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ASSESSING SOCIAL AND CULTURAL CONSEQUENCES OF HOUSING DEVELOPMENT IN RIYADH: A CASE STUDY OF AL-MALAZ DISTRICT

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Master's Thesis

Supervisor

Prof. Dr. Aykut KARAMAN

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I hereby declare that all information/data presented in this graduation project has been obtained in full accordance with academic rules and ethical conduct. I also declare all unoriginal materials and conclusions have been cited in the text and all references mentioned in the Reference List have been cited in the text, and vice versa as required by the abovementioned rules and conduct.

Jenin ZIDAN

Signature

DEDICATION

This thesis is dedicated to my advisor, Prof. Dr. Aykut KARAMAN, whos' guidance, encouragement, and expertise were invaluable throughout this study ,who inspired me to pursue knowledge with rigor and passion.

I dedicated my work to my parents and family, [hatem and dina] for their unwavering love and support, [siblings and aunties] for their belief in my potential fueled my determination to see this study through.

For my friends, who were my belief during challenging moments and my source of encouragement. Thanks for reminding me always to keep going and to take breaks and celebrate milestones.

For me this thesis represents a culmination of countless hours, late nights, and moments of self-doubt. It's a testament to perseverance and the power of believing in oneself,

This thesis is a record of my growth as a researcher.

ABSTRACT

ASSESSING SOCIAL AND CULTURAL CONSEQUENCES OF HOUSING DEVELOPMENT IN RIYADH: A CASE STUDY OF AL-MALAZ DISTRICT

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The rapid pace of urbanization presents significant challenges to environmental sustainability in cities around the world, and housing development is inevitably impacted as a key component of urban areas. Riyadh, the capital of Saudi Arabia, is no exception. As a rapidly growing city with an increasing population, its housing complexes are transforming the urban landscape. This study examines the impact of housing development on promoting sustainability, with a specific focus on the Al-Malaz district. Through an in-depth analysis, the research evaluates the social and cultural consequences of housing development in Al-Malaz, addressing sociocultural issues such as community well-being, social interaction, as well as cultural adaptation and durability.

The study employs a mixed-methods approach, combining quantitative data with qualitative analysis. The goal is to provide insights into the effectiveness of housing development regulations and practices in promoting sustainability. By understanding the impacts of residential development in Al-Malaz, the findings aim to inform future strategies for urban development and architectural design, contributing to a more sustainable and resilient in Riyadh city.

Keywords: Housing Development, Sustainability, Family Dynamics, Housing Types, Cultural Adaptation and Wellbeing.

ÖZET

KONUT GELİŞİMİNİN SOSYAL VE KÜLTÜREL SONUÇLARININ DEĞERLENDİRİLMESİ: AL-MALAZ BÖLGESİ ÖRNEĞİ

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Hızlı kentleşme, dünya genelinde şehirlerin çevresel sürdürülebilirliği için büyük zorluklar oluşturmakta ve kentsel alanların önemli bir bileşeni olan konut gelişimi kaçınılmaz olarak etkilenmektedir. Suudi Arabistan'ın başkenti Riyad da kaçınılmaz

olan durumdan etkilenmektedir. Hızla büyüyen ve nüfusu artan bir şehir olarak, konut kompleksleri kentsel manzarayı dönüştürmektedir. Bu çalışma, konut gelişiminin sürdürülebilirliği teşvik etmede etkisini, özellikle El-Malaz semtini odak noktasına alarak incelemektedir. Araştırma, derinlemesine bir analiz yoluyla, El-Malaz'daki konut gelişiminin toplumsal refah, sosyal etkileşim, kültürel uyum ve dayanıklılık gibi sosyo-kültürel konulara ilişkin sosyal ve kültürel sonuçlarını değerlendirmektedir.

Çalışma, nicel verileri nitel analiz ile birleştirerek karma yöntem yaklaşımı kullanmaktadır. Amaç, konut geliştirme yönetmeliklerinin ve uygulamalarının sürdürülebilirliği teşvik etmedeki etkinliğine ilişkin bilgi sağlamaktır. El-Malaz'da konut geliştirmenin etkilerini anlayarak, bulgular gelecekteki kentsel gelişim ve mimari tasarım stratejilerini bilgilendirmeyi, Riyad şehrinde daha sürdürülebilir ve dayanıklı bir yaşam alanı oluşturmaya katkıda bulunmayı amaçlamaktadır.

Anahtar Kelimeler: Konut Gelişimi, Sürdürülebilirlik, Aile Dinamikleri, Konut Tipleri, Kültürel Uyum ve Refah.

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1. INTRODUCTION

The aim of this introductory chapter is to lay the necessary foundations for this thesis. It introduces the key concept of sustainability in hosing context, which is the focus of this thesis and in the urban context as secondary focus and underscores its growing importance in the field of Architecture. It also outlines the structure of the thesis providing a brief overview of each of the chapters that follow.

Urbanization and housing development are parts of modern cities, promoting economic growth and affecting the social fabric of communities, however because of the uncontrolled rapid urban growth considerable challenges offering to reach sustainability in housing, human well-being and social harmony. Al-Malaz district, located in the center of Riyadh, shows the complexity of rapid growth and its impact on housing developments and neighborhood sustainability. While such development programs promise to enhance economic growth and meet the need for housing, it affects sustainability, social harmony, resource use, culture preference and well-being. This research investigates the urgent issues that exemplify by rapid urbanization and large-scale housing production in Saudi Arabia, particularly Riyadh, regarding sustainable urban development requirements. There is an important problem in literature regarding the conflict between contemporary urban design and cultural adaptability. Al-Said (2003) assesses the damage caused to traditional neighborhood arrangements, social cohesion and cultural identity in urban districts such as Al-Malaz by Western grid-pattern planning. Riyadh takes part of this transformation with new street layouts and contemporary architectural designs that seem to deviate from the traditional compact forms. Adding to this, Bin Sulaiman (2017) argues that the outward expansion of urban areas and reliance on automobile-loving suburbs have had more adverse effects on environmental sustainability than benefits; compact high-density urban forms would serve as an antidote in promoting walkability while sustaining community spirit. His research suggests that Riyadh's urban form is a source of environmentally taxing; it results in increased energy consumption and carbon emissions. Smart city technology (see Batty et al. 2010) addresses these concerns in the following way. (2012) has been identified as a feasible method to counteract the social and environmental inefficiencies of rapid urbanization, whilst simultaneously fulfilling sustainability goals. Contemporary dwelling types and traditional social conventions with emphasis on the major cultural consequences

of modern housing designs are thoroughly examined by Mubarak (1999) as well as Al-Qahtany While Mubarak argues that the housing of today have been deprived from spaces for societal activities, which are important in the Saudi context, Al-Qahtany stresses on considering social norms mentalities regarding privacy and ensuring family life as one aspect integrate into an environmental sustainable design. The both hold that home development has to be integrated in socioeconomic contexts and sociocultural traditions while respecting lifestyle requirements of today. However, there is a significant gap in the study of the housing developments in rapidly growth cities customized to social and cultural sustainability point of view. This gap indicates a lack of a comprehensive understanding of how these modifications affect social harmony, well-being, cultural identity and overall neighborhood sustainability. This study aims to evaluate the social and cultural housing developments and its impact on its sustainability in rapidly growth cities, with a particular emphasis on the Al-Malaz district. It emphasizes the complex interactions between urban growth, housing units, and sustainability through a case study of Al-Malaz by unraveling the complicated relationship of these different factors that influenced the housing's sustainability. The ability of this study is to expand on the theory and results obtained by previous researchers who have studied the housing and urban sustainability and also assist policymaking, urban planning, architects and urban designers for developing a more sustainable future for housing developments projects and neighborhood in Riyadh by developing similar districts which face the same challenges as well as contributing to the 2030 vision of the kingdom in it programs for reaching sustainability and resilience community. This thesis is organized into 8 chapters. Before each of them is introduced briefly, chapter one has the concepts that reflect the importance of the study by explaining the housing sustainability importance concept and principles and in neighborhood level. Chapter two reviews the literature relevant that the study is based on and the principles that the neighborhood analysis laid on as well as explore the new project that take a place in Riyadh city as well as the fusion of modernity in the case study of Masdar city. Chapter three has the information of the region and the applied of the theoretical in the chapter 2 by practically analysis the chosen neighborhood sustainability. Chapter four focuses on the housing context by introducing the housing project in Al-Malaz neighborhood and assessing them based on the explained principles. Chapter five explains the data collection from the conducted survey based and related to the same principles explained in chapter 2. Lastly

chapter 6 explains the findings from the study and the recommendations based on the sustainability principles that have been discussed in the research for both neighborhood and housing level.

1.1 THE IMPORTANCE OF HOUSING SUSTAINABILITY

The importance of sustainable housing development lies in its ability to address critical environmental, social, and economic challenges while ensuring long-term benefits for both current and future generations. As global urbanization accelerates, sustainable housing has become a key component in the effort to achieve broader sustainable development goals, particularly in the face of environmental degradation, climate change, and growing housing demands (Pullen et al., 2010).

One of the central benefits of sustainable housing is its ability to reduce the environmental impact of construction and habitation. Sustainable homes are designed to use energy, water, and other resources more efficiently, thereby lowering carbon footprints and reducing reliance on non-renewable resources. This not only benefits the environment but also leads to long-term cost savings for residents through lower utility bills and reduced maintenance costs. Energy-efficient homes, for example, play a critical role in mitigating climate change and conserving resources (Pullen et al., 2010).

Sustainable housing also promotes social equity by providing lower-income households with access to affordable housing that supports better living conditions. These homes improve the quality of life for residents, especially those in the affordable housing sector, by ensuring better indoor air quality, healthier living environments, and reduced exposure to environmental hazards. In addition, the long-term economic benefits of sustainable housing, such as reduced utility bills, can help alleviate the financial burdens on low-income families, creating a more equitable and inclusive society (Pullen et al., 2010).

By promoting compact, high-density housing options, cities can enhance the utilization of existing infrastructure, reduce travel times, and alleviate the environmental impacts associated with suburban expansion (Pullen et al., 2010).

In conclusion, housing sustainable development is essential for creating resilient and livable urban environments. It contributes to environmental conservation, supports social equity, enhances economic efficiency, and aligns with global efforts to achieve long-term sustainability goals. As cities grow, sustainable housing will play a key role in ensuring that urban development is inclusive, efficient, and environmentally responsible (Pullen et al., 2010).

1.2 THESIS PROBLEM STATEMENT

The rapid expansion of housing constructions in fast urbanizing areas like Riyadh introduces the opportunities and challenges relating to sustainability issues associated with the housing sector. While urban expansion and housing projects have economic benefits on the one hand, in Riyadh on the other hand it does not refer to the local social structures and its cultural identity. Housing Developments in Riyadh has a problem in referring to the social and cultural sustainability introducing adverse effects on conventional socio-cultural bonding with a complete disregard to the dynamism involved. The key to sustainable housing development is the ability to adapt in three aspects environmental technical, social and economic discipline resulting in long-term benefit for current generation and future generations while promoting global sustainability. Acknowledging the need for housing and a crippling struggle against developing houses in Riyadh, it is essential to maintain robust upcoming urban environments that deliver balanced cities effectively while interlocking with schemes of inclusive, effective towns. The research titled "ASSESSING SOCIAL AND CULTURAL CONSEQUENCES OF HOUSING DEVELOPMENT IN RIYADH: A CASE STUDY MALAZ DISTRICT" Response to assess and focusing on detecting gap from socio-Cultural perspective Regarding sustainability. Aiming to provide a conceptual insight that can inform urban planning, policy development and design practices towards achieving sustainability and collaborate to Saudi Arabia 2030 Vision regarding resilient community goals.

1.3 RESEARCH QUESTIONS

This study aims at assessing the impact of housing development on its social and cultural sustainability in Riyadh city, with particular focus on Al-Malaz district. In the rapid urban expansion of Riyadh, local residential types and block patterns have changed significantly

that in turn reduces social and cultural aspects. This study addresses the primary questions as follow to explore these dynamics:

whether the housing development has enhanced its social and cultural sustainability in Riyadh in general and in Al-Malaz district as a focus? How does housing development effect on social and culture sustainability of the dwelling unit and on the neighborhood in all, and how can this research improve the process of housing development and neighborhood structure?

This study seeks to explicitly document emerging dynamics regarding the impacts of housing development on sustainability and proposes conceptual recommendations for achieving sustainability.

1.4 OBJECTIVES OF THE RESEARCH

The goal of this study is to completely evaluate the housing development sustainability in Riyadh, with an emphasis on the Al-Malaz district, firstly analyze the city urbanization factor then investigate the social implications for community well-being and integration and assess the cultural impacts of housing development and identify potential benefits with sustainability goals. By providing recommendations from the collected data, the research will inform policymakers, urban planners, developers, and stakeholders about promoting sustainable housing development practices in Al-Malaz district and can also be applied for any city or district that face the same challenges.

a.Sub objectives

This research looks to dive into the complex of housing growth on sustainability in Al-Malaz district, notably in Riyadh, Saudi Arabia. Addressing this gap in understanding the critical issue for shaping future urban development strategies and architectural designs to improve the neighborhood and housing sustainability and resilience.

i. Understand the housing development consequences.

ii. Understand the factors that influence the district structure.

iii Driving recommendations that will improve housing and neighborhood sustainability.

1.5 LITERATURE REVIEW

The rapid urbanization and housing expansion in Saudi Arabia, particularly in city like Riyadh, have presented both opportunities and challenges toward sustainable urban and housing development goals. The convergence of modern urban and housing development and sustainability with cultural adaptability in the Saudi environment is an area that has been a subject for study by several researchers. The literature review highlights key themes such as structural transformation of urban communities, sustainability in urban design cultural and social adaptation to housing requirements, the possibility for sustainable fast urbanization. Saudi neighborhoods are viewed through a different point of view, the modern effect on traditional living patterns. This transition is examined by Al-Said (2003) focusing on the district of al-Malaz in Riyadh. This is similar to what can be seen in the urban expansions of Riyadh, which advanced with a new grid pattern city structure following contemporary Western planning concepts carrying significant changes on both neighborhood level and single house layout. Saudi neighborhoods have been affected by the reliance on grid-patterned streets and newer architectural styles in place of traditional compact designs, as these changes have also altered social interaction, community cohesion and cultural identity. Contemporary developments, Al-Said argues further on, have limited public spaces and corroded the old family relationships in guardianship of a great binary conflict between modernization versus cultural preservation. The configuration of Urban form is key for affecting the sustainability dynamics in cities. Bin Sulaiman (2017) discusses the environmental and social sustainability aspects of Riyadh urban morphology. His research showed that Riyadh's urban sprawl spread predominantly to car-dependent suburbs, posing multiple environmental threats: more energy use and carbon emissions per capita as well failed land-use efficiency. Bin Sulaiman has been advocating a move towards more compact, high-density urban forms that make it easier for people to walk and public transit systems work at their best. Not only would constructions like this mitigate the environmental implications of city living, but it would also be more socially sustainable by fostering a less alienated community life. With fast urbanization posing sustainability questions, the concept of "smart cities" has been pitched as a solution. Batty et al. (2012) explore the role of smart city technology data and information used as a way to improve infrastructure, reduce energy consumption and make urban services more efficient. The authors suggest that with most cities, they are certain to grow faster than the infrastructure will be able to provide in Riyadh

Quick expanding urban areas so far smart future cities should further include practices of Sustainability in their design. A shape of an object is influenced by climatic, factors which refer to the physical environment that either constraints or allows certain possibilities as well as construction methods and materials used to build the desired envelope. the author designates socio-cultural forces as primary and the others secondary or modifying (Rapport, 1969). Understanding the sociological ramifications of modernization requires a cultural examination within Saudi Arabia, particularly in terms of housing development. Mubarak, (1999) studied how the modern urban housing typologies proposed in Riyadh mismatches with traditional cultural practices. The case study concludes that the move from traditional to modern house designs has produced an incongruence between the built environment and its residents 'social needs. Modern homes, many of which focus on privacy and personal space have put an end to much communal areas that are integral to Saudi social culture. Reminding once again of the importance for housing designs to be rooted in, and maintain socio-cultural practices whilst addressing modern life needs. Al-Qahtany (2020) focuses on the importance of a culture-based approach towards housing by exploring the perspectives and perceptions on sustainable housing in Riyadh, based on LCA. Riyadh residents, according to his research, are most concerned with the sustainability of housing meeting environmental criteria but at once also upholding cultural norms regarding family life and privacy as well as social engagement. The study of Al-Qahtany argues that in order to reach sustainability, it must take social and cultural elements into account as well; the author considers local values with a high regard while such environmentally sustainable solutions are being designed.

1.6 METHODOLOGY

The methodology for this paper is a mixed-methods approach that combines quantitative and qualitative techniques to evaluate housing development and its impact on its sustainability and to analyze Al-Malaz district sustainability. Qualitative data will be collected from literature as well as data collected from an observation of the site with a focus on social and cultural metrics. Quantitative data will be gathered through site analysis on focus of sustainable metric and a survey on a focus group that is living in the chosen district. Data will use statistical approaches for quantitative data and thematic analysis for qualitative data which explain the data more, these findings combined to provide a full knowledge of the

impact of housing development on social and cultural sustainability and the neighborhood sustainability. This strategy attempts to develop a conceptual framework for policymakers, urban planners and architects with detailed understanding for improving sustainable development based on neighborhood and housing development in Riyadh.

a.Thesis Framework

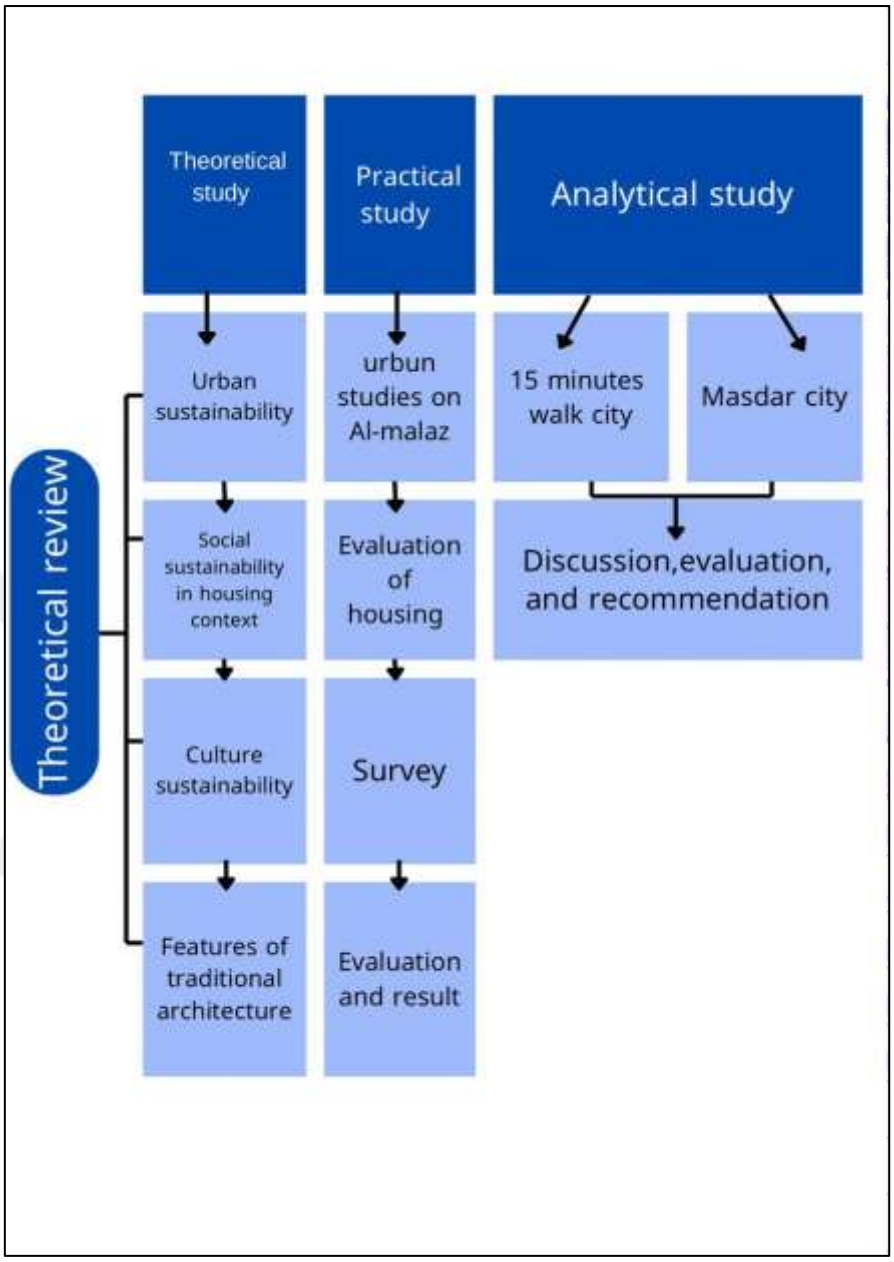


Figure 1.1: Conceptual Model of Research by the Author.

b.Hypothesis

"If The dwelling designs in Riyadh's Al-Malaz district, shaped by social dynamics, cultural preferences and sustainability practices, then a significant impact on the built environment's long-term sustainability will emerge. “The study expects that sustainable development in housing will have various degrees of environmental sustainability, socially, economically and culturally sustainability. Furthermore, improved understanding of social dynamics,

cultural variables, and sustainable practices in dwellings may lead to customized sustainable practices that, when integrated into house designs and urban scale, can increase Al-Malaz's overall sustainability and well-being in overall of the district.

2. AN OVERVIEW OF URBANIZATION AND SUSTAINABLITY CONCEPTS

2.1 THE PRINCIPAL FACTORS DRIVING URBAN GROWTH

Riyadh city is the region where the thesis is focus and as it is considered as rapidly growing city this section is highlighting the main principles that drive to the urban growth where the thesis in the upcoming chapters will elucidate the principles governing urban growth in Riyadh, encompassing geographic expansion through history, rural-urban migration related to the chosen case of the study Al-Malaz neighborhood, natural population increase, and suburbanization, particularly in the newly developed projects in the northern suburbs.

i. Rural-Urban Migration: People travel from rural areas to cities in quest of better economic opportunities and living conditions, which is a primary driver of urbanization. This migration is frequently driven by a desire for jobs, education, and better services, which are more readily available in metropolitan areas (Cohen, 2005).

ii. Natural Population Increase: Although urban areas often have slightly lower rates of natural population increase than rural areas, overall population growth in cities remains significant due to higher birth rates among urban populations (Cohen, 2005).

iii.Geographic Expansion and Annexation: Urban communities frequently expand geographically by annexation, in which surrounding rural regions are absorbed into the metropolis. This can also include the conversion of rural villages into tiny urban communities, which contributes to the general expansion of urban populations (Cohen, 2005).

iv Suburbanization: The migration of middle-class people from core cities to suburban areas contributes to urban growth. These phenomena can result in the extension of metropolitan areas and the creation of new urban spaces on the outskirts of established cities (Cohen, 2005). These causes contribute to the rapid and often uncontrolled expansion of urban areas in emerging countries, posing considerable problems for sustainable urban growth management (Cohen, 2005).

2.2 SUSTAINABLE ARCHITECTURE

The essential requirements of environmental protection, social responsibility, cultural sensitivity, and economic viability in the built environment have given rise to the field of sustainable design. This section explores the basic dimensions of sustainable architecture where the study focuses on two aspects which is the social and culture sustainability.

i. Ecological and Environmental Aspects

Sustainability in architecture, as put forth by (Lányi ,2007), refers to seeking to design a full building in a way that it will conserve natural resources and provide a positive impact on its ecological surrounding. (Neama, 2012) supports protecting Greenfields, conserving water, energy and using local materials, to extend the environmental footprint. Shi et al. With renewable energy, proper insulation and passive design (Shi et al ,2010) call for energy efficiency to reduce energy use and promote environmental sustainability. The strategy of sustainable architecture is to ensure that no ecological impact is created, while also linking the built environment to the local topography, vegetation and climate.

ii. Economic Aspect

sustainable architecture secures great amount of investment early but saves money in the long term. Even so, the initial costs associated with sustainable building are often higher; but such costs are offset by reduced ongoing costs for energy, water, and upkeep over the longer term (Lányi ,2007) and (Neama, 2012). life-cycle costing" is a principle of economics in which efficiency leads to cost-effectiveness over the long term by reducing the need for frequent repairs and using less material to build with durable materials. (Shi et al ,2010) Such economic resilience ensures buildings will benefit local economies using local materials and labor, efficiency of resources, and economic stability in the form of durability and adaptability.

iii. Social Aspect

Social sustainability in sustainable design, on the other hand, focuses on human and community well-being as well as health in the built environment. According to (Neama, 2012) sustainable architecture should contribute to renew quality of life and crucially strengthens the sharing between community and the environment by introducing sunlight, green space and unpolluted air into the indoor environment. (Shi et al ,2010) elaborates further by introducing health problems, such as, sick building syndrome, they encourage the use of non-toxic materials and ample ventilation, further allowing for healthy indoor

environments. They highlight the need for community involvement and the need for communal spaces that enable people to gather and mix, thereby improving community spirit and cohesion. In addition, for social sustainability to occur, structures need to be adaptable, meaning that they must be able to accommodate changes in their use over time, thus extending the occurrence of their significance and functionality. Architectural designs with a high level of flexibility and adaptability foster long-term sustainability and help avoid costly retrofits and therefore require more social viability (Shi et al, 2010).

iv. Cultural Dimension

Cultural-sensitive architecture means sensitivity to local traditions, local styles, and local values, (Lányi,2007) points out that sustainable buildings ought to be environmentally attuned, culturally congruent and combine modern sustainable techniques with traditional ways of building. This component ensures that the built environment is a true reflection of both the character and culture of the location in which it is situated, creating a sense of place and continuity. (Shi et al, 2010) call for architectural sensitivity, where buildings respect local cultural and architectural heritage, thereby reinforcing `local identity and social cohesion. Cultural sensitivity goes beyond pretty pictures, it means creating spaces that respect the values, traditions, and history of that community.

Sustainable architecture is a multi-faceted paradigm to be seen through ecological, economic, social, and cultural lenses, which together form the base for resilient, adaptive, and meaningful cities. Not only do these principles respond to the need to address critical environmental problems, but sustainable architecture also addresses the deeper social and cultural needs of local communities, which makes it an integral component of sustainable urban development.

This is also enhancing the important of the focus of these dimensions in rapidly urbanizing areas, such as the Al-Malaz neighborhood of Riyadh, where the element can be crucial to maintaining a sense of place during modernizing forces, in addition the social and cultural aspects only is the central domain of the study where it highlights a holistic perspective of sustainable design in these two dimensions. The focus on community need, health and inclusivity, coupled with cultural relevance and sensitivity, enable sustainable architecture that creates vibrant, connected, and culturally rich communities. These are particularly relevant as cities undergo rapid urbanization, exemplified by Riyadh. Within this context, built upon respect toward social structure and cultural background, sustainable architecture

could provide its dwellers with resiliency and continuity through spaces that respond to their past, and nurture their future through places that fulfill their identity and needs.

In this way, the essential principles of sustainable architecture based on environment, society and economy can be incorporated by the architects to ensure buildings not only minimize the negative environmental practices with the least impact on the ecology but also provide social benefit and profit over the duration of use of the building (Shi et al. 2010). And this research paper discusses the two aspects, which are social sustainability and culture sustainability, and elaborate in detail in the following section.

2.3 THE CONCEPT OF SOCIAL SUSTAINABILITY

Social sustainability in the context of housing focuses on creating homes and communities that promote social well-being, equity, inclusion, and quality of life. It ensures that housing development meets the needs of residents in a way that fosters social cohesion, health, safety, and cultural identity (Lami & Mecca, 2021). This section deals with theoretical concepts based on a review of literature in social sustainability It is built on the work of (Lami & Mecca ,2021), (Ahmad & Thaheem ,2017) and (Fatourehchi & Zarghami ,2020) who provide a broad view of social sustainability criteria. This section builds up an analytic framework based on the theoretical criteria shown in (Figure 2.1) where it is specific for assessment purposes while housing development is a concern, particularly at Al-Malaz District-Riyadh by relating these criteria to create framework that has been used in this study.

2.3.1 The Criteria of Social Sustainability

This section of the study aim to unravel the social sustainability criteria, and each creation used in the assessment framework of the study for the social sustainability explained in details , where (Figure 2.1) shows the main criteria that the study focus on which is built by the common criteria from the different sources , where the conceptual map shown in (Figure 2.1) is built align with work of(Lami & Mecca, 2021) explained in the red square, (Ahmad & Thaheem ,2017) explained in the blue square and(Fatourehchi & Zarghami, 2020) explained in the green square in (Figure 2.1). Housing affordability, Access to services and amenities, Social interaction and community engagement, Safety and security, Health and well-being, Inclusivity and accessibility, Community well-being and cohesion, Resident Satisfaction and Empowerment, Education and employment opportunities and Cultural

preservation explained as social criteria by (Lami & Mecca, 2021) ,where (Ahmad & Thaheem, 2017) divided the principles first into three main heading as Functional, Aesthetic, and Innovative Design Approach ,User Comfort and Safety and Sub-indicators, starts with the Functional, Aesthetic, and Innovative Design Approach where Usability, Functionality, and Aesthetic Aspects, Architectural Considerations, Integration of Cultural Heritage, and Compatibility with Local Heritage and Innovation and Design Process listed , to the User Comfort and Safety where Indoor Environmental Quality , Health and Well-being , Safety , Open Space Availability, Number of Facility Users, Accessibility, Community Amenities Provision Listed, and lastly Sub-indicators where Stakeholder Opinions , Airborne Pollutant Rate of Production, Daylight Illumination are explained (Ahmad & Thaheem, 2017). In addition (Fatourehchi & Zarghami, 2020) divided the criteria to five heading as Safety and Security Issues, Health and Comfort Considerations, Site Considerations and Equipment, Practitioner Interactions and Architectural Factors, started with Safety and Security Issues where Safety-based Design Considerations and Security-based Management Considerations are explained , to the Health and Comfort Considerations where Thermal Comfort , Visual Comfort, Acoustic Comfort, Indoor Air Quality, Daylight Access and Indoor Environmental Quality are explained , to the Site Considerations and Equipment where Site Selection and Land Use, Infrastructure Quality, Universal Accessibility and Barrier-Free Design and Facility Quality are listed , to the Practitioner Interactions where Public Participation , Interaction with Stakeholders and Social Interaction and Cohesion taken place to the Architectural Factors where Traditional Architectural Considerations , Functional and

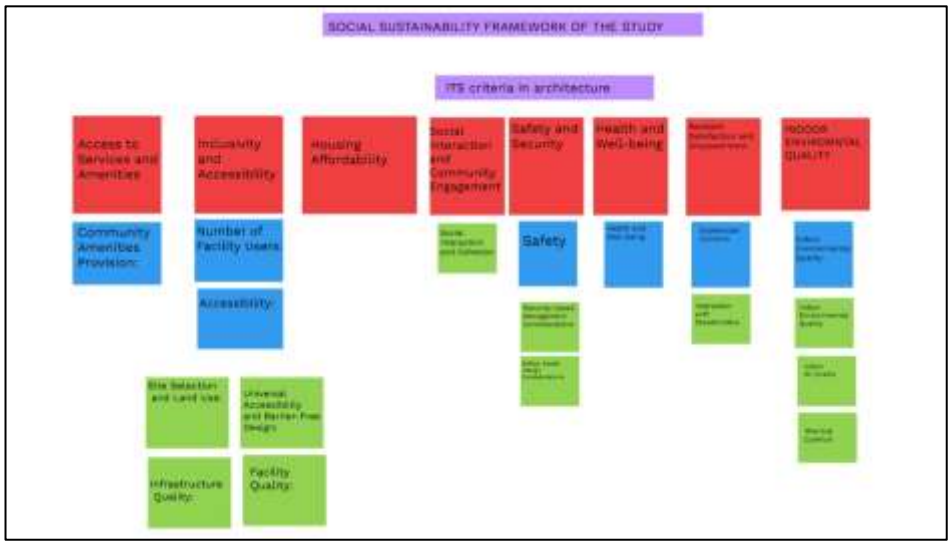


Figure 2.1: Social Sustainability Criteria Used for the Assessment of the Study by the Author.

Flexible Architectural Design and Functional and Flexible Architectural Design are explained.

Social sustainability criteria explanation that used in the assessment framework of the study is listed and explained as:

i. Housing affordability

Affordability defined as the Percentage of income spent on housing costs (including rent, mortgage, and utilities) should not exceed a reasonable threshold (e.g., 30%) (Lami & Mecca, 2021). As affordable housing is critical to the social property (throughout all individuals), and Secure, living arrangements for a variety of monetary parties. (Lami and Mecca ,2021) provide a powerful argument for the need of more housing designed to be affordable while also avoiding economic segregation that dampens community vibrancy.

ii. Social interaction and community engagement

An environment that encourages its residents to connect with one another builds a sense of community and promotes social interaction. (Lami and Mecca ,2021) argue that public space, parks and common spaces is very important in integrating indigenous into a social network or create the feeling of home.

Public spaces: Availability and quality of communal spaces (parks, playgrounds, plazas) that promote social interaction (Lami & Mecca, 2021).

Participation in decision-making: Level of community involvement in housing development, planning, and governance processes (Lami & Mecca, 2021). where in addition to that (Fatourehchi & Zarghami, 2020) Addresses the creation of spaces that promote community engagement and social interaction among residents. The aim is to foster a sense of belonging and social unity within the residential building.

iii. Safety and security

Society without safety and security results in an unsustainability society. (Fatourehchi & Zarghami, 2020) explain this criterion in two different dimensions where Safety-based Design Considerations involves designing buildings with adequate safety features, such as safe access paths, escape routes, and emergency facilities like fire exits and electrical safety

systems. Architectural features that enhance safety are also critical, including building elevation, proximity to fire stations, and the likelihood of hazards in the area and Security-based Management Considerations addresses the management of security features such as monitoring systems, building conditions, and the implementation of proper maintenance and emergency preparedness measures. It also includes protective systems like natural access control to enhance residents' security. In addition (Ahmad & Thaheem, 2017) explained it as the level of compliance with safety standards and the overall safety of the neighborhood. Factors like building safety design and safety indices (like the neighborhood's crime rate) are included. Where in addition (Lami & Mecca, 2021) explained this creation as Crime rates where the Evaluation of local crime rates and perceptions of safety in and around housing areas and design for safety where Implementation of Crime Prevention Through Environmental Design (CPTED) principles, including well-lit areas, clear sightlines, and secure entrances (Lami & Mecca, 2021).

iv. Health and well-being

Health and well-being are basic to the social sustainability of housing. (Ahmad and Thaheem ,2017) noted that this criterion assesses how the building affects occupants' health, including pollution levels in the area and the availability of healthcare facilities nearby. Where (Lami & Mecca, 2021) explained it by the access to green spaces, Percentage of green or open space per person and proximity to parks, gardens, or natural areas that support physical and mental health as well as the Noise levels where Control of noise pollution through proper insulation and thoughtful urban design.

v. Indoor environmental quality

Indoor environmental quality includes the air, thermal comfort or temperature and illumination within residential space. (Lami & Mecca, 2021) explained this criterion as Indoor air quality where Adequate ventilation and use of non-toxic materials to ensure healthy living environments, where (Ahmad & Thaheem, 2017) evaluates factors like air quality, ventilation, and daylight access, all of which are essential for the health and comfort of the residents. Metrics such as the number of air changes per hour and the amount of natural light available are measured, and (Fatourehchi & Zarghami, 2020) Ensures the ventilation system maintains high-quality indoor air by minimizing dust, pollutants, and odors from

sources like cooking or smoking. Good indoor air quality is vital for the health and comfort of building occupants as well as Encompasses the overall quality of the indoor environment, ensuring that harmful conditions such as poor waste management, pest infestations, or inadequate ventilation are avoided.

vi. Resident Satisfaction and Empowerment

This criterion makes measures of social sustainability in terms of resident satisfaction and empowerment vital. (Lami & Mecca, 2021) explained This criterion as resident feedback where Surveys and evaluations measuring residents' satisfaction with their living conditions, amenities, and social environment as well as Participation in housing management: Opportunities for residents to engage in decisions about the management and maintenance of their housing. Where (Ahmad & Thaheem, 2017) explained it as Stakeholder Opinions, For subjective sub-indicators, the framework collects feedback from different stakeholders (residents, design consultants, experts) to assess usability, functionality, and aesthetic appeal, where (Fatourehchi & Zarghami, 2020) Encourages the involvement of residents in the decision-making process related to building design and construction. This ensures that their needs and preferences are reflected in the final project, leading to higher satisfaction and a sense of ownership.

vii. Access to services and amenities and inclusivity

This criterion supports the importance of ensuring that citizens have proper access on services and every day's needs such as health care, education and leisure. (Lami & Mecca, 2021) explained it as Universal design, Incorporation of features that ensure accessibility for people with disabilities, including ramps, elevators, wide doorways, and accessible bathrooms **,** Diversity in housing types where Variety of housing types and sizes that cater to different demographic groups, including families, seniors, single individuals, and people with special needs, Proximity to essential services where distance to healthcare, schools, public transportation, shops, and recreational areas should be within a walkable range and Public transportation access to ensure the Availability and frequency of public transport options that connect residents to employment centers, schools, and essential services, where (Ahmad & Thaheem, 2017) explained it as how accessible the building is to essential services like hospitals, shops, and the city center, along with the accessibility for disabled

individuals as well as the measures the satisfaction of building users with available amenities such as community centers, parks, and other services, and (Fatourehchi & Zarghami, 2020) explained it as the universal Accessibility and Barrier-Free Design to Ensures that the building is accessible to all individuals, including those with disabilities, by addressing potential hazards and providing features like ramps, handrails, and non-slip flooring as well as Addresses the quality and availability of community amenities such as parks, recreational areas, and shopping centers, contributing to residents' overall satisfaction.

2.4 15-MINUTES WALK CITY CONCEPT

Professor Carlos Moreno of the Faculty of Business Administration at Sorbonne University in Paris shares the new vision for urban planning and spatial dynamics to re-imagine a social inclusive context based all around an “15 Minute City Model” and where Access to services and amenities and inclusivity have been explained in the previous section is directly connected to this section since the concept outlines the architecture of a commendable urban life providing residents with jobs of decent quality, easy and prof. Carlos Moreno meant to create self-sustaining neighborhoods that provide residents with access to all of life’s necessities like jobs, education, healthcare, food, recreation, and parks within a 15–minute walk or bike ride from home where Local living reduced long-distance commuting, healthier and more sustainable and resilient urban environments are hallmarks of this paradigm. Based on walkability and proximity, the idea promotes a chrono-centric lifestyle that improves life quality by reducing commute and increasing the accessibility of the immediate vicinity to the inhabitant., this strategy fosters dense, multimodal urban areas, reducing dependence on cars, lowering pollution, and improving community cohesion by enabling easier local service access (Moreno,2024).

And this flexibility gives the 15-minute city its ability to cater to all types of urban, even rural settings, creating a solution that is universally accessible, whilst still tailored to the specific needs of each individual locale (Moreno,2024). Due to its flexibility the study used its principles first to understand the district potentials and challenges as well as to use its flexibility for recommended conceptual proposal for the neighborhood.

The model of ecological stewardship, social solidarity, and positive citizen engagement has already been working in cities like Busan, South Korea. Busan's "Happy Proximity" where

it is designed for sustainable, resilient and livable urban environment (Moreno,2024). and the study explain the city 2030 vision where it also built up on the same parameter of building a An Ambitious Nation, A Vibrant Community and A Thriving Economy where it can be enhanced while aligning the model with the housing development.

a.characteristics of the 15-Minute City

The key characteristics of the 15-minute city, consist of four essential elements that are necessary for the actualization and functioning of a 15-minute city:

proximity, density, mixed-use, and ubiquity, Together, these features create a neighborhood structure that encourages movement over short distances, social interaction, and functional mixing in a small geographic area. While proximity emphasizes access to basic amenities, well-regulated density promotes a critical mass of people and diversions without causing crowding. The mixed-use development allows people to live, work and play in a close-knit community by bringing together industrial, commercial and recreational sectors of the environment. Its ubiquity ensures that these benefits are distributed throughout the city for everyone, making it universally available to all residents (Moreno,2024).

i. Proximity

Keeping essential services and facilities close to residents so there is less travel time and more time for socializing. This promotes walking or biking to access the goods or services we need to fulfill our everyday needs, improving lifestyle and reducing the dependence on cars **(**Moreno,2024**)**.

ii. Density

Using human-scaled geographic population density to energize local communities and optimize resource distribution across urban space The right density for a local economy provides enough foot traffic for businesses to thrive and supports active transportation — walking, cycling, etc.) — in all its forms. However, such density needs to be carefully managed to prevent the disease of overcrowding and ensure that infrastructure can satisfy the needs of the population **(**Moreno,2024**)**.

iii. Mixed-Use

Integrating different functions (such as residential, commercial, and recreational) within one domain. This healthy mix creates community, allowing people to live, work, and play all in one area without the long commute.) This approach strengthens social capital and builds community economic resilience **(**Moreno,2024).

iv. Ubiquity

Providing equal opportunities to reap these benefits across all parts of the city and ensuring every citizen, no matter where they live, can access the services they need within a 15-minute walk Such equitable distribution avoids both social exclusions making the urban environment inclusive whereby services are available widely and not just in certain areas ,these characteristics work together to create an urban environment that is sustainable, livable, and equitable, prioritizing factors of life, ecological impact, and equity**(**Carlos Moreno.2024).

This idea has since been embraced or adapted by cities like Paris, Milan and Melbourne, and as such has been entrenched as one of the important frameworks for future sustainable urban design **(**Moreno,2024).

a. Objective of the concept

This section outlines the main goal and objectives of the concept of a 15-minute city where it is built up as an integrated urban project that meets urban population environmentally, socially and culturally in a complementary manner, divided into two parts starts with the Principal Objective where it explained the general goal of the concept and the Primary Objectives where it highlights and explains the objectives in detail and its relation to the social and cultural sustainability**.**

b. Principal Objective

It is a principle that calls for less reliance on the use of private vehicles, more use of active transportation modes like walking and cycling and improved public transit service contributing to lower pollution levels, lower greenhouse gas emissions and reduced traffic

congestion in cities and to build cities that meet current needs while being ready for future challenges.

c. Primary Objectives

The 15-minute city promotes a shift in urban livability that seeks to change the way people live, work, shop and play by moving away from complete zoning to a mixed-use, multifunctional urban environment **(**Moreno,2024). This aim is related to the quality of life for its inhabitants by enabling them to fulfill needs throughout their daily lives close to their homes.

i. Social and Environmental Value, it relies on the "triple zero" goals for zero carbon, zero poverty and zero exclusion. Inspired by the Sustainable Development Goals (SDGs), the 15minute city promotes a new approach to value creation that goes beyond the urban realm through ecosystems of ecological, economic and social sustainability **(**Moreno,2024).

ii. Creating Access and Fairness, the 15-minute city fosters inclusive, multifunctional neighborhoods by encouraging closeness and resource allocation. This arrangement aims to reduce social disparities and develop cohesive communities by providing universal access to critical services within a short distance, thus enhancing social and spatial justice as well **(**Moreno,2024).

iii. Fostering Community Participation and Local Pride**,** another aim is to build social networks within communities by creating spaces for engagement, pride, and belonging to the area. The this concept of "topophilia" stresses the importance of the bond that the inhabitants have with their neighborhood; social sustainability happens through the support and solidarity amongst inhabitants **(**Moreno,2024) as shown in (Figure 2.2).

As explained in the criteria of the social sustainability one of its major principles which is explained in all researchers referred in the section of social sustainability is the accessibility which reflect its importance to achieve the sustainability of the housing development and the 15-minitues city is enhance the accessibility by its concept which in the coming chapter will be explained in detail.

In this study Al-Malaz district have been analyzed the urban level based on the explained dimensions of 15-miniutes walk city to evaluate the present urban fabric by using the measures of accessibility tool to fully understand the ability of the site to be developed through its opportunities and issues.

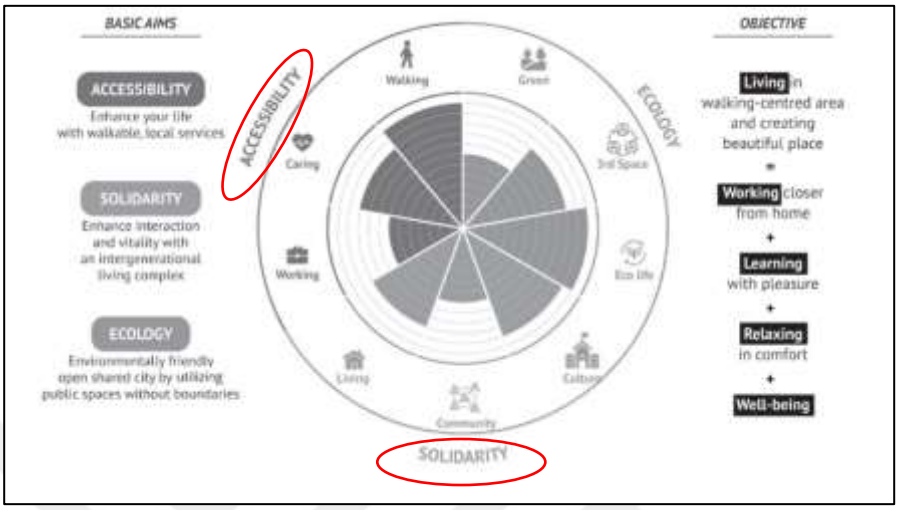


Figure 2.2: The Objective of the 15-Miniutes City Concept

Source: (Moreno,2024) Adopted and Edited by the Author.

2.4.1 The 15-Minute City Model and Its Relation to Social and Cultural Aspects

This concept aims to develop a sense of community as it encourages social interaction in public spaces, Accessible public spaces, venues, and facilities deployed in urban areas provide opportunities for people to participate in cultural practices and experiences together surrounded by built spaces where it have its main two parameter which are built on accessibility and durability and both are directly connected to enhance the social and cultural sustainability where the concept reiterates the importance of a topophilia, or emotional bond with place, which aligns with the goal of the 15-minute city to create spaces that connect with the citizens.

Inclusivity and social cohesion are among the key benefits of the 15-minute city plan mentioned in the previous section where it is the same in the social sustainability goal which enhances the importance of considering the concept in the study. This framework enables both equal access to housing, services and social infrastructure, thus supporting an even urban structure. identification of the gaps permits to recognize which resources already exist and which are missing or need to be developed, and to collaborate in the conceptual proposal

to adjust urban policies and architects to transform the territory in the direction of the sustainable vision and human needs.

2.4.2 Measures of Accessibility

As the Connections and Inclusivity are factors of the main principles to establish a sustainable neighborhood explained in the concept where it Facilitating efficient integration with current infrastructure and encouraging alternative modes of mobility, such walking and cycling, to enhance accessibility and reduce reliance on autos , the study use the measuring technique that have been studied is Masdar city which is in the same region of the case of this study Al-Malaz neighborhood where both have the same harsh weather and geographic features to analyze the issues that the neighborhood has.

Academics characterize accessibility as "the potential for opportunities for interaction". It is additionally characterized as the capacity and possibilities to get desired products, services, activities, or locations. In contrast to mobility, which emphasizes movement, accessibility prioritizes the proximity of products and services to consumers. This includes enhancing access to educational institutions and retail establishments by situating them centrally within neighborhoods and addressing the needs of individuals by minimizing travel distance and duration. Consequently, accessibility measurements facilitate the prediction of the effects of transportation investments and assess their efficacy on residents' everyday behaviors. It offers insights to planners and decision-makers for evaluating the allocation of activities, land use, and transportation infrastructure and services. It is an extensive origin-based accessibility-indexing approach designed to assess the accessibility of common land use destinations, including residential, business, health, and retail areas, by walking or public transit. It is among the initial models that regard public transit as a means of access rather than a service to be utilized. It depends on data regarding land-use destinations, road infrastructure, pedestrian pathways, and public transportation systems. The primary

Table 2.1: Measure of Proximity to Public Transit and Diverse Land Uses Within the City Source: (Maghelal et al., 2022).

Layer	High 4	Medium 3	Low 2	Poor 1	Very poor 0
Walking to transit (in meters)	0–300	301–400	401–800	801–1200	> 1201
Total time to public transit (in minutes)	0–6	6.1–13	13.1–25	25.1–38	>38.1

objective of this model is to facilitate the assessment of accessibility to certain locations during urban planning and decision-making processes. The technique for this is explained as a grid measuring 400 m by 400 m was physically overlaid over the city area in as a unit of accessibility, according to established guidelines, a 5-minute walk (about 400 m) is deemed an acceptable distance and duration for accessing public transit, assuming a walking speed of 5 km/h or around 80 m/min. Due to the hot desert climate in the use, most research utilize this metric as an appropriate walking distance for their analyses. Each cell will receive an accessibility score (Table 2.1) determined by its proximity to public transit and diverse land uses within the city. The scores varied from 0 (indicating very low accessibility) to 4 (indicating good accessibility) for each form of transportation (Maghelal et al., 2022).

2.5 THE CONCEPT OF CULTURAL SUSTAINABILITY

a.Cultural Sustainability in Housing Development

cultural sustainability in the context of housing focuses on the preservation of cultural heritage, the integration of local practices, and the fostering of community identity and social cohesion. This section offers the framework for evaluating the cultural sustainability of residential projects in Riyadh, particularly within the Al-Malaz region referencing researches by (Sagnia & International Network for Cultural Diversity ,2004), (Wu, Fan, & Chen ,2016), (Memmott & Keys, 2015) where it built for cultural sustainability , in addition (Lami & Mecca, 2021), (Ahmad & Thaheem ,2017), and (Fatourehchi & Zarghami ,2020) mentioned the cultural criteria in the social sustainability concept, however it is integrated to the framework of the cultural sustainability in this study, Where it is specific for assessment purposes while housing development is a concern in (Figure 2.3)shown the relation between the research and the built up framework where it is explained in this section in detail as well.

2.5.1 THE CRITERIA OF CULTURAL SUSTAINABILITY

This section of the study aim to unravel the cultural sustainability criteria, and each creation used in the assessment framework of the study for the cultural sustainability explained in details, (Sagnia & International Network for Cultural Diversity, 2004) categorized the criteria of a cultural sustainability as Cultural identity and heritage, Traditional knowledge and craftsmanship, Cultural Appropriateness and Functionality, Cultural Spaces and

Community Interaction, Integration of Local Arts and Symbols, Resident Participation in Cultural Design, Cultural diversity and inclusivity, Cultural Innovation and Adaptability and Cultural Sustainability Education and Awareness. Where (Memmott, P., & Keys, C. ,2015) categorized the criteria as Cross-Cultural Variation in Authority, Culturally Specific Spatial Behaviors, Behavior Settings, Meanings in Buildings and Environments, Cultural Properties of Places, Dynamics of Architectural Traditions, Cultural Constructs of Well-Being, furthermore (Wu, Fan, & Chen ,2016) categorized it as Cultural Diversity, Cultural Heritage, Cultural Identity, Aesthetic Experience, Creative Sensitivity, Spiritual Enrichment and Behavioral Shifts. In other hand (Lami & Mecca, 2021) mentioned the Cultural preservation as one of the criteria of the social sustainability, in addition (Fatourehchi & Zarghami ,2020) explained the cultural sustainability based on the Traditional Architectural Considerations of the social sustainability as well as (Ahmad & Thaheem ,2017) mentioned it as Architectural Considerations, Integration of Cultural Heritage, and Compatibility with Local Heritage. where Figure() shows the main criteria that the study focus on which is built by the common criteria from the different sources , where the conceptual map shown in Figure () is built align with work of (Sagnia & International Network for Cultural Diversity ,2004) where it is explained in the Cayan squares, (Wu, Fan, & Chen ,2016) where it is explained in the orange squares, (Memmott & Keys, 2015) where it is explained in the pink squares as well as the integration of (Lami & Mecca, 2021) where it is explained in the red square,

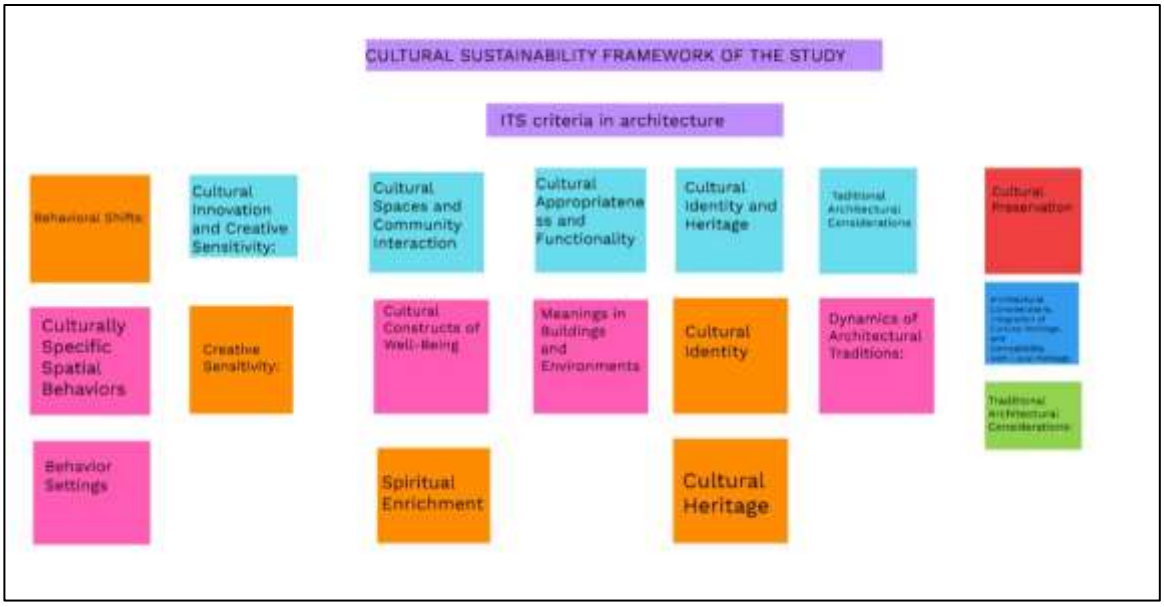


Figure 2.3: Cultural Sustainability Criteria Used for the Assessment of the Study by the Author.

(Ahmad & Thaheem ,2017) explained in the blue square and(Fatourehchi & Zarghami, 2020) explained in the green square in (Figure 2.3).

The cultural sustainability criteria explanation that used in the assessment framework of the study is listed and explained as:

i. Behavioral Shifts and Culturally Specific Spatial Behaviors

Housing designs must account for the impact of cultural norms on spatial behaviors. This criterion observes that cultural habits frequently govern individuals' utilization and navigation of environments. Comprehending these culturally particular behaviors facilitates improved alignment of architectural design with resident requirements, hence promoting a pleasant living environment (Wu, Fan, and Chen ,2016) and (Memmott & Keys, 2015) evaluates how the architectural design influences sustainable behaviors among users. It considers factors such as the building's location, accessibility, and features that promote environmentally friendly practices.

ii. Cultural innovation and creative sensitivity

This criterion balances between maintaining cultural traditions and integrating modern technologies or approaches that enhance sustainability without erasing cultural significance. Evolution of cultural housing: How well housing allows for cultural evolution while maintaining a connection to the past (Sagnia & International Network for Cultural Diversity, 2004) were also (Wu, Fan, and Chen ,2016) explained it as the focus on the building's ability to foster creativity and innovation. It assesses the presence of spaces that encourage artistic expression and community engagement.

iii. Cultural Spaces and Community Interaction

Availability of spaces within the community for cultural activities, festivals, and gatherings, such as plazas, community centers, or temples. Design for community interaction: Incorporation of communal spaces that foster cultural exchange and interaction among residents (Sagnia & International Network for Cultural Diversity, 2004) in addition to (Memmott & Keys, 2015) where mentioned the Integrating cultural constructs of well-being and social design into the architectural process, ensuring that designs support not just physical health but also spiritual, environmental, ideological, political, social, economic, and

mental well-being as well as (Wu, Fan, and Chen ,2016) examines how the design promotes well-being and spiritual fulfillment. It looks at the incorporation of natural elements and spaces for reflection, meditation, or community gatherings.

iv. Cultural Appropriateness and Functionality

Housing design that allows residents to carry out cultural or religious practices (e.g., spaces for prayer, communal areas for family gatherings, or traditional kitchens) as well as the Flexibility of housing designs to cater to the diverse needs of different cultural groups (e.g., privacy, gender-specific spaces) (Sagnia & International Network for Cultural Diversity, 2004) in addition to (Memmott & Keys, 2015) Acknowledging the meanings encoded in buildings and environments, and how these meanings serve as properties of culturally designed architecture .

v. Cultural Identity and Heritage

This criterion assesses how well a building reflects and enhances the unique cultural identity of a community. It looks at the use of local materials, design elements, and artistic expressions that resonate with the community's values and traditions as well as focuses on the preservation and integration of local cultural heritage within architectural designs. It evaluates the extent to which buildings reflect historical contexts, traditional practices, and local architectural styles (Wu, Fan, and Chen ,2016).

vi. Traditional Architectural Considerations

(Sagnia & International Network for Cultural Diversity, 2004) categorized this criterion as the Traditional Knowledge and Craftsmanship integration. Where (Memmott & Keys, 2015) explained it as Understanding the dynamics of architectural traditions and their time properties within varying scales of cultural change processes as well as (Fatourehchi & Zarghami, 2020) explained it as the building’s harmony with its surroundings, especially in historical or culturally significant areas. Expert opinions are considered for whether the building respects and integrates local cultural heritage.

2.6 TRADITIONAL ARCHITECTURE

2.6.1 Features of Desert Traditional Architecture

As the family structure has been changed during time but the traditional way of living is still the same nowadays and to understand the way of living it should start from the dwelling that the family were used to live in, and in Riyadh city back to the history the traditional dwelling that were used is the courtyard home since it is the suitable choose for a desert climate for the first case. Desert traditional architecture, particularly at the housing level, incorporates several distinctive features that are specifically designed to address the unique environmental challenges of arid regions (Mortada, 2016).

2.6.2 Case Study of: Al-Derah

i. Compact urban form

Conventional desert communities typically display a dense configuration as shown in (Figure 2.4) where its structural pattern is clear, with structures in proximity to reduce exposure to intense sunlight and wind. This design minimizes the surface area exposed to environmental factors, aiding in the preservation of colder temperatures (Mortada,2016).

Figure 2.4: Ad-Dera Site Plan for the Residential Part in the North Side of Al-Derah District. Source: (ADA,2004).

ii. Narrow streets and alleys

in the desert traditional district, (Figure2.5 and 2.6) shows the site plan where streets are narrow and solid compact design are reflected, and the streets are typically narrow as (Figure 2.7) shows winding street as shown in (Figure 2.8), which helps to create shaded areas and reduce wind speed. This design also encourages social interaction among residents (Mortada,2016).

Figure 2.5 : Ad-Dirah Solid Analysis Source: (Al-Said, 1992).

Figure 2.6: Ad-Dirah Void Analysis Source: (Al-Said, 1992).

Figure 2.7 : The Visual Street Pattern of the Historical District Source: (Atual, 2023).

Figure 2.8: the Curve Street Design in Ad-Dahira District Source :(Atual, 2023).

iii. Natural materials

Buildings are constructed using locally sourced materials such as mud, stone, and palm wood, which are well-suited to the climate and readily available. This practice not only supports sustainability but also reflects local craftsmanship. Urban buildings often feature decorative elements that reflect cultural identity and social status. These may include intricate stucco work, carved wooden doors, and ornamental window screens (Mortada,2016).

iv. Orientation and Layout

Urban buildings often incorporate courtyards that serve as private outdoor spaces for families. These courtyards provide ventilation, light, and a place for social gatherings while offering privacy from the street (Mortada,2016), as designed as cul-de-sac it contributes to the social connectivity of the residents as (Figure 2.9 and 2.10) shows.

Figure 2.9: Semiprivate Space Between the Neighbors in Ad-Daho District Source: (Atual, 2023).

Figure 2.10: Cul-De-Sac Street in Ad-Dahira, Source: (Atual, 2023).

Buildings are strategically oriented to minimize direct sunlight exposure, with windows and openings as shown in (Figure 2.11) placed to maximize natural ventilation while reducing heat gain. This orientation helps maintain comfortable indoor temperatures (Moustapha,1985).

v. Social Spaces

Urban areas in traditional fabric are organic and pedestrian oriented and designed to include communal spaces such as markets, mosques, and gathering areas that foster social interaction and community cohesion.

These spaces are vital for cultural and social activities (Mortada,2016), (Figure 2.12) shows the social spaces from the public social space which called the market to the semi-public space which came by the design of the dead-end street, to the Baraha which is another gathering space work as a square to the private social space which is the inner courtyard design for the family.

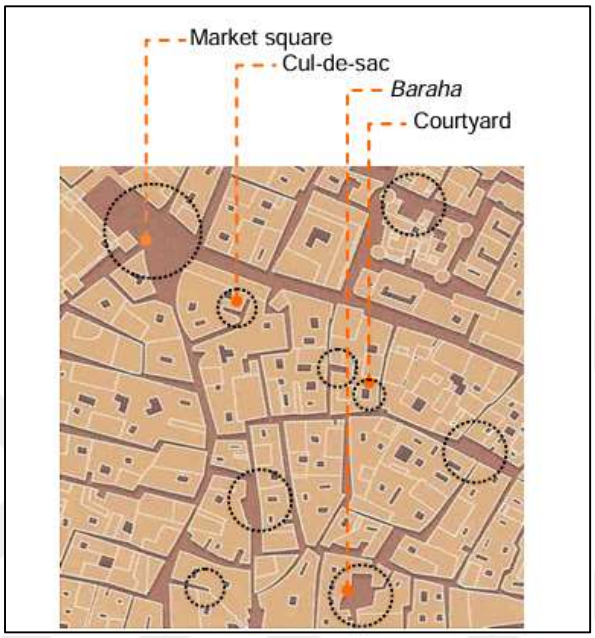


Figure 2.11: Hierarchy of Open Space Within Traditional Neighborhood Source: (Moustapha,1985)**.**

Figure 2.12: Traditional House with its Small Opening to Minimize Direct Sunlight Source: (Atual, 2023).

vi. Adaptability and Flexibility

Urban structures are often designed to be adaptable, allowing for changes in use or expansion as community needs evolve. This flexibility is essential in responding to demographic changes and economic shifts (Mortada,2016), and (Figure 2.13) shows the flexibility of the district to be changed with the social need recently.

Figure 2.13: Visualization of Ad-Daho Development Project Source:(RCRC,2013).

vii. Cultural and Spiritual Significance

Urban architecture often reflects the cultural and spiritual values of the community, with buildings designed to accommodate religious practices and social customs. This connection to culture enhances the sense of identity among residents as (Figure 2.14) shows. These features collectively illustrate how desert traditional architecture at the urban level is intricately designed to respond to the environmental challenges of arid regions while fostering social interaction, cultural identity, and sustainability.

viii. Thick Mud Walls

Houses are constructed with thick walls made of adobe or mud bricks, which provide excellent thermal mass. This helps to keep interiors cool during the day and warm at night (Mortada, 2016) and according to (Bahaman 1998), a courtyard dwelling is a clay structure with strong walls as shown in (Figure 2.15) and one or more rectangular courtyards.

Figure 2.14: Wall Thickness in the Traditional Home in Riyadh Source: (Moustapha,1985).

Figure 2.15: Traditional Home Presents the Culture Identity by Using the Local Material Source: (Moustapha,1985)**.**

ix. Central Courtyards

Many traditional homes feature a central courtyard that serves as a private outdoor space for family activities. This design promotes ventilation and provides shade (Mortada, 2016). (Moustapha,1985) categorizes traditional buildings into four types based on courtyard position, centrally courtyard positioned plan and U-shaped courtyard shown in (Figure 2.16), L-shaped courtyard shown in (Figure 2.17), and divided into two parts for private and public entrances shown in (Figure 2.18).

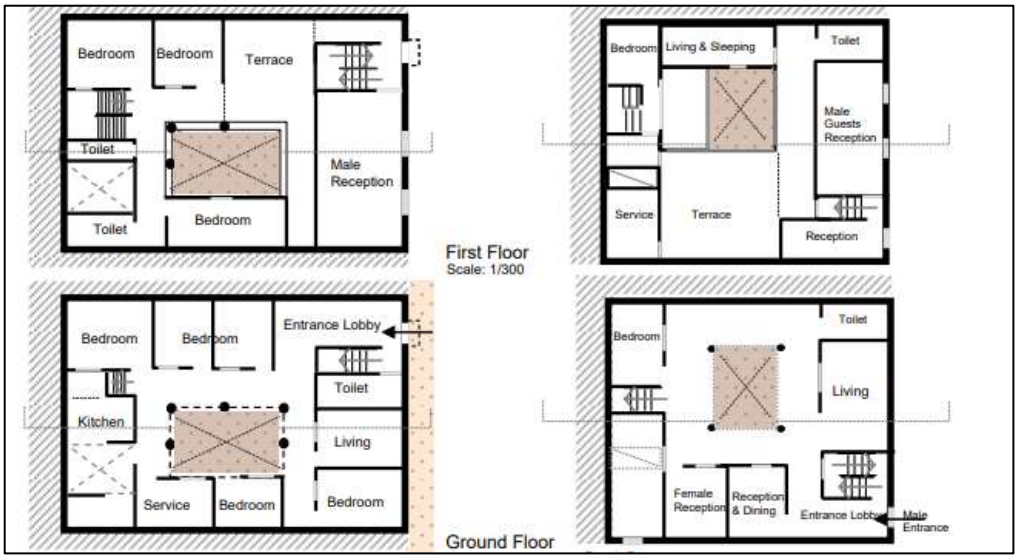


Figure 2.16: Example of U Shape Courtyard Home on the Left Side and Central Courtyard Home Plan on The Right-Side Plan Source: (Moustapha,1985).

x. Inward Orientation

The layout of rooms is often inward facing, focusing on the courtyard and minimizing exposure to the harsh desert environment. This enhances privacy and security (Mortada, 2016). where the larger opening faces the inner courtyard as shown in (figure 2.19).

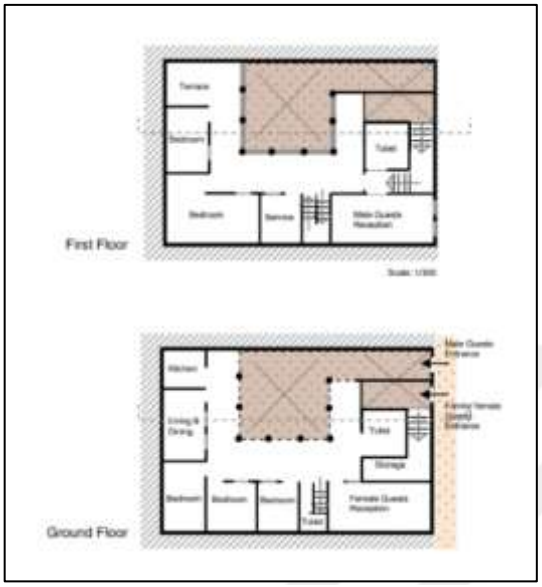


Figure 2.17: Example of L Shape Courtyard Home Plan Source: (Bahammam ,1998).

Figure 2.18: Example of Divided Courtyard Home Plan source: (Moustapha,1985).

xi. Small Windows and Openings

Windows are generally small and strategically placed to reduce heat gain while allowing for natural light and ventilation (Mortada, 2016). The outer walls feature small holes as shown in (Figure 2.20).

Figure 2.19: Inward-Facing, on the Courtyard Source: (Mortada, 2016).

Figure 2.20: Example of Courtyard Home Elevation and Inner Opening Source: (Bahammam ,1998).

xii. Roofing Techniques

Roofs are often constructed using palm trunks, mats, or other local materials that provide insulation and shade. They may also be flat or slightly sloped to manage rainwater (Mortada, 2016).

xiii Natural Ventilation

Architectural features such as high ceilings and ventilation openings facilitate airflow, helping to cool the interior spaces naturally (Mortada, 2016).as shown in (Figure 2.21)

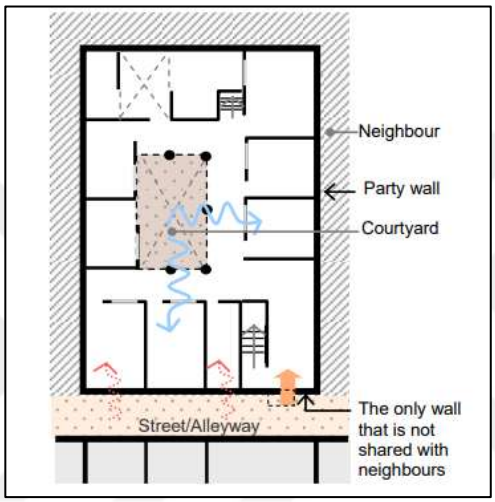


Figure 2.21 : Natural Ventilation and the Thickness of the Walls Source: (Mortada, 2016).

xiv. Use of Local Materials

Construction materials are sourced locally, such as mud, straw, and palm wood, which are well-suited to the environment and reduce transportation costs (Mortada, 2016). As shown in (figure 2.22)

Figure 2.22 : The Mud Uses in the Traditional Home Source (Mortada, 2016).

xv. Crenellated Parapets

Many traditional houses feature crenellated parapets that not only add aesthetic value but also serve practical purposes, such as diverting rainwater away from the walls (Mortada, 2016). As shown in (Figure 2.23)

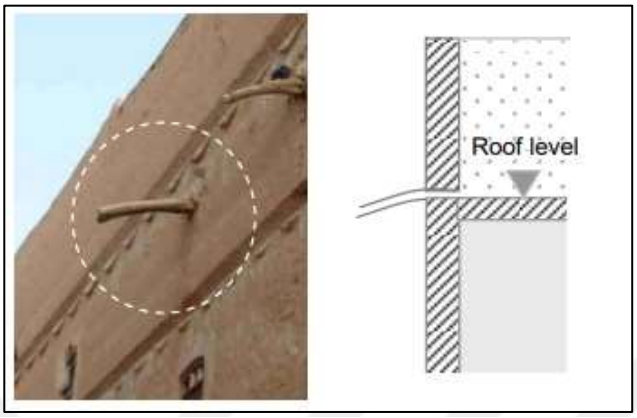


Figure 2.23 : The Wooden Gutter for Discourage Rainwater Source (Mortada, 2016).

xvi. **A**daptability

Traditional homes are often designed to be flexible, allowing for modifications as family needs change over time (Mortada, 2016).

xvii. Cultural Symbolism

Architectural elements often reflect cultural values and social structures, incorporating features that resonate with local traditions (Mortada, 2016).

These features collectively demonstrate how desert traditional architecture is tailored to meet the challenges of arid environments while reflecting the cultural and social values of the communities that inhabit them.

a. Courtyard home types and the development of the house in traditional architecture

Table 2.2 The Development of Traditional Housing and its Types by the Author.

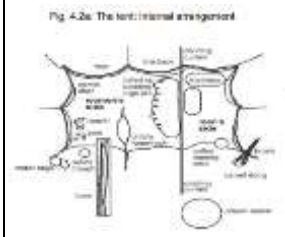
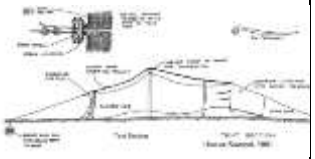
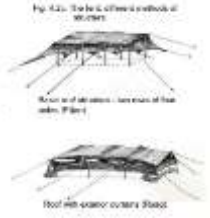
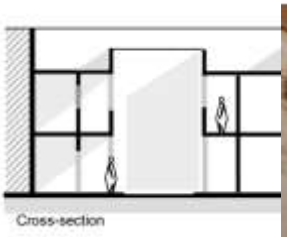
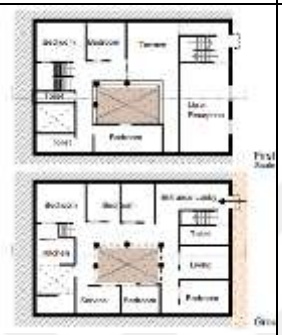
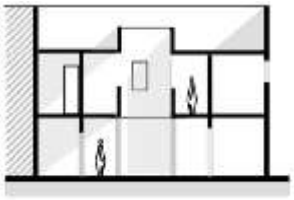
	THE PLANS	THE SECTION	THE ELEVATION
TENT 1930 Source: (Moustapha et al ,1985)			
Centrally positioned courtyard 1940 source: (Moustapha et al ,1985)			
U-shaped courtyard 1940 source:(Moustapha et al ,1985)			

Table 2.2: The Development of the Traditional Housing and its Types "Table Continued".

L-shaped courtyard 1940 source:(Moustapha et al ,1985)			
the courtyard is divided into two parts 1940 source:(Moustapha et al ,1985)			

2.7 THE EMERGE OF MODERNITY IN THE NEW DEVELOPMNT PROJECTS

This section explain the integration of modernity in 2 different projects to compare it with the traditional architecture from sustainability point of view, first project is located in Riyadh city where the study focus the other project is in Dubai where it located in the surrounded region of Riyadh city which reflect the reason of the choice to be similar to the geography and climate metric to have a useful comprehensive .

2.7.1 Modern Housing Suburb Case Study: Al-Khuzam Suburb

This section elucidates the recent project in Riyadh aimed at enhancing the significance of the study by addressing the issues outlined in the study. It encompasses the city's growth to ultimately provide a comprehensive understanding of past, present, and future developments, as explained in population trends and the immigration of the citizen from the center of the city to outskirt, the city growing to the north site with different new projects in the area, and this section explain in detail one of the hugest projects in relation with the aim of the research. Khuzam Suburb, located north of Riyadh where the city is expansion with

many different projects, it is a residential area with high-quality and modern housing units. The area also includes an industrial valley that adheres to environmental standards and adds aesthetic value to the area. The project's location is close to King Khalid International Airport as shown in (Figure 2.24) and Princess Noura bint Abdul Rahman University. The project has 77000 housing unit with an Area of 30,459,614m2 which include 14 housing projects Murcia, Asala al-jawan, Al-Rabla , Al-Muhannadiya , Saraya al-jawan, Al-Narjis view , Nesaj town Riyadh , Shams Al-Dyar, Eskan Riyadh 1, Al-Jawhara buildings , Ishraq living , Diyar Al-Saad , Saraya Al-Narjis and Dar – Khuzam ,And in this section the projects will be taken in consideration are the projects which have the largest area which are Ishraq living project and Murcia project.

Figure 2.24 : Distance of Al-Khuzam Suburb Project to The Airport Source:(Google Earth,2024).

a.Site Level

i. Ishraq Living Project

The project located in Riyadh region within the boundary of Al-Khuzam suburb , with total area of 554,879 m2 and total units number of 2,229 units and the Developer of the project is Al-Tahaluf Real Estate Company where it is a partner with the NHC and the Project status is Fully Booked with price started from 164.887$, the unit lot area is between 195 - 570 m2 and the Floor areas start from 296 - 375 m2 as shown in the site plan in (Figure 2,25) where the Unit models Villa – Townhouse , The Facilities in the project are 1 Grand mosque , 6 Mosques, 6 Schools, 7 Commercial facilities and 7 Gardens.

ii. Murcia Project

The project located in Riyadh region with total area of 2,733,880 m2 as shown in the site plan in(Figure 2.26) and total units number of 5,590 units and the Developer of the project is NHC and the Project status is Fully Booked with price started from 79.780 $, the unit lot area is between 165 - 165 m2 and the Floor areas start from 133 - 240 m2 where the Unit

Figure 2.25 : Ishraq Living Site Plan Source: (Google Earth,2024).

models Villa ,Townhouse and Apartment, The Facilities in the project are 4 Grand mosque , 10 Mosques, 8 Schools, 14 Commercial facilities and 14 Gardens.

Figure 2.26: Site Plan of Murcia Project Source: (Google Earth,2024).

Figure 2.27: The Housing of The Project as Villa Type Where the Modernity of the Project Reflected by The Visualization Source: (NHC,2018).

b.Building level

This section shows all the villa housing floor plans ,Starting the explanation with the climatical comfort point of view will have the same problem based on the setbacks design and the outward courtyard design , The safety has been solved by the gated site solution ,Privacy will again face the same result based on the design , Status as the dwelling all has the same modern external design the status can be only reflected by the square meter of the dwelling ,Identity as the project is all designed on a slandered modern design then the identity of the site will again not reflecting the city's identity or even the users identity , House type again it is a villa type , Threshold the housing has again 2 entrances for the car and the main entrance and finally the internal arrangement is a stander where the ground floor for dining and guest room, the first floor for bedrooms and family living room and the roof floor has an extra room with bathroom usually for the maid and the following Figures explain the examples type of dwelling design in the project.

Figure 2.28: The Right Figure is the Floor Plans of Model C and the Left is the Floor Plans of Model A in Murcia project 4+1 267M2 in Murcia Project Source: (NHC,2018).

Figure 2.29 Left is the Floor Plans of Model E 6+1 340m2 and the Right Floor Plans of Model D in Ishraq Living project 5+1 305m2 Source:(NHC,2018).

2.8 CASE STUDY OF: MASDAR CITY

a.Neighborhood-Level Sustainability

Masdar City exemplifies sustainable urban design at the neighborhood level by integrating various traditional and modern strategies to adapt to its desert environment. The city's compact urban form is key to its sustainability efforts. Inspired by traditional Arab cities, Masdar City's urban design features narrow streets, high-density, low-rise buildings, and natural shading. These design principles not only mitigate the harsh desert climate but also reduce energy demand by promoting walkable neighborhoods and reducing the need for air-conditioning and transportation (Ibrahim, 2016). The key sustainability features include:

i. Compact Urban Form, Masdar City's layout minimizes the use of land and infrastructure, promoting a more energy-efficient urban form. It also includes mixed-use neighborhoods, where residential, commercial, and public spaces are in proximity, reducing the reliance on vehicles (Ibrahim, 2016) as shown in (Figure 2,31).

ii.Public Spaces and Pedestrian Priority, the design includes well-distributed public spaces and plazas, along with wide pedestrian corridors, facilitating community engagement and reducing dependence on cars.

The city's transport system integrates electric vehicles and light rail, further reducing carbon emissions (Ibrahim, 2016) as shown in (Figure 2.32).

Figure 2.30: The Urban Form of Masdar City Source: (Ibrahim, 2016).

Figure 2.31: The Plaza and The Pedestrian Corridors Design of Masdar City Source: (Ibrahim, 2016).

iii. Microclimate Management, the orientation of streets and the design of public spaces are optimized to mitigate local microclimate conditions, such as high temperatures and solar exposure, creating comfortable outdoor spaces with reduced energy needs for cooling (Ibrahim, 2016).

b. Building-Level Sustainability

At the building level, Masdar City incorporates a blend of traditional Arabic design with cutting-edge sustainable technologies. The focus is on reducing energy consumption, optimizing natural resources, and creating adaptable, energy-efficient living spaces (Ibrahim, 2016). The key building-level sustainability features include:

i. High-Density, Low-Rise Living, Buildings in Masdar City are designed to support high-density populations while maintaining a low-rise profile, minimizing the energy needed for cooling and improving the efficiency of water and energy distribution systems (Ibrahim, 2016) as shown in (Figure 2.33).

Figure 2.32 : The Type of The Residential Building as Low-Rise Building and High-Density Source: (Ibrahim, 2016).

ii. Passive Design Elements, traditional features like the mashrabiya (latticed screens) are reinterpreted with modern materials to allow natural light and ventilation while protecting interiors from direct sunlight, significantly reducing cooling demands (Ibrahim, 2016) as shown in (Figure 2.34).

Figure 2.33: The Material of the Façade Which Shade the Balcony and Which Work as Mashrabiye in the Traditional Way of Building Source: (Ibrahim, 2016).

iii.Natural Ventilation and Thermal Mass, many buildings, such as those in the Masdar Institute, employ atrium spaces that utilize thermal mass to regulate temperature and natural ventilation to provide free cooling. This reduces the reliance on mechanical ventilation systems (Ibrahim, 2016) as shown in (Figure 2.35).

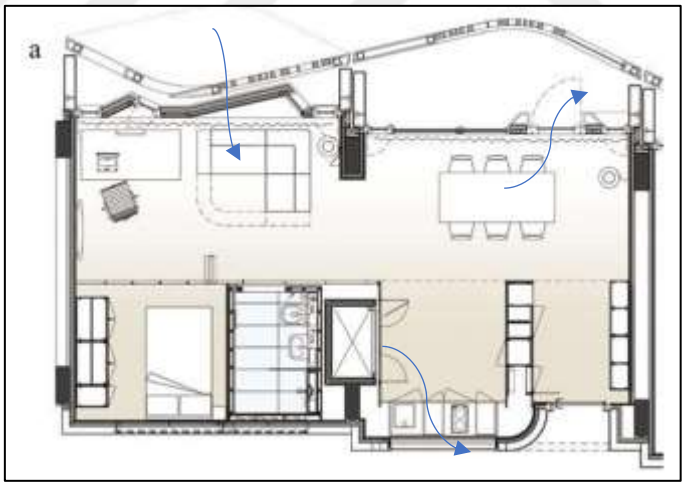


Figure 2.34 : The Interior Design of The Dwelling Which Shows the Ventilation Source: (Ibrahim, 2016) Adopted and Edited by The Author.

iv. Advanced Building Materials, the buildings feature materials such as glass-reinforced concrete and highly insulated walls, which offer high thermal resistance and reduce energy consumption. The integration of photovoltaic panels and other renewable energy sources ensures that energy is generated sustainably (Ibrahim, 2016).

v. Water and Energy Management, the residential buildings are equipped with metering systems that provide feedback on energy and water use, encouraging residents to monitor and reduce their consumption. The efficient use of water is a key focus, with innovations like greywater recycling systems Source: (Ibrahim, 2016). Masdar City's neighborhood and building-level sustainability strategies reflect a commitment to achieving a livable, eco-friendly urban environment that responds to the challenges of desert climates while pushing the boundaries of modern sustainability technologies.

vi. Natural Ventilation, the wind tower supports passive ventilation for buildings by directing cooler air into the structure and expelling warm air. This strategy improves indoor air quality and reduces the demand for mechanical ventilation systems, leading to lower energy consumption (Ibrahim, 2016).

vii. Thermal Regulation, by channeling air through the tower, the system reduces heat buildup in nearby buildings, especially in shared spaces such as lobbies or atriums. This natural air circulation helps maintain comfortable temperatures with minimal energy input, reducing the need for air conditioning (Ibrahim, 2016).

3. THE RESEARCH REGION-RIYADH

3.1 RIYADH'S GENERAL INFORMATION

The city located in the center of the Arabian Peninsula as shown in (Figure 3.1), Ar-Riyaḍ, one of the country's 13 provinces, and is situated in the central portions of both the country and the larger Arabian Peninsula. Few of the world's cities have transformed as rapidly as Riyadh, which grew from a small, fortified desert village in the 17th century into a modern metropolis of several million inhabitants in the 20th century (ADA, 2016). Where this study explains in detail the transformation of the city in the coming sections as well as the features that led to the urbanization of the city starting with geographical expansion of Riyadh city to the natural population increase, to the rural-urban migration that took place in the city lastly to the suburbanization.

Figure 3.1 : Riyadh City location in Arabian Peninsula Source: (Al-said,1992).

a. History of Riyadh City and Urbanization

the present form of the metropolis emerged when Riyadh's transformation has grown from a walled city of less than one square kilometer in 1920 to a massive modern capital spanning 1500 square kilometers (Figure 3,2) (Doxiadis, 1968; GAfS, 1992, 2004, 2010) . It has been

similarities in transformation, particularly during the 1970s. In the 1930s, King Abdulaziz initiated a plan to construct a spacious palace and administrative complex in Riyadh, about 2 kilometers north of the historical city. This marked the commencement of the physical transformation of Riyadh. The Al-Murabba' complex spanned around 16 hectares, which is comparable to an area of 400 by 400 meters, and had an average height of two and a half stories.(Philby 1959). King Abd Al-Aziz built Al-Murabba as a model for Riyadh. The affluent individuals at that time believed that they had the ability to construct and reside in areas located beyond the boundaries of the city, particularly in the northern region. In 1938, Crown Prince Saud constructed a stronghold for his own use at the Al-Murabba' location. In addition, an impressive mansion was built to function as the designated lodging for esteemed visitors of royal status. (Philby 1959).

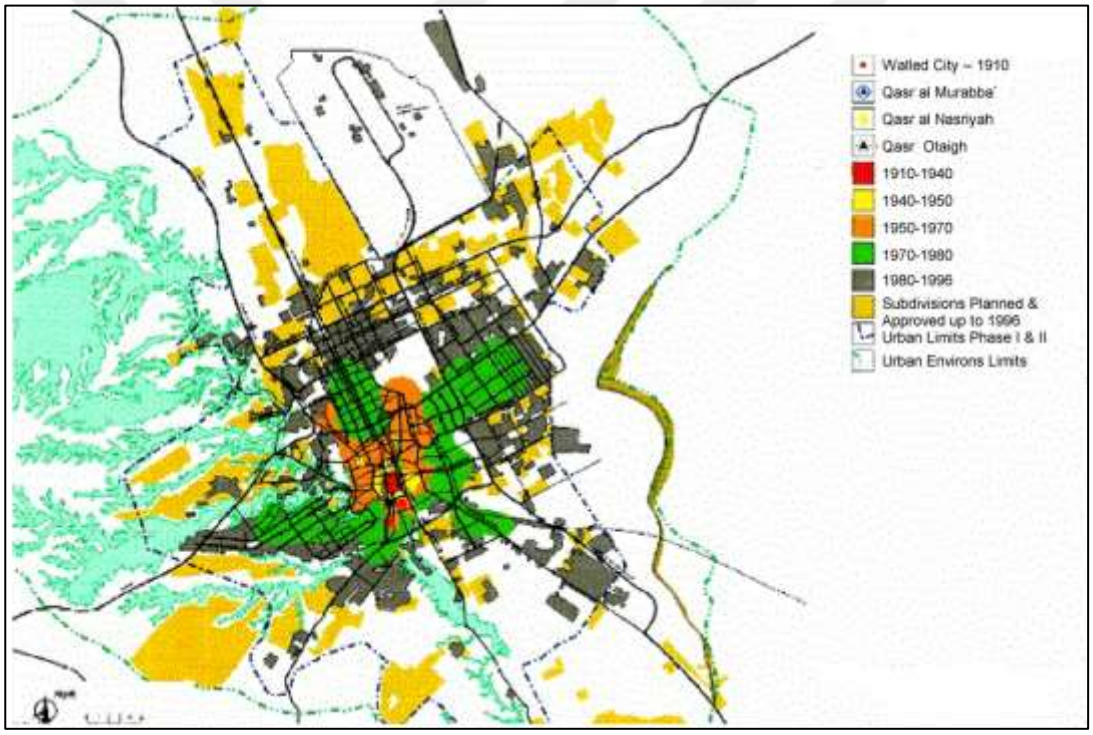


Figure 3.2 : City Physical Expansion Through the History Source: (Philby 1959).

3.1.1 The City Physical Transformation and Urbanization

Upon ascending to the throne in 1953, King Saud enacted three measures that had a direct impact on the geographical expansion and advancement of Riyadh. The person relocated all government institutions from Mecca and began a project to build new administrative entities on the western side of the airport road. In addition, the king oversaw the construction of al-Malaz, a newly established residential area located 4 kilometres northeast of the capital, this

region was purposefully designed to accommodate the government staff who had been moved which is the case of this study. Moreover, he enlarged and renovated his dwelling in Nasiriyyah (Al-Hathloul 2017). Nasiriyyah has grown to 250 hectares, with a grid design of boulevards, gardens, and modern structures as Al-Malaz district. (Figure 3.3) shows the following physical implementation that took a place in forming Riyadh city, 1-Airport, 2-Nasriyah, 3-al-Murabba, 4-Railway station, 5-Old Riyadh, 6-Al-Malaz. The physical transformation made an immediate impact on the inhabitants of Riyadh city.

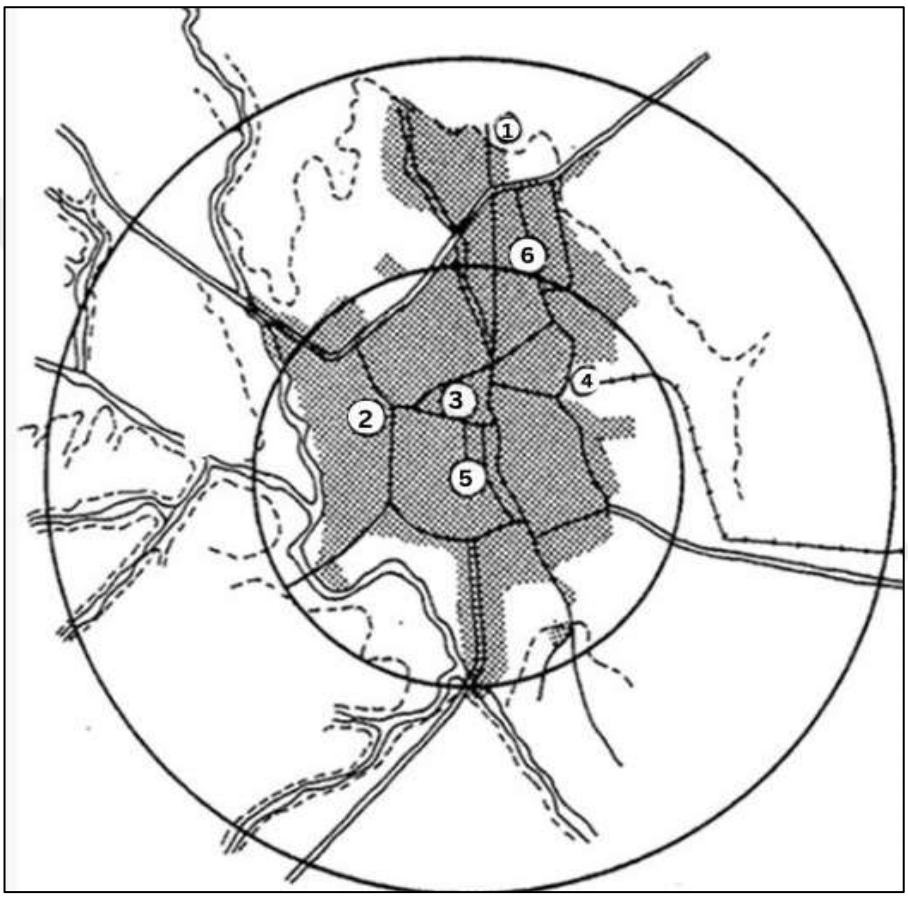


Figure 3.3 : Physical Implementations Forming the City Source: (Al-Hathloul et al, 1975).

3.2 RIYADH'S GEOGRAPHY AND CLIMATE

The duration of the hot season spans 4.3 months, commencing on May 13 and concluding on September 23. Throughout this period, the average daily high temperature exceeds 102°F. In Riyadh, the month of July is characterized by scorching temperatures, with an average maximum of 110°F and minimum of 86°F. The cool season spans a duration of 3.0 months, starting from November 26 and ending on February 26. During this period, the average daily high temperature remains below 76°F. In Riyadh, the month of January is characterized by

the lowest temperatures of the year, with an average minimum of 49°F and maximum of 69°F as explained in (Figure 3.4) (Riyadh Climate,2024).

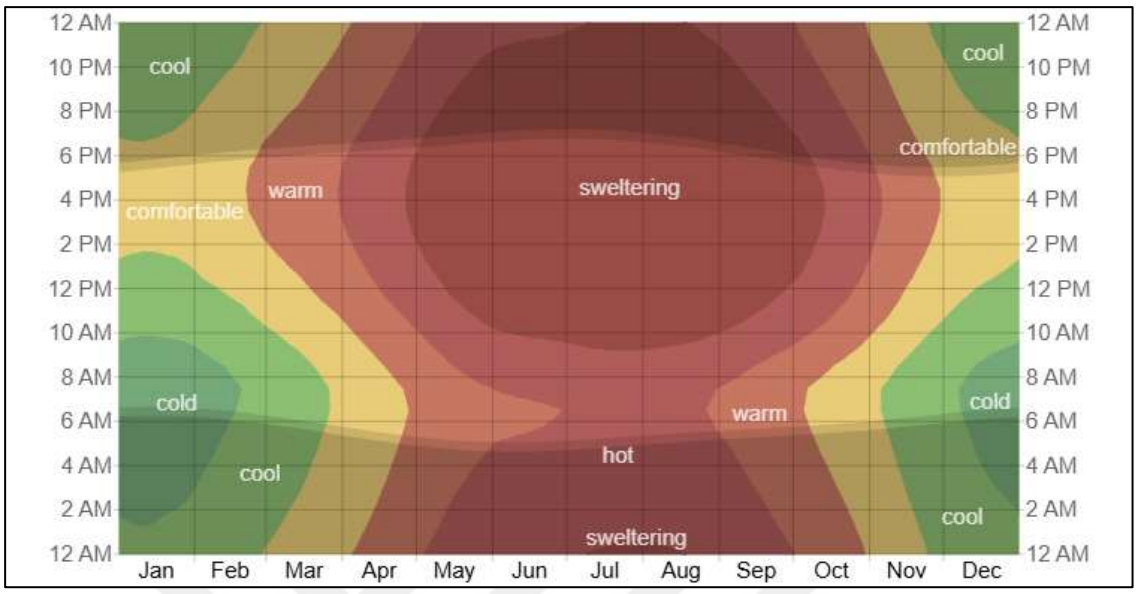


Figure 3.4 : Average Hourly Temp of the City Source: (Riyadh Climate - Weather Spark 2024).

3.2.1 City's Population

The city's population grew from an estimated 14,000 people in 1902 to 666,480 in 1974, then to more than 2.8 million in 1992, more than 4.8 million by 2004 (Doxiadis, 1968; GAfS, 1992, 2004, 2010), 5.25 million by 2010, and more than 6.5 million in 2016 (ADA, 2016), Saudi nationals constitute about two-thirds of the city's population. Among the non-Saudi population, Asians (among whom Indians and Pakistanis predominate) represent about one-half, and Arabs (among whom Egyptians and Yemenis predominate) constitute about two-fifths. Small proportions of Europeans and Americans also reside in the city. On the whole, Riyadh's population is quite young; more than half of the residents are younger than 35 years old, and less than one-fifth are older than 60. Males constitute about half the city's Saudi population but nearly three-fourths of the non-Saudi population, as many expatriate laborers come to work in Riyadh without their families. The average family size is large, with Saudi families averaging more than six members and non-Saudi families averaging approximately five members (Riyadh Population ,2024). And in (Figure 3.5) it explains the coming growth of the population in recent year to 2030.

2024	7,820,551	1.8%	138,121
2025	7,952,861	1.69%	132,310
2026	8,079,944	1.6%	127,083
2027	8,202,462	1.52%	122,518
2028	8,320,907	1.44%	118,445
2029	8,435,667	1.38%	114,760
2030	8,547,001	1.32%	111,334

Figure 3.5 : Population Growth Recently (2024) and in the Following Years, Source (Riyadh Population,2024).

3.2.2 Population Density Trends in the City Centre of Riyadh, Saudi Arabia

Population density in the city core of Riyadh, Saudi Arabia, has been decreasing over time. According to (Al-Gabbani,1992), As people have relocated to the city's outskirts, the population density in Riyadh's central districts has declined. This development has been influenced by factors such as income, home type, vacancy rate, household size, and zoning laws. The main portions, which were previously densely populated, have seen a demographic shift, with immigrant laborers and low-income inhabitants moving in. As a result, core regions have become less appropriate for residential usage, leading to a decrease in population density. variables have caused variances in population density patterns in Riyadh's city Centre such as People are moving from the older city to the periphery. Riyadh's built-up area has expanded substantially, absorbing nearby smaller settlements and encroaching on adjacent ones. Riyadh’s additional housing units have helped to modify population density patterns. The expansion of residential neighborhoods has reduced population density in the city Centre. Income growth and increased car ownership have influenced population dispersion. People with higher salaries and access to private transportation may choose to live on the outskirts rather than in the city Centre, resulting in lower population densities in the core. Zoning restrictions and changes in housing unit sizes can affect population density patterns, it set density limitations and lot sizes, which can affect the number of structures and people per unit area And The age, location, and overall plan design of residential areas can all influence population density patterns. People have relocated from the older city to the outskirts, lessening the importance of central residential areas, The physical and social structures of the city have undergone considerable changes.

indicating that people are migrating from the older city to the outskirts ,The central residential areas have lost importance, while the new outlying suburbs like the project shown in (Figure 3.6) have expanded in population ,Population density shifts have had a substantial impact on the city's physical and social systems ,The decline in core densities and population concentration has resulted in lower population density and a flattening of the density curve and Population density patterns have shifted from extended to nuclear family arrangements, impacted by household size (Al-Qahtani,2022). Changes in population density patterns affect land use and zoning regulations, as well as ventilation and density control per unit area (Al-Gabbani,1992). Industry data found that overall Saudi real estate sales declined by 24% during the time, emphasizing the need for increasing investment in the building of smaller, more affordable housing stock to satisfy the changing needs of Saudi workers, particularly young Saudis. According to the most recent quarterly study from real estate consultancy Knight Frank, typical apartment prices in the Saudi capital have risen by 30% in the last year. This figure is substantially higher, around 40%.in some of the most desirable neighborhoods in northern Riyadh. The cost of villas in the capital have increased by 20% as well. "The disparity in affordability between the expectations of buyers and the substantial rise in housing prices observed in urban areas throughout the kingdom is causing a decline in home sales," stated Faisal Durrani, a partner and the leader of Middle East research at Knight Frank. Durrani proposes that a significant factor impacting the data is a change in the preference for smaller residential units, namely among the younger population in Saudi Arabia. "In a nation where 56 percent of the populace is under the age of 35, this is a notable shift and is expected to substantially boost the housing demand in the upcoming years.

Figure 3.6 : The Growth of The City Towards the North by the New Suburb Projects and the Location of Al-Khuzam Suburb Project Source: (Google Earth ,2024).

4. FIELD STUDY OF AL-MALAZ

4.1 URBAN DEVELOPMENT OF AL-MALAZ

Al-Malaz district explained in the gap project section, and it begins in Riyadh city in general, Al-Malaz housing project was conceived in 1957 as a result of the relocation of the government offices from Makkah to Riyadh.

Al-Malaz layout shows the introduction of the grid pattern street plan which (Figure 4.1) shows, led to new building restrictions between 1953 and 1957 when "Al-Malaz" was built (Al-Hathloul 2017), laws were implemented to limit building height, scale, and setbacks.in terms of physical appearance, legislative development, and transition. Al-Malaz neighborhood in Riyadh, Saudi Arabia illustrates a typical modern Saudi neighborhood where it was designed to house transferred government employees and their families. The Ministry of Finance funded the initiative. The government created Al Malaz, a gridiron-style suburb, in the 1950s to house personnel moved from Jeddah on the Red Sea coast to Riyadh. features a grid of streets, rectangular blocks, and big lots, most of which are square in design as shown in (Figure 4.2).

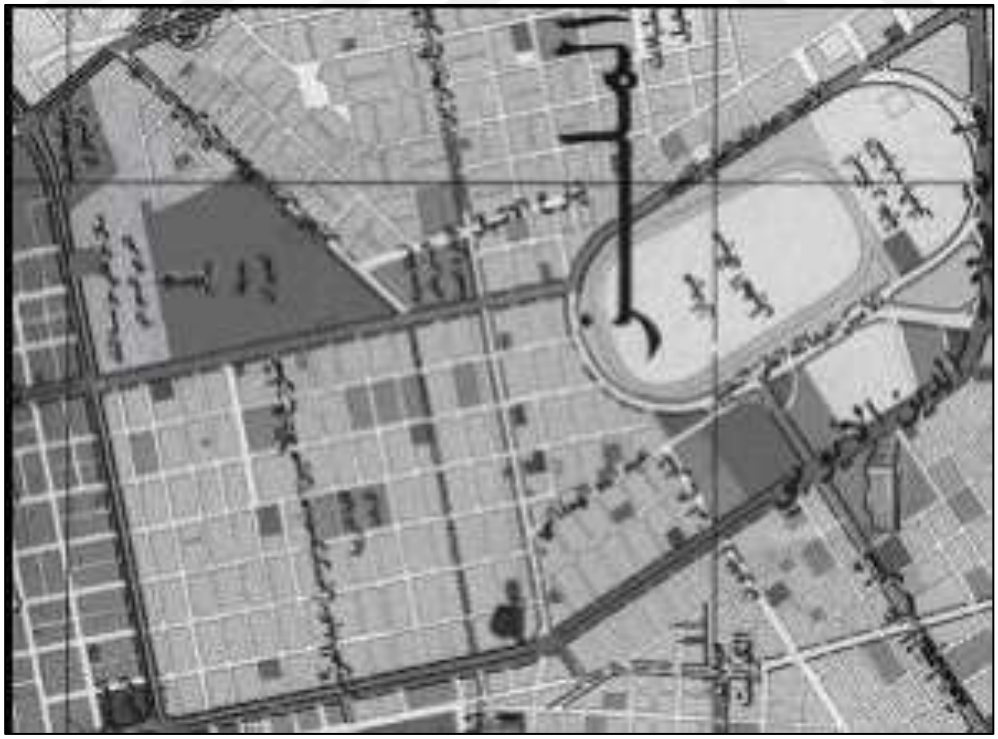


Figure 4.1 : Al-Malaz District Plan Source :(Al-Hathloul, 1975).

Figure 4.2 : Al-Malaz District Site Plan Source: (Al-Hathloul, 1975).

4.2 INCLUSIVITY AND ACCESSIBILITY OF THE NEIGHBORHOOD

In this section the study focusses on the urban sustainability features in the chosen neighborhood based on the sustainable urban principles explained in the second chapter to fully understand the issues and the potential of the district to achieve the sustainability, by analyzing the neighborhood and using the measure of accessibility technique.

This section has been evaluated Al-Malaz case in 2 parts the first part focuses on the neighborhood level by assessing the layout, local facilities, vegetation and accessibility to basic services and the second part focuses on the Site level by assessing the housing development based on the criteria explained in the second chapter.

i. Layout

This part is focus on the pedestrian-friendly streets and environments, as the neighborhood is car oriented as a result of the modernization and grid pattern structure shows in (Figure 4.3) affected in the history of the district the site has not been design for pedestrian-friendly streets in contrast it designed primary for the car as, the primary thoroughfares have a width of 30 meters, but the secondary roads have a width of 20 meters. The width of the narrower streets ranges from 10 to 15 meters covered with asphalt where it enhance the urban heat island according to the cover material of these wide street. Al-Malaz neighbourhood pattern was properly converted into the modern design message However, the Ministry of Interior circular issued in 1960 to all Saudi municipalities confirmed the copying of the Al-Malaz neighborhood layout and design throughout the kingdom through clearly defined

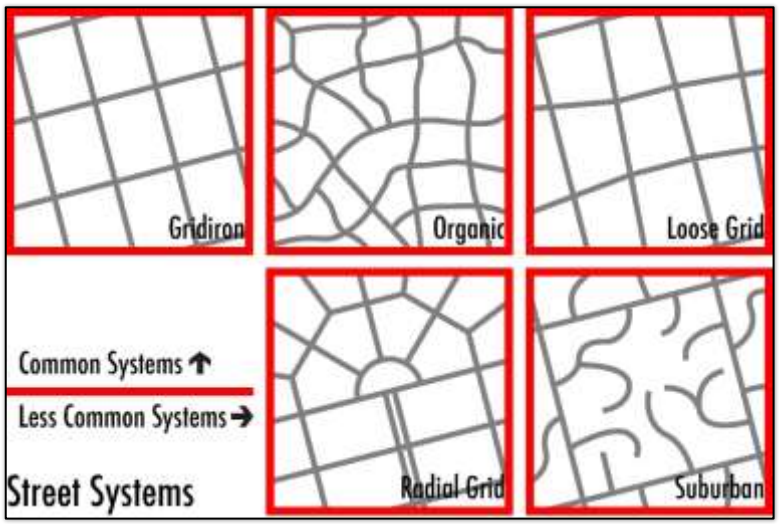


Figure 4.3 : Street Systems Pattern Source: (Al-Hathloul, 1975).

restrictions. This circular marks a watershed moment in the physical pattern and legislation of Saudi Arabia's current built environment (Al-Hathlol,2017).

ii. local facilities

as it Incorporating mixed-use complexes that combine residential, commercial, and recreational spaces to create vibrant, multifunctional neighborhoods for a sustainable neighborhood, Al-Malaz encompassed amenities such as a shared park, a governmental establishment, and a public library. Moreover, it contained the structures that were originally designated as educational establishments for the just established University in 1957. The region encompassed a racetrack, a football field, and a public zoo, however the analysis in (Figure 4.4) shows the mixed land use of the neighborhood where mostly the commercial lands are aligned with the main road and the residential part according to the distance by walk is isolated in most of the spots which reflect the car dependency to reach theses spaces in harsh climate region.

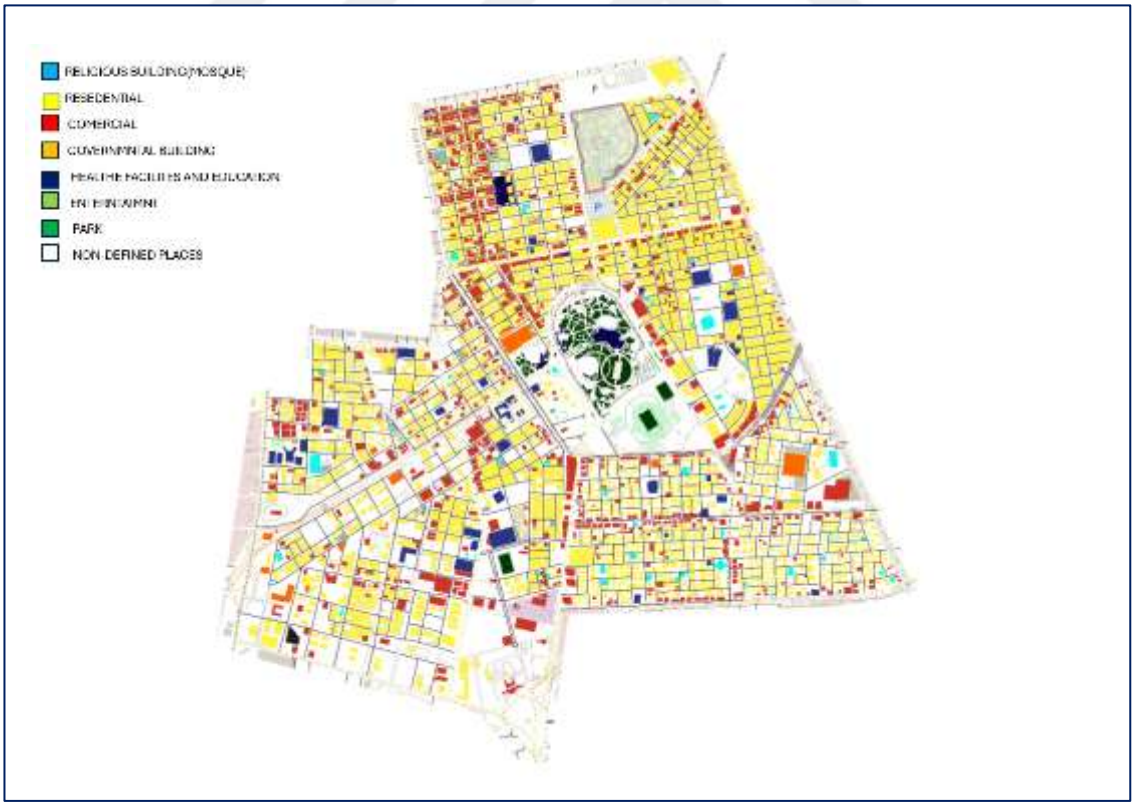


Figure 4.4 : Land Use Analysis of The Neighborhood Drawn by the Author.

iii. Vegetation analysis

The urban context converge with an analysis and incorporation of the environment, social input/output together along with economic variables to shape coherent impactful specific improvements and the study is focus on the social metric it analysis the incorporating the prevailing landscape to the neighborhood by analyzing the green area , and as shown in

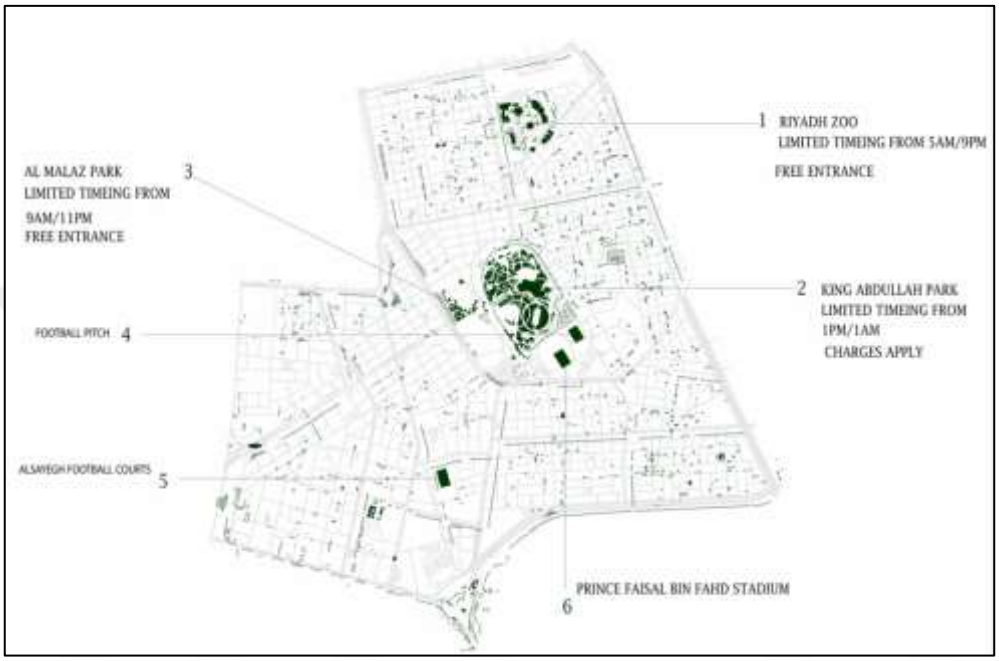


Figure 4.5 : Green Analysis of The Neighborhood by the Author.

(Figure 4.5) Where zone 1, 2 and 3 are park which are gated and closed in work hours as well as zone 2 is not free , also zone 4,5 and 6 are stadium which is not for the families and it need a reservation and charge apply as well .the analysis shows the lack of the landscape comparing to the built environment which reflect a context of a dead site in natural environmental point of view as well as the output of the social life that will be automatically effected by the weakness of the common green spaces as well as the urban heat island impact due to the lack of the vegetation of the site.

iv. Accessibility of basic services and transportation

This part of the section focus on the interconnections and inclusiveness where it ensures efficient integration with existing infrastructure and advocating for alternative modes of transportation, such as walking and cycling, to enhance accessibility and reduce reliance on autos and establishing universally accessible surroundings, regardless of age, mobility, or socioeconomic position, while providing diverse housing options to cultivate diversified

communities, by using the measure Tanique explained in the previous chapter the section explain the accessibility of the district to the services and transportation system to understand its power and weakness .Typically, it is assumed that the average walking pace of 5 km/h or about 80 m/min supports a catchment area with an optimal distance and time to access public transit of around five minutes by foot (about `400 meters). Most of the study uses this metric as a good walking distance to analyze, given that it is very easy for humans to maintain and occupy in an arid desert climate region accordingly, each grid cell received an accessibility score determined by the travel time to the nearest schools to the health facilities accessibility analysis, to the transportations in the district starts with the bus stops, community bus routes and the metro accessibility analysis. From the center of the grid, reflecting many transportation modes and services. In the School Accessibility Analysis of The Neighborhood shown in (Figure 4.6), it reflects that the site has 2 main spots that needs improvement due to its weak accessibilities. For the Health Facilities Accessibility shown in (Figure 4.7), it highlights the same spots that has been highlighted in education weakness accessibility where it also needs improvement Although there were initial plans to develop supporting infrastructure such as schools, shops, and clinics, these facilities were ultimately built by other organizations (Al-Hathlol 2017). In the Bus Stops Accessibility shown in (Figure 4.8), it shows that the site is kindly well accessible for the bus stops in all spots of the neighborhood

In the Community Bus Routes Accessibility shown in (Figure 4.9), it reflects that the center of the neighborhood has an efficient accessibility while the rest of the neighborhood reflected as weak accessible. Lastly for the Metro Accessibility shown in (Figure 4.10), it shows the weakness of the neighborhood to be accessible the nearest metro station by walk. As the site has been designed for car priority it is understood that the site reflected a significant issue in reaching transportation and services by walk

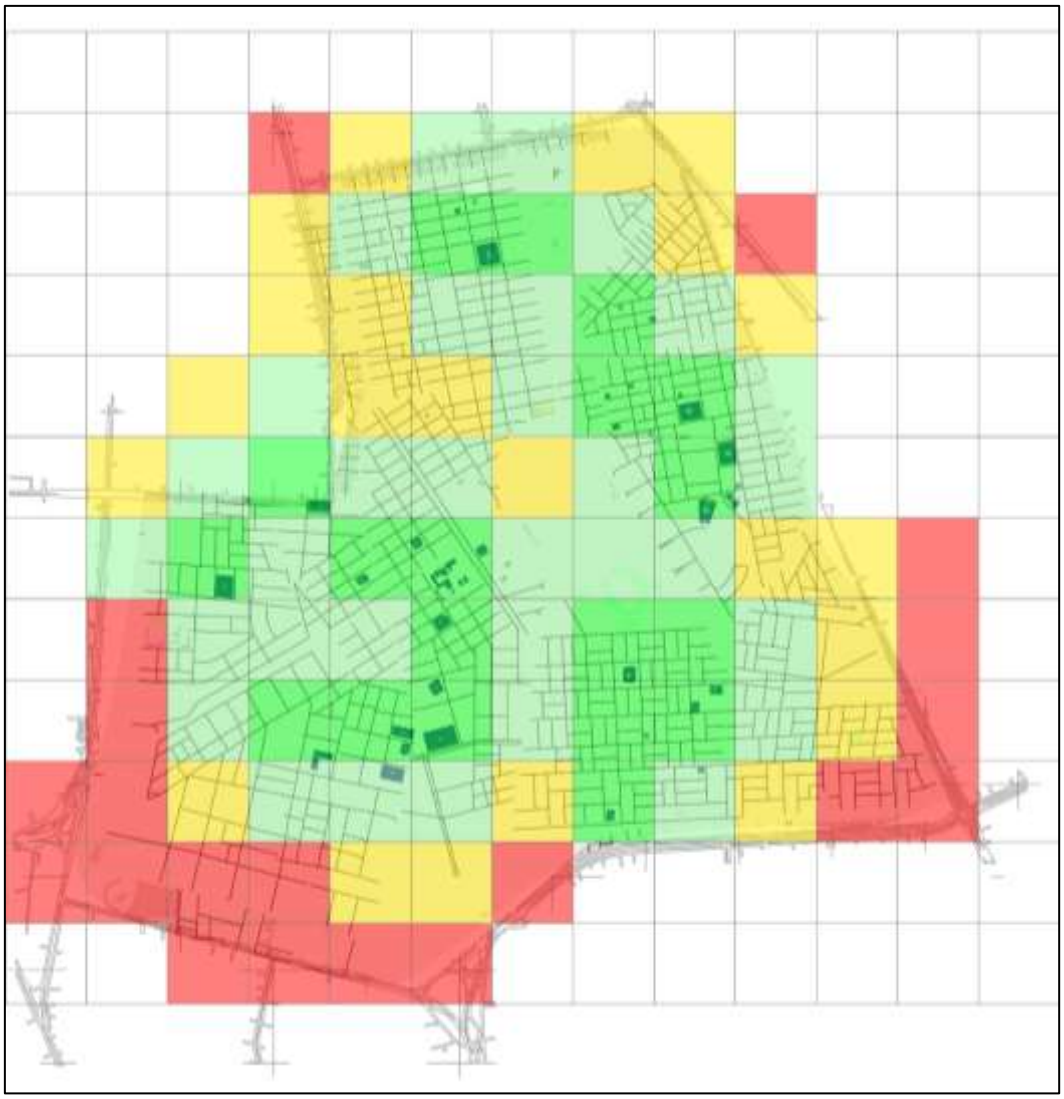


Figure 4.6 : School Accessibility Analysis of the Neighborhood Drawn by the Author.

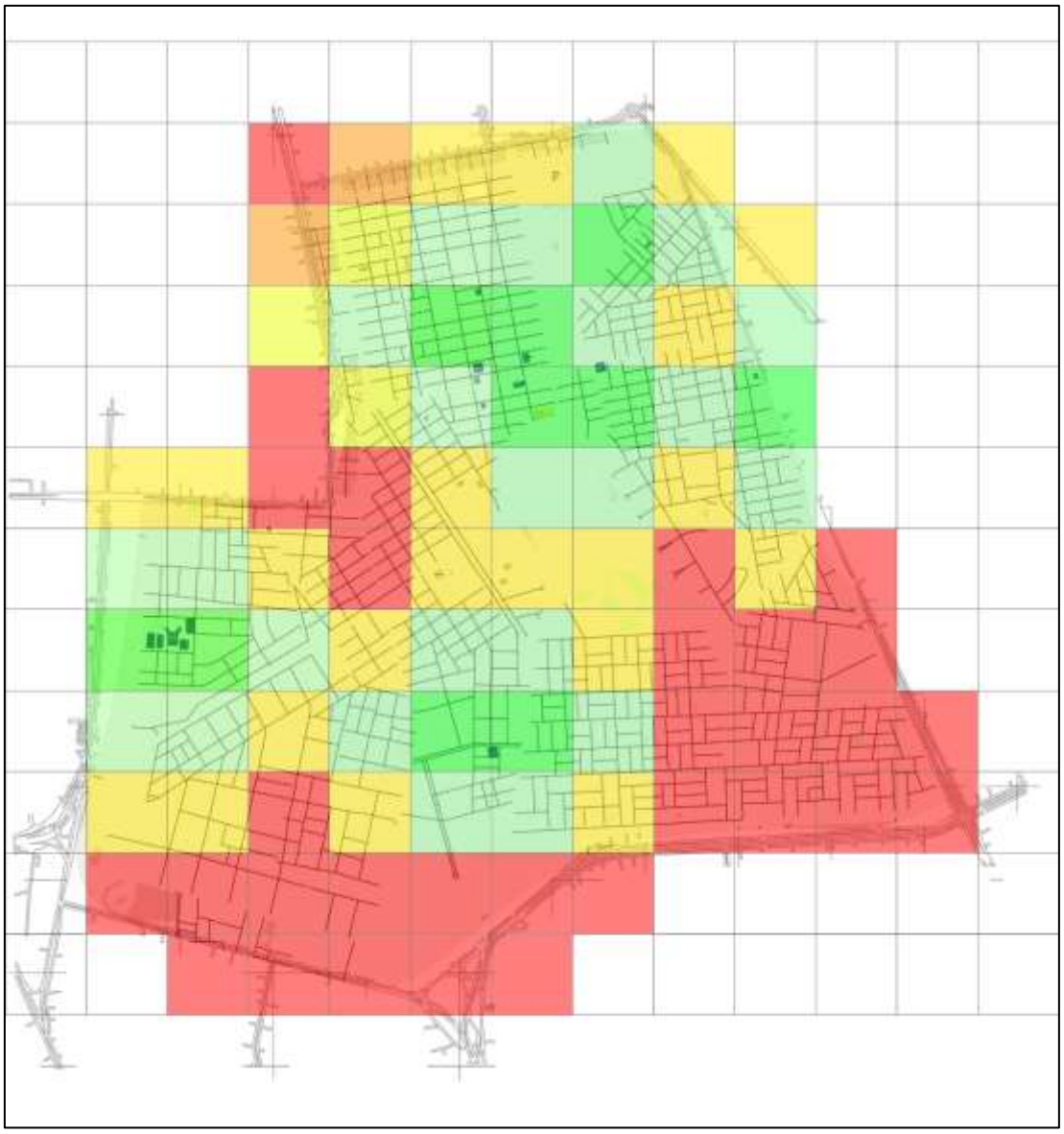


Figure 4.7 : Health Facilities Accessibility Analysis of The Neighborhood Drawn by the Author.

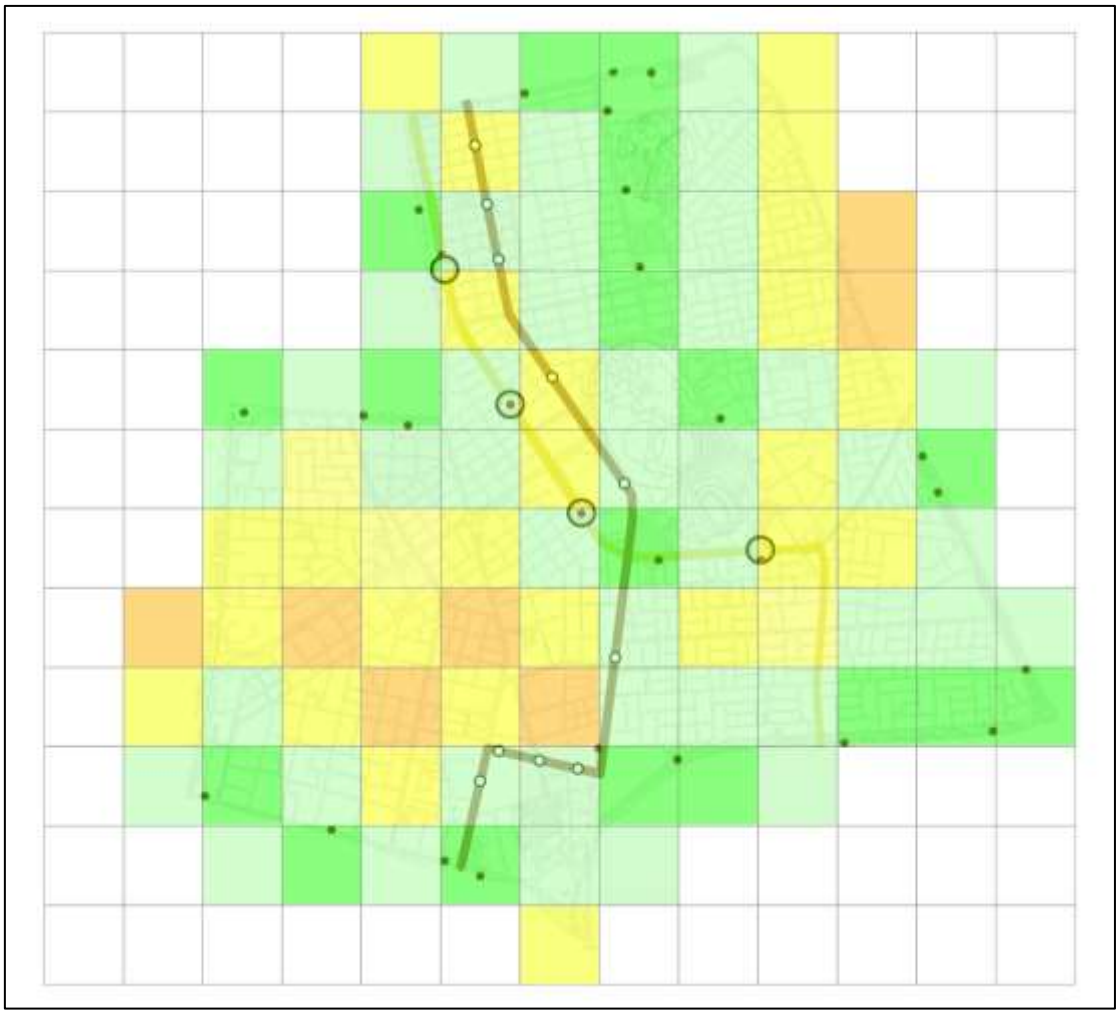


Figure 4.8 : Bus Stops Accessibility Analysis of The Neighborhood Drawn by The Author.

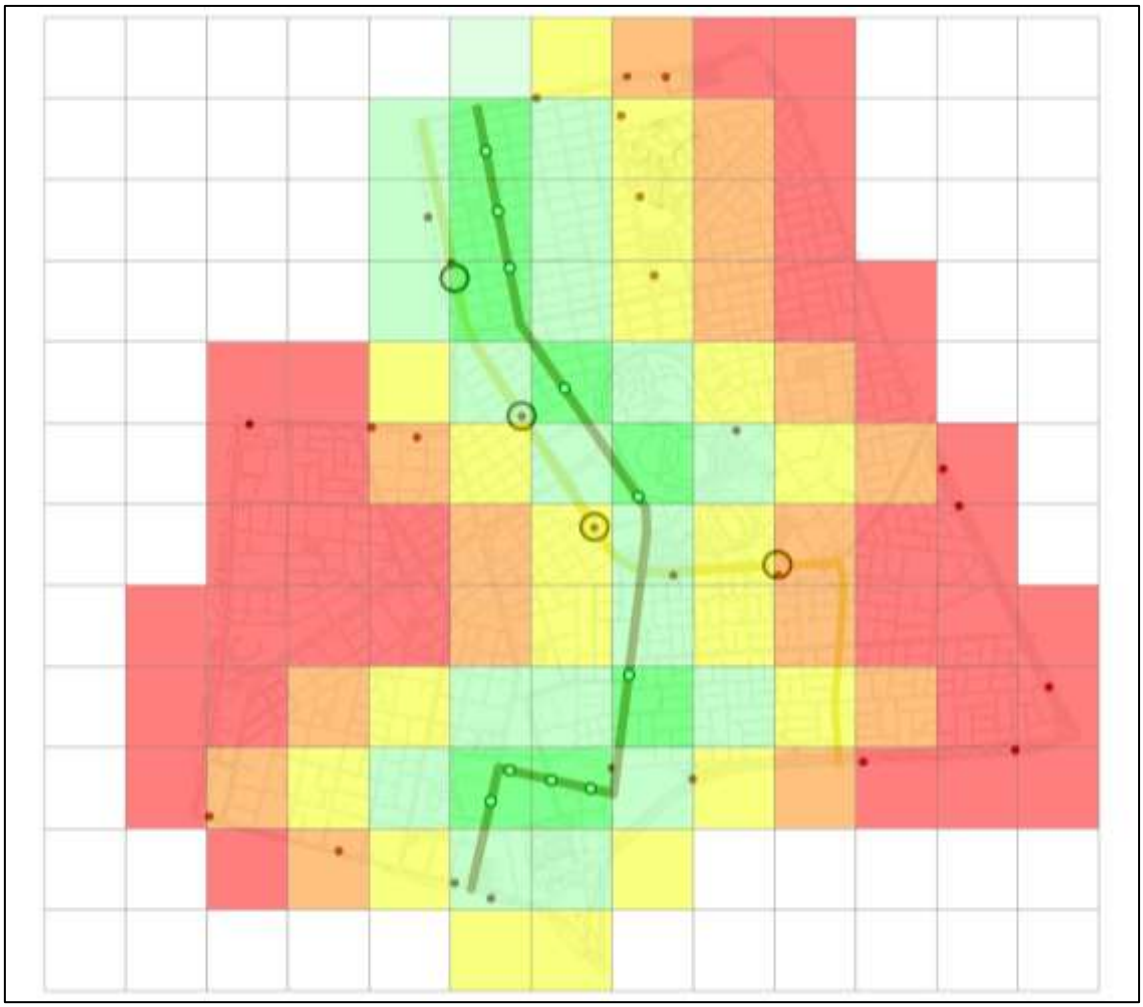


Figure 4.9 : Community Bus Routes Accessibility Analysis of The Neighborhood: Drawn by The Author.

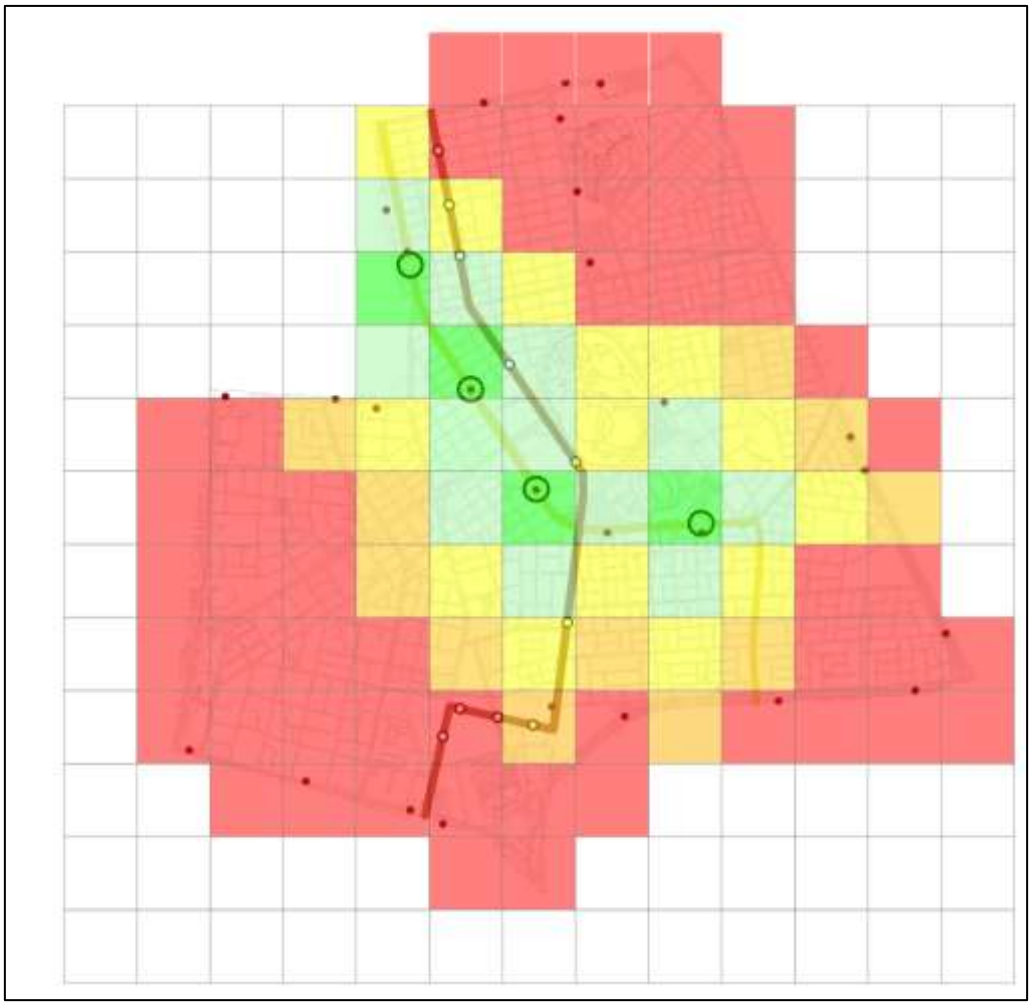


Figure 4.10 : Metro Accessibility Analysis of The Neighborhood: Drawn by the Author.

4.3 AL-MALAZ IN HOUSING CONTEXT (THE CASE)

This section assesses the housing development of the chosen neighborhood in terms of social and cultural aspects by assessing the houses based on the criteria explained in the previous chapter. This section starts with the housing developments through history to understand the context of the site and the transformation of the housing that taken place in its history to relate it to the recent image of the housing in the site.

4.4 HOUSING DEVELOPMENT IN AL-MALAZ

Al-Malaz was well on track to accomplish its aim of 750 villas, 180 apartment units, and support facilities. These efforts offered new concepts about space, street patterns, architectural designs, and materials to the city. Collectively, it were known as New Riyadh,

but Al-Malaz in particular gained this moniker. The villas were constructed and sold to employees through a deferred payment scheme, whereas the apartments were leased on a recurring basis. Al-Malaz neighbourhood pattern was properly converted into the modern design message.(Figures 4.11 , 4.12) explain the developmnt of the project through history and the in (Figure 4.13) shows the recent pattern and hosing type in the neighborhood.

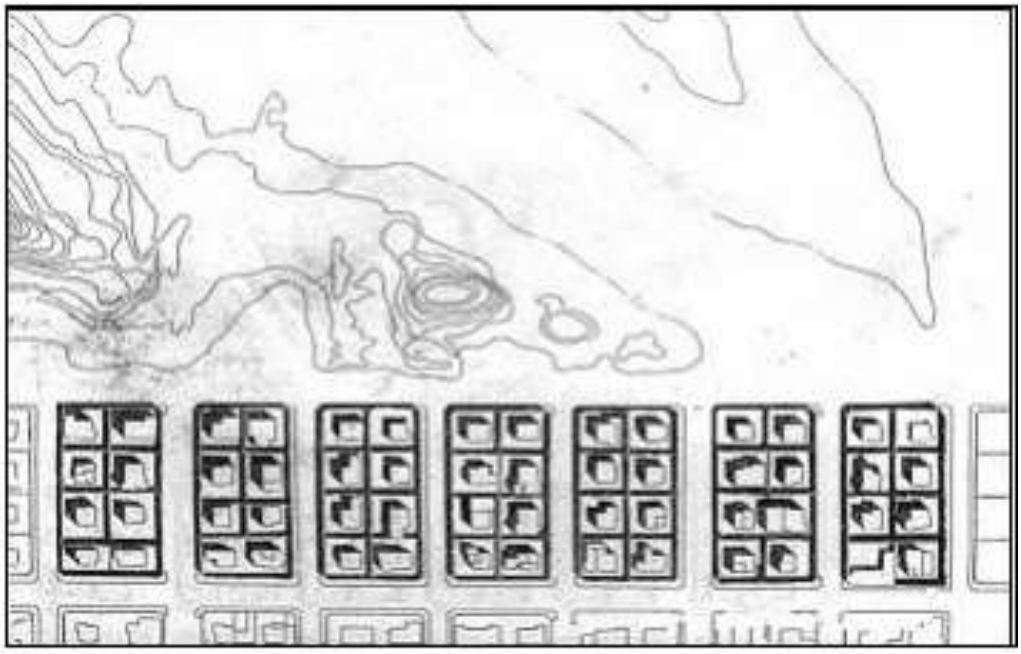


Figure 4.11 : Al-Malaz Neighborhood in 1970's Source: (Al-Said, 1992).

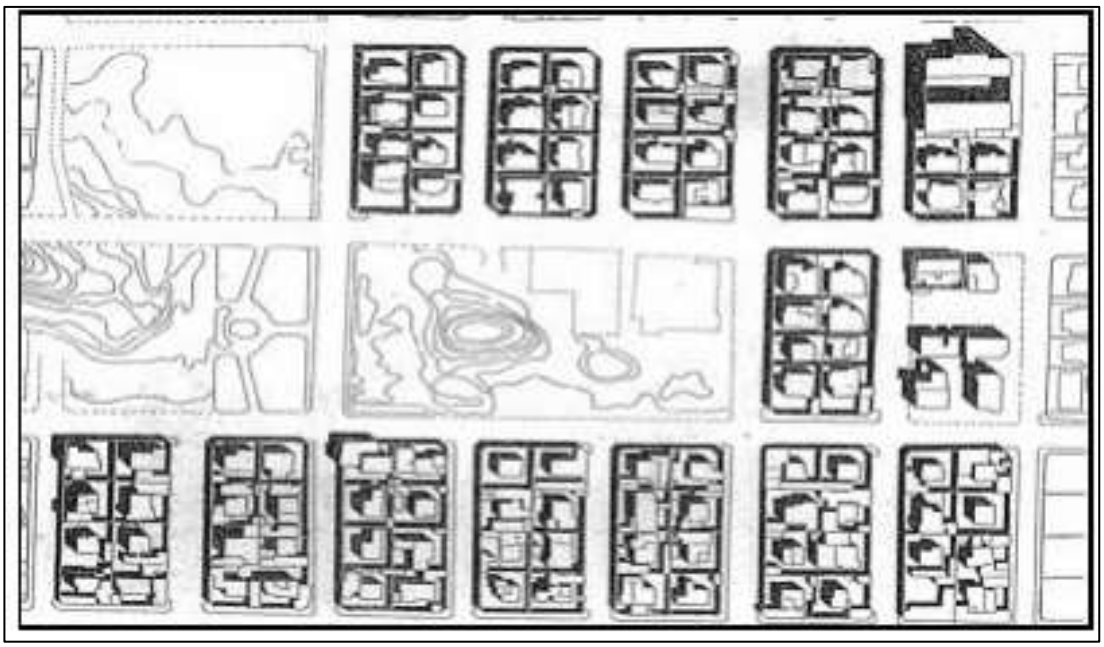


Figure 4.12 : Al-Malaz Neighborhood in 1990's source: (Al-Said,1992).

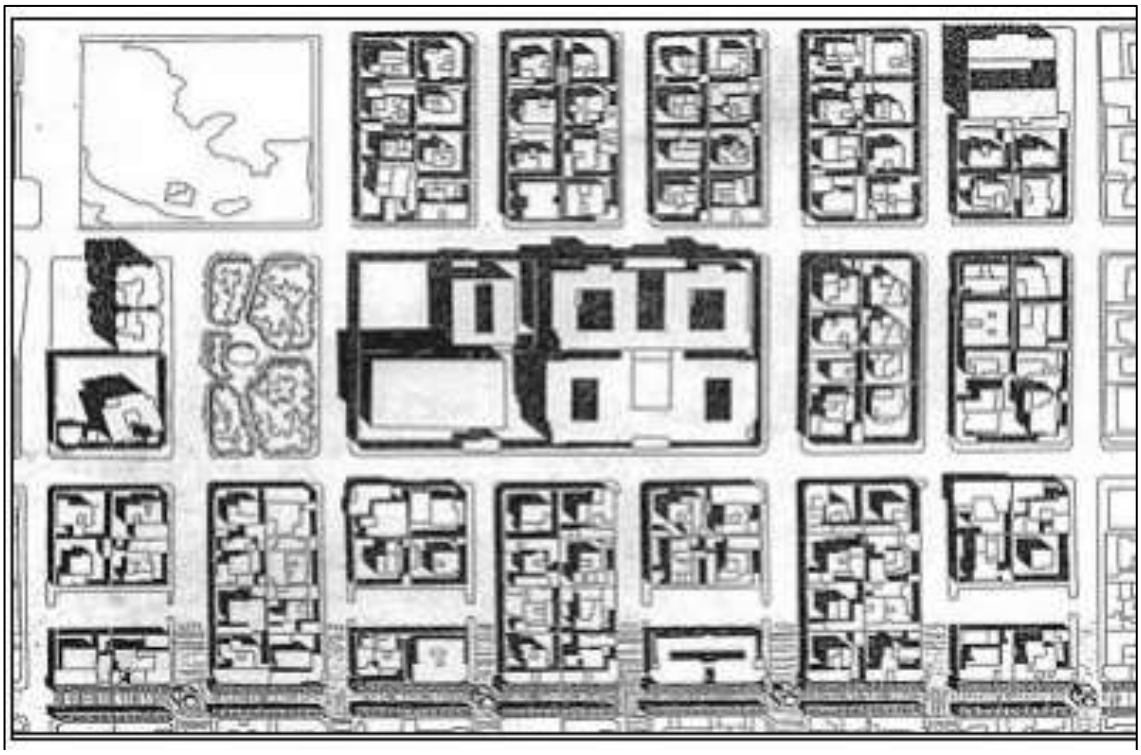


Figure 4.13 : Existing Neighborhood Pattern of Al-Malaz. Source: (Al-Said, 1992).

4.4.1 Villa House's Structural Transformation

This section will describe the villa house type since it is the most popular type in the district .The unofficial structural modification of the neighborhood blocks has dimensions of 100 meters in length and 50 meters in breadth. A standard lot typically has dimensions of 25 by 25 meters, with widths varying between 25 and 37.5 meters and depths ranging from 25 to 50 meters. The neighborhood's target population density was set at 60 residents per hectare, with 53% of the territory designated for private development and 45% reserved for public spaces (Al-Said,1992).

Primarily in the villa home, has gone through three different stages: the villa stage, the villa extension stage, and the villa annex buildings stage as shown in (Figure 5.15) is the physical pattern of the home as envisaged by the building laws. The outcome was the creation of the villa-style residence, which has gained worldwide recognition. The villa is located far from the street and is surrounded by a three-meter fence. The phase commenced during the late 1950s and early 1960s, and it rigorously conforms to all regulations on construction materials, setback distances, and the proportion of lot size to building size.

This transformation has been done by the resident's and recognized while revising the Doxiadis master plan, the municipality deliberately disregarded the side set-back standards outlined in the SECT master plan (Al-Hathlol,2017).

a.The villa expansion stage, mid-1960s

The need to alter the positioning of doors, since mid-1960s, there has been continuous debate on how the planned utilization of rooms and the allocation of space in the interior design of the villa suggest that the initial design did not adequately fulfil the requirements of its inhabitants. The square lot ratio control has encountered its first challenge at this point. The proprietors of the villas made further alterations to their houses by enclosing the balconies and converting them into further chambers to increase the number of rooms and to efficient used as a room rather than the balcony where it was not used by the inhabitants regarding its

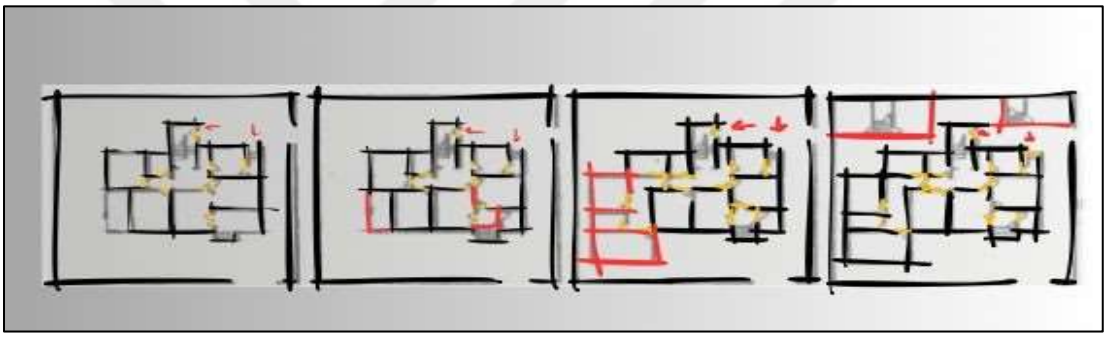


Figure 4.14 : Villa Transformation Sketch Explanation, Source: (Al-said, 1992) Edited by the Author.

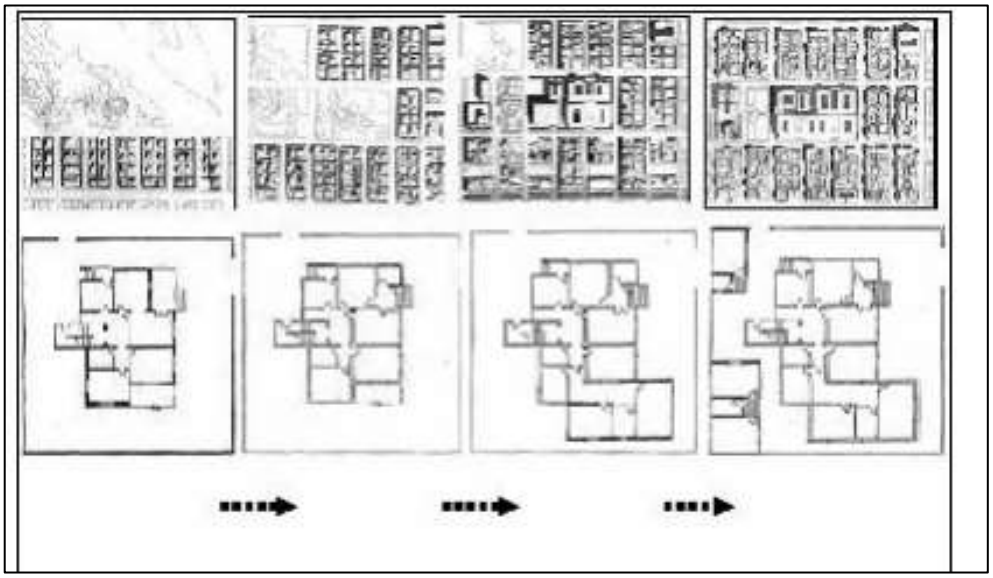


Figure 4.15: Villa Transformation Between (1957-2001). Source: (Al-said, 1992).

insufficient design to the region climate condition and the privacy (Al-Hathlol,2017) and as (Figure 4.15) explains.

b.The annex building stage, early 1970s

This tendency can be ascribed to changes in the inclinations of villa residents towards natural, artificial, and human surroundings was evident in the early 1970s. During this stage, the assessment of setback requirements entails the creation of additional rooms in close proximity to the fence wall, making use of the existing setback space. These structures are generally referred to as "Mulhaq" or annex in the local language. As a result of the frequent fluctuations in user preferences, they reverted back to prior informal norms, particularly the concept of ownership, in order to reorganize and cultivate the underutilized land areas as well as the using of need for the isolated room for the inhabitants' requirements of segregation and seek of privacy (Al-Hathlol,2017) and as (Figure 4.14) explains.

4.4.2 Housing Regulation

The definition of the villa home where it is the main type focus in this study, identified by Al-Hemaidi (2001) and Bahammam (1998), is a free-standing concrete dwelling of two stories, built according to the setback requirements on all four sides: a minimum of two meters at the back and sides, and 20 per cent of the street's width at the front. The site coverage is limited to 60 per cent of the site area. The housing regulations in this section are implemented in residential zones and can be related to the villa design that taken place in the history where both have been designed under the same regulation as these regulations has been established aligned with Al-Malaz housing project and has not updated till these days. These standards establish explicit criteria for the acceptable size and placement of structures and fences, The fundamental principles for constructing residential buildings as outlined in the building laws. The maximum allowable height for structures is restricted to 12 meters, while the height of each floor can vary between 2.7 meters and 3.5 meters. The maximum permissible height for fences is 3.5 meters. The cumulative area of all constructed structures, including any additional buildings, should not surpass 60% of the overall land area. The setbacks from the road must be a minimum of 1/5th of the road width, with a maximum limit of 6 meters. However, there is a minimum need of 2 meters for the setbacks. The setbacks from adjacent properties must be at least 2 meters, and no structures or extensions are

allowed within these setback areas as explained in (Figure 4.16). These restrictions guarantee that buildings retain a sufficient distance from roads and adjoining properties, promoting a well-structured and visually appealing urban environment.

Table 4.1: Building regulations principles

Height of buildings	Max 12m (floor height 2.7m–3.5m)
Height of fences	Max 3.5m
Ratio of building size to site area	Max 60% (included annex)
Setbacks towards road (Road width – min 12m)	1/5th of road width up to 6m (min 2m)
Setbacks towards neighbours	Min 2m (projection should not be permitted within these areas)

(Source: MOMRA, 2007)

Fig. 4.35a: Building regulations principles

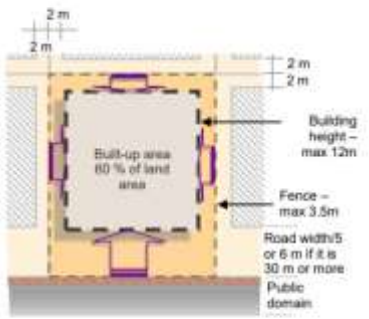


Figure 4.16 : Housing Regulations Source: (MOMRA,2007).

4.4.3 HOUSING AFFORDABILITY

This part starts with the social housing assessment where it first criteria is about housing affordability. In this section it explains the prices of the housing in Al-Malaz neighborhood and utility expenses in Riyadh city, compared with the housing prices in Riyadh city in general to fully understand the prices and the affordability.

Utility expenses in Riyadh for a household, including power, air conditioning, and water. $157.50 to $315

i. One-Bedroom Apartments:

The price in Riyadh's city center varies from $525 to $1,050. In Al-Malaz, a 1-bedroom apartment is priced slightly higher, beginning at $600 and capping at $1,000. This indicates that although Al-Malaz may be pricier at the bottom tier, the total disparity is negligible.

ii. Two-Bedroom Apartments:

The pricing range in the city center of Riyadh is between $1,260 and $2,100. Conversely, Al-Malaz presents a more economical range of $1,000 to $1,500. Al-Malaz is considerably more affordable for individuals seeking a 2-bedroom apartment.

iii. Three-Bedroom Apartments:

The price of a 3-bedroom flat in the city center of Riyadh varies between $1,890 and $3,150. Conversely, Al-Malaz provides these apartments at a more affordable level, from $1,300 to $2,000. Al-Malaz offers a more economical alternative for larger apartments, exhibiting a significant disparity at both the lower and top price ranges.
Three to four-bedroom villas (compound living):

In the city center of Riyadh, villa prices range from $2,625 to $7,350. Al-Malaz, however, presents a more economical spectrum, commencing at $1,800 and culminating at $4,000,

Table 4.1 : Housing Prices /Month in Riyadh City and in Al-Malaz Neighborhood Source: (Pierce, 2024) Edited by the Author.

Type of Housing	Riyadh (City Center)Monthly Cost in USD	Al-Malaz (City Center)Monthly Cost in USD
1-Bedroom Apartment	$525 – $1,050	$600 – $1,000
2-Bedroom Apartment	$1,260 – $2,100	$1,000 – $1,500
3-Bedroom Apartment	$1,890 – $3,150	$1,300 – $2,000
3-4 Bedroom Villa (Compound Living)	$2,625 – $7,350	$1,800 – $4,000

which is considerably lower than the costs in the city center. Al-Malaz presents an appealing choice for expatriates or families seeking economical compound housing.

Al-Malaz neighborhood offers a more economical housing alternative relative to the wider Riyadh city center, especially for larger apartments and villas as explained in (Table 5.1). This affordability renders it an appealing locale for expatriates, particularly for those in pursuit of more spacious accommodations or economical residences. The little rise in the cost of 1-bedroom apartments in Al-Malaz may be counterbalanced by substantial savings on larger units.

4.4.4 Social Interaction and Community Engagement

Al-Malaz is a Contemporary neighborhood where it is a geometric and vehicle oriented This has negative implications for semi-public and semi-private domains that play a significant role in linking people with their environments; instead of private, semi-private, semi-public and public spaces, the urban spaces in contemporary residential neighborhoods are only private defined by the home and the public space which is the street. Due to the absence of the semi-private spaces as well as the weakness of the public spaces as well as its accessibility with the lack of pedestrian facilities which is recognized in the urban analysis in Al-Malaz neighborhood people have fewer opportunities to be involved with their built

environments due to several factors such as the separation of dwellings because of the setbacks, the lack of social public spaces, the large sizes of plots and high boundary walls and the existing regulations that affect residents social interaction, thus weakening their emotional ties and attachments to their environments. Seatback As (Al-Nowaiser ,2010) points out, "in this case, the environment is used as a medium for people's activities in terms of speed and economy efficiency (Akpinar ,1992) criticizes the villa style for contributing to segregating household members and reduced potential for social interaction, by which it has weakened the sense of belonging.

4.4.5 Safety and Security

Newman (1995) states four elements of physical design that contribute, separately or together, to the creation of secured environments. Firstly, there should be a clear hierarchical definition of territories, from public to semi-public, semi-private to private. Secondly, the positioning of doors and windows needs to provide natural surveillance opportunities over entrances and open areas. Next, building forms and materials should be selected that do not imply that the residents are vulnerable. Lastly, residential developments should be located in areas where residents do not feel threatened. As the housing in Al-Malaz neighborhood has reflected a weakness in the definition of territories where there is a lack in the public to semi-public, semi-private, the district is mostly residential with villa type where the definition of terriers mostly based on the private domain (the villa) and the public domain (the street). as well as the windows in the ground floor is isolated from the street due to the seatbacks and the high-rise fence where it effects the natural surveillance opportunities in contrast to the durable material that the dwelling is made from and the window is covered with it increase the chance of having safety home as well as the location of the neighborhood where it considered as safety neighborhood due to the governmental buildings and municipalities that located in the neighborhood.

In this context, Al-Nowaiser (2001) argues that the urban planning of a contemporary (grid pattern) neighborhood in Saudi Arabia, with wide and straight streets leads to increases in vulnerability to crime; it makes it easy for criminals to wander through neighborhoods and select their targets without being noticed. The author further adds that the weakness of the social fabric contributes to weakened livability and a downturn in surveillance by the community. Modern urban developments are car oriented, and demonstrate an acute

separation between dwellings and other uses and functions (Eben-Saleh, 1998), and Al-Malaz has its grid pattern and wide street where the current layout of neighborhood streets facilitates fast traffic while discouraging pedestrian movement, in addition with the weakness of the social fabric due to the lack of the social interaction decrease the sense of safety for the resident's.

As a result of the lack of safety and security in contemporary neighborhoods, (Al-Nowaiser, 2001) indicates that some residents have been prompted to seek some protective measures in different ways, such as living in a family/relatives block or gated communities, or by fortifying their houses with fencing walls three to six meters high and using metal mesh to cover exterior windows and balconies, as shown in (Figure 4.21and 4.19) housing in Al-Malaz neighborhood high rise the exterior walls by using metal Shinko ,and covering the interior and exterior windows by metal as well as shown in (Figures 4.18 and 4.20), as well as steel doors as shown in (Figures 4.17), in order to provide family safety and house security. Despite all these provisions, it is reported that, "crime still occurs at increasing rates" (Al-Nowaiser, 2001). Unfortunately, as indicated by Al-(Hathloul,1981), others seek

Figure 4.17 : Villa House Example Using the Metal Exterior Door by the Author.

Figure 4.18 :Villa House Example Using the Metal Mesh Covering the Windows by the Author.

Figure 4.19: Villa House Example Using the Metal Shinko by the Author.

to sue their neighbors to force them to refrain from opening windows overlooking them, which has resulted in a social controversy.

Figure 4.20 : Villa House Example Using the Metal Interior Door by the Author.

Figure 4.21: Villa House Example Using the Metal Shinko by The Author.

4.4.6 Health and Well-Being

According to the current Technical Requirements for Obtaining Permission to Set-up Villas and Residential Buildings (AR Riyadh Municipality, 2007), contemporary built environments suffer from several problems, including lack of response to the arid climate. The provision of setbacks on all sides as shown in (Figure 4.24) exposes the whole building

Figure 4.22: Villa House Example by the Author.

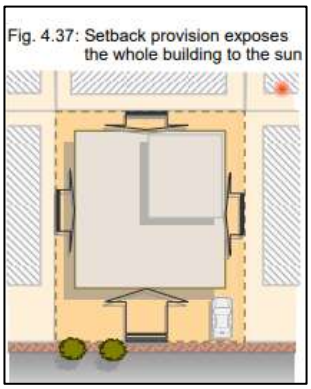


Figure 4.23: Climatic Comfort Explanation Source: (MOMRA,2007).

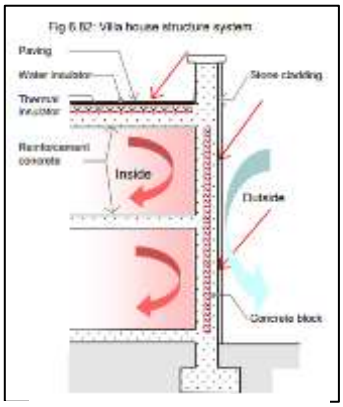


Figure 4.24: Climatic Comfort Explanation Source: (MOMRA,2007).

to the sun and as explained in (figure 4.22) which, in turn, necessitates the constant use of air-conditioning throughout the day and night (Al-Nowaiser, 1996, p.102). in addition to that, while the main purpose of the setbacks is to provide light, air and views, the existing mandatory setbacks expose most of the external and internal spaces of the house to its neighbors, with long windows facing each other. According to (AlNowaiser, 2010) while others close the curtains of some or all rooms all the time to the point that some people sometimes forget the existence of the window in that room, and others rarely open it, this in turn, prevents light and air entering and creates dark and gloomy environment, it may thereby cause some diseases and mental health problems This means that house windows cannot be opened in most cases. As a result, health problems are starting to appear among the residents, because of the dark interiors and the inability to use poor quality outdoor spaces. The negative impact of climate on the contemporary villa house has been given little consideration: "glass and concrete led to the penetration of the sun's hot rays, blocked cooling winds and allowed overexposure of large areas" (Eben-Saleh, 1998a, p.583) as shown in (figure 4.3) The grid-pattern system of contemporary neighborhoods, reserves almost the entire plot frontage of houses for vehicle entrances and parking. Further, emphasizes the negative influence of the setback regulations on isolating the interior environment of a house from the outdoor spaces, resulting in dependence on artificial interior climate control (Al-Nowaiser ,1996). And in this section in mostly of the villa examples show the priority and the vehicle entrances in the home.

4.4.7 Indoor Environmental Quality and Inclusivity

This section assessed the types of villas and the indoor environmental quality that the neighborhood has by drawing its plan outline related to the known types of the region and its elevations, four different villa-house types were identified in the neighborhood: detached villa as shown in (figure 4.27), villa attached on one side as shown in (Figure 2.29), and two varieties of villas attached on two sides (Figure 2.26 and 2.28). However, attachment of houses is only available where they are all owned by the same owner at the time of construction, i.e. one person or one’s relatives, or a property developer, Consequently, detached dwellings are the most common type (Eben-Saleh, 2001, Bahammam, 1998; Mubarak, 2007). (AlHemaidi ,2001) argues that house setbacks actually create unusable spaces: "they have destroyed the features of open spaces between the buildings". Setbacks

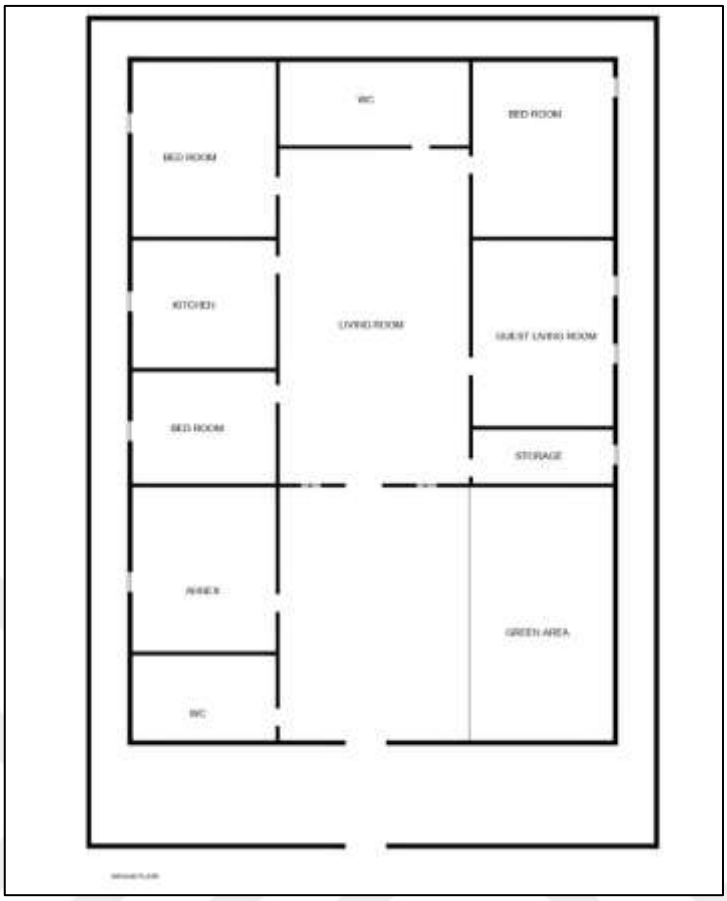


Figure 4.25 : Villa House Example in Al-Malaz for Interior Arrangement Drawn by the Author.

create dead spaces as they are unable to support women's activities, due to their lack of privacy (Al-Nowaiser, 1996). On the other hand, four characteristics are distinctive to the detached villa: a separate entrance; no shared spaces with neighbors; no party walls with adjacent houses and the plot are owned independently (Bahammam, 2011). The arrangement of spaces in a villa is almost uniform all over the city. male guest part of the house, incorporating reception rooms, dining room and toilet are towards the front of the house close to the entrance and open onto the front yard. The location of the kitchen enables direct and easy serving. Bedrooms are usually located at the back of the house or on the upper floor (Al-Hemaidi, 1996). In addition, an extra room, with a bathroom, has been added for maid(s) at roof level (Bahammam, 1996, p.566). In the front yard, an annex is incorporated as a reception room for the male teenagers of the family. There is another room and bathroom for the family chauffeur, which are normally located adjacent to the boundary wall with access from outside the front boundary of the plot (Bahammam, 1996). The family living space is in the heart of the house on the ground floor, and acts as a circulation space to other

rooms. This space plays a significant role as a congregating and communication place for the family members (Talib, 1984). And in the (figure 4.25) it shows the interior division of the villa home where it has the annex with its facilities, and the living room where it acts as the circulation space where it weak the social interaction and activities for the family and the divided of the interior by the walls play a major rule in decreasing colling and ventilation of the home.

Figure 4.26: Villa House Plans and Elevation of Attached on Two Sides by the Author.

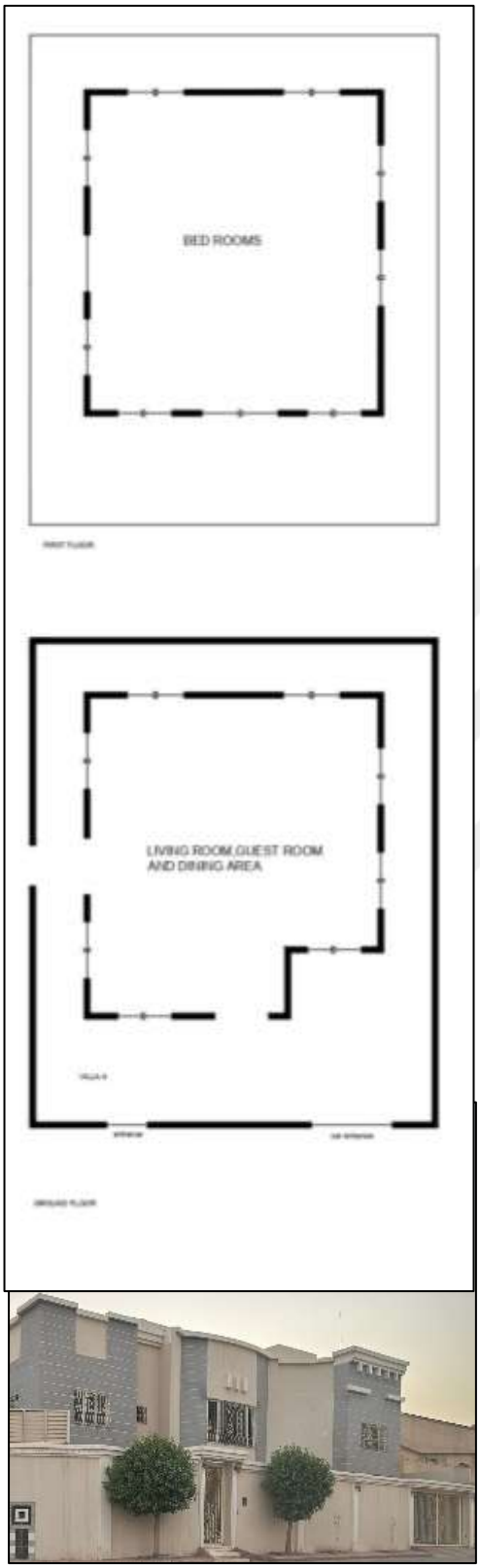


Figure 4.27 : Villa House Plans and Elevation of Detached Type by the Author.

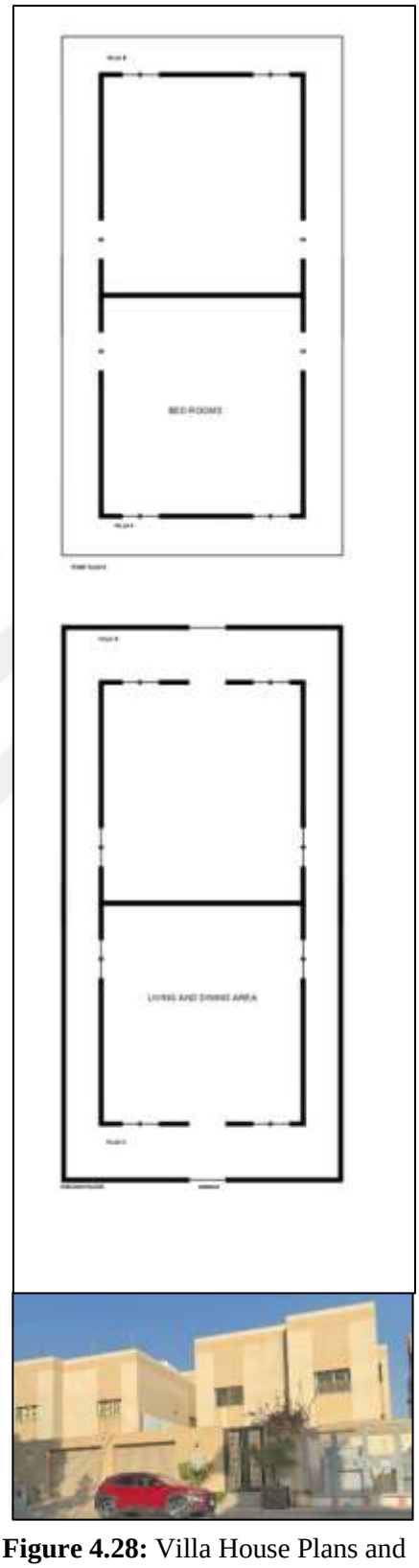


Figure 4.28: Villa House Plans and Elevation of Attached on Two Sides Type by the Author.

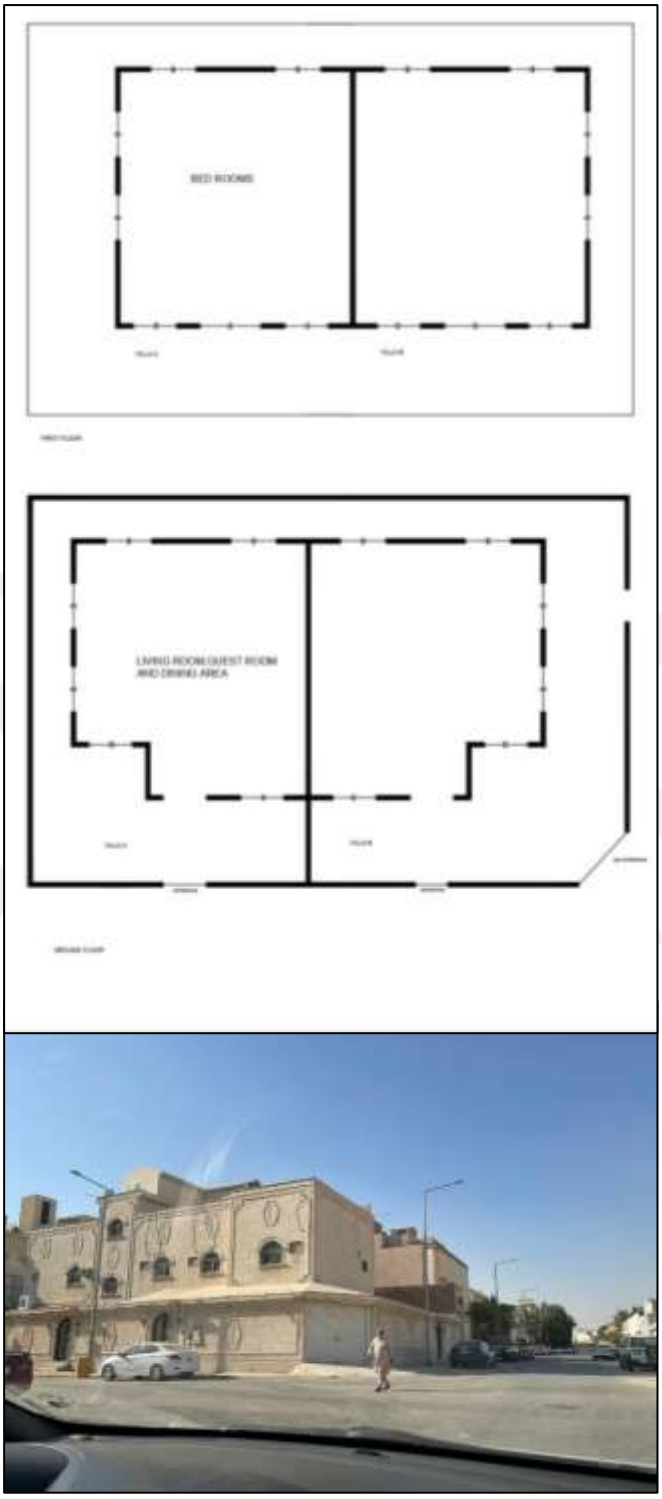


Figure 4.29 : Villa House Plans and Elevation of Attached One Side Type by the Author.

Table 4.2: The Popular Types of Villa Housing in Riyadh City Source: (Mubarak, 2007).

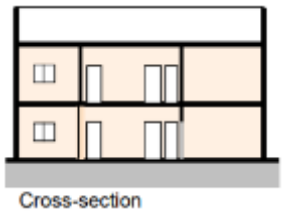
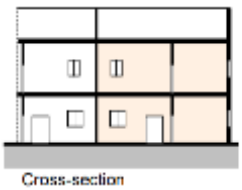
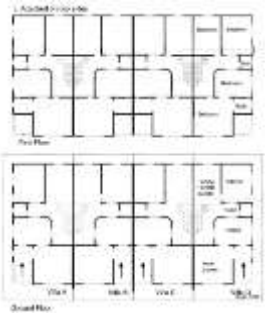
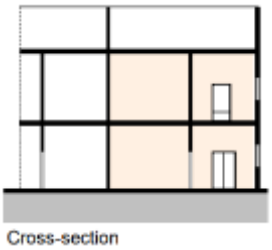
Villa Home Detached Type 2007 Source: (Mubarak, 2007).		 Cross-section	
Villa Home Attached on One Side 2007 Source: (Mubarak, 2007).		 Cross-section	
Villa Home Attached on Two Sides First Type 2007 Source: (Mubarak, 2007).		 Cross-section	

Table 4.2: The Popular Types of Villa Housing in Riyadh City Source: (Mubarak, 2007) "Table Continued".

Villa Home Attached on Two Sides Second Type 2007 Source: (Mubarak, 2007).		 Cross-section	

a.Cultural housing assessmnt

This section assesses the housing development from cultural aspect and to fully understand the culture aspect the section starts by assessing the cultural sustainability criteria starting with the cultural spaces and community interaction, integration of local arts and symbols, cultural appropriateness and functionality lastly to the cultural identity and heritage.

4.4.8 Cultural Spaces and Community Interaction

In Al-Malaz neighborhood the pattern of it is designed for car priority and the dwelling with its seatbacks give the mass the isolation sense to its residents, the site does not have any pedestrian facilities aa shown in the previous Figures which mean a weak social fabric in the site since the inhabitants are depends on car for moving in the site were the mobility does not improve the community integration according to the isolation of its usage. Compared to the traditional site which has the market as a cultural space it is not reflected in the neighborhood as well as the Baraha which is the square that used to be exist in the urban form of the traditional form has not existed in the site which mean the cultural spaces that reflect the society has been lost in the contemporary neighborhood.

As also shown in the analysis of the site in the neighborhood in (Figure 4.30) were the context that occur in the neighborhood is totally residential area , a governmental building and a small park that is not well designed with the climate of the region and no other activities except the religious spots which is not an activities that can be integrated by all the resident'sas a result as the involvement of people in the neighborhood is weak within the urban form were it led to decrease the community interaction.

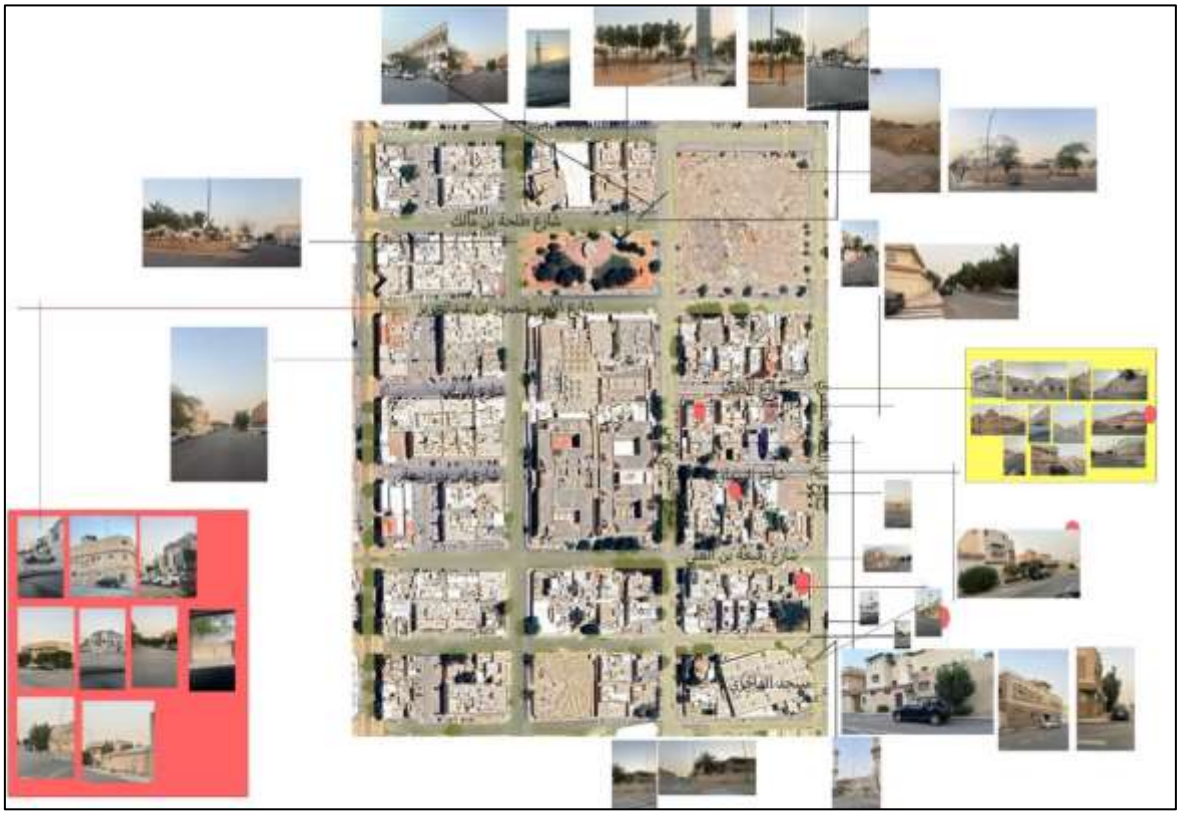


Figure 4.30: The Urban Fabric of the Site Source: Edited by the Autor.

4.4.9 Cultural Innovation and Creative Sensitivity

The built form of a house and the pattern of the neighborhood have fundamental roles in expressing spatial symbols, which reflect occupants' cultural norms and environmental context, however, in the contemporary built environment, inauthentic places relying on mobility and commercialization have resulted in the weakening of the role of the house in this context, Thus, it has lost any deep symbolic association (Al-Nowaiser, 1985). Meanings in architecture emerge from the interaction between people and physical objects. However, in modern built environments, lifestyle requirements change over time this means that the significance of the physical form may change (Al-Naim, 2008). As the lifestyle requirements change and it needed to faster than the old days the neighborhood as it have been designed

for the car move and to fasten the neighbor's life and requirements, the neighborhoods as an interaction between people and the physical environment, now in Al-Malaz it is an interaction between the people and their mobility which let to lose its symbol. According to (Al-Nowaiser ,1985), people have become less attached to their built environments. Thus, their involvement and experience are weakened. This will affect the sense of place symbolism, "the spatial elements of the physical environment in the dwelling and within the urban form symbolize the major activities that occur in them" (Al-Nowaiser ,1996). As also shown in the analysis of the neighborhood were the activities that occur in the neighborhood is far from the dwelling and cannot be reached by walk and in mostly is a totally residential area which no other activities except the religious spots which is not an activities that can be integrated by all the resident's , as a result as the involvement of people in the neighborhood is weak within the urban form it led to decrease the sense of a place symbolism.

a. Cultural Appropriateness and Functionality

The traditional building methods distinctly reflect the cultural appropriateness of the local inhabitants, evident in the design of both the exterior and interior of their dwellings. As discussed in the traditional architecture section, the objective of privacy was a primary consideration in the design elements. The privacy issue in the villa-type house has been questioned through a number of studies, Due to the existing mandatory setbacks on all sides of the plot, most of the internal and external spaces of a house are exposed to its neighbors (AlNowaiser, 1996). The villa home regulation stipulates that it has setbacks on all sides, which exposes the interior of the property and the open spaces resulting from the setback requirement revealing the neighboring properties.

The villa house has lost the inward-looking feature of traditional houses and is exposed to public view (Moustapha et al., 1985), Windows now open towards the exterior and provide less privacy (Talib, 1984). As a result, inhabitants rarely open their windows, particularly in the bedrooms and living room (Al-Hemaidi, 2001). The villa in Al-Malaz are outward looking and other buildings next to having the same design role as (Figure4.34) explains which led the neighbors to close their windows for the require of privacy as shown in (Figure 4.32).

Due to its visual exposure to surrounding neighbors, the use of the villa's open space between the house and boundary walls is limited (Al-Hussayen, 1995; Eben-Saleh, 1997). The lack

of privacy has prompted villa residents not to use outdoor spaces for family activities and has forced most outdoor activities to take place indoors (Al-Nowaiser, 1996; Al-Hemaidi, 2001). The villa's open spaces, resulting from the seatbacks and outward-facing design, are compromised by neighboring exposure, leading to inefficient utilization that does not align with the residents' needs. As illustrated in (Figure 4.31), this space is further disrupted by its proximity to the street, which diminishes the residents' privacy, consequently relegating outdoor activities to the interior of the home.

The courtyard where it explained in detail in the previous section where the culturally activities were taken place in the inner courtyard, (Al-Nowaiser ,1996) identifies the grid pattern system as the prime reason for moving most of what used to be communal activities inside the house, causing a negative impact on core familial activities. In the villa house in the neighborhood the inner courtyard, is replaced by a family living space on the ground floor as shown in (Figure 4.25) example, which partially functions as a circulation space, thereby losing its main role as a family space in which different activities

Consequently, occupants treat this problem in different ways. Living within a communal residential enclave, or family and relatives block is one option. However, most residents

Figure 4.31 : Villa House Example of The Neighbors Window's by the Author.

Figure 4.32 : Villa House Example of The Neighbors Surrounding Related to The Front Yard by the Author.

have raised party and boundary walls, up to six meters, and blocked off windows and balconies (Al-Nowaiser, 1996).in the neighborhood as shown in (figure 4.33 and 4.35) the inhabitants tend to reach their privacy needs by rising the exterior walls as well as blocking their windows by solid materials.

Figure 4.33: Villa House Example of Using Metal Shinko Between the Neighbors by the Author.

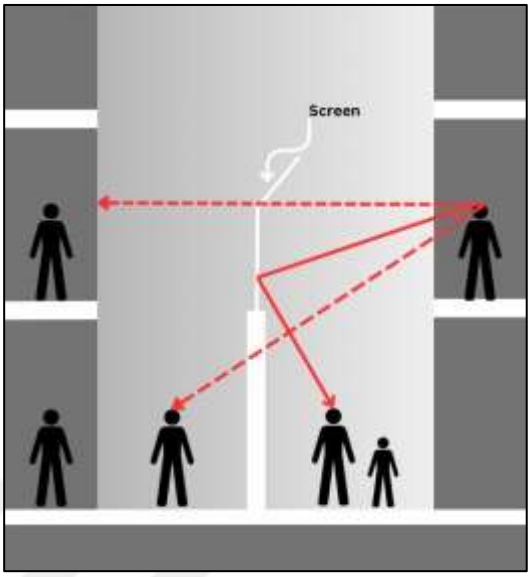


Figure 4.34: Section Sketch for the Yard Privacy Drawn by the Author.

Figure 4.35: Villa House Example of Using Metal Shinko to Cover the Outdoor Spaces by the Author.

4.4.10 Traditional Knowledge and Craftsmanship

As Riyadh city is considered as rapid growth city and the need of the housing dwelling, the traditional way of building and the material of mud according to (Al-Ibrahim, 1990) the traditional sunbaked mud brick is more expensive, and the concrete is easier and faster in erect than the sunbaked mud brick Due to the mechanical process of production. And as Al-Malaz neighborhood built to meet the urgent need for housing project, the villa home was built by concrete and not the traditional and local materials and because of the concept of the project which was to reflect modernity in design using a modern material. Cement-based products contribute to producing modern dwellings which are compatible with present-day standards such as multiple electrical fixtures and numbers of sanitary fittings (Mubarak, 2007) , the villa construction recently as shown in (figure 4.36 and figure 4.37) still using the concrete blocks due to its price and speed up the building process in craftsmanship , however according to (Al-Ibrahim, 1990) Concrete block walls conduct more heat than mud

Figure 4.36 : Villa House Example of Material Usage

Source: Edited by the Author.

walls, and are more resistant to rain. Compared with concrete blocks, oven baked clay blocks can offer sufficient strength and durability coupled with higher insulation value, as a result it is higher in price but it reduce the heat of the villa witch mean if the mud integrated to new modern villa's construction materials the use of the energy for cooling the villa will decrease according to its durability in heat isolation , however for the existing building as it made of concrete witch related to (Al-Ibrahim, 1990) concrete blocks accept a variety of finishes , the mud might be used as a finishing layer since it gives an efficient heat isolation and the concrete accept a Varity of finishes instead of the cement finishes which gain more heat as shown in(figure 4.38) and explained in (figure 4.39).

Figure 4.37 : villa house example of material usage by the Author.

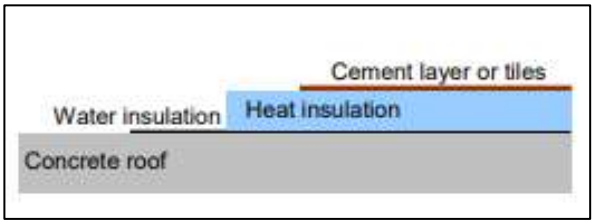


Figure 4.38 : Material Section Layer Source: (Al-Ibrahim1990).

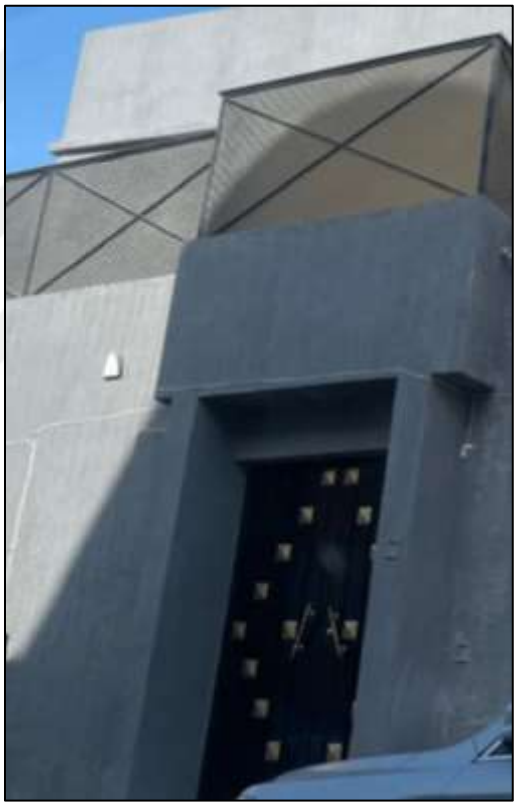


Figure 4.39 : Villa House Example of Finishing Material Usage by the Author.

4.5 COMPARISON BETWEEN SUSTAINABILITY ELEMENTS

Table 4.3: Comparison Between Sustainability Elements of Desert Traditional Architecture and Modern Architecture in Al-Derah , Masdar City , Al-Khuzam Project and Al-Malaz Neighborhoods by the Author.

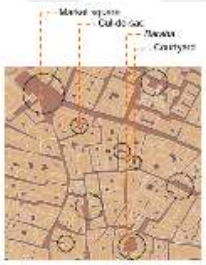
	AL-DERAH (OLD)	MASDAR CITY (NEW)	AL-KHUZAM (NEW)	AL-MALAZ (THE CASE) RECENT
urban form				
Court yards	 			

Table 4.3: Comparison Between Sustainability Elements of Desert Traditional Architecture and Modern Architecture in Al-Derah , Masdar City , Al-Khuzam Project and Al-Malaz Neighborhoods by the Author "Table Continued".

Orientation	  			  
Windows and Openings				 
treets and alleys				

a.Cultural Identity and Heritage

Place identity is the outcome of an integration of environment and culture (Tuan, 1974). According to Eben-Saleh (1998a), the contemporary urban fabric of the neighborhoods does

not reflect cultural identity. The traditional neighborhood which explained before reflect the culture of the environment as it designed related to the weather and the human well-being as well as the culture of the inhabitant which also can be seen in the building design as well as the public, semi-public and private spaces in Al-Malaz neighborhood and according to its planning it does not reflect the culture of the space since the buildings reflect personal identity as well as the neighborhood is not designed with the climate of the region .

It is composed of several physical characteristics and different social and economic environments. The design of a place should meet the requirements of physical and social conditions, which in turn produces a visual image that may carry appropriate place identity (Eben-Saleh, 1998b). In addition, In the contemporary built environment spatial features are produced by the recent phenomena of individualism and materialism (Al-Nowaiser, 1985).

In Al-Malaz neighborhood designed for car priority which kills the pedestrian life as well as the residential independency design as a result the visual image that might carry the identity of the place is not reflected as shown in (Figure 4.31) were a collected of the residential spots reflected the loss of the identity of the neighborhood in the urban and housing level.

In the same context, Al-Hathlul and Mughal (1999) suggest that, due to modernization, with advances in modern technology, a common phenomenon of standardization of built environments can be seen all over the country that prevents its residents from accessing their cultural, regional and national identity. As explained in the history of Al-Malaz neighborhood and the decision of copying Al-Malaz model to all over the country, as a result of the standardization of the built environment the identity of the region is not defined as it reflect the same concept of modernity without taking the culture identity impact into considerations.

5. DATA COLLECTION AND RESULTS

5.1 SURVEY

The Questions conducted based on the same criteria that the housing was assessed by, and by filling the part that the observation couldn't collect the data. The purpose of the survey was to obtain factual data as a means of confirming the principles discovered in the literature that were collected for the case study Al-Malaz district. This survey sought to collect thorough data on numerous elements of housing and neighborhood dynamics in Al-Malaz. The findings shed light on home cultural identity preservation, ownership, perceptions of dwelling permanency, satisfaction with living circumstances, community engagement, and the design and usage of public areas. (Figure 5.1) explain the questionnaire framework which is divided into 2 main statements following by the explanation of the purpose for each criterion that the survey's questions have been conducted. in addition to the result of the survey and its analysis in relation to the explained criteria.

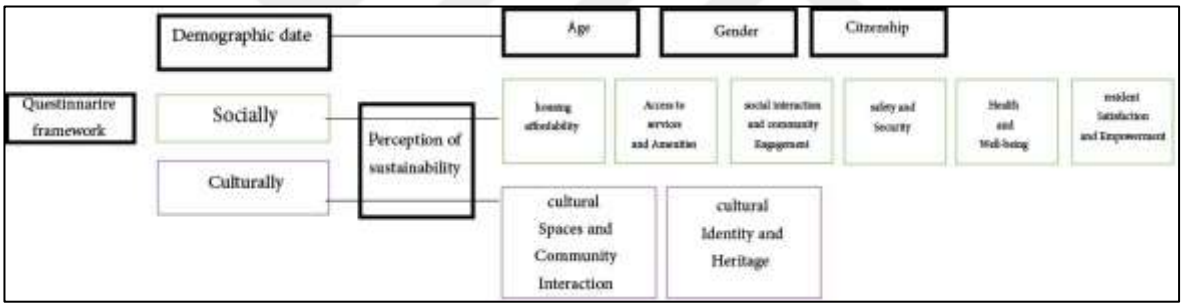


Figure 5.1 : The questionnaire framework that the questions conducted based on by the Author.

The demographic data of the survey resulted as

Gender Distribution: • Male: 36.8% • Female: 63.2%, Age Distribution: • 18-25: 47.4% • 25-35: 21.1% • 35-45: 15.8% • 45-55: 10.5% • 55-65: 5.3% • 65-75: 0.0% and Citizen ship as Saudi: 63.2% • non-Saudi: 36.8%.

5.1.1 Statement 1: Culturally Specific Behaviors

a.Cultural Identity and Heritage

This section of the survey conducted to assess how well the house design aligns with cultural and traditional values, to explore how residents see their house design in comparison whether cultural distinctions are evident by the following questions.

To what extent do you think your home reflects your cultural value? (Rate out of 10)

Based on the survey results on the residence house symbolizes their cultural value, the distribution is as follows: 6/10:two respondents(12.5%).7/10:2 responders(12.5%).8/10:2responders(12.5%).10/10:1respondent(6.3%)5outof10:3responses(18.8%)6/10: one respondent (6.3%). 7/10:fourresponses(25%).8/10:onerespondent(6.3%).This implies that respondents have varying perceptions of the cultural importance of their residences, with ratings ranging from 5 to 10/10. The most prevalent grades were 5/10 and 7/10, showing that a sizable proportion of respondents have a modest perception of cultural significance in their households.

Analysis of the result:

The poll results reveal a wide range of perceptions about the cultural importance of respondents' homes. The ratings vary from 5/10 to 10/10, with the most popular being 5/10 and 7/10. This suggests that respondents' perceptions of cultural value are modest, with some variation. Moderate Perception: The most often picked ratings were 5/10 (18.8%) and 7/10 (25%), showing that a sizable proportion of respondents believe their residences have a moderate level of cultural significance. Extremes: Only a tiny proportion of respondents ranked their house's cultural worth as very high (10/10, 6.3%) or very low, indicating that extreme views on this issue are uncommon.

The distribution of ratings indicates that there is no overwhelming consensus on the cultural significance of dwellings, highlighting a variety of perspectives within the community.

Do you perceive your house as different from the house across the road?

(Yes / No)

According to the survey results about perception of the residence to their home in term of shape, 50% of respondents view their house to be different from the house across the street, while the other 50% saw no change. This demonstrates a gap in respondents' perceptions of the uniqueness or resemblance of their dwellings to those directly opposite them.
Analysis of the result:

The study results reflect an equal split in respondents' perceptions. Half of the occupants believe their house differs from the one across the street, while the other half sees no difference. This split indicates that residents have various levels of awareness or significance for architectural or design distinctions.

What is the reason that weak the connection between the private place(home) and the public space in the neighborhood?

(Difference in neighbors' culture/ Lack of acceptable gathering spaces in the neighborhood/ Preference for privacy).

The survey results about the reason of unrelated connection between internal and external spaces highlight the main reasons preventing a perceived connection between home and community among respondents who answered 'No': Difference in neighbors' culture: 37.5%, Preference for privacy: 37.5%, Lack of acceptable gathering spaces in the neighborhood: 25%.,

These findings indicate that cultural differences and a demand for privacy are equally important explanations for a lack of perceived connection, followed by a lack of appropriate gathering areas in the community.

Analysis of the result:

The study results provide insights into the primary reasons that impede respondents from recognizing a link between their property and the neighborhood: Cultural differences among neighbors (37.5%) are a substantial barrier to a felt connection between home and area.
This shows that cultural diversity can make it difficult to develop coherent community bonds, potentially creating a sense of separation between personal and communal places. Preference for Privacy (37.5%): A sizable proportion of respondents claim a preference for privacy as a reason for not seeing a link.
This demonstrates that many people respect their privacy and prefer to keep their private life apart from the communal parts of neighborhood living. Lack of Appropriate Gathering venues (25%): A quarter of respondents cite a lack of appropriate gathering venues in the community as a hindrance.

This emphasizes the necessity of providing communal areas where residents can interact and foster a sense of community. Without these locations, opportunities for social engagement and community development are limited, which adds to apparent alienation.

5.1.2 Statement 2: Resident Satisfaction and Empowerment

This category looks at how satisfied residents are with their housing and neighborhood, and whether they feel empowered in their living situation. Ownership is often related to empowerment and long-term investment in the community, to assess tenure and its relationship to satisfaction, to explore residents' sense of permanency and attachment to their home, to evaluate whether the house meets residents' evolving needs and expectations and to gauge overall satisfaction with the neighborhood by the following questions.

How long have you lived in this house?

(Less than 2 years / 3-7 years / 8-17 years / More than 18 years)

The survey results for residence tenure reflect a variable length of residence among participants:11.1% of respondents had resided in their current residence for two years or less.16.7% have lived in their home for three to seven years.33.3% have lived in their home for 8 to 17 years. The majority, 38.9%, have resided in their current residence for at least 18 years. These findings show that a sizable proportion of respondents had long-term occupancy in their homes, with the majority having resided in their current home for more than 8 years. Analysis of the result:

According to the survey, respondents' residence tenure varies greatly, with a considerable fraction having resided in their residences for extended periods: A minority of respondents (11.1%) had resided in their current homes for two years or less, indicating recent moves or new ownership/rental situations.16.7% have lived in their homes for a moderate period of three to seven years. This group may include people who have recently moved into their homes but are not new residents.33.3% have lived in their residences for 8 to 17 years, demonstrating a steady and long-term residency for around one-third of the participants. The largest group (38.9%), They have lived in their current homes for at least 18 years.

This indicates a high level of long-term stability and perhaps a deep loyalty to their homes and communities. According to the poll results, 72.2% of respondents had resided in their current houses for more than 8 years.

The majority of responders reported long-term stability and potentially deep attachments to their communities. Understanding the reasons for these extended periods of time may provide more information about aspects such as community satisfaction, property ownership, and demographic stability.

Does this house satisfy your current and future needs?

(Yes / No)

According to the survey results about satisfaction of the resident current and future needs, 66.7% of respondents believe their residence meets their present and future needs, while 33.3% disagree. This shows that, while the majority of respondents are satisfied with their living arrangements, a sizable proportion believe that their existing dwelling does not meet all of their expected demands.

Analysis of the result:

According to the poll, 66.7% of respondents are content with their current residence, indicating that they believe their living arrangements meet both current and future needs. This shows that these people have enough room, facilities, and flexibility in their homes to meet changing needs throughout time. However, 33.3% of respondents believe that their existing accommodation is inadequate for their current and future needs. This sizable minority may be experiencing challenges such as insufficient space, or a lack of adaptability in their living arrangements to future changes in family size, lifestyle, or other variables. However, the answer of this question is in contrast with the question of the "Do you think this dwelling is temporary or for your future?" where it needs more study to understand it in detail.

In general, are you happy about this district, or do you want to move?

(Happy / Want to move)

According to the survey results 72.2% of respondents are satisfied with their present district, while 27.8% want to change. This shows that the majority of respondents are content with their current living situation, yet a sizable proportion still wish to relocate.

Analysis of the result:

According to the survey results, 72.2% of participants are satisfied with their present district. This shows that the vast majority of respondents are content with their living situation. However, 27.8% of respondents reported a desire to relocate, indicating that a sizable minority were unsatisfied with their current district. Addressing the concerns of individuals who want to move forward with community improvements and participation activities could help boost overall satisfaction. However, the answer of this question is in contrast with the question of the "Do you think this dwelling is temporary or for your future?" where it needs more study to understand it in detail.

i. Housing Affordability

This section of the survey conducted to assess housing affordability since the statistics of the income in the official site of the region is only supported the overall income of people in the city and not specified for a current district, the questions are conducted to the specific residents of the chosen neighborhood.

These questions explore the affordability by indirectly assess affordability, as homeownership often reflects financial capability, to assess affordability if the house is seen as sustainable for future use without needing major investments as well as to assess affordability, as home price and homeownership which reflects the affordability of the neighborhood’s housing units by the following questions.

Do you own this house?

(Yes / No)

This statement focused on the attachment of the residents to their home and to the neighborhood based on their ownership residence tenure, perceptions of dwelling permanency and housing work manageability and based on the survey results, for the home ownership is 55.6% of respondents own their homes and 44.4% do not. This shows that the majority of participants are homeowners.

Analysis of the result:

The majority of respondents (55.6%) said they owned their home. This shows that the survey participants own homes at a reasonably high rate. In contrast, 44.4% of respondents do not own their homes, indicating that a sizable proportion of people rent or live in a residence they do not own.

Do you think this dwelling is temporary or for your future?

(Yes / No)

According to the survey results for perceptions of dwelling permanency, the majority of respondents (58.8%) perceive their current residence to be temporary. Meanwhile, 41.2% of respondents saw their home as a long-term or future residence. This shows that, while a considerable portion of participants desire to relocate or see their present living arrangement as temporary, a sizable number intend to remain in their current houses for the foreseeable future.

Analysis of the result:

The study results reflect respondents' different perceptions on the permanence of their current dwellings: The majority of respondents (58.8%) regard their current residence as transient. This could reflect a number of issues, including a desire or need to migrate in the near future, uncertainty about long-term intentions, or the belief that their existing residence does not match their future needs. In contrast, 41.2% of respondents regard their house to be for the future, indicating that a sizable proportion of participants perceive their current home as a long-term domicile. According to the survey, a higher percentage of respondents consider their current dwellings to be transitory rather than permanent. Economic factors, employment stability, family considerations, and home market dynamics could all influence these opinions. Further examination into these underlying causes could provide a better understanding of the participants' residential planning and decision-making processes.

What made to choose to move to this district?

Home price affordability, accessible public services, home ownership

According to the survey results about the reason behind choosing Al-Malaz district, the reasons for choosing to migrate to the district are as follows: 44.4% of respondents chose to

relocate to the district due to house ownership. 27.8% of respondents were motivated by low property prices. 27.8% of respondents relocated because of convenient public services. This shows that home ownership is the most important motive for migrating to the district, followed by inexpensive property costs and convenient public services.

Analysis of the result:

The poll results show that property ownership is the most important element influencing inhabitants' decision to relocate to the district, with 44.4% citing it as their primary motivation. This shows that the possibility to own a home is a significant appeal for the district. 27.8% of respondents place equal importance on affordable property prices and accessible public services. The emphasis on affordability means that the region has competitive housing prices, making it appealing to people and families looking for low-cost living options. The importance of accessible public services suggests that citizens place a premium on amenities like schools, hospitals, transportation, and recreational facilities.

ii. Access to Services and Amenities

This category focuses on assessing how accessible outdoor spaces are for children and families, which relates to service availability, to explore barriers preventing access to neighborhood amenities and outdoor spaces for children.

Do your children play outside the home (in the neighborhood)?

(Yes / No)

According to the survey results about the children’s engagement to the district, the majority of respondents (66.7%) do not allow their children to play outside in the neighborhood. In comparison, just 33.3% said that their children play outside in the neighborhood.
Analysis of the result:

According to the study results, the majority of respondents (66.7%) do not allow their children to play outside in the neighborhood. In comparison, just 33.3% said that their children play outside in the neighborhood. "Explaining the reason behind it based the survey results, three significant worries that parents have about their children's outside play (43.8%) The most common cause given is a lack of suitable play areas in the neighborhood. This shows that the neighborhoods have a lack safe and appropriate play areas for children,

emphasizing the need for enhanced recreational facilities and spaces created specifically for children's activities. A large proportion of respondents cited a lack of trust in the community as a primary factor. (18.8%) Safety concerns are still a significant factor for limiting outdoor activity. This includes generic concerns about children's physical safety while playing outside, such as fears of crime, accidents, or other risks. Traffic Movement (6.3%): While less frequently reported, traffic movement remains a concern for some parents. Busy streets and the possibility of a traffic collision often discourage parents from letting their children play outside.

iii. Social Interaction and Community Engagement

This category focuses on how well the neighborhood encourages interaction and community participation to understand how public spaces facilitate social interaction, to assess walkability and how it promotes community interaction and social engagement and to measure the sense of belonging and community engagement.

Which public place do you usually meet people in your neighborhood?

(Mosque / Garden / Cafe/Restaurant / Other)

According to the survey results about the most visitable public space, the preferred public areas to meet people in the neighborhood 55.6% of respondents frequently meet people at mosques, 22.2% of respondents frequently meet people in gardens and 22.2% of respondents typically meet people in cafes and restaurants. This shows that the mosque is the most popular gathering location in the area, followed by gardens and cafes/restaurants, which are both selected by a lesser proportion of respondents.

Analysis of the result:

The survey results reveal that the mosque is the most popular meeting place, with 55.6% of respondents choosing it as their preferred location for social interactions. This indicates that the mosque plays a central role in the community's social life, serving as a primary gathering spot for residents. Gardens and cafes/restaurants are equally popular, each preferred by 22.2% of respondents. This suggests that these locations also play significant roles as social hubs, offering alternative spaces for community members to interact and engage with one another.

From your different experiences and memories in this neighborhood, most of them were associated with?

(House/Green spaces and parks/ public places, restaurant market etc. / the street)

According to the survey results about the most place that is associated with the residences' experiences, 66.7% of respondents link most of their neighborhood experiences and memories with their home. Other major associations include public locations (16.7%) and the street (16.7%), with green spaces and parks having the lowest prevalence at 11.1%. This shows that home environments are crucial to the questioned persons' experiences and memories, with public and community places contributing to a lower amount.

Analysis of the result:

The survey results illustrate where respondents' major experiences and memories are developed in their community. house (66.7%): The majority of respondents attribute most of their experiences and memories to their house. This emphasizes the essential role that home life plays in developing human experiences and memories, demonstrating the significance of the domestic environment in everyday life. Public venues and The Street (16.7% each): Both public venues (restaurants, marketplaces, etc.) and the street are important sources of memories for 16.7% of respondents. This suggests that communal and social connections outside the home, as well as activities and encounters on the street, are essential to a large section of the community. Greenspaces and Parks (11.1%): A smaller percentage of respondents identify their recollections with green spaces and parks. While less prominent than the home and public locations, these regions still serve an important role for a section of the population, emphasizing the importance of recreational and natural spaces in urban settings.

What is your opinion about the relationship between the internal space(home) and the external space (neighborhood)?

Ther is no link between them

There is a link between them

The survey results about the relation between the internal and external spaces indicate that a majority of respondents (55.6%) believe there is a link between the internal space (home)

and the external space (neighborhood). Conversely, 44.4% of respondents feel there is no link between these spaces. This suggests that while more than half of the participants perceive a connection between their homes and the surrounding neighborhood, a significant portion do not see this relationship.

Analysis of the result:

The survey results reflect respondents' different views on the link between their residences and the surrounding area. There is a link between them (55.6%). A slight majority of respondents believe there is a link between their home and the neighborhood. This indicates that more than half of the participants believe the quality, design, and characteristics of their neighborhood influence their home environment, and vice versa. Factors contributing to this image may include the ease of access to neighborhood amenities, the general ambiance of the community, and how effectively the area supports inhabitants' lifestyles and well-being. There is no link between them (44.4 percent): A sizable proportion of respondents, 44.4%, say there is no relationship between their home and the community. This suggests that for a large percentage of individuals, the internal space (house) is perceived as separate from the outward environment (neighborhood). These respondents explained in the culture assessment part since it assesses the impact of the different culture of the neighbors on the interactions between them.

Has the shape of the neighborhood affected social life today?

(Yes / No)

The survey results about the effect of the district’s structure on the social life indicate that a slight majority of respondents (55.6%) believe that the shape of their neighborhood has affected social life today. Conversely, 44.4% of respondents do not feel that the shape of the neighborhood has impacted social life. This suggests that while more than half of the participants perceive a connection between neighborhood design and social interactions, a significant portion do not see this influence.

Analysis of the result:

Yes (55.6%) of respondents believe that the shape of their neighborhood has influenced social life. This implies that more than half of the participants believe that the physical layout and architecture of their neighborhood influence social interactions, community

participation, and possibly the overall sense of belonging. This view could be influenced by factors such as home layout, the existence of common areas, walkability, and public space accessibility. No (44.4%), 44.4%, disagree that the shape of the neighborhood has had an impact on social life. This suggests that other factors, such as individual lifestyle choices, social networks, or external social and economic conditions, may have a greater influence on social interactions for a large number of people.

Do you feel a part of this district?

(Yes / No)

Based on the survey results about the belonging for the district, 83.3% of respondents indicated that their housework is manageable in terms of day-to-day activities, while 16.7% of respondents indicated that it is not. This suggests that the majority find their housework manageable within their daily routines, although a notable portion still faces challenges.

Analysis of the result:

According to the survey, a substantial majority of respondents (83.3%) had a strong sense of belonging to their area. This high percentage indicates that the majority of inhabitants are well-integrated into their community, which can result in a more supportive and connected neighborhood. Active community engagement, good communication, and a friendly setting can all contribute to a strong sense of belonging. However, 16.7% of respondents do not feel connected to their area. This minority demonstrates a sense of separation or exclusion, which can be caused by a variety of circumstances such as a lack of community activities, insufficient social networks, or feeling undesired.

iv. Safety and Security

This section of the survey conducted to assess determination of safety concerns limit residents' outdoor activity and mobility in the neighborhood.

Do you walk around the neighborhood?

(Yes / No)

According to the survey results , 61.1% of respondents walk about their neighborhood, while 38.9% don't. This shows that while the majority of respondents walk about their area, a sizable proportion do not.

Analysis of the result:

According to the poll results, the majority of respondents (61.1%) go for walks around their area. Walking appears to be a popular pastime among these residents, possibly contributing to physical fitness, social connection, and acquaintance with the surrounding environment. However, 38.9% of those polled do not stroll about their area. This sizable minority may face obstacles such as a lack of time, safety concerns, insufficient walking infrastructure, or personal preferences that prevent people from walking where it will be discuss in the following section.

if the answer is no is that because of?

According to the survey results about the reason of not preferring to walk , of people who do not feel a part of the district, the reasons are as follows:70% of respondents said the district was not suitable for strolling around.
20% of respondents noted long distances to destinations such as marketplaces and public places.10% of respondents reported feeling unsafe because of unorganized traffic. This implies that the majority of residents are most concerned about the district's lack of walkability, followed by the difficulty of vast distances to vital locations and traffic safety issues

Analysis of the result:

According to the study results, poor walkability is the key reason 70% of respondents this shows that the district's design and infrastructure may be unsuitable for pedestrian activities, making it difficult for inhabitants to wander around and interact with their neighbors' second most important issue, indicated by 20% of respondents, is the vast distance to vital locations such as markets and public spaces. This suggests that some inhabitants may not have easy access to basic services and amenities, which contributes to their sense of isolation. Finally, 10% of respondents feel frightened as a result of uncontrolled traffic, emphasizing safety concerns as a barrier to feeling like a member of the community.

If your children do not play outside, what are the reasons?

(Lack of play areas / Lack of trust in the community / Safety concerns / Traffic movement)

The survey results about the reason of not engaging the children to the district illustrate the key concerns that parents have about their children playing outside in the neighborhood. Lack of Adequate Play Areas (43.8%): The most common explanation given by respondents is a lack of adequate play areas in the neighborhood. This highlights the need for additional or enhanced recreational facilities and locations where children can safely participate in outdoor activities. Lack of Trust in the Community (31.3%): Many respondents cited a lack of trust in the community as a reason for not allowing their children to play outside. This could be due to safety concerns, unfamiliarity with the neighbors, or previous unfavorable experiences. Safety Concerns (18.8%): Safety concerns are also a significant factor, comprising broad concerns about children's physical safety while playing outside, which may include issues such as criminality or unattended surroundings. Traffic Movement (6.3%): Although less frequently mentioned, worries about traffic movement underscore the dangers posed by congested streets and the potential of accidents, which can discourage parents from allowing their children to play outside.

Analysis of the result:

According to the study results highest percentage of the reason of not engaging children to the neighborhood was lack of Adequate Play Areas with (43.8%) which identifies multiple safety and security problems, notably the insufficient availability of play areas and a deficit of community trust, which are the foremost difficulties for parents as a major reason.

5.1.3 Limitation and Opportunities

This section highlights the district’s limitations and opportunities to fully understand the neighborhood to be developed and to achieve sustainability goals, due to the growth of the city and the population Al-Malaz district development is necessary to meet the housing demand needs as well as the coming generation needs for sustainable housing dwellings.

a. Limitation

i. Temperature swing from day to night are quite high

ii. Rapid population growth

iii. Accessibility issues to the basic needs

iv. Housing regulation sensitivity issues to the climatic condition and safety

v. Lack of privacy

vi. Weak social fabric and interactions

vii. Lack of natural ventilation of indoor environment

ix. Lack of green area and open playground spaces for children

x. Housing developments are not referring to cultural identity and traditional knowledge

b. Opportunities

i. Affordable housing

ii. Transportation infrastructures are in a good condition

iii. Street infrastructures are quite good and wide need for re-planning and development

iv. Health facilities are established and distributed in different zones except one spot need improvement

v. Schools are well distributed to the spots of the district

vi. Safety district due to its location

vii. The identity and heritage of the district due to its history gives the opportunity to the district to be defined as a culturally valuable district to be improved.

6. FINDINGS AND RECOMMENDATIONS

6.1 FINDINGS

As the study evaluates the sustainability of residential structure in influence of urbanization on Riyadh, with a specific emphasis on the Al-Malaz district. This section summarizes the findings where it covers urban sustainability, social and cultural sustainability dimensions.

The Al-Malaz district exacerbates the urban heat island effect because of its few green spaces and extensive asphalt-covered streets. This leads to an escalation in energy use, resulting in heat-related health issues and influencing the dynamics of local weather patterns. Scarcity of vegetation, the neighborhood is characterized by a limited number of gardens, with just two prominent ones located in the center and northeast (which functions as a zoo). The absence of vegetation in certain portions of the district is a result of the urban planning and prevalence of villa dwellings, which leads to a decrease in green spaces and an increase in the urban heat island effect. This has a negative influence on environmental sustainability. Energy consumption, the design of the villa and the regulation of the seatbacks as residential structure, have a lack of adaptability to the climate as it results the structure being exposed to the sun from all the views of the home where the dwelling gain the heat as well as the ventilation inside the home are not well-designed according to standardized internal arrangement, where it requires continuous use of air-conditioning which means an increase in the energy consumption. Carbon emissions, the street plan and building limits in Al-Malaz have created a grid pattern structure that encourages reliance on cars and contributes to significant carbon emissions. The suburb's gridiron-style layout, characterized by wide roadways and rectangular blocks, intensifies carbon emissions due to its inadequate walkability design, which leads to a heavy reliance on cars.

The district experiences the urban heat island effect attributable to the pervasive use of asphalt and the deficiency of green spaces or tree cover. This elevates the ambient temperature, rendering outdoor activities uncomfortable and leading to increased energy use for cooling. The lack of green corridors or shaded pathways deters walking and intensifies reliance on automobiles, hence increasing carbon emissions

i. Deficiency of Green Infrastructure, Al-Malaz has a paucity of green spaces and urban parks. The insufficient vegetation does not mitigate the elevated temperatures encountered

in the summer, hence diminishing the neighborhood's environmental resilience. The absence of trees and green spaces adversely affects the visual appeal and environmental sustainability of the district

ii. Inability to Integrate Traditional Architecture, Despite the prevalence of modern designs in the area, there exists an overlooked opportunity to include traditional Saudi architecture, which provides enhanced cultural and social sustainability. For example, elements such as internal courtyards, which facilitate improved air circulation and family gatherings, have not been incorporated into housing developments.

iii. Housing Affordability and Social Sustainability , While Al-Malaz defined as affordable neighborhood due to its pricing compare to the center of Riyadh neighborhoods, the limited type of housing and the size might decrease the potential of the affordability for the small families specially as the society is considered more then it half population as young age where the size of the house does not meet the needs for the size of the family.

iv. Low Walkability, The neighborhood is unfavorable for pedestrian activity due to its expansive streets, elevated temperatures, and absence of sheltered pathways. The majority of citizens depend on automobiles for transportation between their residences, workplaces, and key services, resulting in heightened traffic congestion and diminished possibilities for physical activity. This reliance on automobiles undermines the tenets of sustainable urban mobility, which prioritizes pedestrian-centric design

v. lack of accessibility to transportation Alternatives, Al-Malaz has not implemented sustainable methods as the cycling and pedestrian well designed sidewalk to increase the accessibility to the transportation by walk. The lack of accessibility to the public transit or sustainable mobility alternatives exacerbates car dependency, constraining efforts to diminish carbon emissions and promote more sustainable lifestyles

vi. Uniform Urban Design, the grid-patterned street configuration inhibits natural development and variety in land utilization. The grid facilitates fast travel but diminishes the neighborhood's vibrancy by not fostering exciting mixed-use areas. This inflexibility stands in stark contrast to sustainable urban models that prioritize adaptable and flexible designs, fostering a blend of residential, commercial, and recreational spaces in contrast to Al-Malaz neighborhood where it mostly isolated as residential land use far from other activities.

vii. Underutilization of Public Spaces, Public spaces, including parks and communal areas, are inadequately utilized owing to their insufficient integration into the urban environment. These areas fail to address the daily requirements of the inhabitants, hence diminishing their social sustainability and constraining their capacity to promote community engagement and interaction.

a. Cultural Sustainability Aspect

The Community Identity of the district fails to embody cultural identity due to a lack of integration between cultural elements and modern urban environments since it faced a rapid urbanization where Priority was given to the need of the housing units which affected the district in losing the cultural identity and diminish the symbolic connection between houses and cultural traditions and their natural surroundings. The villa style which is the most housing type in the district, fosters cultural and social vacuity as a result of its western front and internal layout. where the differences of the neighbor's culture enhance the identity of the traditional social life to be lost in its meaning.

Insufficient Cultural Venues: The neighborhood lacks adequate dedicated cultural venues that embody and honor the local culture. Although mosques function as essential cultural centers, there is a conspicuous lack of venues for inhabitants to participate in traditional activities, conduct cultural events, or commemorate communal celebrations as it reflected in the plan of the traditional urban form.

Inadequate Cultural Preservation: The urban and housing designs in Al-Malaz do not maintain the cultural integrity of Saudi Arabian history. The architecture and urban planning of the district exhibit minimal incorporation of local arts, crafts, or symbols, leading to a disconnection between residents and their cultural identity.

Insufficient Cultural Integration in Housing: The housing designs in Al-Malaz exhibit modern and Western-influenced architectural forms, with minimal acknowledgment of Saudi Arabia's traditional cultural values. This has led to a deficiency in cultural attachment among residents.

Privacy Considerations: Conventional Saudi families emphasize privacy, nevertheless, the existing dwelling designs inadequately fulfill this requirement. Residences are deficient in suitable internal and external partitions that facilitate cultural behaviors, including family gatherings and gender-specific areas

b. Social Sustainability Aspect

Starting with the community well-being, the design of the villa-type dwelling has undermined privacy by requiring setbacks, which expose houses to neighboring properties. As a result, the utilization of outdoor areas has been restricted, and measures such as increasing the height of boundary walls and erecting metal screens have been taken to ensure privacy. Some residents have chosen to stay in communal residential enclaves or gated communities due to the absence of privacy. The compulsory setbacks result in the exposure of a significant portion of the house's external and internal areas to neighboring properties, which in turn leads to health issues caused by dimly lit interiors as a result of blocking the windows that are facing the neighbors and poor outdoor space conditions resulted of not preferring to be used. As well as the lack of well-designed outdoor spaces specially for the children and the lack of safe feelings led them to live their activities all inside the home which effect the child well-being, social life and the mental health.

Restricted Social Interaction: The urban design of Al-Malaz, marked by expansive thoroughfares and automobile-oriented planning, constrains regular informal social contacts. Despite the presence of communal spaces like mosques and parks, these sites frequently remain unused owing to insufficient pedestrian-friendly routes and shaded walkways. Consequently, social cohesion is feeble, and inhabitants infrequently interact with their neighbors on a consistent basis

Automobile Dependence and Accessibility Challenges: Al-Malaz’s car-oriented design poses difficulties for inclusivity, especially for individuals lacking access to private transportation. Essential services such as educational institutions, healthcare facilities, and retail establishments are accessible; however, access predominantly relies on automobile transportation. This restricts mobility for at-risk populations, including the elderly, children, and low-income individuals, who may lack automobile ownership

Restricted Accessibility for Individuals with Disabilities: The district is deficient in universal design elements that accommodate those with limited mobility. The streets, buildings, and public areas lack in inclusive design features, exacerbating the area's inaccessibility.

The social and cultural evaluations indicate that Al-Malaz is deficient in infrastructure necessary for promoting robust community engagement, cultural identity, and social

cohesiveness. Housing designs inadequately address cultural requirements, and urban planning neglects to incorporate sustainability principles including walkability, green infrastructure, and sustainable mobility.

To foster a socially and culturally healthy community, urban and housing design must include aspects that embody traditional values, while improving walkability , environmental resilience, cultural identity and social interaction.

6.2 RECOMMENDATIONS

Based on the concepts of the 15-Minute Walk City, insights from Masdar City and lessons from conventional design at both urban and residential levels to achieve sustainability goal , the subsequent recommendations for Al-Malaz are explained in both neighborhood and housing level:

a. Urban configuration and land utilization

i. Improving Accessibility and Inclusivity (15-Minute City)

The grid pattern need revision to improve walkability. This can be accomplished by providing covered pedestrian pathways, including green infrastructure (such as trees and bushes), and diminishing the prevalence of expansive roadways to enhance the district's walkability. Infrastructure that is conducive to pedestrians will promote more foot traffic, enhance social connections, and diminish reliance on automobiles.

Guarantee that all vital services (educational institutions, healthcare facilities, parks, retail outlets) are accessible within a 15-minute walk for residents by consolidating services in strategically located, pedestrian-friendly nodes across the district. This will conform to the 15-minute city paradigm, fostering healthy lives and diminishing the ecological impact of automobile usage.

ii. Integrate Cultural and Public Spaces

Cultural spaces, including traditional marketplaces (souqs) and community centers, ought to be incorporated into the neighborhood to embody local cultural values and promote social interaction. These areas can function as centers for community engagement and cultural

events, revitalizing the conventional assembly behaviors observed in historical Saudi urban architecture.

Establish smaller local parks and public squares that promote everyday social interactions and enhance community involvement. These places must be structured to prioritize both privacy and inclusivity, incorporating zones for family gatherings and spaces for solo leisure.

iii. Sustainable Transportation and Public Transit

(Masdar City Model) - Inspired by Masdar City's sustainable transport strategy, Al-Malaz should incorporate public transportation alternatives (e.g., buses or shuttles) that link residents to major urban centers, thereby diminishing reliance on personal vehicles. Simultaneously, promote the utilization of bicycles and other sustainable transportation by establishing designated bike lanes.

By integrating elements from the 15-minute city, Masdar City, and traditional architecture, Al-Malaz can be converted into a sustainable, culturally significant, and socially dynamic community. Enhancing walkability, accessibility to facilities, and integrating cultural elements into housing and public areas would foster well-being, social cohesiveness, and a heightened feeling of community.

iv. Promoting Environmental Sustainability

Landscaping: Integrate vegetation, including gardens, trees, and parks, into residential developments to elevate people' quality of life, offer recreational possibilities, and promote the environmental sustainability of the region. Encourage the creation of community gardens that enable locals to cultivate their own produce, thereby enhancing community engagement and promoting sustainable practices.

v. Enhancing Community Engagement

Design residences including communal courtyards or semi-private areas between dwellings to foster informal social interactions, inspired by traditional design that balances privacy and community. These communal areas can function as venues for neighborly interaction while preserving cultural limits for privacy.

Promote the creation of mixed-use housing developments that integrate residential units with commercial areas, fostering dynamic communities where people can conveniently access services and facilities within walking distance.
Designated Community Spaces: Allocate communal places within residential projects, such as playgrounds, gardens, or community centers, to promote social contact and community involvement

vi. Advocate for Accessibility Features:

Universal Design Principles: Incorporate universal design elements in new housing projects to provide accessibility for all inhabitants, including individuals with impairments. This may encompass ramps, expanded doorways, and accessible restrooms to meet various requirements.
Proximity to Amenities: Ensure that housing complexes are strategically situated near critical services, including educational institutions, healthcare facilities, and public transportation, to improve accessibility and diminish dependence on automobiles.

6.2.1 Social and Cultural Sustainability Approach

Considering the study's findings on social and cultural sustainability in the Al-Malaz district, the following recommendations are for the Residential sector:

i. Green Building Practices (Influence of Masdar City)

Housing development must prioritize sustainability, adhering to the energy-efficient design principles exemplified by Masdar City. This can be accomplished by the integration of the energy-efficient materials and design the building accordingly to the climate to decrease the heat gain and increase the ventilation of the building and using the sun shaded elements that covers the openings to avoid the direct sun heat. The implementation of these technologies will enhance environmental sustainability and decrease utility expenses, hence rendering homes cheaper in the long term.

ii. Incorporating Cultural Identity in Housing Design

Housing design in Al-Malaz should include features of traditional Saudi architecture, like courtyards, diminutive windows, and robust walls to facilitate natural cooling and improve

seclusion. These attributes enhance energy efficiency while honoring the cultural imperative for private, family-oriented living environments.

Design Integration: Housing designs must integrate traditional Saudi architectural elements, like courtyards, diminutive windows, and robust walls that facilitate natural cooling. These components not only improve energy efficiency but also cultivate a sense of cultural identity and belonging among inhabitants.

Employ local craftsmanship and integrate cultural features in housing designs to embody the occupants' cultural heritage. This can augment communal pride and cultural continuity.

iii. Augment Privacy Features

Family-Centric Designs: Conventional designs that segregate residential rooms from social spaces can fulfill the cultural requirement for privacy in Saudi households which can be integrated in the modern design.

outside Spaces: Establish secluded outside areas, such as gardens or patios, that enable families to participate in social activities while preserving privacy. These areas can function as extensions of the residence and elevate outdoor living experiences.

iv. Advocate for Sustainable Construction Practices

Housing in Al-Malaz should be developed with adaptability to accommodate changing family requirements and expansive gathering places to support cultural traditions. Enhancing the adaptability of dwellings enables housing to accommodate the changing needs of people over time.

Incorporating local craftsmanship and materials into building designs can enhance cultural identity. Local motifs, colors, and construction methods must be employed to embody the community's traditions while integrating sustainable principles for energy efficiency.

Energy Efficiency: Promote the adoption of energy-efficient materials and technologies, including solar panels and high-insulation materials, to diminish energy usage and decrease utility expenses for inhabitants. This is consistent with sustainable urban development objectives.

Water Conservation: Incorporate water-efficient fixtures and rainwater harvesting devices into housing designs to enhance water conservation, particularly considering Riyadh's arid climate.

v. Community Involvement in Decision-Making

Participatory Design: Involve inhabitants in the housing design process to guarantee that their needs, preferences, and cultural values are incorporated into new developments. This interactive approach will empower people and augment their sense of ownership and contentment with their living situations.

Feedback Mechanisms: Create avenues for inhabitants to offer input on housing designs and community layouts, facilitating ongoing enhancement and adjustment to the community's changing requirements.

By executing these ideas at the neighborhood and housing level, Al-Malaz can augment its cultural identity, elevate people' quality of life, and foster social cohesion while harmonizing with overarching objectives of sustainability and inclusion. These initiatives will not only advantage current inhabitants but also cultivate a more appealing and robust community for future generations.

The thesis has underscores the importance of integrating social, cultural, and environmental considerations into urban development practices in Al-Malaz. By executing these ideas of community engagement, promoting cultural identity, enhancing accessibility, and implementing sustainable practices at the neighborhood and housing, Al-Malaz has the potential to transform into a vibrant, inclusive, and culturally rich neighborhood. Such efforts will not only improve the quality of life for residents but also contribute to the broader goals of sustainable urbanization in Riyadh. By adopting a holistic approach to urban development, Al-Malaz can become a model for sustainable living, reflecting the rich heritage of its residents while addressing the challenges of modern urban life.

6.2.2 Kingdom’s 2030 Vision

The vision is built around three primary themes: An Ambitious Nation, A Vibrant Community and A Thriving Economy based on different sectors as explained in (Figure 6.1) The research described in the abstract is closely tied to Riyadh's 2030 Vision, described as a

comprehensive strategic plan aimed at making the city more lively, sustainable, and habitable. The 2030 Vision stresses sustainable urban growth, environmental conservation, and improving citizens' quality of life. As assessing the urban sustainability, social and cultural implications of housing growth in Al-Malaz district, the study helps the city meet its sustainability goals. Understanding the consequences of residential development in Al-Malaz can help shape future urban development policies, such as those indicated in Riyadh's 2030 vision. By analyzing the problems and opportunities associated with housing development, policymakers and urban planners can modify their approaches to ensure that the development project is consistent with the city's long-term goal of growth and prosperity. The study also contributes to Riyadh's resilience and adaptation tactics by investigating how housing development affects community well-being, affordability, and cultural dynamics. By recognizing vulnerabilities and strengths in the urban environment, municipal leaders may better prepare for and respond to future concerns such as growing urbanization and climate change. The study's findings can help to examine and enhance Riyadh's residential development policies and practices which is one of the city's future projects in the residential sectors which known as Construction and building of new housing units and renovation and repair of existing homes. Policymakers may make educated decisions to encourage responsible and sustainable development practices by analyzing how effective present policies are at achieving sustainability goals. In essence, the research directly contributes to Riyadh's 2030 Vision by offering useful insights on the effects of housing and urban development on sustainability and resilience. By answering major research questions

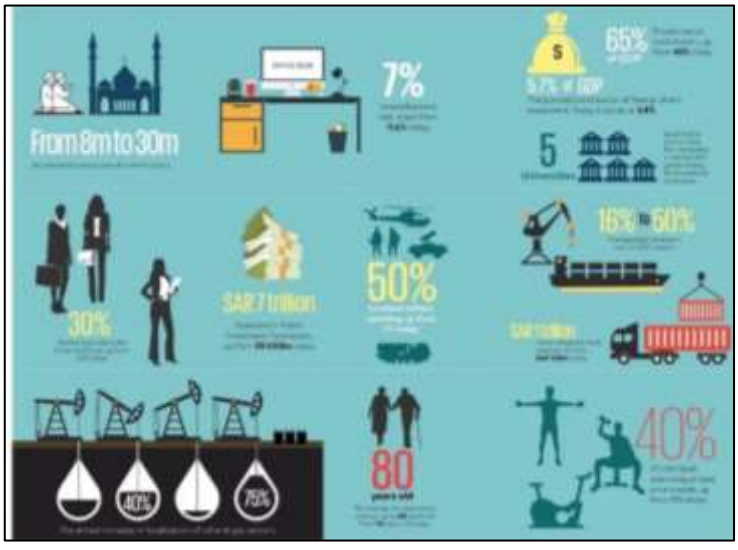


Figure 6.1: The Aim of Saudi Vision 2030 Source: (Saudi Vision 2030).

indicated in the abstract, the study contributes to ongoing efforts to make Riyadh a more sustainable, resilient, and livable city for its citizens.

7. CONCLUSIONS

In conclusion, this study sheds light on the complex effects of housing sustainability construction in impact of urbanization in Riyadh city, with a special emphasis on the Al-Malaz neighborhood. The study highlights the interdependence of housing developments with broader urban sustainability goals by conducting a comprehensive evaluation that includes social, cultural and sustainability practices components. Housing development in Al-Malaz has been shown to have a major impact socially, culturally and sustainably. The findings underscore the importance of implementing ecologically sustainable building and design approaches to reduce the negative impacts from the environmental, cultural and social point of view. Furthermore, the study exposes the complex social dynamics shaped by housing development, such as community well-being and daily life. Addressing these social factors is critical to building inclusive and resilient urban communities. In addition, the cultural aspect of housing development emphasizes the need of preserving local heritage and identity in the face of growing urbanization. Balancing modernization with cultural adaptation is critical for establishing a feeling of community and social cohesiveness. This study used a mixed-methods approach to provide a nuanced understanding of the complicated relationships between housing growth and urban sustainability in Riyadh. The findings are useful for policymakers, urban planners, and architects as they build future plans for sustainable urban growth in districts in specific and in the city in general. To summarize, promoting sustainability in Riyadh's housing development necessitates a comprehensive approach that considers environmental stewardship, social equality, economic viability, and cultural preservation. Riyadh can pave the way for a more resilient and livable urban future by embracing sustainable practices and learning from the consequences seen in Al-Malaz. This thesis has examined the housing development and urban sustainability of the Al-Malaz district in Riyadh, focusing specifically on social and cultural dimensions that significantly influence residents' experiences. Given Al-Malaz's role as one of the major contemporary neighborhoods in Saudi Arabia's rapidly urbanizing capital, it provides a compelling case study for understanding the intricate relationships between urban design, cultural identity, and community engagement.

REFERENCES

Ahmad, T., & Thaheem, M. J. (2017). Developing a residential building-related social sustainability assessment framework and its implications for BIM. Sustainable Cities and Society, 28, 1–15. https://doi.org/10.1016/j.scs.2016.08.002

Aina, Y. A., Adam, E. M., & Ahmed, F. (2017). Spatiotemporal variations in the impacts of urban land use types on urban heat island effects: The case of Riyadh, Saudi Arabia. *The International Archives of the Photogrammetry, Remote Sensing and Spatial Information Sciences*, 42, 9-14.

Al-Hathloul, S. (2017). Riyadh development plans in the past fifty years (1967-2016). *Current Urban Studies*, 97-120.

Al-Hathloul, S., Al-Hussayen, M., & Shuaibi, A. (1975). Urban land utilization, Riyadh, Saudi Arabia. Cambridge, MA: Education/Research Program, USD, MIT.

Al-Hemaidi, W. (2001). The metamorphosis of the urban fabric in an Arab-Muslim city: Riyadh, Saudi Arabia. *Journal of Housing and Built Environment*, 16, 179-201.

Al-Hemaidi, W. K. (2001). The metamorphosis of the urban fabric in Arab-Muslim city: Riyadh, Saudi Arabia. *Journal of Housing and the Built Environment*, 16, 179-201.

Al-Mayouf, A., & Al-Khayyal, A. (2011). Provision of public housing in Saudi Arabia: Past, current and future trends. *Population*, 2004, 2007.

Almehrej, M. I. (2015). A design guide for contemporary Saudi Arabian homes in Riyadh. *University of Northumbria at Newcastle (United Kingdom)*.

Almulhim, A. I., & Brandful Cobbinah, P. (2023). Can rapid urbanization be sustainable? The case of Saudi Arabian cities. In Elsevier Ltd., *Habitat International* (Vol. 139, p. 102884) [Journal-article]. https://doi.org/10.1016/j.habitatint.2023.102884

Al-Nowiser, M. (1996). Toward a residential zoning regulation approach for Saudi Arabia. *Journal of Architectural and Planning Research*, 13(2), 91-106.

Al-Nowiser, M. (2010). Alinsan wa alomran (Human and urban: application study on Riyadh). Riyadh: King Saud University Press. (In Arabic)

Alqahtany, A. (2022). Green roof as an approach to enhance urban sustainability: A study of perception in Riyadh, Saudi Arabia. *Strategies for Sustainable Urban Development*, 1-13.

Al-Said, F. (2003). The pattern of structural transformation of the Saudi contemporary neighborhood: The case of Al-Malaz, Riyadh, Saudi Arabia. In *39th International Society of City and Regional Planners Congress* (pp. 2-8).

ALshabanat, A., & Omer, S. (2023). The potential of green engineering solutions for energy conservation in residential buildings towards sustainability: A case study of Saudi Arabia. *Architecture*, 3(4), 713-738.

Alshabib, A., & Ridgway, S. (2021). Aramco and Al-Malaz Housing Schemes: The origins of modern housing in Saudi Arabia. *Histories of Postwar Architecture*, (8), 147-166.

Angel, S., Parent, J., Civco, D. L., Blei, A., & Potere, D. (2011). The dimensions of global urban expansion: Estimates and projections for all countries. *Progress in Planning*, 53-107.

AR Riyadh Development Authority (ADA). (2016). Background of the Riyadh Public Transport Network.

Batty, M., et al. (2012). Smart cities of the future. *The European Physical Journal Special Topics*, 481-518.

Beatley, T. (2012). *Green urbanism: Learning from European cities*. Island Press.

Bin Sulaiman, F. F. S. (2017). The role of urban form in sustainability: the case study of a Riyadh city neighborhood (Doctoral dissertation, Newcastle University).

Eben-Saleh, M. (1998b). Actual and perceived crime in residential environments: A debatable discourse in Saudi Arabia. *Building and Environment*, 33(4), 231-244.

Eben-Saleh, M. (2001). The evolution of planning & urban theory from the perspective of vernacular design: MOMRA initiatives in improving Saudi Arabia neighborhoods. *Land Use Policy*, 18, 179-190.

Fatourehchi, D., & Zarghami, E. (2020). Social sustainability assessment framework for managing sustainable construction in residential buildings. Journal of Building Engineering, 32, 101761. https://doi.org/10.1016/j.jobe.2020.101761

Grimm, N. B., Faeth, S. H., Golubiewski, N. E., Redman, C. L., & Briggs, J. M. (2008). Global change and the ecology of cities. *Science*, 756-760.

Handy, S. L., Boarnet, M. G., Ewing, R., & Killingsworth, R. E. (2002). How the built environment affects physical activity: views from urban planning. *American Journal of Preventive Medicine*, 23(2), 64-73.

High Commission for the Development of AR Riyadh (HCDR). (2016). Transit Oriented Development, Strategy & Case Studies for Riyadh.

Lami, I. M., & Mecca, B. (2021). Assessing Social Sustainability for Achieving Sustainable Architecture. Sustainability, 13, 142. https://dx.doi.org/10.3390/su13010142

Maghelal, P. K., Li, X., & Qahtani, A. (2022). EVALUATING THE ACCESSIBILITY OF A SUSTAINABLE CITY: CASE STUDY OF MASDAR CITY, UAE. *WIT Transactions on the Built Environment*. https://doi.org/10.2495/umt220081

Mansour, S. (2015). Spatial analysis of public health facilities in Riyadh Governorate, Saudi Arabia: A GIS-based study to assess geographic variations of service provision and accessibility. *Faculty of Arts, Department of Geography and GIS, Alexandria University*, 5-10.

Memmott, P., & Keys, C. (2015). Redefining architecture to accommodate cultural difference: Designing for cultural sustainability. Architectural Science Review, 58(4), 278-289.

Michalina, D., Mederly, P., Diefenbacher, H., & Held, B. (2021). Sustainable Urban Development: A Review of Urban Sustainability Indicator Frameworks. *Sustainability*, 9348. https://doi.org/10.3390/su13169348

Moreno,C. (2024). *The 15-Minute City: A solution to saving our time and our planet* (1st ed.).

Mortada, H. (2016). Sustainable Desert Traditional Architecture of the Central Region of Saudi Arabia. *Sustainable Development*, *24*(6), 383–393. https://doi.org/10.1002/sd.1634

Mubarak, F. (2004). Urban growth boundary policy and residential suburbanization: Riyadh, Saudi Arabia. *Habitat International*, 28, 567-591.

Mubarak, F. A. (1999, June). Cultural adaptation to housing needs: A case study, Riyadh, Saudi Arabia. In *IAHS Conference Proceedings* (pp. 1-7).

Philby, H. S. J. (1959). Riyadh: Ancient and modern. *The Middle East*, 129-141.

Pierce, A. (2024, January 11). *17 BEST NEIGHBORHOODS To Live in Riyadh Saudi Arabia [2024]*. One Life Passport. https://www.onelifepassport.com/neighborhoods-to-live-in-riyadh-saudi-arabia/#:~:text=Learn%20about%20the%20pros%20and%20cons%20of%20living%20in%20Riyadh

Policy Guide on Planning for Sustainability. (2000). New York, NY.

Pozoukidou, G., & Chatziyiannaki, Z. (2021). 15-Minute City: Decomposing the New Urban Planning Eutopia. *Sustainability*. https://doi.org/10.3390/su13020928

Pullen, S., Arman, M., Zillante, G., Zuo, J., Chileshe, N., Wilson, L., & Institute for Sustainable Systems and Technologies University of South Australia. (2010). Developing an Assessment Framework for Affordable and Sustainable Housing. In *Australasian Journal of Construction Economics and Building* (Vols. 10–1/2, pp. 48–64).

Rapoport, A. (1969). house form and culture (Vol. 146). university of wisconsin.

Riyadh Climate, Weather by Month, Average Temperature (Saudi Arabia) - Weather Spark. (n.d.). Retrieved from https://weatherspark.com/y/104018/Average-Weather-in-Riyadh-Saudi-Arabia-Year-Round#Figures-ColorTemperature

Riyadh Population 2024. (n.d.). Retrieved from https://worldpopulationreview.com/world-cities/riyadh-population

SAGNIA, B. K. & INTERNATIONAL NETWORK FOR CULTURAL DIVERSITY. (2004). *FRAMEWORK FOR CULTURAL IMPACT ASSESSMENT*. https://cnxus.org/wp-content/uploads/2022/04/FRAMEWORK20FOR20CULTURAL20IMPACT20ASSESSMENT20INCD_2004.pdf

Saleh, M. A. E. (1998). The integration of tradition and modernity: A search for an urban and architectural identity in AR Riyadh, the capital of Saudi Arabia. *Habitat International*, 22(4), 571-589.

Saudi Vision 2030. (n.d.). Retrieved from https://www.vision2030.gov.sa/en/

Saudia Channel. (2018, July 24). Why do we live in houses with high walls? Abdul Mohsen Al-Dhiyab [Video]. YouTube. https://www.youtube.com/watch?v=J-_O5R8SVc8

Saudia Channel. (2019, December 18). Meeting with His Excellency the General [Video]. YouTube. https://www.youtube.com/watch?v=CpBUblSvLN4

Saudia Channel. (2020, February 26). How were the cities of Saudi Arabia planned so badly? [Video]. YouTube. https://www.youtube.com/watch?v=nR-A-1ax9fM

Saudia Channel. (2022, February 9). Our cities were not designed for humans, according to Saleh Al-Hathlo [Video]. YouTube. https://www.youtube.com/watch?v=y54AJwbBMiA

Saudia Channel. (2022, October 15). Humanizing future cities [Video]. YouTube. https://www.youtube.com/watch?v=hmwU9O0WXu0

Saudia Channel. (2024, April 8). (A story in architecture) [Video]. YouTube. https://www.youtube.com/watch?v=7lSxBwRLg8A

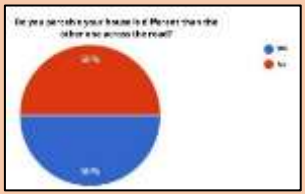
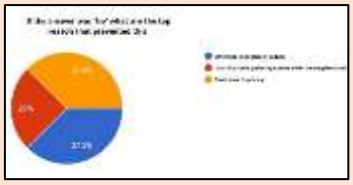
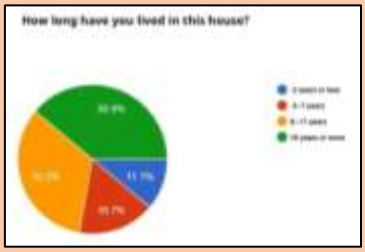
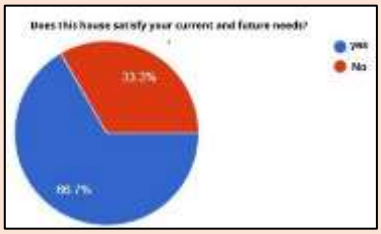
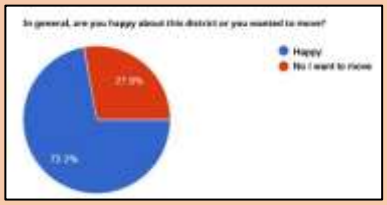
Taha, M. N. A. (2024, April). Balancing heritage preservation and regeneration in Riyadh: Objectives and considerations. In *KEEP ON PLANNING FOR THE REAL WORLD. Climate Change calls for Nature-based Solutions and Smart Technologies. Proceedings of REAL CORP 2024, 29th International Conference on Urban Development, Regional Planning and Information Society* (pp. 59-71). CORP– Competence Center of Urban and Regional Planning.

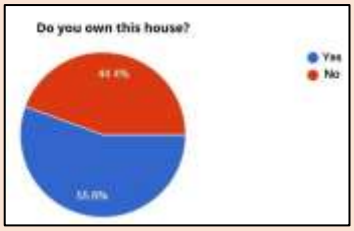
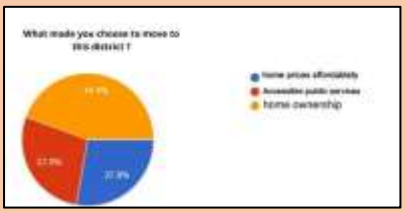
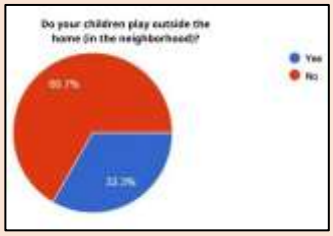
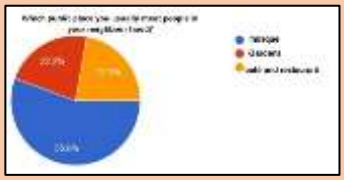
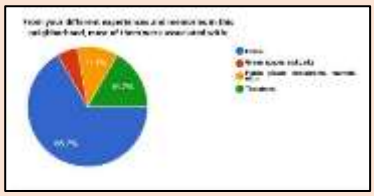
Tribal, Planners and Urban Designers, O' Mahony Pike, Architects and Urban Designers, MacCabe Durney, Town Planners and Urban Designers, Design for Homes, Residential Research Consultant, Zero-G, Communications Design, Department of Environment, Heritage and Local Government, & Gormley, J. (2009). *Urban Design Manual*.

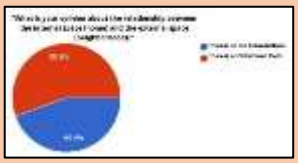
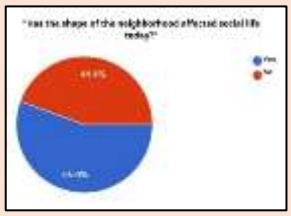
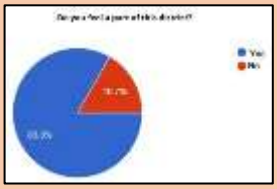
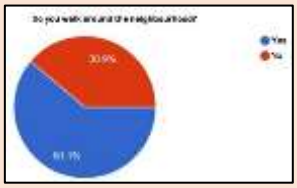
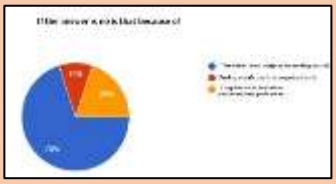
Wu, S. R., Fan, P., & Chen, J. (2016). Incorporating culture into sustainable development: A cultural sustainability index framework for green buildings. *Sustainable Development*, *24*(1), 64-76.

APPANDEX A

home	Al-Malaz district		SURVEY
	QUESTIONS		ANSWERES
SOCIAL ASSESSMENT	Resident Satisfaction and Empowerment	How long have you lived in this house?	(Less than 2 years / 3-7 years / 8-17 years / More than 18 years)
		Does this house satisfy your current and future needs?	(Yes / No)
		In general, are you happy about this district, or do you want to move?	(Happy / Want to move)
	Housing Affordability	Do you own this house?	(Yes / No)
		Do you think this dwelling is temporary or for your future?	(Yes / No)
		What made to choose to move to this district?	Home price affordability, accessible public services, home ownership
	Access to Services and Amenities	Do your children play outside the home (in the neighborhood)?	(Yes / No)
	Social Interaction and Community Engagement	Which public place do you usually meet people in your neighborhood?	(Mosque / Garden / Cafe/Restaurant / Other)
		From your different experiences and memories in this neighborhood, most of them were associated with?	(House/Green spaces and parks/ public places, restaurant market etc. / the street)
		What is your opinion about the relationship between the internal space(home) and the external space (neighborhood)?	Ther is no link between them There is a link between them
		Has the shape of the neighborhood affected social life today?	(Yes / No)
		Do you feel a part of this district?	(Yes / No)
	Safety and Security	Do you walk around the neighborhood?	(Yes / No)
		if the answer is no is that because of?	(The district is not designed for walking around, Feeling unsafe due to unorganized traffic ,Long distance to destinations such as (markets, public areas...)
		If your children do not play outside, what are the reasons?	(Lack of play areas / Lack of trust in the community / Safety concerns / Traffic movement)
CULTURE ASSESSMENT	CULTURAL SPACES AND COMMUNITY INTERACTION	What is the reason that weak the connection between the private place(home) and the public space in the neighborhood?	(Difference in neighbors' culture/ Lack of acceptable gathering spaces in the neighborhood/ Preference for privacy).
	Cultural Identity and Heritage	To what extent do you think your home reflect your cultural value?	(Rate out of 10)
		Do you perceive your house as different from the house across the road?	(Yes / No)

The Residence House Symbolizes Their Cultural Value	
Perception of The Residence to Their Home in Term of Shape	
The Reason of Unrelated Connection Between Internal and External Spaces	
length of residence	
Satisfaction of The Resident Current and Future Needs	
Residents' Satisfaction of Public Spaces	

Perceptions of Dwelling Permanency	
The Reason Behind Choosing Al-Malaz District	
Children Engagement to The District	
The Most Visitable Public Space	
The Most Place That Is Associated with The Residences' Experiences	

The Relation Between the Internal and External Spaces	
The Effect of The District's Structure on The Social Life	
The Belonging for The District	
Walkability in The District	
The Reason of Not Preferring to Walk	
The Reason of Not Engaging the Children to The District