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**Department of
Economics and Finance**

Impediments to Sustainable Housing Development and its Competitive Edge in Bahrain's Residential Sector

A Thesis Submitted in Partial Fulfilment of the Requirements for the
M.Sc. Degree in Real Estate Development and Property Management

Submitted by

**Zainab Salman Ashoor Mohamed
20100937**

Supervised by

Dr Ali Murad Syed
Assistant Professor
University of Bahrain

Kingdom of Bahrain

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Defence Committee's Approval

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Thesis Discussion Committee Decision

Form Code: UDNGS013

Student Name:	Zainab Salman Ashoor Mohamed
Student ID. No.	20100937
Department:	Economics and Finance
College:	Business Administration
Program:	Masters in Real Estate Development and Property Management
Student GPA:	3.96
Thesis Title:	Impediments to Sustainable Housing Development and its Competitive Edge in Bahrain's Residential Sector

The Discussion Committee met on 26/10/2025 in Room # S1B-281 and on TEA upon discussing the student whose details are stated above in public. The discussion committee recommends the following:

The student is awarded the grade Pass in the thesis course RES695.

- ☐ Without making any changes to the thesis.
- ☒ After making the modifications attached with this decision.

Discussion Committee Members Approval:

1.	Supervisor Name:	Dr. Ali Murad Syed	Sign.:	
2.	Internal Examiner:	Prof. Qaiser Munir	Sign.:	
3.	External Examiner:	Dr. Mohammed Ather Elahi	Sign.:	

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الكلية:	كلية إدارة الأعمال
البريد الإلكتروني:	zainab.s.mohammed@gmail.com
رقم الاتصال:	٣٩٢١٨٨٧٧

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Abstract

As one of the developing countries, the Kingdom of Bahrain has ratified the 2030 Agenda for Sustainable Development and fully adopted and integrated its goals into its 2030 national economic plan, which includes developing sustainable human settlements and cities. Despite the national initiatives and endeavours to attain this goal, the conversion towards sustainable buildings in Bahrain is slower than projected, as sustainable housing transformation strategies have not been adopted up to now in the absence of a progress measuring plan. This raised the urgency to explore the extent of Bahraini housing stakeholders' awareness of sustainable residential for the purpose of perceiving their advantages and the impediments to their adoption. The case study design, which comprised in-depth, semi-structured individual interviews with fifteen key figures from Bahrain's public and private housing sectors, who represented various levels of organisational hierarchy, served as guidance for this qualitative thesis. The thematic analysis of the raw data induced several codes that revealed the extensive knowledge of sustainable housing practices in the four facets of sustainability: economic, environmental, social, and cultural. Proper planning, design, and construction techniques, power and water efficiency solutions, privacy, security, and safety features, and dwelling affordability were the most applied principles in the Bahrain housing market. The leading real estate players concurred that mitigating maintenance and operational expenditures, raising the market value of properties, and enhancing residents' quality of life represented the principal benefits of sustainable attributes. However, according to the stakeholders' perspectives, insufficient policies, regulations, and standards, neediness for additional government incentives, and high investment capital for sustainable methods formed significant barriers to the implementation of sustainable housing. The novelty and uniqueness of this study contribute to the corpus of knowledge, and its crucial implications will be advantageous for investors, decision-makers, and academics who are responsive to change.

Key Words

Sustainable Housing; Residential Properties; Economic Sustainability; Competitive Edge; Impediments

Dedication

This thesis is dedicated to my beloved parents, whose steadfast love and support have been a constant source of strength since my earliest days.

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Table of Contents

Defence Committee's Approval.....	A
Dissertation Deposit Form	B
Abstract	C
Dedication	D
Acknowledgements	E
Table of Contents	F

Chapter One Introduction

1.1 Introduction.....	1
1.2 Research Problem	2
1.3 Research Questions.....	5
1.4 Research Objectives.....	6
1.5 Research Significance.....	6
1.6 The Study's Setting.....	8
1.7 Research Terminology	8

Chapter Two Literature Review

2.1 Introduction.....	9
2.2 Sustainable Housing Concept	10
2.2.1 Housing Cultural Sustainability	11
2.2.2 Housing Social Sustainability.....	12
2.2.3 Housing Economic Sustainability	13
2.2.4 Housing Environmental Sustainability	13
2.3 Sustainable Housing Advantages.....	15
2.4 Sustainable Housing Impediments.....	19
2.5 Literature Benefits and the Research Gap	32
2.6 The Economic and Financial Theories Guiding Stakeholder Decision-Making.....	34

2.6.1	Utility Theory	34
2.6.2	The Time Value of Money (TVM) Theory	35
2.7	Conclusion	37

Chapter Three

Research Methodology

3.1	Introduction.....	38
3.2	Research Methodology	38
3.2.1	Rationale for Employing Qualitative Research.....	40
3.2.2	Rationale for Choosing Case Study Design	41
3.2.3	The Researcher's Role and Reflexivity	43
3.3	Research Tools.....	44
3.3.1	Trustworthiness of the Data.....	45
3.4	Data Collection Procedures.....	47
3.4.1	The Study's Participants	47
3.4.2	Data Collection Process.....	50
3.4.3	Data Analysis.....	52
3.4.3.1	Phase 1: Familiarising with Data.....	54
3.4.3.2	Phase 2: Producing Preliminary Codes.....	54
3.4.3.3	Phase 3: Probing for Themes.....	55
3.4.3.4	Phase 4: Reviewing Themes.....	56
3.4.3.5	Phase 5: Identifying and Naming Themes.....	56
3.5	Ethical Concerns	57
3.6	Conclusion	58

Chapter Four

Analysis and Discussion

4.1	Introduction.....	59
4.2	Description of Participants.....	59
4.3	Descriptive Analysis of Participants' Demographic Characteristics 67	
4.3.1	Nationality	68

4.3.2	Age	69
4.3.3	Gender	70
4.3.4	Education Level and Academic Specialisation	70
4.3.5	Employment Level and Sector	72
4.3.6	Experience and Job Specialisation	73
4.4	Themes And Codes Development	74
4.4.1	The Awareness of Stakeholders in Bahrain of Sustainable Housing 80	
4.4.2	The Benefits of Sustainable Housing Adoption	84
4.4.3	The Barriers to Sustainable Housing Adoption.....	88
4.5	Discussion of Results	92

Chapter Five

Conclusion and Recommendations

5.1	Conclusion	104
5.2	The Study's Limitations.....	106
5.3	Recommendations and Future Research	107
	References	109
	Appendices	120
	Abstract (Arabic).....	155

List of Tables

Table (2.2): Overview of the Related Studies Included in the Literature Review.....	25
Table (2.3): Most Prevalent Sustainable Housing Advantages Introduced in the Literature	30
Table (2.4): Most Prevalent Sustainable Housing Impediments Introduced in the Literature	31
Table (4.1): An Abstract of the Study's Participants' Demographics, Academics, and Practical Backgrounds	65
Table (4.2): Description of the Demographic Characteristics of the Participants in the Study.....	67
Table (4.3): The Codebook Generated by NVivo 15 Software for Codes and Themes Emerged from Interviews	75
Table (4.4): Matrix Coding of the Most Significant Codes Perceived by Bahraini Stakeholders According to Their Specialisations.....	78

List of Figures

Figure (3.1): A research approach framework: The correlations between worldviews, designs, and research methods.....	40
Figure (3.2): The adopted research approach framework in the thesis	40
Figure (4.1): Visualised distribution of participants' nationality	69
Figure (4.2): Visualised distribution of participants' age group	69
Figure (4.3): Visualised distribution of participants' gender	70
Figure (4.4): Visualised distribution of participants' education level.....	71
Figure (4.5): Visualised distribution of participants' academic specialisation	71
Figure (4.6): Visualised distribution of participants' employment level ..	72
Figure (4.7): Visualised distribution of participants' employment sector	73
Figure (4.8): Visualised distribution of participants' experiences	74
Figure (4.9): Visualised distribution of participants' job specialisation ..	74
Figure (4.10): A mind map of the codes and themes used to evaluate the awareness of Bahraini stakeholders of sustainable housing.....	81
Figure (4.11): The explore diagram to evaluate the awareness of Bahraini stakeholders of sustainable housing	81
Figure (4.12): A comparison bar chart of Bahraini stakeholders' awareness of housing environmental sustainability policies	82
Figure (4.13): A comparison bar chart of Bahraini stakeholders' awareness of housing economic sustainability policies.....	82
Figure (4.14): A comparison bar chart of Bahraini stakeholders' awareness of housing social sustainability policies.....	83
Figure (4.15): A comparison bar chart of Bahraini stakeholders' awareness of housing cultural sustainability policies.....	83
Figure (4.16): A bar chart of Bahraini stakeholders' most knowledgeable sustainable housing policies	84

Figure (4.17): A mind map of the codes and themes used to explore the benefits of sustainable housing adoption	85
Figure (4.18): The explore diagram to investigate the benefits of sustainable housing adoption	85
Figure (4.19): A comparison bar chart of the environmental benefits of sustainable housing adoption	86
Figure (4.20): A comparison bar chart of the economic benefits of sustainable housing adoption	86
Figure (4.21): A comparison bar chart of the social benefits of sustainable housing adoption	87
Figure (4.22): The most significant benefits of sustainable housing adoption perceived by stakeholders	87
Figure (4.23): A mind map of the codes and themes used to explore the barriers to sustainable housing adoption	89
Figure (4.24): The explore diagram to investigate the barriers to sustainable housing adoption	89
Figure (4.25): A comparison bar chart of the economic barriers to sustainable housing adoption	90
Figure (4.26): A comparison bar chart of the regulatory barriers to sustainable housing adoption	90
Figure (4.27): A comparison bar chart of the technical barriers to sustainable housing adoption	91
Figure (4.28): The most important barriers to sustainable housing adoption according to stakeholders' viewpoints.....	91

List of Abbreviations

GDP	Gross Domestic Product
SH	Sustainable Housing
TVM	Time Value of Money
UN	United Nations
UN-Habitat	United Nations Human Settlements Programme

List of Appendices

Appendix (1): Research Terminology.....	120
Appendix (2): The Thematic Map that Demonstrates the Three Global Themes and the Ten Organising Themes.....	123
Appendix (3): The Explore Diagrams for all Sustainable Housing Dimensions and Policies Generated by NVivo 15 Software.....	125
Appendix (4): The Explore Diagrams for all Benefits of Sustainable Housing Adoptions Generated by NVivo 15 Software.....	138
Appendix (5): The Explore Diagrams for all Barriers to Sustainable Housing Adoptions Generated by NVivo 15 Software.....	145
Appendix (6): A Conceptual Model that Summarises the Achieved Competitive Outcomes for Each Organising Theme	153

Chapter One

Introduction

1.1 Introduction

The global housing industry faces unprecedented challenges due to the vast figures of residential demand in light of the population explosion, finite natural and financial resources, and growing sociocultural pressures. Indeed, the significance of housing transcends its conventional role as a crucial social factor that impacts the welfare and life quality of people and places. Rather, it serves as a major contributor to energy consumption and exerts a pivotal influence on the economic dynamics of countries. These intriguing interconnections compel viewing housing as an essential component of sustainable development and emphasise the indispensable role of sustainable housing in tackling the various economic, social, environmental, and cultural objectives concurrently.

Bahrain, as a developing country, is currently manifesting an economic revival in the real estate sector, which has seen a massive uptick in transactions in 2023 of 20.9% compared to 2022 (Global Commercial Real Estate Services Group, 2024). This expansion and its accompanying comprehensive impacts underscore the necessity of integrating sustainable development goals with housing, rather than treating them as distinct domains. In light of that, Bahrain has proven an unambiguous dedication to sustainability, which has become one of the main pillars of its 2030 Economic Development Plan. Mindful of its significance, Bahrain adopted the seventeen development goals and has made substantial efforts to achieve the 11th development goal, represented by granting sustainable, safe, inclusive, and resilient human settlements and cities.

Despite this national dedication, the Kingdom's transition toward sustainable housing is sluggish and limited. The disparity between the

planned goals and the real implementation serves as the impetus behind the current study to explore Bahraini stakeholders' awareness in relation to sustainable residential development. Accordingly, employing a qualitative case study design and semi-structured interview tool, this investigation will focus on recognising the primary drivers and impediments to the sustainability embracement from the housing industry's supply-side perspectives.

The exploratory nature and novelty of this study necessitate the espousal of a qualitative case study approach to comprehend the rationale, perceptions, and driving forces underlying the adoption of sustainable housing, which is vital for perceiving not only the concluded decisions themselves but also the reasoning that informs them. Backed by a semi-structured interview tool, the investigation would allow for the exploration of a broad range of reliable, in-depth perspectives across diverse stakeholders. The captured, profound, context-specific insights and outcomes will guide strategies to enhance resource allocation, promote the social acceptance of sustainable buildings, and hasten the movements to attain the 11th development goal.

1.2 Research Problem

According to Enerdata (2023), the residential sector, which comprises energy required for the cooling, heating, and lighting of domestic spaces, as well as the equipment and appliances that are housed within, took responsibility for 28% of the total power consumption in Bahrain in 2022. Apart from this, the construction process consumes considerable quantities of water in all its operations, for which there are no accurate statistics when the world is suffering from amplifying water stress and water scarcity risk. As reported by Kuzma et al. (2023), on a global scale, Bahrain is one of the five most water-stressed nations. Not only this but also the urbanisation

and building refurbishment initiatives yielded a rapidly growing amount of construction waste. In 2021, for example, the construction sector in Bahrain generated over half a million metric tonnes of waste, representing 11.6% of the total municipal waste (Bahrain Open Data Portal, 2025).

The given truths in consort with the dramatic Bahrain population increase of +1,238% in the last seventy years and scarcity of lands and resources mandate the necessity for more rapid changes in the real estate sector through engaging in sustainable building practices. At present, the world has charted the transformation process towards sustainability through many agreements and frameworks, most importantly the 2030 Agenda for Sustainable Development. Bahrain has ratified, fully adopted, and incorporated its goals into its 2030 national economic plan. The eleventh goal of this agenda concentrates on making human settlements and cities sustainable, safe, inclusive, and robust (Ministry of Sustainable Development, n.d.).

Moreover, the Kingdom declared multiple short-term goals were also declared for 2035, including a twofold rise in the objective for renewable energy (Government of Bahrain, n.d.). Within this framework also, the Ministry of Works published a detailed code for implementing green buildings in 2021 (Benayat - Building Permit Portal, 2021). Indeed, the sustainable building criteria were already applied to some projects, for example, Sheikha Mozah Bint Hamad Al Khalifa Model School and the Postal Isolation Building in Hidd (Ministry of Works, n.d.-a, n.d.-b). Based on the Green Building Information Gateway (n.d.), the number of Leadership in Energy and Environmental Design LEED-certified sustainable properties in Bahrain is limited to nine, which was also confirmed by Alqahtani and Alareeni (2020). Alqahtani and Alareeni (2020) highlighted the weak implementation level of sustainability

techniques in Bahrain, with most building designs not utilising renewable energy sources.

Despite the above-presented nationwide initiatives in the last decades, the conversion towards sustainable buildings in Bahrain is slower than projected, as sustainability housing transformation strategies have not been adopted up to now in the absence of the progress measuring plan. Furthermore, the prevailing legislation, policies, and regulations do not enforce the imperative of coping with sustainable approaches and techniques. Heretofore, the decision-makers have not introduced any local rating system for sustainable buildings, as in various world countries such as Singapore and Malaysia. Beyond that, there is a lack of updated official local lists regarding the total number of sustainable estates in Bahrain.

Switching from traditional to sustainable properties necessitates a thorough comprehension of contemporary sustainable strategies that could assist real estate companies in achieving their economic, social, environmental, and institutional goals. As sustainability is one of the main tenets of Bahrain's Economic Vision 2030, the urgency arose to probe the Bahraini housing stakeholders' viewpoints about sustainable buildings to analyse the level of present awareness of these modern properties' advantages. As well as identify the primary impediments that have hindered the implementation of sustainable estates in the Kingdom of Bahrain, especially after their adoption in other nearby and international countries.

The in-depth rummaging search in various journals and e-resources archives has revealed that information related to the SH concept is scarce in Bahrain. More crucially, hardly any researcher had captured and explored the benefits and hindrances of sustainable housing construction in the country. Certainly, the conversion towards sustainable residential properties will not progress to the intended level unless the competitive edges and obstacles to their proliferation are comprehensively scrutinised.

Without a doubt, raising the SH issue and conferring it with varying housing stakeholders would uncover the significance of this necessary demand that the government adopt in its national development plan as a key guiding principle.

1.3 Research Questions

The exploration will attempt to obtain responses to the queries irritating the scientific circles and practitioners as to what grounds and rationales are behind the resistance of Bahrain's residential sector to incorporating sustainable construction approaches into new housing despite its globally recognised advantages in social, economic, institutional, and environmental aspects. Therefore, the investigation will examine the predominant consciousness about sustainable dwellings in Bahrain's local community by posing the following three questions:

1. To what extent are key stakeholders, including developers and investors, knowledgeable about the applications of environmental, economic, social, and cultural dimensions of sustainable housing, such as cost-saving energy efficiency systems?
2. What specific financial benefits, such as reduced maintenance costs, lower utility bills, and increased property values, do stakeholders perceive as incentives for adopting sustainable housing in comparison to traditional housing options?
3. What particular challenges do stakeholders identify, including high initial costs, lack of public awareness, and insufficient government incentives, that hinder the adoption of sustainable housing practices in Bahrain?

The research questions will afford a distinct focus and course of action to the study and assist in pursuing the knowledge and insights that will guarantee the continued targeting of the research's fundamental concern.

Furthermore, these questions will facilitate achieving the research objectives by deriving suitable, proper answers that will be obtained at the end of the probe.

1.4 Research Objectives

This research primarily intends to probe deeply into the extent of Bahraini society's awareness of SH by presenting and debating the issue with the various housing stakeholders to draw inferences specifically related to the following:

1. To evaluate the extent of awareness and understanding among key stakeholders in Bahrain's residential sector regarding the applications of environmental, economic, social, and cultural dimensions of sustainable housing.
2. To quantify the economic advantages associated with sustainable housing practices in Bahrain, including but not limited to savings in maintenance and utility costs.
3. To investigate the barriers perceived by stakeholders as obstacles to the adoption of sustainable housing practices in Bahrain.

1.5 Research Significance

The series of economic, environmental, and social concerns related to destitution, climate change, vagrancy, and resource scarcity that the globe is currently confronting underscore that incremental change towards conscious sustainable practices is no longer an option. The percipient impacts of these issues enforce the need for accelerating action to adopt mitigation and adaptation policies and strengthening the global response to these threats to preclude their rapid progression. Hence, in view of the fact that residential estates are associated directly with these concerns in one way or another and comprise a substantial goal in the 2030 Agenda. It is

plausible to conclude that housing, in particular, plays a key role in contributing to tackling these issues in Bahrain and the rest of the world.

This situation imposes the urgency of the world shifting towards SH and accentuates the importance of investigating Bahrain separately to assess public awareness of the advantages of SH and strive to comprehend stakeholders' perceptions about the obstacles to implementing these properties, specifically since this issue has not been locally addressed before.

Disseminating the outcomes of this study will assist in boosting public awareness of the new global trend towards sustainability as a definitive solution to numerous concerns of the planet. Accurately, society will be able to recognise the economic, social, cultural, and environmental impacts arising from the sustainability approach adoption, which will contribute to growing the investment in such technologies and, hence, enhancing individual efforts to preserve the ecosystem and resources for the next generations. Moreover, the anticipated proprietors and investors could benefit from the inferred advantages and obstacles in making logical and sound financial decisions by considering all angles.

In light of the profound understanding of this research, the government could also prominently involve the results when releasing SH implementation plans to optimise the gains and mitigate the hurdles, thus properly allocating the country's resources. The legislators may appeal to the study's conclusions as a core source to develop rational frameworks encouraging sustainable practices in Bahrain by formulating different policies and analysing their consequences. At the local scientific community level, this investigation will serve as a foundation for future, deeper research that could reassess and address each finding separately. At the international level, it will be an auxiliary reference that can be exploited

to examine countries of comparable socioeconomic considerations, and it may be feasible to relate the research result to the other Gulf countries.

1.6 The Study's Setting

The research will be conducted in the Kingdom of Bahrain, an island country on the southwestern coast of the Arabian Gulf, and its population reached 1.5 million in 2023. As a developing country, crude oil processing has long been the backbone of its economy, and despite the diversification agenda's advancement, hydrocarbon revenues continue to constitute more significant than 60% of the entire budget revenues (World Bank Group, 2024).

The Gross Domestic Product (GDP) of the country is US\$44.9 billion (World Bank Group, 2024), and the preliminary government figures indicate that the GDP grew by 2.4%, with the non-oil sectors accounting for the majority of the growth with 3.4% (Information and eGovernment Authority, 2024). According to the Ministry of Finance and National Economy's latest report for 2023, the real estate sector was among the top growing sectors during the year, and it contributed together with the construction industry by 12.5% to real GDP.

The qualitative data of this research will be collected through semi-structured interviews and the study sample will cover a diverse group of local stakeholders in the housing and real estate field, including engineers, real estate agents and developers, academics, and experts from both the private and public sectors to ensure a thorough and accurate representation of Bahraini society.

1.7 Research Terminology

A comprehensive glossary, providing definitions of numerous terms used in the context of this research, is presented in Appendix 1.

Chapter Two

Literature Review

2.1 Introduction

This chapter provides a theoretical underpinning for the study and offers a comprehensive review of the relevant literature, exploring the background knowledge of the research problem and the basis on which it is grounded. The first part of the chapter presents the theoretical foundation of the study, namely the sustainable housing notion. The concept and characteristics of sustainable housing will be deeply explored from the various viewpoints that cover the four dimensions: cultural, social, economic, and environmental. The framework of sustainable housing policies developed by the United Nations Human Settlements Programme will be employed to address the first research question related to exploring the awareness of Bahraini stakeholders about sustainable housing techniques. Accurately, the application of each of these policies will be investigated to measure the current awareness level and prevailing knowledge of sustainable estates in Bahrain.

Subsequently, the chapter will recognise potential major advantages and impediments to sustainable residential real estate thriving globally from the desktop research of the previous body of work. This literature search will improve the understanding of the second and third research questions and develop themes for discussion with the targeted sample of stakeholders. Finally, the chapter will conclude by displaying some economic and finance theories, which are considered significant instruments to analyse the decision-makers' behaviour in adopting sustainable techniques while dealing with scarce resources. These theories will interpret the judiciousness and rationale behind the participants' answers from an economic angle, as will be reflected in the findings and discussion chapter.

2.2 Sustainable Housing Concept

Sustainable buildings are any structure that adheres to the precept of sensible handling of natural resources, thus minimising environmental disruption. This could be attained by exploiting eco-friendly and health-safe materials, applying indoor solutions that enhance communication, lowering energy demands, employing renewable energy sources, considering superior quality and durability as construction guidelines, and operating feasibly and economically (Bauer et al., 2010).

Sustainable buildings primarily aim to mitigate the adverse effects on the environment while improving the health and comfort of the residents. Accordingly, they are designed to provide technical and environmental advantages to the occupants throughout the life cycle of a building, from design to construction and then operation. Sustainable buildings alleviate energy consumption and carbon footprints by applying energy-efficient features and technologies, such as insulation, energy-efficient windows, LED lighting, and highly effective heating and cooling systems (Tokbaevich et al., 2024).

The sustainability perspective should be employed throughout the life of the building and during all stages of design, planning, execution, upkeep, destruction, disposal, and material recycling as well in architectural qualities, for instance, location, material selection, building form, size, and orientation (Salama & Alshuwaikhat, 2006). In order to achieve the ultimate avails of sustainability in buildings, a holistic approach, namely the Life Cycle Engineering approach, is required that enables the integral of positive aspects from planning and design, the several possibilities of modernised planning and computation tools, continuous optimisation procedures throughout operation, and careful handling during material renaturation. All of this culminates in a sustainable building that can fulfil

the prospects of its inhabitants while generating the least possible interference with nature (Bauer et al., 2010).

An overview of the above different definitions assists in perceiving that sustainable properties have an irrefutable role in conserving energy and diminishing carbon dioxide emissions. However, the impact of sustainable buildings is unrestricted to environmental themes; instead, broadly, they balance the long-term cultural, social, environmental, and economic facets of the housing stock and its residents. Based on this, green homes should be affordable and strengthen communities' and individuals' capabilities by instrumentalising the design and construction processes on one hand. On the other hand, SH should be connected with economic growth at all income levels and inclusive institutions. Therefore, a house is not deemed sustainable, even though it is constructed using the most eco-friendly substances and building techniques, if it is not reasonably priced, situated near services and employment, culturally and socially appropriate, and integrated into a functional infrastructure and service network. Hence, it is crucial to connect housing policies with sustainable urban planning, good governance, and the micro- and macro-economy (French & Lalande, 2013). More conclusively, sustainable building processes should be bonded to economic development, cultural conservation, social mobilisation, and community participation policies (Rode et al., 2011).

2.2.1 Housing Cultural Sustainability

Producing culturally sensitive housing suitable for its inhabitants' expectations and the community in which it is situated is vital to achieving sustainability. This implies that elements like shape, design, material composition, spatial arrangement, etc., should represent the cultural communities it caters to, the lifestyles of its residents, and their values and views. Considering the concepts, convictions, and customs of the different cultural groups contributes to delivering housing that satisfies individuals'

requirements and is appropriate to their environment. It, therefore, ensures the optimal utilisation of housing while also boosting the sense of belonging and contentment among residents (Choguill, 2007).

The United Nations Human Settlement Programme in the Housing and Slum Upgrading Programme (2018) classified cultural adequacy as one of the seven criteria for adequate housing. It considers the housing inadequate if it disregards the cultural identities and does not express the lifestyles of its occupants. Thus, the various cultural traditions related to the building materials, designs, sizes, and shapes of the houses shall be assimilated in conjunction with knowledge and technologies during planning and designing.

2.2.2 Housing Social Sustainability

Social sustainability has numerous facets; when considered, houses become more suitable and responsive and can more accurately mirror the needs of inhabitants and foster their sense of accountability and ownership (Omann & Spangenberg, 2002). One of these is including individuals of various genders, ages, income levels, and ethnic backgrounds in the decision-making processes related to home construction. The people should be engaged in information collection, planning, execution, upkeep, and monitoring phases of housing (Bramley et al., 2006). Therefore, SH should follow a 'bottom-up' approach to ensure the participation of local stakeholders, communities, and governments in the planning and construction processes, in addition to adopting decentralised strategies to obtain long-term housing solutions that are valued by those for whom the residence is intended (Adger, 2000).

Social integration of various groups during the production process of houses enhances social resilience and builds social capacity; thus, it is crucial to avoid the social marginalisation of different low-income, ethnic, and gender groups (Bramley et al., 2006). Moreover, expanding the

availability of reasonably priced homes for modest-income groups can mitigate social tensions and promote community stability, security, and social engagement. This is because SH plans support individual basic needs in obtaining an adequate standard of living, securing a stable income source, and accessing basic urban services (Rode et al., 2011).

2.2.3 Housing Economic Sustainability

The sustainable principles would ensure the delivery of reasonably priced houses that fulfil the residents' expectations. This assists in preventing real estate overstock, which stabilises the housing market by maintaining the equilibrium between supply and demand (UN-Habitat, 2012). SH also provides significant financial and economic benefits over the long run because it consumes less energy. Besides, SH policies offer long-term solutions to the community and economy by promising to generate new jobs and grow income. This could be attained by increasing construction and retrofitting activities and building the capability of professionals and local communities to produce energy-efficient materials and renewable technologies (Rode et al., 2011).

2.2.4 Housing Environmental Sustainability

Environmental sustainability requires evaluating each option in light of the regional weather, surrounding circumstances, natural resources, and available materials. Thus, balancing various decisions and selections is essential to conserve energy in manufacturing, material transportation, and construction processes; prioritise natural and repurposed materials; prevent toxins and pollution; promote energy efficiency; and benefit from renewable energy (Irurah, 2011). Sustainable housing contributes to reducing carbon footprint and consumption as much as is feasible for both embodied energy and the required energy for maintenance (Venkatarama Reddy, 2004).

In this regard, the UN-Habitat (2012) developed a framework of the fundamental criteria that must be considered for SH within the four-dimensional sustainability model. Refer to Table 2.1.

Table (2.1): A Multifocal Framework for Sustainable Housing Policies

	MACRO (NATIONAL)	MESO (REGION, CITY)	MICRO (NEIGHBORHOOD, HOUSEHOLD)
Environmental dimension	Housing to support climate mitigation and adaptation efforts. Mainstreaming green housing practices and innovations. Ensuring energy and resource efficiency in the building industry. Integrating national housing and energy systems.	Achieving good location and density for residential areas and access to infrastructure. Serviced land in environmentally safe locations and green areas. Protection of ecosystems and biodiversity. Promoting sustainable and low-carbon urban infrastructure, public transport and non-motorised mobility, energy systems. Waste management and recycling.	Ensuring energy efficiency, micro/generation, water and resource efficiency. Green design, using sustainable local construction and materials. Sanitation, preventing hazardous and polluting materials. Affordable use of resources. Improving resilience and adaptation of homes.
Social dimension	Fulfilling the right to adequate housing and promoting the right to the city. Ensuring affordable, decent and suitable homes for all, including disadvantaged groups. Developing social housing provision. Promoting choice and security of tenure.	Promoting integrated communities and ensuring trust in communities. Providing community facilities, preventing segregation and displacement. Regenerating and reintegrating 'neglected' areas into regional, urban fabric. Ensuring infrastructural integration of housing into wider areas. Upgrading inadequate housing and slum areas.	Empowering people and ensuring public participation. Ensuring health, safety, well-being in residences. Creating a sense of community, 'sense of place', and identity. Meeting specific needs and wants in housing (including those related to gender, age and health). Providing access to infrastructure and public spaces.
Cultural dimension	Promoting links between housing and knowledge-based and cultural economies. Promoting traditional, indigenous and local knowledge (including of relevance to sustainable resource use, energy efficiency and resilient building techniques). Protecting cultural heritage.	Promoting urban creativity, culture, aesthetics, diversity. Shaping values, tradition, norms and behaviours (eg. in relation to energy use, recycling, communal living and place maintenance). Protecting housing heritage and familiarity of city (eg. preventing unnecessary social replacement/gentrification or complete redevelopment).	Culturally responsive settlements and house planning and design. Improving aesthetics, diversity and cultural sophistication of the built environment and residence. Helping community creativity (i.e. via amenities; affordable sporting, cultural and entertainment facilities). Assisting people's transition from rural and slums areas to decent housing or multifamily housing.
Economic dimension	Institutional capacities for sustainable housing markets and housing development. Articulating housing productivity within national economic systems. Improving housing supply and effective demand, stabilising housing markets. Improving housing finance options. Promoting innovations in housing. Stimulating necessary technological developments for sustainable housing.	Managing economic activities and growth by strengthening housing provision and housing markets. Provision of necessary infrastructure and basic services to housing. Providing serviced land for housing. Strengthening entrepreneurship of communities, local building industry and enterprise. Promoting local and traditional building materials and techniques. Promoting regional and urban regeneration.	Ensuring housing affordability for different social groups. Providing adequate residences to raise labour productivity; ensuring housing is integrated with employment. Supporting domestic economic activities and enterprise. Promoting petty landlordism and self-help housing. Housing management and maintenance. Strengthening resilience and future-proofing of homes.

Note. Reprinted from "Sustainable Housing for Sustainable Cities: A Policy Framework for Developing Cities", by United Nations Human Settlements Programme - UN-Habitat, 2012, p.8. Retrieved from <https://unhabitat.org/sustainable-housing-for-sustainable-cities-a-policy-framework-for-developing-cities>

2.3 Sustainable Housing Advantages

Designed and constructed housing within an integrated sustainability framework will comply with the different legislation and laws concerned with combating climate change and concurrently fulfil the numerous social, cultural, and economic necessities of households and societies; hence, it will have numerous positive impacts on the built and natural surroundings, the micro- and macro-economy, and people's physical and mental well-being. In order to comprehensively perceive the advantages of executing and adopting sustainable dwelling on an individual and national scale, the literature review will purposefully include studies implemented at various periods, spanning multiple geographic contexts, covering varying scopes, and assuming various viewpoints.

At the level of the African continent, Ojo-Fafore et al. (2018) scrutinised the privileges of sustainable properties in Johannesburg, South Africa, and they indicated that, among all gains, prolonging the housing economic lives was the most significant feature. This was because such buildings are more resilient in employing energy-efficient products that preserve the durability of structures and concurrently decline operational and support costs, waste disposal fees, emissions and environmental taxes, and annual water bills. It was also detected that developing sustainable estates with conquering interior quality would bolster the building residents' comfort, health, welfare, security, safety, and general standard of living.

Oyetunji et al. (2022) also unveiled the potential for sustainable dwellings in Lagos, the former Federal Capital of Nigeria, which is comparable to the findings of Ojo-Fafore et al. (2018). They affirmed that the intrinsic characteristics of these buildings contribute to lowering maintenance expenses and decreasing the various operational expenses and electricity bills. Moreover, the implementation of sustainable dwellings that adhere to

the use of ecologically friendly materials would lessen waste while raising the unit's aesthetics and values, enhancing rental revenue, and lengthening the lifespan of homes. Indeed, the sustainable construction approach, which is based on supporting sustainable operations and protecting the environment, could improve occupants' quality and encourage economic investment in contemporary innovative products.

Certainly, the world's continued interest and curiosity regarding sustainable procedures has stimulated the rendering of more studies from various countries. On the Asian continent, Olanrewaju et al. (2018) evaluated the cognisance of the housing providers about the benefits of sustainable dwellings in Southeast Asian countries. It was identified that reducing electricity and water bills was the most acknowledged advantage of sustainable properties because this approach harnesses natural illumination and solar energy as a crucial means to lower energy costs and output. Besides, the investigators discovered that green or sustainable features would raise the houses' values, extend their lifespan and increase the users' comfort since such buildings enhance their health and well-being compared to conventional buildings.

The outcomes of Olanrewaju's study (2018) were supported by Mohamed Saraf et al. (2023), who probed into the advantages that motivate residential clients to invest in sustainable properties in Malaysia. The researchers disclosed that the primary economic driving forces behind sustainable housing acquisition were cutting back on electricity and water bills, raising the property's future market value, and ensuring higher rental returns. They also uncovered that sustainable attributes had paramount social and environmental gains represented in boosting the occupants' health and achieving environmental sustainability goals through lessening the reliance on non-renewable energy sources and hence expanding possibilities for environmental control.

In line with the results of Olanrewaju et al. (2018) and Mohamed Saraf et al. (2023), Pham et al. (2024) comprehensively examined the advantages of embracing sustainable criteria within Vietnam's construction industry. The analysis exhibited several advantages associated with sustainable building techniques, where economic privileges were deemed the most significant. The sustainable strategies could lower operating and maintenance expenses and amplify reliability in project quality, which adds value to the properties. The other positive implications included promoting public health and the standard of indoor living environments and preserving the environment by cutting pollutants and preventing the waste of pure water, energy, and other resources.

Delving into the five previous pieces of literature from Asia and Africa showed that incorporating sustainable features into residential buildings could raise the property's value. To confirm that, Kempf and Syz (2022) considered residential properties certified by MINERGIE, the predominant Swiss standard for energy-efficient buildings, to explore the influence of sustainable accreditation on the buildings' price and occupants. It was revealed that MINERGIE flats traded at a higher price premium canton-wide in the sales market, which means that they preserved superior value compared to traditional construction. Furthermore, the analysis illustrated that in a lessors' market, investors gained from more efficient sustainable construction as additional expenses involved were fewer, enabling them to raise net rents. In contrast, the tenants also benefitted from living in better-quality and more comfortable flats.

The above inferences also motivated Huang (2023) to discover precisely the impact of sustainable strategies on Taiwanese residential prices. It was displayed that the green building label and the green building candidate certificate had the greatest impact on house pricing, as estates bearing those features had a higher worth than those without these designations. In the

same way, Chuweni et al. (2024) scrutinised the impact of green certification on the prices of residential real estate in Malaysia. It was shown that the Green Building Index Certification significantly and favourably affected the market value of Malaysian residential homes.

The preceding comprehensive overview of the pieces of literature assisted in discovering the competitive edges of sustainable residential for various parties. Table 2.2 abbreviates the eight research papers discussed in this section. Broadly, all studies concurred on a similar goal, which is exploring the benefits of adopting sustainable housing on different sustainability facets: social, economic, and environmental. The documental research covered the various economies and continents—Europe (Switzerland), Africa (South Africa and Nigeria), and Asia (Malaysia, Taiwan, Vietnam, and Southeast Asian countries)—by assessing the global knowledge level of SH benefits during the past seven years. It is worth mentioning that all the presented publications were appropriately aged and met the modernity criterion, as they were publicised between 2018 and 2024 and, hence, consistent with the recommendations from different prestigious bodies like Rutgers University Libraries (2022) and Shapiro Library of Southern New Hampshire University (2024).

Looking deeper at Table 2.2, it is undeniable that the bulk of the studies followed a quantitative approach, except Kempf and Syz (2022), who applied a mixed approach to explore the benefits of sustainable residential estates. It is also obvious that the majority of the investigators employed questionnaire surveys with diverse housing stakeholders to collect the research data. However, it can be noted that two pieces of literature that relied on secondary data to derive the findings are Huang (2023) and Chuweni et al. (2024). Whereas only Kempf and Syz (2022) used the case study design.

However, despite the variant methodologies and research tools, diversified geographical regions of the studies, and different economies of the countries under consideration, all attained analogous inferences, as appeared in Table 2.3. Referring to Table 2.3, 70% of the studies ascertained that the most significant advantage of sustainable dwellings is raising the market value of the properties. Moreover, most of the surveys believed that sustainable techniques could mitigate the operation and maintenance expenses, prolong the economic lives of the properties, and ensure higher rental returns. Among other mutually agreed benefits are bolstering the life quality of sustainable housing occupants and conserving the environment.

2.4 Sustainable Housing Impediments

The deepening into the prior reviews presented in Section 2.4 attested that unequivocally, imperative avails of sustainable buildings are unlimited; they mitigate the operation and maintenance expenses, prolong the economic life of the property, raise the market value of the housing, enhance the health and life quality of the residents, and safeguard the environment. Despite all the appreciable technical feasibility of SH, these homes are relatively modern innovations, and it is uncertain whether clients would be interested in buying them. Moreover, it is unsettled whether the world is technologically and financially ready to execute such technologies. Therefore, this section examines the critical obstacles that may prevent the implementation of sustainable housing to pave the way towards the widespread adoption of these homes.

From a global perspective, Adabre et al. (2020) scouted the decisive hindrances to affordable, sustainable housing in 18 developed and developing nations. They revealed that the high price of sustainable construction materials was among the highest critical barriers, followed by

insufficient regulations and policies for SH, and limited public funding. In like manner, Singh et al. (2019) tackled obstacles to consumers' reluctance to adopt sustainable houses in North America, particularly in Canada. They located that sustainable housing's prohibitively expensive price was the primary barrier to the spread of this approach. Other significant barriers were the lack of prior experience with modernised technology, the economic feasibility decision of cost-benefit, and the social norm of not knowing anyone who owns a sustainable home.

The outcomes of Singh et al.'s (2019) investigation were supported by another study conducted in the United States of America. Tafazzoli et al. (2020) explored the hindrances to sustainable construction in the United States of America and their association extent with different stakeholders: owners, contractors, and government. The researchers realised that the cardinal barriers to the thriving of SH were related to the owners, followed by contractors and then the government. The investors were unwilling to cover the higher upfront expenditures associated with sustainable practices and lacked awareness and knowledge regarding the importance of eco-friendly procedures. The resistance from the contractors was due to their belief that sustainable technology slows down the project's delivery pace, in addition to insufficient experience with this modern strategy implementation. From the government side, the main hurdles were the absence of sustainable building standards and regulations and inadequate policies that support environmentally friendly operations, such as incentive programmes.

In Europe, particularly Sweden, the directive of local municipalities to implement sustainability policies in housing development incited Candel and Törnå (2021) to discover the impediments countered by residential developers when integrating sustainability regulations into their projects. The researchers approached that incorporating sustainable standards in

housing bore high uncertainty levels and financial risks and commanded significant costs beyond the developers' capabilities and thus declined their financial flexibility and adaptation to shift during challenging economic circumstances. It was also noted that the infeasibility of some techniques, which might impact investors' prospective future returns and the demand of probable customers, formed an obstacle to adopting sustainable requirements.

Within the same continent, Souaid et al. (2022) explored the obstacles to sustainable housing adoption in Ireland. The investigators asserted that the lack of awareness and knowledge of the newest technologies and designs and the restrictive building codes, as well as the associated uncertainty and risks with sustainable housing, constituted the paramount barriers to the adoption of sustainable approaches. Other obstacles that could hinder efforts to offer a more sustainable built environment in the future were the higher costs due to additional expenses correlated with SH, lax building regulations that depict SH as exceeding the present minimum standards, a shortage of skills, the mindset of "business as usual", insufficient financial incentives, payback periods and yields on investment, and cultural inclinations.

By the same token, Ezennia (2022) highlighted the impediments to embracing the sustainable approach in African public residential projects. The examiner evidenced that housing providers conceive that knowledge limitations, such as lack of interest and demand and lack of public awareness, were the main obstacles to sustainable houses' adoption in Nigeria. The other critical barriers were restricted mortgage and financial systems, reluctance to embrace changes (new ideas or construction technologies), ineffective government housing policy implementation, insufficient focus on sustainable building, design, and use in housing policy, and lack of demonstration projects.

At the Asian level, Wong et al. (2020) debated the barriers to sustainable technology application in Malaysia's residential real estate market. They suggested that the economic barriers were shown to be the leading challenge among all groups. Accurately, high capital/investment costs were identified as the most critical obstacle, implying that stakeholders could assume that sustainable housing is more expensive than conventional homes and that it will take longer for the return on investment without sufficient financial incentives from the government. The absence of professional experience in sustainable dwelling construction and operation was ranked second, and the market competition that hampered sustainability embracement was rated third. However, the institutional and socio-cultural barriers appeared to be the least significant where ignorance of sustainable technology, lack of public awareness about sustainability benefits, which led to the absence of demand and interest from end users, and opposition to change were the crucial factors in these two groups.

Wong et al.'s (2020) inferences were validated by Akcay (2023), who examined the barriers to sustainable building design and construction adoption in the Turkish construction industry. Akcay's investigative findings expressed that higher construction costs, insufficient market demand, and higher operation expenses represented the top three critical hindrances to sustainable dwelling implementation. The other impediments were scarcity of expert training, lack of knowledge, insufficient awareness, deficiency of government incentives, absence of recognised rating systems, and extending the delivery time.

In line with Wong et al. (2020) and Akcay (2023) and within the Asian context, Alawneh et al. (2024) tested the risks correlated with sustainable building projects in Jordan based on consideration of their likelihood of occurring. They testified that the top risks were the additional costs arising from the use of sustainable building materials and equipment, a long lead

time for green building materials, a jam-packed project schedule, inaccurate budgeting and insufficient planning due to inexperience with such projects, clients' unwillingness to adopt sustainability principles, a lack of contractors' experience in sustainable practices, and alterations to the original design.

Likewise, the smallest continent on earth also received a similar study, as Martek et al. (2019) attempted to scout the barriers preventing the Australian real estate industry from conversion to sustainability. The research workers identified a wide array of challenges that affected the amenability of the Australian market to SH adoption, the most crucial of which was the lack of end-user demand. This was attributed to insufficient public awareness of the performance of sustainable dwellings due to inadequate green marketing and the deficit of genuine incentives that encourage the demand for such houses. The investigation also showed that the absence of a government long-term plan or vision for sustainability, lack of an efficient auditing system to ensure the fulfilment of standards, and lower regularity requirements comprised challenges in achieving a sustainable Australian housing sector. These were beside the developers' resistance to change due to the unaffordability of sustainable techniques.

The prior thorough overview of literary productions contributed to exploring the impediments of sustainable residential properties from different stakeholders' viewpoints. Table 2.2 summarises the ten literary works reviewed in this section. The entire review intended to uncover the challenges of adopting sustainable strategies in newly constructed housing. The researcher was keen to select the debates covering various economies. Some studies addressed the issue according to the realities of the developed countries, for example, the United States of America, Malaysia, Canada, Australia, Sweden, and Ireland. Other reviews tackled the matter based on the nature of developing countries, such as Nigeria, Turkey, and Jordan.

However, Adabre et al. (2020) approached the problem from an international perspective. Besides, several continents and nations were considered by the documentary research—North America (Canada and the United States of America), Europe (Sweden and Ireland), Africa (Nigeria), Asia (Malaysia, Turkey, and Jordan), and Australia.

It is noteworthy that all the displayed studies were of an appropriate age and fit the modernism criterion, as they were publicised between 2019 and 2024 and, therefore, are in line with the suggestions made by various esteemed organisations, such as the Shapiro Library of Southern New Hampshire University (2024) and the Rutgers University Libraries (2022). Upon closer inspection of Table 2.2, it is evident that half of the studies followed a quantitative approach to explore the obstacles to sustainable residential estates. Whereas Martek et al. (2019), Candel and Törnå (2021), and Souaid (2022) adopted a qualitative approach, and only Ezennia (2022) applied a mixed approach. Beyond a doubt, all quantitative examiners employed questionnaires with different housing stakeholders to collect the research data. However, Martek et al. (2019), Candel and Törnå (2021), and Souaid (2022) conducted focus groups and semi-structured interviews to access knowledge in the field of study.

However, despite the varied research approaches and instruments, the studies' varied geographical zones, and the economies of the participating nations, as a matter of fact, the analyses do not report a difference in the hindrances to SH. As shown in Table 2.4, all the research reached equivalent conclusions regarding the common impediments to embracing sustainable techniques. Table 2.4 illustrates that 90% of the analyses approved that the high capital cost was the main hindrance. The other identified obstacles are lack of knowledge, experience, and policies; insufficient public awareness; absence of interest and demand; economic infeasibility; and inadequate government incentives.

Table (2.2): Overview of the Related Studies Included in the Literature Review

Study No.	Publication Year	Author (s)	Study Location	Key Findings
Competitive Advantages of Sustainable Residential Estates				
1.	2018	Ojo-Fafore et al.	South Africa	- Prolong housing's economic lives - Reduce operational annual bills - Lower environmental taxes - Bolster the occupants' comfort and health - Increase reliance on energy-efficient products
2.	2018	Olanrewaju et al.	Southeast Asian Countries	- Reduce electricity and water bills - Raise the houses' values - Extend homes' lifespan - Enhance users' health, well-being, and comfort
3.	2022	Kempf and Syz	Switzerland	- Preserve superior housing value - Minimise running expenses - Command higher net rentals - Improve occupants' life quality

4.	2022	Oyetunji et al.	Nigeria	- Decrease the maintenance and operational expenses - Raise the unit's aesthetic and values - Enhance rental revenue - Lengthen the lifespan of homes - Enhance the occupants' life quality - Encourage investment in sustainable products
5.	2023	Mohamed Saraf et al.	Malaysia	- Cut back on electricity and water bills - Raise the property's market value - Ensure higher rental returns - Boost the tenants' health state - Lessen the reliance on non-renewable sources
6.	2023	Huang	Taiwan	- Heighten properties' market values
7.	2024	Chuweni et al.	Malaysia	- Affect favourably on the market value of residential properties
8.	2024	Pham et al.	Vietnam	- Mitigate operating and maintenance expenses - Add value to the properties - Increase the reliability in estate quality - Promote the occupants' health and comfort - Preserve the environment

Impediments to Sustainable Residential Estates Adoption				
Study No.	Publication Year	Author (s)	Study Location	Key Findings
1.	2019	Martek et al.	Australia	- The unaffordability of sustainable housing - Lack of end-user demand - Insufficient public awareness - Inadequate green marketing - Deficit of genuine incentives - Absence of sustainability long-term plan - Lower regularity requirements - Resistance to change
2.	2019	Singh et al.	Canada	- Housing's expensive price - Economic infeasibility - Lack of experience - Absence of an example
3.	2020	Adabre et al.	International	- Increased materials price - Insufficient regulations/policies - Limited public funding

4.	2020	Tafazzoli et al.	United States of America	- Higher upfront expenditures - Lack of awareness and knowledge - Insufficient experience - Slow down the project's delivery - Absence of codes and regulations - Inadequate support policies
5.	2020	Wong et al.	Malaysia	- High capital/investment cost - Long time for return on investment - Absence of professional experience - Ignorance of technology - Lack of public awareness - Absence of end users' demand - Resistance to change - Insufficient financial incentives
6.	2021	Candel and Törnå	Sweden	- Significant costs - Economic infeasibility - High uncertainty levels and risks

7.	2022	Ezennia	Nigeria	- Lack of public awareness - Absence of interest and demand - Restricted financial system - Reluctance to embrace changes - Insufficient policies - Lack of demonstration projects
8.	2022	Souaid et al.	Ireland	- Higher costs and risks - Long payback period - Lack of awareness and knowledge - Business-as-usual mindset - Shortage of skills - Lax building regulations - Insufficient financial incentives
9.	2023	Akcay	Turkey	- Higher expenses - Extend delivery time - Insufficient awareness and demand - Lack of knowledge and experience - Absence of government incentives

10.	2024	Alawneh et al.	Jordan	- Additional costs - Long lead time for materials - Jam-packed project schedule - Inaccurate budgeting and planning - Unwillingness to change - Lack of experienced contractors
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Table (2.3): Most Prevalent Sustainable Housing Advantages Introduced in the Literature

Benefit Number	List of Benefits	Benefits Occurrence in the Previous Studies (Study Number)								Total	Rank
		1	2	3	4	5	6	7	8		
1.	Enhance users' health	X	X			X			X	4	4
2.	Bolster the occupants' life quality	X	X	X	X				X	5	3
3.	Prolong housing's economic lives	X	X		X					3	6
4.	Raise the property's market value		X	X	X	X	X	X	X	7	1
5.	Mitigate operation and maintenance expenses	X	X	X	X	X			X	6	2
6.	Ensure higher rental returns			X	X	X				3	6
7.	Conserve the environment	X			X	X			X	4	4

Table (2.4): Most Prevalent Sustainable Housing Impediments Introduced in the Literature

Barrier Number	List of Barriers	Barrier's Occurrence in the Previous Studies (Study Number)										Total	Rank
		1	2	3	4	5	6	7	8	9	10		
1.	High capital/investment cost	X	X	X	X	X	X		X	X	X	9	1
2.	Lack of knowledge and experience		X		X	X			X	X	X	6	2
3.	Limited public funding			X				X				2	10
4.	Insufficient public awareness	X			X	X		X	X	X		6	2
5.	Absence of government incentives	X			X	X			X	X		5	4
6.	Resistance to change	X				X		X	X		X	5	4
7.	Insufficient regulations/policies	X		X	X			X	X			5	4
8.	Economic infeasibility		X			X	X		X			4	7
9.	Absence of interest and demand	X				X		X		X		4	7
10.	Slow down the project's delivery				X					X	X	3	9
11.	Lack of demonstration projects		X					X				2	10

2.5 Literature Benefits and the Research Gap

The extensive review of the relevant body of works assisted in enriching the understanding and acquiring the current knowledge, which will contribute to mapping the research area. The comprehensive overview provided a valuable synopsis by assessing SH's global knowledge level over the last six years. Briefly, the literature review led to gaining insight into the current position of sustainable homes worldwide. It also contributed to clarifying the sequence of research procedures and selecting the population that can be used as a sample for the study. It is observed that the earlier studies followed diverse methodologies, including qualitative, quantitative, and mixed, and the majority of them relied on primary data such as semi-structured interviews, focus group discussions, and questionnaires to gather the research data. Deepening into these studies revealed that the qualitative pieces of literature offered candid conversations and discussions for evaluating the benefits and obstacles of SH. This allowed the study sample to express their perceptions explicitly and explain their answers, granting the researchers the ability to draw appropriate conclusions.

Moreover, the literature survey demonstrated that numerous researchers have pursued investigations into the benefits and hurdles to sustainable housing adoption in various countries, continents, and economies as mentioned above. Nevertheless, no exploration has been published in the literature that specifically handled the advantages and impediments to sustainable initiatives in Bahrain or other Gulf countries with comparable socioeconomic environments whose GDP is primarily based on oil. According to Durdyev et al. (2018), each nation's unique economic, political, and social features require a distinctive examination of the gains

and hindrances of integrating sustainable housing design and construction methods.

Therefore, the researcher discovered a pressing need for an intensive study of the advantages and challenges of SH in the Kingdom of Bahrain to enhance public awareness of such estates and their significance in current and non-current terms. Especially with the growing contribution of real estate and construction industries to the real GDP, which reached 12.5% in the last year (Ministry of Finance and National Economy, 2023). Furthermore, tackling sustainable housing in the Bahraini context is imperative due to the government's espousal of the Sustainable Development Goals and its integration into its 2030 Economic Plan. This will present an opportunity for the local stakeholders to voice their views and opinions on the study issue to attain more conspicuous inferences that interpret the real estate sector's delay in the transition towards sustainability.

This study is crucial to the economy since the knowledge of sustainable techniques enables the production of homes that fulfil the expectations of beneficiaries. This preserves the supply and demand market equilibrium and, hence, contributes to avoiding real estate overstock and stabilising the housing market. In addition, discussing sustainability will open up different horizons for thinking to exploit traditional, local, and recycled materials, which will enhance reliance on locally available resources. Furthermore, disseminating the advantages of this approach will stimulate the innovation of new industrial lines for sustainable technologies that will promote the economy and create new job opportunities.

Presenting and debating the globally acclaimed sustainable principles is also imperative for investors and decision-makers to raise awareness and adoption levels. Indeed, recognising the advantages and obstacles of sustainable tools assists in arriving at rational investment decisions. It

contributes to establishing business strategies that optimise allocating the resources and choosing between the alternatives to maximise the gains and mitigate barriers or reduce their impacts. Any further than that, the novelty and distinctiveness of this study represent an added value to the body of knowledge, and it functions as a ground for real estate academicians to dive deeply into the new global course toward sustainability.

2.6 The Economic and Financial Theories Guiding Stakeholder Decision-Making

Since Bahrain is a small region with limited land and resources and has encountered increasing housing demand due to the sharp population growth, exceeding +1,238% in the last 70 years (Ritchie et al., 2024). The decision-makers are duty-bound to make wise choices that accommodate the needs and maximise the benefits for the bulk of people in light of natural and financial resource scarcity. This is in conjunction with optimising their financial performance and amplifying their returns. Accordingly, utility theory and time value of money theory supply a solid foundation for interpreting and analysing the stakeholders' perspectives in making decisions associated with adopting the sustainable approach in the residential sector.

2.6.1 Utility Theory

Utility theory is viewed as one of the most significant neoclassical microeconomic conceptualisations that is established on the rational actor approach. In line with utility theory, people are solely motivated by self-interest utility maximisation. Consequently, each individual makes decisions and chooses alternatives that could maximise his/her utility (Broome, 2001). As stated by Vipond (2024), utility in economics represents a metric to determine the extent to which consumers benefit from specific goods or services. From a financial perspective, utility

identifies the return that investors achieve from the success of their investments. Therefore, utility is utilised to develop functions that describe the pleasure and satisfaction levels obtained from consuming various products and services. These functions then serve to appraise consumer preferences and maximise utility in the face of budgetary restrictions. Furthermore, the inferred information from these functions could assist the firms in outlining suitable investment strategies, such as the production amount, pricing, etc., and the government agencies in enacting and implementing public legislation.

This economic concept is particularly appropriate for this study, as it provides a theoretical prism through which key players' decision-making in the housing industry could be comprehended. In light of the limited natural and financial resources, the utility theory demonstrates how stakeholders assess the available alternatives and choose to apply one sustainable policy over another that maximises beneficiaries' gains and firms' profits. Therefore, stakeholders analyse and prioritise the various sustainable practices in view of financial, social, and environmental considerations according to perceived advantages to determine their overall utility. This rational evaluation of costs and benefits justifies Bahrain's slow conversion toward sustainability, despite the government initiatives and the heightened cognisance of this approach. Wherefore, utility theory provides a sensible explanation for the prioritisation patterns and embracement behaviours noticed in the industry, in line with the primary objective of this investigation.

2.6.2 The Time Value of Money (TVM) Theory

The time value of money is an underlying principle in finance that underpins many financial decisions. It is grounded in the idea that money's value fluctuates over time, and a dollar gained today is worth more than a dollar acquired tomorrow. This discrepancy is primarily due to inflation,

uncertainty, and the opportunity cost of the wait. In the financial analysis of an investment, the future cash flows are discounted to their present value to determine investment feasibility (Vyasani, 2024). The TVM theory facilitates interpreting the stakeholders' financial decisions related to sustainable techniques investment. In fact, investors and developers tend to evaluate the economic viability of sustainability initiatives by contrasting the discounted value of future savings and benefits with the current costs.

Accordingly, this temporal assessment determines whether the sustainable intervention is viewed as financially feasible or not. Therefore, in certain circumstances, although sustainable investments offer favourable long-term returns, stakeholders might avoid or postpone such investments due to short-term financial priorities, market turbulence, and risk aversion. On this basis, the TVM hypothesis illustrates the financial rationale behind housing providers' reluctance or selective adoption of sustainable alternatives. By demonstrating the direct impact of anticipated gains' time on the shifting rate towards sustainability in the Bahraini housing industry. Collectively, the utility theory and the time value of money theory supply a logical, coherent framework for perceiving the decisions and choices made by stakeholders in relation to the sustainable methods adoption. Whereas the former explains the decision makers' behaviour to maximise benefits during resource scarcity, the latter provides a financial instrument to appraise and prioritise those benefits over time. Essentially, investors rely on TVM-based analysis to ascertain whether the expected long-term benefits of sustainable solutions outweigh and justify their upfront outlay. In consequence, the TVM theory employs the utility maximisation concepts by quantifying future benefits in present-value terms, associating rational economic conduct with practical investment decisions in Bahrain's housing industry.

2.7 Conclusion

This chapter illustrated the conceptualisation and essence of the sustainable housing notion in the four facets: environmental, social, cultural, and economic. According to the discussed concepts above, the adoption of sustainable housing secures the efficient consumption of natural and artificial resources while preserving the environment and cultural legacy, attaining social prosperity, and booming national and global economics. Moreover, reviewing the framework of the sustainable housing policies developed by the United Nations Human Settlements Programme contributed to absorbing the de facto applications of sustainable housing techniques. This drew the roadmap to tackle the first research question related to exploring Bahraini stakeholders' awareness of the sustainable estates approach.

The scrutinised literature indicated that the most prevalent advantages of implementing sustainable residential properties were related to economic aspects, such as raising the property's market value and mitigating maintenance and operation expenditures. Analogously, the literary interpretation of ten international studies discovered that the most widespread impediments to sustainable housing were financial, for example, high initial investment costs. Finally, the chapter debated certain financial and economic theories, more specifically, utility theory and time value of money theory, as instruments for analysing the behaviour of Bahraini stakeholders in making decisions related to adopting and implementing sustainable techniques and the benefits resulting from that. The upcoming chapter covers the methodology employed in this research and describes the rationale for espousing it. It demonstrates the methods and techniques used in selecting the participants' sample and gathering and analysing the data.

Chapter Three

Research Methodology

3.1 Introduction

This chapter outlines a framework for the prober's diverse research methodologies and research methods in investigating the competitive advantages and impediments to sustainable housing in the Kingdom of Bahrain. It initially describes the study's selected research design and its rationale. Then, it provides a depiction of the adopted tools for measuring the key concepts and collecting the data, the construction process of these instruments, and the extent of their validity and reliability. The chapter also details the research population, the methods used to sample the participants, and their inclusion criteria. Lastly, it deliberates the techniques applied to analyse the gathered data and their selection grounds.

3.2 Research Methodology

Research methodology is a systematic approach to addressing the research problem. It is the science of exploring the employed methods and the followed steps by the researcher in the scientific investigation to analyse the research question and the reasoning behind it (Kothari, 2004). The research methodology strives to figure out the reason for conducting the research study, the way to define the research problem, the nature of the collected data, the adopted method to gather the data, the selected technique to analyse the data, and a host of other related aims (Goundar, 2012). Based on Denzin and Lincoln (2005), a research methodology is dictated by the character of the research question and the issue being probed. Consequently, the selection of the research procedures is influenced by the posed questions, their context, the attainable resources, and the researcher's aptitudes in such circumstances (Nelson et al., 1992).

Therefore, viewing the study strategy employed in an investigation as an instrument for solving the research issue is crucial. This thesis aimed to examine and discern the meanings the participants generated regarding sustainable housing by applying interpretive techniques to make the field study more comprehensible. The collected detailed narratives and descriptions explored multiple viewpoints, which allowed for a comprehensive understanding of the research focus. Noteworthy, the study was intended to investigate a certain perspective and interpretation of the studied topic rather than to offer the definitive truth about this topic.

According to Stake (2010), a qualitative methodology is suitable when the research aims to clarify a phenomenon by leaning on the perception of an individual's experience in a specific scenario. Conversely, the quantitative strategy is applicable when a researcher strives to comprehend the relationships between two or more variables (Creswell, 2003). Since this thesis was purposed to probe the perspectives and experiences of the housing stakeholders regarding the benefits and impediments to sustainable residential properties, the qualitative methodology was the most favourable alternative. In the same context, Creswell and Creswell (2018) affirmed that all research methodology definitions should comprise research design and unique methods or procedures. The inclusive research approach illustrates the research strategy that integrates philosophy, research designs, and specific methods. Figure 3.1 demonstrates the framework used to explain the interplay of these three components.

Therefore, in determining the research approach, the examiners must carefully consider the research design and the distinct research procedures or methods that convert the approach into action. Based on the aforementioned, the research design that grounded this qualitative thesis was the case study design in which semi-structured interviews were employed to collect the investigation data; refer to Figure 3.2. The

following sections describe the logic and sense behind the selection of the research approach and design.

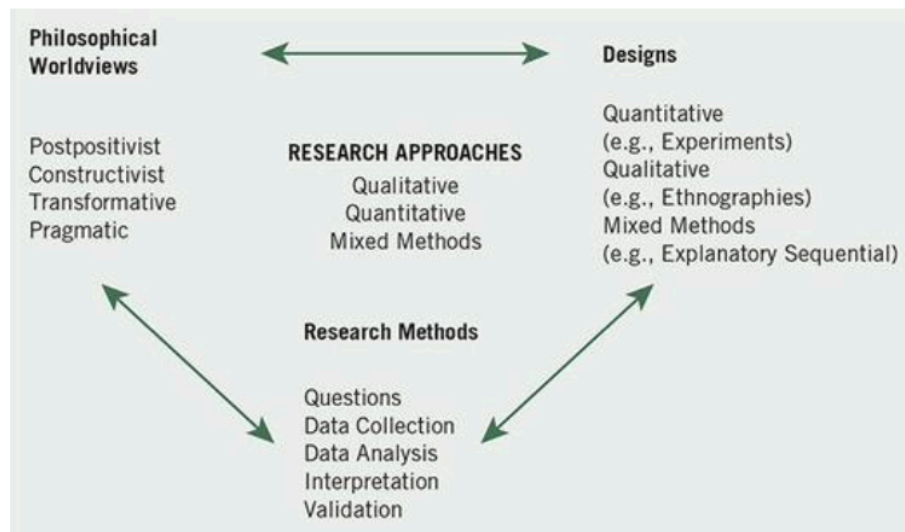


Figure (3.1): A research approach framework: The correlations between worldviews, designs, and research methods

Note: Reprinted from "*Research Design: Qualitative, Quantitative, and Mixed Methods Approaches* (5th ed.)", by Creswell, J. W., & Creswell, J. D, 2018.

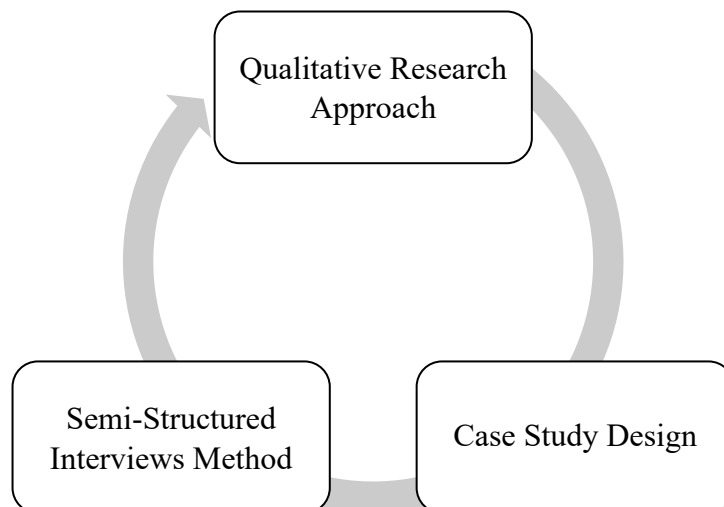


Figure (3.2): The adopted research approach framework in the thesis

Source: The author.

3.2.1 Rationale for Employing Qualitative Research

A qualitative approach is an illustrative, non-metric, and reasoning-based procedure to convey the situation's meaning and circumstances (Goundar, 2012); thus, it fortifies the comprehension and interpretation of the meaning and intentions inherent in human communication. It is a

multipronged approach that follows a naturalistic, interpretive stance towards the subject content, allowing investigators to create a comprehensive image of the phenomenon at issue (Denzin & Lincoln, 2005). Numerous writers, including Creswell (2016), Hatch (2002), and Marshall and Rossman (2016), exhibited the various qualities and characteristics of the qualitative methodology, including comprehensive narrative, which entails covering multiple viewpoints, defining all the variables at play in the problem, and illustrating the broader perspective to provide a nuanced image of the issue being explored. This implies that the qualitative research strategy may be altered partially or fully after the explorers step into the field and start gathering data.

In this approach, qualitative examiners are the fundamental tool for obtaining in-depth field data by directly engaging with individuals and observing their behaviours and acts in their natural environment. The examiners ordinarily apply inductive methods to generate themes from the bottom by arranging the data into progressively more abstract information units. Then, they employ deductive reasoning to review their data from the themes and decide whether additional evidence is required to support each theme. Indeed, throughout the whole proceeding of directing the qualitative study, the researchers remain focused on citing the meanings held by participants regarding the problem rather than the meanings the researchers or the authors of the literature convey to the study. However, the investigators' backgrounds may impact the study's course since their cultures and experiences lend a hand in the data interpretation, for example, the conferred themes and the meaning assigned to them.

3.2.2 Rationale for Choosing Case Study Design

The exploratory nature of this thesis highlighted the need to employ a case study design as a strategy to guide the study and address the research questions. Based on Stake's (1995) discussion, case study design

inclusively strives to obtain various viewpoints on a single product, activity, event, operation, or circumstance at a certain moment or over a time duration. This technique usually concentrates on a specific geographic area or a relatively small population as the study object, which leads to a comprehensive, precise, and contextual evaluation of the research subject. According to Yin (2003), case studies are a prevalent and influential research strategy in the qualitative research literature to develop knowledge of different phenomena in various fields, including business and economy, as they can be applied to explore the nature and structure of a specific industry or a country's economy. Consequently, the case study was deemed the ideal method to approach this first-of-its-kind thesis because this design is considered suitable for preliminary, exploratory research of the poorly comprehended phenomena, as mentioned by Stake (1995).

Moreover, and with respect to Yin's (2003) conditions for using case studies, the modernity of the sustainable housing concept and the lack of trustworthy tangible records in Bahrain advocated for applying an exploratory case study to examine this contemporary technique. In order to develop a comprehensive comprehension of the character, reality, and intricacy of the studied object, 'what' research questions were raised as recommended by Yin (2003) and Creswell (2003). The formulation of 'what' questions encouraged the expansion of the exploration scope to include the analysis of the various aspects of the problem rather than enumerating frequencies. This entailed conducting a holistic, in-depth investigation of the issue based on Bahraini experts' knowledge gleaned from their actual applications to build a thorough comprehension of the subject rather than deliver ultimate numerical statistics. The interaction between the researcher and the participants took into account the different surrounding factors of the issue, including the physical location,

demographics, economic conditions, community culture, and institutional provisions to realistically address the problem.

3.2.3 The Researcher's Role and Reflexivity

Within qualitative research, the researcher is viewed as an integral component of the study methodology, as he/she is a key instrument in collecting and interpreting data (Creswell, 2003). This suggests that the investigator's background, personal knowledge, opinions, and perceptions likely affect the data gathering, analysis, and explanation (Gibbs & Mapanje, 1999). The researcher of this thesis is qualified with a Bachelor of Science in Civil Engineering and a Project Management Professional (PMP) certificate and worked for more than five years in the buildings industry. She was involved in major historical projects worth multi-billion dollars in the Kingdom of Bahrain that covered various sectors, including commercial, residential, and industrial construction projects. In light of this scientific and practical background, the investigator predicted it was simple to relate to and comprehend the numerous constructions and meanings presented by the participants as a result of her knowledge and experience in the housing field.

Moreover, her responsibilities in her last career encompassed corporate communications and meetings with multiple internal and external audiences and entities, which contributed to developing her communication, debriefing, and analysis skills. Nevertheless, the researcher was conscious that she should endeavour to uphold objectivity, neutrality, and impartiality during her interviews with housing experts by laying aside her personal experience, perspectives, and feelings and listening from the viewpoint of the researcher. Although the researcher admits that she could relate to the respondents, she made certain that she did not force her thoughts and beliefs on them while performing the interviews. The inquirer had no direct relevance or relationship with any

participant, which would have created a conflict of interest, including contracts, hierarchical relations, or any other communication or link that would have granted bias to the research study. In the analytic stage, the researcher evoked her expertise in buildings to absorb and support the statements formed by the participants. Simultaneously, she carefully stuck to the interview material and properly practised her role in the research process. This will be discussed extensively in the reliability and validity section.

3.3 Research Tools

According to Yin (2003), there are several methods to collect the data in the case study design. However, two techniques are regarded as primary sources of evidence that enrich the researcher's repertoire, with interviews being one of them. Qualitative interviews are usually perceived as the most eminent, valuable, and acceptable approach to gathering data in qualitative research since they can cover an extensive range of themes with different participants concurrently, which is difficult to accomplish using other tools. Besides, they provide a high level of control over sampling. However, interviews in their nature are not intended to obtain an authentic story about the subject under study but rather to recognise and investigate participants' interpretive practices (Potter, 1996).

The nature of this exploratory study postulated the need to adopt the semi-structured individual interviewing technique to facilitate the in-depth deliberation of the research questions. This tool was seen as beneficial in promoting openness and transparency to determine why the participants adopted certain perspectives and decisions. In addition, a deeper interpretation of participants' meanings provided richness and importance to the data and steered the discussion in directions that the researcher had not thought of before. It should be pointed out that the research participants

were employees and managers whose interview subject is pertinent to their current work. Thus, the interviews were the most advantageous approach to eliminate the ambiguity and anxiety that participants may have about the utilisation of their responses. It also assisted in increasing the interviewees' confidence in the interviewer, raising the response rate, and ensuring that the target respondents were the ones who answered the questions, which enhanced the reliability of the data. This was aligned with recommendations made by Saunders et al. (2019) for effective contexts for employing semi-structured interviews.

The interviews were electronically recorded using the Voice Memos application. At the beginning of the discussion, the interviewees were asked open-ended questions concerning their knowledge and past experiences in the residential property industry and their initial interest in SH. Subsequently, the participants were asked thorough, profound questions to gather intensive, detailed information regarding the advantages and barriers to sustainable estates' adoption in the Kingdom of Bahrain. The interview ended with more open-ended questions that aimed at obtaining a comprehensive view of the participants' perceptions of the necessity of converting toward sustainable construction techniques and their future. The interviews were conducted in person, in which each participant's interview was completed in one session. It is worth mentioning that no interview occurred without the respondent's verbal and written consent, where every participant signed a non-disclosure form before conducting the interview.

3.3.1 Trustworthiness of the Data

Since interviews are the most popular tool for gathering data in qualitative research, such studies should exhibit adequate rigour to grant readers confidence in their outcomes. Notwithstanding, there are no widely recognised standards to assess qualitative research (Noble & Smith, 2015),

causing difficulty in defining the quality of the interviews (Reed, 2009). Indeed, there are considerable variations in describing and applying the validity and reliability in these kinds of studies, as these measures are always associated with quantitative research. Numerous famous qualitative researchers (e.g., Guba & Lincoln, 1989; Mishler, 1990; Stiles, 1993; Denzin & Lincoln, 2005) suggested many other definitions more suitable for qualitative studies, such as quality, trustworthiness, and authenticity. Trustworthiness implies offering readers a sense of confidence in the research's outcomes after reading and interpreting the written work (Stahl & King, 2020). In this regard, Lincoln and Guba (1985) formulated four broad criteria to identify the trustworthiness of qualitative research: credibility, transferability, dependability, and confirmability.

This thesis attempted to achieve the highest possible level of data trustworthiness by adopting several techniques and practices. Initially, the researcher ascertained credibility and transferability by selecting and interviewing participants with the necessary wide experience to discuss the investigated subject as recommended by Lincoln and Guba (1985). The investigator also promoted credibility by employing the member-checking approach, as each participant confirmed his/her inputs and viewpoints at the end of the interview, and saturation was demonstrated, which ensured that the assembled data had adequate information to lend credence to the put-out issue. From the transferability perspective, the researcher was eager to describe the subject being studied, the geographical location of the investigation and its economic state, the participants and their backgrounds and experiences, the data collection and analysis techniques and procedures, and the duration of the fieldwork deeply. Stahl and King (2020) stated that the rich, detailed depiction of these elements could assist other researchers in taking advantage of this study and applying it in similar settings or contexts.

Regarding the dependability aspect, the research explanations and findings were validated by following the peer debriefing method, which was conducted with a colleague in the real estate development and property management master's program. Moreover, the confirmability criterion was maintained by minimising bias in the inferences that arise from this probe in multiple ways. One significant way was to preserve the researcher's reflexivity and certify that there was no bias from her side by interpreting the data objectively. This was attained by applying hand-coding and interview transcription, which contributed to obtaining a thorough comprehension of the interviews' raw material and the respondents' intents away from the researcher's personal beliefs. Furthermore, the electronic recording of the interviews using the Voice Memos application restrained the modification or deletion of any information from the repliers' interviews. The researcher also employed the audit trail method by providing an in-depth explanation of the research and decision process, which allows the readers to assess the logic of the investigator and her conclusions.

3.4 Data Collection Procedures

3.4.1 The Study's Participants

The sample was purposefully chosen from the population of Bahraini or resident experts who were educated in real estate, engineering, and business fields and have at least five years of practical experience in housing engineering and construction and property development, management, and broking industries in the Kingdom of Bahrain. The requirement for Bahraini nationality or residency was aimed at ensuring the participants' second-to-none immersion and full cognisance of the Bahraini real estate sector, its nature, circumstances, specificities, and challenges. Moreover, the other nomination criteria guaranteed the

participation of only professionals with pertinent academic backgrounds and a wealth of experience that allowed them to deeply comprehend the research problem and the ability to offer a detailed articulation in tackling the three research questions, as proposed by Crabtree and Miller (2022).

This enriched the study and contributed to deepening the researcher's understanding of the issue and opening up new horizons to consider. It must be stressed that the selection was not restricted by age or gender. However, all target participants hold a diploma degree or higher in one of the abovementioned disciplines and have pursued their employment in related professions. The interviewees were appertained to the various public and private sectors, academic and non-academic areas, and managerial and operational levels.

As advocated by Cooper and Schindler (2014), the participants were recruited through two non-probability sampling methods: judgment and snowball techniques. The researcher relied on her network within the professional community to select the well-known participants in their fields and could add to the research subject by sharing their experiences. Initially, the researcher contacted potential interested participants she knew who fulfilled the criteria for inclusion in the study via phone. Consequently, the researcher reached the first four interviewees who satisfied the above-described requirements. Consequently, the participants' sample was thus increased by requesting the four identified experts above to recommend other professionals they knew and could assist in enhancing the research with pertinent information. This procedure reflects the snowball sampling approach as described by Marshall and Rossman (2016). The researcher then approached the appropriate participants who met the specified conditions, and those who agreed to cooperate in the study were therefore interviewed.

In line with the research objectives, three main thematic areas guided the interviews with the selected participants: (1) perception and awareness of sustainable housing practices, (2) motivators influencing decisions related to the sustainability adoption, and (3) various financial, technical, and regulatory challenges. These areas served as a framework for the interviews while allowing new themes to emerge naturally through open-ended questions with the stakeholders, developing a well-founded, rich qualitative analysis. Notably, the UN framework and pertinent studies presented in the second chapter served as guiding references to stimulate discussion and ensure comprehensive coverage, while the real insights appeared spontaneously, uniquely from Bahrain's context.

Cooper and Schindler (2014), Marshall and Rossman (2016), Asadul Islam and Aldaihani (2022), and many other qualitative authors recognised that in the qualitative methodology, the precise number of participants could not be decided earlier in the investigation. Rather, the researcher shall stop gathering the data when the themes are saturated, implying that obtaining new data no longer leads to new insights or discoveries. At this moment, the researcher could infer that no more interviews are required, and the sample size is considered sufficient. Based on the above facts, the number of experts involved in this research was not prearranged; instead, it was based on the quality of the acquired data from the interviews on the investigation topic.

Hence, the interviews were conducted until an appropriate saturation point of the issue was achieved, ensuring that the research questions could be addressed properly and the study objectives met. In the aggregate, fifteen interviews were conducted, and it was discovered that by the fifth interview, the information was being duplicated, and no new themes were raised. Nonetheless, the researcher continued carrying out the interviews to ascertain that the saturation point had been captured and the same themes

were held across diverse professional backgrounds. This procedure improved the consistency and credibility while ensuring confirmatory saturation of the collected data. It should be noted that each interviewee was obliged to read and sign the informed consent form before he/she could take part.

Therefore, the participants' final sample involved representatives from government entities, private development, property management, valuation, broking, and consulting organisations and covered varied founding, managerial, and operational roles. Notably, the distribution of participants throughout these industries and roles appeared organically across the sampling procedure and the data saturation concept, which guided the interview process until no new themes were detected. This strategy guaranteed comprehensive representation of the full spectrum of the Bahraini housing industry, collecting a wide range of insights, and promoting the qualitative results' trustworthiness, depth, and abundance. Tables 4.1 and 4.2 and the associated figures summarise the participants' sectors, qualifications, and experience, demonstrating the varying perspectives captured in this study.

3.4.2 Data Collection Process

As indicated earlier, this qualitative research relied on the interviewing technique as a tool for data collection. Initially, the researcher discussed the interview questions with the supervisor, and upon receiving approval, she initiated contact with the participants. As Birren and Birren (1996) recommended, the participants in the study were allowed to select the preferred time and location of their interviews. However, all the interviews except interview 4 were carried out at their workplaces in quiet, private rooms and a single session. Before taking part, each interviewee was informed about the background of the study and the rationale behind conducting it, as well as the ethical concerns surrounding their

participation, and requested to complete the informed consent form. The researcher was responsible for administering and recording the interviews, which were all performed in English, albeit occasionally the respondents would express certain idioms in their native Arabic language. The discussion in English assisted the investigator in transcribing the interviews as offered by the respondents without any intervention that may change or affect the intended meaning.

However, the small pieces of Arabic information were converted to English during the transcription process of the interviews to ensure that the research data would be available to non-Arabic speakers. The interviewer showed respect to all respondents throughout the interviewing sessions, and the shared attributes (e.g., nationality and social and cultural backgrounds) of the researcher and the respondents contributed to directing and facilitating the conversations. In addition, the researcher's education and experience eased her understanding of the participants' intended meanings, even though she was committed not to force her beliefs on them. Entirely, the interviews were handled over twelve continuous weeks, with an average of two interviews per week. The average duration of the interviews was approximately sixty minutes.

The interviews were semi-structured, as mentioned above, with the researcher beginning each interview by asking an opening question about the participant's educational background and practical experience. The discussion then dived further into the housing projects the interviewee was involved in to find out the construction methods adopted in those projects, which then served as a path that paved a route to the subject matter. Later, the conversation moved towards the participants' viewpoints regarding the benefits and hindrances of implementing sustainable residential in the Kingdom of Bahrain. These probing, in-depth questions formed the core of the research objectives and encouraged answering the research questions.

The discussion concluded with more open-ended questions to capture the respondents' insights into the future of SH and potential solutions to overcome the challenges faced in the country. At the end of the interview, the participants were given the chance to discuss and raise any further thoughts.

The interviewees were supplied with pre-publication copies of the transcripts and provided with the opportunity to review and approve them. Once endorsed, the transcriptions were edited to involve any post-interview reflections. It is worth mentioning that the participants were not involved in documenting or editing the analysis and the findings of their interviews. Furthermore, the interviewees were not informed about each other to secure the independence of each participant and the uninfluenced of his/her perspectives of others.

3.4.3 Data Analysis

The thematic analysis was applied to analyse the qualitative data of this study. Thematic analysis is a frequent technique utilised in analysing the data of qualitative studies by identifying and interpreting the meanings, producing the codes, and developing the themes (Clarke & Braun, 2014). The inductive approach directs this exploratory analysis technique, which derives its codes from raw data sources, like interviews and focus groups, without predetermination (Guest et al., 2012). According to Clarke and Braun (2014), thematic analysis is flexible since it effectively summarises the main features of homogeneous and heterogeneous samples in small and big data sets from any source like interviews, focus groups, or internet discussions. It is also comparatively easy to understand and execute; hence, it is suitable for beginner qualitative researchers. Furthermore, it assists the investigator in detecting patterns and disparities in the data and generating unexpected conclusions that could guide the formation process of policies.

In conformity with the advocations of Merriam (1998) and Marshall and Rossman (2016), qualitative researchers should collect and analyse the data simultaneously. Accordingly, the researcher divided the interviews' conduct into three batches to allow for instantaneous data analysis and review of the interview questions as new themes appeared. The interviewer then transcribed the interviews verbatim, as Creswell (2003) suggested, to become more familiar with the initial data. Merriam (1998) recommended chronologically and categorically coordinating the data and continuously reviewing and coding to facilitate capturing the main themes and concepts. Therefore, the coding was done constantly during the interviews and analysis to comprehend the participants' views and interpret their encounters, and finally, themes were developed and named. It is worth noting that the data analysis was conducted using the NVivo 15 software program, a well-known qualitative analysis software.

NVivo has intrinsic characteristics for managing qualitative data, for example, character-based coding and multimedia features. NVivo's strength lies in its high affinity with various study designs, as it functions well with different qualitative research designs and data analytical techniques. Moreover, NVivo secures simple, powerful, and effective coding that facilitates retrieval by linking a paragraph to another from the same or a different source into one code. Besides, it streamlines and fastens the restructuring and rearrangement of coding with a few clicks; codes might be copied, moved, deleted, or merged without altering the sources. Consequently, this software further improves the efficiency of the researchers by allowing them to concentrate on exploring underlying themes and interpretations instead of squandering their time and efforts on copy-and-paste manual coding procedures. In the bargain, NVivo handles documents by housing all the sources under one roof, conquering the traditional manual approach, where managing the documents is

challenging and misplacing a single paper could have serious consequences for the entire project. In contrast to the conventional method, NVivo predominantly offers the chance for anyone, not just the analyst, to easily skim through the project and comprehend the data analysis procedures (Zamawe, 2015).

A detailed explanation of the analysis steps is presented in the following sub-sections, where the guide of Clarke and Braun (2014) was the basis for this analysis.

3.4.3.1 Phase 1: Familiarising with Data

The data was collected by conducting, recording, and writing out the interviews. This practice helped to gain background knowledge of the data before commencing the analysis and to formulate potential preliminary analytic ideas. At an early stage, the recorded voice interviews were verbatim transcribed into written form, and the accuracy of the transcripts was verified by comparing them to the original audio recordings. After that, the interview transcripts were frequently read to deeply understand the participants' perspectives. Concurrently with the reading, possible patterns were looked for, and the notes were inscribed around the concepts that might be utilised in the coming coding phase.

3.4.3.2 Phase 2: Producing Preliminary Codes

Later, after reading and becoming acquainted with the data in Phase 1, a preliminary list of the items in the data and what piqued curiosity about them was prepared. Thus, an initial list of codes that determined the data features was generated. The codes in this list were developed by line-by-line scrutiny of the interviews to trace the word repetitions and understand keywords in the different contexts. These codes were mainly related to a portion of the raw data that appeared intriguing and could interpret the subject matter in a meaningful way. The coding technique enabled the grouping of the data into clear, expressive categories using the NVivo

software program, in which each interested data item was shaded and included in a defined code. During this stage, the highest possible number of conceivable themes that might be seen as interesting in the future were coded.

3.4.3.3 Phase 3: Probing for Themes

Following the creation of the codes list in the previous step, the concentration on the broader context of themes by classifying the various codes into prospective themes was started. Therefore, the absorption in this level was on organising the constructed codes on the second step according to their similarities, coherence, and integration and subsequently initiating to recognise recurring themes. This iterative process, which involved switching between the codes, led to excluding the ambiguous or irrelevant codes and commencing the classifying of the codes into preliminary themes. This classification was performed by analysing the codes, understanding the relationships and commonalities among them, and then collating them into themes using the NVivo software program.

The literature review of the pieces of work and the established definitions and presented frameworks in Chapter 2 helped in identifying the possible organising themes that could tackle the research questions. The selection of the relevant organising themes was based on their capability to offer a theoretical and conceptual level of comprehension of the study matter using the available data. Thus, each chosen organising theme encapsulated a significant aspect of the data related to the research objectives, and it demonstrated a pattern or link among the data set and codes. As well as these developed themes together worked to build a larger narrative and addressed the research questions by interpreting the data and serving as a basis for the provided arguments on the issue under study. It should be emphasised that the global themes were fundamentally nothing but the three research questions.

3.4.3.4 Phase 4: Reviewing Themes

At this point, the nominated organising themes developed in Phase 3 were refined. The refinement process was aimed at eliminating the themes that had no sufficient data to support them or combining multiple themes into one because they were analogous and impliedly interconnected. Therefore, this phase validated the internal homogeneity and external heterogeneity by confirming that the data contained in each theme were meaningfully coherent and the themes themselves were distinguished from each other. At the end of this phase, it was ensured that the candidate thematic map suitably described the coded data features.

3.4.3.5 Phase 5: Identifying and Naming Themes

The thematic map produced earlier was used in Phase 4 to identify and refine the themes involved in the analysis and interpret the data they included. This procedure figured out the key core of each theme and the themes collectively and specified the data part that each theme represents. At this step, the focus was on choosing expressive names for the themes that reflected the essence of the theme to the reader. Hence, a thorough analysis of each theme based on its contained data and in relation to the research questions was performed. This analysis resulted in generating the codebook that involved all established codes and themes in this investigation. As well as the various mind maps, which represented visual hierarchy depictions of each global theme with the relevant organising themes and codes. In addition to the explore diagrams, which revealed the interviewees who demonstrated an understanding of each global theme, enhancing transparency by connecting respondents directly to the themes. These diagrams further supported data saturation validation by ensuring that all themes were endorsed by multiple participants from different professional groups.

Appendix 2 shows the finalised thematic map adopted in this research, which demonstrates the three global themes and the ten organising themes and their relationship.

3.5 Ethical Concerns

This thesis complied with the University of Bahrain postgraduate research guidelines, including the Thesis Writing Guide Handbook for 2018, the Scientific Research System of 2019, and other pertinent university policies. Throughout each stage of the research investigation, the researcher verified that ethical commitment was the highest priority. Therefore, the examiner espoused a series of procedures that guarantee the moral norms and trust of the study outcomes. At the outset, the examiner ensured that all participants were of legal age and showed no signs of mental impairment, as they held important job positions, thereby certifying their involvement in the investigation. Before consenting to take part, all participants were informed about the objectives, rationale, procedures, and expected benefits of the study, as advised by Mitchell and Jolley (2010). In addition, the informed consent form was explained to each individual, and his/her approval was obtained before conducting the interview. The interviewees were also instructed that they were free to withdraw at any time during the interview. During the data collection process, the investigator sought to preserve the participants' rights to privacy by interviewing each person individually at their preferred time and place. The respondents were then provided with the written interpretations and verbatim transcriptions of their interviews before they were published, as proposed by Creswell and Creswell (2018). In the final report, the identities of the interviewees were withheld, using pseudonyms in their place. The recorded materials were maintained with the researcher only to reduce any potential jeopardy to

confidentiality in the future. It must be stressed that this study did not pose any risks to the environment, creatures, or safety.

3.6 Conclusion

This chapter aimed to demonstrate the various research methodologies and methods employed in addressing the research questions. The thesis adopted the case study design in which the semi-structured interview tool was employed to evaluate the stakeholders' knowledge of sustainable housing and explore the comparative advantages and barriers to the implementation of this approach in the Kingdom of Bahrain. On this selection basis, the chapter discussed the entire process of conducting the research, including the data collection procedures, the study participants' nomination, the interviewing protocols, the data trustworthiness verification practices, and the data analysis techniques. The outcomes of the study will be introduced in Chapter 4, which will also illustrate the adherence to the procedures outlined in Chapter 3.

Chapter Four

Analysis and Discussion

4.1 Introduction

The previous chapter discussed the adopted methodology to investigate the competitive advantages and barriers to sustainable housing in the Kingdom of Bahrain. It described how interviews were used as a data collection tool and explained how the data was gathered and transcribed into written form and then analysed using thematic analysis. In an effort to achieve a thorough comprehension of the data, the researcher relistened to the recorded interviews and reread the protocols to discover more about the meaning constructed by the participants about the research topic. Initially, each transcribed interview was scanned and probed separately to gain deep insight into each participant. Subsequently, various lists of codes that determined the data features were generated and classified into themes using the NVivo software program.

This chapter presents the analysis of the following research constructs: (1) assessing stakeholder awareness and understanding of sustainable approach applications in Bahraini residential real estate, (2) identifying the various financial, social, and environmental benefits associated with sustainable housing practices in Bahrain, and (3) investigating the barriers to the adoption of sustainable residential property practices in Bahrain.

4.2 Description of Participants

A total of 15 interviews were implemented for this study, and all were incorporated into the analysis. The research's participants are professionals in Bahrain's residential real estate sector between the ages of 32 and 64. At the time of conducting the study, the participants had at least five years and up to forty-two years of experience in the housing industry. Below is a

synopsis of each interviewee, and as previously indicated, the identities of the interviewees were withheld using pseudonyms in their place to maintain secrecy. Table 4.1 presents an abstract of the study's participants' demographics and backgrounds.

Interviewee 1

The responder is a 62-year-old Bahraini who holds a bachelor's degree in civil engineering and a master's in civil engineering. He has been working in the public housing sector for more than 38 years as a consultant for project design and execution for different public housing and apartment projects in the Kingdom of Bahrain.

Interviewee 2

The interviewee is a 64-year-old Jordanian Australian who holds a bachelor's degree in civil engineering. He has more than 42 years of experience in the engineering, project management, and real estate fields and has worked previously in many countries, such as the United States, Kuwait, Australia, and Qatar. The participant has been a resident of Bahrain since 2007, and currently, he is the chief development officer of a private real estate development company specialising in residential, commercial, and industrial buildings.

Interviewee 3

The participant is a 44-year-old Bahraini with a bachelor's degree in environmental civil engineering and a LEED Green Certificate. He has more than 17 years of experience in engineering, project management, and real estate in the semi-government and private sectors. The interviewee worked for leading real estate development companies in Bahrain and is currently the chief development officer of an eminent private property development company that specialises in residential and commercial properties.

Interviewee 4

The respondent is a 42-year-old Bahraini with a bachelor's degree in building services engineering and a master's degree in real estate. He worked for more than 19 years in local and international real estate companies in different positions ranging from department head to chief executive officer. Currently, the participant teaches real estate courses at a prestigious institute and manages his company, which specialises in providing property consulting, broking, and valuation services.

Interviewee 5

Interviewee five is a 40-year-old Bahraini who holds a bachelor's degree in business administration and management. He has worked in the real estate field since 2013 as a building manager and has joined different premier local companies as a sales manager. At present, the participant is the general manager of a newly established broking and property management company.

Interviewee 6

The respondent is a 55-year-old Bahraini who holds a bachelor's degree in architectural engineering. He worked as a senior government official in the public housing sector for 28 years. In 2022, the interviewee joined a private development company specialising in developing and selling different real estate products, for instance, residential, commercial, and entertaining buildings, farms, and lands, as a chief development officer.

Interviewee 7

The participant is a 33-year-old Bahraini with a bachelor's degree in architecture and a master's degree in real estate development and property management. He has 10 years of experience in the architecture and real estate fields, primarily residential building projects. Currently, the interviewee is the head of development for a private local company

majoring in development and valuation services for various residential and commercial buildings and lands.

Interviewee 8

Interviewee eight is a 37-year-old Bahraini who holds a bachelor's degree in international business and commerce. Since 2009, he has been working in a governmental real estate company that practices many activities, including private residential and commercial building development, management consulting, operation, valuation, and broking. Presently, the participator holds the manager of property management in the company.

Interviewee 9

The respondent is a 36-year-old Bahraini who holds a diploma degree in electrical, electronics, and communications engineering and a bachelor's degree in informatics engineering. He has worked for 8 years in the real estate field in different international and local firms. Currently, he is a property manager at a well-respected private real estate company that is proficient in residential and commercial property development, management, operation, and appraisal services.

Interviewee 10

The interviewee is a 35-year-old Bahraini who holds a bachelor's degree in marketing and marketing management and a master's degree in business and human resource management. He has 13 years of experience in marketing, management, and real estate industries. At present, the participant is the general manager of a private properties company that is majoring in residential and commercial real estate development, management, and operation activities. Moreover, he handles the management of social responsibility and sustainability programs of the entire corporation.

Interviewee 11

The participant is a 42-year-old Bahraini who holds a diploma degree in real estate management. He has worked for 19 years in the real estate sector for numerous private companies. Nowadays, the interviewee is a property manager at a mid-level property company that works in residential and commercial building development, acquisition, management, and operation fields.

Interviewee 12

Interviewee twelve is a 32-year-old Syrian who holds a bachelor's degree in business and managerial economics and a master's degree in business administration and international business development. He has been a resident of Bahrain since 2011 and has worked for 10 years in the Bahraini real estate sector for multiple private firms. Presently, the respondent is the chief executive officer at a private property company that offers property management, advisory, broking, valuation, hospitality, and homeowners' association management services.

Interviewee 13

The responder is a 37-year-old Bahraini who holds a bachelor's degree in finance. In 2019, he started working in real estate by establishing his company for broking and valuation services. Today, he is managing a team responsible for selling and assessing the various types and sizes of commercial and residential properties and lands.

Interviewee 14

The participator is a 34-year-old Bahraini who holds a bachelor's degree in architecture and a master's degree in business administration. She is a LEED Accredited Professional and has been working as a programs specialist in the public sector since 2016. The interviewee is a part of the sustainable design section team in the ministry and is responsible for

overseeing the design and implementation of numerous public building projects, for example, schools, hospitals, health centres, and postal centres.

Interviewee 15

The last participant is a 36-year-old Bahraini who holds a bachelor's degree in architecture. Since 2011, he has been working in a ministry, which is accountable for developing and maintaining different public buildings such as hospitals, schools, postal centres, and health centres. Now, the respondent is acting chief of the sustainable design section, supervising the design and execution of the various projects.

Table (4.1): An Abstract of the Study's Participants' Demographics, Academics, and Practical Backgrounds

Participant No.	Nationality	Age	Gender	Education	Years of Experience	Job Level	Job Specialisation	Sector
Participant 1	Bahraini	62	Male	B.Sc. Civil Engineering M.Sc. Civil Engineering	38	Medior	Project design and execution	Public
Participant 2	Bahrain Resident	64	Male	B.Sc. Civil Engineering	42	Senior	Project development	Private
Participant 3	Bahraini	44	Male	B.Sc. Environmental Civil Engineering	17	Senior	Project development	Private
Participant 4	Bahraini	42	Male	B.Sc. Building Services Engineering M.Sc. Real Estate	19	Founder	Consulting, broking, property management, and valuation	Private
Participant 5	Bahraini	40	Male	B.Sc. Business Administration and Management	12	Senior	Broking and property management	Private
Participant 6	Bahraini	55	Male	B.Sc. Architectural Engineering	30	Senior	Project development, design, and execution	Private
Participant 7	Bahraini	33	Male	B.Sc. Architecture M.Sc. Real Estate	10	Senior	Project development	Private

Participant No.	Nationality	Age	Gender	Education	Years of Experience	Job Level	Job Specialisation	Sector
Participant 8	Bahraini	37	Male	B.Sc. International Business and Commerce	15	Medior	Property management	Public
Participant 9	Bahraini	36	Male	B.Sc. Informatics Engineering	8	Medior	Property management	Private
Participant 10	Bahraini	35	Male	B.Sc. Marketing M. Business and Human Resource Management	13	Senior	Project development and property management	Private
Participant 11	Bahraini	42	Male	Diploma of Real Estate Management	19	Medior	Property management	Private
Participant 12	Bahrain Resident	32	Male	B.Sc. Business and Managerial Economics M.B.A.	10	Senior	Property management, advisory, broking, and valuation	Private
Participant 13	Bahraini	37	Male	B.Sc. Finance	5	Founder	Broking and valuation	Private
Participant 14	Bahraini	34	Female	B.Sc. Architecture M.B.A.	8	Medior	Project design and execution	Public
Participant 15	Bahraini	36	Male	B.Sc. Architecture	13	Medior	Project design and execution	Public

4.3 Descriptive Analysis of Participants' Demographic Characteristics

The demographic information section in the interview was an efficient means to achieve data about the study's participants to ensure that each individual meets the specified criteria in section 3.4.1. Thus, they can be considered a representative and reflective sample of the target population. The analysis covered (1) nationality, (2) age, (3) gender, (4) education level and academic specialisation, (5) employment level and sector, and (6) experience and job specialisation. Table 4.2 shows a description of the demographic characteristics of the participants in the study with their frequencies. The following subsections explain the results for each of the attributes.

Table (4.2): Description of the Demographic Characteristics of the Participants in the Study

Demographics	Value	Frequency (%)
Nationality	Bahraini	87.0
	Bahrain Resident	13.0
Age	30-39 Year	53.0
	40-49 Year	27.0
	50-59 Year	7.0
	>60 Year	13.0
Gender	Male	93.0
	Female	7.0
Education Level	Diploma	7.0
	Bachelor's Degree	53.0
	Master's Degree	40.0
Academic Specialisation	Engineering	50.0
	Business	33.0
	Real Estate	17.0

Demographics	Value	Frequency (%)
Employment Level	Senior	47.0
	Medior	40.0
	Founder	13.0
Employment Sector	Public	27.0
	Private	73.0
Experience	5-14 Years	53.0
	15-24 Years	27.0
	25-34 Years	7.0
	>35 Years	13.0
Job Specialisation	Project Design and Execution	16.0
	Project Development	20.0
	Property Management	28.0
	Broking	16.0
	Valuation	12.0
	Consulting and Advisory	8.0

4.3.1 Nationality

As mentioned earlier in section 3.4.1, the participant should be a Bahraini or a resident in Bahrain for at least the last five years to ensure his/her knowledge, familiarity, and awareness of the nature of the Bahraini real estate market and its current circumstances and challenges. Table 4.2 and Figure 4.1 display that the majority of the interviewees (87%) were Bahraini, and 13% were only residents. The two residents were Participant 2, a Jordanian Australian based in Bahrain 17 years ago, and Participant 12, a Syrian resident in Bahrain 13 years ago.

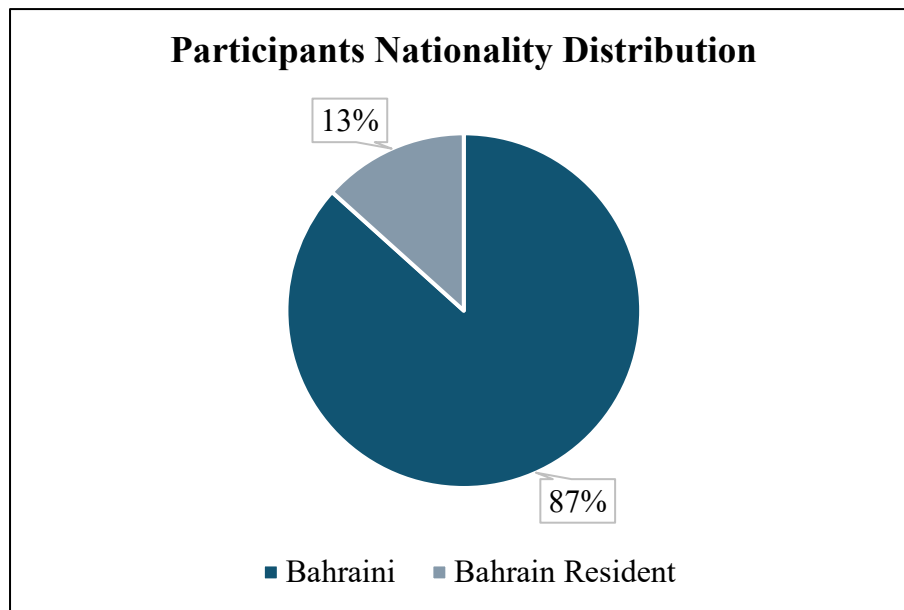


Figure (4.1): Visualised distribution of participants’ nationality

4.3.2 Age

The findings of Table 4.2 and Figure 4.2 show that more than half of the professional responders involved in the study (53%) belonged to the age group between 30 years and 39 years. Moreover, 27%, equivalent to 4 participants, were between 40 and 49 years old. However, the other two age groups, older than 50 years, combined consisted of only 20%.

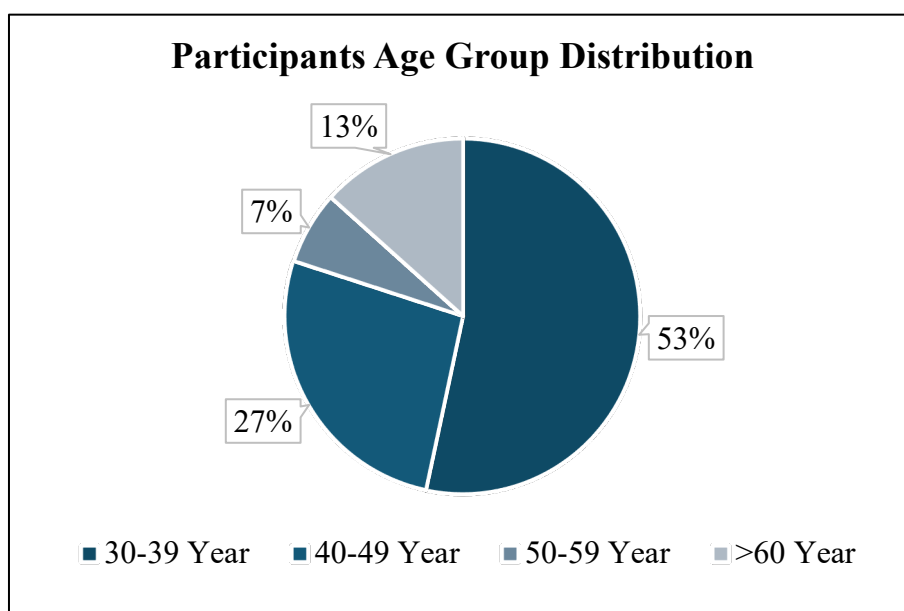


Figure (4.2): Visualised distribution of participants’ age group

4.3.3 Gender

As indicated in Table 4.2 and Figure 4.3, 14 participants in the research out of 15 were males. This distribution is consistent with the sector's true gender makeup published by Tamkeen in March 2024, which revealed that men are the prevailing majority of professionals in the Bahraini real estate sector. According to the report, the total percentage of men practitioners in various property specialisations reached 83.5% in comparison to 16.5% of women. Indeed, this demographic pattern reflects Bahrain's broader sociocultural milieu rather than constituting a selection bias. It provides precious insight into the dominant gender gap and the limited female engagement in housing-related decision-making processes from a cultural and social sustainability standpoint.

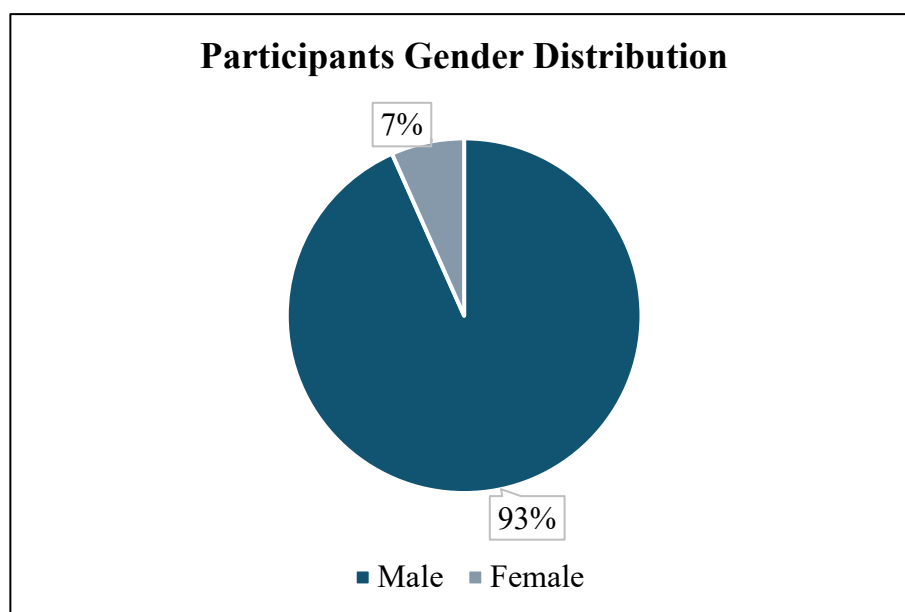


Figure (4.3): Visualised distribution of participants' gender

4.3.4 Education Level and Academic Specialisation

The descriptive analysis of participants' education level disclosed that all participants, other than Interviewee 11, were bachelor's holders; refer to Table 4.2 and Figures 4.4 and 4.5. Furthermore, 40% of them had completed their master's degree in different academic disciplines. The

results also indicated that 50% of the interviewed professionals were engineering graduates, 33% were business administration alumni, and 17% of the participants had real estate degrees. Moreover, two interviewees (3 and 14) were LEED Accredited Professionals. This demographic feature contributed to verifying the second condition of the participation eligibility criteria discussed in section 3.4.1.

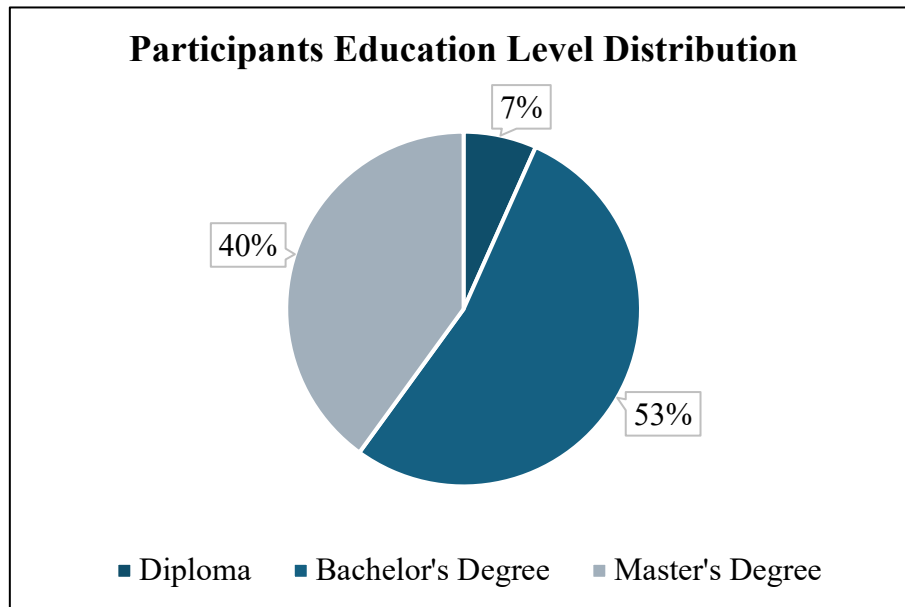


Figure (4.4): Visualised distribution of participants' education level

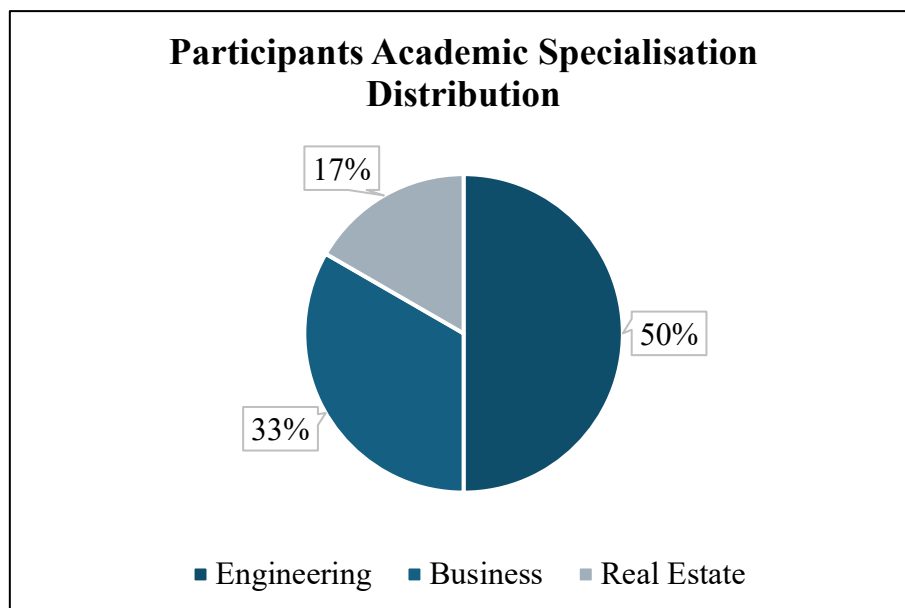


Figure (4.5): Visualised distribution of participants' academic specialisation

4.3.5 Employment Level and Sector

According to the analysis outcomes presented in Table 4.2 and Figures 4.6 and 4.7, the bulk of the study's respondents (73%) were employees of the private sector. This is compared to 27% who had been working in public entities, whether ministries or governmental companies. Moreover, seven interviewees, equivalent to 47%, had been holding senior positions; a mass of them were chief development officers, and the residues were general managers. Furthermore, 40% of the responders were at a non-managerial level, and only two participants (13%) were founders. Indeed, the variation in the participants' sample assisted in obtaining a penetrative understanding of the research matter from the viewpoints of various stakeholders and decision-makers for both the public and private real estate sectors. In addition, the sample involved respondents from all organisational levels, which aided in investigating the research problem and acquiring an in-depth understanding of its implications on all the top and bottom scales of professionals.

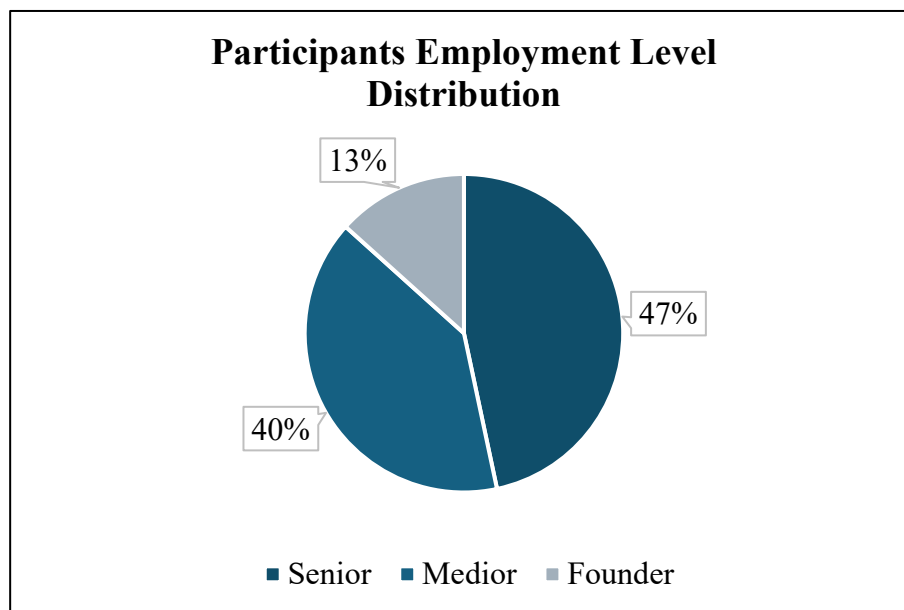


Figure (4.6): Visualised distribution of participants' employment level

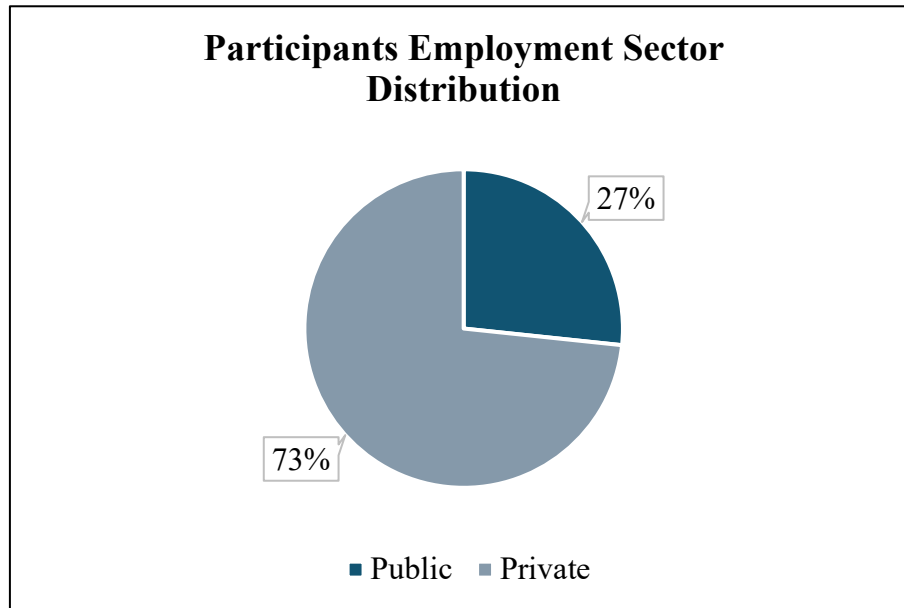


Figure (4.7): Visualised distribution of participants' employment sector

4.3.6 Experience and Job Specialisation

Table 4.2 and Figures 4.8 and 4.9 illustrated that a vast majority of the research's sample (53%) had 5 to 14 years of experience in Bahraini residential real estate. On the other hand, 27% of the total interviewees fell into the 15- to 24-year-old experience category. However, the remaining 20% represented the combined two groups of 25 years and above experience. In further elaboration, a big share of the sample (42%) has been practising project development and execution roles, and 37% of them have been functioning in property management careers. Lastly, the lowest portion of respondents, 21%, have been providing broking, valuation, and consulting services. It should be noted that the sample covered different stakeholders from all roles and proficiencies, as specified in section 3.4.1, to attain deep, comprehensive insights into the impact of sustainable approach application on the different phases of the real estate life cycle, including design, implementation, acquisition, management, and selling.

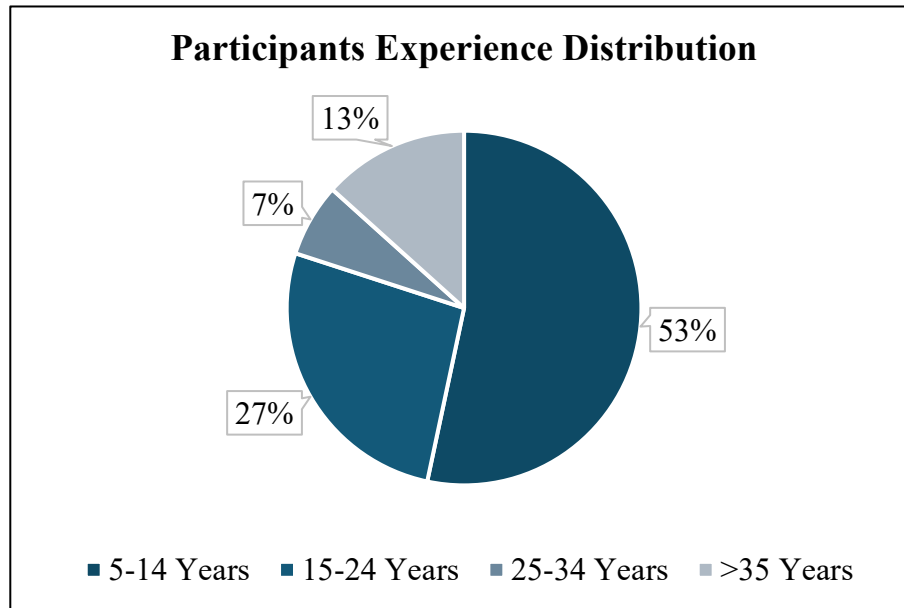


Figure (4.8): Visualised distribution of participants' experiences

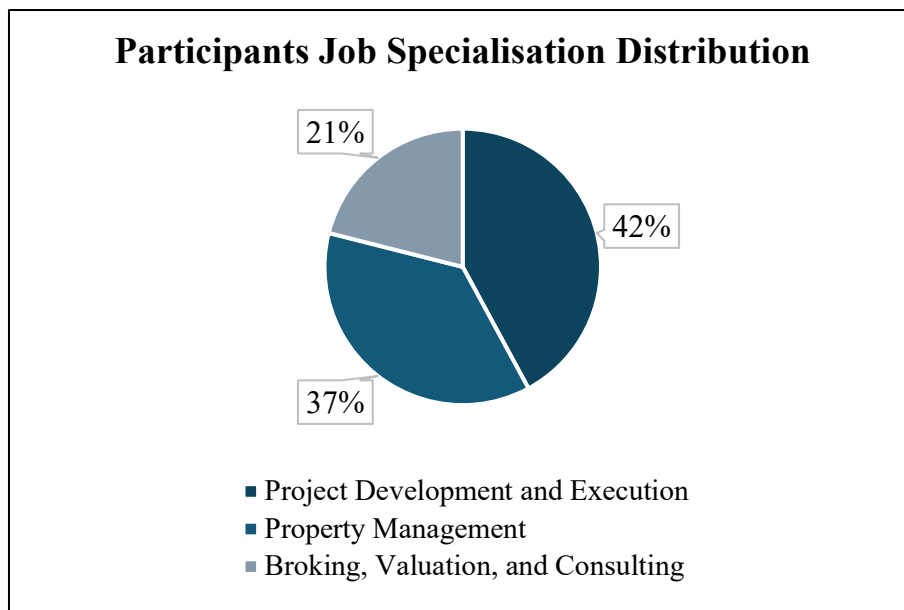


Figure (4.9): Visualised distribution of participants' job specialisation

4.4 Themes And Codes Development

In line with the research objectives, the results are presented by interpreting the transcripts, producing the codes, and developing the themes using thematic analysis with the aid of the NVivo 15 software program, as stated in Chapter 3. The following codes and themes surfaced from the fifteen interview transcripts while conducting the thematic analysis process:

Table (4.3): The Codebook Generated by NVivo 15 Software for Codes and Themes Emerged from Interviews

Global Theme	Organising Theme	Code	Sources	References
Bahraini Stakeholders' Awareness on Sustainable Housing	Environmental Sustainability Knowledge	Energy and Water Efficiency Systems	14	27
		Green Areas	6	11
		Green Practices and Innovations	4	18
		Location and Accessibility	8	15
		Recycling and Waste Management	4	4
		Solar Systems	7	13
	Economic Sustainability Knowledge	Different Housing and Financing Options	7	14
		Property Affordability	11	27
		Property Innovations	5	6
		Property Management and Maintenance	8	28
		Property Technological Development	7	12
	Social Sustainability Knowledge	Beneficiaries Participation	10	28
		Entertainment Facilities	11	31
		Fulfilling People's Specific Needs	9	16
		Infrastructure and Community Facilities	7	11
		Safety, Security, and Privacy	12	22
		Sense of Community and Identity	6	13

Global Theme	Organising Theme	Code	Sources	References
	Cultural Sustainability Knowledge	Cultural Heritage	7	13
		Planning, Design, and Construction	14	59
		Values, Traditions, and Norms	5	8
Sustainable Housing Adoption Benefits	Environmental Benefits	Conserving the Environment	5	8
	Economic Benefits	Attracting Customers	10	20
		Building Positive Image	10	12
		Increasing Rental Rate	7	8
		Prolonging Property's Life	8	9
		Raising Property's Value	11	16
		Reducing Operation and Maintenance Expenses	14	22
	Social Benefits	Promoting Healthy Lifestyle	8	10
		Raising Life Quality	14	30
Sustainable Housing Adoption Barriers	Economic Barriers	High Investment Capital	12	23
		Infeasibility	11	14
		Lack of Awareness	4	8
		Resistance to Change	11	20
	Regulatory Barriers	Absence of Certification System	4	4
		Neediness for Additional Government Incentives	12	30

Global Theme	Organising Theme	Code	Sources	References
		Insufficient Policies, Regulations, and Processes	12	35
		Limited Public Funding	8	14
	Technical Barriers	Insufficient Demonstration Projects	6	6
		Lack of Supply Chains	9	14

In Table 4.3, each research question was presented as a 'global theme'; it was addressed from multiple dimensions displayed as 'organising themes.'. Hence, the most frequent ideas discussed by the interviewees for each 'organising theme' and referred to by at least 25% of them were introduced as 'codes.' The researcher realised that repeating the code by a quarter of the participants fulfils the saturation condition that Cooper and Schindler (2014), Marshall and Rossman (2016), and Asadul Islam and Aldaihani (2022) referred to. Thus, codes that were repeated once or twice were excluded, especially since they were not closely related to the research questions and did not introduce new paths for thinking and inference. Hence, they did not add any significance or core addition to the study results. The 'sources' column indicated the total number of participants who discussed each concept 'code.'. Lastly, the 'references' column disclosed the total number of coding all participants did for each 'code.'. Table 4.4 reflects a matrix for the most substantial codes for each research question as per the interviewees' groups' viewpoints. The following subsections review in detail the findings of each research question supported with mind maps, explore diagrams, and stacked and unstacked comparison bar charts.

Table (4.4): Matrix Coding of the Most Significant Codes Perceived by Bahraini Stakeholders According to Their Specialisations

Organising Theme	Participants Specialisation		
	Project Developers and Executors	Property Managers	Brokers, Valuers, and Consultants
The Awareness of Stakeholders in Bahrain of Sustainable Housing			
Environmental Sustainability Knowledge	- Energy and Water Efficiency Systems	- Energy and Water Efficiency Systems	- Energy and Water Efficiency Systems - Location and Accessibility
Economic Sustainability Knowledge	- Property Affordability	- Property Management and Maintenance	- Different Housing and Financing Options - Property Management and Maintenance
Social Sustainability Knowledge	- Beneficiaries Participation	- Safety, Security, and Privacy	- Entertainment Facilities - Safety, Security, and Privacy - Sense of Community and Identity
Cultural Sustainability Knowledge	- Planning, Design, and Construction	- Planning, Design, and Construction	- Planning, Design, and Construction

Organising Theme	Participants Specialisation		
	Project Developers and Executors	Property Managers	Brokers, Valuers, and Consultants
The Most Significant Benefits of Sustainable Housing Adoption Perceived by Bahraini Stakeholders			
Environmental Benefits	- Conserving the Environment	- Conserving the Environment	- Conserving the Environment
Economic Benefits	- Reducing Operation and Maintenance Expenses	- Reducing Operation and Maintenance Expenses	- Reducing Operation and Maintenance Expenses
Social Benefits	- Raising Life Quality	- Raising Life Quality	- Raising Life Quality
The Most Significant Barriers of Sustainable Housing Adoption Perceived by Bahraini Stakeholders			
Economic Barriers	- High Investment Capital	- Resistance to Change	- Resistance to Change
Regulatory Barriers	- Insufficient Policies, Regulations, and Processes	- Neediness for Additional Government Incentives	- Insufficient Policies, Regulations, and Processes - Neediness for Additional Government Incentives
Technical Barriers	- Lack of Supply Chains	- Insufficient Demonstration Projects - Lack of Supply Chains	- Lack of Supply Chains

4.4.1 The Awareness of Stakeholders in Bahrain of Sustainable Housing

Concerning Table 4.3 and as articulated in Chapter 2, the awareness of Bahraini stakeholders of sustainable residential properties was assessed by investigating their knowledge of the four dimensions of sustainable housing developed by the UN-Habitat in 2012: environmental, economic, social, and cultural. Particularly, the codes of each organising theme were derived from UN-Habitat's framework's policies; refer to Table 2.1. Consequently, the participants were asked about the application of each policy within their projects to evaluate their knowledge of sustainable real estate. Figure 4.10 exhibits the mind map of the codes and themes of the first research question. Moreover, Figure 4.11 shows the explore diagram of the question, which includes all associated organising themes, i.e., the four dimensions, and the participants who showed knowledge of the different sustainable housing policies. For greater detail, Appendix 3 displays the explore diagrams for each dimension and code with those who demonstrated an understanding of each sustainable housing policy.

In addition, Figures 4.12, 4.13, 4.14, and 4.15 reveal comparison bar charts among the codes of each organising theme that measure the percentage knowledge of the participants about each policy. These figures exhibit stacked and unstacked bars, where the unstacked bars indicate the total awareness of each policy. Meanwhile, stacked bars disclose the awareness of each specialisation group regarding the various policies. These percentages were calculated by dividing the total sources of each group by the total number of study respondents. The last figure, 4.16, reveals the most knowledgeable codes in each sustainable housing dimension by the interviewees. It should be noted that the highest knowledge level for all policies was 100.0%, whilst the lowest was 31.6%.

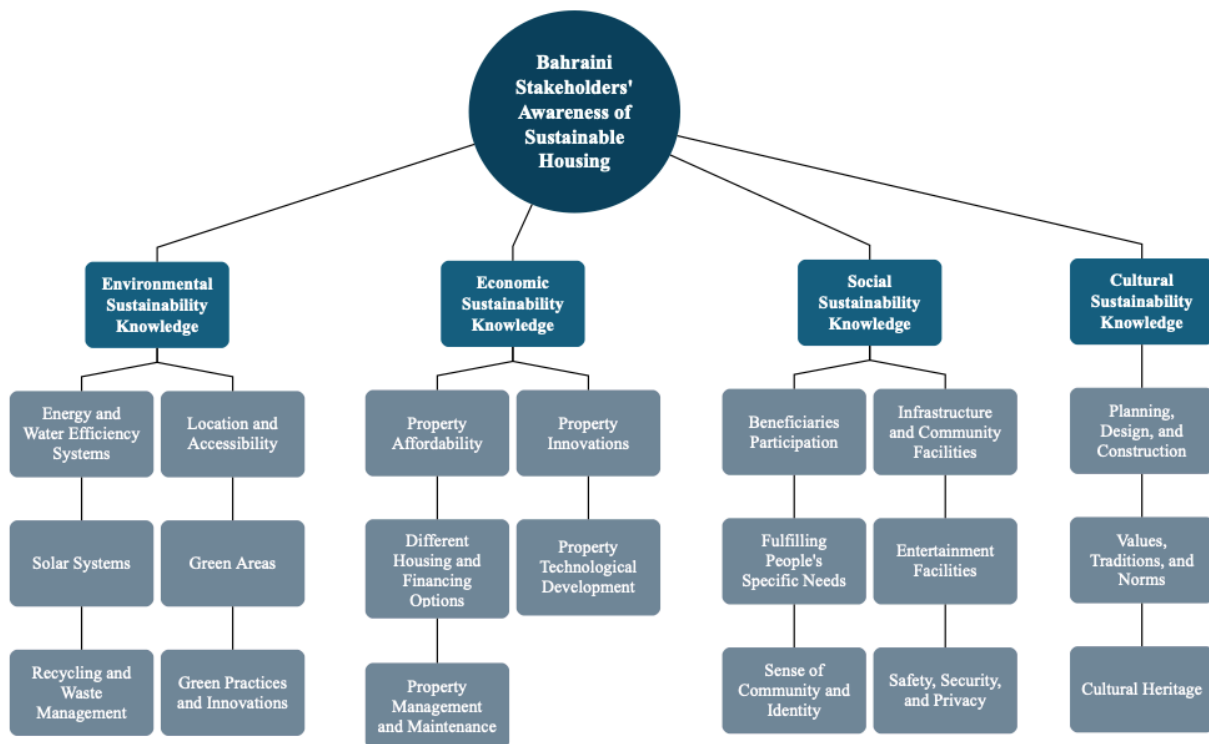


Figure (4.10): A mind map of the codes and themes used to evaluate the awareness of Bahraini stakeholders of sustainable housing

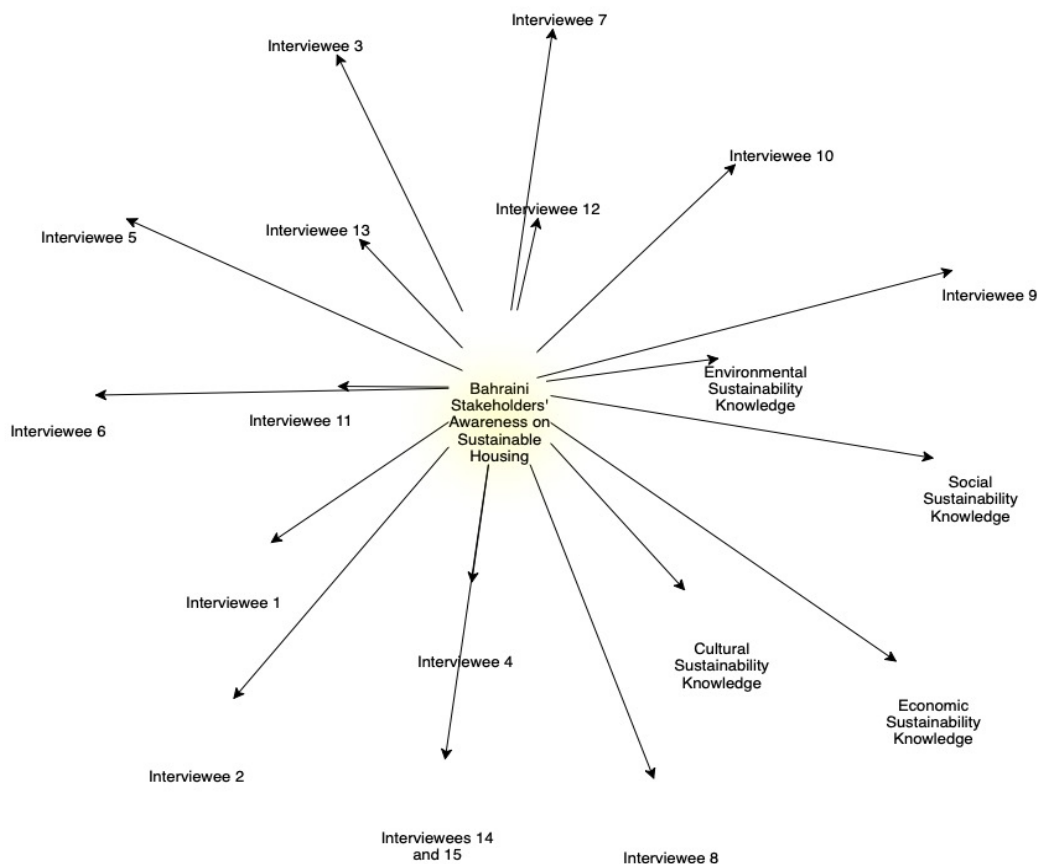


Figure (4.11): The explore diagram to evaluate the awareness of Bahraini stakeholders of sustainable housing

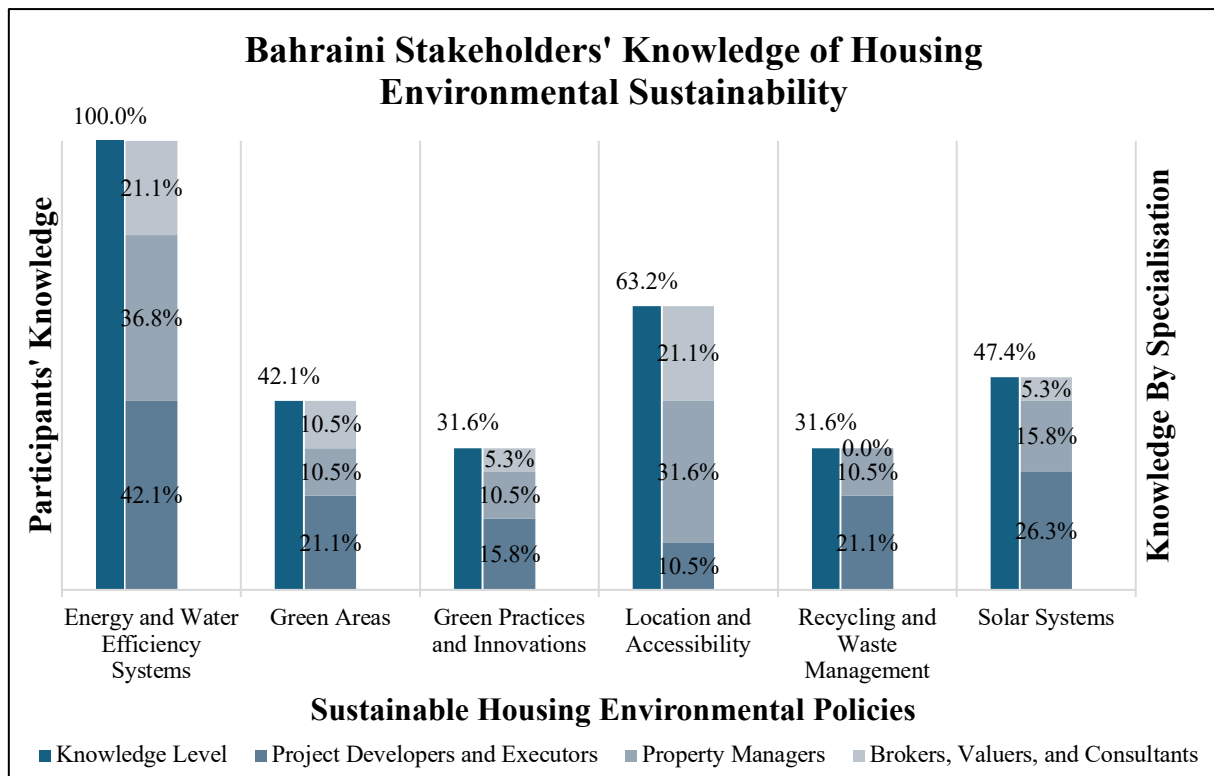


Figure (4.12): A comparison bar chart of Bahraini stakeholders' awareness of housing environmental sustainability policies

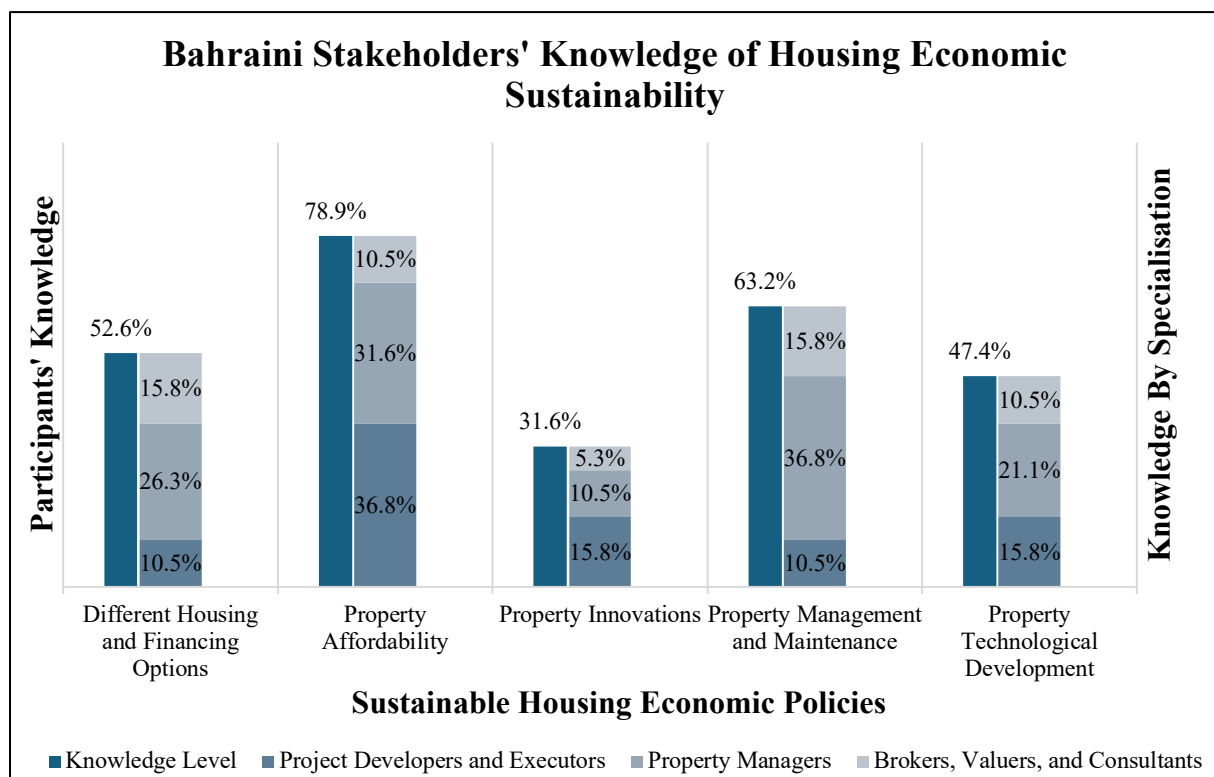


Figure (4.13): A comparison bar chart of Bahraini stakeholders' awareness of housing economic sustainability policies

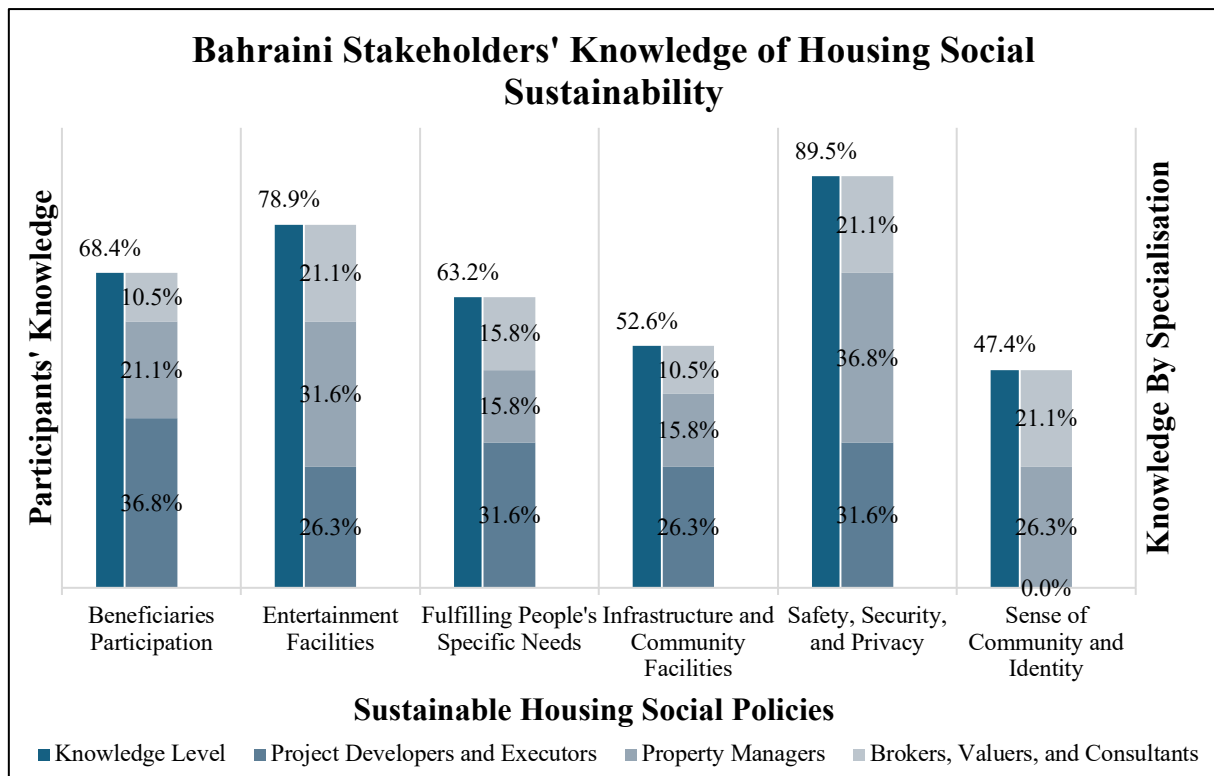


Figure (4.14): A comparison bar chart of Bahraini stakeholders' awareness of housing social sustainability policies

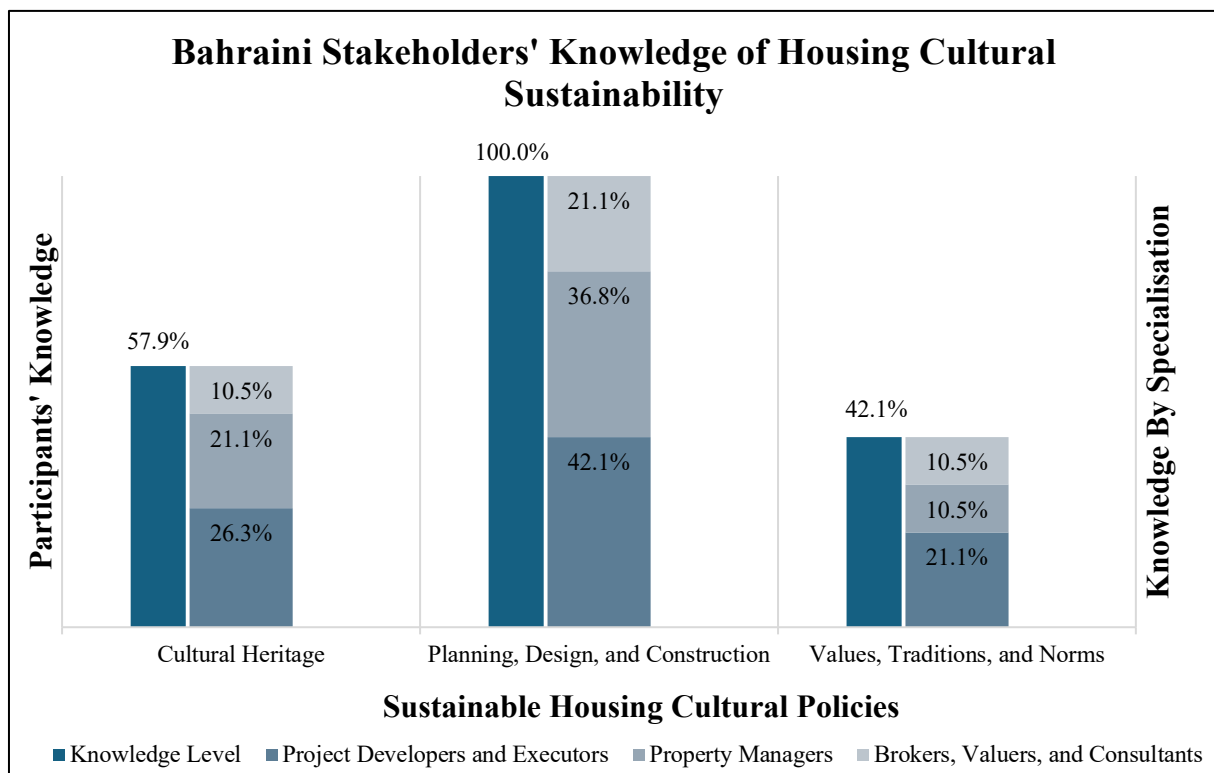


Figure (4.15): A comparison bar chart of Bahraini stakeholders' awareness of housing cultural sustainability policies

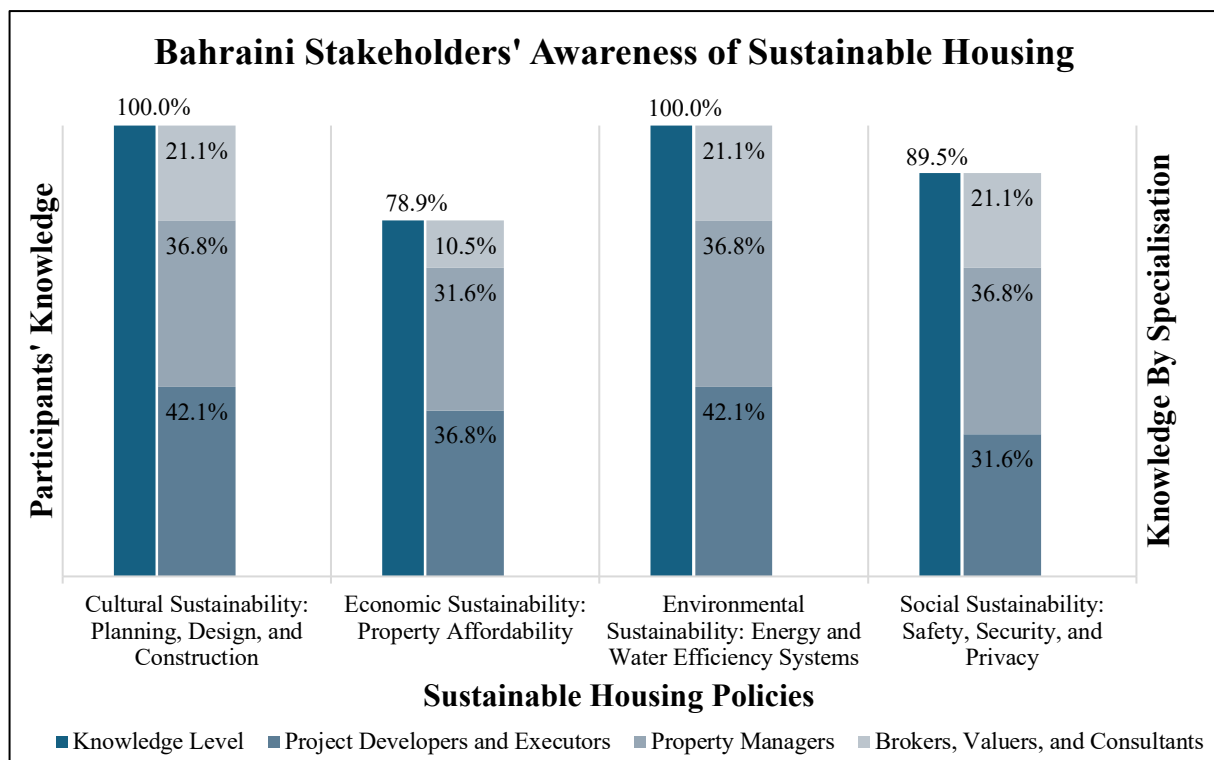


Figure (4.16): A bar chart of Bahraini stakeholders' most knowledgeable sustainable housing policies

4.4.2 The Benefits of Sustainable Housing Adoption

Based on the most prevalent benefits of sustainable housing extracted from the literature, three categories of advantages were created and discussed with the participants to extract the answer to the second research question. The three dimensions of 'organising themes' were environmental, economic, and social and consisted of 9 codes; consult Table 4.3. Each benefit 'code' was debated with the interviewees to determine the extent to which they agreed with its significance based on their experience. Figure 4.17 presents the primary mind map used to develop the codes and themes for the question. In addition, Figure 4.18 illustrates the explored dimensions of this question, and the interviewees who concurred with the different benefits of SH. Appendix 4 expounds on the explore diagrams of each dimension and code. Furthermore, Figures 4.19-4.21 display comparison charts that show the advantages of each dimension, quantifying the participants' agreement on the importance of each benefit. Finally, Figure 4.22 exhibits the most substantial advantages of SH embracement from stakeholders' viewpoints.

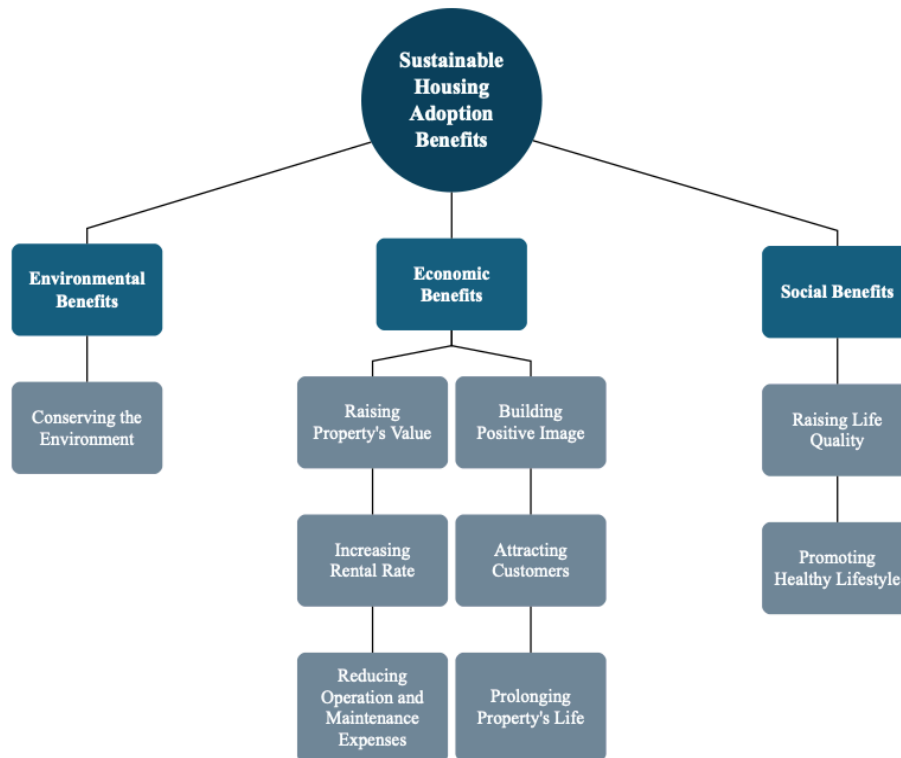


Figure (4.17): A mind map of the codes and themes used to explore the benefits of sustainable housing adoption

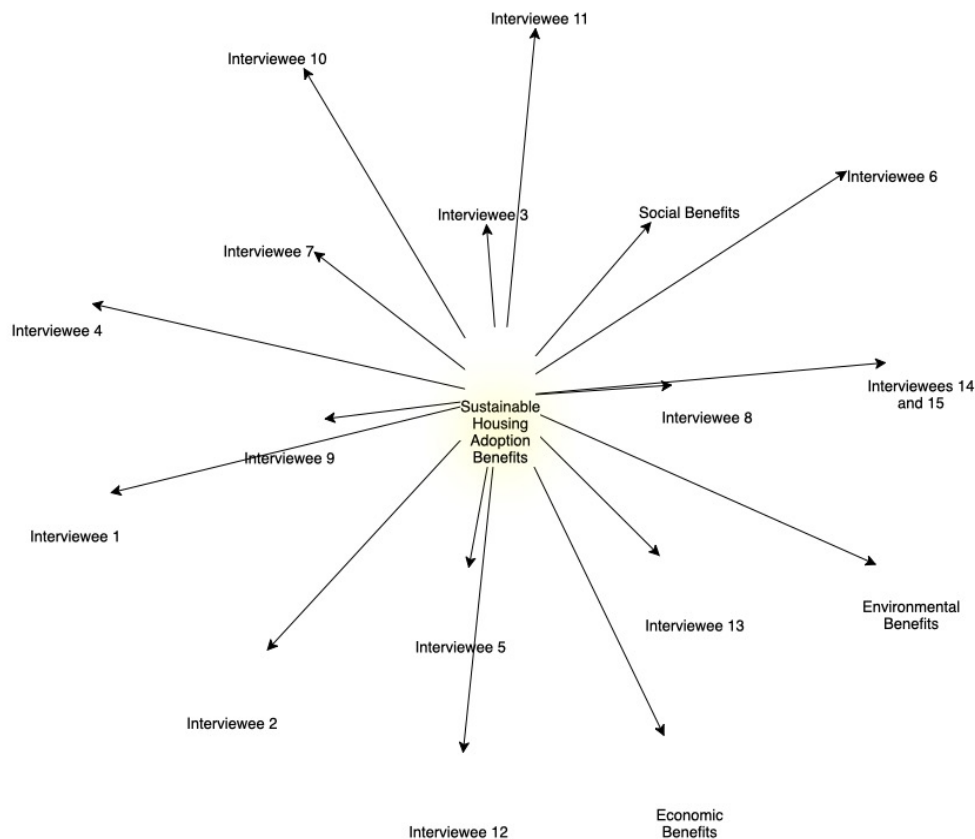


Figure (4.18): The explore diagram to investigate the benefits of sustainable housing adoption

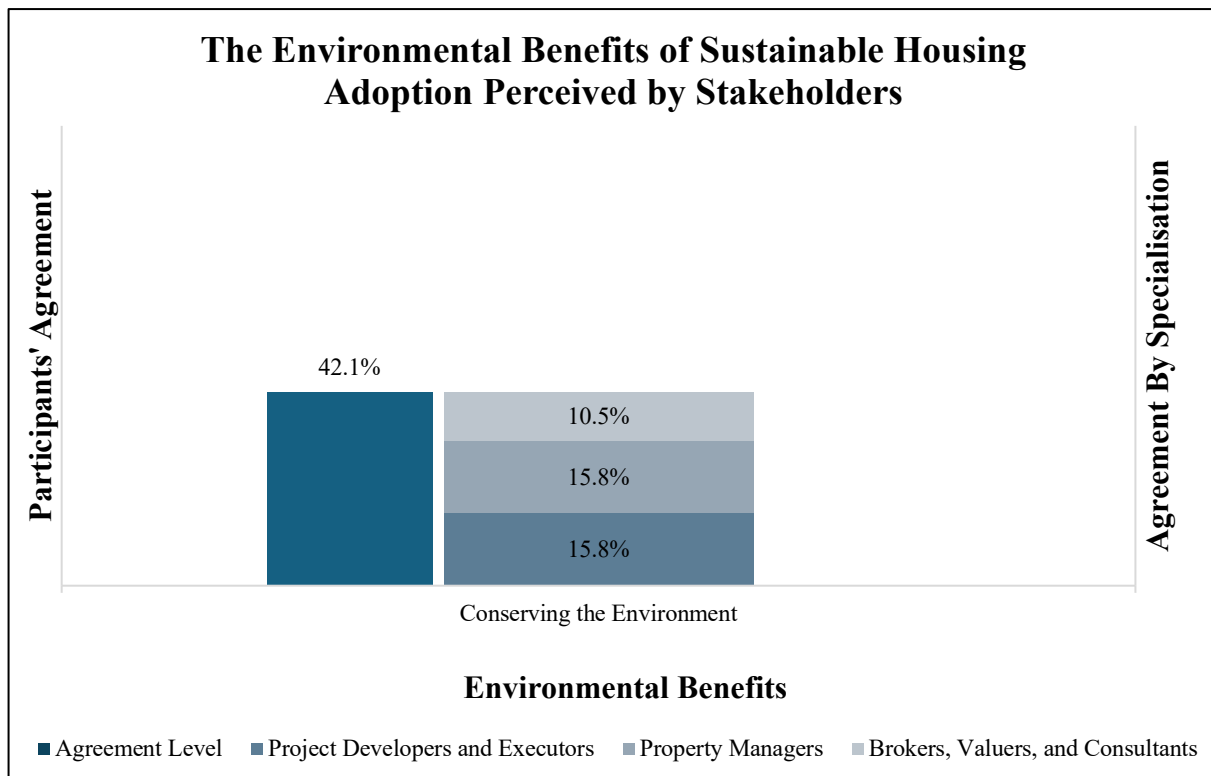


Figure (4.19): A comparison bar chart of the environmental benefits of sustainable housing adoption

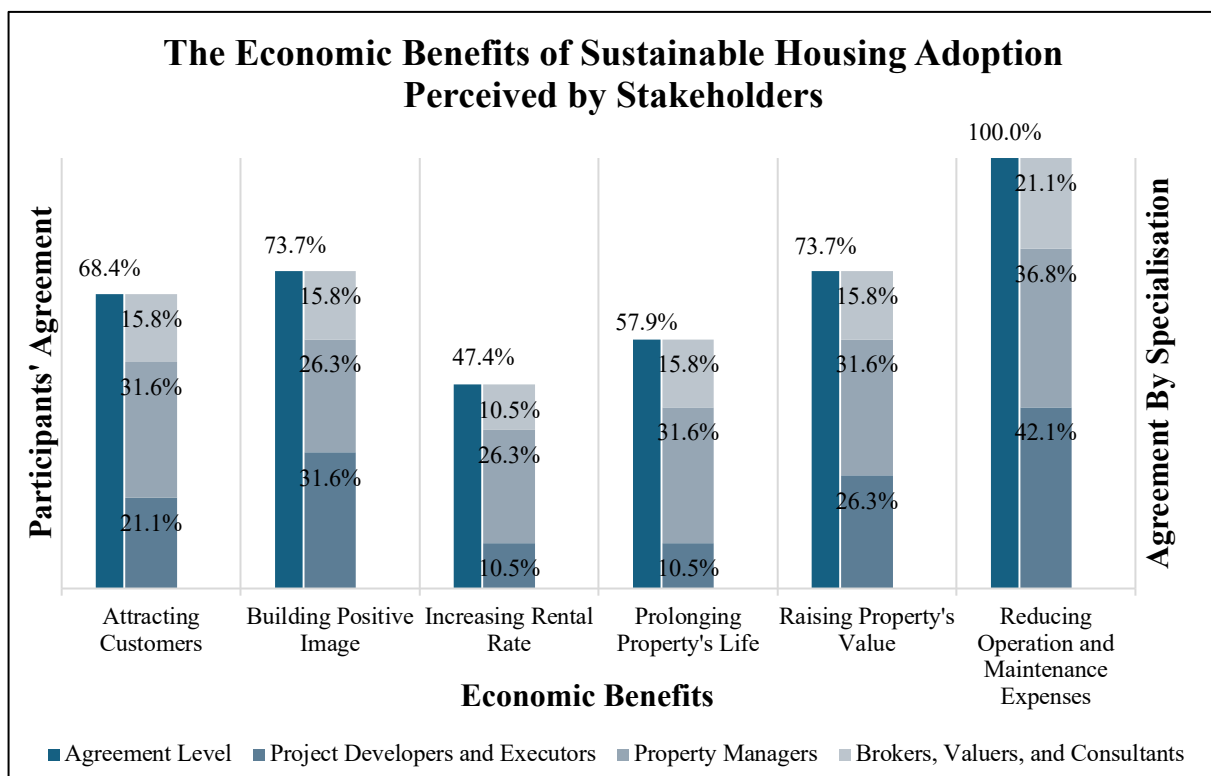


Figure (4.20): A comparison bar chart of the economic benefits of sustainable housing adoption

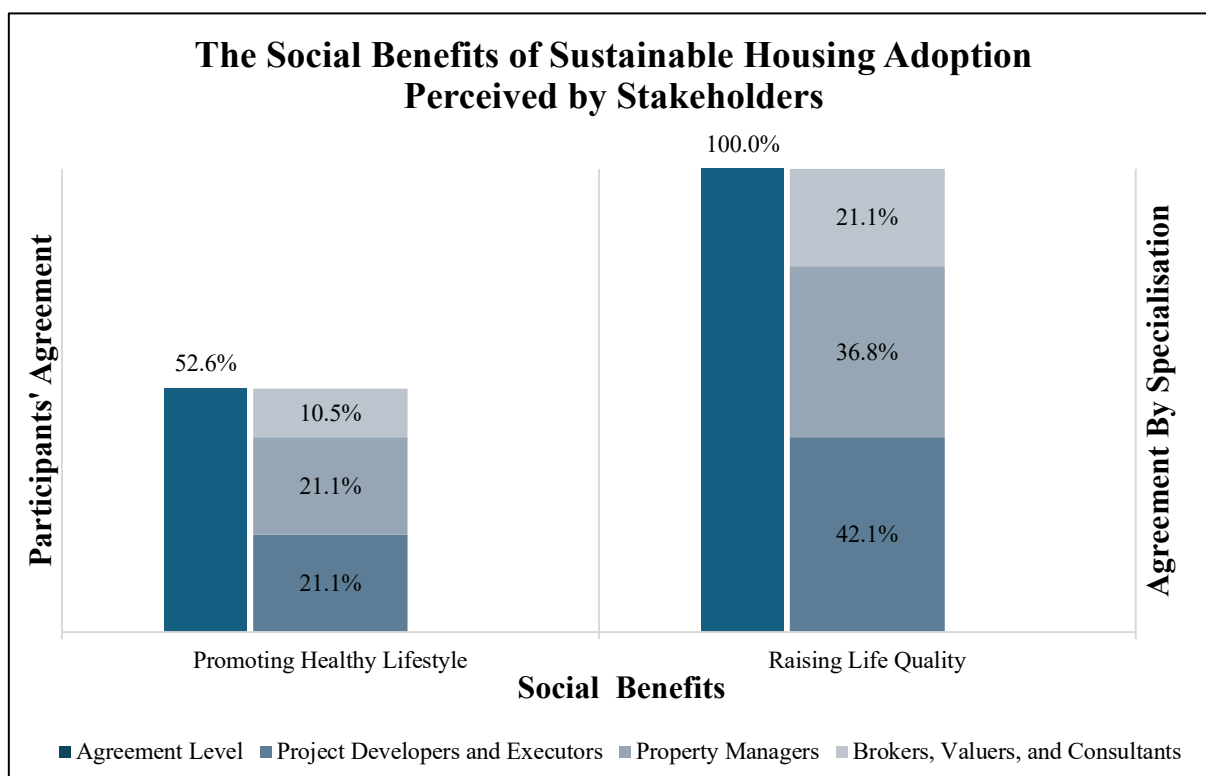


Figure (4.21): A comparison bar chart of the social benefits of sustainable housing adoption

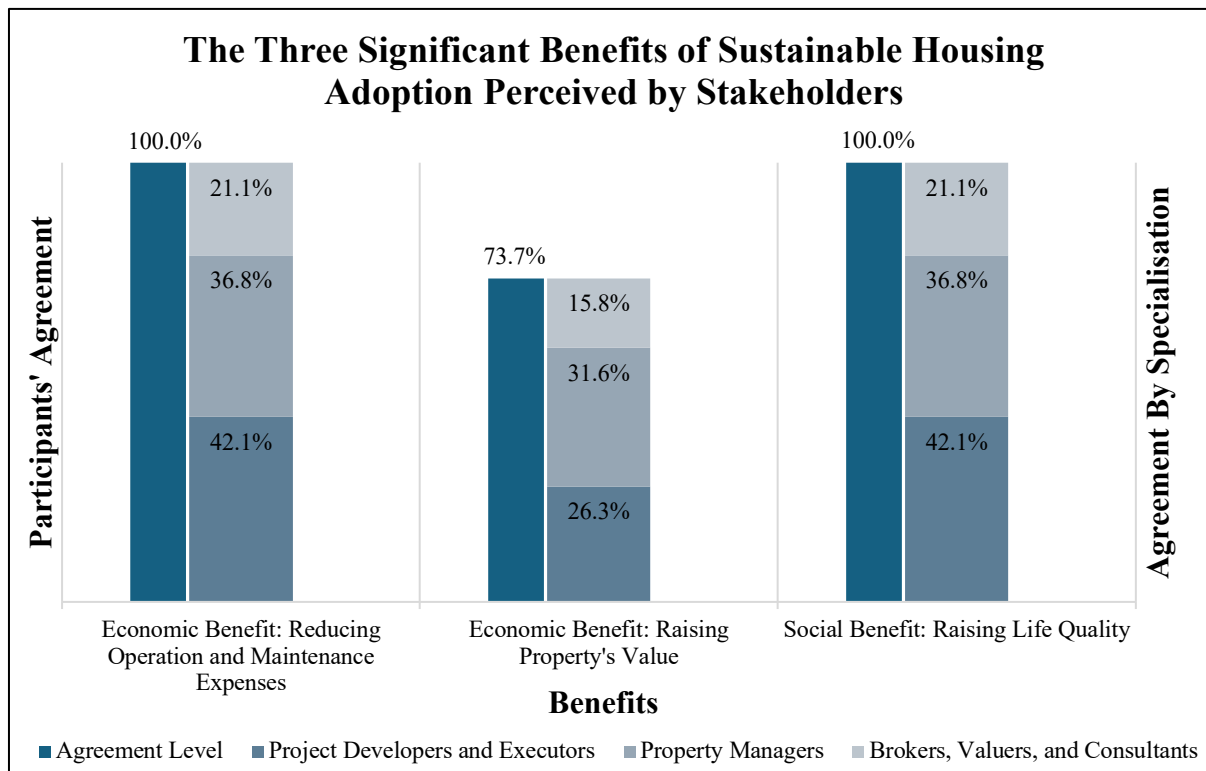
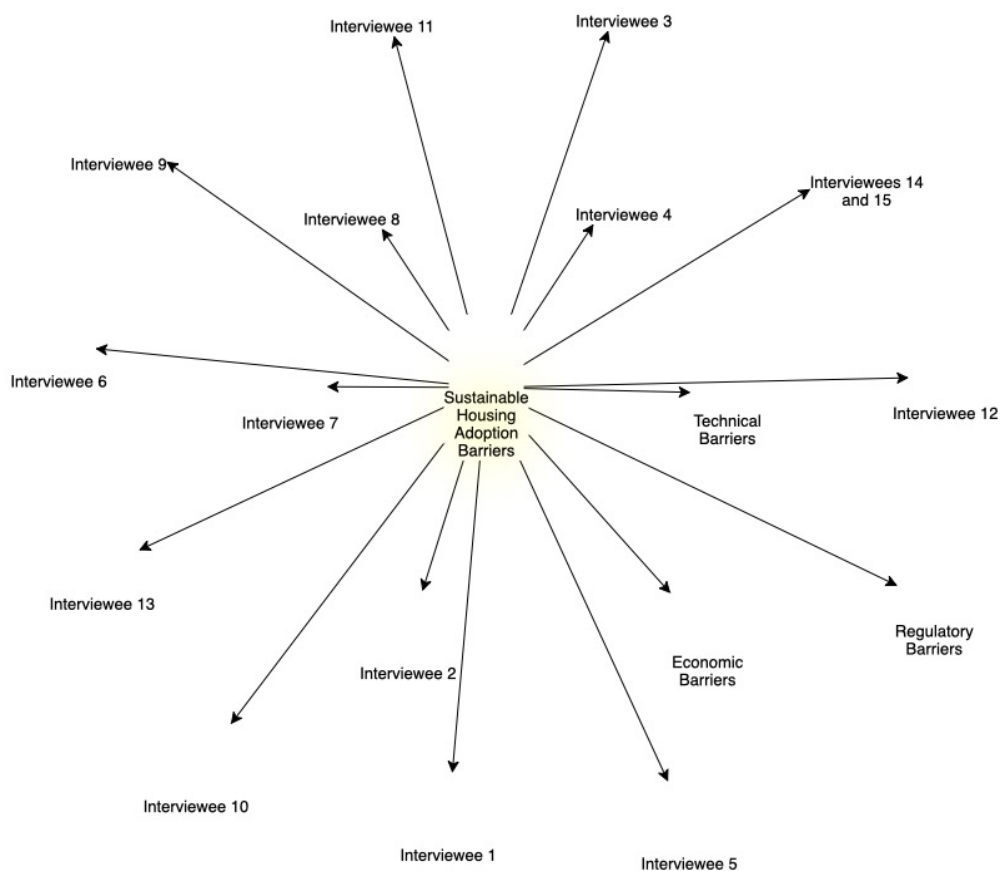
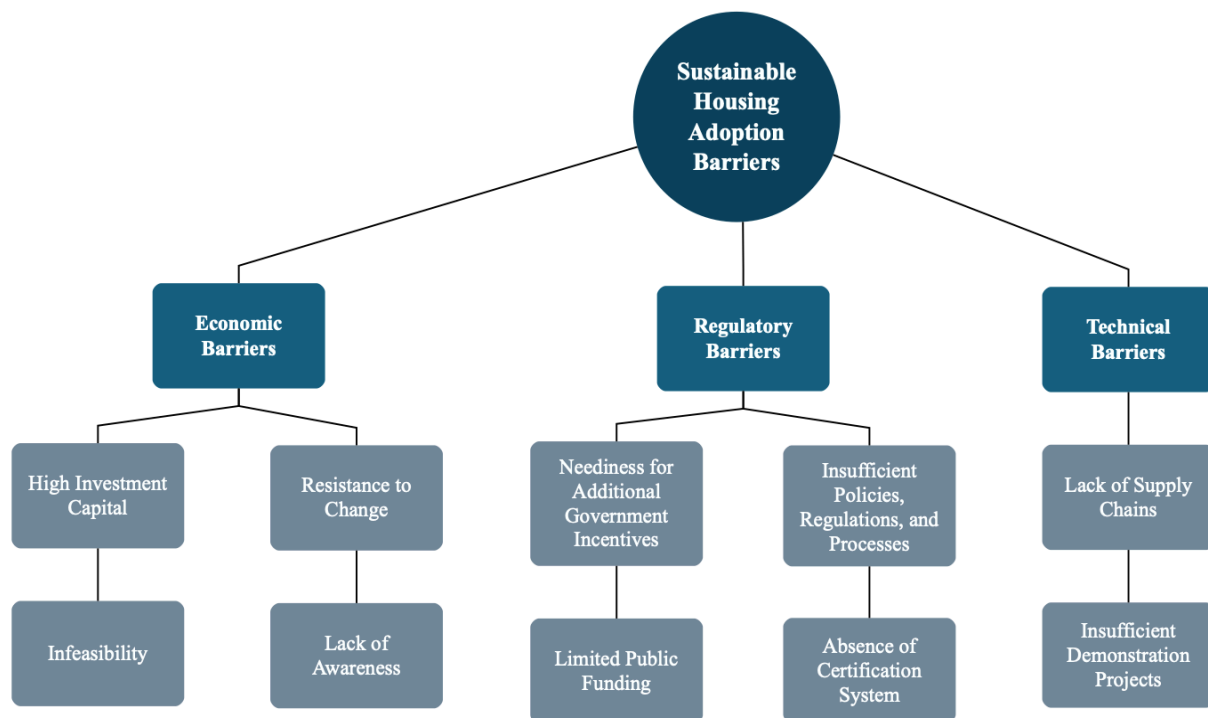


Figure (4.22): The most significant benefits of sustainable housing adoption perceived by stakeholders

4.4.3 The Barriers to Sustainable Housing Adoption

The most predominant barriers to sustainable housing retrieved from literary works introduced in Chapter 2 and summarised in Table 2.4 were used to build three groups of impediments, economic, regulatory, and technical, to resolve the third research question. Each of the eleven barriers 'codes' was discussed with the participants to decide their agreement with its importance based on their background and experience.

Figure 4.23 shows the constructed mind map in an early stage to form the codes and themes of the last research question. Besides, Figure 4.24 reflects the explore diagram of the question, which includes all associated dimensions and the interviewees who introduced the different obstacles to sustainable property adoption. For a comprehensive overview, Appendix 5 discloses the explore diagrams of each dimension and code. Moreover, Figures 4.25, 4.26, and 4.27 display comparison bar charts among the barriers of each dimension that ascertain the agreement percentage of the participants about the severity of each impediment. In the end, according to stakeholders' perspectives, Figure 4.28 depicts the three paramount impediments to sustainable housing implementation.



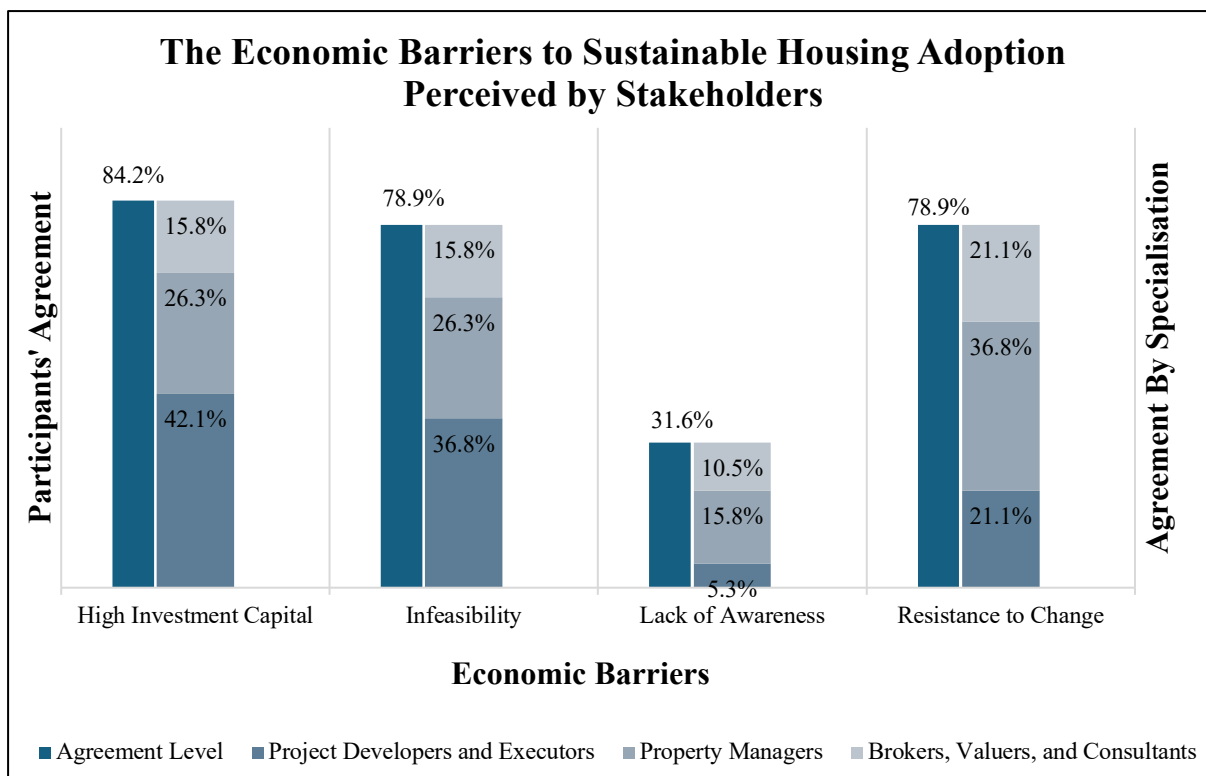


Figure (4.25): A comparison bar chart of the economic barriers to sustainable housing adoption

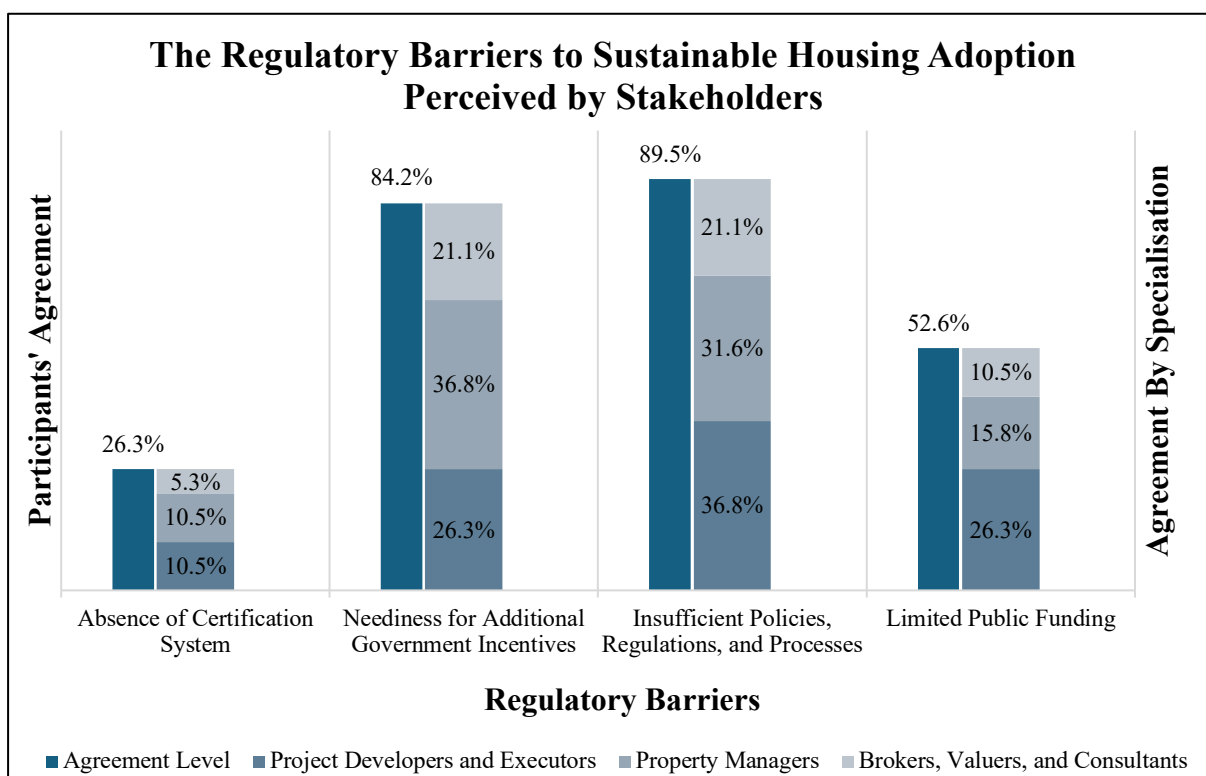


Figure (4.26): A comparison bar chart of the regulatory barriers to sustainable housing adoption

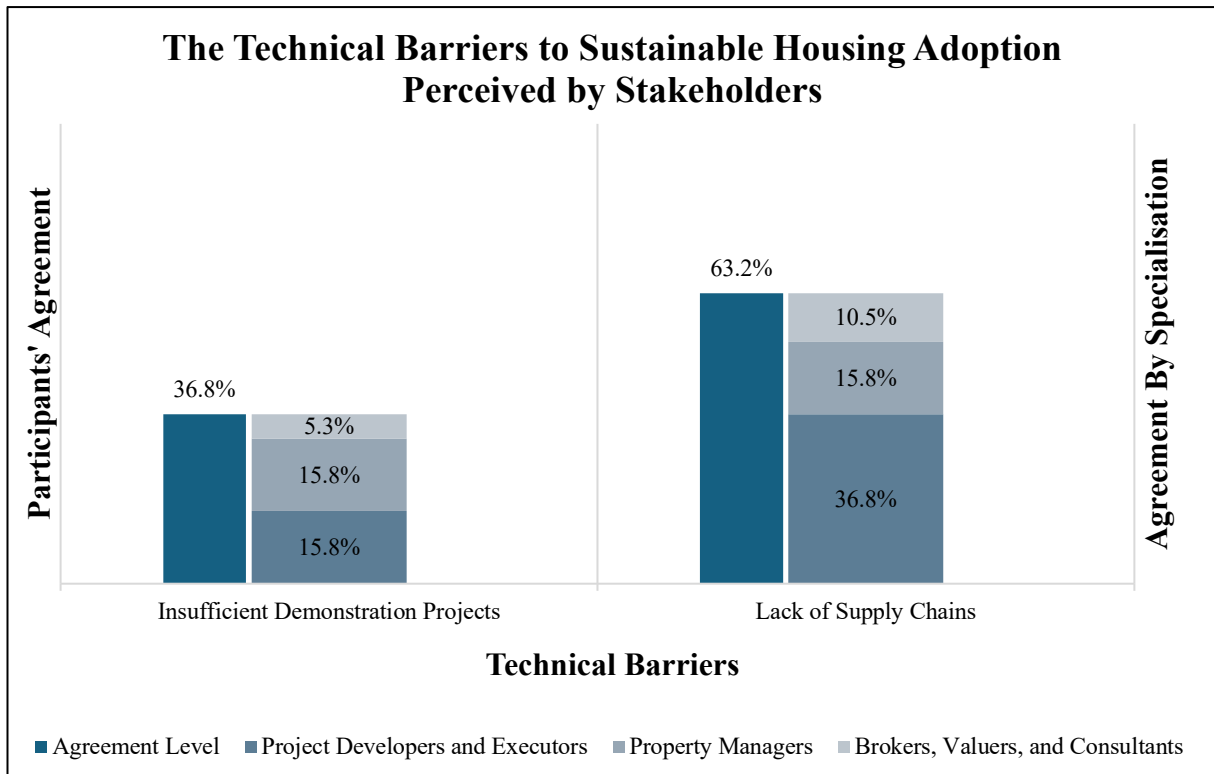


Figure (4.27): A comparison bar chart of the technical barriers to sustainable housing adoption

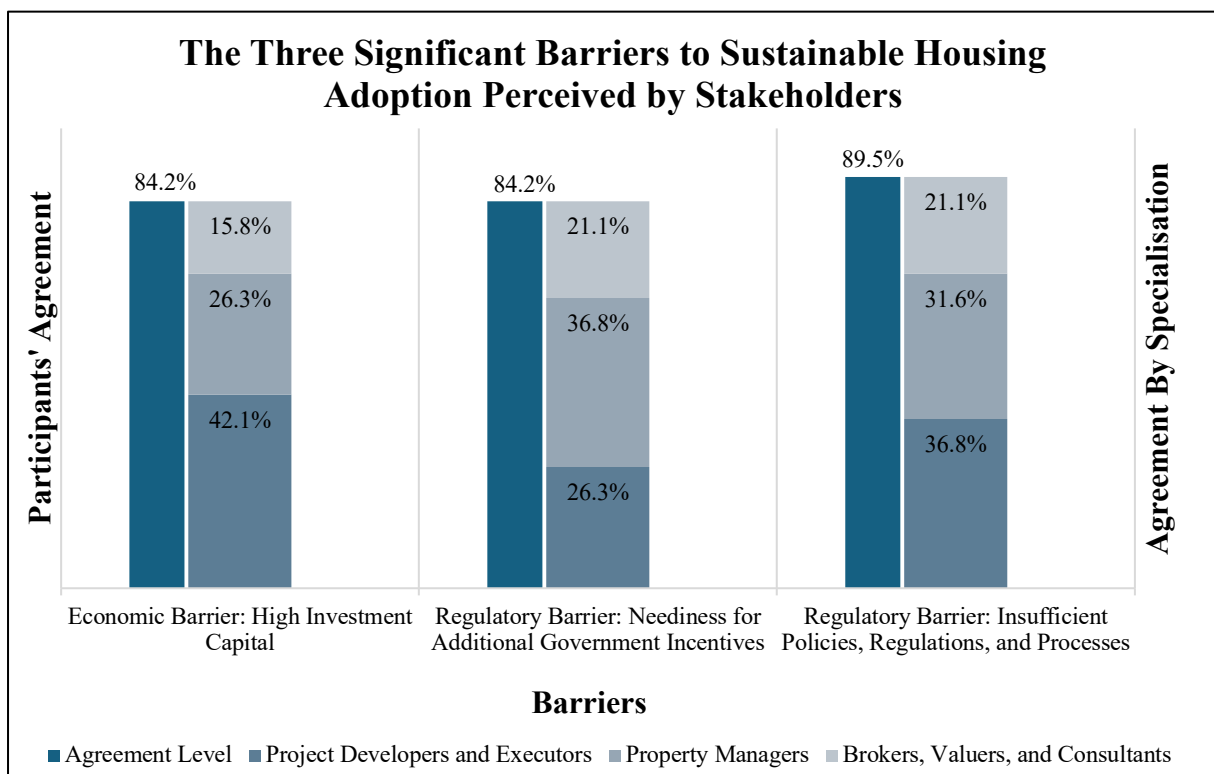


Figure (4.28): The most important barriers to sustainable housing adoption according to stakeholders' viewpoints

4.5 Discussion of Results

This study addressed three research questions revolving as a whole around exploring the current status of sustainable housing in the Kingdom of Bahrain. The first question aimed to discover the existing knowledge of various dimensions of sustainable estates: environmental, economic, social, and cultural. To seek to resolve this question, the researcher discussed diverse policies suggested by the United Nations Human Settlements Programme, as mentioned previously, with fifteen Bahraini stakeholders in the housing industry in semi-structured individual interviews. The results showed that the entire sample applied, in one way or another, the principles of proper housing planning, design, and construction, which are considered in its tenor as the cultural sustainability of properties (refer to Figure 4.16). This tenet was employed for both developed and acquired housing throughout their life cycle, whether allocated for ownership or rent.

The fifteen participants discussed the application of sustainable planning, design, and construction principles from several aspects, for example, following high standards of construction practices, selecting superior consultants and contractors from category A, designing the units effectively and space utilisation, and considering architectural design principles such as sun direction. The respondents also indicated other aspects of suitable planning and design, for instance, implementing advanced construction techniques, for example, precast and post-tension slabs, choosing high-quality construction and finishing materials, unifying interior design and furniture, and taking the residents' future requirements into account, like extension. This is in addition to a keenness to provide a distinctive technical footprint that distinguishes each property from others, such as adding certain architectural features and elements. In fact, it is axiomatic and anticipated that all respondents are conscious of this sustainable

premise since planning, design, and construction present the core of the dwellings and are the first attributes that attract buyers' attention.

Against this background, Interviewee 3 expressed that "Our new product will contain two things: smart in design and smart in application. Smart design means that you can easily make changes in the house without demolishing or extending anything, as all the provisions exist. Hence, the customer does not need to create new engineering designs and drawings or pay any extra charge, as the current layout is ready to bear the extra live load." As well as Interviewee 4 confirmed, "Before acquiring any building, we look at the designer of the building, the contractor's level, and the completion duration of the building. Also, we hire an inspection team to snag and evaluate the expected life of the building and machines, including AC, chillers, etc."

Analogously, all stakeholders proved a rich awareness of housing environmental sustainability since they all presented applications and techniques that would contribute to conserving energy and water and diminishing the operation and maintenance expenditures in the long run. Examples of this are thermal insulation, power factor, light-emitting diode lights, automatic sensor lights, inverter air conditioners, variable refrigerant flow air conditioner systems, solar panels, eco-friendly refrigerants, high-pressure flash tanks, solar water tanks, electric vehicle chargers, etc. Undoubtedly, the interest of different players in adopting water and power conservation technologies was motivated by their effective role in cutting corners.

Prominently, such technologies have intrigued both the public and private sectors. Within this framework, Interviewee 1, a participant in charge of public housing, attested to, "We applied many sustainable techniques to save energy in the housing units. For example, the flash tank was initially using 12 litres of water, but currently, it is using only 4 litres. In the unit toilets, we changed the mixtures, as the old ones used too much water. The new mixtures used the air with the water, which then raised the pressure while reducing the water volume." While

Interviewee 7, a representative of a private development company, affirmed, "Like all other companies, we use some reasonably priced techniques. We applied the VRF AC system in the Amwaj project, which can operate all ACs in one machine and thus save energy."

From a social angle, virtually all interviewees (90%) placed great importance on adding privacy, security, and safety features to the residential estates as a critical component that strengthens a sense of place. The significance of this principle has been manifestly displayed by property managers, brokers, and valuers. The reason behind that is that safety and security are critical in managing properties and could be viewed as a competitive edge in the marketing process, as they could directly impact the occupancy level and the rate of property sales. This tenet is implemented in housing in many respects, for instance, by offering security services, including CCTV cameras, security officers, access control, gate passes, and gated communities. As well as supplying firefighting systems and smoke and gas detectors that ensure the safeguarding of the residents, and double walls and sound insulators that retain the privacy of the occupants.

Despite the fact that some of these features are noncompulsory, the conversations demonstrated the considerable interest of Bahraini businesses in them, as highlighted by Interviewee 3: "And because safety is a part of sustainability, we added many features that are not obliged by the regulations but can protect the occupants' lives, like smoke detectors, gas detectors, etc." Besides, Interviewee 2 emphasised, "The villas were semi-detached, so we provided a double wall and sound insulator for each villa to reduce the noise and ensure the privacy of the occupants."

When heading towards housing economic sustainability, it is perceptible that the vast majority of interviewees (80%) endorse the cruciality of affordability in the housing trade in view of the fact that price is the leading determinant and controller of the purchasing decision. The eminence of this was particularly evident in developers since they have budgetary constraints and property

managers who are obligated to achieve the utmost possible occupancy level. Indubitably, the affordability precept could accelerate the promotion, vending, and leasing of properties and prevent overstock in the dwelling market. The findings reveal that Bahraini housing stakeholders embrace trade-off strategies to balance between espousing diverse, sustainable methods while offering budget-friendly products. The discussions draw a picture that the developers' decisions to execute sustainable approaches are derived from the buying power of the prospects.

This is explicitly indicated by various participants; for instance, Interviewee 6 acknowledged, "We are always looking at the purchasing ability of our market and moving within it. So, we mostly design according to the ministry's specifications and requirements and within the budget of the housing loan." In view of this, the public housing sector affiliates also underscored their concern in providing affordable housing, with Interviewee 1 expressing, "The ministry bears social responsibility by ensuring that monthly deductions of housing loans do not exceed 25% of beneficiaries' salaries." These insights show that economic sustainability in Bahrain's housing market is chiefly motivated by affordability concerns, which impact developers' decisions and establish the realistic bounds of executing sustainable design.

Assuredly, the participants' responses to the first research question, which included the discussion of twenty sustainable principles, proved their familiarity, experience, and knowledge, which reached 100% in some policies, about sustainable applications in the Bahraini housing market. This entails that all stakeholders have tested and practically experimented by some means with these techniques in their projects, which qualifies them to answer the second question related to the advantages gained from adopting the sustainable approach.

With reference to Figure 4.22, it is apparent that the economic benefits were the principal avail that the real estate players experienced when they applied sustainable methods. The viewer could notice and discover that all respondent

categories involved in the study consent to the considerable impact of sustainable tools on reducing the maintenance and operation expenditures of the properties. The value of this edge appears in several respects, including facilitating the disposition process of real estate in which the installation of water and energy efficiency solutions could gain dwellings a competitive privilege, whether in selling or leasing. Furthermore, this attribute allows the asset owners the opportunity to raise the rental rate due to the savings tenants obtain from mitigating the power expenses. More than that, such means could substantially magnify the net operating income of property management firms since the running costs represent the greatest influencer on the profit margin.

This notion has garnered particular interest from property managers, as outlined by Interviewee 8: "If I provide a smart system like Alexa or Apple that can control and schedule the turning of equipment, this will decrease the bills and also increase the property and rent value." In the same vein, Interviewee 10 approved, "Providing techniques that can reduce these expenses is a fantasy advantage that can raise profits and allow them to raise rental rates."

This outcome was supported by the literature review findings by Ojo-Fafore et al. (2018) and Oyetunji et al. (2022), which affirmed that lowering maintenance expenses and the various operational expenses constitutes the most consequential intrinsic characteristic of sustainable housing in South Africa. Likewise, this finding also aligns with the conclusions of Olanrewaju et al. (2018), Kempf and Syz (2022), Mohamed Saraf et al. (2023), and Pham et al. (2024), which verified that the primary economic driving force behind sustainable property investment in the Asian and European countries lies in cutting back on electricity and water bills.

Another economic privilege associated with sustainable methods, as reported by approximately three-fourths of the participants' perspectives, is the increase in the market value of housing. The stakeholders attributed this to the belief that investment in sustainable techniques such as power efficiency systems,

entertainment amenities, green areas, infrastructure and community facilities, gated communities, etc., improves the functional and aesthetic value of the building, thereby creating added worth to the property, which hence increases its market value.

This concept was principally stressed by those engaged in sales and broking, as Interviewee 5 asserted, "The existence of high-standard facilities like supermarkets, shops, gated communities, road networks, and drainage systems can increase the price by 15% to 20%. Having services means saving money and extending the life cycle of the building." In the same manner, Interviewee 11 claimed, "I think sustainable techniques can raise the market value of the property because if I install solar panels and smart systems on my building, this will reduce the electricity and operation bills and hence increase my profit. In the long run, such things can be considered a competitive edge for the building because they can reduce the bills. Thus, the value of the building will increase."

This finding conformed to the studies carried out by Olanrewaju et al. (2018), Oyetunji et al. (2022), and Mohamed Saraf et al. (2023), which revealed that sustainable features enhance the unit's attractiveness and worth. Along the same lines, Kempf and Syz (2022), Huang (2023), Chuweni et al. (2024), and Pham et al. (2024) also demonstrated that the residential estates' selling prices were favourably affected by sustainability features.

Beyond the financial benefits, all the participants' groups concurred that sustainable attributes would certainly positively impact the quality of life of housing residents. This is attributable to the fact that sustainable applications ensure the fulfilment of the occupants' entire social, economic, and cultural needs and their involvement in all levels of decision-making, which enhances their satisfaction and well-being and raises their living standards.

The respondents ascribed this feature to various grounds; for example, Interviewee 5 noted, "When you purchase a house with full facilities, you will save the extra future payments for gyms, play areas, etc. Besides, you will save

time spent on transportation because all that you need is near you, which will raise your comfort and life quality." In the same direction, Interviewee 10 reaffirmed, "For example, the facilities that can attract more customers and raise your profits are directly associated with offering well-being, joy, and comfort to tenants."

Indeed, this advantage is also determined to be extremely important by Ojo-Fafore et al. (2018), Olanrewaju et al. (2018), Kempf and Syz (2022), Oyetunji et al. (2022), Mohamed Saraf et al. (2023), and Pham et al. (2024), who found that communities benefit from the sustainable methodologies in raising living environment standards, therefore improving occupant comfort, quality of life, and well-being.

Proceeding to the third research question that tackled the impediments to sustainable housing, it is evident that financial and regulatory issues were predominant. Precisely, the majority of the sample (90%) admitted that policies, regulations, and standards related to a sustainable approach are insufficient. This is, besides the long and complicated regulatory approval mechanism for such techniques and materials. The stakeholders in the various categories consented that the government ought to take the lead in the shift toward sustainability by setting an example. They perceived that implementing sustainable housing on a larger public scale would encourage private sector investors and developers to adopt this approach, specifically since public housing units are seen as a benchmark for other projects. The people who took part also agreed that the first step towards sustainable estates should be to make and enforce laws that require these practices. This is because enacting regulations is deemed to be a necessity for embracing the sustainable approach, which will not occur if adoption is left up to investors' preference and discretion.

In this regard, Interviewee 1 articulated, "Governmental bodies should intervene to increase the implementation of sustainable techniques. For example, if we are talking about air conditioning, there are normal AC, tropical AC, and inverter

AC. The inverter type could save up to 40% of the power consumption, so I think the Ministry of Industry and Commerce should prohibit importing other AC types to force people to buy the inverter." Interviewee 7 also supported the former viewpoint, stating, "I think the change should start from the government. If the government begins to use these techniques in their public housing, all developers will start to use them because public housing is the benchmark in Bahrain."

This barrier has proven to be crucial in numerous probes conducted across multiple countries and economic settings, for instance, the investigation of Martek et al. (2019) in Australia, Adabre et al. (2020) in 18 developed and developing nations, Tafazzoli et al. (2020) in the United States of America, Ezennia (2022) in Africa, and Souaid et al. (2022) in Ireland. All results concurred that the ineffective and voluntary government housing policies posed a major challenge in achieving a sustainable housing sector.

From the regulatory perspective, also, 84% of the participants consented that there is an imperative need for more government incentives to accelerate the adoption of sustainable housing. In this regard, the study's respondents proposed that, in addition to enforcing the policies, the local authorities ought to initiate an incentive mechanism and programs to encourage the investors and landlords to embrace the sustainable approach and proceed in this manner. At the individual level, examples are dropping some housing loan instalments or granting owners credit to purchase sustainable products from specific authorised vendors. At the developers' scale, the government could bear part of their mortgage loans, offer certain financial backing, or assist in the project's infrastructural construction. At the national level, it is feasible to introduce a rating system to certify sustainable properties and offer incentives accordingly, as well as facilitate the investment for specialised foreign vendors.

Interviewee 7 suggested, "We need a system like LEED; if the developer achieves the gold criteria, they will get some cash back, or motivate people by dropping the housing loan instalments for the first year if they implement sustainable

techniques at their houses." In this vein, several participants displayed their willingness to enhance the adoption of sustainable technologies if the government offered certain support. For example, Interviewee 12 assured, "The government incentives can 100% incentivise me to implement more sustainable strategies for my projects." Interviewee 2 also declared, "As a developer, if I receive financial support from the government or banks, I will adopt sustainable techniques."

This outcome is in line with those of several previously published studies, for instance, Martek et al. (2019), Wong et al. (2020), and Souaid et al. (2022), that revealed the crucial role of public stimuli in making decisions related to investment in sustainability. These investigations all coincided that a deficit of genuine incentives adversely influences toward sustainability transition due to the absence of demand for such exorbitant houses.

To a similar extent, 84% of the stakeholders perceived that the high investment capital for sustainable techniques forms a significant barrier to the adoption of sustainable housing. It is apparent in Figure 4.28 that, among all barriers, outrageous financial expenditures were ranked as the main constraint by all interviewees of project developers and executors. This is due to the fact that this category is responsible for delivering a project that achieves the maximum return for shareholders in light of a restricted budget. Therefore, they are compelled by financial limitations to choose the alternatives wisely to attain the greatest possible benefit for every buck. In light of this, several participants acknowledged their intention to employ sustainable practices in several initiatives but eventually abandoned them due to their considerable cost. This impediment's implication is particularly exacerbated in the public housing sector, where the tight public funds and the rising annual housing demands oblige decision-makers to compromise on many sustainable techniques to deliver the largest number of units in the shortest possible waiting period.

The discussions disclosed that housing providers expressed genuine intent to integrate sustainable techniques into their projects; however, they backed down

due to beneficiaries' unwillingness to bear additional costs. For example, Interviewee 2 asserted, "However, after providing some prototypes and conducting surveys, we found that people did not welcome such techniques due to the additional costs." In addition, Interviewee 11 articulated, "Even for people who may be interested and happy with such tools, this does not mean that they are going to pay for them."

The conclusions support the earlier investigations of Singh et al. (2019), Adabre et al. (2020), Tafazzoli et al. (2020), Wong et al. (2020), Candel and Törnå (2021), and Souaid et al. (2022), which revealed that the high initial costs constitute the core challenge to adopting sustainable properties. The elevated price of such housing hinders their marketability due to the consumers' reluctance, extends the payback period of the investment, and consequently declines the investors' financial flexibility and adaptability, specifically during challenging economic circumstances.

Notably, the debates with the diverse stakeholders exhibited a high level of awareness regarding sustainable techniques within Bahrain's housing industry. As illustrated in Figure 4.25, only 30% of participants perceived a lack of public awareness, indicating that this barrier has minimal significance in the Bahraini context, in contrast to international findings. This outcome contradicts various studies conducted worldwide, for instance, Martek et al. (2019), Tafazzoli et al. (2020), Wong et al. (2020), Ezennia (2022), Souaid et al. (2022), and Akcay (2023), which consistently identified the lack of public awareness as a primary impediment to the embracement of sustainable technologies across both developed and developing countries.

In this regard, Interviewee 7 affirmed, "All parties know, are aware of, and are interested in these techniques but are not willing to pay." Likewise, Interviewee 10 remarked, "We cannot say we have a lack of awareness; everyone knows, we have a lack of incentives to do the right thing." Furthermore, Interviewees 14 and 15 underscored, "We can say that most of our clients have a high awareness of

sustainability and want to implement it, but as we said earlier, the initial high costs of these techniques may stop them."

It is evident from closely examining and analysing the study's outcomes, whether they pertain to advantages or obstacles, that Bahraini housing stakeholders have consistently relied on the maximising utility principle and applied the TVM rule when making decisions associated with adopting sustainable practices. In the face of resource scarcity, such as land and finance, with a commitment to provide homes that fulfil the needs and aspirations of beneficiaries within a given time frame. Power brokers find themselves obligated to act rationally and make logical decisions that contribute to achieving their objectives while exploiting the available resources to the full. In essence, this is considered an application of the neoclassical microeconomic theory in sensibly choosing between alternatives, in which the TVM theory is employed in comparing the feasibility of choices.

For instance, concerning Figure 4.12, all the key players in the local housing market (100%) employed water and energy efficiency systems. Their implementation was motivated by the fact that investments in such solutions would lower the bills and generate future savings. Thus maximising their monetary profit and the residents' utility in the immediate and long term. In justifying the allocation of limited resources to such techniques, the investors applied the TVM principle. They discounted the future received cash flows from implementing these tools to their present value to determine their feasibility. In contrast, only 31% of them adopted the recycling and waste management programmes as they discovered the infeasibility of allocating their meagre resources to such practices since there are no obvious financial gains.

Likewise, the investigations disclosed that 100% of the participants were interested in implementing the criteria of proper planning, design, and construction. This policy would facilitate the promotion and disposition of estates and, hence, recover investment capital at the earliest opportunity while delivering profits. Conversely, around 60% and 45% of them were not concerned with

reflecting the cultural principles of "values, traditions, and norms" and "cultural heritage," respectively, in the housing. This is in view of the fact that the TVM analysis of such principles did not show sufficient monetary future compensations that validate their adoption. Hence, the players deemed them an impracticable economic luxury that could only be attained in the event of a wealth of resources.

Accordingly, asset allocation in sustainable techniques investments is always motivated by optimising the profit margins and achieving competitive advantages. Bearing in mind the lack of resources, the stakeholders perceive that embracing sustainability solely for environmental or social considerations is undoable. This contradicts maximising self-interest and does not achieve the greatest avails of assets for firms and individuals.

Based on this, any capital investment decision in sustainability should be driven by maximising economic benefits in the first instance. This will further assist in enhancing the contentment of occupants by obtaining a favourable return on their spending. Predicated on the same principle of maximising utility, the lawmakers formulate their policies and laws related to sustainability. For instance, Bahraini authorities impose the application of thermal insulation principles, which is a fundamental component of sustainable building design. In addition to the environmental earnings of insulation, it lowers the need for electricity, fuel oil, and natural gas for building heating and cooling, which would finally contribute to creating monetary savings for authorities and landlords. Therefore, any sustainable choice must be vindicated on the basis of maximising the utility to accomplish the optimisation of scarce resources.

Appendix 6 shows a conceptual model that summarises the main outcomes achieved from this in-depth investigation.

Chapter Five

Conclusion and Recommendations

5.1 Conclusion

To conclude, the study effectively addressed its primary objective to discover the underlying causes for the slow transition toward sustainable residential development in the Kingdom of Bahrain. The outcomes provided answers to the three research questions by (1) identifying the most extensively adopted sustainable housing practices in the economic, environmental, social, and cultural dimensions; (2) exposing the main regulatory and financial barriers preventing wider implementation; and (3) outlining the various financial and social advantages that will drive future embracement. These findings cooperatively demonstrate that, despite the high awareness of sustainable applications, additional financial incentives and stricter legislative backing are crucial to accelerating the achievement of the eleventh goal of the 2030 Agenda.

Specifically, the thematic analysis of the fifteen semi-structured interviews disclosed that appropriate planning, design, and construction were the most applied culturally sustainable principles. While the energy and water efficiency systems embodied the predominantly practiced environmental technique, owing to their ability to conserve resources and lessen operating and maintenance expenditures. As for social sustainability, privacy, security, and safety traits were foremost tenanted by their virtue of improving the sense of place. Lastly, housing affordability was identified as the greatest significant economic principle since price is the deciding factor of the purchasing decision.

Doubtless, the thorough comprehension and experience of the housing stakeholders of the sustainable principles contributed to eliciting the major advantages achieved from embracing such methodologies, which were primarily financial and economic. Exhaustively, the impact of applying sustainable tools emerged unambiguously in mitigating maintenance and operation expenses,

which contribute to expediting the estate disposal process and increasing the net operating income. In addition, the debates demonstrated that sustainable methods could positively impact the residential market value since investment in such methods would improve the estate's utility and add value to it. Outside financial gains, it was revealed that sustainable features would undeniably boost the standard of living and life quality of residents, as they fulfil the different occupants' needs.

In spite of all these competitive advantages, the probe discovered that sustainable housing development in the Kingdom remains limited due to certain regulatory and financial impediments. Most notably, the high investment capital of sustainable methods, which forms a core challenge, specifically in the case of limited resources. Besides the inadequacy of policies, regulations, and standards for sustainable practices and a desperate need for additional government incentives to accelerate the adoption of these strategies. This requires the government to take the initiative in the transition toward the sustainable approach by setting an example in the public housing units, enacting laws and legislation, and launching incentive schemes and programmes.

Indeed, this study, supported by TVM and utility theories, reframed Bahrain's sluggish shift toward sustainable housing as a logical financial decision rather than ignorance in which sustainability adoption is shaped by economic rationality constraints. Bearing in mind the numerous competitive edges the occupants acquire throughout the sustainable residential life cycle. The decision-makers ought to comprehend the prominence of this paradigm change toward sustainable methods and refrain from implementing them due to their substantial capital. Especially since future initiatives are anticipated to reveal strategies for decreasing the additional expenses and efforts required to execute such projects. The growing adoption of this approach will facilitate the attainment of Goal 11 of the 2030 Agenda related to evolving sustainable cities that fulfil the needs of their citizens at all levels.

It is anticipated that the research's outcomes will be leveraged as a ground and reference that assists investors and decision-makers in different sectors in making informed choices on sustainability. This is achieved through addressing each impediment separately and discovering the means to confront or mitigate it, which will contribute to increasing the public embrace of sustainable housing. As well as disseminating the awareness of sustainable principles and benefits will considerably contribute to the development of houses that fulfil the beneficiaries' needs and expectations. This will assist in stabilising the housing market by maintaining the equilibrium between supply and demand, consequently avoiding property overstock. Academically, this study's originality and novelty will furnish value to the existing corpus of knowledge by contextualising the adoption of sustainable housing in a Gulf developing nation, providing empirical evidence from Bahrain that enhances international movement on the residential sector's transition to sustainability.

5.2 The Study's Limitations

This study espoused a qualitative methodology to examine the present awareness of sustainable residential properties in the Kingdom of Bahrain and explore their competitive edge and challenges. The investigation employed semi-structured interviews with fifteen Bahraini stakeholders in the housing industry to address the research questions. Nonetheless, it is important to take caution when interpreting the findings of this study and consider some limitations. Primarily, the findings reported in this research came from a single case study that was conducted in a particular setting and represented the Bahraini reality with its circumstances and resources. Therefore, the inferences achieved in this case may not apply to other countries and economies.

It is also worth noting that the scope of this thesis was focused on the residential real estate market. Hence, its outcomes might not hold in the commercial and industrial property sectors. Moreover, the sample comprised 93% males and 7%

females, which might minimally impact the representativeness of findings. The underlying reason is that women represented only 16.5% of the professionals in Bahrain's real estate industry (Tamkeen, 2024). Nonetheless, the researcher approached many women to take part in the study, but the majority did not express a willingness to do so due to their hectic schedules.

5.3 Recommendations and Future Research

This study advanced the knowledge about Bahraini sustainable housing implementation principles by providing constructive theoretical contributions. Primarily, it assesses the existing awareness of the housing industry's providers of sustainable policies in the four dimensions: economic, environmental, cultural, and social. Further, it thoroughly explores the sustainable approach's advantages and impediments and their significance. Finally, at an operational level, it broadens the global insight into sustainability in real estate, which is still in its infancy.

The research outcomes could guide policymakers in developing procedures and enacting laws and regulations that mitigate the disclosed barriers and encourage the espousing of sustainability in real estate. Besides, homebuyers could also exploit these hurdles to make a conscious decision when buying or developing houses. It is important to recall that this thesis restricts its investigation to the residential properties sector. Nevertheless, as pointed out in Chapter One, the Kingdom of Bahrain is witnessing a remarkable expansion in the real estate sector. Therefore, the commercial properties sector might be examined in further studies as a booming market with massive investment. Such a move will be worthwhile in determining whether sustainability challenges are comparable in the two sectors. This will contribute to unifying endeavours aimed at expanding the application of sustainable principles.

Moreover, this study relied solely on the perspectives of the supply side represented by developers, property managers, valuers, and brokers to construct

its outcomes. Hence, supplementary studies must be carried out to explore the issue from the viewpoints of beneficiaries as they stand in for the demand market. In such a case, the participants might be categorised into three classes representing the beneficiaries of public housing units, those bound by housing loans, and a final group not constrained by a specific budget. This will assist in validating the housing suppliers' inputs and concerns related to the decline in demand due to the price increase resulting from adopting sustainable techniques. Furthermore, this exploratory research examined the applications of sustainability, its advantages, and impediments to newly developed estates exclusively. Like other countries, the Kingdom of Bahrain has a sizable real estate stock growing annually. Accordingly, it would be valuable to address the implementation of the sustainability approach to existing properties, considering their distinct qualities. This is due to the fact that some of these estates are hundreds of years old, which necessitates attention to their sustainability as they are regarded as the intangible cultural legacy of the country.

Lastly, the conclusions of this investigation are deemed to be advantageous for Bahrain and other nations with homologous traits in their initiatives towards integrating sustainability into real estate. Therefore, it is feasible to execute comparative studies to compare the outcomes of this study with those of other developing countries, particularly those that share the same sustainability and economic goals as the Bahraini government, to confirm or expand these research findings.

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Appendices

Appendix (1): Research Terminology

Residential Real Estate

Residential real estate is any property or unit zoned that has been intended for living use. Housing is available in various sizes and forms and differs between countries and areas. The residential properties encompass single-family or semi-detached housing typical for areas where residential use is predominant and apartments and multi-family housing more frequent for dense urban areas and city centres (Statista, n.d.).

Sustainability

Sustainability is the integration of environmental health, social justice, and economic vigour to produce diversified, flourishing, healthy, and resilient communities for the current and future generations (University of California, Los Angeles, n.d.).

Sustainable Development

Sustainable development implies satisfying current needs without relenting the ability of the next generation to meet their own needs (United Nations, n.d.).

Sustainable Housing

Sustainable housing is described as dwellings planned, designed, constructed, and maintained intending to be durable, affordable, low-energy, technologically advanced, and appropriately integrated into the sociocultural and economic fabric of their local neighbourhoods and larger metropolitan regions (Ganiyu, 2016).

Qualitative Research

Qualitative research methodology is an approach for exploring and comprehending the meaning assigned by people or groups to an issue or problem. The research process incorporates arising questions and processes, data acquired in the participant's natural environment, inductive data analysis leading from particulars to broad themes, and the researcher's explications of the data meaning (Creswell, 2003).

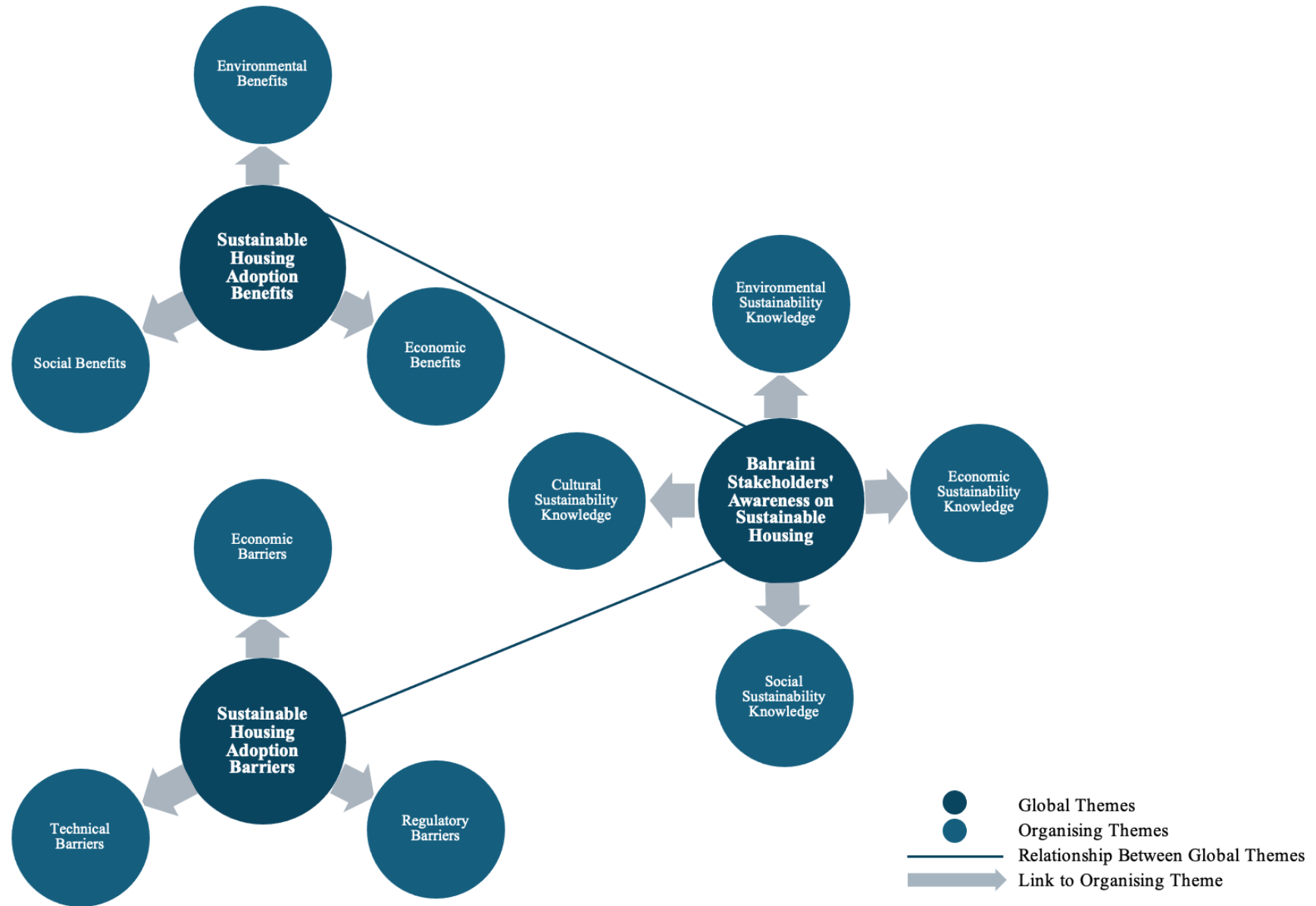
Case Studies

Case studies are considered a qualitative design in which the researchers exhaustively examine a process, program, activity, event, or one or more persons. The case(s) are constricted by activity and time, wherein the researchers gather in-depth data by applying diverse data collection techniques over a sustained period (Creswell & Creswell, 2018).

Qualitative Interviews

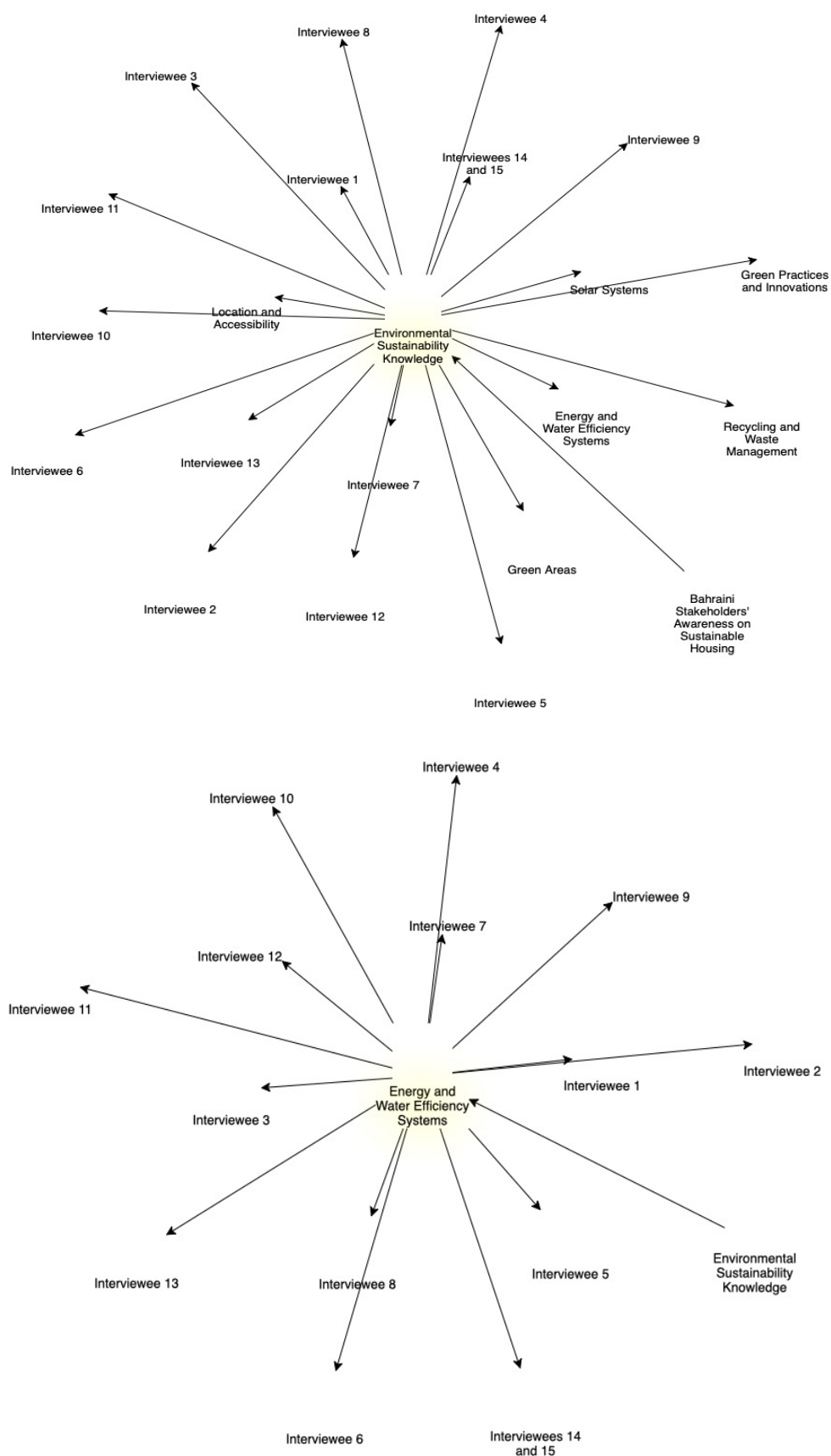
A qualitative interview is a research tool utilised in qualitative methodologies. The researcher conducts in-person, telephone interviews, or focus groups to collect in-depth information and comprehensive viewpoints from the participants about the phenomenon under investigation. Qualitative interviews rely on follow-up, open-ended questions, which are typically asked in the form of a conversation or discussion (Creswell & Creswell, 2018).

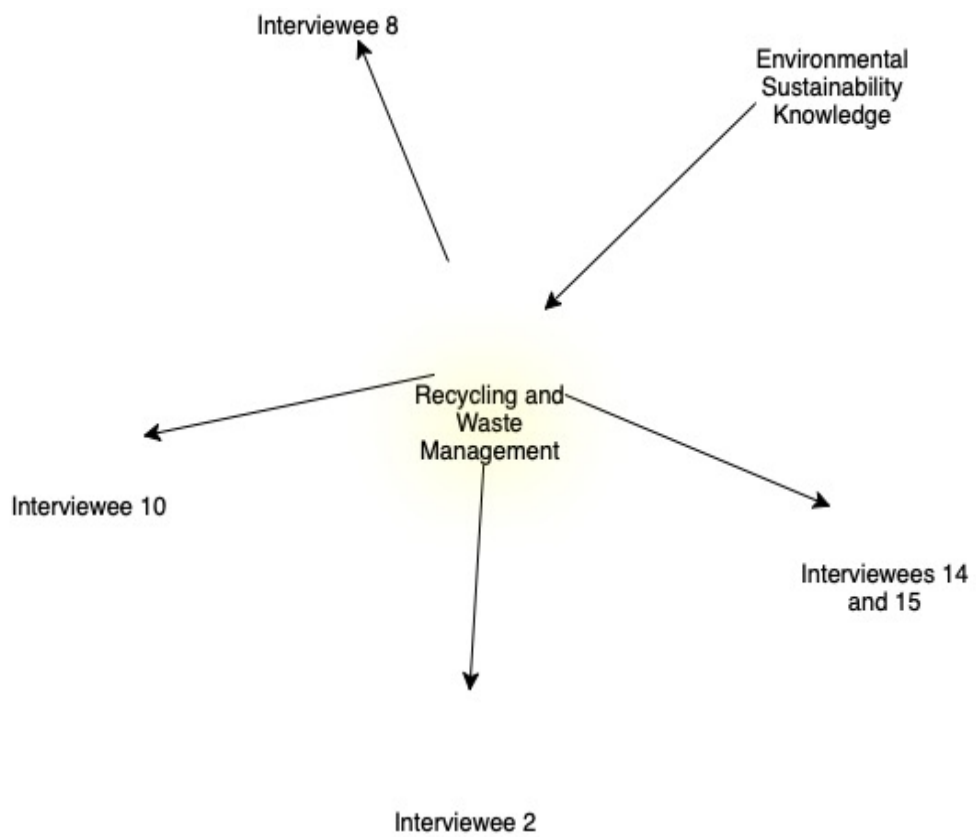
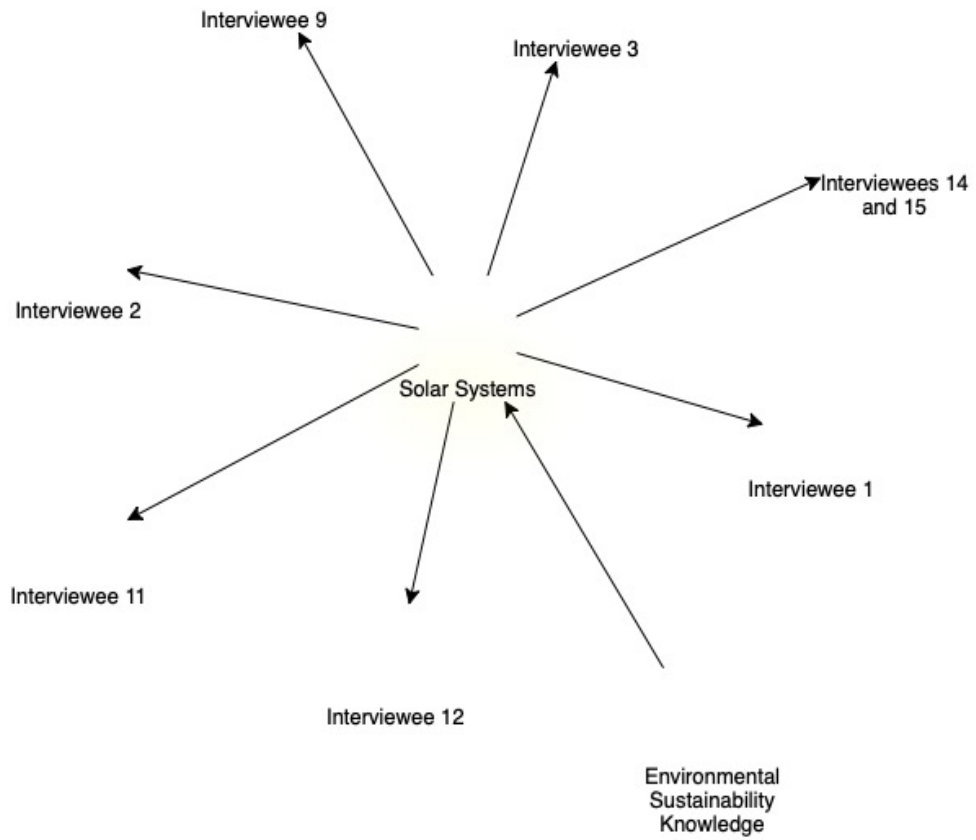
Appendix (2): The Thematic Map that Demonstrates the Three Global Themes and the Ten Organising Themes

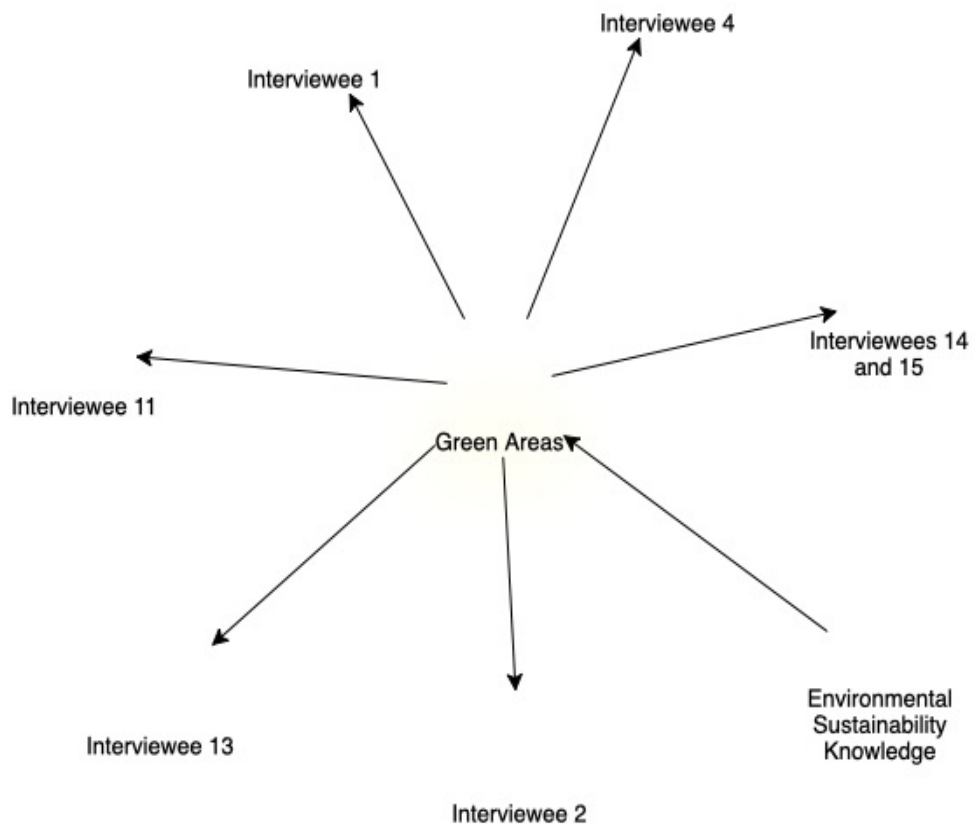
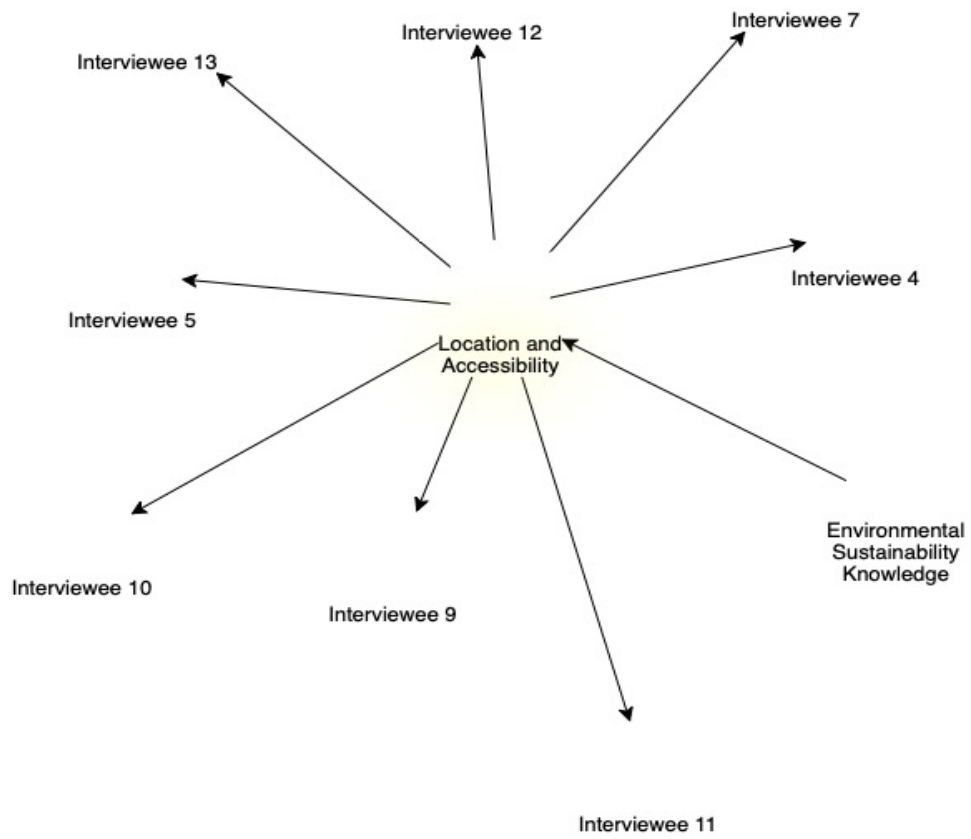


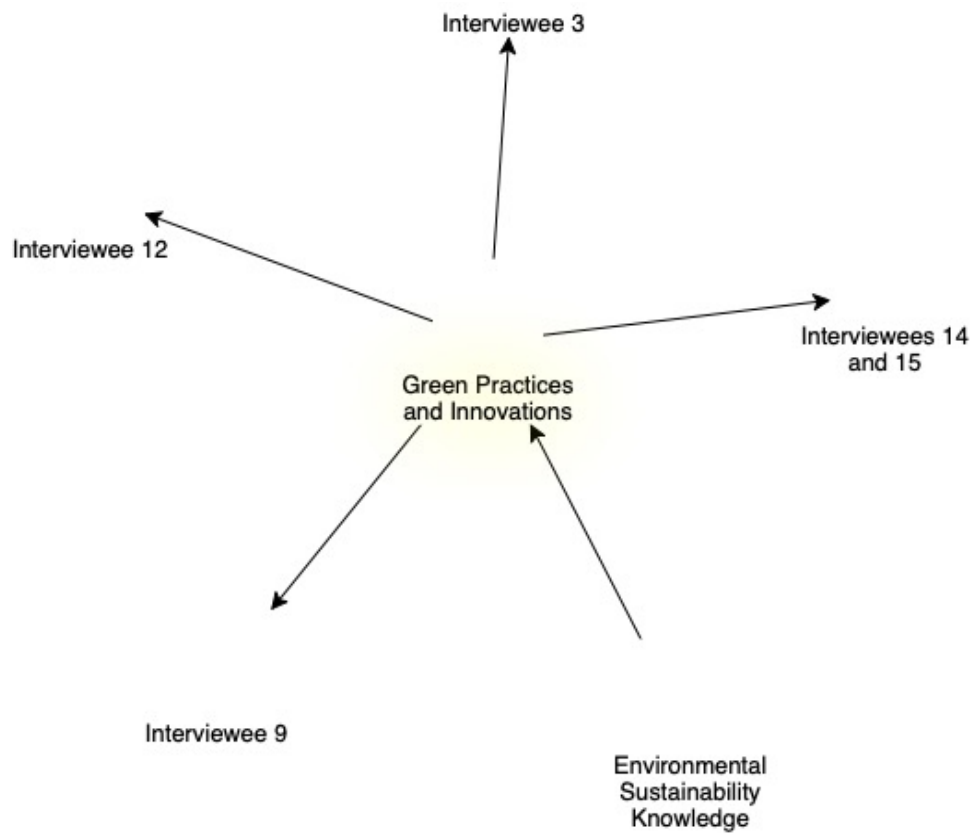
**Appendix (3): The Explore Diagrams for all
Sustainable Housing Dimensions and Policies
Generated by NVivo 15 Software**

The Explore Diagrams for Sustainable Housing Environmental Policies

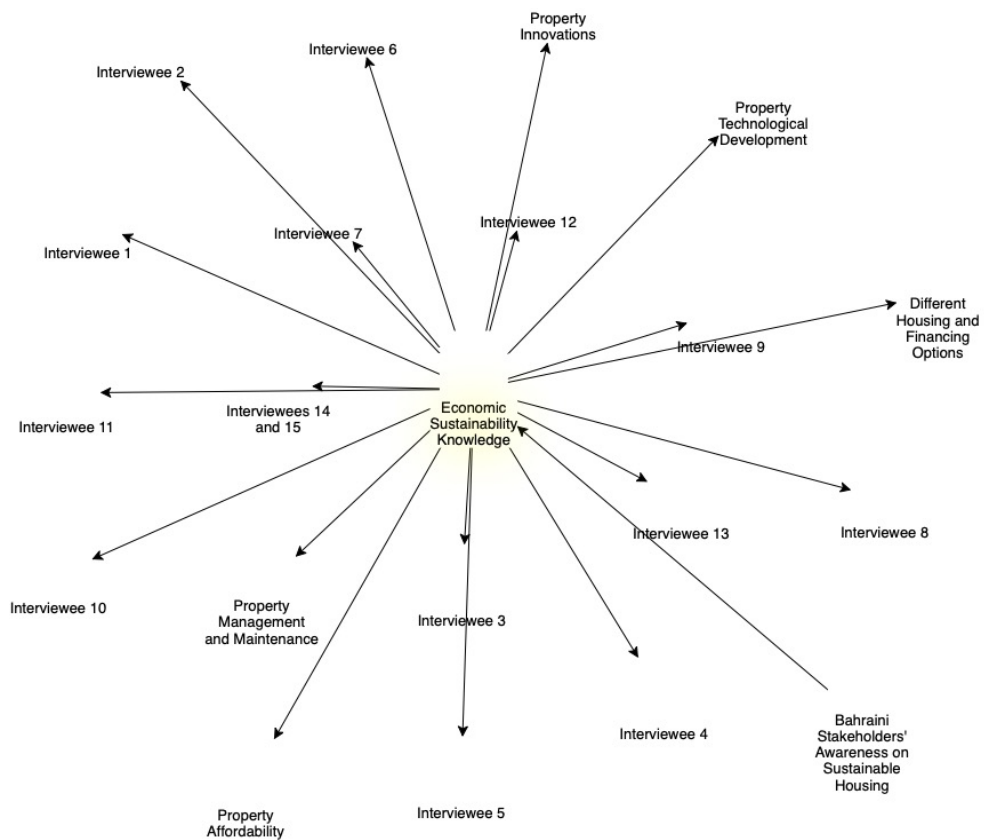


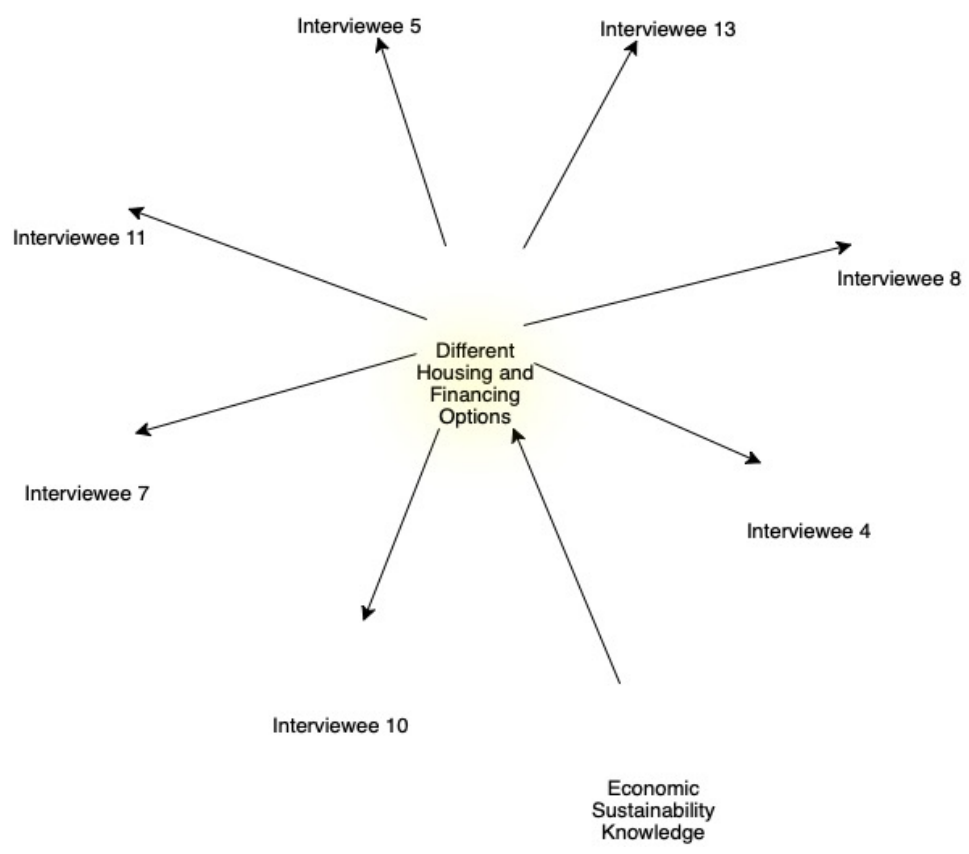
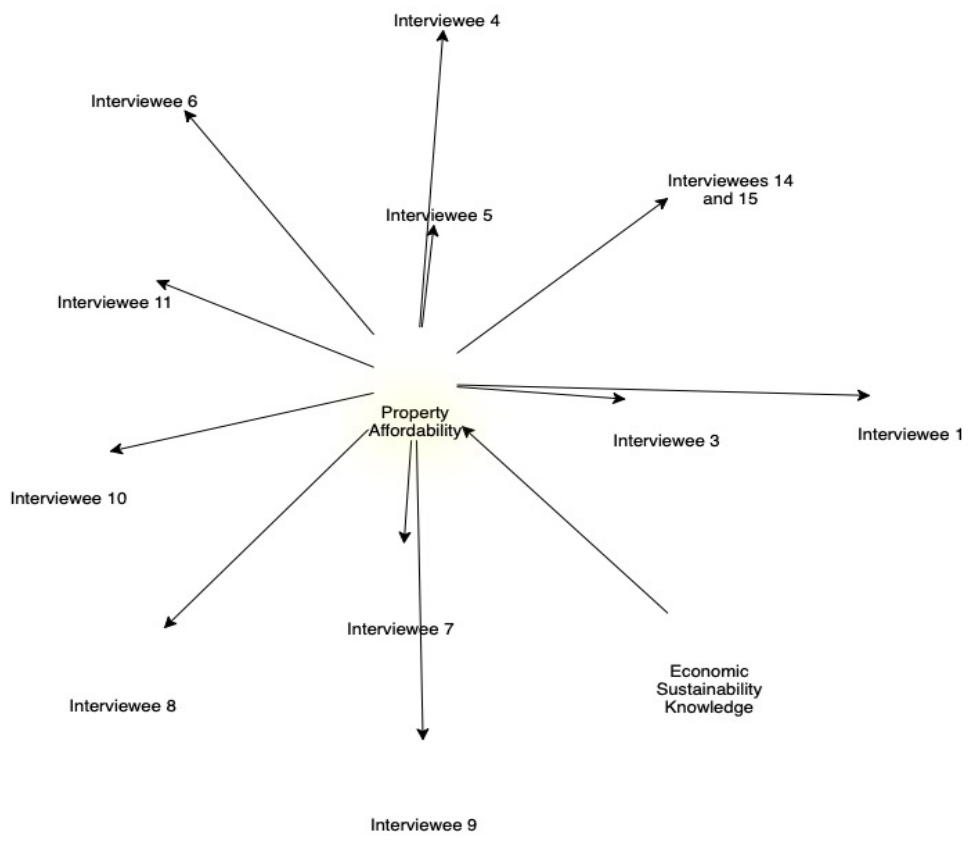


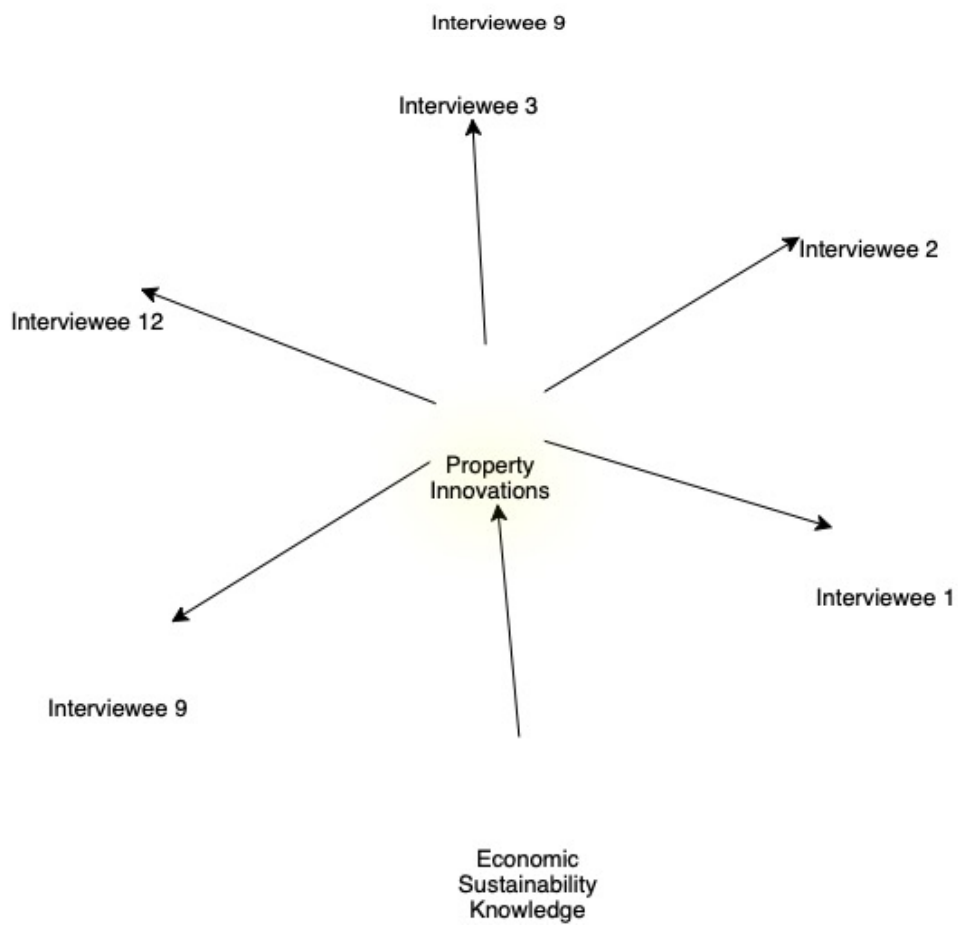
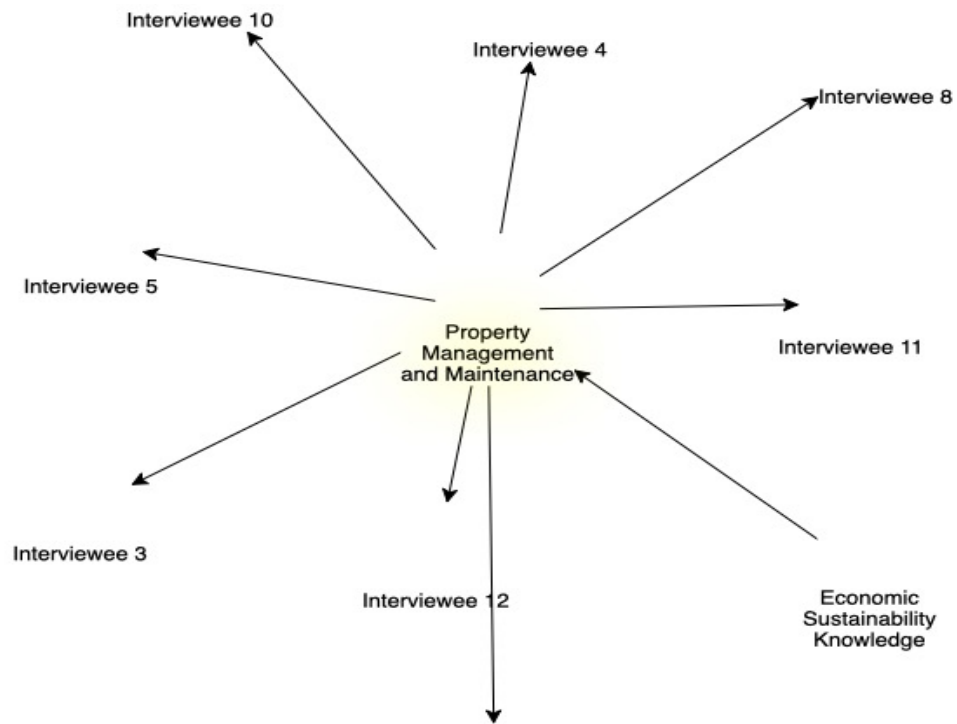


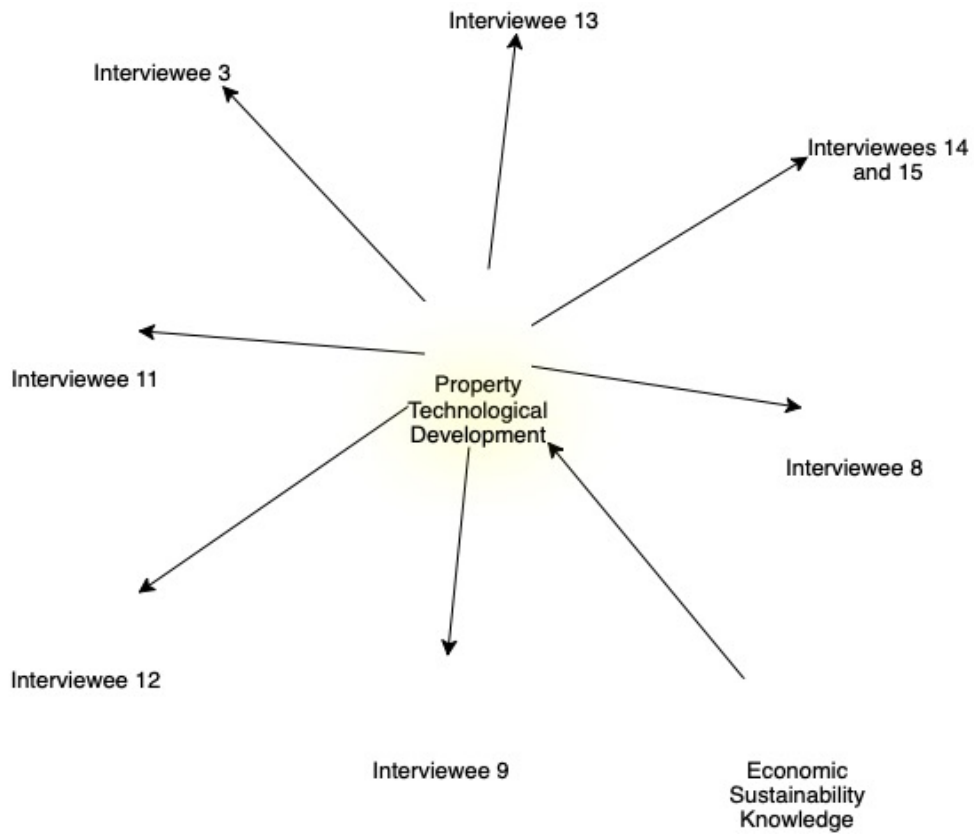


The Explore Diagrams for Sustainable Housing Economic Policies

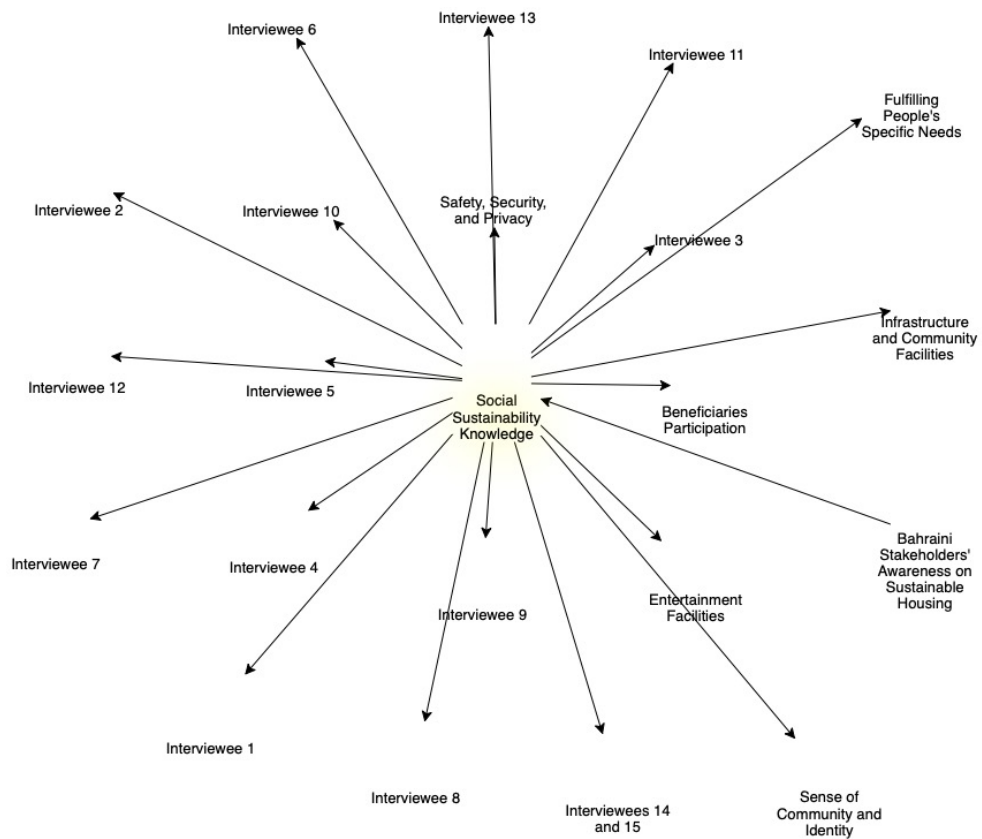


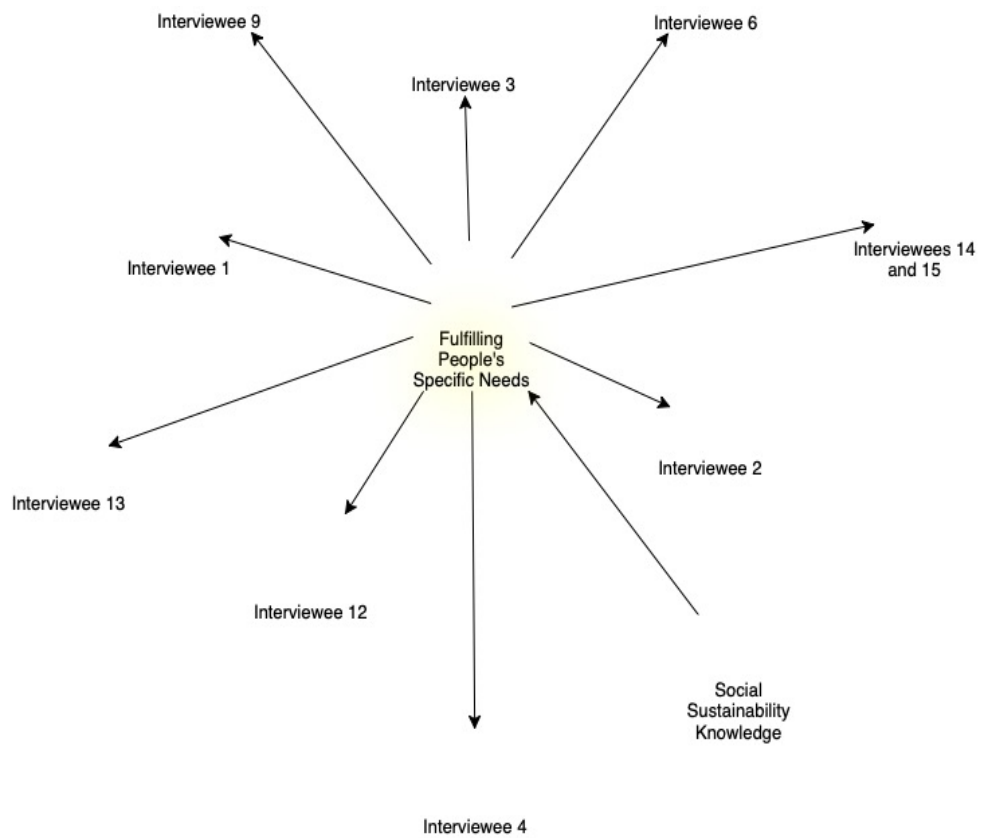
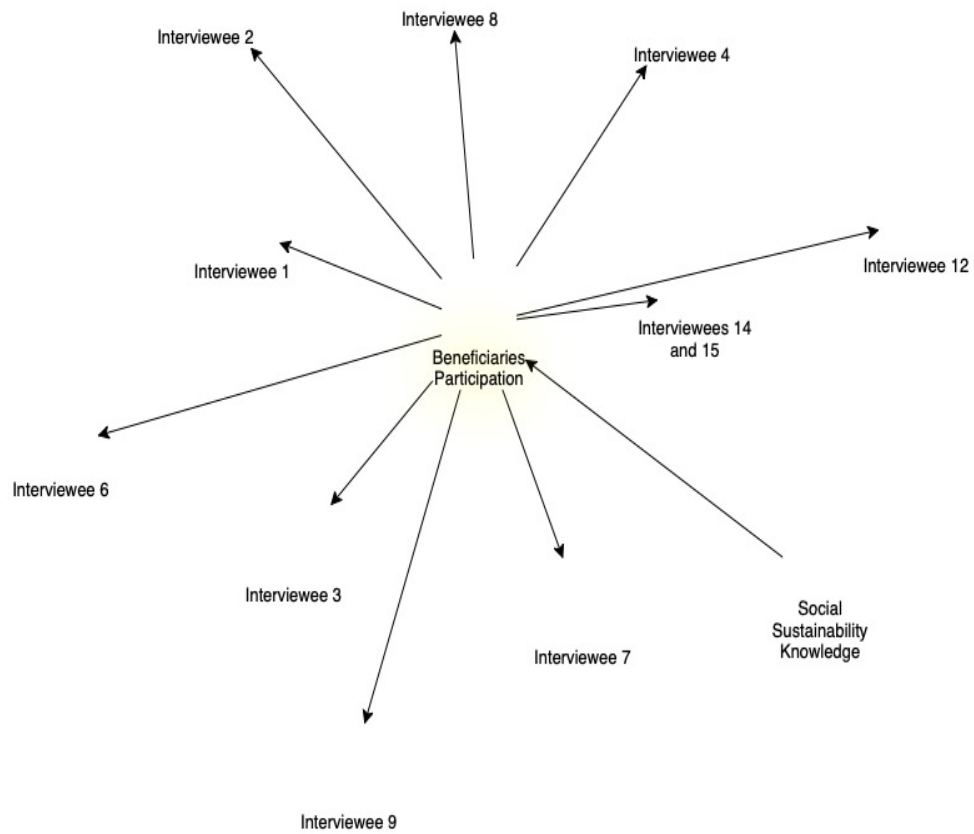


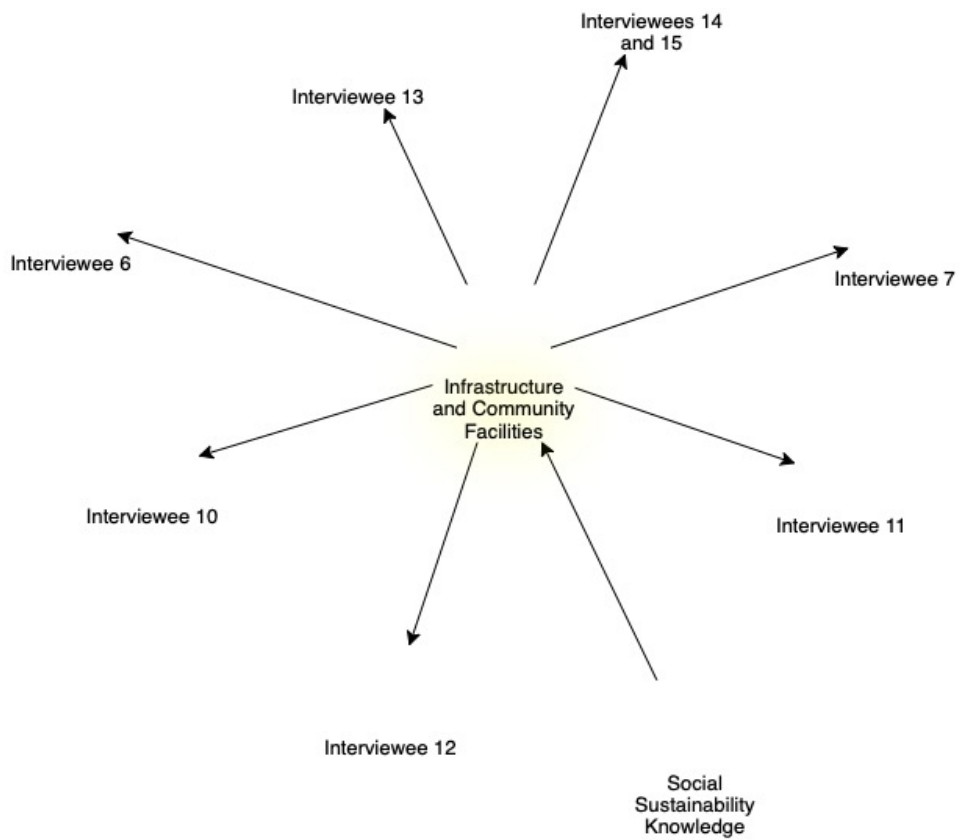
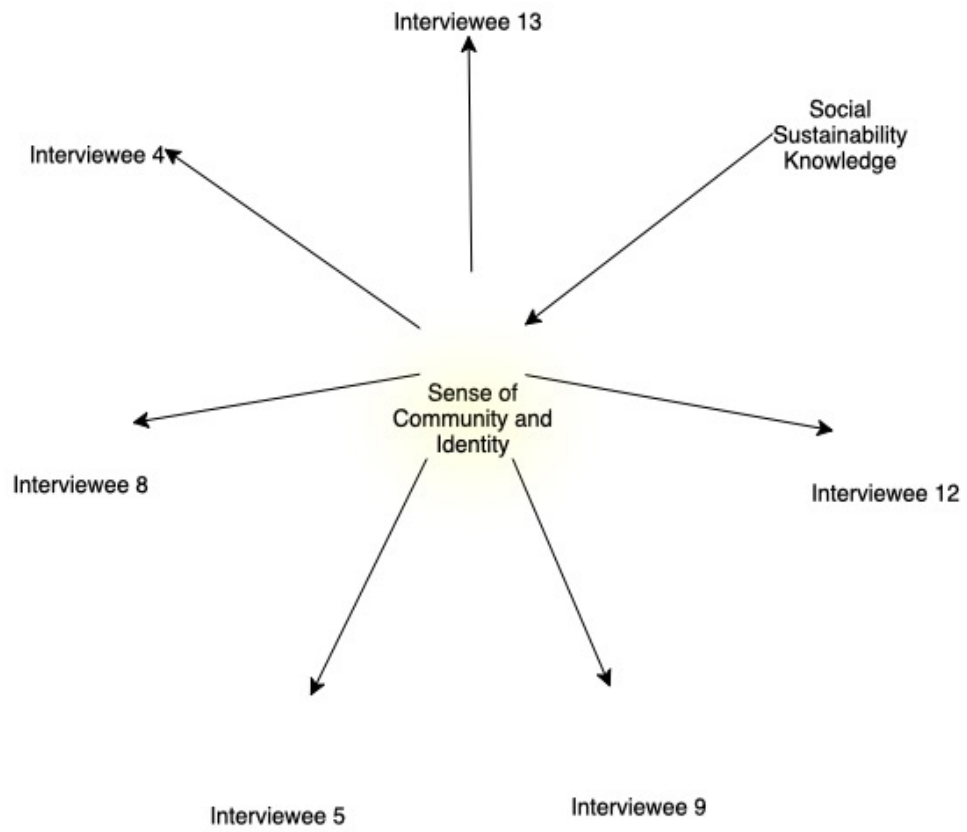


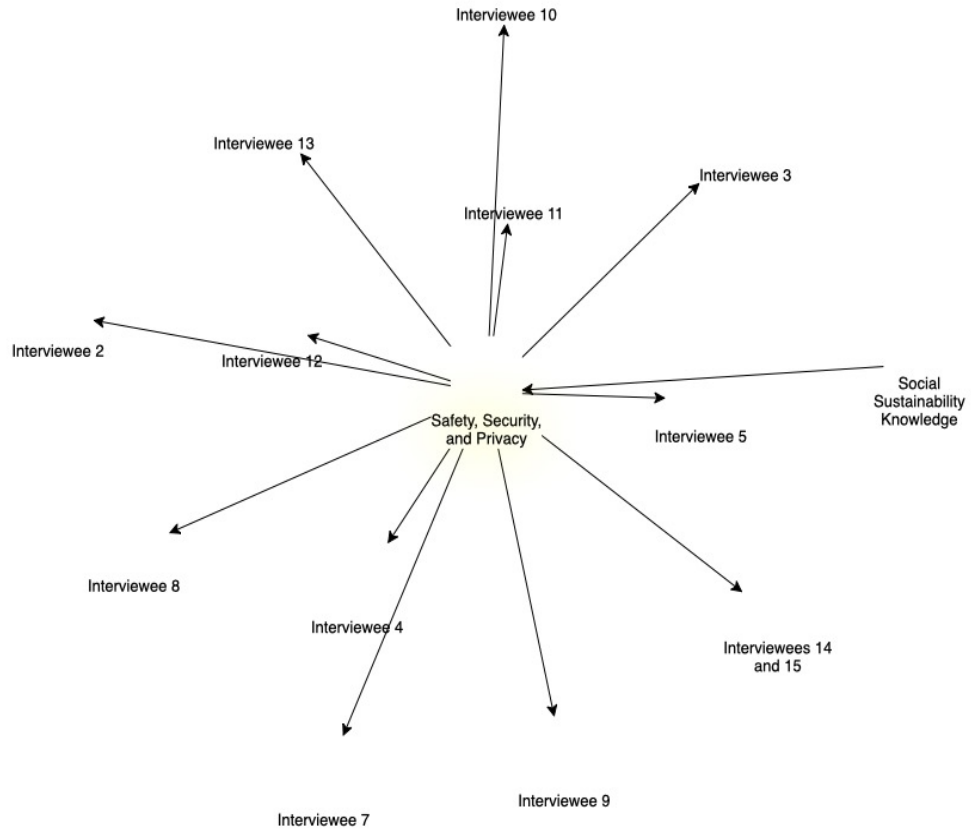
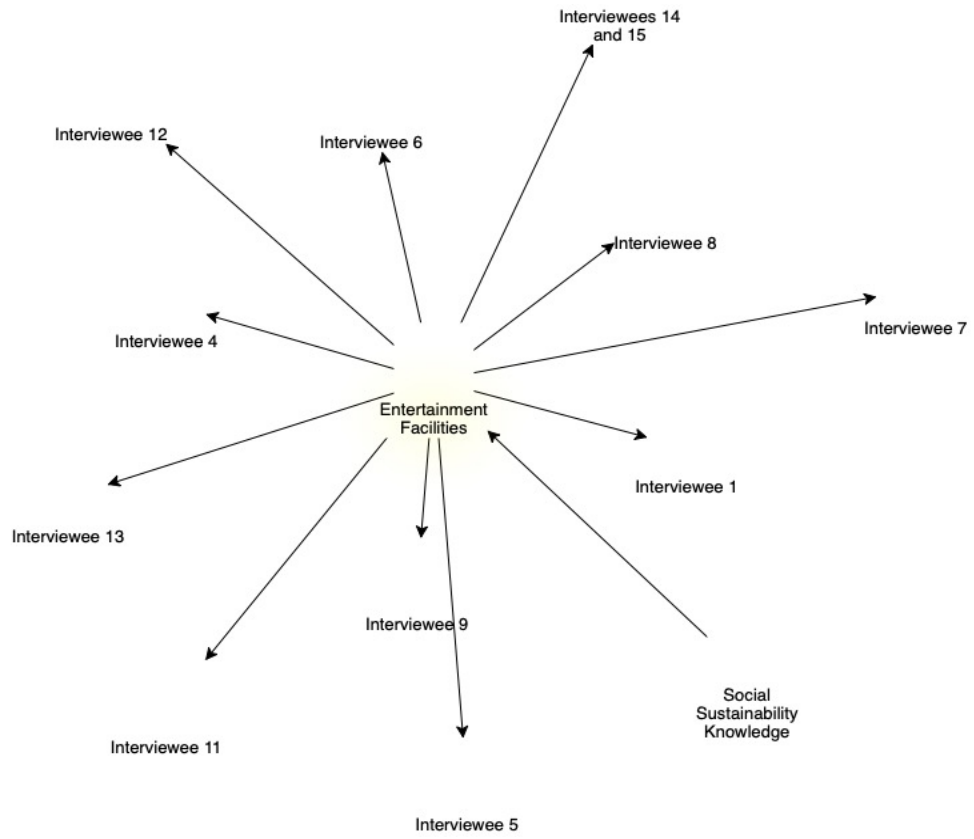


The Explore Diagrams for Sustainable Housing Social Policies

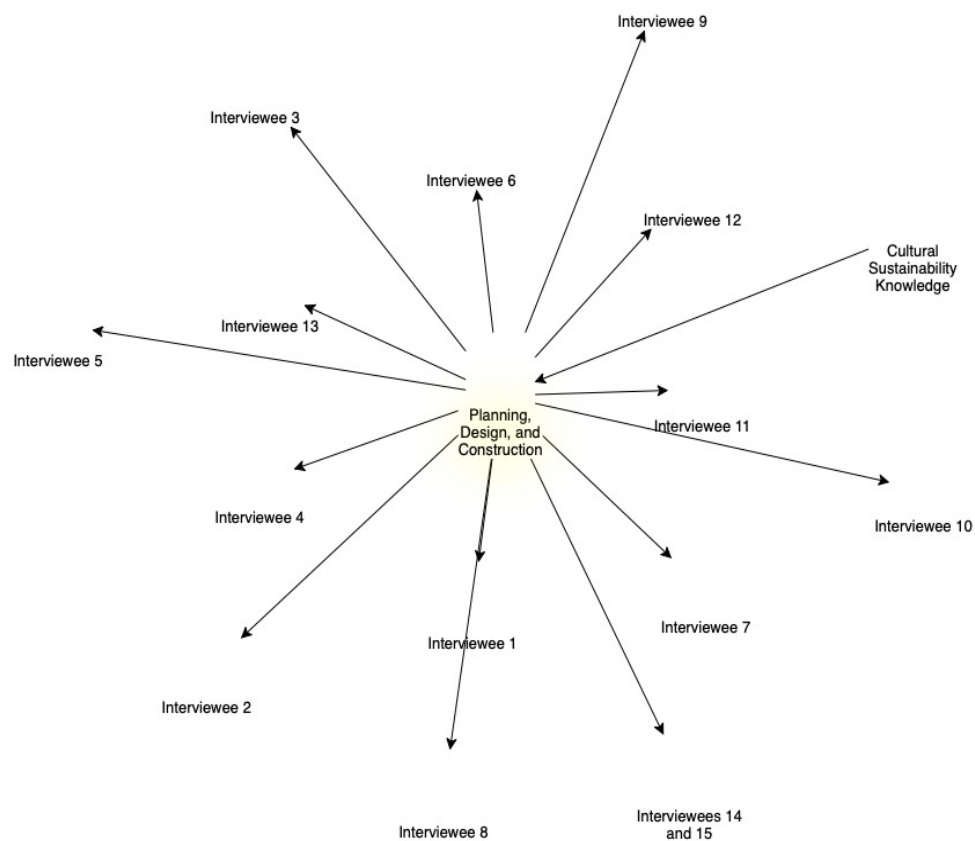
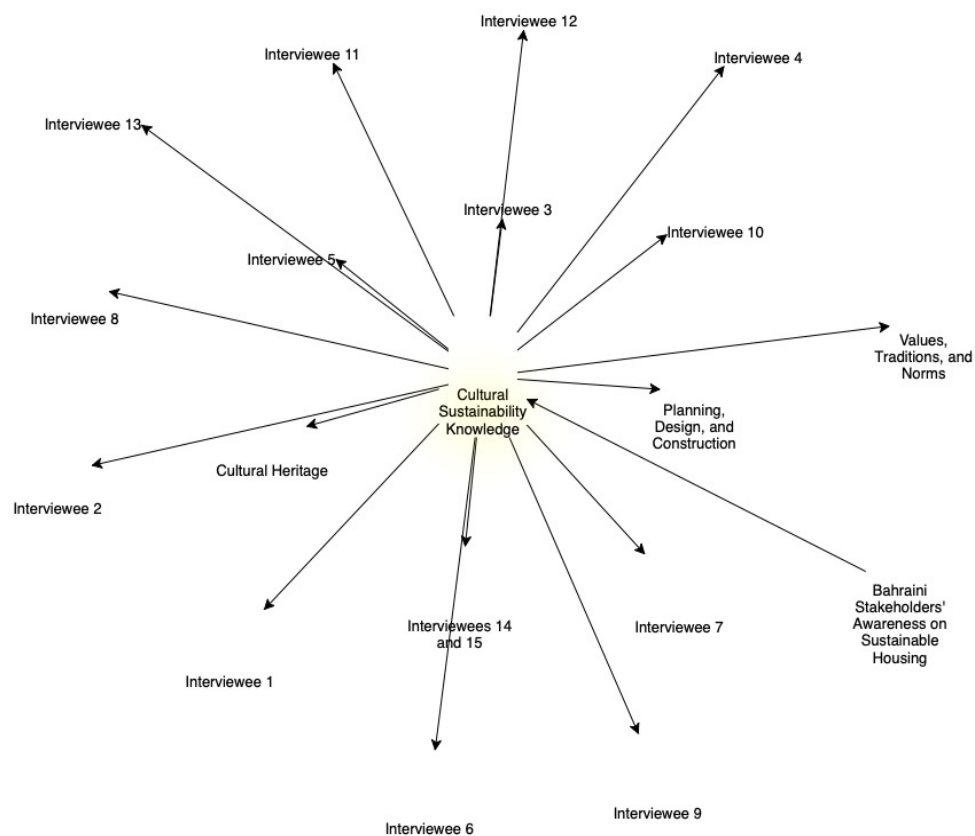


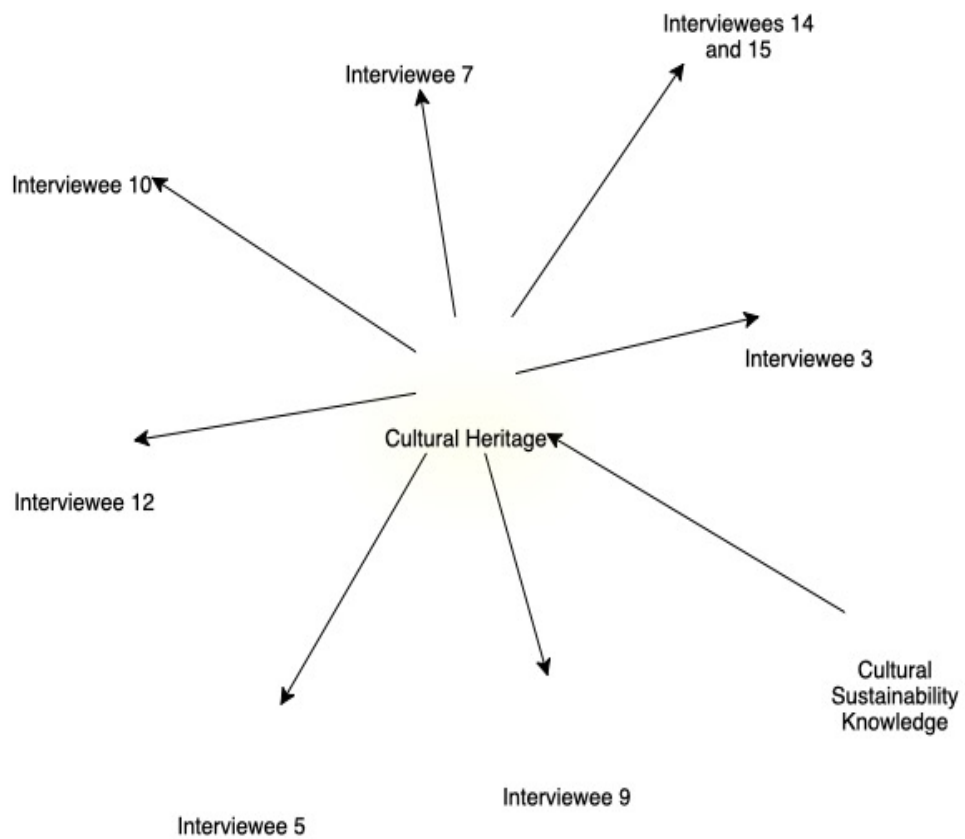
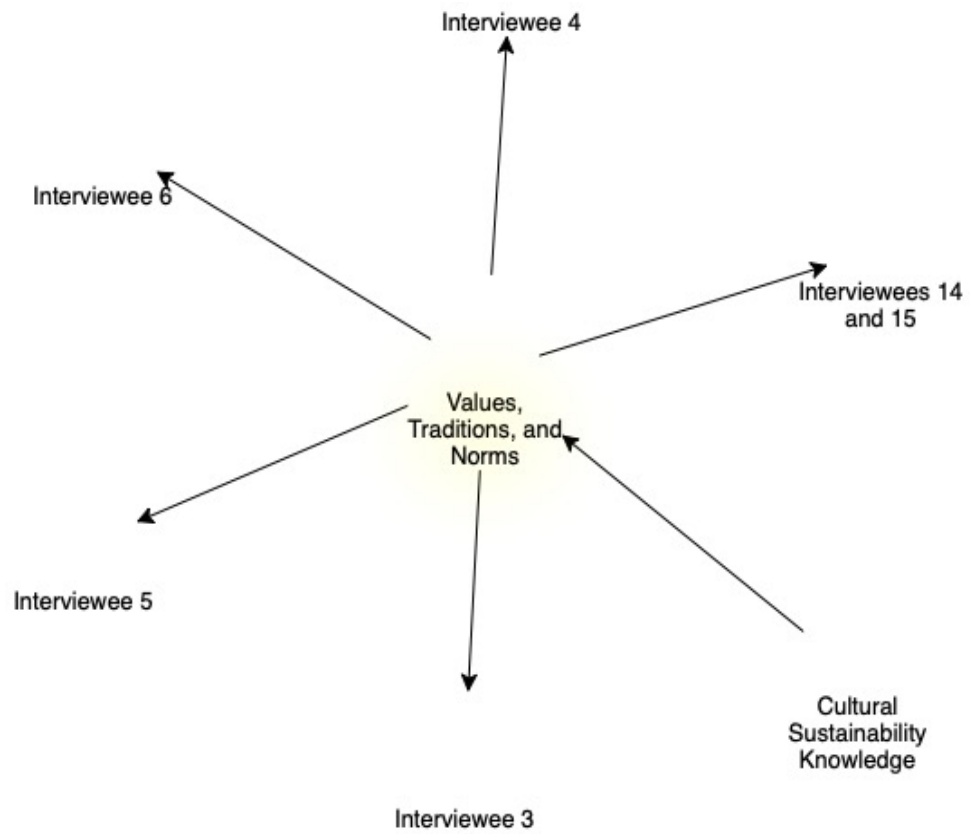






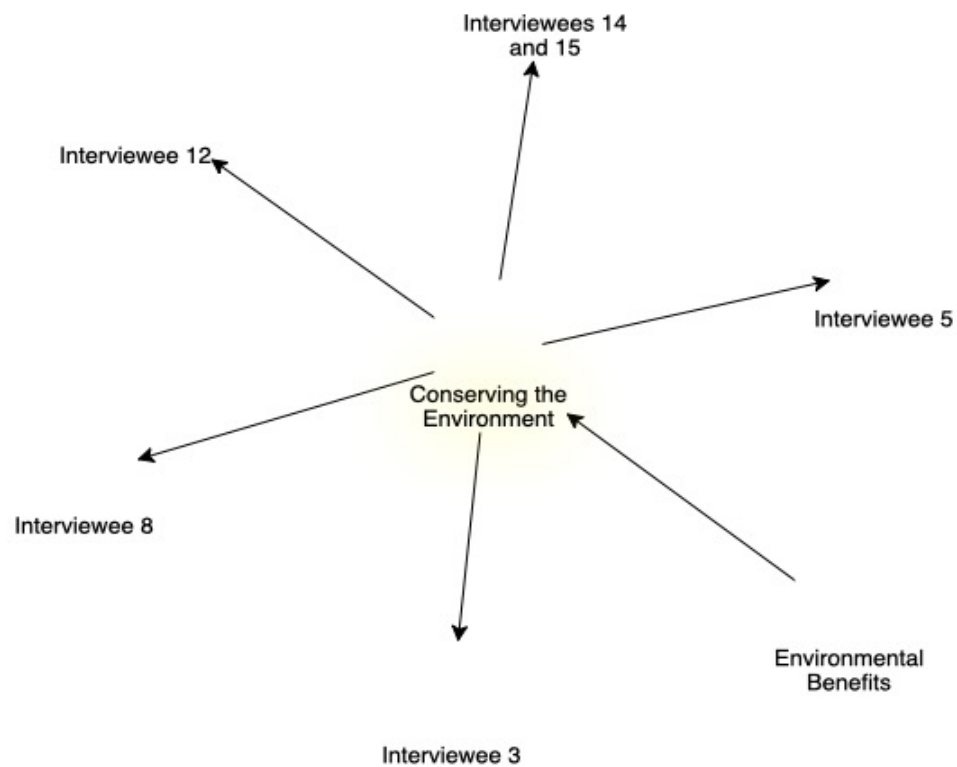
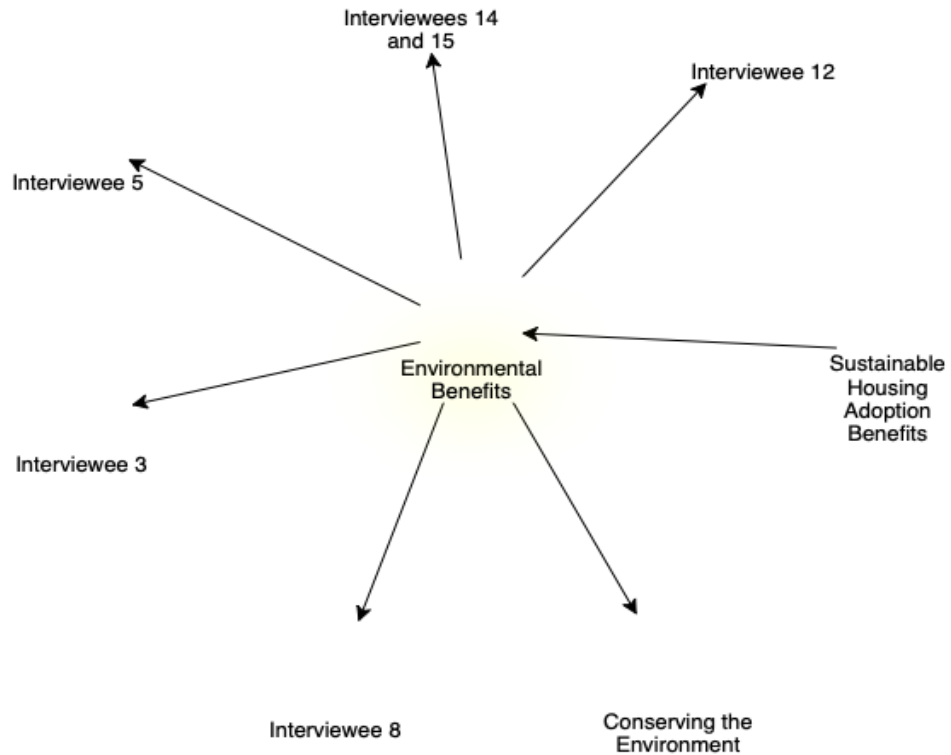
The Explore Diagrams for Sustainable Housing Cultural Policies



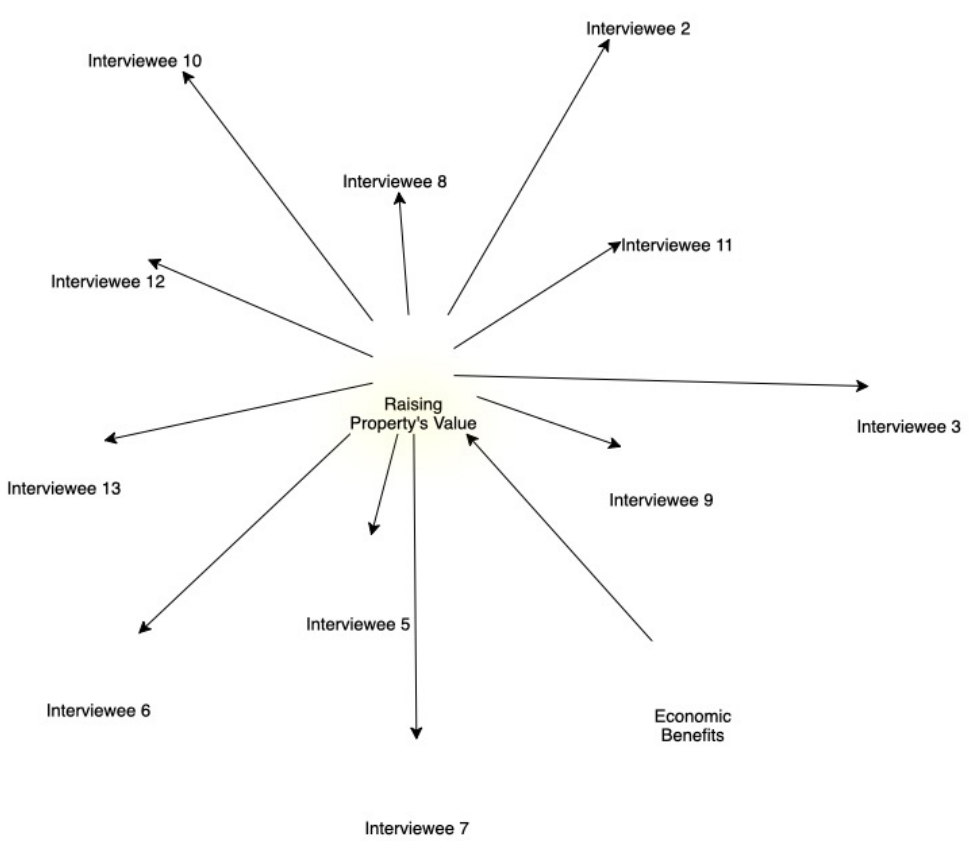
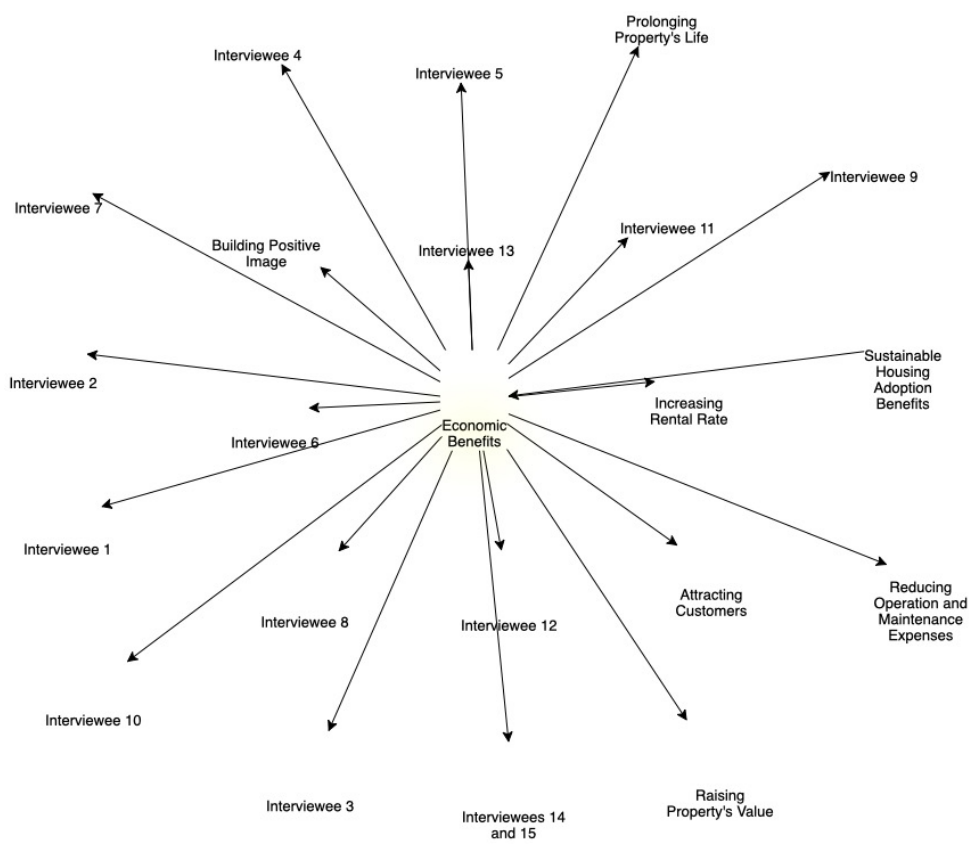


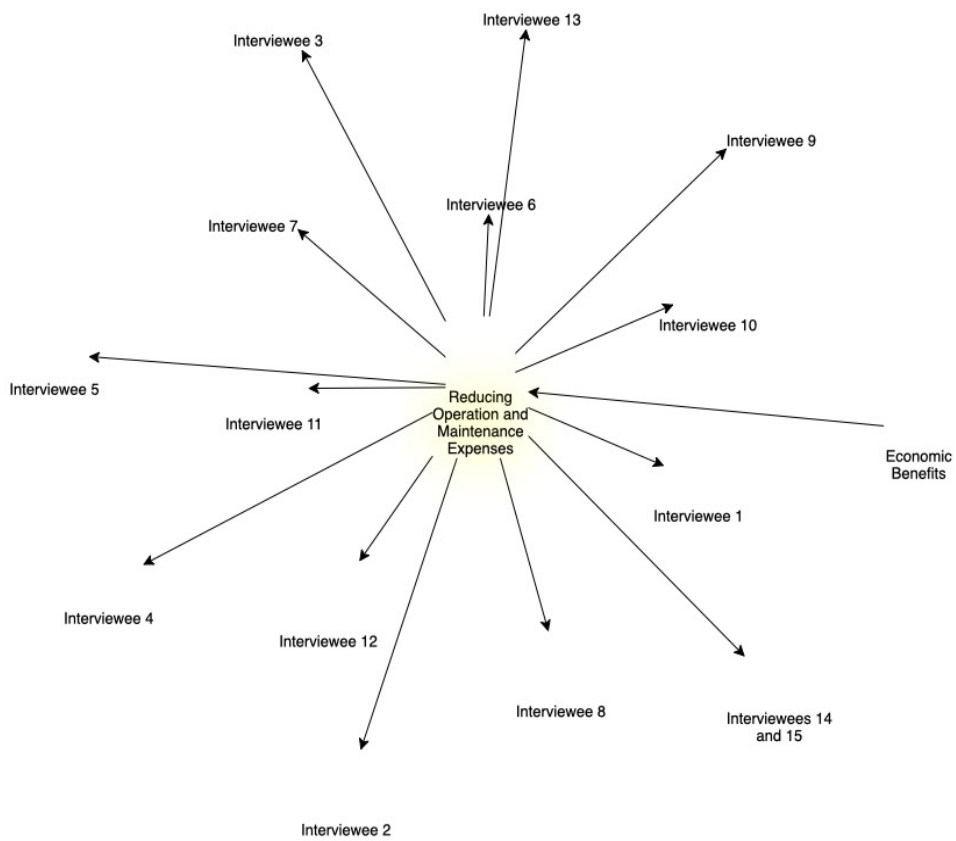
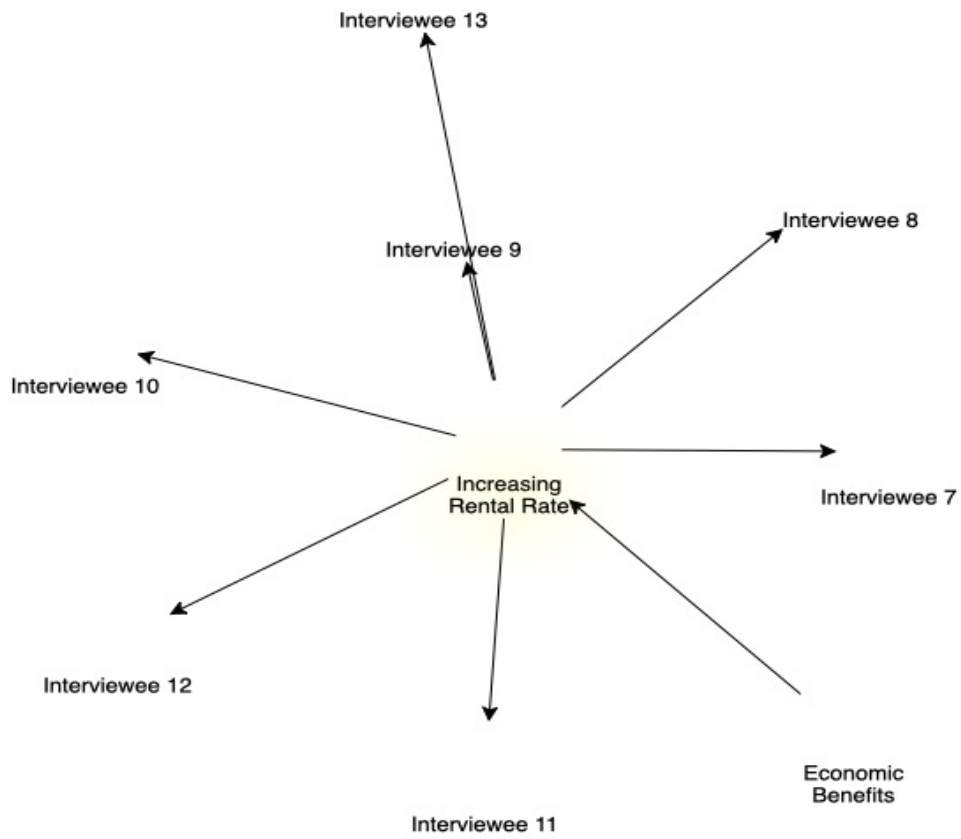
**Appendix (4): The Explore Diagrams for all Benefits
of Sustainable Housing Adoptions Generated by
NVivo 15 Software**

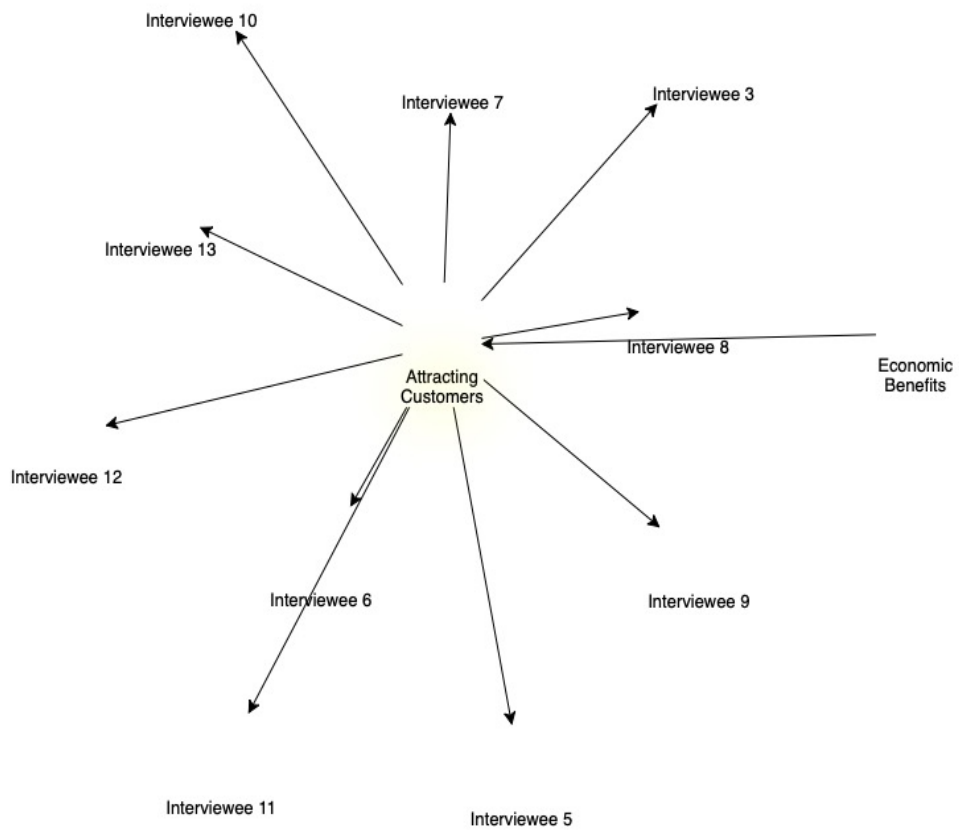
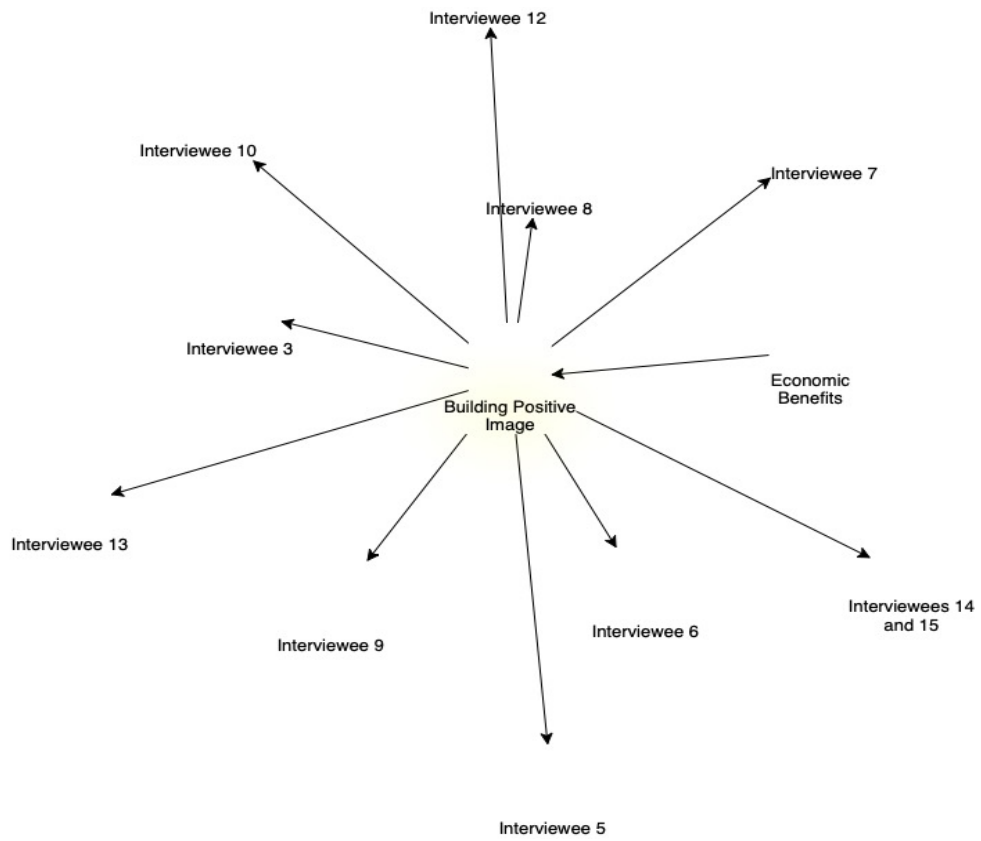
The Explore Diagrams for Environmental Benefits of Sustainable Housing Adoption

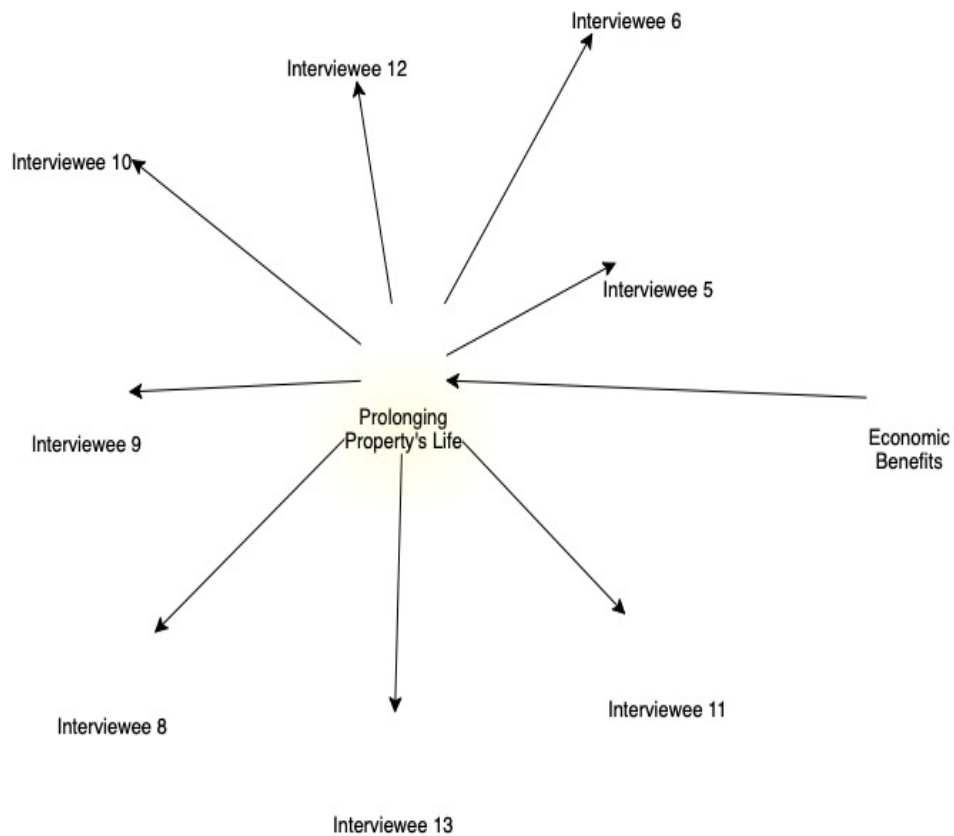


The Explore Diagrams for Economic Benefits of Sustainable Housing Adoption

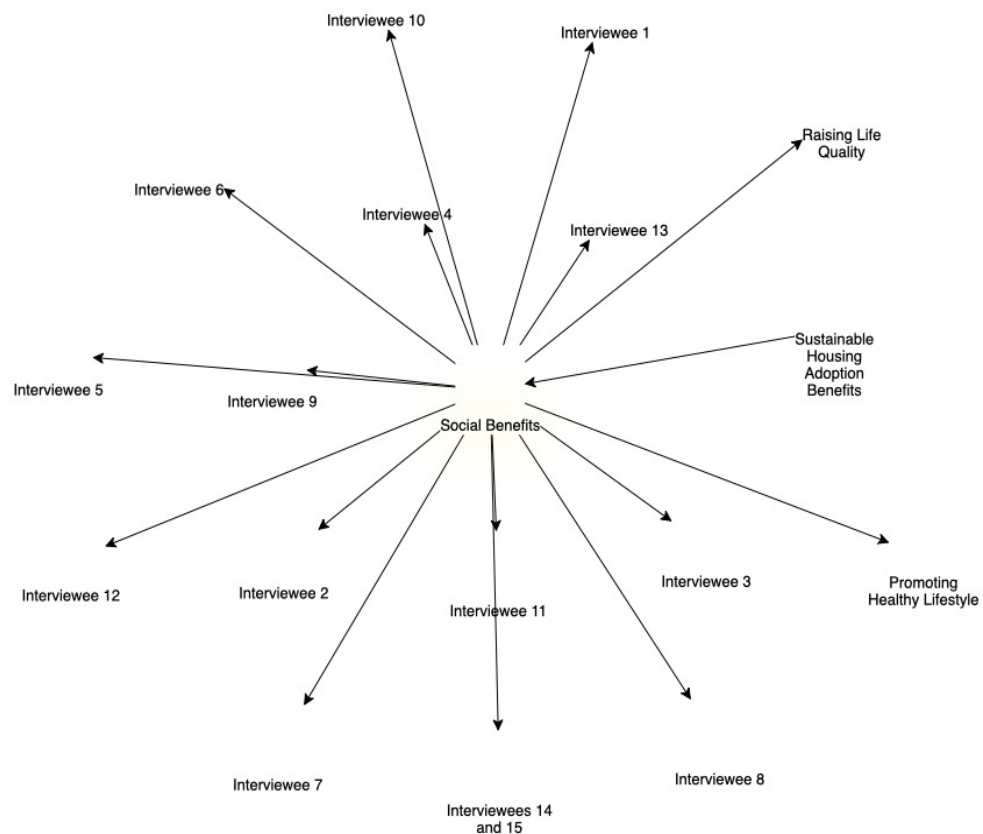


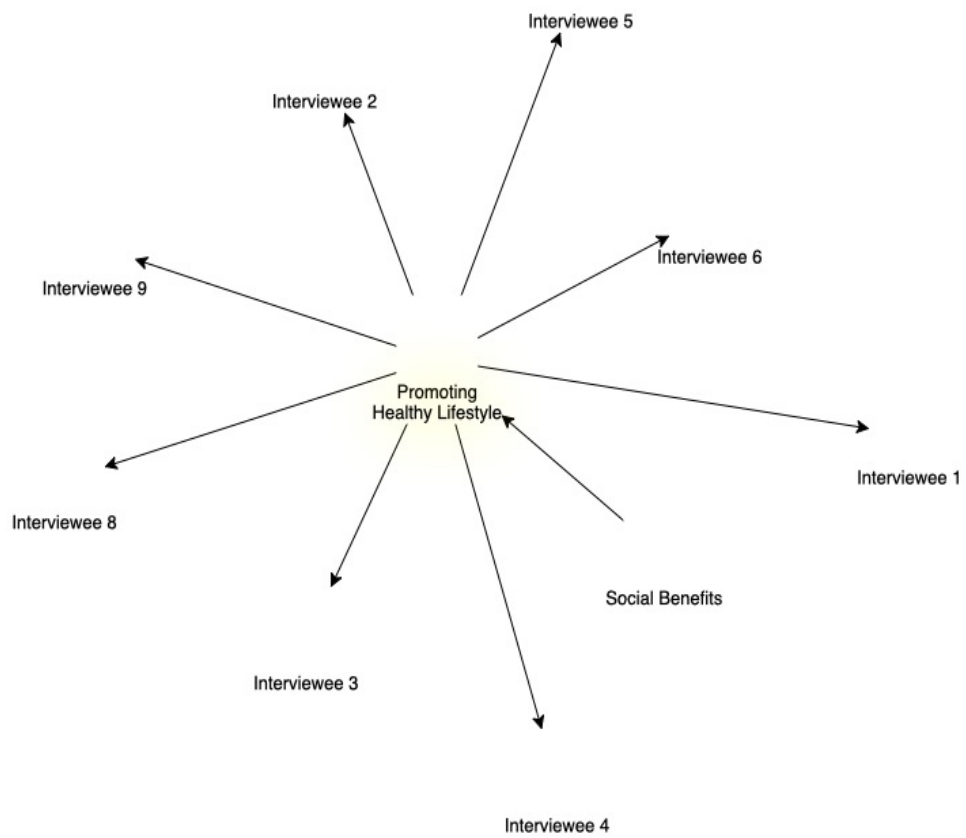
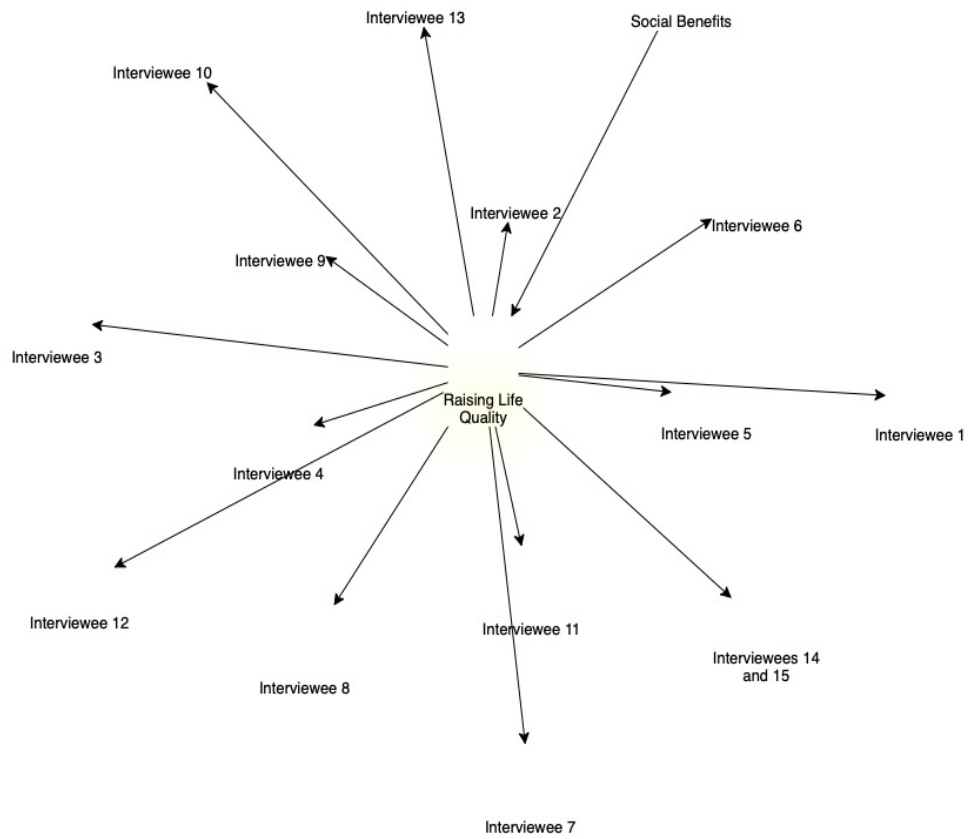






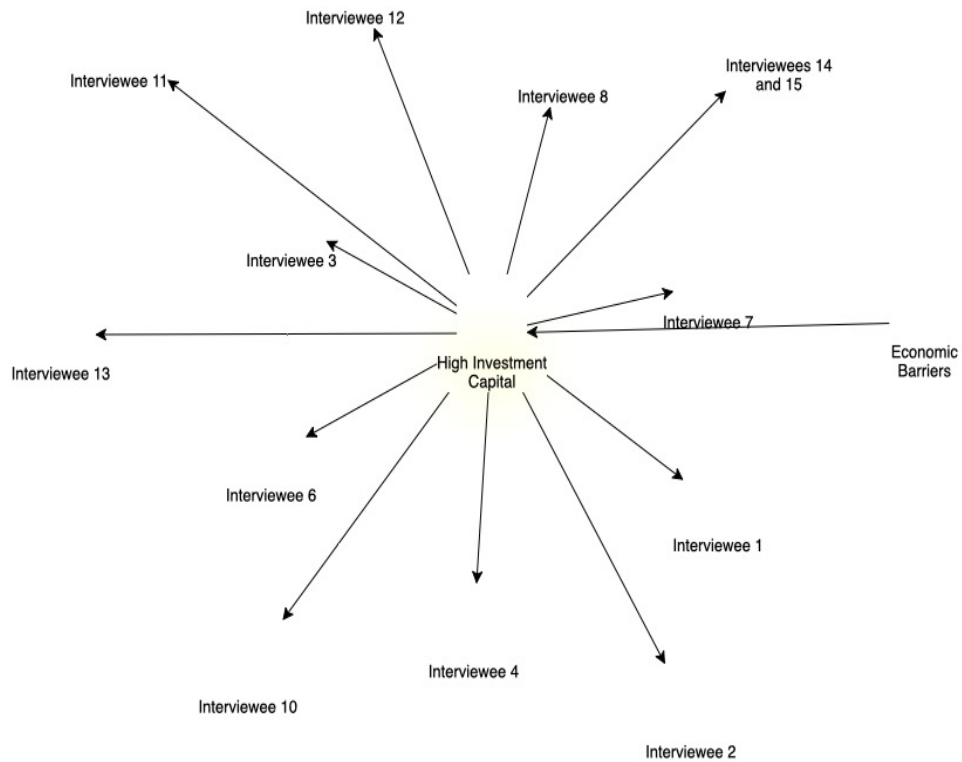
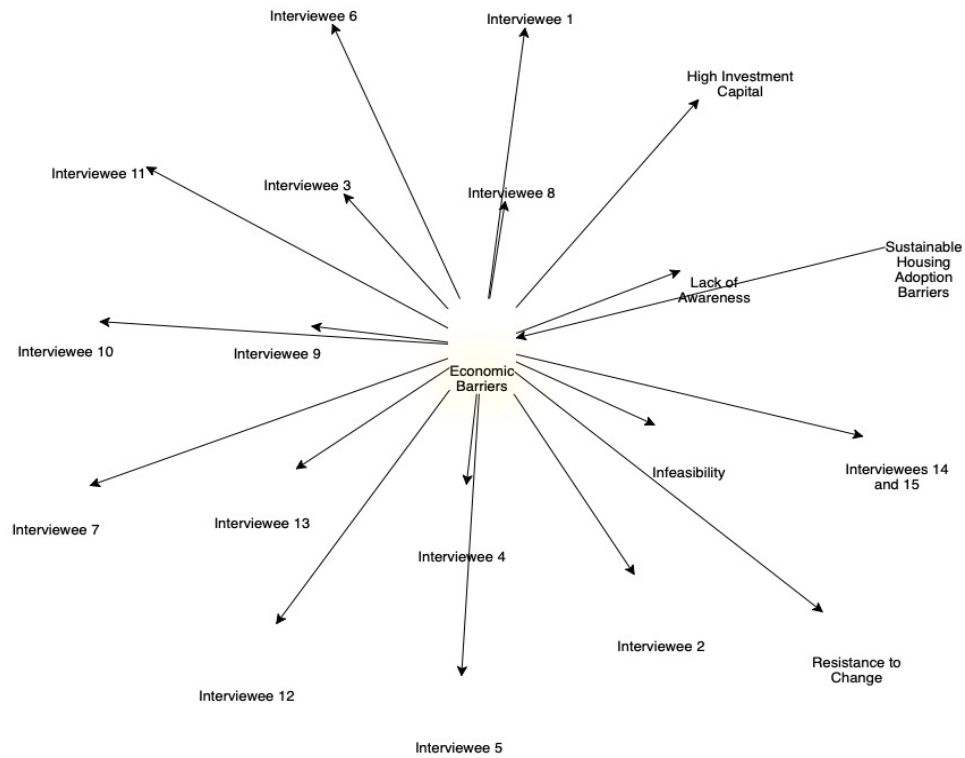
The Explore Diagrams for Social Benefits of Sustainable Housing Adoption

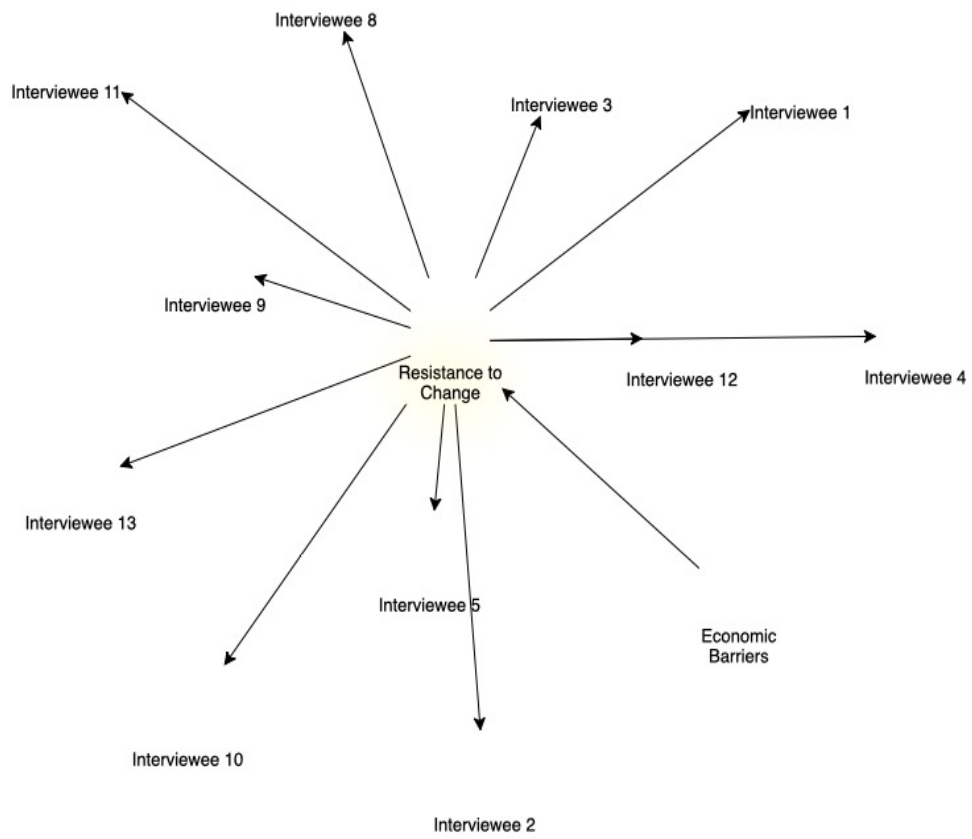
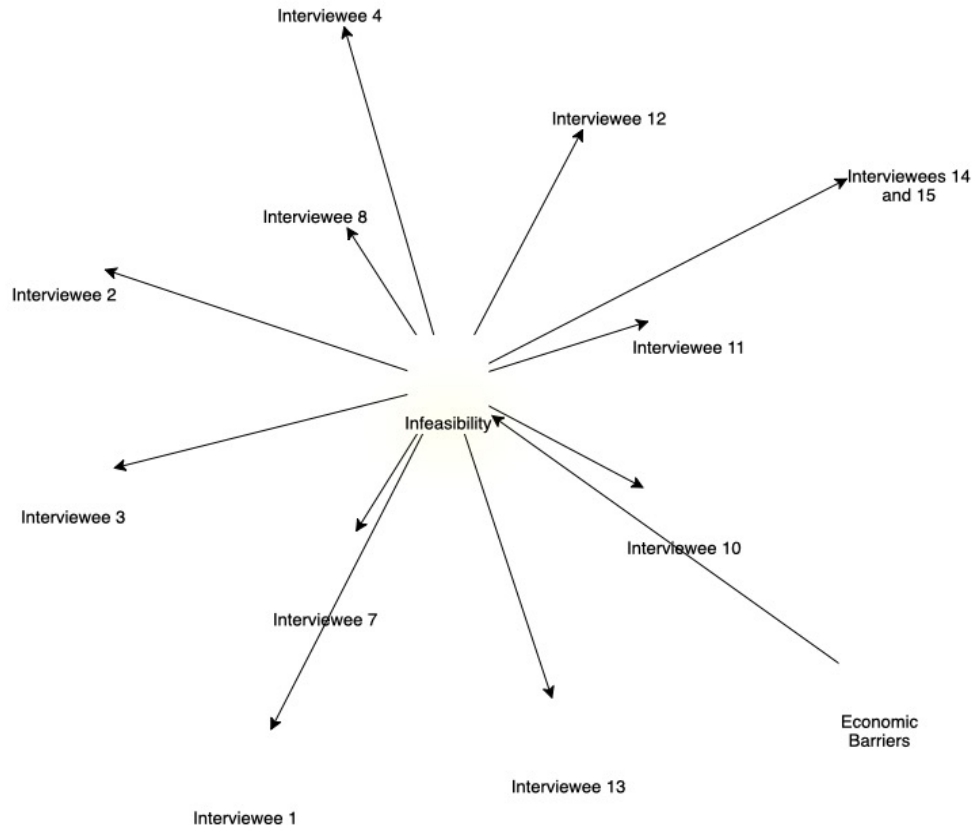


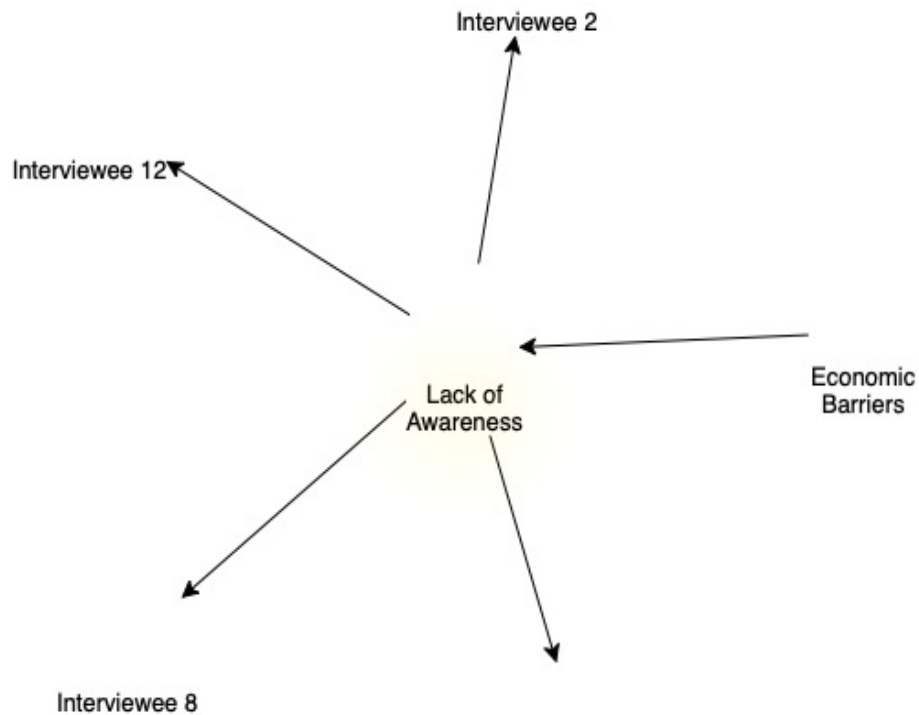


**Appendix (5): The Explore Diagrams for all Barriers
to Sustainable Housing Adoptions Generated by
NVivo 15 Software**

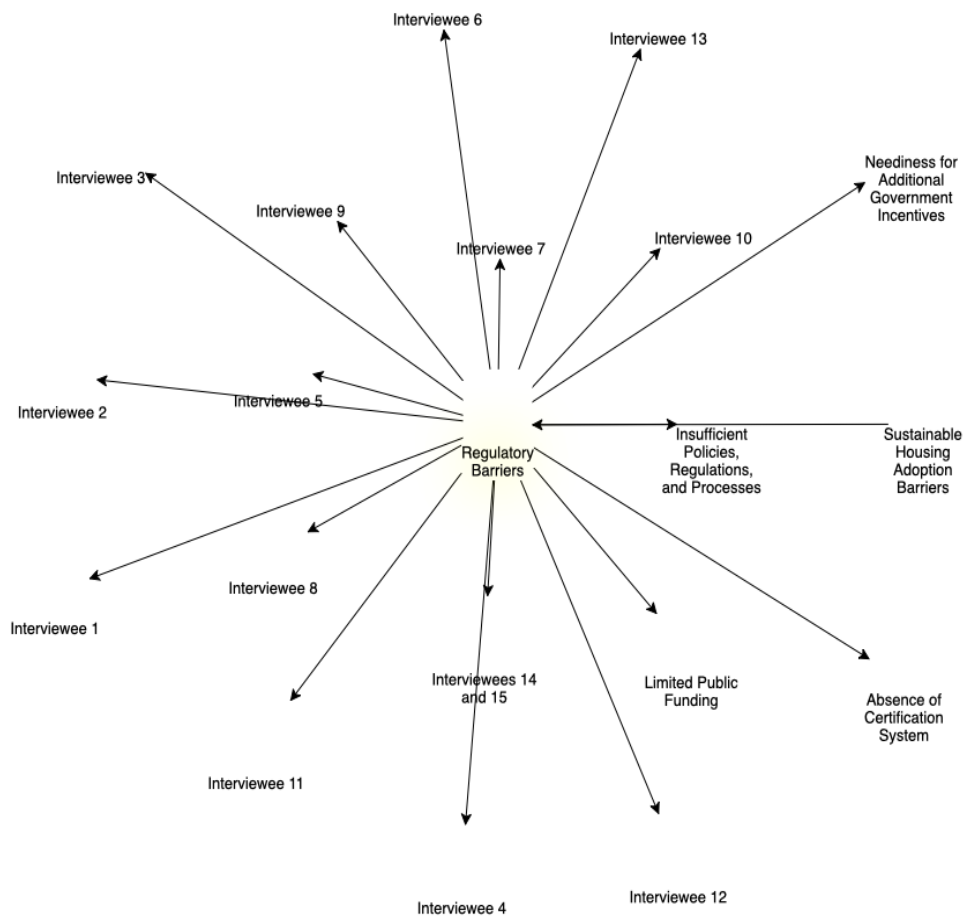
The Explore Diagrams for Economic Barriers to Sustainable Housing Adoption

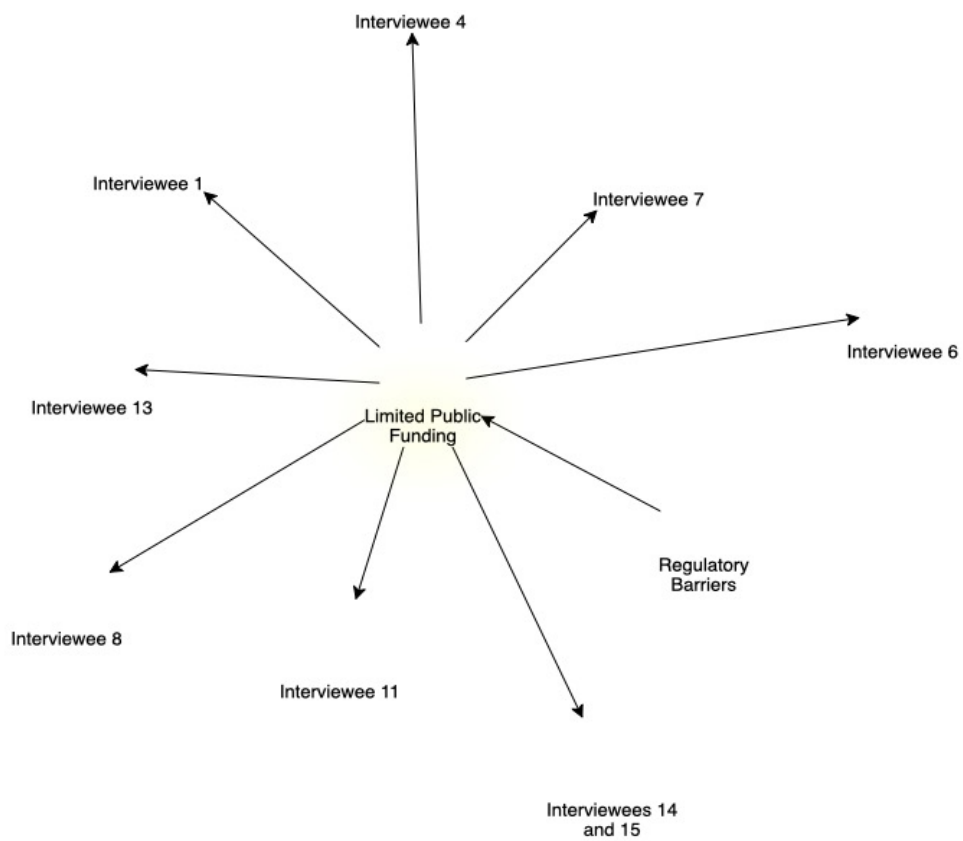
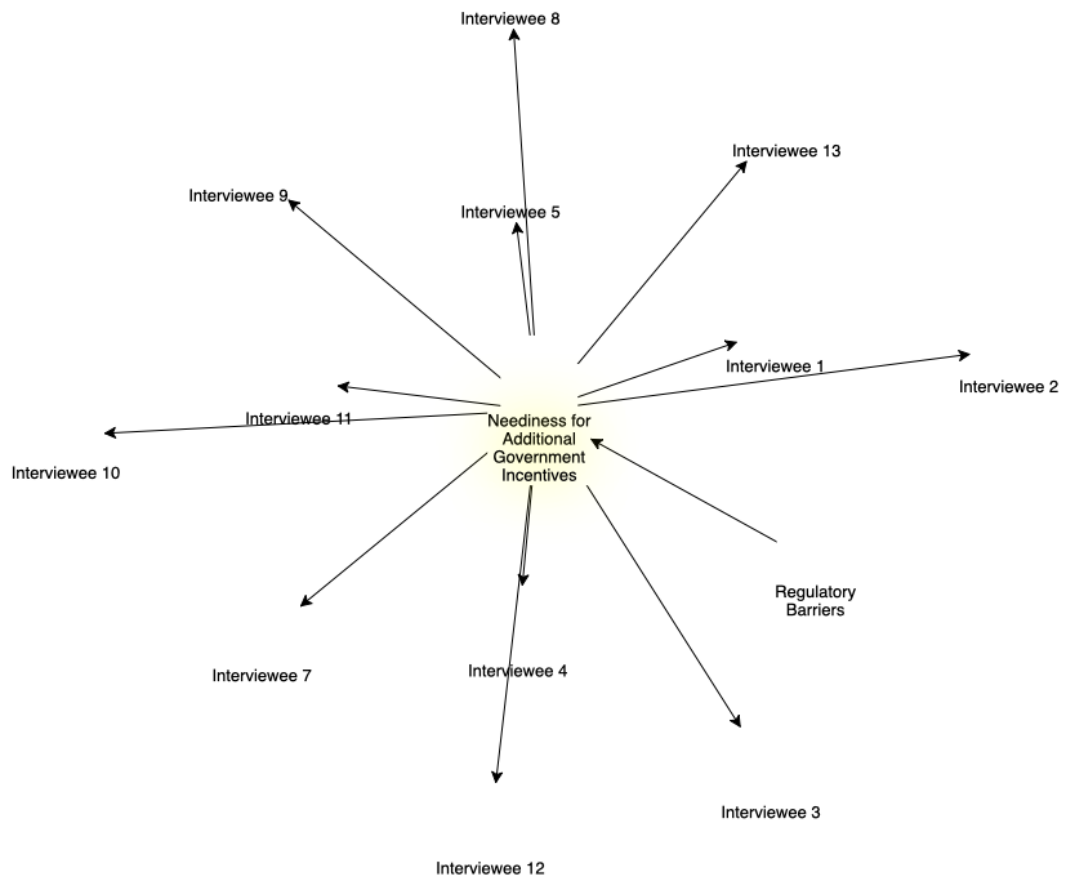


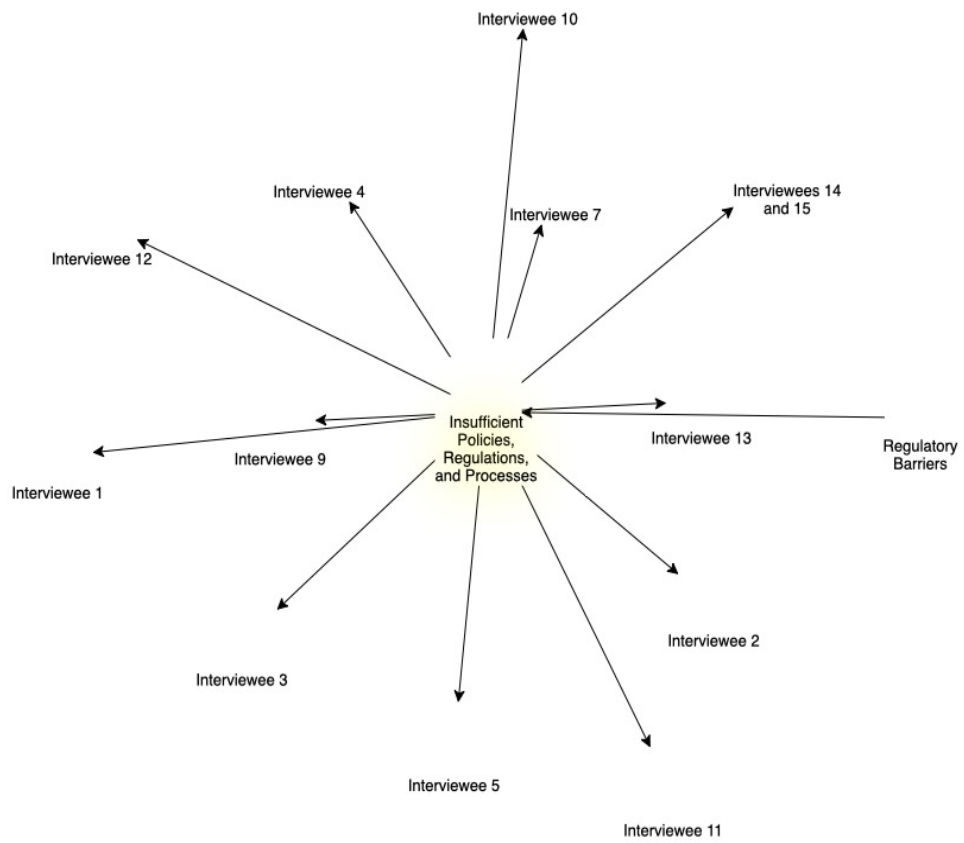
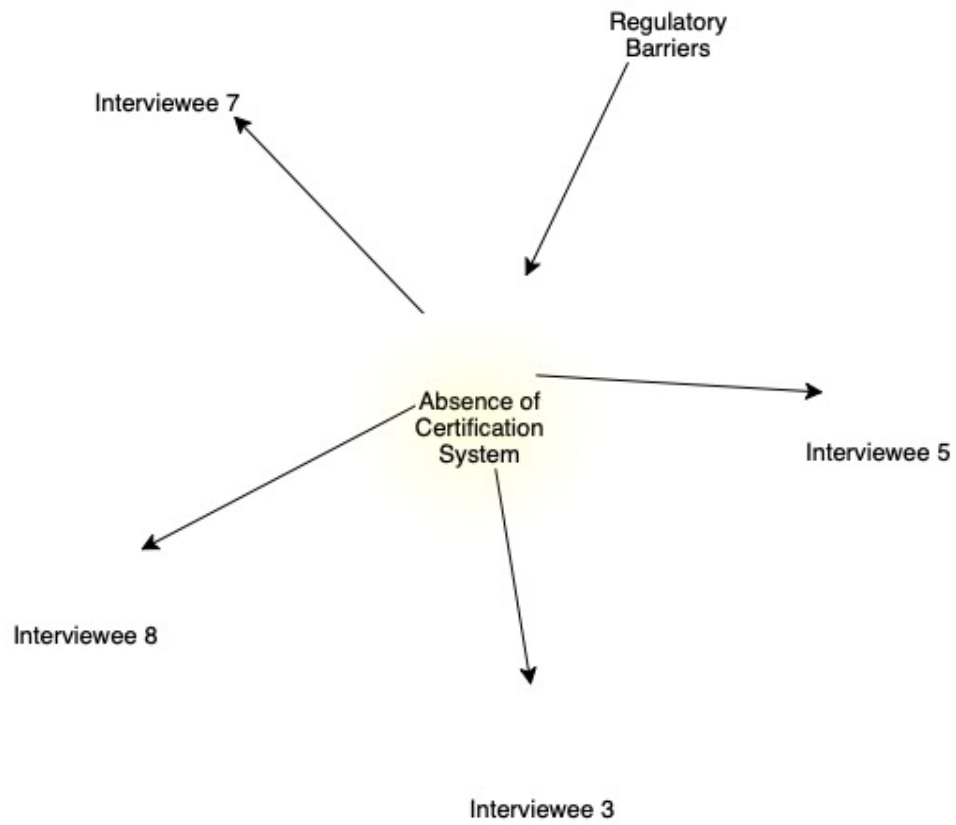




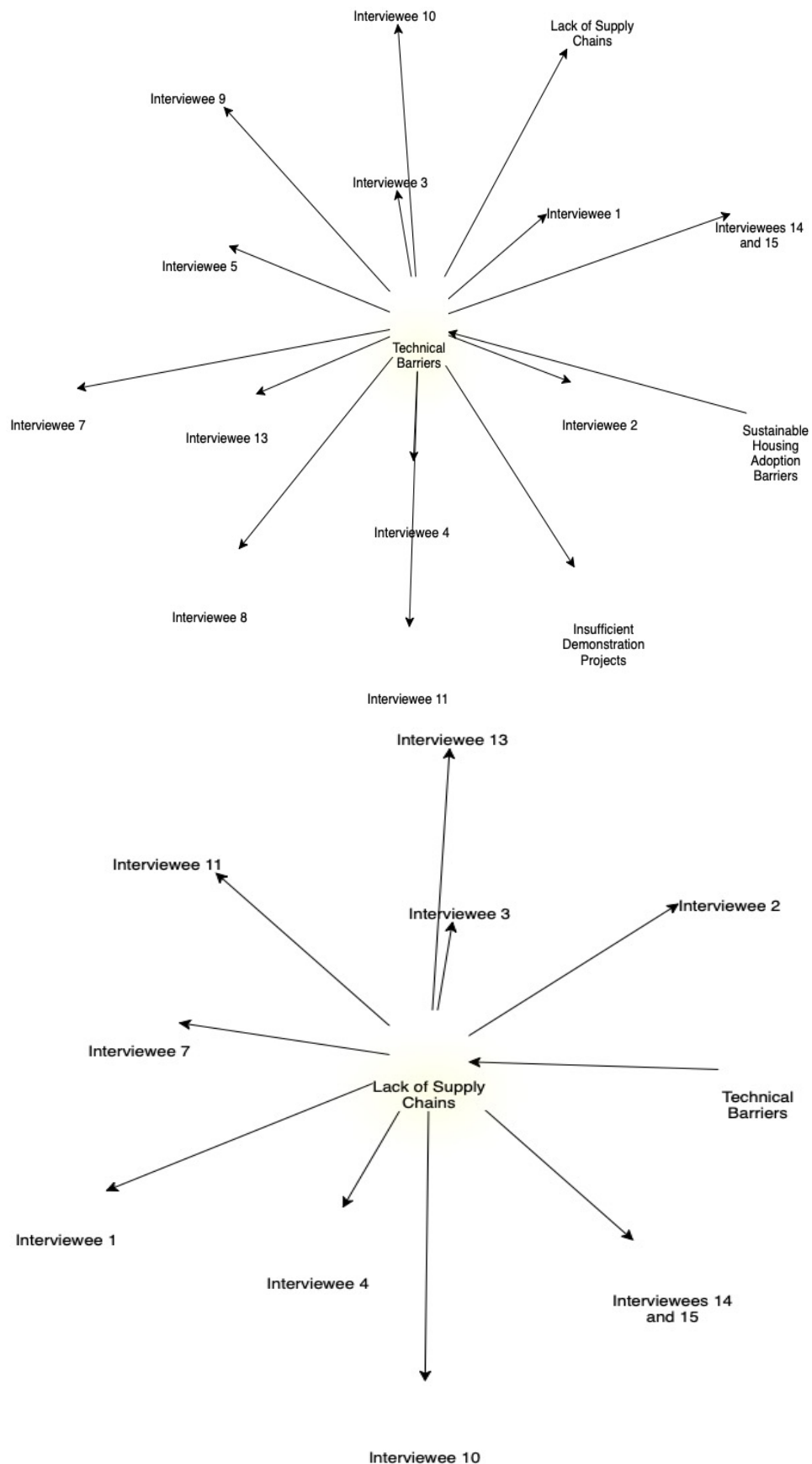
The Explore Diagrams for Regulatory Barriers to Sustainable Housing Adoption

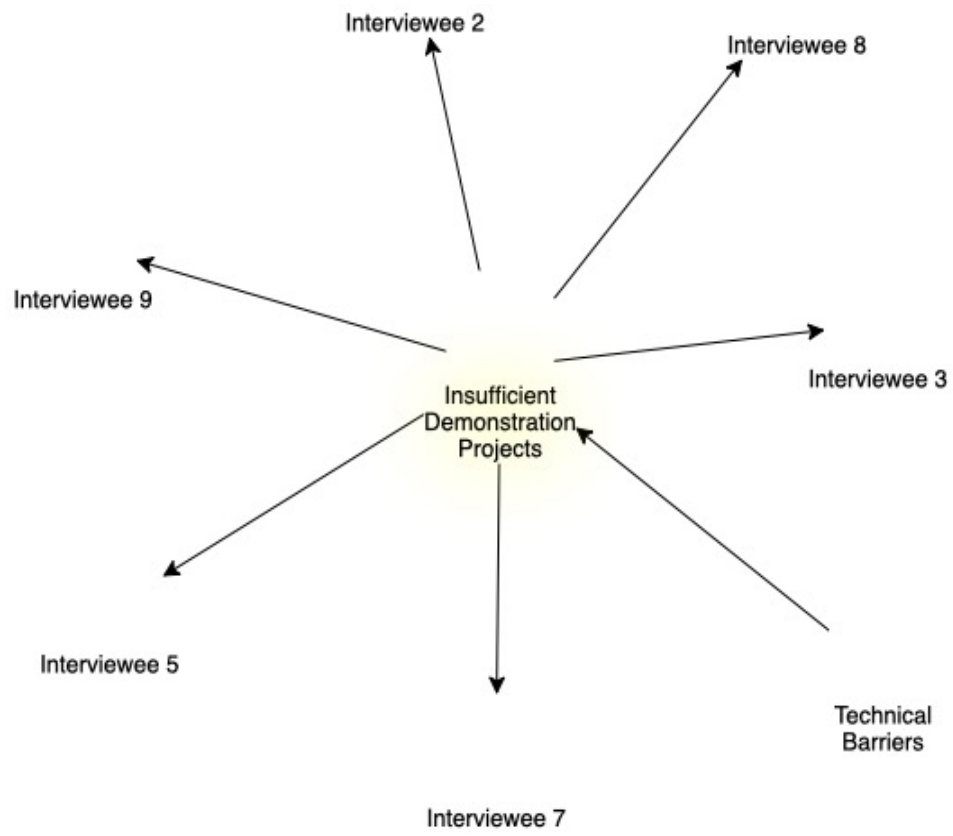




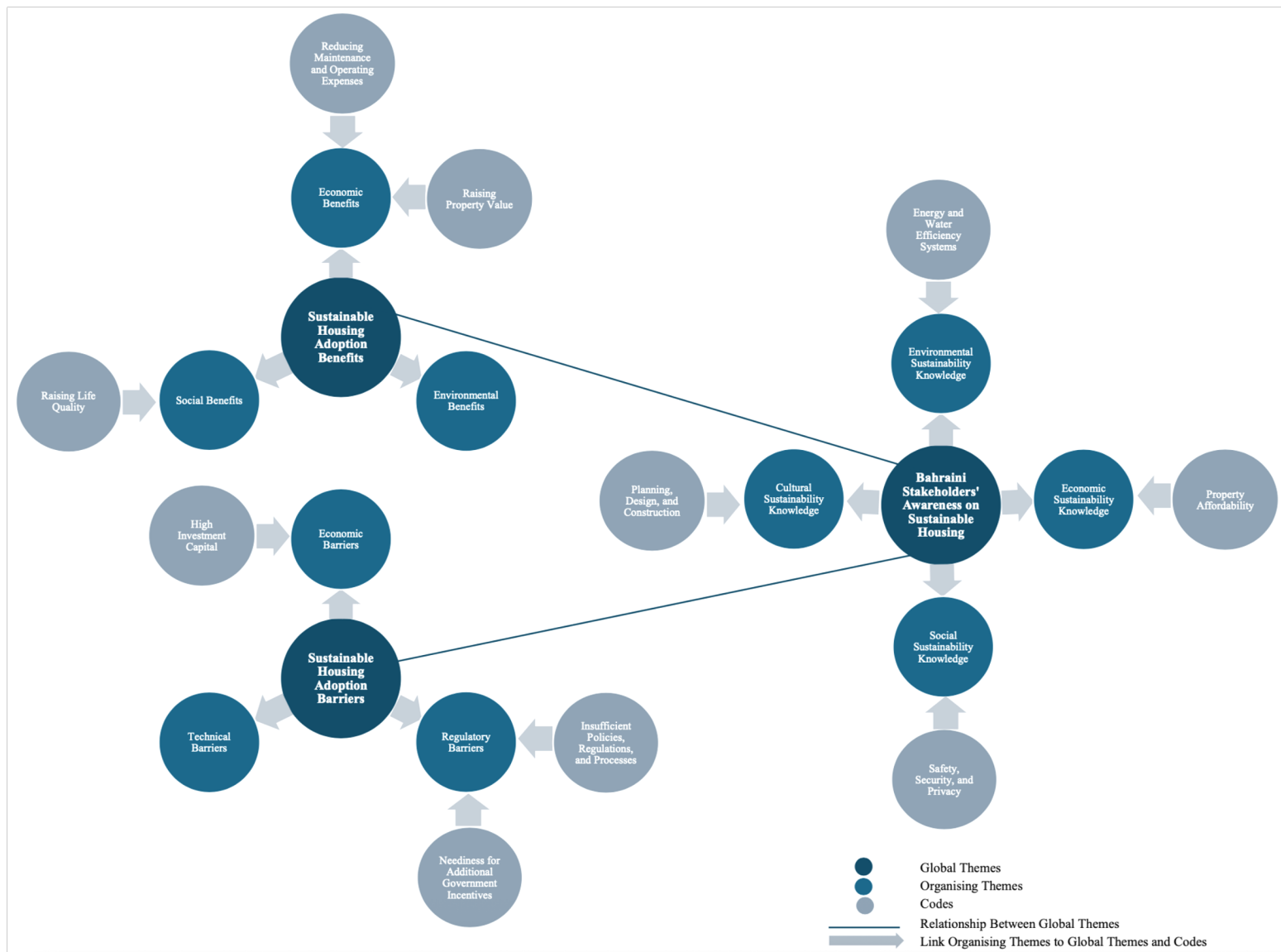


The Explore Diagrams for Technical Barriers to Sustainable Housing Adoption





**Appendix (6): A Conceptual Model that Summarises
the Achieved Competitive Outcomes for Each
Organising Theme**



المُلخَص

باعتبارها إحدى الدول النامية، صدّقت مملكة البحرين على جدول أعمال الأمم المتحدة 2030 للتنمية المستدامة واعتمدته بالكامل وأدرجت أهدافه السبعة عشر ضمن رؤيتها الاقتصادية الوطنية 2030، والذي ينصب الهدف الحادي عشر منه على تطوير مدن ومُستوطنات بشرية مُستدامة. وعلى الرغم من المبادرات والماساعي الوطنية للوفاء بهذا الالتزام؛ لا يزال التحول الشامل نحو المباني المستدامة في البحرين أبطأ من المتوقع؛ حيث لم يتم اعتماد استراتيجيات هذا التحول حتى الآن في ظل غياب خطة قياس التقدم. وقد أثار ذلك حاجة ملحة لاستكشاف مدى وعي أصحاب المصلحة في الإسكان البحريني بالعقارات المستدامة لغرض إدراك مزايا هذه الخواص وعوائق تبنيها. اعتمد تصميم دراسة الحالة لتوجيه هذه الأطروحة النوعية؛ حيث تم الاستعانة بأداة المقابلات الفردية الشبه منظمة مع خمسة عشر شخصية رئيسية من قطاعي الإسكان العام والخاص في البحرين مثلت مختلف المستويات الإدارية والتنظيمية. ساهم التحليل الموضوعي للبيانات الأولية في توليد العديد من الرموز والتي أبرزت معرفة محلية جلية بممارسات الإسكان المستدام في أبعاده الأربعة: الاقتصادية، والبيئية، والاجتماعية، والثقافية. وقد اتضح أن أكثر مبادئ الاستدامة تطبيقاً في السياق المحلي تضمنت أسس التخطيط والتصميم والبناء السليم ثقافياً، حلول كفاءة الطاقة والمياه بيئياً، ميزات الخصوصية والأمن والسلامة اجتماعياً، والقدرة على تحمّل تكاليف المساكن اقتصادياً. وبناءً عليه فقد أجمع عامة العقاريون المشاركون أن أهم سمات المنازل المستدامة تتمثل في تخفيف نفقات الصيانة والتشغيل، وزيادة القيمة السوقية للممتلكات، بالإضافة إلى تعزيز جودة حياة شاغلي المنازل. ورغم هذه الميزات التنافسية للعقارات المستدامة؛ فقد ارتأى أصحاب المصلحة المستجيبون للدراسة وجود حواجز كبيرة تُعيق تبنيها أبرزها نقص السياسات واللوائح والمعايير المتعلقة بالإجراءات المستدامة، ارتفاع تكاليف الاستثمار الأولية، فضلاً عن الحاجة إلى المزيد من الحوافز الحكومية. تُسهم حداثة هذه الدراسة وتفردها في إثراء المعرفة السائدة، وستكون نتائجها ذات أهمية وأثر للمستثمرين وصانعي القرار والأكاديميين المتعاطين للتغيير.

الكلمات الرئيسية

الإسكان المستدام؛ العقارات السكنية؛ الاستدامة الاقتصادية؛ ميزات تنافسية؛ عوائق

جامعة البحرين

قسم الاقتصاد والتمويل



كلية إدارة الأعمال

معوقات تطوير المساكن المُستدامة وميزتها التنافسية في قطاع الإسكان البحريني

أطروحة مُقدمة كجزء من مُتطلبات الحصول على درجة الماجستير في التطوير العقاري وإدارة
المُمتلكات

إعداد

زينب سلمان عاشور محمد

٢٠١٠٠٩٣٧

إشراف

د. علي مُراد سيد

أستاذ مُساعد

جامعة البحرين

مملكة البحرين

نوفمبر ٢٠٢٥