147	.130 .233	.355	0.044 -0.026 0.111 -0.002 0.078 -0.087 0.017 -230 -0.09 407 -244 435 283 -370 426 253 244 0.061 228 1.78 1.31 1.49 0.110 219 1.26 252 1.47 226 0.100 237 312 231 485 1.000 815 7.94 744 7.03 3.67 425 4.70 3.43 +280 -219 563 215 422 3.35 1.88 1.50 1.74 227 1.55 1.56 1.30 1.51 4	0.024 .175 .194 .231
	Sig. (2-tailed)	0.886 0.001 0.000 0.000 0.022	0.043 0.000	0.000		
	N	244 244 243 242 244	244 241	242	238 240 258 238 238 238 238 241 244 243 240 248 248 241 244 243 244 243 241 241 241 241 241 241 241 241 241 241	241 240 239 241
Number of close relationships in the street lived in	Correlation Coefficient	-0.022 .262" .235"339"138"	.138 .170	.260	0.021 0.039 0.103 0.023 1.65' -131' 0.052 -261' 0.024' 360' 1.55' 411' 248' -344' 384' 1.98' 200' 0.102 1.48' 1.76' 0.116 1.67' 0.079 1.43' 1.83'' 1.83'' 1.131' 1.49' 0.062 241' 310' 263' 435' 815' 1.000 7.58' 7.76' 6.60' 354' 452' 592'' 339'' -3.04'' -1.14'' 320'' 1.28'' 3.21'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11'' 2.11''' 2.11'' 2.11'' 2.11'' 2.11'' 2.11''' 2.11'' 2	0.017 .186 .186 .217
	Sig. (2-tailed)	0.739 0.000 0.000 0.000 0.032	0.031 0.008	0.000		
N 1 4 1	N De la compañía de	243 243 242 241 243	243 240	241	237 237 237 237 237 237 237 237 237 237	240 239 238 240
your neighborhood	Correlation Coefficient	-0.016 0.124 .253339 -0.047	.229 .143	.313	40/25 0/259 0/109 0/00 0/11 -1/49 0/19 -234 40/21 4/29 2/28 3/9 2/6 -311 3/2 1/9 1/5 0/0/6 0/95 0//6 1/5 1/45 1/9 2/3 1/6 1/45 2/9 3/0 6/21 1/6 1/45 2/9 3/0 6/21 1/6 1/6 1/6 1/6 1/6 1/6 1/6 1/6 1/6 1/	0.041 .153 .166 .230
	Sig. (2-tailed)	0.800 0.054 0.000 0.000 0.465	0.000 0.027	0.000	0.599 0.54 0.093 0.94 0.952 0.94 0.952 0.94 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.00	220 220 227 220
N 1 41 12 12	N De la compañía de		242 239	240		239 238 237 239
in the neighborhood	Correlation Coefficient	0.021 .139 .241251 -0.090	.223 .220	.211	4 009 0112 0014 0180 0112 0014 0180 0112 0019 137 206 317 136 -228 328 222 212 0182 189 199 0116 165 149 135 147 268 228 175 0102 217 364 317 408 744 76 871 400 750 342 512 574 318 -264 -466 569 188 412 435 248 246 245 207 373 146 168 289 0	0.087 .236 .243 .261
	Sig. (2-tailed)	0.742 0.032 0.000 0.000 0.164	0.001 0.001	0.001		
Manda and a second second	N Completion Confident	240 240 239 238 240	240 237	238		237 236 235 237
neighbors	Sin (2 = 3 - 4)	0.010 0.110 .248241 -0.069	.227 .128	.256	wir	.170 .173 .205
	Sig. (2-tailed)		0.000 0.04/	0.000		241 240 220 241
Receiving social sunnort from	Correlation Coefficient	0.056 0.054 0.094 -0.071 -0.053	244 241	0.005		241 240 239 241
people in the neighborhood	Cir (2 + 3 - 0)		0.082 0.026	0.005		.101 .178 .136 .203
	N	0.362 0.400 0.142 0.265 0.402	249 21	0.935		244 242 242 243
Lean ask for help/favor from	Correlation Coefficient	249 249 248 247 249	249 246	0.112		244 245 242 244
my neighbors	Cir (2 + 3 - 0)		0.082 0.118	0.092		.103 .280 .230 .207
	N	242 242 242 242 241 242	242 240	0.083		241 240 220 241
Lhave neighbors that Lean ask	Correlation Coefficient	-0.016 120* 0.097 155* 127*	0.090 147*	125*		0.097 248" 128" 102"
for advice in personal issues	Sig (2-tailed)		0.162 0.022	0.037		
	N	243 243 242 241 243	243 240	241	0.554 0.559 0.512 0.055 0.546 0.536 0.756 0.249 0.417 0.005 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000	241 240 239 241
Lean leave my ners onal	Correlation Coefficient	-0.013 0.021 258" -0.063 -0.046	150° 0.079	0.112		0.114 205" 215" 225"
property safely outside. (ex.	Sig (2 toiled)		.150 0.077	0.001		203 .213 .233
Car, delivery package)	N	244 244 243 242 244	244 241	242		242 241 240 242
I need to lock my door while I	Correlation Coefficient	0.068 0.053 .131* 126* -0.069	- 186 -0.011	-0.074	0.057 - 0.018 0.051 - 0.056 0.051 - 0.056 0.051 - 0.056 0.059 0.068 + 142 - 0.021 - 701 - 0.059 145 - 1.15 - 0.019 - 0.051 0.017 - 0.018 - 0.051 - 0.059 - 1.05 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.55 - 7.	-0.108 . 224" . 177" . 202"
am in the house	Sig (2-tailed)	0.292 0.409 0.041 0.050 0.283	0.004 0.863	0.253	0 276 076 065 075 098 041 038 047 070 007 075 070 007 073 073 078 042 047 067 017 017 010 101 000 001 000 001 001 00	
	N	244 244 243 242 244	244 241	242	219 240 238 238 238 238 238 241 243 242 241 243 242 241 240 242 241 240 241 240 241 240 241 242 242 242 242 242 242 243 243 243 242 241 244 244 244 243 241 240 239 237 241 243 243 243 243 243 243 244 244 244 244	242 241 240 242
I need monitoring system to	Correlation Coefficient	-0.074 -0.091 0.026 212" 0.115	0.054 -0.038	- 186	4.037 046-0.039 0.094 -0.036-0.032 0.052 131 0.050 -0.091 -0.094 -775 -710 727 -175 -0.00 -0.046 0.081 -0.020 -0.017 0.024 -0.015 -0.056 0.001 0.021 0.054 0.005 0.000 -0.07 0.009 -0.022 -106 -155 -146 -157 -0.119 -741 -315 -0.005 -0.056 0.000 -777 0.046 -0.085 -0.115 -140 -776 -0.030 -0.079 0.024 -140 -776 -0.030 -0.079 0.024 -140 -776 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019 -0.019	-0.039 _ 142* 0.039 -0.055
keep my house safe from	Sig (2-tailed)	0.247 0.156 0.688 0.001 0.072	0.401 0.558	0.004	0 550 0475 0551 0150 0584 0576 0427 0039 0434 0159 0145 0000 0001 0001 046 0355 0475 0/09 0750 0400 097 0561 0010 097 0561 0010 0035 0015 0055 0000 0000 0555 0000 0000	
breaking in	N	244 244 243 242 244	244 241	242	219 240 238 238 238 238 238 241 243 242 241 243 242 231 221 242 242 240 242 241 240 241 241 242 242 242 242 242 243 243 243 243 241 244 244 244 244 249 239 237 241 243 243 243 243 243 243 244 244 244 244	242 241 240 242
Neighbors look after each	Correlation Coefficient	-0.006 -0.033 0.081186" 0.001	.200 .216	.215**	0.03 0.011 0.064 0.093 0.036 0.007 0.009 0.002 0.069 295" 0.122 266" 0.049 .199" 200" 211" 241" 0.081 1.70" 1.42" 0.102 0.093 1.52" 255" 1.33" 210" 0.119 0.093 0.052 0.096 1.96" 250" 3.53" 565" 550" 528" 565" 5.50" 528" 464" 4.70" 326" -328" -322" 1.000 278" 445" 557" 272" 297" 333" 309" 200" 1.64" 281" 370"	.180" .385" .328" .350"
other's in this neighborhood	Sig. (2-tailed)	0.924 0.606 0.211 0.004 0.988	0.002 0.001	0.001		
	N	242 242 241 240 242	242 239	240	237 238 236 236 236 236 236 236 236 236 236 236	240 239 239 240
I can walk safely in this	Correlation Coefficient	0.011 0.031 .274 0.030 -0.085	.166** 0.059	0.008	-0.056 -0.017 -0.018 -0.049 0.048 0.044 -0.050 0.059 0.040 0.109 -0.025 -0.065 -0.100 0.059 0.000 174" 0.119 0.009 0.122 -0.074 201" 0.024 0.000 1.55" 0.102 1.28" 0.048 0.041 0.074 -0.055 0.080 1.55" 2.61" 215" 1.29" 2.28" 1.88" 2.39" 1.93" 2.55" 0.114 4.70" -4.06" 0.046 2.78" 1000 6.05" 3.89" 211" 1.73" 202" 2.71" 316" 4.66" 3.32" 1.28"	0.091 .152* .218** .254**
neighborhood at any time	Sig. (2-tailed)	0.861 0.631 0.000 0.640 0.186	0.010 0.363	0.899	0.391 0.792 0.785 0.457 0.499 0.443 0.366 0.534 0.093 0.690 0.318 0.134 0.163 1.000 0.007 0.066 0.890 0.61 0.254 0.002 0.709 0.995 0.016 0.115 0.049 0.456 0.528 0.256 0.390 0.219 0.016 0.047 0.000 0.001 0.047 0.000 0.001 0.000 0.001 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.0000 0.0000 0.0000 0.0000 0.000000	
	N	241 241 240 239 241	241 238	239	236 237 235 235 235 235 235 235 235 235 238 240 239 240 239 228 218 239 239 237 239 238 237 238 238 239 239 239 239 239 239 239 239 240 240 240 240 240 240 240 240 240 241 241 241 241 241 241 241 241 240 240 240 240 240 240 240 240 240 240	240 239 238 240
This is a friendly neighborhood	Correlation Coefficient	-0.099 0.011 .236"154" -0.100	.233 .168	.158	-0.071 -0.001 0.126 -0.059 0.074 -0.079 0.016 -0.082 0.015 212 0.124 203 0.077 -1.82 0.078 246 234 0.069 349 0.084 279 0.093 0.104 225 1.66 1.99 1.57 0.047 0.124 0.005 1.48 1.77 344 422 341 453 412 409 284 354 310 4.47 -400 -0.085 4.45 6.05 1.000 531 259 229 201 386 405 4.76 4.25 279 1	0.111 .237** .286** .360**
to live in	Sig. (2-tailed)	0.126 0.863 0.000 0.017 0.120	0.000 0.009	0.015		
	N	241 241 240 239 241	241 238	239	237 238 235 235 235 235 235 235 235 238 240 239 240 239 228 218 239 239 237 239 238 237 238 238 239 239 239 239 239 239 239 240 240 240 240 240 240 240 240 240 240	240 239 238 240
Different people from different	Correlation Coefficient	0.015 -0.073 .144"170" -0.018	.262 .132	.159*	0.034 -0.103 0.065 -0.080 0.119 -0.105 0.084 -149 0.033 329 0.117 227 0.129 -161 0.106 0.122 0.124 0.049 1.48 1.63 1.89 0.013 0.027 220 0.076 228 1.83 1.46 0.100 0.034 1.35 273 2.75 335 390 4.40 4.45 390 2.99 4.42 4.64 4.66 -330 -0.115 5.57 3.89 5.31 1.000 2.62 2.87 333 3.35 3.09 3.41 3.42 3.43 3.41 3.41 3.41 3.41 3.41 3.41 3.41	.231 .293 .259 .391
background get well together in this neighborhood	Sig. (2-tailed)	0.817 0.255 0.026 0.008 0.779	0.000 0.042	0.014	0.668 0.113 0.317 0220 0.65 0.109 0.200 0.021 0.611 0.000 0.65 0.000 0.052 0.017 0.10 0.059 0.055 0.47 0.022 0.012 0.013 0.836 0.575 0.001 0.241 0.000 0.004 0.024 0.122 0.600 0.006 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000	
and neighborhood	N	242 242 241 240 242	242 239	240	237 238 236 236 236 236 236 236 236 239 241 240 229 219 240 229 219 240 240 239 238 240 239 238 239 239 240 240 240 240 241 241 240 239 242 242 241 239 238 237 235 239 241 241 241 242 242 242 241 241 241 242 242	241 240 239 241
Satisfaction on the outdoor	Correlation Coefficient	-0.045 -0.035 0.011 0.097 -0.063	0.026 0.084	-0.021	0.078 0.026 0.007 0.059 -0.012 0.039 -0.033 0.051 0.019 -0.051 0.015 0.051 0.019 0.051 1.36 0.063 0.059 236 1.41 1.188 214 1.182 214 1.52 1.75 0.051 1.64 2.46 0.003 0.109 0.033 1.51 1.92 1.30 1.185 1.63 1.188 248 1.49 2.22 2.80 1.95 220 1.95 220 1.95 220 1.95 220 1.95 220 1.95 220 1.95 220 1.95 220 1.95 2.20 1.95 2.20 1.95 2.20 1.95 2.20 1.95 2.20 1.95 2.20 1.95 2.20 1.95 2.20 1.95 2.20 1.95 2.20 1.95 2.20 1.95 2.20 1.95 2.20 1.95 2.20 1.95 2.20 1.95 2.20 1.95 2.20 1.95 2.20 1.95 2.20 1.95 2.20 1.95 2.20 1.95 2.20 1.95 2.20 1.95 2.20 1.95 2.20 1.95 2.20 1.95 2.20 1.95 2.20 1.95 2.20 1.95 2.20 1.95 2.20 1.95 2.20 1.95 2.20 1.95 2.20 1.95 2.20 1.95 2.20 1.95 2.20 1.95 2.20 1.95 2.20 1.95 2.20 1.95 2.20 1.95 2.20 1.95 2.20 1.95 2.20 1.95 2.20 1.95 2.20 1.95 2.20 1.95 2.20 1.95 2.20 1.95 2.20 1.95 2.20 1.95 2.20 1.95 2.20 1.95 2.20 1.95 2.20 1.95 2.20 1.95 2.20 1.95 2.20 1.95 2.20 1.95 2.20 1.95 2.20 1.95 2.20 1.95 2.20 1.95 2.20 1.95 2.20 1.95 2.20 1.95 2.20 1.95 2.20 1.95 2.20 1.95 2.20 1.95 2.20 1.95 2.20 1.95 2.20 1.95 2.20 1.95 2.20 1.95 2.20 1.95 2.20 1.95 2.20 1.95 2.20 1.95 2.20 1.95 2.20 1.95 2.20 1.95 2.20 1.95 2.20 1.95 2.20 1.95 2.20 1.95 2.20 1.95 2.20 1.95 2.20 1.95 2.20 1.95 2.20 1.95 2.20 1.95 2.20 1.95 2.20 1.95 2.20 1.95 2.20 1.95 2.20 1.95 2.20 1.95 2.20 1.95 2.20 1.95 2.20 1.95 2.20 1.95 2.20 1.95 2.20 1.95 2.20 1.95 2.20 1.95 2.20 1.95 2.20 1.95 2.20 1.95 2.20 1.95 2.20 1.95 2.20 1.95 2.20 1.95 2.20 1.95 2.20 1.95 2.20 1.95 2.20 1.95 2.20 1.95 2.20 1.95 2.20 1.95 2.20 1.95 2.20 1.95 2.20 1.95 2.20 1.95 2.20 1.95 2.20 1.95 2.20 1.95 2.20 1.95 2.20 1.95 2.20 1.95 2.20 1.95 2.20 1.95 2.20 1.95 2.20 1.95 2.20 1.95 2.20 1.95 2.20 1.95 2.20 1.95 2.20 1.95 2.20 1.95 2.20 1.95 2.20 1.95 2.20 1.95 2.20 1.95 2.20 1.95 2.20 1.95 2.20 1.95 2.20 1.95 2.20 1.95 2.20 1.95 2.20 1.95 2.20 1.95 2.20 1.95 2.20 1.95 2.20 1.95 2.20 1.95 2.20 1.95 2.20 1.95 2.20 1.95 2.20 1.95 2.20 1.95 2.20 1.95 2.20 1.95 2.20 1.95 2.20 1.95 2.20 1.95 2.20 1.95 2.20 1.95 2.20 1.95 2.20 1.95 2.20 1.95 2.20 1.95 2.20 1.95 2.20 1.95 2.	.476 .510 .501 .492
spaces in your neighborhood	Sig. (2-tailed)	0.477 0.586 0.866 0.131 0.323	0.682 0.193	0.745	0 229 0.684 0.918 0.363 0.854 0.58 0.56 0.111 0.429 0.827 0.820 0.59 0.438 0.72 0.426 0.033 0.31 0.51 0.000 0.29 0.003 0.001 0.004 0.00 0.433 0.010 0.00 0.97 0.089 0.644 0.017 0.003 0.42 0.004 0.001 0.004 0.000 0.021 0.000 0.001 0.001 0.000 0.021 0.000 0.001 0.000 0.021 0.000 0.001 0.000 0.001 0.000 0.001 0.000 0.001 0.000 0.001 0.000 0.001 0.000 0.001 0.000 0.001 0.000 0.001 0.000 0.001 0.000 0.001 0.000 0.001 0.000 0.001 0.000 0.001 0.000 0.001 0.000 0.001 0.000 0.001 0.000 0.001 0.000 0.001 0.000 0.001 0.000 0.001 0.000 0.001 0.000 0.001 0.000 0.001 0.000 0.001 0.000 0.001 0.000 0.001 0.000 0.001 0.000 0.001 0.000 0.001 0.000 0.001 0.000 0.001 0.000 0.001 0.000 0.001 0.000 0.001 0.000 0.001 0.000 0.001 0.000 0.001 0.000 0.001 0.000 0.001 0.000 0.001 0.000 0.001 0.000 0.001 0.000 0.001 0.000 0.001 0.000 0.001 0.000 0.001 0.000 0.001 0.000 0.001 0.000 0.001 0.000 0.001 0.000 0.001 0.000 0.001 0.000 0.001 0.000 0.001 0.000 0.001 0.000 0.001 0.000 0.001 0.000 0.001 0.000 0.001 0.000 0.001 0.000 0.001 0.000 0.001 0.000 0.001 0.000 0.001 0.000 0.001 0.000 0.001 0.000 0.001 0.000 0.001 0.000 0.001 0.000 0.001 0.000 0.001 0.000 0.001 0.000 0.001 0.000 0.001 0.000 0.001 0.000 0.001 0.000 0.001 0.000 0.001 0.000 0.001 0.000 0.001 0.000 0.001 0.000 0.001 0.000 0.001 0.000 0.001 0.000 0.001 0.000 0.001 0.000 0.001 0.000 0.001 0.000 0.001 0.000 0.001 0.000 0.001 0.000 0.001 0.000 0.001 0.000 0.001 0.000 0.001 0.000 0.001 0.000 0.001 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000	
	N	246 246 245 244 246	246 243	244	241 242 240 240 240 240 240 240 243 245 244 245 244 245 244 243 222 244 244 242 243 241 242 242 243 243 243 243 243 243 243 243	245 244 243 245
Satisfaction on the leisure	Correlation Coefficient	0.021 -0.029 -0.036 0.047 -0.090	0.024 .147*	-0.038	153° 40.65 0.032 -0.072 0.081 -0.005 -0.090 0.019 -0.033 -0.018 0.027 0.046 -0.021 200° 0.084 0.034 174° 1.69° 1.147' 2.44° 1.30' 2.40° 0.081 1.45' 1.83° 0.032 0.059 0.004 1.55' 1.58° 0.122 1.50' 2.15° 1.144' 2.46° 1.27' 2.55° 3.18° 2.68° 1.29' -1.62' -22.8° 2.97' 1.73° 2.90' 2.87'' 7.70° 1.000 5553° 471° 4.54° 3.49° 364° 559°	.473** .574** .492** .475**
neighborhood	Sig. (2-tailed)	0.749 0.651 0.573 0.466 0.161	0.706 0.022	0.559	0 0318 0319 0271 0213 0.941 0.890 0.136 0.763 0.610 0.676 0.610 0.694 0.779 0.656 0.479 0.743 0.002 0.96 0.022 0.000 0.09 0.022 0.000 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.024 0.02	
-	N	245 245 244 243 245	245 242	243	240 241 239 239 239 239 239 242 244 243 244 243 244 243 224 243 224 243 243	245 244 243 245
Satisfaction on the shopping	Correlation Coefficient	0.009 -0.118 -0.067 0.068 -0.058	.130° .145°	-0.003	0.039 - 0.039 0.063 0.065 0.003 0.058 - 0.074 0.094 0.007 0.039 - 0.033 0.000 0.032 0.017 0.010 0.032 0.017 0.010 0.027 1.64 0.120 1.52 2.35 0.055 1.85 2.33 0.031 1.95 0.091 0.052 0.114 0.091 1.173 243 0.126 1.92 2.44 2.10 2.11 2.13 0.023 2.01 2.11 2.13 0.023 0.017 0.010 0.052 0.114 0.091 1.151 0.055 0.011 0.010 0.052 0.114 0.091 1.173 243 0.126 1.92 2.44 2.10 2.11 2.13 0.023 0.017 0.010 0.052 0.114 0.091 1.151 0.025 0.011 0.010 0.052 0.011 0.010 0.052 0.011 0.010 0.052 0.011 0.010 0.052 0.011 0.010 0.052 0.011 0.010 0.052 0.011 0.010 0.052 0.011 0.010 0.052 0.011 0.010 0.052 0.011 0.010 0.052 0.011 0.010 0.052 0.011 0.010 0.052 0.011 0.010 0.052 0.011 0.010 0.052 0.011 0.010 0.052 0.011 0.010 0.052 0.011 0.010 0.052 0.011 0.010 0.052 0.011 0.010 0.052 0.011 0.010 0.052 0.011 0.010 0.052 0.011 0.010 0.052 0.011 0.010 0.052 0.011 0.010 0.052 0.011 0.010 0.052 0.011 0.010 0.052 0.011 0.010 0.052 0.011 0.010 0.052 0.011 0.010 0.052 0.011 0.010 0.052 0.011 0.010 0.052 0.011 0.010 0.052 0.011 0.010 0.052 0.011 0.010 0.052 0.011 0.010 0.052 0.011 0.010 0.052 0.011 0.010 0.052 0.011 0.010 0.052 0.011 0.010 0.052 0.011 0.010 0.052 0.011 0.010 0.052 0.011 0.010 0.052 0.011 0.010 0.052 0.011 0.010 0.052 0.011 0.010 0.052 0.011 0.010 0.052 0.011 0.010 0.052 0.011 0.010 0.052 0.011 0.010 0.010 0.010 0.010 0.010 0.010 0.010 0.010 0.010 0.010 0.010 0.010 0.010 0.010 0.010 0.010 0.010 0.010 0.010 0.010 0.010 0.010 0.010 0.010 0.010 0.010 0.010 0.010 0.010 0.010 0.010 0.010 0.010 0.010 0.010 0.010 0.010 0.010 0.010 0.010 0.010 0.010 0.010 0.010 0.010 0.010 0.010 0.010 0.010 0.010 0.010 0.010 0.010 0.010 0.010 0.010 0.010 0.010 0.010 0.010 0.010 0.010 0.010 0.010 0.010 0.010 0.010 0.010 0.010 0.010 0.010 0.010 0.010 0.010 0.010 0.010 0.010 0.010 0.010 0.010 0.010 0.010 0.010 0.010 0.010 0.010 0.010 0.010 0.010 0.010 0.010 0.010 0.010 0.010 0.010 0.010 0.010 0.010 0.010 0.010 0.010 0.010 0.010 0.010 0.010 0.010 0.010 0.010 0.010 0.010 0.010 0.010 0.010 0.010 0.0100 0.010 0.010 0.0100 0.0100 0.010 0.0100 0.0100 0.0100 0.010 0.0100	.446** .572** .656** .534**
la chilles	Sig. (2-tailed)	0.887 0.066 0.294 0.289 0.367	0.043 0.024	0.963	0.550 0.542 0.334 0.317 0.962 0.371 0.254 0.146 0.916 0.543 0.666 1.000 0.629 0.805 0.871 0.004 0.100 0.657 0.003 0.676 0.010 0.663 0.018 0.000 0.397 0.044 0.000 0.425 0.002 0.159 0.414 0.075 0.158 0.000 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001	
	N	245 245 244 243 245	245 242	243	240 241 239 239 239 242 243 243 244 243 244 243 224 243 244 243 223 22	245 244 243 245
Satisfaction on the sidewalks in the neighborhood	n Correlation Coefficient	-0.065 -0.065 0.008 -0.041 -0.063	0.034 .166"	-0.062	0.031 -0.095 -0.032 -0.058 0.041 -0.034 0.046 0.075 -0.019 0.053 0.071 .143 0.088 -0.103 0.061 223" .186" 0.021 237" .164' 319" 235" 235" 331" .140' 251" 277" 0.031 .168" -1.146' 0.055 .139 '198" 227" 201" 199" 207" .138' 193" 228" .186" 314" -269" -0.079 309" 271" 3.36" 3.225" .461" .471" 619" 1.000 7.05" 378" 510" 515"	.379 .558 .594 .523
are neighborhood	Sig. (2-tailed)	0.314 0.312 0.904 0.529 0.326	0.593 0.010	0.334	0 631 0.141 0.626 0.373 0.529 0.60 0.480 0.248 0.76 0.409 0.272 0.26 0.180 0.127 0.46 0.00 0.011 0.000 0.00 0.00 0.00 0.00 0	
	N	245 245 244 243 245	245 242	243	240 241 239 239 239 242 244 243 244 243 244 243 244 243 244 243 244 243 244 243 242 242	245 244 243 245
Satisfaction on the maintenance of your	Correlation Coefficient	-0.119 -0.099 0.016 -0.080 -0.005	0.124 0.125	-0.017	0.052 -0.047 -0.009 -0.048 -0.052 0.082 0.046 -0.063 0.084 0.096 .136 0.108 -0.115 0.09 272" 204" -0.044 372" 0.081 218" 219" 236" 279" 0.106 .185" 299" -0.053 0.118 -0.056 0.035 0.093 .133" .155" .145" 203" .173" 0.126 .182" 245" .166" 323" -320" -0.009 200" 316" 405" 309" 481" 454" 352" .705" 1.000 .666" 508" 466"	.386 .461 .560 .551
neighborhood public spaces	Sig. (2-tailed)	0.064 0.124 0.800 0.214 0.932	0.052 0.052	0.796	0 645 0 845 0 645 0 845 0 646 0 10 6 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647 0 647	
(neat, tidy, clean,)	N	245 245 244 243 245	245 242	243	240 241 239 239 239 239 239 239 239 242 244 243 244 243 234 224 243 244 243 244 243 244 243 242 242	245 244 243 245
8.45.6.2 A 7	Combile Commission	0.010 0.117 0.000	1 40			AN
Satistaction on the quality of you neighborhood	Corretation Coefficient	-0.019 -0.117 0.099 -0.044 0.057	.152 0.057	0.013	0.013 - 0.003 - 0.003 - 0.003 - 0.003 - 0.010 - 1.002 - 0.022 - 0.070 - 0.011 - 0.102 - 0.039 - 0.010 - 0.010 - 0.011 - 0.026 - 1.01 - 0.026 - 1.01 - 0.026 - 1.01 - 0.026 - 1.01 - 0.026 - 1.01 - 0.026 - 1.01 - 0.026 - 1.01 - 0.026 - 1.01 - 0.026 - 1.01 - 0.026 - 1.01 - 0.026 - 1.01 - 0.026 - 1.01 - 0.026 - 1.01 - 0.026 - 1.01 - 0.026 - 1.01 - 0.026 - 1.01 - 0.026 - 1.01 - 0.026 - 1.01 - 0.026 - 1.01 - 0.026 - 1.01 - 0.026 - 1.01 - 0.026 - 1.01 - 0.026 - 1.01 - 0.026 - 1.01 - 0.026 - 1.01 - 0.026 - 1.01 - 0.026 - 1.01 - 0.026 - 1.01 - 0.026 - 1.01 - 0.026 - 1.01 - 0.026 - 1.01 - 0.026 - 1.01 - 0.026 - 1.01 - 0.026 - 1.01 - 0.026 - 1.01 - 0.026 - 1.01 - 0.026 - 1.01 - 0.026 - 1.01 - 0.026 - 1.01 - 0.026 - 1.01 - 0.026 - 1.01 - 0.026 - 1.01 - 0.026 - 1.01 - 0.026 - 1.01 - 0.026 - 1.01 - 0.026 - 1.01 - 0.026 - 1.01 - 0.026 - 1.01 - 0.026 - 1.01 - 0.026 - 1.01 - 0.026 - 1.01 - 0.026 - 1.01 - 0.026 - 1.01 - 0.026 - 1.01 - 0.026 - 1.01 - 0.026 - 1.01 - 0.026 - 1.01 - 0.026 - 1.01 - 0.026 - 1.01 - 0.026 - 1.01 - 0.026 - 1.01 - 0.026 - 1.01 - 0.026 - 1.01 - 0.026 - 1.01 - 0.026 - 1.01 - 0.026 - 1.01 - 0.026 - 1.01 - 0.026 - 1.01 - 0.026 - 1.01 - 0.026 - 1.01 - 0.026 - 1.01 - 0.026 - 1.01 - 0.026 - 1.01 - 0.026 - 1.01 - 0.026 - 1.01 - 0.026 - 1.01 - 0.026 - 1.01 - 0.026 - 1.01 - 0.026 - 1.01 - 0.026 - 1.01 - 0.026 - 1.01 - 0.026 - 1.01 - 0.026 - 1.01 - 0.026 - 1.01 - 0.026 - 1.01 - 0.026 - 1.01 - 0.026 - 1.01 - 0.026 - 1.01 - 0.026 - 1.01 - 0.026 - 1.01 - 0.026 - 1.01 - 0.026 - 1.01 - 0.026 - 1.01 - 0.026 - 1.01 - 0.026 - 1.01 - 0.026 - 1.01 - 0.026 - 1.01 - 0.026 - 1.01 - 0.026 - 1.01 - 0.026 - 1.01 - 0.026 - 1.01 - 0.026 - 1.01 - 0.026 - 1.01 - 0.026 - 1.01 - 0.026 - 1.01 - 0.026 - 1.01 - 0.026 - 1.01 - 0.026 - 1.01 - 0.026 - 1.01 - 0.026 - 1.01 - 0.026 - 1.01 - 0.026 - 1.01 - 0.026 - 1.01 - 0.026 - 1.01 - 0.026 - 1.01 - 0.026 - 1.01 - 0.026 - 1.01 - 0.026 - 1.01 - 0.026 - 1.01 - 0.026 - 1.01 - 0.026 - 1.01 - 0.026 - 1.01 - 0.026 - 1.01 - 0.026 - 1.01 - 0.026 - 1.01 - 0.026 - 1.01 - 0.026 - 1.01 - 0.026 - 1.01 - 0.026	.271 .389 .505 .531"
	Sig. (2-tailed)	0.765 0.069 0.128 0.494 0.375	0.018 0.382	0.839	0.814 0.411 0.942 0.513 0.414 0.076 0.082 0.976 0.734 0.142 0.788 0.116 0.577 0.383 0.168 0.009 0.078 0.387 0.005 0.076 0.003 0.047 0.022 0.029 0.003 0.477 0.075 0.150 0.198 0.212 0.242 0.029 0.003 0.477 0.075 0.150 0.198 0.212 0.242 0.029 0.000 0.026 0.21 0.083 0.000 0.079 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.0000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.0000 0.000 0.000	
Satisfaction +	N Completion Confficient	241 241 240 239 241	241 238	239	Long Long Long Long Long Long Long Long	241 240 240 241
neighborhood as a place to live	Concession Coefficient	0.000 -151 0.030 0.111 0.064	.180 .160	-0.019	0.000 90.011 0.0000 90.022 90.001 90.000 90.012 90.001 90.000 90.112 90.000 90.112 90.010 90.011 90.000 90.011 90.000 90.011 90.000 90.011 90.000 90.011 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.000 90.0000 90.000 90.000 90.000 90.000 90.0000 90.000 90.000 90.000 90.000 9	.511 .569 .576
	Sig. (2-tailed)	0.998 0.018 0.642 0.083 0.322	0.005 0.013	0.774	U-SAU U-S1 U-S3 U-S1 U-S1 U-S1 U-S1 U-S1 U-S1 U-S1 U-S1	24
Satisfaction on some on first	N Correlation Conflicing	243 243 244 243 245	245 242	243	2 47 51 627 627 627 627 627 627 627 627 627 627	243 244 243 245
the neighborhood	Corregion Coefficient	-0.039 -145 -0.079 0.080 0.065	0.000	-0.035	www wire ware ware ware ware ware ware ware wa	.508 .575 .553 .526
	Sig. (2-failed)	0.544 0.023 0.217 0.215 0.309	0.080 0.029	0.585	U-SUV (9-LE (S-H) U-LY (9-00) (S-H) (0.57) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (0.17) (	246 246 249
Satisfaction on al 34	Correlation Co. St. i.e.	245 245 244 243 245	245 242	243	2 49 541 527 527 527 527 527 527 527 527 527 527	243 244 243 245
in the neighborhood?]	Corregion Coefficient	-0.043133 -0.061 .180 0.029	0.024 .133	158	war	.503 .520 .466
	Sig. (2-failed)	0.503 0.037 0.346 0.005 0.648	0./04 0.039	0.013676186	U-0.52 U-0.75 U-0.119 U-0.52 U-0.59 U-0.119 U-0.52 U-0.59 U-0.51 U-0.159 U-0.52 U-0.52 U-0.59 U-0.109 U-0.052 U-0.000	244 244 249 249
Satisfaction on the driver it	Correlation Co. St. i.e.	245 245 244 243 245	245 242	243	2 470 241 257 257 257 257 257 257 257 257 257 257	243 244 243 245
you can do together with your	Concession Coefficient	-0.097 -0.121 -0.022 -0.043 0.009		0.065	were were were were were were were were	.505 .691 .601
family at your neighborhood	Sig. (2-tailed)	0.132 0.059 0.733 0.506 0.888	0.145 0.011	0.315	0 2219 0.748 0 90 0.274 0.990 0.712 0.990 0.712 0.990 0.712 0.900 0.712 0.825 0.314 0.78 0.29 0.50 0.66 0.713 0.000 0.003 0.009 0.001 0.001 0.001 0.001 0.001 0.001 0.000 0.001 0.001 0.000 0.001 0.000 0.001 0.000 0.001 0.000 0.001 0.000 0.001 0.000 0.001 0.000 0.001 0.000 0.001 0.000 0.001 0.000 0.001 0.000 0.001 0.000 0.001 0.000 0.001 0.000 0.001 0.000 0.001 0.000 0.001 0.000 0.000 0.001 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.00	
	N	244 244 243 242 244	244 241	242	239 240 258 238 238 238 238 241 243 242 243 242 243 242 243 242 243 242 242	244 244 242 244
Satisfaction on the building	Correlation Coefficient	-0.055 -0.100 -0.029 -0.011 0.071	.158 208**	0.086	-0.005 0.038 0.076 -0.069 -0.020 0.026 -0.042 0.011 0.017 0.119 0.040 0.085 0.066 -0.032 0.012 204" 196" 0.125 202" 205" 330" 358" 7x4" 106" 0.079 7x5" 106" 0.079 7x5" 106" 0.079 7x5" 106" 0.041 151" 0.101 194" 155" 164" 325" 171" 136" 316" 316" 316" 316" 316" 316" 31	.520** .691** 1.000 800**
density of the neighborhood	Sig. (2-tailed)	0.391 0.119 0.653 0.860 0.272	0.014 0.001	0.184	0.944 0.554 0.245 0.245 0.245 0.245 0.259 0.752 0.691 0.521 0.864 0.788 0.061 0.521 0.864 0.788 0.061 0.020 0.221 0.001 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0	
	N	243 243 242 241 243	243 240	241	238 239 237 237 237 237 237 237 237 237 240 242 241 242 241 231 220 241 241 239 241 241 239 241 241 241 241 241 241 241 241 241 242 242	243 242 243 243
Satisfaction on the population	Correlation Coefficient	-0.092 -134* 0.037 -0.069 0.117	.211 182"	0.126	0.016 0.001 0.083 -0.065 0.067 -0.063 0.049 -0.055 0.055 1,65 0.073 1,51 0.094 -0.114 0.064 231 1,60 0.073 300 223 313 331 101 147 246 247 714 -0.48 0.123 187 0.17 710 341 347 346 347 141 346 347 346 347 347 346 347 347 346 347 347 346 347 347 347 347 347 347 347 347 347 347	.466 .601 808 1.000
density of the neighborhood	Sig. (2-tailed)	0.153 0.035 0.565 0.283 0.068	0.001 0.004	0.051	0.802 0.987 0.199 0.118 0.303 0.310 0.452 0.372 0.333 0.010 0.255 0.019 0.151 0.099 0.319 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0	
	N	245 245 244 243 245	245 242	243	240 241 239 239 239 239 239 242 244 243 224 243 224 243 224 243 224 243 224 243 242 243 242 243 243	245 244 243 245

### L. Raw data: anonymised questionnaire

### **Design and Wellbeing**

#### Dear Sir/ Madam,

I would like to invite you to participate in this research questioner and highly appreciate your support. This investigation is part of an academic research project for a Ph.D. degree.

This research aims to investigate how the design of the residential built environment influence the social wellbeing of inhabitants in Doha city. Different designs and layouts of the built environment have a different impact on the inhabitant's behaviour. This questioner will help to understand the complex relation between built environment design features and the social behavior of residence.

This questioner is therefore based on the following sections:

- 1. Personal information: who are you?
- 2. Dwelling scale design features
- 3. Dwelling scale social life
- 4. Neighbourhood scale design features

5. Neighbourhood scale social life

The information you provide will be treated confidentially, anonymously and that your name will NOT be associated with the completed questionnaire. For further information, please contact Hameda Janahi. Email: <u>janahih@cardiff.ac.uk</u> Shibu Raman. Email: <u>ramans@cardiff.ac.uk</u>

First: You
where do you live *
Althumama
O Almamora
O Onaza
O Duhail
O Dhil Alhamam
O Hazem Almarakia
Your age group
0 16-25
0 26-34
35-44
• 45 - 49
O over 50

Gender		
C Female		
Male		
Nationality		
O Qatari		
O Arab		
Non-Arab		
Marital statues		
Married		
O Divorced		
O Widowed		
In general, would you say your health is:		
C Excellent		
Very good		
O Good		
O Fair		
O Poor		
In general, do you have any emotional problems that interfered your normal social activities with family or neighbors?		
Not at all		
⊖ Slightly		
O Moderately		
O Severe		
Very severe		

Но	usehold size (number of people in the house)
۲	1-4
0	5-7
0	More than 7
Wh	at is the number of children in the household ( Age rang 0 years to 18)
0	1-3
0	4-6
۲	Not applicable
0	Other:
Wh	at is your employment status
•	Employed
0	
0	Student
0	Other:
Но	v do you travel to work/ university? (select all applicable answers)
	Walking
	Cycling
	Bus
$\checkmark$	Driving
	Not applicable

Hov	v many cars does the household have
۲	1-2
0	3-4
0	5 or more
0	Not applicable
	Second: Your House
Curi	rent house type
0	Apartment
0	Detached Villa
0	Villa within a compound
•	Shared Villa
0	Arabic house/ Popular house
Hov	v many bedrooms does your house have? 2-3 bedrooms
0	4-6 bedrooms
0	More than 6 bedrooms
Doy	/ou have outdoor space (ex. Garden, yard, porch, balcony)
•	Yes
0	No
Doy	you own or rent your house
$\cap$	Own
$\smile$	
If own property, is it	
-------------------------------------------------------	--
O Designed by the owner	
Bought from a privet developer	
O Provided by the government	
O Not applicable	
If rented property, is it	
Rented from privet landlord	
Rented for you by the employer	
O Not applicable	
With whom do you live (select all applicable answers)	
Spouse	
Parents / Parents in law	
Friends	
Group of families	
Alone	
How long have been in this house	
Less than 5 years	
O Between 6 to 9 years	
O More than 10 years	
Would you prefer to move to another neighborhood	
○ Yes	
No No	
O Maybe	

Why?
Would you prefer to move to another house
○ Yes
Mayba
Мауре
Why?
Would you like to make some changes in your house design? ( add wall, window, enlarge or add rooms, )
() No
○ Mayha
() Maybe
Стизуре
How do you go to daily destinations in the neighborhood (ex. shop, mosque,) (select all applicable answers)
How do you go to daily destinations in the neighborhood (ex. shop, mosque,) (select all applicable answers)
How do you go to daily destinations in the neighborhood (ex. shop, mosque,) (select all applicable answers)  Driving  Walking
<ul> <li>Maybe</li> <li>How do you go to daily destinations in the neighborhood (ex. shop, mosque,) (select all applicable answers)</li> <li>Driving</li> <li>Walking</li> <li>Cycling</li> </ul>
<ul> <li>Maybe</li> <li>How do you go to daily destinations in the neighborhood (ex. shop, mosque,) (select all applicable answers)</li> <li>Driving</li> <li>Walking</li> <li>Cycling</li> <li>Other:</li> </ul>

How do you feel about					
	Satisfied	Mostly satisfied	Neither/ nor satisfied	Mostly unsatisfied	Unsatisfied
your house location	0	۲	$\bigcirc$	0	0
your house design in general	۲	$\bigcirc$	0	0	0
the original height of your house fence	۲	0	0	0	0
the original layout of your house	$\bigcirc$	۲	0	0	0
your outdoor space (garden, yard, parking space)	۲	0	0	0	0
the privacy you have in your outdoor space (ex. Garden, yard, porch, balcony)	۲	0	0	0	0
the privacy you have in your house ( indoor)	$\bigcirc$	۲	0	0	0
your own privet space in your house	0	۲	0	0	0

Third: Your social life at the dwelling level

How many times a day do you gather with your own household members (people you live with them)  $\star$ 

O Never

Once to twice a day

O More than twice a day

where in your house do you like to gather with your own household members (select all applicable answers) \*

🔲 In the garden, yard
-----------------------

In the kitchen

In the living room

Other:

What activity you like to do with your own household members (select all applicable answers) *
Talking
Eating or drinking
Vatching TV
Playing
Other:
Does your house allow you to invite guest easily *
• Yes
O No
Do you think that the house has design feature that might create conflict between the household member ( number of rooms, parking * spaces, allocation of some activates)
Yes
O No
Forth: Your social life at the neighborhood level
Did you have relatives or friends in your area before/after moving to the area (excluding people you live with them) *
○ Yes
No
Where do you prefer to gather with your friends or relatives? *
In the house
O Public place within the neighborhood
O Public outside the neighborhood

Frequency of gatherings within the neighborhood (extended family or friends excluding people you live with them) *	
O Never	
Occasionally (Eid, celebrations,)	
Once a month	
Once a week	
O Twice a week or more	
Opportunities you have to meet people in the neighborhood *	
O Never	
Occasionally (Eid, celebrations,)	
Once a month	
Once a week	
O Twice a week or more	
Where can you meet/talk to new people within the neighborhood (select all applicable answers) *	
Where can you meet/talk to new people within the neighborhood (select all applicable answers) *	
Where can you meet/talk to new people within the neighborhood (select all applicable answers) *          Around the house entrance         Public area: supermarket, mosque, park	
Where can you meet/talk to new people within the neighborhood (select all applicable answers) *         Around the house entrance         Public area: supermarket, mosque, park         None	
Where can you meet/talk to new people within the neighborhood (select all applicable answers) *         Around the house entrance         Public area: supermarket, mosque, park         None         Other:	
Where can you meet/talk to new people within the neighborhood (select all applicable answers) *  Around the house entrance  Vublic area: supermarket, mosque, park None Other:	
Where can you meet/talk to new people within the neighborhood (select all applicable answers) *         Around the house entrance         Public area: supermarket, mosque, park         None         Other:	
Where can you meet/talk to new people within the neighborhood (select all applicable answers) *         Around the house entrance         Public area: supermarket, mosque, park         None         Other:	
Where can you meet/talk to new people within the neighborhood (select all applicable answers) *         Around the house entrance         Public area: supermarket, mosque, park         None         Other:         How often do you met or chat with your neighbor? *         Never         Occasionally (Eid, celebrations,)	
Where can you meet/talk to new people within the neighborhood (select all applicable answers) *         Around the house entrance         Public area: supermarket, mosque, park         None         Other:         How often do you met or chat with your neighbor?*         Never         Occasionally (Eid, celebrations,)         Once a month	
Where can you meet/talk to new people within the neighborhood (select all applicable answers) *         Around the house entrance         Public area: supermarket, mosque, park         None         Other:	
Where can you meet/talk to new people within the neighborhood (select all applicable answers) *         Around the house entrance         Public area: supermarket, mosque, park         None         Other:         How often do you met or chat with your neighbor? *         Occasionally (Eid, celebrations,)         Once a month         Once a week         Twice a week or more	

How many person do you *					
	Most of them	A lot	Quit few	few	None
know in the street you live in	$\bigcirc$	$\bigcirc$	۲	$\bigcirc$	0
have close relationships in the street you live in	0	0	0	۲	0
know in your neighborhood	0	0	0	۲	0
have close relationships in your neighborhood	0	0	۲	$\bigcirc$	0
neighbor you can recognize	0	0	۲	$\bigcirc$	0

Do you receive social support from people in your neighborhood (ex. Taking care of kids, home, give advice,..) \*

YesNo

How do you agree or disagree with the following statements: \* Disagree Neither/ nor agree Strongly agree Strongly disagree Agree I can ask for help/ favor  $\bigcirc$ ۲  $\bigcirc$  $\bigcirc$  $\bigcirc$ from my neighbors I have neighbors that I can ask for advice in  $\bigcirc$  $\bigcirc$  $\bigcirc$  $\bigcirc$ ۲ personal issues I can leave my personal property safely outside. ۲ 0  $\bigcirc$  $\bigcirc$  $\bigcirc$ (ex. Car, delivery package) I don't need to lock my 0  $\bigcirc$  $\bigcirc$  $\bigcirc$ door while  ${\bf I}$  am in the  $\odot$ house I need monitoring system to keep my  $\bigcirc$ ۲  $\bigcirc$ Ο  $\bigcirc$ house safe from breaking in Neighbors look after each other's in this ۲ 0  $\bigcirc$  $\bigcirc$ 0 neighborhood I can walk safely in this ۲  $\bigcirc$  $\bigcirc$  $\bigcirc$  $\bigcirc$ neighborhood at any time This is a friendly  $\bigcirc$  $\bigcirc$ ۲ Ο  $\bigcirc$ neighborhood to live in Different people from different background get  $\bigcirc$  $\bigcirc$ ۲  $\bigcirc$  $\bigcirc$ well together in this neighborhood

Fifth: Your Neighborhood

## How satisfied are you with \*

	satisfied	Mostly satisfied	Neither/ nor satisfied	Mostly unsatisfied	unsatisfied
the outdoor spaces in your neighborhood (ex: Park)	0	۲	0	0	0
the leisure facilities you use in your neighborhood (recreational, sport facilities)	۲	0	0	0	0
the shopping facilities	0	۲	0	0	0
the sidewalks in the neighborhood	۲	0	0	0	0
maintenance of your neighborhood public spaces (neat, tidy, clean,)	0	0	0	۲	0
the quality of you neighborhood	0	۲	0	0	0
this neighborhood as a place to live?	0	0	۲	0	0
your safety in the neighborhood?	0	۲	0	0	0
children safety in the neighborhood?	0	۲	0	0	0
the things that you can do together with your family at your neighborhood ?	0	۲	0	0	0
the building density of the neighborhood	0	0	۲	0	0
with the population density of the neighborhood	0	0	۲	0	0

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Google Forms

## L. Raw data: anonymised interview

Case study: Dhal Alhamam House code: 061		
General Questions		MAP
Who is the interviewee ?	husband, wife, sons?	
	Gender?	
	Age group?	
House wife	Female   50s   not employed	
How would you describe your	What is your neighbourhood boundaries	Х
neighbourhood?		
Why did you chose to live in this nei	ghbourhood?	
I didn't choose,, the land was granted	by the government to my husband. At first	
we thought to move somewhere close	er to my brothers in low as every one of them	
was located in a different neighbourh	ood,, our children -cousins- were granted	
lands next to each other. But my neig	hbours are very good,, simple,, and	
interconnected. We meet during Rar	nadan and in the mosque,, and if we miss	
anyone we ask about her.		
How long have you lived:	If more than 5 years	
- In this house	What kept you here ? do you plan to move	
- In this neighbourhood		
We were in Freej Kulibe and	First it is owned by us,, second which is	
moved in here 2006. Around the 11	very very important is the mosque,, even if	
years in this house. I was crying	you sleep very deeply,, you weak up with	
when I moved out from that	the call of prayer – Athan The houses that	
neighbourhood,, but when I came	are not close to the mosque are poor –	
here I found neighbours are better	unlucky My husband like to do yearly	
than relatives. We have a	maintenance for the mosque although	
whatsApp group,, if we don't meet	ministry of endowments and Islamic affairs	
regularly,, but we are always	are taking care of the mosques,, but he enjoy	
connected,, whenever one of us has	doing that,, he feel it is part of our house. the	
an occasion – sad or happy- we	mosque makes us love the house more.	
arrange a day to visit her,, there are		
no formalities between us,, we are	I don't think of moving out of this house,,	
all on one hart.	except if have big land for me and my children	
	all together in the same place,, otherwise no	
	way I leave my neighbourhood,, I don't think I'll	
	find similar neighbourhood.	

Immediate neighbourhood		
Can you tell me about your home		
surroundings?		
Street	Neighbours	
	During Ramadan we exchange food,, every	
	house share their food with neighbours,, my	
	neighbours wait for my soup in Ramadan,, I	
	hope this behaviour doesn't stop,, we didn't	
	have the same in Sudia Ariba. Also	
	sometimes I send food to my old neighbours	
	in Freej Kulaib, and I visit them too.	

What do you think about the street fu	rniture? Benches, lighting, garbage ben,	
water fountain?	1 1. 4.1.4.1.0 1	-
Everything is available,, for example bens are distributed for every house,, even		
we have a box for charity you can put	it the cloth that you no longer need. The water	
Iountains near to the mosque is neave	ily used,, whenever I pass there I find people	
using them,, I think one of the neight	bours built that water fountain.	N/
How well do you know your neighbo	Drs?	X
		Check
		the
		map
Do you trust your neighbours?	Ask them for help, lend things, child care, school run, social activity, visit?	
Yes,, we lend each other cloth,, when	never you ask for something,, you will get it	
right away. When I have occasions,,	every neighbour come with something she	
did.		
When my family come to visit from	Sudia,, they get amazed by the relationships	
we have between neighbours.		
Where do you usually meet or talk w	ith neighbours? Why?	Х
I used to do a religious lessons in my	house weekly,, then I stopped. My kids grow	
and the responsibility increased,, my	mother in low is handicap,, my husband is	
her only son,, his brothers are from h	is father,, so I am busy with her.	
•		
My neighbours walk as a group during	ng night,, but I don't join them,, they walk in	
the park and they ask me to turn off t	he house headlights so they have their	
privacy when exercising. I feel it is d	lifficult for me to go with them as I have	
responsibilities at home. They gather	at the park also.	
	1	
Do you allow your children to play in	n you immediate neighbourhood? Why?	X
When my children were young., they	used to go the park. I used to look at them	
from my room window. It is more he	althy to live in a place surrounded by green.	
When I compare our neighbourhood	to others, all the houses are concise, and too	
many streets. I feel that the place is t	not healthy, when I ask the inhabitants, they	
say that they don't know their neight	nours	
suy that they don't know then hergine	, , , , , , , , , , , , , , , , , , ,	
For my grandchildren I don't allow	them to play at the street they can play at	
the outdoor space or the can go to the	he park with an adult Although it is not a	
main road, but still there are car movement, there are many turns. I see kids in		
the streets with adults to supervise, but I don't agree		
the streets with adults to supervise,, t	but I doll t agree.	_
Wider neighborhood		
What are your daily destinations in	What are the routes you take usually?	X
vour neighborhood	walking/ driving	x
	Where mostly do you bump into people?	
No		
How often do you use the public spa	ces like the park? why?	+
riow often do you use the public spa		

The neighbourhood park doesn't have sufficient lighting. My husband is trying to solve this problem,, because at night maybe somebody hid in it,, maybe something

wrong happens there,, they say that they didn't light it for female privacy if they want to use it during night. I think this is wrong			
waite to use it during inght,, i during and is wrong.			
My husband and the neighbourhood's men who are retired gather in the park after			
the Fjer prayer or during the weeken	ds they workout in the park, female during		
the night. Kids always play football in the park. During the weekends, some			
strangers come to use the park., as D	hal Alhamam park gets crowded.		
Do you have any relatives live in	How often you met or visit them? They visit	Х	
your area?	you? Go together somewhere?		
No relatives., only friends.			
It depends on the occasions., some m	onths we don't gather at all., other times.		
every day., but in all cases our feelin	g are mutual. We are always connected		
though social media., when we meet	it feels as if we met vesterday.		
How well do you know your neighbo	ours?	Х	
Check the map		Check	
		the	
		man	
Do you have any concern about the r	neighborhood safety?	map	
Never ever and we leave the house	gaets open and sleep and nothing happens		
even neighbours does the same and	we have never heard of any issue in the		
neighbourhood	we have hever heard of any issue in the		
Are there any places in your neighbo	urbood that you don't use in a particular	x	
season ? Why?	uniood that you don't use in a particular	Λ	
No,, only during summer when it is v	very hummed we don't want to go to outdoor		
spaces,, its only because of the weath	her condition not for any other reason.		
What are your Fav. Places in the Why?			
neighbourhood?			
The kindergarten in the building nex	t to us,, my daughter after graduation she likes		
to go there. Kids sounds singing rhy	mes is very pleasing. The kindergarten is		
owned by my husband and we have a	a door between the two properties.		
What do you think about living in	Do you think it would influence Social		
more/less dense area? More	connection, trust, social support		
houses, more people			
If the neighbours where all Qataris,,	you will find them interconnected. The other		
nationalities do not visit back when v	we visit,, you feel they don't want to engage		
with the community,, we – Qataris-	whenever we have an occasion we invite the		
neighbours first. When I was in Free	ej Kulaib,, we had many apartment buildings		
with different nationalities,, I tried to	invite them to the religious lessons,,		
sometimes they come,, sometimes the	ney come but don't want you to visit them. I		
think homogenous between neighbou	ars is very important.		
No I don't agree,, you want able to e	stablish strong relationships with large		
number of people,, whenever the pop	oulation are less,, the relationships are		
stronger.			
What would like to add/ change in Why?			
your neighbourhood?			
Lighting the park.			
The walkway in front of the house ha	as a corner that makes car entry to our house		
difficult. My husband is trying to ask	for permission to remove this corner.		

Dwelling Scale Questions			
Sketch the dwelling plan -if not available- for marking and annotation			
House type, who designed it	What are the factors that contributed in your		
House tenure	design decisions?		
Owned/ designed by the owner/	We built the house and our children where		
detached two floors	young., so we thought of moving out to a		
	bigger one., then we changed our mind., the		
	house is enough but we wanted more		
	spacious places. When we moved in we felt		
	as if we were in paradise.		
Why did you chose to live in this house?			
-			
Were there any addition after	What was added, why?	X	
construction completion?			
No., and every one come to visit ask	about our decor.		
We built exterior extension. Mailes and dining room servant rooms			
Has any room used changed with	What and why ?		
time?			
My sons rooms were given to their si	sters after they lift the house, girls rooms stay		
as they are in case they come to visit	it.		
We have an interior Mailes that was	used as a temporary guest bedroom when we		
have visitors from UAE or Sudia Ara	bia. we only change the furniture of the		
room. Recently, I kept it as a bedroo	m., as I use it for my daughters reception		
when they give birth.			
This room become more usable than when it was a Mailes			
The tent sometimes is used by my daughter as a gym when her trainer comes.			
What do you think about your	I wish to make it higher., but this is the		
dwelling fence ?	maximum height we can reach. We have		
	used partition for the side walls as		
	neighbours windows overlook our house.		
What do you think about your	The gates of the house facing the house		
dwelling entrance?	doors,, if you open the gates you will face		
e e e e e e e e e e e e e e e e e e e	the doors of the house, when we move in we		
	changed its location.		
	If I have an occasion and the gates need to be		
	opened all the time,, I use a temporary		
	partition.		
What do you think about your	Very happy about it,, and we have a garden,,		
outdoor space?	we set in this garden. My grandchildren		
*	collect floors for me from the garden when		
	they come to visit.		
What do you think about your	Happy about it.		
indoor special layout?			
What do you think about the	Indoor: yes very happy of the privacy		
privacy you have in your house	indoor,, sometimes I set in the living room		
(indoor/outdoor)	with my pyjamas and my brother in low		
	come to visit their stepmom and I have my		
	full privacy.		
	Outdoor: the doors of drivers rooms are to		
	the street,, they don't enter the outdoor		

space,, they ask before entering if they want				
to take the car out. I get annoyed when I see				
nouses they don't use the outdoor space				
because of the lack of privacy. I go out and				
walk in my outdoor space,, I am know that				
nobody overlook out outdoor space.				
Thinking about the doors between spaces, are the doors kept open, closed but not locked? Why?				
Opened, the first thing I do when I weak up is to open all the closed doors. At night I do				
the doors as the prophet Mohammad behest. I like to keep the house lively even the rooms				
of my sons who got married and moved out we try to use every place for praving taking				
a nap and so on. I don't agree locking spaces that is for guest use only. Even my outdoor				
Majles that is used for big events I try to use it for something., like my daughter take prive				
classes in there. Even I have regular cleaning schedule for the rooms,, so nothing get	•			
abandoned.				
What are the positive things that your house have?				
I have many entrances to the house,, I like to ventilate the house. All the exterior				
doors has windows to allow natural lighting. The stairs windows also allow natural				
lighting with respect to privacy.				
When we have men and women guests, both of them has their full privacy.				
because I have two doors in different directions, and the places are separated.				
What are the negative things that your house have?				
The ceiling heights are low., we wanted it higher.				
What are the changes/addition you would like to do in the house? Why?				
I want to change one of my sons room into a GYM, we have GYM room in the				
second floor but we laze to climb the stairs.				
I am planning to open the room adjacent to my room and convert it to a dressing				
room. My daughter who used to use this rooms is going to take her brother room				
who married and got out of the house.				
How long do you spend daily in the house.				
I don't get out of the house except for occasions. I like to stay with my daughters.				
sometimes my husband offer me to go travel for two days alone,, but I tell him that I	want			
my daughters with me. Every day I have some of my children come to visit me., but the				
whole family get together on Fridays.				
Where do How long? With whom ? What do you do in these spaces				
you spend				
this time?				
Ground floor living room, my children and husband, we eat there and drink coffee and tea				
What is your fav. place, space in Why?	Х			
the house?				
Ground floor living room. I can see who is coming and who is leaving the house. I				
like to make changes in the living room., it is the place where we gather. I keep the				
furniture and antiques in a big store.				
What are the spaces that you use by For how long? AM. PM				
your own? alone				
No,, maybe the only place is my bedroom,, I watch my favourite programs,, maybe				
I spend an hour before bed time in my bedroom.				
The location of my bedroom makes it control tower,, from the windows you can				
overlook the neighbourhood and the park,, from the other side it overlook the				

dwelling gates and the garage. It is spacious room,, it looks like two rooms joined		
together,, I have a sitting space,, the bed,, the bathroom,, storage space.		
What are the spaces that you share	What do you think about the space available	Х
with your family members?	for gathering? activities ? how long ? AM.	
	PM	
We use the first floor living room only before bed,, but mainly we use the ground		
floor living room as my mother in low room is in the ground floor,, even if we		
don't have old people in the house,, I don't agree to abandoned the house and use		
the first floor only.		
If the weather is good,, we take out the setting furniture to the garden and the TV,		
the gates are covered by the movable partition.		
Sometimes I like to set with the girls at their rooms,, chat with them.		
What are the spaces that you share	For how long ? AM. PM	Х
with guests? How often do you		
have guests?		
Because my mother in low is in my house,, we host Eid gathering,, daily Ramadan		
gatherings. Other than that,, they come to visit once a week,, Friday lunch. My sons		
with their wife's and daughters with their husbands.		
If I have large number of guests,, we use the exterior Majles,, otherwise we use the		
interior Majles. If relatives or neighbours we gather at the living room.		
I gather with my children and their wife's almost daily. With my brothers in low,,		
twice a week.		
Do you have spaces which is not	Why?	Х
used?		
No, not a corner.		
Can you draw the plan of your	Can you tell me using the map family routine	Х
house?		



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