DEVELOPMENT OF AFFORDABLE HOUSING FRAMEWORK FOR LOW-INCOME HOUSEHOLDS IN PAKISTAN

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Abstract

Provision of affordable housing is a global issue and key agenda of UN Habitat, 'housing for everyone' (ILO, 1974). It is believed that a decent and good quality affordable housing is a basic and fundamental need for humans and can help to achieve several socio-economic policy objectives (UN-Habitat, 2008; Rizvi, 2015; Shaikh, 2016; Anacker, 2019; Commission, 2019). Housing affordability is mostly assessed based on the income to expense (IER). However, researchers (Anacker, 2019; Affordable Housing Commission, 2019; Matt and Marshall, 2019) are agreed that housing affordability is more than housing (rent, mortgage and utility bills) and non-housing expenses (commuting, health and education expenses, etc.). A household should not spend more than 30% of their household income on housing costs; and social and environmental criteria should be considered to assess the housing affordability Mulliner, Malys and Maliene, 2016; Napoli, Trovato and Giuffrida, 2016; Meen, 2018; Affordable Housing Commission UK, 2019; Matt and Marshal, 2019), especially for low-income households.

The government of Pakistan is unable to meet housing requirements due to rapid urbanization and uncontrolled population growth in the country. Available affordable housing developments either are too expensive for low-income households or are built in the periphery of the major cities. Households with low-income ($2 a day) face non-housing expenses (especially traveling cost and time) due to lack of employment opportunities near these affordable housing developments (Rizvi, 2015; Kakakhel, 2014; Gerrity, 2016; Shaikh, 2017; Hasan and Arif, 2018; Islamabad, 2018; Zameen.com, 2019). Consequently, a substantial proportion of

population lives in sub-standard and low-quality houses or slums near the town centres of major cities or go homeless. All the housing finance organizations including House Building Finance Company Limited (HBFC: a public body) use IER to assess the housing affordability; and they do not consider any social and environmental criteria. Therefore, there was a need to develop an affordable housing framework that can be used to assess the housing affordability of low-income households. The aim of this research is to establish an affordable housing framework that can be used to assess the housing affordability and to develop future affordable housing developments for the low-income households in Pakistan.

A rigorous literature review helped to develop housing affordability assessment criteria (HAAC). In order to bring together cross-national housing information, and to get an approval for developed HAAC, housing professionals in Pakistan were asked to rank them on importance scale. The Delphi methods were used due to their hybrid nature within the mixed research methodology framework. Some statistically significant tests whether to use parametric or non-parametric tests for statistical analysis such as Kolmogorov-Smirnov (K-S); to compare the differences of opinion between housing professionals and the end users' groups Mann-Whitney U test; Cronbach's alpha to check the internal consistency (reliability) of the data. The HAAC was reduced into most critical criteria by applying factor analysis tests using Statistical Package for the Social Sciences (SPSS).

Based on the literature review and the field survey results, this thesis offers an original contribution to knowledge by developing the concept of affordable housing to support the low-income households in Pakistan. The framework contains

comprehensive housing affordability assessment criteria (HAAC) and income to expense ratio (IER) threshold to assess the housing affordability of low-income households in Pakistan. Housing stakeholders, housing finance & banking sector and government authorities can use this framework to assess housing affordability for low-income households, provide and monitor good quality affordable housing developments for this segment of population in Pakistan.

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List of Acronyms and Abbreviations

1	AH	Affordable housing
2	AHF	Affordable housing framework
3	BSHF	British Social Housing Federation
4	CDA	Capital development Authority
	CLTs	Community Land Trusts
5	DHA	Defence housing authority
6	Eco. 1	Monthly rent in relation to household income
7	Eco. 2	House price to buy in relation to household income
8	Eco. 3	Travelling cost to workplace from your home
9	Eco. 4	Cost of maintenance
10	Eco. 5	Cost of incremental expansion of the house
11	Eco. 6	Other Eco-Criteria
12	Env. 1	Durable building design (suitability to cope with the weather changes)
13	Env. 2	Flexible internal layout and design
14	Env. 3	Management and maintenance system for the housing building (to resolve the issues related to energy, services, cleaning, security, etc.)
15	Env. 4	Other Environmental Criteria
	FA	Factor analysis
17	G. 1	Low income range
18	G. 10	Participant's Low-income range
19	G. 2	Room occupation per person
20	G. 3	Suitable affordable housing
21	G. 4	Suitable financial product
16	G. 5	Housing expense per month
22	G. 5	Housing expense per month
23	G. 6	Non housing expense per month
24	G. 7	Govt. Contribution to low-income household
25	G. 8	Current job
26	G. 9	Participant's contact details
27	H_0	Null hypothesis

28	HA	Housing affordability
29	HAAC	Housing affordability assessment criteria
30	HBFC	House Building Finance Company of Pakistan
31	IER	Income to expense ratio
32	Katcha makan	A house built with mud and bricks
33	Katchi Abadis	Squatter-settlements or slums
34	K-S test	Kolmogorov-Smirnov test
35	MPA	the Member of the Provincial Assembly
36	NHP (2001)	National Housing Policy (2001) of Pakistan
37	OECD	Organisation for Economic Corporation and Development
38	PKR	Pakistani rupees
39	PPP	Public-Private Partnership
40	PR1MA	My first home scheme (Malaysia)
41	R & D	Research and development
42	SB or SBP	State Bank of Pakistan
43	Soc. 1	Location in terms of accessibility to the local shops, education centres and health facilities
44	Soc. 2	Accessibility to local transport for local and general commute
45	Soc. 3	A place of prayer close to your home
46	Soc. 4	Internal privacy separate sitting place for male and female guests
47	Soc. 5	External privacy (no internal view of the house from outside and from the neighbouring houses due to cultural reasons)
48	Soc. 6	Other Social Criteria
49	U test	Mann-Whitney U test
50	UK	United Kingdom
51	UNH	United Nation Habitat
52	USD	American dollars
53	USNHA 1937	The United States National Housing Act 1937
54	WILT	Will I Live There

ACKNOWLEDGEMENTS

1 CHAPTER ONE: INTRODUCTION

1.1 Introduction

The provision of affordable housing is one of the major issues around the globe especially in developing countries. The United Nations Organisation's (UNO) directives on housing states that 'human beings need a continual supply of adequate housing and associated facilities along with food and clothing'(UN-Habitat, 2008). State is responsible to improve wellbeing by providing an appropriate housing for less fortunate members of their society (Gopalan and Venkataraman, 2015; Hjort and Widen, 2015; Javaid, 2016; Shaikh, 2016). Yet, most countries struggle to tackle this global issue (Anacker, 2019) and use various strategies, approaches and initiatives to manage their housing needs. Particularly, developing countries struggle more to provide affordable housing due to lack of housing planning and interest in the sector (Awuah and Lamond, 2015; Ghar47, 2015; Gopalan and Venkataraman, 2015; Hjort and Widen, 2015; Rizvi, 2015). Certainly, it is hard to create adequate shelter with an affordable price and sustaining standard quality and features in terms of liveable space for humans. Households living in less than the predefined housing attributes should be considered living in an inappropriate condition and hence would need either improvement to their present shelter or need a new one (Rojas and Medellin, 2011). A workable housing policy and strategy to provide affordable housing to a country's less privileged population improves their welfare and wellbeing.

A rigorous literature review regarding affordable housing research revealed that, there is no standard criteria to assess the housing affordability and believed to be one of the issues in the provision of affordable housing; mostly housing affordability is assessed and defined by the economic viability (Fisher, Pollakowski and Zabel, 2009; Dülgeroğlu-Yüksel, 2010; Waseem et al., 2011; Amjad and Idara-e-Taleem-o-Agahi, 2012; Amjad and MacLeod, 2014; Isalou, Litman and Shahmoradi, 2014; Kakakhel, 2014; Elkins, 2018; Meen, 2018; Schwartz and Wilson, 2018). Housing affordability is mostly assessed based on the income to expense (IER). However, researchers (Anacker, 2019; Affordable Housing Commission, 2019; Matt and Marshall, 2019) are agreed that housing affordability is more than housing (rent, mortgage and utility bills) and non-housing expenses (commuting, health and education expenses, etc.). A household should not spend more than 30%[1] (Section 2.4.1.5) of their household income on housing costs; and social and environmental criteria should be also be considered to assess the housing affordability (Mulliner, Malys and Maliene, 2016; Napoli, Trovato and Giuffrida, 2016; Meen, 2018; Anacker, 2019; Commission, 2019; Matt and Marshall, 2019).

Previous studies (Fisher, Pollakowski and Zabel, 2009; Dülgeroğlu-Yüksel, 2010; Waseem et al., 2011; Amjad and Idara-e-Taleem-o-Agahi, 2012; Amjad and

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[1] The 30 percent of household income have evolved from the United States National Housing Act of 1937. The National Housing Act of 1937 limits the maximum rents for family eligibility to live in public housing; that is, a tenant's income could not exceed five to six times the rent. By 1940, income limits gave way to the maximum rent standard in which rent could not exceed 20 percent of income. The Housing Act of 1959 maintained maximum rents. The Brooke Amendment (1969) to the 1968 Housing and Urban Development Act established the rent threshold of 25 percent of family income (Anacker, 2019). By 1981, this threshold had been raised to 30 percent, which today remains the rent standard for most rental housing programs (Herbert, C., Hermann, A. and McCue, D. 2018; Meen, 2018; Nikodem, 2018; Anacker, 2019; Commission, 2019)

MacLeod, 2014; Isalou, Litman and Shahmoradi, 2014; Kakakhel, 2014; Elkins, 2018; Meen, 2018; Schwartz and Wilson, 2018) have quoted 30% IER criteria as standard and have not found it to be invalid. Housing affordability of low-income households gets effected by the non-housing issues such as housing design, features, structure, quality and location, end-users' geopolitical and socio-economic situations, demands/needs and some other criteria as well (Anacker, 2019; Commission, 2019). Therefore, IER cannot be generalized, as it does not incorporate social, cultural, geographic, spatial and environmental implications of affordable housing.

Available literature on housing situation, affordable housing developments and the National Housing Policy Pakistan (NHP 2001) were explored. Literature review revealed that majority of the Pakistani population lives under the poverty line (Kakakhel, 2014). A lay worker on average (general labourer or labourer working on a construction site) earns between $50 to $100 a month and cannot afford to buy or rent a decent house near the city centre (Aslam, 2014; Malik and Sajjad, 2014; Ghar47, 2015; Rizvi, 2015; Javaid, 2016; Shaikh, 2016). The House Building Finance Company Pakistan (HBFC), banks and other lenders only use the 'income to expense ratio' (IER) criterion to assess the housing affordability. There is no any other framework or criteria to assess their affordability or to support low-income household to buy or rent a house. The National Housing Policy of Pakistan (NHP 2001) is almost 18 years old and has neither been implemented nor amended since its launch (Mouzughi, Bryde and Al-Shaer, 2014; Rizvi, 2015; Javaid, 2016).

This research endeavoured to explore the housing situation and affordable housing developments in Pakistan and to develop the framework of affordable housing which could be used to assess the housing affordability of low-income households in Pakistan.

1.2   Research Problem

An affordable house is more than financial costs involved and should satisfy the larger issues of social wellbeing and sustainability for end-users and broadly for the community. A house is classed unaffordable if the cost of monthly rent is more than 30 per cent of gross household income (Hulchanski, 1995; Statistics, 2005-6; Fisher, Pollakowski and Zabel, 2009; Tang, 2009; Calnan, 2015; Javaid, 2016; Elkins, 2018). It is important to determine to whom affordable housing is required for (Alberts and Christopher, 2014). 'Affordable housing' as a term supports low-income households for an appropriate shelter without facing undue financial adversity (Milligan *et al.* 2004 quoted by Labin et al. 2014; Meen, 2019). The affordable housing developments should have employment opportunities for the community and the price should not be more unaffordable for low-income households (Fisher, Pollakowski and Zabel, 2009; Boulkedid et al., 2011; Baranoff, 2016).

Most of housing affordability definitions are unclear with inherited ambiguities and discrepancies (Stone, 2006); there is a need to clarify the term of housing affordability (Hulchanski, 1995). The term 'housing affordability' is used, often without paying much attention to its implications. Affordability or housing affordability varies case-to-case basis and needs clear definition (Alberts and Christopher,

2014). Housing affordability is a link between housing expenses such as, monthly household income on monthly rent, water, gas and electricity bills, (Meen, 2018; Schwartz and Wilson, 2018) and non-housing expenses such as food, health care, academic cost, etc., (Meen, 2018; Schwartz and Wilson, 2018) (non-housing expenses have been explained in Section 2.4.1.3). Housing affordability is also an ability of a household to pay rent or monthly mortgage for their house without falling into debt. It is dependent on social and environmental criteria such as geographic location, social pressures, neighbourhood and environmental issues (Shuid, 2016; Meen, 2018; Schwartz and Wilson, 2018; Anacker, 2019).

It is quite subjective to set a standard or criterion to determine earnings cut-off value or income threshold. In a household, its size and composition are important housing criteria. Income threshold or the cut-off earning amount is far from arbitrary as it is a pinnacle point to determine the division between households in unaffordable and affordable housing (Nepal, Tanton and Harding, 2010). Globally, lack of consensus has been found amongst the researchers (Robinson, Scobie and Hallinan, 2006b; Fisher, Pollakowski and Zabel, 2009; Calnan, 2015; Hertz, 2015; Meen, 2018) to define and measure housing affordability. Nevertheless, the term 'housing affordability' is still in use, often without paying much attention to its implications. Affordability or housing affordability, however, varies case-to-case basis and it is important to determine to whom affordable housing is required for (Alberts and Christopher, 2014). Literature regarding housing affordability (Hulchanski, 1995; Schwartz and Wilson, 2018; (Robinson, Scobie and Hallinan, 2006b; Stone, 2006;

Fisher, Pollakowski and Zabel, 2009; Calnan, 2015; Hertz, 2015; Meen, 2018) reveals that most of housing affordability definitions are unclear with inherited ambiguities and discrepancies. Therefore, there is a need to clarify the term 'housing affordability', especially for the region of Pakistan as the low-income households. Income to expense ratio (IER) has some limits, Baker, Mason and Bentley (2015) described the most important ones, for example, it does not reflect change over time; unpredictable income cut-off point and does not recognise the composition and or the size of the different households. Some small changes in household income may bring many changes to the household: for example, a temporary bonus, extra money etc. In Pakistan, IER is the only measurement to assess the housing affordability [(House Building Finance Company (HBFC), 2019)], which measures point in time affordability (Wilson and Barton, 2019).

Households with low-income ($2 a day) face non-housing expenses (especially traveling cost and time) due to lack of employment opportunities near these affordable housing developments (Kakakhel, 2014; Gerrity, 2016; Shaikh, 2017; Hasan and Arif, 2018; Islamabad, 2018; Zameen.com, 2019). Consequently, a substantial proportion of population lives in sub-standard and low-quality houses or slums near the town centres of major cities or go homeless. All the housing finance organizations including House Building Finance Company Limited (HBFC: a public body) use IER to assess the housing affordability; and they do not consider any social and environmental criteria. The government of Pakistan is unable to meet housing requirements due to rapid urbanization and uncontrolled population growth

in the country. Available affordable housing developments either are too expensive for low-income households or are built in the periphery of the major cities.

Mostly, affordable housing is built for low-income (poorer) households. The private sector has taken over public housing stocks and have added commercial values to affordable housings developments. It is becoming difficult to identify responsible authorities to administer affordable housing policy (Anderson and Turner, 2014). It is becoming difficult to identify responsible authorities to administer affordable housing policy (Anderson and Turner, 2014). Pakistan is a developing country and going through some major political and financial crises. It is struggling to cope with housing deficit due to a growing population and rapid urbanization. Mostly, people live below the poverty line whereas the housing market only caters for high-end homebuyers. Rural areas lack in basic facilities such as health, education facilities and job opportunities (Gerrity, 2016; Javaid, 2016; Shaikh, 2016; Sharafat and Sharafat, 2016; Shaikh, 2017) which contributes to rapid urbanization. It has added to the demand for affordable housing. It has been recognised that the National Housing Policy of Pakistan (NHP) (2001) is almost 18 years old and does not offer any definitive strategy to develop affordable housing for low-income households.

Hence, there is a need to establish an affordable housing framework, which could help the housing stakeholders to make a right decision to support housing developments for low-income households.

1.3   Research Questions

It has been established that in Pakistan average wage of a lay worker (working on a daily wage basis with no fixed income) is less than $50 (50 US dollar or less than Rs. 5000 Pakistani rupees) a month (Kakakhel, 2014; Siddiqui, 2014; Islamabad, 2018). Like other developing countries, in Pakistan 'income to expense ratio' (IER) is used as a tool to assess housing affordability (House Building Finance Company, 2019). International IER threshold is 30 percent or one week's pay for one month's income (Elkins, 2018; Elmabruk, 2018; Herbert, Hermann and McCue, 2018; Islamabad, 2018; Kasim, Alexander and Hudson, 2018; Meen, 2018; Melnikovas, 2018; Mitchell, 2018; Nikodem, 2018; Schwartz and Wilson, 2018; Anacker, 2019). IER is simple and easy housing affordability measurement to apply, but is not perfect (Herbert, Hermann and McCue, 2018). Based on the apparent research problem following research question was proposed:

- How the housing stakeholders including end-users in Pakistan perceive affordable housing?

Affordable housing concepts, strategies to provide affordable housing have been explored to answer this question. Global affordable housing best practices (Section: 2.6) were also investigated. In addition, by answering this question a comprehensive definition of affordable housing and housing affordability has been developed.

This research by answering the research question also determine whether IER can be used in Pakistan, and an income threshold has been developed (Section 2.13.4). Moreover, by answering this question this study brings in a new paradigm of thinking

by developing a framework for affordable housing for the low-income household in Pakistan. Most of the affordable housing developments in Pakistan lack in health & safety and basic facilities and are located at remote locations with higher crime rates, fewer schools and health facilities. This framework will bridge the gap between income, housing delivery process, the product (housing), and the socio-cultural aspects of the affordable housing in Pakistan. This framework can be used to review the National Housing Policy of Pakistan (2001) to bring in some financial reforms to provide better affordable housing developments for low-income households in Pakistan. This framework is sustainable and flexible and all the interested parties such as developers, housing finance organisations, bankers, and the government authorities can use this framework to assess the housing affordability of the low-income households.

Because of answering the research question, the developed concept and framework of affordable housing for the low-income households is the first one in Pakistan.

1.4 Research Aim and Objectives

The aim of this research is 'to develop an affordable housing framework for low-income households in Pakistan'.

In order to achieve the research aim following objectives have been identified:

Objective 1: To analyse the affordable housing concept and definition perceived by the housing stakeholders in Pakistan

Objective 2: To assess the prevailing strategies and policies regarding the affordable housing in Pakistan

Objective 3: To analyse any available mechanisms and frameworks, which could support an affordable housing development in Pakistan

Objective 4:	To assess available affordable housing developments (low-income projects) in Pakistan
Objective 5:	To assess the needs and interests of stakeholders including end-users for affordable housing development
Objective 6:	To develop an affordable housing framework to assess and influence the future low-cost housing developments for low-income households in Pakistan

This research is first of its kind to develop HAAC for the low-income households and to investigate the affordable housing situation in Pakistan. The proposed framework is a unique concept for the region and an original contribution to the knowledge within the context of Pakistan. Usually housing affordability is related to income to expense ratio (IER) but often ignores associated non-housing and social (related to facilities provided, schools, commuting, hospital etc.), environmental (such as durable design, sustainable and healthy environment, and green areas) criteria. This research considered that IER is not an appropriate housing affordability measure for the low-income households (earning $2-$5 a day) in Pakistan. Therefore, the aim of this research is to propose an affordable housing framework (AHF) for the low-income households in Pakistan. This framework has integrated theoretical concept of economic, social and environmental criteria to the data findings to offer a guide for future affordable housing developments in Pakistan.

This is an assessment framework, which will allow housing stakeholder to make better-informed decisions including usage of a new measure of 'area affordability' to assess the distribution and housing situation across different metropolitan jurisdictions of Pakistan. It is anticipated that the proposed framework can help the

stakeholders and the housing authorities to analyse the different dimensions to make affordable housing possible for households belonging to lower working class.

1.5 Rationale

Housing affordability is a relationship between housing and non-housing criteria, and IER is not an appropriate housing affordability measure for the low-income households in Pakistan. Mostly, selection of housing (to buy or rent a house) depends on household's income and housing expenses; mostly non–housing expenses are overlooked at assessment. Later, this may cause problem for the households. Some researchers (Stone, 2006; Tang, 2009; Hertz, 2015, Mulliner and Maliene, 2015; Prochorskaite et al., 2016) stress to select a house and to measure the housing affordability of a household, non-housing (Section 2.3.1) and residual income (leftover funds after dividing the housing expenses from the income: Section 2.3.2 sub-section Residual measures) should also be considered as part of the housing package. Harvard University's Joint Centre for Housing Studies reports that low-income households, who succeed to achieve 30% threshold of their housing expenses, in reality end up paying more on travelling and getting around (Sohail, Maunder and Cavill, 2006; Isalou, Litman and Shahmoradi, 2014; Hertz, 2015; Newman, 2015; Newman, Kosonen and Kenworthy, 2016). Transportation cost, for example, by far is the most important of any other housing costs. Housing near city centre is normally more expensive because of the available amenities and less travelling/driving time and cost. This research assumes that IER threshold (30%) do not articulate the quality of the housing and so-called low-cost (affordable) housing lack in basic and contemporary facilities, even without sanitation and heating

system; most of the affordable housing projects in Pakistan have the same issue. Affordable housing developments are in remote locations with higher crime rates, fewer schools, less options for household groceries and other quality of life problems. Generally, it is challenging for housing planners and policy makers to both define and measure affordability for different types of households. It is clear from the previous research (Mulliner and Maliene, 2012; Mulliner, Smallbone and Maliene, 2013; Mulliner, Malys and Maliene, 2016) that there are some circumstances where end users' choice of housing (location-wise) is more important than the financial cost of the house. End-users must pay a premium price for better environment and better neighbouring surroundings. The price of land, value of location and quality of neighbourhood, all impact on housing affordability of a low-income household. Old paradigms of IER criteria fail to consider all of the above, therefore, the Organisation for Economic Cooperation and Development (OECD) nations are progressively recognising the necessity for a wider and more incorporating understanding of housing affordability (Fisher *et al,* 2009; Gabriel *et al,* 2005, Mulliner, et al, 2016; Meen, 2018).

The IER method alone cannot investigate into different methods that influence users' choice of housing and social issues of wellbeing and community sustainability. IER cannot measure residual income (Stone, 2006; Hertz, 2015) therefore; it was needed to establish the housing affordability concept that can be accepted by all housing stakeholders in Pakistan.

In Pakistan, not very many attempts have been made to reduce affordable housing price for low-income households. There is a growing need for accessible (help to

buy) financial products for low-income households in Pakistan (Tariq, 2011; Tariq, 2012). It is understood that the provision of financial products cannot only be provided by the government efforts alone. Worldwide, several financial products have been introduced to facilitate the low-income household, this research have reviewed some of them and asked housing professionals to approve the best match for Pakistan.

Housing is a global issue, different approaches to fill the housing deficit gap have been tried and tested, some of them are likely to be provocative and involve more scrutiny than other state funded programmes. In a study to examine the housing policies of 17 developing countries, Hardy and Satterthwaite (1989) concluded that only two out of seventeen countries had a national housing policy for low-income households. In Pakistan, the National Housing Policy was announced in the year 2001, which has never been completely implemented due to political influences and bureaucratic red tapes.

Therefore, there was a need to find the answer for the research questions (Section 1.3), and by doing so this research managed to develop a framework, which can make decision making more informative for the housing stakeholders including the Government of Pakistan. This research may not be able to become a definitive guide due to the time, funding, limitation and scope; yet it anticipates being able to provide references to auxiliary and comprehensive reading and future research for the research community.

1.6   Original Contribution to Knowledge

This research regarding the affordable housing and housing affordability is the first of his kind in Pakistan. This the concept and framework of affordable housing for the low-income households in Pakistan was not developed until now. This research adds to knowledge by:

- **Developed concept of housing affordability for the region of Pakistan**

  This research goes beyond the typical notion of housing affordability to show some evidence of originality; usually housing affordability is defined and assessed in economic terms in Pakistan. The research developed housing affordability notion to reflect socio-economic well-being of the end-users including environmental attributes, this research makes a significant and original contribution to knowledge by using non-housing, social and environmental criteria to be used in defining the housing affordability concept for low-income households in Pakistan. Normally, non-housing, social and environmental concepts are disregarded to assess housing affordability for the low-income households in Pakistan. This thesis interprets and ascertain underlying theory and information leading to the diverse opinion regarding the concept of affordable housing prevailed in Pakistan. A comprehensive definition of housing affordability and a conclusive description of affordable housing has been developed. As part of the process, a set of housing affordability assessment criteria (HAAC) has been developed to inform the housing stakeholders regarding the assorted and consistent feature of the subject.

- **Developed Income threshold for low-income households (LIH) in Pakistan**

   It is quite subjective to set a standard or criterion to determine earnings cut-off value or income threshold due to size and composition of a household. Income threshold divides between unaffordable and affordable housing. Currently, in Pakistan, there is no standard income to expense ratio criteria to determine the housing affordability of a low-income household. This research developed an income to expense ratio criteria (Section 2.3.1, Table 2.1) and consider that a household spending more than 30% percent of their household income on housing should be considered in housing stress. Housing stakeholders in Pakistan can use this sustainable income to expense ratio to determine the housing affordability of a low-income household and for future affordable housing developments.

- **Developed a housing affordability framework for low-income households in Pakistan, which contains established set of criteria for housing affordability assessment to support stakeholders' decisions making**

   Most of the affordable housing developments are either are too expensive or are located at the periphery of the major cities and lack in basic amenities and facilities with higher crime rates in the area. This framework contains comprehensive HAAC to provide scrutiny and understanding that is more intricate of the broad range of criteria such as economic, social and environmental.

   This framework is sustainable and flexible; all the interested parties such as developers, housing finance organisations, bankers, and the government

authorities can use this framework to assess the housing affordability of the low-income households. Government of Pakistan can use this framework to review the National Housing Policy of Pakistan (2001) and to bring in some financial reforms to provide better affordable housing developments for low-income households in Pakistan.

The government of Pakistan needs attention, interventions and assistance from both housing stakeholders and the research community in order to improve housing deficit and encourage future affordable housing developments in Pakistan. This research study can be used a preliminary guide about affordable housing situation and housing affordability issues in Pakistan.

1.7   Overview of chapters

The structure of the thesis (Figure 1.1) has been explained in the following lines:

Chapter 1:   serves as an introduction and an overview of the research topic. It introduces the research problem, research questions, the aim and objectives of this research and concludes with an original contribution to knowledge.

Chapters 2:   contains background knowledge of the subject area including a literature review of the previous research on the topic. Initially, the concept of housing and housing affordability has been discussed broadly, and later in the context of Pakistan. Housing affordability assessment criteria has been developed and scrutinised. Traditional and modern housing affordability approaches have been reviewed, highlighting their weaknesses and strengths. A brief introduction of the sample locations (in Pakistan) has been presented, highlighting the challenges and housing situation of the country. Scrutiny of affordable housing best practices can help to find an appropriate approach to develop more affordable housing developments in Pakistan that are better aligned with low-income ($2-5 a day) households, considering social, environmental and economic criteria.

Chapter 3:   contains the details of the key research methodology and tools used during this empirical research. Both quantitative and qualitative research methods have been used sequentially, by adopting the mixed

methods approach. At the outset, it discusses the research paradigms, design and approaches. In the next section, survey developments have been explained, introducing the research tools such as Delphi Techniques. Delphi Rounds fall into the qualitative methodology due to their hybrid nature. Then end users' questionnaire survey as the quantitative methodology are explained. Finally, it clarifies the details of the data collection and the analysis process using several analytical methods.

Chapter 4: this chapter presents the data results of the Delphi techniques with housing professionals in Pakistan. The Delphi techniques were conducted to validate the housing affordability assessment criteria identified. The data results are analysed using the 'Statistical Package for the Social Sciences' (SPSS) and Excel computer programmes. The data results have been presented in this chapter using mathematical tables and figures along with their illustration.

Chapter 5: housing affordability assessment criteria was validated by the end-users of affordable housing in Pakistan. In this chapter, data results have been presented with analytical figures and tables.

Chapter 6: in order to find the differences of opinions between housing professionals and end user's surveys responses, a comparison of results have been presented in this chapter. Figures and tables have been shown to highlight the differences of opinion between two groups.

Chapter 7: this research aimed to develop an affordable housing framework for the low-income households. In this chapter, a framework has been offered to the housing stakeholders of Pakistan.

Chapter 8: this chapter concludes the thesis with research findings and conclusions. Later it expresses research limitations, highlighting the major contribution to knowledge and research beneficiaries.
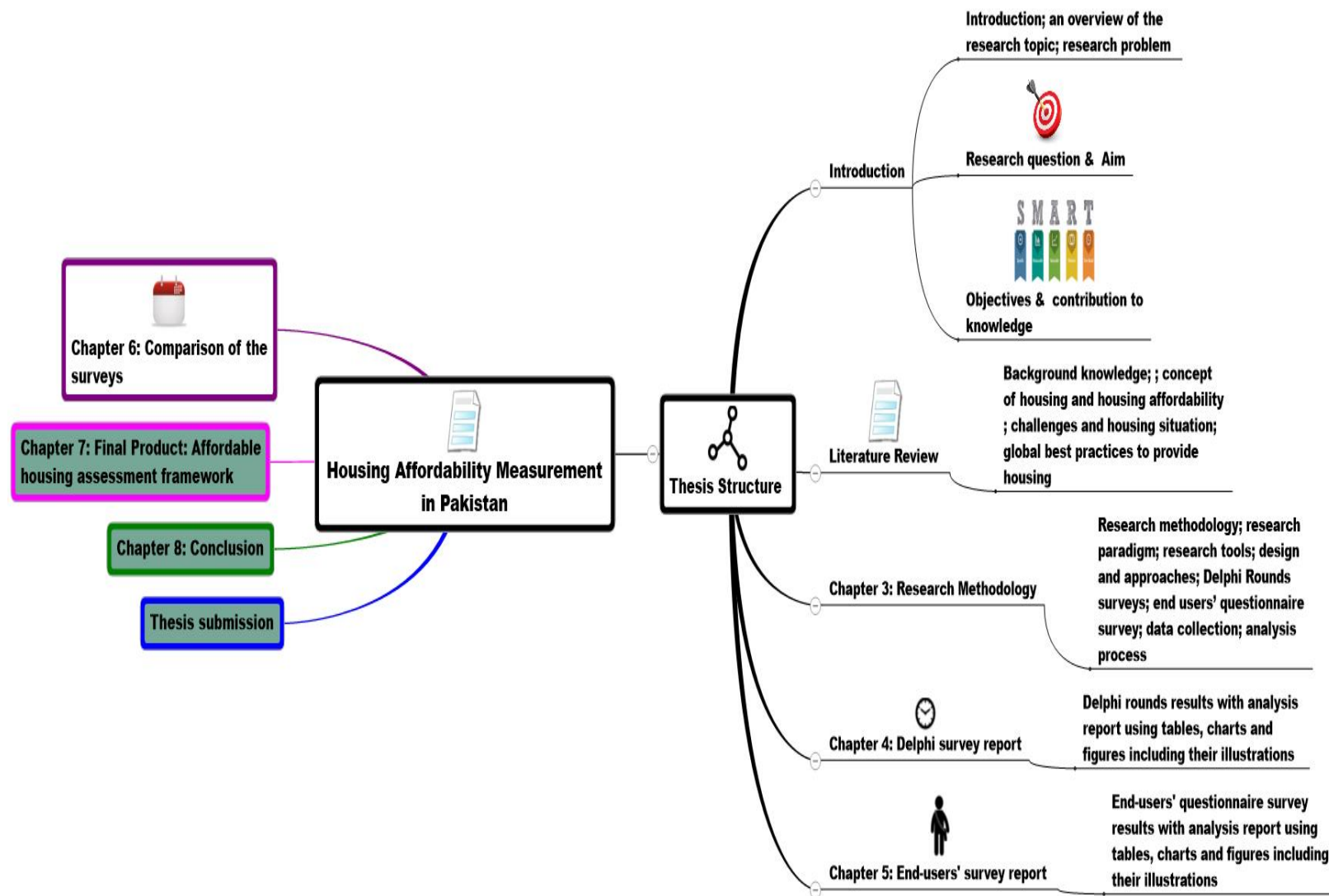
Figure 1.1: Thesis structure

2 CHAPTER TWO: AFFORDABLE HOUSING AND HOUSING AFFORDABILITY THEORIES, CONCEPTS AND GLOBAL BEST PRACTICES

2.1 Introduction

This chapter primarily discusses the contested nature of the theories and the concepts of affordable housing and its housing affordability assessment criteria. The principal aim of this chapter is to review available literature regarding affordable housing, exploring existing theories used by both housing professionals and academics. Subsequently, the aim shifts to analyse the key techniques and criteria used to assess housing affordability. Later it discusses and examines the conventional and alternative techniques of measuring housing affordability, defining the weaknesses and strengths of the methods and detecting gaps within the literature.

2.2 Housing (a basic need approach)

In the year 1976 the International Labour Organisation (ILO) introduced the 'basic needs' approach, this initiative included shelter along with clothing and food as a basic need. However, it is not just a basic human need, but also indicates the living standard of its end-users (Henilane, 2016) 'Housing is a major place-based infrastructure and an essential part of the community fabric' (Tariq, 2014). Globally, the affordable housing issue is taking the centre stage, housing being recognized as a basic need; government departments in both developing and developed countries are working to solve this problem. Economic success and national competitiveness are dependent on the relative competence of cities. The most useful and successful

housing developments are near the city centres where end-users can easily commute to work. During the fieldwork survey, it was observed that end-users in Pakistan spend more money on their commuting costs than their housing expenses. Some people preferred to pay premier prices to buy or rent closer to their workplace.

It is an important place for people to perform their daily life activities, and is an important unit of the environment, which has an extreme and profound impact on the socio-economic fabric of the society. It profoundly influences the well-being, welfare, efficiency, satisfaction and social-behaviour of the community [(Onibokun, 1998 quoted by Adegbehingbe, 2011); (Kwofie, Adinyira and Botchway, 2011; Labin, Che-Ani and Kamaruzzaman, 2014)]. The function and role of housing is a complex phenomenon, according to Gopalan and Venkataraman (2015), end users' housing choices influence their access to employment, household income, infrastructure, and education. Housing choice also, overwhelmingly influence women's contribution to the labour force, health including maternal and child mortality, and many other environmental and wellbeing criteria.

Easily available low-cost housing (affordable housing as known in Pakistan) quality and quantity plays a vital role in national fiscal effectiveness. Krieger and Higgins (2002) argue that it is difficult to find economical and properly effective incentives that can lead towards the next phase of development and to improve quality of housing and its affordability. Nevertheless, policy makers are inclined towards finding ways through which housing can be made more effective and end users can be provided with low cost housing.

2.3   Affordable Housing

The housing costs can lead to arrears, debts, financial difficulties and consequent personal problems when purchase or rents costs go above a third of a household income, for those in work, and this situation gets worse if that percentage of income is higher than 30% of income, this value signals a very serious affordability issue (Affordable Housing Commission UK, 2019). Housing professionals use this term to refer to a variety of housing contracts provided to middle or low-income households at a lower market price or rent. The term 'affordable' can be defined, as one being able to pay without facing financial difficulty; 'But how does one decide exactly when they are in financial difficulty' (Robinson *et al,* 2006). Affordable housing in old paradigms is a value of housing related to its attributed costs (Dülgeroğlu-Yüksel, 2010), in simplest terms this equation (Mumtaz, 1995) can be expressed as follows:

Available funds = price of housing

Explanation: available funds are equal to price of housing.

An affordable house is more than financial costs involved and should cater for larger issues of social wellbeing and sustainability for the community and the end-users. Figure 2.1 has been derived from the literature to shows an ideal affordable house for the low-income households in Pakistan. Figure 2.1 gives a visual info of WILT standard affordable house, which is suitable for low-income households in Pakistan. This house meets 'Will I Live There' (WILT) standard (Mayday 2016), which means all properties must meet health & safety and fitness standard and has adequate conditions for humans to live in (Ni Direct, 2019). Figure 2.1 house is decent in quality within a sustainable community, has an accessible and more affordable

ownership. Housing affordability threshold is 30% of monthly household income where a household is left with 70% of residual income to meet non-housing expense. This idealistic WILT standard house has a enough floor space to facilitate an average size family, is equipped with basic needs, has nearby local amenities, and cleaner neighbourhood.

An ideal WILT standard affordable derived from the literature for the low-income household in Pakistan

Affordability threshold	

Affordablity threshold 30% of monthly household income

30%

70%

☐ Housing Expense ☐ Non-housing expense

Floor space

Health & safety Neighbourhood, local amenities and basic needs

✈✈✈ Commute time < 1
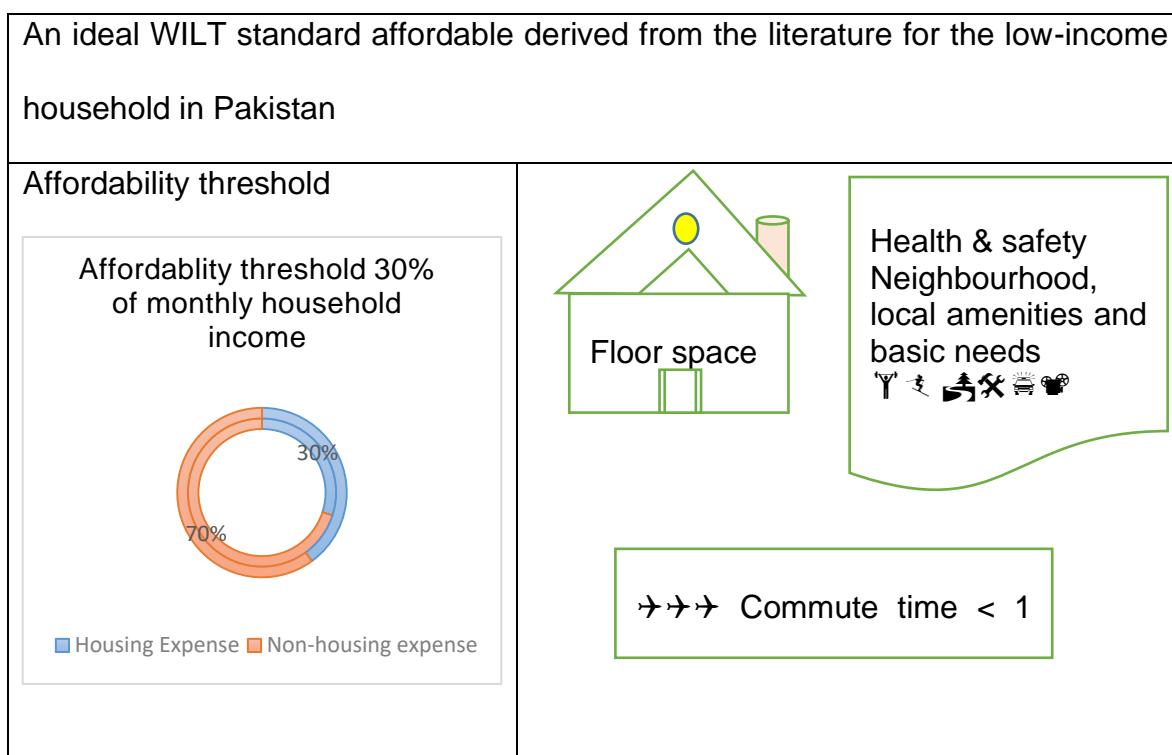
Figure 2.1: Info-graph of a WILT[2] standard affordable house, suitable for low-income households in Pakistan

'Affordable housing' as a term indicates the housing that supports lower earning households for an appropriate shelter without facing undue financial adversity (Milligan *et al.* 2004 quoted by Labin et al. 2014; Meen, 2019). As shown in the

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[2] WILT: Will I Live There standard (Mayday 2016). WILT: all rented properties must meet the health & safety and fitness standard and has adequate conditions for people to live in (Ni Direct, 2019)

Figure 2.1 affordable housing should be built in a sustainable community with accessible amenities and with an ownership tenure. The affordable housing developments should have employment opportunities for the community and the price should not be more unaffordable for low-income households (Fisher, Pollakowski and Zabel, 2009; Boulkedid et al., 2011; Baranoff, 2016).

'Affordability' is mostly articulated in terms of affordable housing (Stone, 2006), sometimes it is also used interchangeably with housing affordability (Mulliner and Maliene, 2012). UN-HABITAT (1974) declared 'Shelter for everyone' and it has been embedded in the UK's and Pakistan's National Housing Policy housing policy. According to the UK's housing policy, 'everyone should have the chance to afford a decent home, in a community of their own choice' [CLG, 2011a, mentioned by (Mulliner, Smallbone and Maliene, 2013)]. The main objective of the UK's affordable housing policy is to provide affordable housing for those who cannot afford to pay market price.

The phrases demand, need and supply refer to both quality and quantity of the available accommodation that falls short of what is vital to provide each person or household/family, regardless of ability to pay, with lodging of a specified basic standard and above (Al Shareem et al., 2014). Demand in financial terms refers to the active demand for housing; and is related to the accommodation or house for which the buyer (end-user) is able and willing to pay. Therefore, the dissimilarity between 'need' and 'demand' are that the first term is used to symbolize the shortage of existing housing as compared to socially anticipated norm, and the remedy is that the housing provision should be improved to attain that norm. 'Demand' for

economists on the other hand, is used as a descriptive term to represent the association between the quality of housing, quantity, and price of housing which end-users are able and willing to pay (Al Shareem et al., 2014).

The growing demand for housing around the world is due to rapidly growing population. Affordable housing provision for low-income is a global phenomenon, unfortunately, until today it remains a critical challenge for most countries. Essentially, the role of any government is to provide subsidised land, funding/finance or buildings along with removing market imperfections and to ensure a smooth operation of the housing market. Public authorities' intervention is a vital part to ensure the market can effectively encounter housing requirements, especially for less privileged and low-income households.

2.4 Theory of Housing Affordability

This section explains the theory and the concept of housing affordability integrating economic, social and environmental housing affordability assessment criteria.

2.4.1 Economic criteria of affordable housing

'Housing', on a national scale plays a vital role in the economic development of a country and comprise 10 to 20 percent of total economic activities; on an individual level it is a biggest fixed asset of a household (Henilane, 2016). The housing affordability measure is to ensure that provided housing is affordable to every income group whether high, middle or low-income (Suhaida et al., 2011). In its most comprehensive understanding, the term affordability can be assessed as IER at a given time (Davidson, 2016) it is a very basic criteria yet quite primitive. It has been

commonly used for assessing housing affordability and is widely used and accepted by the stakeholders. Baker, Mason and Bentley (2015) stated that for many households, housing expense is their main outgoing and on-going expense. Building and or acquiring a house for an end user can be an individual's self-help intervention, community-based effort or corporate support to acquire it, an NGO or a government's effort to provide a shelter. Generally, these attempts are influenced by terrestrial location, nature of demand and need, culture, religion and government policies. Over the span of several centuries the forms and shapes of houses have changed, ranging from caves, tents, igloos, mud and clay houses, straw and wooden houses, nomadic artefacts, multi-storeys to skyscrapers.

2.4.1.1 The expenditure approaches

The use of the term 'housing affordability' is not new, from the year 1980 it was used to discuss the conventional housing issues for example supply, quality, and inadequate housing (Linneman and Megbolugbe, 1992). Housing affordability reflects whether a household can afford a house (to buy or rent) based on their household income. Housing affordability is normally measured on economic criteria; however, affordability is not simply a matter of housing costs and income levels; it is about people's ability to obtain housing and to stay in it (Housing New Zealand Corporation 2005). The expenditure approach of housing affordability is to recognize the needs of those households who cannot access housing market without assistance. This approach is earnings relative (Madawaki, 2011) and is based on the premise of providing a decent home for every household at a price within their means (Dülgeroğlu-Yüksel 2010).

As stated earlier the housing affordability is commonly equated on the IER criteria, however, it varies case-to-case basis and should not only be assessed on this ratio (Calnan, 2015; Mulliner, Malys and Maliene, 2016; Herbert, Hermann and McCue, 2018; Meen, 2018; Nikodem, 2018; Anacker, 2019; Commission, 2019). The notion of reasonable housing costs in relation to income is that housing costs should leave households with enough income to meet other basic needs such as food, clothing, transport, medical care and education (Calnan, 2015; Baranoff, 2016; Javaid, 2016; Napoli, Trovato and Giuffrida, 2016; Sharafat and Sharafat, 2016; Yap, 2016; Elkins, 2018; Herbert, Hermann and McCue, 2018; Islamabad, 2018; Anacker, 2019; Matt and Marshall, 2019) (Matt and Marshall, 2019) Australia National). 'Yet it is not easy to decide exactly when someone is in financial difficulty' (Robinson et al, 2006). Affordability is concerned with securing some given standard of housing at a price or rent which does not impose, in the eye of some third party (usually government) an unreasonable burden on household income (MacLennan and Williams, 1990). There is no definitive way to define what housing affordability means, 'after all, how can we talk about solving a problem if we do not have a reliable way of determining who is suffering, and where, and why?' (Hertz, 2015). Let us suppose a member of the household works in a local shop or supermarket and earns around $1,500 a month. They share the house with their family of four in a remote neighbourhood, pay $400 as rent, and in addition pay $300 a month for car insurance and other fuel/maintenance expenses; they are left with $800 a month. Leftover money goes quickly on purchases such as groceries, childcare, and health prescriptions. At a

time of sickness of a family member or any maintenance costs, the household cannot escape from racking up some borrowing or credit card debts.

On the other hand, a person who works as a bank manager and earns around $8,000 per month, pays rent for a brand-new apartment near the city centre of $3,000 a month. They can easily walk to their workplace and pay only $100 to commute to other places. They are left with $4,900 of savings every month to spend on their non-housing expenditures such as days out, meals and foreign holidays and still able to save some money for their retirement.

In these scenarios, the person in the first example has problems making rent payments, while the bank manager can easily make their payments. Nevertheless, as per most common criterion of housing affordability, the bank manager's rent is burdened, whereas the first one is doing fine. That is due to the housing affordability measuring criterion, which relies on a simple ratio: if someone pays more than 30% of their household income in rent or other housing costs, their housing is unaffordable. If you do not pay more than 30% then it is affordable.

These scenarios the shop worker pays only $400 of $1,500 (27%), while the bank manager pays $3,000 of $8,000 (38%). If they do not pay more than 30% of their household income then it is falls into affordable range. These illustrations of a shop worker and the bank manager are extreme examples, but they show several fundamental flaws with the 30% measuring threshold of housing affordability. It can be deceiving in evaluating the liability of housing costs on households with similar earnings. As stated earlier, housing affordability varies case to case and not everyone bears the same non-housing commitments for example, a single,

childless, healthy person with a salary of $8,000 a month might cover housing cost, foodstuff, home insurance, and other requirements. Nevertheless, someone on the same income band might struggle due to much higher non-housing expenses because of their school going children, a chronic medical condition in the family, elderly parents or kids with special needs.

Housing affordability is a term, which is defined, as one being capable of paying rent without experiencing financial problems (Robinson et al, 2006). Affordability indicates the value of affordable housing in the measurable (quantifiable) attributes of dwellings and their related costs (Dülgeroğlu-Yüksel, 2010).

2.4.1.2 Housing Expenses (or household expenditures)

Household expenditures can be divided into three groups Cohen (2017); (Anacker, 2019): somewhat fixed, less flexible, and more flexible.

Somewhat fixed – these fixed expenses have very limited room to reduce for example, taxes (housing, income) and they are typically due on a set date. Taxpayers, however, have some liberty to negotiate filling date and monthly instalments, or a temporarily deferred collection, yet taxes are eventually due on certain date.

Less flexible – cost of education and health care, these premiums are typically not negotiable, yet, premium can be reduced by changing the health and educational services provider, changing location of dwelling, changing habits, taking spouses and dependents off from their insurance policies, moving to a cheaper plan.

More flexible – typically rent payments are due on the first day of every month and may have a grace period of three to five days during which most property owners

will not charge penalties or start an eviction (Desmond, 2016). Renters may have opportunity to negotiate reduced rent or instalments with their property owners, find a house with lower rent, (Desmond, 2016). Mortgage repayments are also fixed expenditures (Cohen, 2017).

Households have a very little room to above-mentioned fixed expenses; low-income households (renters) have less room to manoeuvre than borrowers. Rent payments mostly have 3 – 5 days grace period for rent payments while grace period for mortgage repayments are 90 days (Desmond, 2016). An increase in these expenses has been witnessed over the past few years, such as health care premiums and rent payments, transportation to work, health care, childcare, and utility expenses. In contrast, there has been a decrease in more flexible expenditures, such as food and clothing. Certainly, somewhat fixed expenses are hard to cut down than the less flexible expenses (Cohen, 2017; Murdoch & Schneider, 2017; Warren & Tyagi, 2003).

2.4.1.3 Non-housing expenses (life's other necessities)

Non-housing expenses such as cost of commuting and transportation, expenses to use health and education facilities are ignored to assess housing affordability, (Mulliner et. al, 2014; Meen, 2018). The challenge to keep up with housing affordability may affect a households' monthly budget, leaving fewer funds to meet the cost of clothing, utilities, transportation to work, child and health care (Sohail, Maunder and Cavill, 2006; Pakistan and America, 2008; Prochorskaite et al., 2016). It also effects and reduces savings for retirement, emergencies, and other opportunities, such as starting up a small business and pursing higher education

(Anacker, 2019). Non-housing expenses challenges leaves a housing with fewer opportunities and sub-standard quality of life (Drew, 2018; Sawhill, 2018).

According to AHURI (2019), non-housing costs can also be called 'life's other necessities' (such as food, health care, education etc.). Some income band might struggle due to much higher non-housing expenses (30:40 housing affordability indicator as stated in section 1.2 above) because of their school going children, a chronic medical condition in the family, elderly parents or kids with special needs (Cohen, 2017), it also includes days out, meals and foreign holidays, etc., (Hertz, 2015).

2.4.1.4 Residual measure

The residual income approach focuses on the variance between housing costs and incomes rather than the income to expense ratio. One of the disadvantages of the ratio-based measurements are that they believe that the calculated unaffordability is independent of the level of income (Meen, 2018). In simple words, a pre-defined standard of non-housing needs is subtracted from the disposable income (monetary value) and the left-over money determines how much is left to spend on housing. The IER method alone cannot investigate into different methods that influence users' choice of housing and social issues of wellbeing and community sustainability (Stone, 2006; Tang, 2009; Hertz, 2015). Residual income (Mulliner and Maliene 2015) influence users' choice to buy or rent a house. The residual costs faced by households due to the geographical location; accessibility to the amenities; jobs; schools; security; safety and terrorist threats are important criteria of housing quality that can affect housing affordability and have an impact on the wellbeing of the end-

user (Sohail, Maunder and Cavill, 2006; Maliene and Malys, 2009; Podvezko, 2011; Rafi, Wasiuddin and Siddiqui, 2012; Kalia, 2013; Mulliner, Smallbone and Maliene, 2013; Mouzughi, Bryde and Al-Shaer, 2014; Rossi and Civitillo, 2014; Worldometers - Elaboration of data by United Nations, 2015; Mulliner, Malys and Maliene, 2016) (Dülgeroğlu-Yüksel, 2010).

These residual measures of housing are mostly overlooked to assess housing affordability. Since housing typically has a first claim on income, if the amount actually paid exceeds affordable housing costs, then the residual income left over for non-housing consumption will be inadequate. However, there are some hitches using the method, particularly in the explanation and setting up standard of an appropriate non-housing budget which might, for instance, be established on a poverty indicator and, hypothetically, the measure has rarely been created on a regular basis to enable comparisons over time and across countries (Stone, 2006; Tang, 2009; Hertz, 2015).

2.4.1.5 Income to expense ratio threshold (30% of IER)

Stone (2006) and Anacker (2018) provide a historical background of the 30 percent of income to expense ratio: 'the 30 percent of household income have evolved from the United States National Housing Act of 1937. In the United States until the early 1980s, the 25 percent of income was used as ratio standard, or as an appropriate indicator of affordability. The National Housing Act (NHA) of 1937 limits the maximum rents for family eligibility to live in a public housing. According to the NHA (1937); that is, a tenant's income could not exceed five to six times the rent. By 1940, income limits gave way to the maximum rent standard in which rent could not exceed

20 percent of income. The Housing Act of 1959 maintained maximum rents. The Brooke Amendment (1969) to the 1968 Housing and Urban Development Act established the rent threshold of 25 percent of family income (Anacker, 2019)'. By 1981, this threshold had been raised to 30 percent, which today remains the rent standard for most rental housing programs (Herbert, C., Hermann, A. and McCue, D. 2018; Meen, 2018; Nikodem, 2018; Anacker, 2019; Commission, 2019).

Households in the bottom income quintile and spending more than 25 percent of their incomes on housing costs are twice as likely to face stress compare to those in the top quintile (Meen, 2018). Affordable Housing Commission UK (2019) report state that when purchase or rents costs go above a third of the household income for a normal working class household, the housing expenses can lead to arrears, debts and financial difficulties, and may result in personal problems. The position gets much worse when the percentage of income is higher. Moreover, when this income amount gets to the 40%, it alarms for a very serious affordability issue (Commission, 2019; (AHCUK, 2019). The 30:40 housing affordability indicator refers to housing affordability stress, when an Australian household has an income level in the bottom 40 percent of national income distribution and is spending more than 30 percent of its household income in housing expenses (Statistics, 2005-6)(Statistics, 2005-6). Households spending more than 30 percent of their income on housing have traditionally been said to be 'cost burdened' and those who spend 50 percent or more are considered to be 'severely cost burdened' (Elkins, 2018; Schawrtz and Wilson, 2018; Meen, 2018). As a general rule of thumb, no more than 30 percent of the monthly gross household income should be spend on housing, for renters, that

30 percent includes utilities, for an owner, it includes home-ownership costs such as mortgage instalments and interest, property taxes and maintenance costs (Elkins, 2018).

2.4.1.6 Brook amendments

Brook amendments, also known as rental or buying affordability, which assume that housing and non-housing expenses are unavoidable costs for a household (Schwartz and Wilson, 2018), and this expense should be at minimum (Stone, 2006). Housing affordability is based on the term, that income above a certain level is regarded as 'unaffordable' [(Freeman, Chaplin and Whitehead 1997); (Mulliner and Maliene, 2011; Mulliner and Maliene, 2014; Baker, Mason and Bentley, 2015; Calnan, 2015; Baranoff, 2016; Anacker, 2019; Commission, 2019)], it is a capacity of a household to meet housing costs while being able to meet other basic costs of living (Burke 2004). Affordability is not simply a matter of housing costs and income levels; it is about people's ability to obtain housing and to stay in it (Housing New Zealand Corporation 2005). The United States National Housing Act (USNHA) 1937 introduced rental affordability measurement based on 'housing consumption' and used housing rents to income ratio. The Act was revised in 1968 known as the 'Brook Amendments' and was further revised in 1981; according to the Brook Amendments, a maximum of 30% of household income should be used towards rent (Schwartz and Wilson, 2018).

Housing affordability varies according to the geographic location and as per individual needs. It is difficult to describe and there is no specific definition exists. As explained in the Section 2.3, generally, a house is regarded 'affordable' if the

monthly rent does not cost more than 30% of monthly household income or up to 3.5 times the gross annual household income to buy, or for a single earner 2.9 times the gross annual income. Furthermore, the rent payable for affordable housing should not be more than one week's pay or 25% of gross monthly income (Meen, 2018). However, this ratio does not take any other circumstances into account, which may affect the monthly rent (Schwartz and Wilson, 2018).

The Brook amendments suggests that housing affordability has become a normative problem and affects both middle and low-income households. It equally affects city and urban residents and new migrants alike.

2.4.1.7 Rent control law

In the year 2013, the Federal Government of Germany passed a rent control law. Municipalities that have experience rent increases started implementing these laws in June 2015 (Anacker, 2019). However, their impact has been mixed so far (Deschermeier, Haas, Hude, & Voigtlander, 2016; Kholodilin et al., 2016).

2.4.1.8 Availability of financial products

Housing represents the main, in some cases the only wealth or asset of the poor and plays a crucial socio-economic part in most developing countries (The World Bank, 2018). Suitable financial products can make housing purchase more accessible and affordable; provision of readily available and accessible financial products is another related housing affordability issue (Rizvi, 2015). Most of the time a potential homebuyer fails to benefit from such home financing products due to lack of information (Lin, Chang and Chen, 2014).

In Pakistan, low-income households mostly get cash in hand for their work and do not keep any records of their earnings and spending, and therefore, to purchase or to apply for a financial product, they cannot provide enough evidence for their earnings (Gerrity, 2016; Shaikh, 2016; Sharafat and Sharafat, 2016; Shaikh, 2017).

2.4.1.9 Affordability to repayment

Purchasing or buying affordability measure, determines a household's income to their buying capacity (Yap, 2016; Elkins, 2018; Herbert, Hermann and McCue, 2018; Anacker, 2019). It measures housing cost or scheduled mortgage costs against monthly income of a household (Meen, 2018). Buying affordability is purely dependent on the availability of home financing or mortgage products (Sharafat and Sharafat, 2016; Islamabad, 2018). Buying affordability further depends on the mortgage tenure and cost of housing structure.

Repayment affordability suggests that housing may be affordable at that point of time to purchase or rent. However, the payment can become unaffordable due to the movement in the housing market, inflation and interest rates increase (Gopalan and Venkataraman, 2015). Housing can also become unaffordable due to changes in personal circumstances such as redundancy, illness or death (Anacker, 2019). Typically, housing affordability is associated with low-income households, but it no longer stereotypically covers low-income households alone (Elkins, 2018; Herbert, Hermann and McCue, 2018).

2.4.1.10   Consumption expenditure

Household expenditure: household consumption expenditure refers to all money expenditure by the household and individual members on goods intended for consumption and expenses on services (Hulchanski, 1995; Mattingly and Morrissey, 2014; Horsfield, 2015). Also included is the value of goods and services received 'in kind' or 'own produced', which are consumed by the household.

Paid for and unpaid for: For household income and expenditure purposes, household consumption expenditure is classified into two main categories: 'paid' and 'unpaid' expenditure. The expenditure on consumption items is reported under columns, 'paid and consumed' and 'unpaid and consumed'.

Paid and consumed: For household income and expenditure, the category of 'paid and consumed' refers to (i) all cash payments or (ii) purchases on credit or (iii) under barter (exchange) arrangements with other goods and services by the household to obtain goods and services, which were consumed during the reference period.

Unpaid and Consumed: Unpaid and consumed expenditure refers to the imputed market value of goods and services consumed by the household or individual members which were received as 'income in kind' by the household or individual members. The unpaid and consumed expenditure is classified into three sub-categories:

- wages and salaries in kind consumed

- own produced and consumed

- receipts from assistance, gifts, dowry, inheritances and other sources

Wages and salaries in kind consumed: category includes wages and salaries paid 'in kind' as food, clothing and housing provided free of charge by the employer, either at the workplace or consumption out of the workplace. In addition to the income 'in kind' received by the employees, this category includes similar other facilities. Therefore, other consumption items like free telephone, car and domestic servants are to be included if applicable. The valuation of these consumed items should be based on current local market value.

Own produced and consumed: this category refers to the items and value of items produced for commercial or non-commercial purposes by the household. Such as food grains produced and used by farm households, shoes made and used by shoemakers, net rental value of owner-occupied housing, small amounts of vegetables produced, knitting wearing apparel, etc. during the reference period. The commodities consumed do not necessarily have to be produced during the reference period.

Receipts from assistance, gifts, dowry, inheritances and other sources: category relates to commodities consumed during the reference period obtained by means of assistance, gifts, nazrana (charity) and other sources like remittances in kind from relatives, dowry in kind, presents from relatives. Again, they should be valued at current local market prices.

Indirect taxes are included in household consumption expenditures, such as sales taxes and payments made for (consumption) of goods and services. Payments made for commercial expenditures are excluded e.g., expenditure on diesel to operate vans for commercial purposes is not included.

Durable goods: Durable goods include those items with a life expectancy of one year or more such as furniture, fixtures, clocks, wristwatches, television, radio, cutlery, kitchen utensils.

Non-durable goods: Non-durable goods include those items with a life expectancy of less than one year such as food, clothing, fuel and lighting, footwear, medicines.

Accommodation expenses: include the amount paid for renting accommodation, the rental value of rent-free accommodation and the estimated rent of owner-occupied dwellings at current market prices. Housing expenditures also includes expenses incurred on repairs, re-decoration and minor improvements of the dwellings, insurance, water and conservancy charges and other housing expenses.

Per capita consumption: is calculated by dividing the total consumption of the households by the number of household members.

Taxes: are not classified as household consumption, but in a separate expenditure category. Taxes, fines and fees included within the expenditure categories of the household are: house and property tax; licence fees for TV/VCR, firearms and driving licences; registration and renewal fees for car, motorcycle and scooter; fines, choolah (cooking hub) tax, birth and marriage taxes, pet keeping taxes, etc.

The structure and income stream of the household is explained in the following section; the idea has been borrowed from (Islamabad, 2015):

Household – a household may be either a single person household or a multi-person household. A single person household is one where the individual makes provision for his/her own food and other essentials of living, without combining it with any other person and without any usual place of residence elsewhere.

A multi-person household is a group of two or more persons who make some common provision for food or other essentials of living and who are without usual place of residence elsewhere. The persons constituting the group may pool their incomes and have a common budget to a greater or lesser extent; they may be related or unrelated or a combination of both. The general criterion to be used in identifying the members of a multi-person household relates to whether they live and eat together and have no usual place of residence elsewhere.

A household in this research is an individual or a family in possession or with an intention to occupy the space to abide, live and perform the day-to-day activities in an affordable house. Yates and Gabriel (2006) defined lower-income households with a disposable income of less than $367 a week, whereas, the household income in the context of this research project is between $50-$100 a month.

Household members: Household members are all such persons or group of persons in a household who normally live and eat together and consider the living quarters/space occupied by them as their usual place of residence. Such persons may be related or unrelated to each other. All such persons who normally live and eat in the household and are present and those who are temporarily absent for reasons such as, visiting, travelling in connection with business, attending schools/ colleges/universities/ polytechnics/ other educational institutions, admitted to hospital, outside tours etc., are treated as household members. Visitors, purely temporary boarders and lodgers, transients, servants and guests, etc. who consider their usual place of residence to be elsewhere but are found staying with the household included in the sample are not household members.

Absent household members such as migrant workers in the Middle East, are not considered part of the household and their income (as far as made available to the household) is included as remittances received. As these persons are not present, consumption expenditures also do not include expenses on their account. Family members include husband, wife/wives, unmarried sons and daughters and other direct dependents such as parents, unmarried sisters, brothers, separated/divorced sisters and daughters. Other related persons, servants, boarders and lodgers who have no other place of residence elsewhere and who live and eat within the household with or without payment are considered members of the household, but not members of the family.

Employed persons: A person is considered employed if he/she worked for at least one hour during the month preceding the interview or, even if the person did not work in the last month, he/she had a job or ran an enterprise such as shop, business, and farm or service establishment during the last year.

Employment status: Employed persons are divided in the following categories: employer, paid employee, self-employed and own account worker, unpaid family helper, and agricultural labourers (owner cultivator, sharecropper, and contract cultivator). An employer is a person who owns an enterprise and works himself as well as employs individuals for pay to help him/ her in his/her enterprise but may have others working for him/ her without pay. An employee is a person who works for others in exchange for wages and a salary that is paid in cash or in kind. A self-employed or own account worker is a person who, though owning an enterprise, does not employ any person for pay, to help him/ her in his/ her enterprise but may

have others working for him/her without pay, such as family helpers. The self-employed are divided into two categories:

- Those who run their own business or enterprise themselves without the help of any other person.

- Those own account workers who run their own business or enterprise with the help of unpaid family helpers only.

Unpaid family helper is a member of the family who works for the family enterprise without being paid. Although they are not paid, their efforts result in an increase in the household income; therefore, they are considered employed persons.

Earners: are all those persons aged 10 years and above who provide the household with material return, in cash or in kind. Earners are divided into two categories, economically active and not economically active. All employed persons are included amongst the economically active. Pensioners and those who receive incomes from renting buildings and land (i.e. property owners) are classed as not economically active.

Industry divisions: They are divided into agriculture/fishing; mining and quarrying; manufacturing; electricity/gas and water; construction; trade/hotels and restaurants; transport and storage; finance and real estate; community services; and other activities not defined.

Major occupation groups: describe the nature of work usually undertaken by an individual. Where a person performs more than one occupation during the year the main occupation is recorded. Pakistan Standard Classification of Occupations 1994 is currently used to define Occupational groups. Main occupational groups are

legislators/senior officials and managers; professionals; technicians and associate professionals; clerks; service workers/shop and market sales workers; skilled agriculture and fishery workers; craft and related trade workers; plant and machine operators and assemblers; elementary occupations; and armed forces.

Household income is the sum of monetary income and income "in kind". Household income consists of receipts, which, as a rule, are of a recurring nature and are received regularly by the household or by individual household members usually at annual or more frequent intervals. Household income is derived from the following main sources: employees' salaries, wages and other related receipts from employers; operating surplus from non-agricultural and non-financial sector enterprises employing less than 10 persons; operating surplus from agriculture; withdrawal of entrepreneurial income for proprietors engaging ten or more persons in the industry divisions mentioned above; and income from personal investment (rent, interest and dividends) and royalties. For the purposes of household surveys, it is convenient to include as income, bonuses and gratuities, pensions, social security benefits, tuition fees, other subsidiary sources, receipts from Zakat, usher, scholarships, and other periodical receipts like domestic and foreign remittances, alimony, inheritance or trust funds.

Household income in cash includes all money receipts such as wages, salaries, rent from land and property, income from self-employment, gifts, and assistance. Household income "in kind" includes wage payments in kind through goods and services transferred free of charge by an enterprise (including farm products) to an employee and to the household of the owner or part owner of the enterprise; it also

includes the value of home production that is consumed within the household (e.g. agricultural products, livestock products etc.). Where an employee buys from his employer, for his household consumption, goods and services at concessionary/subsidised prices and thus obtains a significant advantage, the value of these concessions/subsidies is also considered as income "in kind". Remittances in kind, gifts and assistance, zakat and other transfers in kind are considered income "in kind". The estimated net rental value of owner-occupied housing is in principle also treated as income "in kind" and, as is the estimated gross rental value to the occupier of rent-free housing, whether obtained as wages "in kind" or otherwise.

Imputed income: is the estimated value at current market prices of the goods and services received by the household for which no cash payment is made. Imputed income includes the estimated value of home-produced goods consumed by the household, rent from owner occupied and rent-free dwellings, gifts and assistance received in kind and wages and salaries paid in kind free of cost by the employers. For example, for wheat received in kind, the enumerator will report the market value of wheat received under the column wages & salaries

Disposable income: is defined in the System of National Accounts (SNA) as the income from all sources after netting for all current transfers (which include taxes) received and paid. It is equivalent to final consumption plus savings. In exceptional circumstances, disposable income may be negative: current expenditure in those cases must be met from the net disposal of assets.

Operating surplus for establishments run by households has generally been calculated from the special agricultural and non-agricultural modules in the

questionnaire. The alternative is to use respondent's own self-reported estimate of operating surplus; however, this estimate is liable to reporting errors.

A detailed worksheet was filled for household members who were engaged in agricultural activities either through cultivation of land or keeping livestock and/or inland fishery.

Concerning those household members engaged in the agricultural sector, no restriction is set on the number of persons engaged in the unit. Furthermore, for all household members who were engaged as owner-proprietor of a business in the non-agricultural and non-financial sectors with less than 10 employees, a detailed worksheet for economic activity was completed. The number of persons engaged in the unit is calculated as the sum of all own-account workers, unpaid-family workers and employees.

All units whether registered or unregistered, using power or not, are included if the unit engages less than 10 persons.

Wages and salaries are the earnings of employees in cash or in kind from one or more jobs.

Income from farming (self-employed) is the operating surplus derived from crop farming, including rent from land and agricultural equipment.

Income from livestock (self-employed) is the operating surplus derived from livestock products.

Income from other activities (self-employed) is the operating surplus derived from commercial and industrial activities, including rent from building and machinery.

Property income consists of interest and dividends from savings/deposits and receipts from rent of land and buildings, if these amounts are not reported in the worksheets for the agricultural or non- agricultural establishments. In fact, rental income from buildings, plants, or machinery reported in the worksheets is included in the operating surplus.

Social benefits include pension and social security benefits, such as sickness benefit, unemployment benefit, family and maternity benefit, invalidity benefit, etc. They all constitute recurrent cash payments from various types of employment schemes.

Net sales of property are calculated as sales minus purchases of land, buildings (including major improvements), livestock, machinery and equipment. The value of major improvements and renovations is deducted from sales along with purchases.

Net sales of other assets include sales minus purchases of stocks, shares and other securities; withdrawal from deposits minus savings added to deposits; sales minus purchases of gold, silver and precious metals (including jewellery), and the sale of durable items. In addition, cash transfers for dowry and inheritance have been considered as asset movements and added to the net sale of assets (cash expenses minus values received). Finally, from this aggregate those amounts that households reported as losses of cash were deducted.

Net borrowing consists of two parts, the value of loans obtained minus the loans repaid (including interest/profit) and the difference between the values of loan given out minus repayments on such loan received. Net borrowing is net loans obtained minus net loans given out.

Net capital transfers receipts consist of property received as gift, inheritance, etc., minus property given away, lost or destroyed.

Net change in cash balances is the net change of cash kept in hand or in current accounts with the banks. This criterion is derived as a residual. It is calculated as net savings (household income minus expenditures) minus receipts other than income, that is, income from liquidation of assets, net capital transfers received and increases in borrowing.

2.4.1.11   Median house price

Median income to median house price ratio focuses to get access to housing by using the lowest quartile income ratio to the lowest quartile house price, or the percentage of households that can only manage to pay for adequate housing with assistance (Nikodem, 2018). The median house price determines the midway point of the units/houses sold at market rate (sold price) over a set period (monthly, yearly, quarterly, etc.). For example, if there were 101 housing units sold out during a month, the median unit price would be the house price in the middle i.e., that has fifty units' prices below it and fifty-unit prices above it. Median price differs from the mean price, it equates to an average price – adding the amount of sold prices together and then dividing them by the number of sales (Cossar, 2013). One of the reasons to use median price is that it gives more precise indicator of the market, as it reveals the sample size being used. However, one of the problems using the median price is that it does not reflect if there has been a less expensive or homes that are homes that are more expensive sold in within a period.

2.4.2 Social criteria of affordable housing

A households budget get an influence by challenges of affordable housing and housing affordability, leaving less funds to buy food, household utilities, transportation to work, child care and health care expenses and reducing their savings for retirements, emergencies, and other prospects, such as starting a small business or pursuing higher education. These challenges may also affect end users' quality of life and result in decreased future affordable housing developments (Anacker, 2019).

2.4.2.1 Commuting cost

Housing location is one of the most influential housing affordability assessment criteria, commuting (travelling) cost effects a homebuyer's choice of buying a house at a suitable location (Casallo Blanco et al., 2005; Sohail, Maunder and Cavill, 2006; Fisher, Pollakowski and Zabel, 2009; Ming, 2012; Mulliner, Smallbone and Maliene, 2013; Isalou, Litman and Shahmoradi, 2014). Land price is cheaper at the outskirts of a city centre, yet conversely the transportation cost typically increases as distance increases from city centre. Deceptively, housing near the periphery could be affordable for some due to lower costs, yet the commuting expenses will increase due to the distance from the city centre (workplace) making it unaffordable.

2.4.2.2 Criteria of housing liveability

A house is incomplete without the availability of basic amenities and infrastructure for example, electricity, communication, water, transportation, health facilities, and schools, police station, and facilities management mechanisms. Infrastructure and

basic amenities as well as community features jointly make a housing development affordable and a liveable space.

2.4.2.3 Habitat agenda

Affordable house is not just housing on low price; it needs to be at a good location, quality material, and better neighbourhood. Local authorities need to do a lot more to achieve decent quality housing in their region and take responsibility to maintain the affordable housing standards. Rented properties should be professionally audited to keep the rent at an acceptable level with at least minimum level of quality and standard.

Housing affordability is a multi-dimensional issue and affect households' economic, environmental and social aspects of life (Mulliner and Maliene 2011). It is a combination of the geographic and social constraints and a household's financial formation adds to the affordability issue (Albert, Hallowell and Kleiner, 2014; Bryde and Al-Shaer, 2014; Mulliner, Malys and Maliene 2016). 'An affordable housing is adequate in quality and location and does not cost so much to prohibit its occupants meeting other basic living costs and threatens their enjoyment of basic human rights' (UN-HABITAT, 2011).

2.4.2.4 Housing Stress

A household is under housing affordability stress (HAS) if they are spending more than 30 per cent of their household income (either disposable or gross) (Hertz, 2015). As per Joint Centre for Housing Studies at Harvard University, low-income households who succeed to spend fewer than 30 percent of their household income

on housing in reality end up spending more on their commuting cost and getting around, that takes away their savings, leaving them in debt entirely. The term 'housing stress' can be used to discuss the matters of housing affordability [National Housing Strategy (1991); Nepal, (2010); Rizvi, (2015)]. Researchers normally highlight the recurrent expenses which households are expected to pay for their housing needs. Housing stress can be referred to financial situation, including the one-off or short-term issue of paying monthly rent, mortgage deposit or a constant problem for a household whose income is not enough to meet housing costs. For example, households over-stretched themselves to pay too much in mortgage or rental costs, and then a sporadic or unforeseen problem occurs due to unexpected circumstances such as unemployment or a rent increase will experience housing stress. 'Housing stress' can also refer to over-crowding in the house due to many family members, insecurity of letting tenure, and inadequate sanitation and other associated facilities in house.

Housing stress is an alternative measure for all types of housing stresses not just the housing affordability or cost stress. The significant aspects of both housing stress and affordability entail a subjective judgement to ensure that their meanings always remain open to reinterpretation and scrutiny (Gabriel et al., 2005; Yates and Gabriel, 2006; Yates et al., 2007).

2.4.3 Demand for affordable housing

In the year 2005, the United Nations Economic and Social Council projected that there were 100 million people without homes worldwide. However, considering the

impact of the year 2008 financial recession and overall population growth, the current worldwide population is probably much higher; it is estimated that a further 1.6 billion people lack access to adequate housing (Rising Global Movement, 2019). The growing concentration of people in urban spaces can be felt in land and housing shortages and congested transit along with putting a strain on the basic amenities such as water, power and breathing space (Gopalan and Venkataraman, 2015). After recession, an increase in household income has been observed which has led to a growth of the middle-class community (Gopalan and Venkataraman, 2015). This rise in the middle-class community has led to inflation in demand for more affordable housing that includes basic human amenities. A fresh demand for more affordable housing has also contributed to the overall housing market around the world. A thrust in the housing market leads to a boost to the GDP of a country and ultimately improves the quality of life of its end-users.

2.5   Affordable Housing (global best practices)

The following paragraphs discuss a few best practices affordable housing models from around the world as discussed by Robert (2016). Figure 2.2 gives a depiction of conventional and non-conventional housing supply. Following are the tried and tested global affordable housing best practices:

2.5.1   Support-based approach to affordable housing

In fact, government authorities alone cannot meet the demand to produce housing at a reasonable price and in enough numbers.
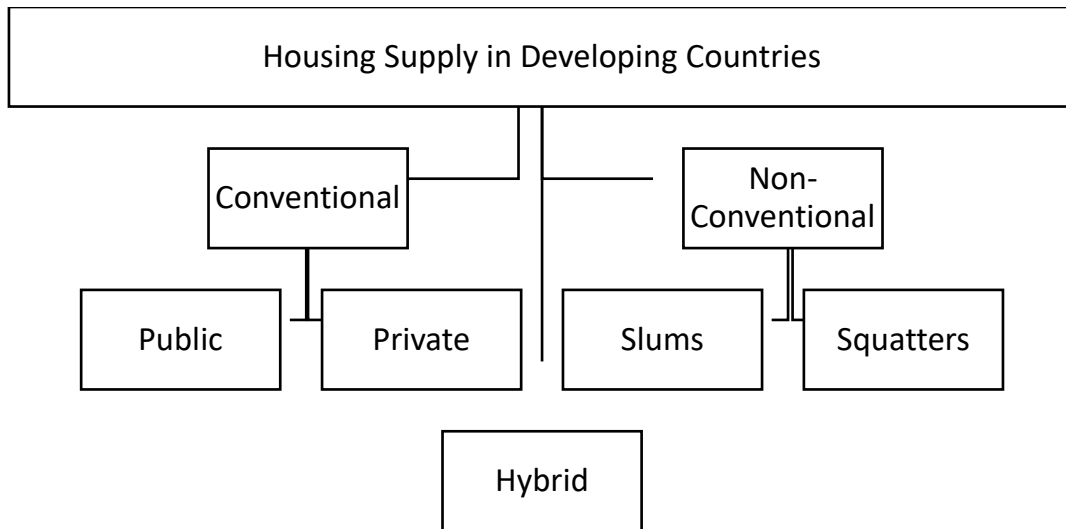
Figure 2.2: Conventional and non-conventional ways to meet housing needs in developing countries

Source: [(Al Shareem et al., 2014) originally presented by (Drakaskis-Smith 2012)]

In order to meet the housing deficit, the governments should adopt a 'support-based approach' (Mumtaz, 1995; Nikodem, 2018; Schwartz and Wilson, 2018; Anacker, 2019; Commission, 2019; Matt and Marshall, 2019; Saunders, Lewis and Thornhill, 2019). Affordable housing initiatives certainly need help and support from both the community and the private sector to meet housing demand at lower prices (Abdul-Aziz and Kassim, 2011; Al Shareem et al., 2014; Amjad and MacLeod, 2014; Mouzughi, Bryde and Al-Shaer, 2014; Rossi and Civitillo, 2014). This involves intervention of the private sector and the community, and there is a need to introduce new parameters and legislation for measuring housing affordability. The price of housing should not be more than the funds available to those to whom it is intended for. The production/construction, usage and consumption of housing can be typically characterised as non-conventional (informal) and conventional (formal) as shown in

Figure 2.2. Using support base approach, affordable housing should be physically adequate, made available to those who cannot afford a house without some special intervention by government or special arrangement by the providers (Field, 1997). Homeless Link (2016), have adopted this approach known as:

Housing First in England – the philosophy behind the Housing First is to provide an independent, stable home providing end-users an intensive and personalised support including case management to homeless people for their complex and multiple needs. 'Housing is basic a human right' as seen by Housing First services (Link, 2016). This approach has been tried in the USA, Canada and the United Kingdom (Link, 2016). Inside the properties, the WILT (Would I Live There) standard (Mayday, 2019) has been adopted there; this standard makes sure that health & safety and legal requirements are met in a human dwelling or a property.

2.5.2 Community – Led Housing

Through community-led housing, the end users and the communities play a vital role to find solutions for their housing problems. Community-led housing helps to create affordable and sustainable communities, building self-supportive and resilient local communities, and helping people to develop new skills. British Social Housing Federation (BSHF) 2016 runs a community-led housing in England. This approach welcomes modern and innovative ideas to provide high-quality affordable housing developments. In the highly competitive, challenging and complex context of housing, this type of housing supports the idea of people choosing their own environment, and how they want to live and make this idea work.

Although community-based housing is not considered the conventional method, yet the United Kingdom (UK) has a substantial past to use this method. Community led housing has developed as a collection of fragmented movements which had a coordinated approach to define or promote the housing sector. Cooperative collaboration identifies the available affordable housing to carry out a joint venture; community-led housing helps to provide suitable affordable housing focusing on the needs of local people. This type of housing model directly improves the quality and value of available housing stock along with giving ownership of property to the communities. It also enhances the skills and employability of the locals through local supply chains, which ultimately strengthens communities, by enhancing their confidence, capacity, and size in future.

2.5.3 Co-housing

Through this model, households have an independent home; however, they manage and maintain their community and shared activities together. This model allows residents to perform their community and shared activities at a common place within the premises of the housing development.

2.5.4 Community Land Trusts (CLTs)

As name suggests, community land trusts (CLTs) are owned and managed by the community, housing projects are developed by community organisations to meet the community needs. These community developments, housing estates, community facilities and other property assets are made available to the community at a

sustainable affordable level. The Citizens UK have launched the first urban land trust called St. Clément's East London Community Land Trust. This trust provides 23 new homes in London at a third of the open market price. The price will be linked to the local rent and a further 229 new homes will be sold at market value to fund the housing scheme. Buyers/owners are obliged to sell their house back to the trust if they want to move elsewhere. The Citizens UK targets to build 5,000-community land trust homes by the year 2025. There are almost 200 registered CLTs across UK, generally in the countryside where farmers sell their few acres of land for housing developments.

2.5.5 Community self-build

This model encourages individual households and groups of households to work together to build their own affordable homes. This model can also be mixed with other models, but the emphasis always remains on supporting and helping one another through the process. This idea has been broadly adopted by the Netherlands Government to build demand-driven homes on a small scale. Through this scheme, the local council provides the plot of land to low-income households. At the acquisition of a plot, the owner has a choice of a few ready-made, ready built options. To support the project the Netherlands Government has relaxed housing and planning regulations. Final road provision and the landscaping are only carried out once the individual homes in each block have been completed.

2.5.6 Housing cooperatives

In the cooperative housing organisations, the members (residents) democratically manage and control their homes in matters such as rents, repairs and who joins and leaves. In the UK, many housing cooperatives also own their properties' assets collectively. This type of housing has shown the highest level of satisfaction as recorded in a report in 2009, yet it makes up only 0.6% of housing stock here, as compared with 15% in Norway and 18% in Sweden (Roberts, 2016).

2.5.7 Tenant management organisations

As name suggests, tenants or the residents take responsibilities to manage existing properties owned by the housing associations and local authorities.

2.5.8 Empty homes doctor

In the year 2013, Leeds Council set up an initiative to restore and refurbish empty homes to a living standard. A team made up social care workers, the officials of the local authority's empty homes department, solicitors, roofers, estate agents and decorators worked together on some empty homes in their local area. It has been reported that the free service was subsidized by the Leeds local council and the team generated almost £350,000 of trade for businesses; 59 houses were brought back to life and made usable; so far more than 100 houses have been refurbished and renovated since set-up of this scheme.

2.5.9 Self-help approach

This is a similar approach as the 'empty home doctor'. Through this approach, the end-user restores the empty property on a self-help basis and restores it to a liveable standard. This scheme helps individuals and broadly benefits the communities.

2.5.10 Micro buildings

This technique has been tried in the New York; initially 55 units have been developed; the units are made of concrete slabs and steel frames prefabricated and manufactured off-site. An apartment comes with high ceilings and measures between 250 square feet (ft^2) (23 square metres: m^2) and 370 ft^2, and has built-in beds, sofas and storage, etc. The apartment building has an on-site gym, roof terrace, and community room and storage lockers. Monthly rent for these affordable apartments is about £600, as compared with £2,200 local rent in Manhattan.

2.5.11 Batigère foundation housing network, France

This initiative was started in Metz France; the focus of this network of social housing bodies is to proactively promote economic development and equal opportunities within the community. The idea behind this network is the recognition of all related housing affordability concerns.

2.5.12 The Vienna models

'Housing is a basic human right' (UN-Habitat, 2008; ILO, 2014); this is the motto of this model. In the Austrian capital 35% of the housing stock is limited-profit housing association and 25% belongs to social housing. Lower-income households can secure their tenancy for life through this type of social housing; social housing promotes mixed communities and there is no stigma attached. Very high-profile architects such as Lord Norman Foster of Thames Bank are enlisted for these projects to provide good quality design. Rents are subsidised and funded by land tax and other taxes. Landowners are obliged to use or develop their land; otherwise, unused lands and sites are taxed at a higher rate than normal. Tenants' rights are protected through the local legal framework for this model.

2.5.13 De Rokade Sheltered Housing, the Netherlands

This is a private residential initiative developed in Groningen, Netherlands that aimed to provide a mixed-use housing to younger and elderly people alike. De Rokade has all types of housing that includes more than 200 nursing and day-care rooms and a kindergarten accommodation. Rokade Tower has its own 'town square' and a cafeteria that serves all generations and encourages mixing within the community. In contrast to many other affordable housing developments for the elderly, this initiative avoids an isolationist ghetto approach.

Various examples of this housing innovation can be seen around the world for example condominiums in Bangkok Thailand. The theme embraces residents' involvement in the housing project, fewer restrictions and flexibility in planning to

encourage revolutionary housing ideas and investment. Too often housing and land have been turned into lucrative investments disproportionate to the wages and incomes of most of the population. Instead, there needs to be a shift to providing housing for real communities.

2.5.14 My first home scheme (PR1MA)

According to Suhaida et al. (2011) in the 2010 Budget, the Malaysian government emphasised to increase the home ownership amongst the people. Some affordable houses were built under Perumahan Rakyat 1 Malaysia – also known as My First Home Scheme (PR1MA). This scheme presented a socio-economic and strategic housing development model; according to this housing model, a decent housing society has infrastructure, amenities, and utilities, recreational, educational and clinical facilities as their normal features. Later, the Malaysian Government passed an act called 'Perumahan Rakyat 1 Malaysia act 2012', to promote and spread this scheme in the urban areas of Malaysia (Government of Malaysia, 2012; Labin, Che-Ani and Kamaruzzaman, 2014).

The Malaysian government has taken an initiative to revamp the abandoned housing projects around the country. The government also has increased the supply of low-cost housing units. An employees' provident fund (EPF) scheme has been introduced which allows the contributor to use the existing funds and future savings for financing a house with a higher price value or to buy an additional house.

The term 'affordable housing' differs across housing markets, but largely it is based on the financial capability of a household (the share of household income devoted

to housing expense). It is difficult to establish the income level to determine the affected income groups and to offer them required housing assistance to provide them socially acceptable housing. Affordable housing should consist of a range of sizes, housing tenures (rental and purchase) and adequate housing affordability thresholds that consider households with different incomes and family sizes in the locality. Mostly, 'housing affordability' is defined as housing expenses that use no more than 30% of household income per month (this will be further discussed in the housing affordability section).

'A basic socially acceptable standard housing unit is defined by a particular community's view of what is required for decent living and this varies by city' (Woetzel et al., 2010). However, the required floor space and location reflects end users' choices, house price, and regulatory constraints. Acceptable affordable housing should also contain basic amenities (drinking water, a toilet, clean environment) as well as access to essential medical and social services such as schools etc. It has been established that the location is a critical housing affordability criterion; a suitable housing unit should not be more than an hour's commute from a city and centres of employment for the end user.

Economic, social and environmental criteria of housing affordability should be included in housing policy, particularly for the type of households that require support to buy or rent an affordable housing. Based on the data analysis, great care is needed when defining the affordable housing, for example for an affordable housing unit, too high floor-space could result in higher priced units for low-income end-users which may push them into the informal housing (shanty towns etc.) sector.

2.5.15 Public-Private Partnership (PPP or 3Ps)

Growth in population, poverty, government accountability, corporate integrity and modern technology and innovation demand a better governance and policy in order to find a viable resolution for a sustainable future. Public-Private Partnership (PPP) provides an inclusive, participated, structured approach by public agencies to reform government policies to collaborate in a business climate with the help of the private sector, where public institutions are underperforming. Public agencies that collaborate with the private sector are more likely to propose reliable reforms and earn support for their strategies and policies. A PPP project in general is an equity joint venture between the private sector and the government. As an alternative solution of government financing, the public agencies acquire a capital asset to provide a public service. The private sector as an individual business establishes the asset in terms of design, investment, construction, maintenance and operation of the facility, and then hands it over to the public sector. PPP models involve the funding, development of infrastructure, along with its operation and maintenance provided by the private sector. The private sector gets its investment recovered by charging levies to the consumer that are linked to performance of the facility. There is substantial misperception and difference of views among patrons as to what precisely constitutes a Public-Private Partnership (PPIAF, 2012). Generally, not everyone has the same level of understanding about PPP due to the absences of a precise and unified definition (Poggesi, 2009; Reim, 2009). 'PPP' means a partnership between the public sector represented by a government agency and a private party for the provision of an infrastructure facility or service with a clear

allocation of risks between parties. PPP agreement means a contractual arrangement which is made between a Government Agency and a private party" (The Punjab Gazette, Government of Punjab, Pakistan, 2009).

Table 2.1: Affordable housing global best practices

	Model	Country	Features	References
1	Community support based approach	UK, Canada, USA, Austrailia, Pakistan	Community and the private sector support	Al Shareem et al., 2014) originally presented by (Drakaskis-Smith 2012
2	Community lead housing projects for after care of the development	England	Self-supportive and resilient local communities, helping people to learn new skills	Roberts, 2016, British Social Housing Federation, 2016
3	Co-housing	United Kingdom	Independent homes, tenants manage and maintain their community and share activities together	Roberts, 2016, British Social Housing Federation, 2016
4	Community land trust	England	Developed by community organisations to meet the community	Citizens UK and St. Clément's East London, 2019
5	Community Self-help approach	Netherlands	Groups of households work together to build their own affordable homes	
6	Housing cooperatives	UK, Norway, Sweden, Pakistan	Housing organisations, the members (residents) democratically manage and control their homes	Roberts, 2016, British Social Housing Federation, 2016
7	Tenant management organisations	United Kingdom	Tenants or the residents take responsibilities to manage existing proper	Roberts, 2016, British Social Housing Federation, 2016; Leeds District Council, 2013
8	Empty home docotor	United Kingdom	Local authority's empty homes several people worked together on some empty homes in their local area	Roberts, 2016, British Social Housing Federation, 2016; Leeds District Council, 2013
9	Self help approach	United Kingdom	Same as the 'empty home doctor'	
10	Micro buildings	USA	Units are made of concrete slabs and steel frames prefabricated and manufactured off-site	
11	Batigere foundation model France: to create opportunities within community	France	Promote economic development and equal opportunities within the community	Metz France, Robert, 2014
12	Vienna model: provision of housing with limited profit margin	Austria	Limited-profit	UN-Habitat, 2008; ILO, 2014
13	De-Rokade Netherland Model	Netherlands, Thailand	Accommodate elderly and pensioners	Roberts, 2016
14	Use of PR-1-MA Malaysian Model	Malysia	To revamp old housing stock and unused land	(Government of Malaysia, 2012; Labin, Che-Ani and Kamaruzzaman, 2014
15	Public-Private partnership	Pakistan	PPP	(PPIAF, 2012; Poggesi, 2009; Reim, 2009; The Government of Punjab, Pakistan, 2009.

2.6 Usage of the Global Housing Best Practices in Pakistan

There has been an important design and planning concern from a policy perspective to tackle the growth of population all over the world, this growth has been seen at a higher pace near the peripheries of major cities (Mattingly and Morrissey, 2014). Provision of affordable housing is an international crisis, especially in developing countries, and different countries have their own housing concerns and issues that differ from one another and vary from area to area (Javaid, 2016; Roberts, 2016; Cohen, 2017; Hasan and Arif, 2018). On the contrary, in some developed countries there are empty houses in some areas with fewer amenities and resources to make them useful for housing needs.

According to Professor Charles Egbu, the Dean of the School of Architecture at London South Bank University, the current housing crisis is not only due to the lack of governmental will to finance the social housing. There is also a huge skill shortage in the construction industry; planning restrictions, red tape and a tax and benefits system which has failed to finance the provision of affordable, sustainable, high-quality housing. Building cost effective housing has been contradictory to the design and quality (Zou, 2014).

Therefore, in the Section 2.6, through the global best practices, new design, financial mechanisms and construction techniques are being explored and some recommendations and suggestion are made through the affordable housing framework. As explained in the earlier sections, over time, several traditional models of housing provision have established their own role to serve several communities with their explicit features. Some of these models are alike or intersecting and

overlapping and have some dissimilarities and differences. The review of these models will be helpful to offer single or combination of models to be offered in the housing framework for Pakistan. Pakistani housing stakeholders and community groups can pick and mix different models to address their own needs.

2.7   Affordable Housing: Impact on Household

Housing affordability has manifold relationships to all the other aspects of the individual's life and wellbeing. Evidence is available which shows the particular relationship of health and education to affordable housing (Dowall and Ellis; Malpezzi, 1999; Research, 2009; Nenova, 2010; Kuang and Li, 2012; Kuang, Taltavull and Li, 2012; Kalia, 2013; Pivo, 2013; Gopalan and Venkataraman, 2015; Hjort and Widen, 2015; Marom and Carmon, 2015; Gerrity, 2016; Javaid, 2016). Better environment and lifestyle improve the wellbeing of individuals; life expectancy (Gopalan and Venkataraman, 2015); and controlled crime rates (Maliene and Malys, 2009; Prochorskaite et al., 2016).

Affordable housing has substantial economic impact on the end users' household income, savings and employment (Calnan, 2015; Gopalan and Venkataraman, 2015). Provision of affordable housing is a fundamental element at individual, city, national and international level. Affordable housing can be used as an attraction to the median income-earner who can be a vital part of labour force to drive a city to economic success. Available affordable housing for low-income households is one of the criteria to a stable progress in a country. On the other hand, unaffordable housing creates severe effects and disparities in the economy and create a bubble in the housing market consequently.

2.8 Asian property market indicator and Housing Crisis in Asia

The United Nations (UN) Centre for Housing Development also known as the Habitat has estimated that almost one third of the urban population of the third world countries, live in an absolute poverty. The Habitat suggested that an active housing policy along with social investment and economic strategies are the way forward to meet the requirement for housing problems.

On a positive note, in recent years, an upwards market trend has been observed in real estate business especially in India and Pakistan. On the other hand, this price rise has hit hard to low and middle-income households. It significantly compromised their affordability to buy or rent a decent home. An exceptional growth in South Asian property prices has been recorded in the last couple of decades as shown in Table 2.2.

Table 2.2: House price comparison of South Asian countries

Country	Price
Afghanistan	$15 to $20 per square foot. High-income dwelling prices stand at $19 per square foot. Home improvement range between $100 and $5,000 per housing unit
Bangladesh	The least expensive residential land in Dhaka costs approximately $27 per square foot, and upscale areas can be priced as high as $60 per square foot.
India	The urban housing prices have risen by 30 percent annually; salaries have increased by an annual average of 20 percent over the last two years. In South Mumbai, the price per square foot increased from $215 in 2004 to $430 in 2006. In central Delhi, land price per square foot doubled from $193 in 2005 to $387 in 2006. For a typical property in Mumbai, affordability has declined from 4.4 times in 2004 to 5.5 times in 2006 (and prices declined in 2008, resuming their ascent thereafter).
Pakistan	The costs range from $9.6 to $12.0 per square foot for low-cost housing, from $16.7 to $19.1 per square foot for middle-cost housing, and PKR 26.3 to PKR 35.8 per square foot for high-end housing.
Sri Lanka	The cost of construction increased about threefold between 1990 and 2005. Building materials that registered substantial price increases since 1990 include sand (1,070 percent), timber (568 percent), and bricks (678 percent). Labour cost increased by nearly 250 percent during the period.
Source: The House Price Comparison, a World Bank survey report (Nenova, 2010)	

According to United Nations Population Fund (2001), the world's population is expected to reach 10.9 billion by 2050, it is an alarming number and is worse than it seems. In developing countries, almost 90% of the population has been forecasted to occur in the next two decades. Presently, almost one sixth of the global population lives in slums in developing countries (Kwofie, Adinyira and Botchway, 2011). Figure 2.3 gives a continental population growth comparison.
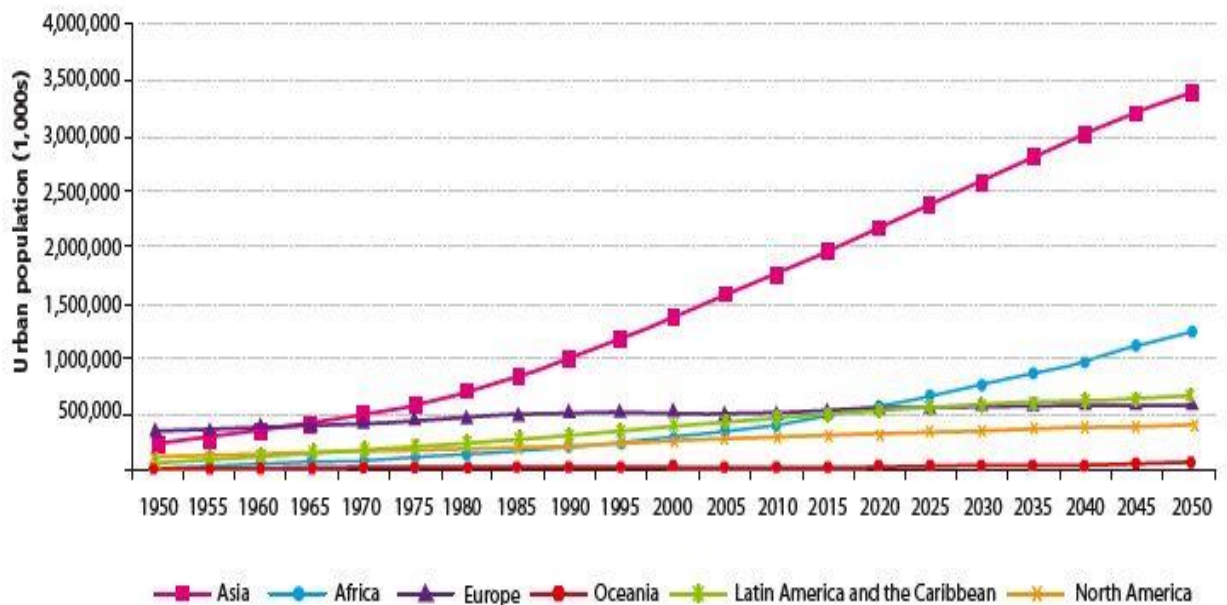
Figure 2.3: 100 years of continental population growth between 1950 and 2050
Source: (Majale, Tipple and French, 2011)

As shown in Figure 2.3 the growth in Asia's total urban population is considerable comparative to other regions of the world. The urban cities' population in Asia in the 1950 has was around 229 million and has soared to up to 1.5 billion over the period of 60 years. Mumbai, Dhaka, Delhi, Jakarta, Karachi, Kolkata, Seoul are the fastest growing cities around the world; on the other hand, Western European countries are the slowest in becoming urbanized (Majale, Tipple and French, 2011). Globally, housing has a profound impression on the physical and socio-economic character of a community. Housing people on a national scale is one of the major issues in most countries (Turner and Fichter, 1972), and Pakistan is no exception to it.

2.9 Housing in Pakistan

Related and relevant literature to establish the housing situation in Pakistan (a full list of the literature reviewed on affordable housing research including affordable housing in Pakistan has been presented in Table 2.7) was reviewed:

Market mechanism determines the locational choices for housing development (Shaikh, 2016). In Pakistan, the urban rich live close to the city centres or major places of employment, while the urban poor reside along urban edges and peripheries. The poor are being pushed to distant peri-urban locations, which substantially increases commuting costs (Majale, Tipple and French, 2011).

Land has become a commodity and is not considered a social asset. Land supply for housing cannot be governed by the government alone, therefore, the role of the formal and informal private sector has become extremely vital and land markets have become a strong recipient of capital investment (Haq, Khan and Khurshid, 2013). Urban sprawl and extension of low-density low-rise development promotes speculation and diminishes the utilization of geographically advantageous locations in cities.

Cost of building and construction material is one of the major issues in most countries around the world. The price rise in construction material causes increased housing price and rent which consequently affect a layperson's ability to buy or rent a decent housie of their own choice. In the major cities of the world such as Shanghai, Mexico City, Moscow, Mumbai, Karachi, Accra, Lagos, etc., around 50% of their population lives in crumbling homes, slums or on pavements; and more than

100 million people have been estimated to be homeless (Kwofie, Adinyira and Botchway, 2011).

Property tax in Pakistan is imposed by the provincial government that is levied on the value of the property (Sharafat and Sharafat, 2016). Table 2.3 gives an idea of the tax regime in Pakistan. Generally, it was levied at a 10% flat rate on the value of the property; however, recent government has introduced 25% of the annual rental value of the property and in all the provinces tax rates vary. In the province of Punjab, property tax is levied at a progressive rate. 25% flat rate property tax is levied on yearly rental value of building and land in the province of Sindh (Zameen.com, 2019). The new amendments 2018-19 in Income Tax Ordinance 2001 have caused a severe effect on the housing market (Zameen.com, 2014; Gerrity, 2016; Zameen.com, 2019). This effect is becoming more visible and is affecting the property valuation; there is a downwards trend in the housing and real estate market and the investors are only speculating with no intention to participate in the real estate market.

Table 2.3: Income tax regime for the year 2014

Taxable income PKR (US$)	Tax rate
Up to 400,000 (US$ 3,810)	0%
400,000 – 750,000 (US$ 7,143)	10%
750,000 – 1,500,000 (US$ 14,286)	15%
1,500,000 – 2,500,000 (US$ 23,810)	20%
2,500,000 – 4,000,000 (US$ 38,095)	25%
4,000,000 – 6,000,000 (US$ 57,143)	30%
Over 6,000,000 (US$ 57,143)	35%

Source: Global Property Guide (2017)

The buying demand is diminishing and sparking a slump in the real estate market in Pakistan (Pakistan Times 2016; Javaid, 2016).

The Income Tax Ordinance 2001, according to Javaid (2016) has resulted in almost 16,000 out of 18,000 housing developers moving their operations abroad for alternative opportunities and have quit the local real estate market. The remaining housing investors have adopted a wait and see strategy. Currently, the worst affected are the short-term investors and commercial and common buyers are wary in doing any new buying and selling.

In Pakistan, credit is essentially tied to collateral assets, which excludes all those who do not own any land title, and no credit support mechanism exists for providing urban poor access to the land market (Javaid, 2016; Sharafat and Sharafat, 2016; Islamabad, 2018). No credit facilities exist for the urban poor through the formal banking structure; loans of small amounts are not granted by the financial institutions, access to formal finance is 14% and housing finance to GDP ratio is 1% approx. (Nenova, 2010; Rizvi, 2010; Tariq, 2011; Tariq, 2012; Tariq, 2014).

The real estate sector is an important part of the Pakistani economy; annually almost $5.2 billion is spent on construction, which makes the 2% of the total GDP of the Pakistani economy (Javaid, 2016; Pakistan Times (2016). Federal Bureau of Revenue Pakistan (FBR) implemented and introduced an amendment in the Housing Tax Ordinance 2001. The new amendments to the Income Tax Ordinance-2001 via the Finance Act 2016 amended on 1st Jul 2016, give all rights of evaluation

of property and the land to the State Bank of Pakistan referred as the FBR's Inland Revenue department, instead of the provincial governments.

2.9.1 Some indicators for housing needs in Pakistan

It is a fundamental phenomenon that housing need of a country evolves as a corresponding measure of the population. The population of Pakistan is around 180 million (estimated at July 2014) and ranks number six in the list of countries by population, Table 2.4 gives some key statistical indicators of Pakistan. Due to the changing family structure, the number of households is increasing at a rate of 3.3 per cent of the existing households. Overall population increase rate is 2.6%; the population density is 233 people per km^2; 37% of the population (68, 888, 535 people in 2014) lives in urban areas; 45 per cent population in urban Sindh and 50 percent in urban Punjab lives in one room house, on average 3 people share a room; urban population increases at the rate of 4.7%. Only 53 per cent of the population have access to a water source in urban Pakistan, which is not necessarily drinkable; only 25 percent have access to sanitation (Gerrity, 2016; Shaikh, 2016; Sharafat and Sharafat, 2016; Shaikh, 2017; Hasan and Arif, 2018; Islamabad, 2018; Zameen.com, 2019).

Gerrity (2016) presents the comparison of prices for the plots of land in several housing societies of three major cities of Pakistan. Some prices have also been extracted from Pakistan's largest property portal and database known as Zameen.com:

Lahore – In the year 2014-2015 the price for one kanal plots in Bahria Town increased by 13.91% bringing its average price up to 11,291,147 PKR (107,791.38 USD or 77,029 GBP). The price of one kanal plot did shoot up by 9.06%, Lahore Development Authority (LDA) Avenue 9,632,064 PKR (91,952.88 USD). The Defence Housing Authority (DHA) is part of the cantonment area, the average price raised 14,881,211 PKR (142,069.27 USD) and is a small 0.29% decrease from last year on the other hand Wapda Town exhibited a 7.25% rise in the prices at an average price for these plots of 15,564,745 PKR (148,589.45 USD), indicating that 2015 was a phenomenal year for this city's real estate market in the city of Lahore (Gerrity, 2016; Zameen.com, 2019).

Islamabad – the capital's Sector F-11 displayed striking numbers in 2015 as rate of plots climbed by a strong 15.99% which fetched the price of these plots to a remarkable 52,346,961 PKR (499,732.32 USD). DHA Islamabad presented a development of 9.39% and pushed the average price of one kanal plots to 12,515,396 PKR (119,478.72 USD), Bahria Town housing society stayed stagnant posting a 2.63% rise, keeping the average price of plots almost the same 1,868,293 PKR (113,301.13 USD). Sector E-11 recorded a 5.52% rise bringing the price up to 37,717,494 PKR (360,071.54 USD) (Gerrity, 2016; Zameen.com, 2019).

Karachi – property market saw mighty growth in 2015, most neighbourhoods in the city of lights exhibited notable statistics, only Bahria Town Karachi snaked in the other direction and registered a 9.74% drop for the 500 yard plots category; the end of the year price marked at 5,789,565 PKR (55,270.31USD). DHA Karachi presented a 15.87% rise and brought the average price of 500 yd^2 plots to

37,011,238 PKR (353,329.24 USD). Gulshan-e-Iqbal recorded an enormous 19.56% increase, which pushed the average up to 24,572,062 PKR (234,578.16 USD).

The average price of DHA City Karachi (DCK) 500 yard^2 plot came up to 4,383,367 PKR (41,845.99 USD), which was an unbelievable 66.71% price escalation from the previous year; in terms of price increase it is almost a 2,000,000 PKR (19,093.08 USD) Gerrity (2016) presents the comparison of prices for the plots of land in several housing societies of three major cities of Pakistan:

Lahore – In the year 2014-2015 the price for one kanal plots in Bahria Town increased by 13.91% bringing its average price up to 11,291,147 PKR (107,791.38 USD or 77,029 GBP). The price of one kanal plot did shoot up by 9.06%, Lahore Development Authority (LDA) Avenue 9,632,064 PKR (91,952.88 USD). The Defence Housing Authority (DHA) is part of the cantonment area, the average price raised 14,881,211 PKR (142,069.27 USD) and is a small 0.29% decrease from last year on the other hand Wapda Town exhibited a 7.25% rise in the prices at an average price for these plots of 15,564,745 PKR (148,589.45 USD), indicating that 2015 was a phenomenal year for this city's real estate market in the city of Lahore (Gerrity, 2016; Zameen.com, 2019).

It is unnecessary to say that the year 2015 clearly witnessed price rises in the property market, especially in in Karachi's real estate. It has also been speculated that in 2016 Karachi would continue their property price roaring upwards so would the city of Lahore and Islamabad.

It is very ironic that all these housing societies in major cities of Pakistan presented above were started as low cost housing for the less privileged. The land mafia sharks bought all the plots and resold them again that resulted in a soaring property price bubble that is unaffordable for low to middle-income households. If comparing the market price of Pakistan's property (city of Lahore) (Nenova, 2010) with price presented by (Gerrity, 2016), it is obvious that there has been a roaring up steep property price trend, the cost of a high end plot of land (Bahria Town Lahore) is now almost 2100 PKR per square foot as compare to 35 PKR per square foot in year 2010 as presented in the World Bank's report. The World Bank's report further states that India has effectively stabilised the land price intensifications by prudently hewn urban planning and land-use strategies that gives a chance of housing affordability to lower – middle income households (Nenova, 2010).

Currently, Pakistan is going through its evolving phase and facing many internal and external challenges. Most Pakistani inhabitants live under the poverty line (UNO); take home salary for a general labourer of a manufacturing or construction site is about $50 a month or below $1.50 a day. It is imperative to understand the diversity and range of opinions regarding the affordable housing concepts. An affordable housing development should satisfy the end users' social need.

Table 2.4 shows that there is a shortfall of almost 8-9 million units, 6 million of which are concentrated in the lower middle-income group; there is an acute need of 0.7 million units supply per year (Javaid, 2016). Major cities like Lahore, Karachi and Islamabad are facing high rate of urbanization – Karachi's current population is 16

million plus, which is growing at a rate of 7 – 8% per annum. Karachi alone needs

100,000 new housing units per year to meet natural growth, cover backlog and the

urbanization pressure.

Table 2.4: The key housing statistics of Pakistan

Key statistics about Pakistan	
Region	South Asia
Population of Pakistan	185,132,926 (estimated at as of 1st July 2014)
Total world population ratio and rank	2.56%. Pakistan ranks number 6 in the list of countries by population
The population density	233 people per km2. 37% of the population is urban (68,888,535 people in 2014)
The median age in Pakistan	22.8 years
Overall population increase	2.6 percent
Urban population increase	4.7 percent
No. of people per room in an average household	3
Access to formal finance	14%
Housing finance to GDP ratio	Approximately 1%
Housing shortfall	8 million units, 6 million of which concentrated in lower middle-income group
Housing supply per year	0.3 million units
Total housing needs	0.7 Million units per year Major metropolitans like Karachi are facing high rate of urbanization – Karachi population 16 million and, growing @ of 7-8% pa. Nearly half of Karachi's population is squatter settlements (around 600-800). Karachi alone needs 100,000 new housing units per year to meet natural growth, cover backlog & urbanization pressure.

Source: Gerrity (2014)

2.9.2 Challenges of affordability in Pakistan

In recent years, a fully market-oriented housing market has emerged in response to the economic transitions in Pakistan. The residential housing market expansion in Pakistan has been supplemented with higher inflation rate and house price appreciation, urbanization, and an escalating demand for housing due to foreign investments through non-resident Pakistanis (NRPs).

As explained in Section 1.7 of Chapter 1, OECD nations are progressively recognising the necessity for a wider and more incorporating understanding of housing (Fisher, Pollakowski and Zabel, 2009). Private-sector provision of finance has been sparked by the limited ability of governments to meet the growing demand for affordable housing in both developed and developing countries, especially Pakistan. Provision of affordable housing cannot be fulfilled only by the government efforts; one such approach involves the non-government sector in the setting-up and operation of privately funded affordable housing facilities. Affordable housing is one of the major challenges faced by the UK and other countries around the world (Mulliner and Maliene, 2012).

2.9.3 Household Structure in Pakistan

An end-user in this research is a person, with an intention to occupy the space to abide, live and perform day-to-day activities. The end-user, in the context of this research project is a member of the household, whose household income is around $50 (Rs. 5235.50) a month. This shows the severity of the problem as Yates and Gabriel (2006) defined lower-income households as those with a disposable income

of less than $367 a week. Household structure and income system has been explained in the following section, the idea has been borrowed from (Statistics, 2015):

Household – a household, where the single person makes provision for all her/his own fundamental items of living including food and other basics of living, without combining or sharing it with anyone else and without any dwelling of residence elsewhere. A household with multi-persons could include a group of two or more individuals who make provision for essential items of living and food and who are without usual place of residence elsewhere. The individuals constituting the group may be unrelated or related or a mixture of both; the group may have a collective budget to a lesser or greater extent to pool their incomes to use collectively. The common criterion in identifying the members of a multi-person household is whether the members of the household eat and live together and do not have their usual place of residence elsewhere.

Head of the household – In general, in households with family members such as husband, wife, unmarried and married children forming a single household, the husband is practically considered as the 'head'. In addition, when either parents or siblings (brothers and sisters) comprise a household, the household members generally consider the eldest daughter/son or a parent as the head. Either the eldest household member or the respondent member is selected as the 'head', when a household consists of several unrelated persons. In private or special dwellings unit the resident person in-charge (e.g. warden/manager) may be considered as the 'head'. A sole person in a household is considered as the head of the household. As

mentioned above, if a group of persons eat and live together, the head of the household is chosen by the household members.

Household members – all the household members are such individuals or persons in a group in a household (related or unrelated to each other) who live and eat together and consider the dwelling space occupied by them as their usual place of residence. All the members of the household who normally eat and live in the household and are present (at least for one year) and those who are temporarily absent due to a reason such as, travelling for business, visiting, attending educational institutions, on a visit abroad, admitted to hospital, etc., are considered as the household members.

Temporary visitors, temporary boarders and lodgers, maids/servants and guests, transients, etc. consider their usual place of residence to be elsewhere.

In a household, family members consist of husband, wife/wives (up to four wives are legally allowed in Pakistani Sharia Law), unmarried daughters and sons. Other direct dependent relatives include parents, unmarried brothers, sisters, divorced/separated sisters and daughters staying in the household. Other related persons from extended family, maids/servants, tenants/boarders and lodgers who have no any other place or dwelling for residence elsewhere and who live/stay and eat within the household as a paying member or without payment, are considered members of the household, however, they are not part of the family.

Unavailable members of the household such as non-resident Pakistanis (NRPs) or migrant, workers, working in the Middle East and other foreign countries, are not taken as a part of the household, however, their income (received as foreign

remittance, and made available to spend in the household) is included, also, due to their absence, expenses and consumptions do not include on their account/behalf.

2.9.4 Slums, squatter settlements & Kachi Abadis

Nearly 50% of Pakistani population in major urban centres lives in slums, katchi abadis and squatter settlements. The situation is alarming as the expansion of katchi abadis in the last decade has picked up pace despite the decision of the Government that katchi abadis would not be regularized after 1985. The mushrooming growth of slums and katchi abadis in urban areas is the product of unprecedented population growth, rapid urbanization and large-scale influx of refugees forcing unauthorized encroachments on urban spaces especially state land including strategic, hazardous areas in and around river beds, abutting on nallas (sewage canals), near railway tracks and the like. Poor estate management by the Land-Owning Agencies (Loans) coupled with poor development controls adds to these problems. As the utilities and services in the katchi abadis are not documented, kunda systems (stealing electricity with a hooked cable) for electricity in Karachi and Lahore and illegal connections of water are a major burden on the utility agencies and multiply their losses and create a financial burden.

In addition, there is a shortage of the suitable land for housing particularly near city centres and in and around urban areas. Unrestrained trends of property speculation resulting in higher land prices; virtually causing a non-availability of affordable land for low-income households. 'Land mafia' (mafia who occupies the land illegally) in connivance with the Government bodies and agencies play a critical role which

enhances the suffering of the poor and lower income groups residing in these squatter settlements, katchi abadis and slums.

2.9.5 Financial products

Non-availability of housing funding at an affordable mark-up (bank interest rates) is another example of the housing stock deterioration. Lack of finance is one of the major constraints in new affordable housing developments' growth and maintenance. The public sectors' share of housing development is flimsy and is declining. The activities of the financial institutions such as banks, investment and insurance agencies have been confined because they cannot offer affordable mark-ups for most of the low earning population; therefore, their financial products are limited to a narrow market of high-income groups. House Building Finance Corporation (HBFC) is the only official housing finance institution; which is also tied to several constraints.

2.9.6 Cost of building material

High cost building material and lack of modern technology the cost of construction material has skyrocketed due to the inflationary drifts in the economy. NHP also referred to a survey; that indicates a mounting gap of income-shelter. This gap is inevitably deteriorating affordability, hitting hard especially households with low income; these are the 81% of households who have an income of below PKR 7000/- (USD 60) per month.

This industry lacks in adaptation of modern technology, innovation and materials; due to absence of the support and funding this industry lack of research has resulted in skewed and extravagant investment patterns in new constructions and development and causing unreasonably high building construction costs.

Code of standards and procedures - NHP sense that there is a need for building, construction planning and construction procedures whereas these are also required to be restructured and streamlined. In addition, there is a dire need of coordination amongst the building agencies such as development authorities, local municipality, cantonment boards, in terms of institutional collaboration and functionality regarding the built environment.

2.10 Some indicators for housing needs in Pakistan

The News (2015) reported that the Prime Minister of Pakistan Mr. Nawaz Sharif acknowledged at a conference that Pakistan was facing a gigantic challenge of housing backlog. It has been estimated at around nine million units of which a large part pertains to the economically disadvantaged families and members of the lower middle class.

The population of Pakistan is around 192 million estimated at July 2016 as shown in Table 2.5. It ranks number 6 in the list of countries by population. In recent years, due to the changing family structure, the number of households is increasing at a rate of 3.3 per cent of the existing households. Table 2.5 shows the total population of Pakistan as of the 1st day of July each year from the year 1950 to 2016, as per the data, overall population increase rate now is 2.6%. The population density is 233 people per km^2; 37% of the population (68, 888, 535 people in 2014) lives in urban

areas; 45 per cent of the population in urban Sindh and 50 per cent in urban Punjab lives in one room house, on average 3 people share a room; urban population increases at the rate of 4.7%.

Table 2.5: Chronology of Pakistani Population

Current (2016) and Historical Population of Pakistan												
Year	Population	Yearly % change	Yearly Change	Migrants (net)	Median Age	Fertility Rate	Density (P/Km²)	Urban Pop %	Urban Population	Country's Share of World Pop.	World Population	Pakistan Global Rank
2016	192,826,502	2.07%	3,901,628	-147,565	22.7	3.65	250	38.90%	74,986,621	2.59%	7,432,663,275	6
2015	188,924,874	2.13%	3,776,191	-216,400	23	3.72	245	38.60%	72,920,650	2.73%	7,349,472,099	6
2010	170,043,918	2.09%	3,337,507	-259,300	21	3.98	221	37.30%	63,369,630	2.61%	6,929,725,043	6
2005	153,356,383	2.10%	3,021,179	-179,300	20	4.23	199	35.80%	54,863,424	2.50%	6,519,635,850	6
2000	138,250,487	2.43%	3,130,148	-145,700	19	4.99	179	34.50%	47,687,034	2.41%	6,126,622,121	7
1995	122,599,749	2.64%	2,998,422	-225,700	19	5.67	159	32.90%	40,333,123	2.31%	5,735,123,084	8
1990	107,607,639	3.15%	3,088,515	28,000	19	6.3	140	31.60%	33,967,023	2.22%	5,309,667,699	8
1985	92,165,065	3.37%	2,818,616	269,000	19	6.44	120	30.20%	27,813,268	2.08%	4,852,540,569	9
1980	78,071,984	3.17%	2,256,098	140,000	19	6.6	101	28.80%	22,448,238	1.92%	4,439,632,465	10
1975	66,791,496	2.83%	1,739,451	-27,600	19	6.6	87	26.90%	17,952,986	1.81%	4,061,399,228	10
1970	58,094,239	2.70%	1,449,093	-42,000	19	6.6	75	25.30%	14,692,753	1.75%	3,682,487,691	10
1965	50,848,775	2.51%	1,187,393	-1,700	20	6.6	52	15.80%	8,035,464	1.68%	3,322,495,121	14
1960	44,911,810	2.13%	896,948	-3,300	20	6.6	58	22.40%	10,066,423	1.63%	3,018,343,828	14
1955	40,427,072	1.49%	576,938	-1,700	20	6.6	52	19.90%	8,035,464	1.60%	2,758,314,525	14

Source: (Worldometers - Elaboration of data by United Nations, 2015)

Only 53 percent of the population have access to a water source in urban Pakistan, which is not necessarily drinkable; only 25 percent have access to sanitation.

In Pakistan, almost 60.19% of the total population is living below the poverty line and an average household income of such families is up to $50 dollars a month (Kakakhel, 2014). Government of Pakistan has been unable to meet the demand and need of increasing population and provide affordable housing for such households. '… The governments mostly fail to facilitate poor and remote areas' (Sohail & Cavill, 2010). Private-sector's provision of finance has been sparked by limited ability of the government to meet the growing demand for affordable housing in Pakistan.

Amjad and Idara-e-Taleem-o-Agahi (2012) shares the statistical data of their research in order to show the housing crisis in Pakistan, stating that only 25 % of the population have access to sanitation (washing up facilities); only 53 % of the population have access to a water source in urban Pakistan, which is not necessarily drinkable.

In remotely located rural areas, the conventional access to land for housing is under stress. Fragmentation of land holdings under inheritance-based distribution, resort to an intensely practised cash transaction, shrinking of community land assets and gradual dislocation of artisans from rural communities has led to a changed scenario in sizable rural contexts. Densification of inner cities is another option that is commonly found in the major cities which leads to the price increase in these cities' housing societies in Pakistan (Gerrity, 2016). Development of multi storeyed blocks with residences on upper storeys and commercial space at the lower levels is a common sight in major cities such as Lahore, Karachi, and Islamabad. Two distinct patterns of housing development are found in small and medium sized cities: (i) housing for the affluent class is organized on land parcels allocated by local landowners. They are sub-divided and utilized for house building according to the specific requirements of prospective occupants. (ii) For poor and lower middle-income people, smaller sub- divisions of land are facilitated to reduce the cost. This approach functions both in the formal and informal manner. Lower income groups build houses incrementally according to needs, scales of affordability and social conditions. Formally, constructed housing stock is unaffordable and inaccessible for the poor due to high initial cost and modes of payments incompatible with the status

of the poor. Objectives and interests in large-scale undertakings initiated by the public sector do not correspond to the prevailing problems in housing sector. Table 2.6 shows a population divide of Pakistan based on their income level.

Table 2.6: Population by the income in Pakistan in the year 2011

Population	Poor	Low	Middle	Upper Middle	High
176.2 million	31.8% of the total population	140.0 % of the total population	3.5 % of the total population	0.8 % of the total population	Data not available

Source - Rakesh Kocher (2015)

2.11 Structure and design of housing in Pakistan

In human life, housing is a structural arrangement or a building which is used as a living space for households/families and individuals. A house also shows off the financial position of the owner or the occupier; in Pakistan, a house is a status symbol and is used to show off the wealth and power. Houses in Pakistan have mostly been influenced by the terrestrial location i.e., being closer to the job or the city centre. There is a trend of incremental enhancement of the houses to meet the demand and need according to the family growth. Over the span of several centuries, the forms and shapes of the houses have changed and transformed significantly. In rural and northern mountainous areas, houses are built with mud and clay, straw and wood logs, whereas, urban cities are full of nomadic artefacts, and multi-storey skyscrapers. In Pakistan, people use a wide variety of housing to

accommodate themselves, such as houses, villas, flats and farmhouses based on their requirements/needs and affordability. Islam (2015) represents different forms of housing in Pakistan:

- Self-Built or building own houses in Pakistan – the most common and widely used practice in Pakistan. Households usually buy a plot of land at their preferred locations. Households   build houses according to their needs and affordability. This construction can be completed all in one go or incrementally.

- Private housing schemes in Pakistan – it is another form of housing in Pakistan; private housing developers build housing societies and houses to sell off. In different cities of Pakistan, most prominent housing societies are Bahria Town (all over the country), DHA (all over the country), Citi Housing Faisalabad, etc.

- State funded housing in Pakistan – in most cases the state only provides affordable housing to the government officials/employees. However, in recent years the government of Pakistan have started some affordable housing projects for the public such as Ashiana Housing and LDA City etc.

There is a diversity in Pakistani architecture design in construction; it is influenced by different architectural designs and several housing styles from the past invaders and attackers. Middle Eastern styled compound housing is the most common form of construction all over Pakistan both in rural and urban areas. In this style of buildings, there is a front and some cases a rare entrance, a greeting room (reception room) just inside the main entrance of the house with a large sitting area

used by the male members of the households for their male guests. Female guests typically have a separate sitting area or women's quarters away from the males' sitting area. These compound houses are built with brick and mortar; furnished with luxuries furniture, basic utilities and other facilities.

In major cities, there are some apartment buildings available to accommodate individuals and small households (for family of 4-5 members). Small houses and multi-storeyed apartments in major cities are not very conducive to the large extended family structure. Cities are becoming more polarised the issue of housing structure has become more difficult to resolve, and authorities are required to make sure that the cost of housing is kept to a minimum.

The north of Pakistan consist of mountainous hills; British design of architecture can be witnessed in the mountains of Murree Hill as well as Kaghan, Naran, Baltistan, etc., villages in the mountains have Tibetan style houses, i.e., multiple storey stone or mud houses tightly crammed together with small walkways in the middle of the small homes on both sides. In the countryside, the houses are typically mud-huts but may also be made of stone or bricks. Houses containing a large family room in the centre with several nuclear family units inhabiting single rooms (attached to one another) located off the central room serving up to three generations of an extended family. In mountainous areas where the temperature remains comparatively lower than the rest of the country; the kitchen has an underground oven for baking nan-bread and is used as a source of heating during icy and cold weather. Houses may contain separate quarters for women and a reception room for men. Most houses in

both urban and rural areas have a courtyard and high external walls to enhance privacy.

2.12 Parameters of Affordable Housing

Affordable housing parameters, implications, limits and supply for the low-income households in Pakistan have been discussed below. Previous global affordable housing studies (Mumtaz, 1995; Nikodem, 2018; Schwartz and Wilson, 2018; Anacker, 2019; Commission, 2019; Matt and Marshall, 2019; Saunders, Lewis and Thornhill, 2019) have been explored to determine the affordable housing parameters. Mumtaz (1995) was the only available empirical study addressed the affordable housing and housing affordability related issues in Pakistan.

Available Funds – The funds available to a household might be in the form of cash or assets. Household income may consist of foreign remittances, receipts, which are received regularly and are of a recurring nature. A household can get their income from the following main sources – wages, and other related benefits from their employers; bonuses and gratuities; pensions; social security benefits; tuition fees; educational scholarships, and other regular and periodical receipts allowance, inheritance funds etc. Some households including poor and low-income in Pakistan keep some amount of gold in the form of jewellery or cash to hand. Most of the time the gold jewellery and cash are used to buy a property. It has also been noticed that some households store construction and building materials such as timber, brick, blocks, plumbing, or other storable materials and with an intention to build a house (Meen, 2018; Anacker, 2019).

Informal Loans – some household may get access to some type of an informal loan (Rizvi, 2015). They are unregulated and informal loans without constituting any formal operations yet are based on personal reference of the household and community customs. Most likely they are unrecorded, unofficial does not come under any legal codes. There is a network of informal loan lender and the amount they may make available to a specific household. The terms and conditions are set by the specific society for the household's financial status and social stature.

Formal Loans – this type of loan comes from a formal business entity, bank, lending organisation. At the constitution of this type of loan, both parties (lender and borrower) bound themselves into a legal contract (Rizvi, 2015; Javaid, 2016; Cohen, 2017).

The amount and reason of the loan through a formal loan and who can borrow depends on the criteria and the terms and conditions set by the lending organisation. House Building Finance Company (HBFC) is a public lending body working under the State Bank of Pakistan. Figure 2.4 shows the eligibility criteria (HBFC, 2019) to buy a house in Pakistan, for example an amount (up to 70% loan to value ratio) is lent to a household with a rate of interest at the Karachi Interbank Offered Rate (KIBOR) plus 3.25% (mark-up or profit rate as known in Pakistan), which is repaid over a fixed period up to 20 years.

Ability to repay – it is one of the most critical criteria in calculating the eligibility to borrow. As per ability to repay (ATR) rule a credit union must take reasonable steps with a good faith to determine that the borrower will have a reasonable means to

repay the loan according to terms and condition of housing loan or a mortgage (Small Entity Compliance Guide 2013).

The housing price – the price of housing is dependent on the other associated functions such as location, price of land, building material, labour cost, infrastructure, fees/taxes and other charges (Mulliner et al, 2016; Meen, 2018; Anacker, 2019). In the market system, the price of housing is a function of the cost plus the profit (or loss) the housing developer or builder is prepared and capable to extract. In the real estate market, nonetheless, shortage of housing supply creates demand and fetches more profit. Hypothetically, if the housing market functions well, excessive returns will pull and attract other housing developers and suppliers; unless business rivalry and competition amongst them brings the house prices down.

Land – is the most expensive component in setting the price of housing; it also determines the volume and number of housing units to be produced (Javaid, 2016). Geographic and locational features endow the housing with extra value and price. The locational features of the land decide both the available services close to the site but may also determine the price and the services that can be provided on site.

The cost of building – price of a unit or house is determined by the cost of construction and the area to be built (Casallo Blanco et al., 2005; Kalia, 2013; Al Shareem et al., 2014; Albert, Hallowell and Kleiner, 2014). The unit price may also be influenced by building regulations of the area, the house design and methods of building as well as local customs or it may be a case of individual preferences and taste.

Infrastructure and Services – as well as the land and the unit price, the cost of infrastructure and the services provided depend on the quality, quantity and the level of the services (Dowall and Ellis; Casallo Blanco et al., 2005; Sohail, Cavill and Cotton, 2005; Pakistan, 2009; Rafi, Wasiuddin and Siddiqui, 2012; Mouzughi, Bryde and Al-Shaer, 2014; Newman, 2015; Newman and Geoffrey Shen, 2015). There might also be off-site infrastructure required to service the housing development such as electric grid-station, water reservoirs, site access road, bridges etc.

Home Purchase Ghar Aasan Flexi - Eligibility Criteria

Citizenship:
> Resident Pakistani
> Non Resident Pakistani

Facility of Applicant / Co-applicant:
> Primary (or Single) & Co-applicant allowed
> Co-applicant must be an immediate family member

Age of Applicant / Co-applicant / Guarantor:
> Salaried: 18 – 57 years
> Self-employed Businessmen / Self-Employed Professionals: 18 – 62 years

Income Criteria: No minimum requirement

Employment / Business / Professional Tenure:
> Salaried*: Minimum 1 year continuous employment
> Self-employed Businessmen / Self-Employed

Product Features

Ghar Aasan Scheme – Flexi (GAS – Flexi)	
Loan Facility Amount	Loan Facility Amount up to PKR 25,000,000/-
Loan Facility Tenure	3 – 20 years
Profit Type	Variable
Profit Rate	> Salaried: 1 Year KIBOR* + 3.25% > Self-employed Businessmen / Self-Employed Professionals: 1 Year KIBOR* + 3.50 % * To be revised Annually
Loan To Value (LTV) Ratio / HBFC's Share	Up to 70% forced sale value (FSV) of the property to be mortgaged
Insurance Coverage	Life and Property Insurance coverage to the extent of financing amount *Insurance / Takaful Companies on HBFC's Approved Panel
Collateral Specifications	-

Figure 2.4: Home purchase eligibility criteria set by HBFC (2019)

Source: House Building Finance Company Pakistan online calculator (2019).

2.13 Chapter Summary: Major Findings for Narrowing the Research Question Refinement)

An affordable house is more than financial costs involved and should cater for larger issues of social wellbeing and sustainability for the community and the end-users. Figure 2.1 has been derived from the literature to shows an ideal affordable house for the low-income households in Pakistan, Figure 2.1 gives a visual info of affordable house, which is suitable for low-income households in Pakistan. This house meets 'Will I Live There' (WILT) standard (Mayday 2016), which means all properties must meet health & safety and fitness standard and has adequate conditions for humans to live in (Ni Direct, 2019). Figure 2.1 house is decent in quality within a sustainable community, has an accessible and more affordable ownership. Housing affordability threshold is 30% of monthly household income where a household is left with 70% of residual income to meet non-housing expense. This idealistic affordable house has a enough floor space to facilitate an average size family, is equipped with basic needs, has nearby local amenities, and cleaner neighbourhood.

This chapter was an attempt to find the answer for the research question (Section 1.3) and provides the base to make the affordable housing framework. The philosophical, academic and geographic research studies on the subject around the globe have been reviewed. There is a vast body of knowledge related to housing; the literature review remained focused to Pakistan. The affordable housing concept has been developed integrating housing affordability assessment criteria (Table 2.7) with the help of the literature review. Housing and non-housing expenses have been differentiated (Table 2.8).

2.13.1 Housing affordability assessment criteria (HAAC)

Literature on affordable housing including studies related to housing in Pakistan helped to develop a housing affordability assessment criteria (HAAC) given in Table 2.7.

Table 2.7: The social, economic and environmental criteria of housing affordability

CRITERIA	LITERATURE REVIEWED
Economic Criteria	
Housing expenses: i. Rent; ii. Monthly mortgage payment; iii. household income on monthly rent, water, gas and electricity bills etc., (also known as household expenses);	(Fisher, Pollakowski and Zabel, 2009; Dülgeroğlu-Yüksel, 2010; Waseem et al., 2011; Amjad and Idara-e-Taleem-o-Agahi, 2012; Amjad and MacLeod, 2014; Isalou, Litman and Shahmoradi, 2014; Kakakhel, 2014)
House price to buy a house	(Sohail, Maunder and Cavill, 2006; Maliene and Malys, 2009; Podvezko, 2011); Rafi, Wasiuddin and Siddiqui (2012); (Kalia, 2013; Mulliner, Smallbone and Maliene, 2013; Albert, Hallowell and Kleiner, 2014; ILO, 2014; Mouzughi, Bryde and Al-Shaer, 2014; Rossi and Civitillo, 2014; Worldometers - Elaboration of data by United Nations, 2015; Mulliner, Malys and Maliene, 2016)
Housing affordability is related to income	Hulchanski (1995); Statistics (2005-6); Stone (2006); Tirmzi (2007); Cook (2009); Fisher, Pollakowski and Zabel (2009); Tang (2009); Nenova (2010); Alaghbari et al. (2011a); Alaghbari et al. (2011b); Roy, Hulme and Jahan (2013); Isalou, Litman and Shahmoradi (2014); Calnan (2015); Hertz (2015); Marom and Carmon (2015); Javaid (2016); Napoli, Trovato and Giuffrida (2016); Sharafat and Sharafat (2016); Yap (2016); Elkins (2018); Herbert, Hermann and McCue (2018); Islamabad (2018); Anacker (2019)
$2 a day household income	(Kakakhel, 2014; Rizvi, 2015); (Kakakhel, 2014; Siddiqui, 2014; Islamabad, 2018)
30% income to expense ratio: a household should not spend	(Fisher, Pollakowski and Zabel, 2009; Dülgeroğlu-Yüksel, 2010; Waseem et al., 2011; Amjad and Idara-e-Taleem-o-Agahi,

more than 30% of their income on housing	2012; Amjad and MacLeod, 2014; Isalou, Litman and Shahmoradi, 2014; Kakakhel, 2014); (Elkins, 2018; Islamabad, 2018; Schwartz and Wilson, 2018; Anacker, 2019; Commission, 2019; Saunders, Lewis and Thornhill, 2019)
The housing affordability is not just a result of changes in housing costs, but is also a result of changes household income.	Jewkes and Delgadillo (2010)
Primary dwelling: Gross rent; mortgage interest payments; mortgage protection premiums; capital repayments of mortgage. Primary dwelling: Rent 1: gross rent; less housing benefit, rebates and allowances received. Mortgage: mortgage interest payments; mortgage protection premiums; capital repayment of mortgage. Outright purchase: deposits for secondary dwelling; council tax, mortgage, insurance Charges: council tax; water charges; service charge for rent; refuse collection, including skip hire. Moving house: property transaction - purchase and sale transactions. other payments: maintenance and repair of dwelling; central heating repairs; house maintenance etc.; paint, wallpaper, timber; equipment hire, small materials. Alterations and improvements to dwelling: central heating installation. DIY improvements: Double-glazing, kitchen units, sheds etc. Home improvements - contracted out: bathroom fittings	Morduch & Schneider, 2017; Warren & Tyagi, 2003; Prochorskaite et al. (2016); Giles (2003); Harris and Giles (2003); Horsfield (2015); Office for National Statistics, UK (2015); Desmond (2016); Cohen (2017); (Anacker, 2019)

; purchase of materials for capital improvements. Household insurances: structure; contents; household appliances.	
Non-housing expenses such as: cost of commuting and transportation; expenses to use health and education facilities; cost of clothing, every day utilities; child and health care; savings for retirement and emergencies; food, ill member of the household, kids with special needs, days out, meals and foreign holidays, issues such as housing design, features, structure, quality and location, end-users' geopolitical and socio-economic situations, demands/needs and some other criteria as well Other non-housing prospects such as: starting up a small business and perusing higher education; premium price for better environment and neighbouring surroundings; school going children; a chronic medical condition in the family, elderly parents or kids with special needs; days out, meals and foreign holidays, etc.,	Prochorskaite et al. (2016); (Anacker, 2019); (Drew, 2018; Sawhill, 2018); AHURI (2019); (Cohen, 2017); (Hertz, 2015); (Haq, Khan and Khurshid, 2013; Herbert, Hermann and McCue, 2018; Nikodem, 2018; Schwartz and Wilson, 2018; Anacker, 2019; Commission, 2019; Saunders, Lewis and Thornhill, 2019)
House prices in relation to incomes	(Bank; Hulchanski, 1995; Stone, 2006; Tirmzi, 2007; Fisher, Pollakowski and Zabel, 2009; Nenova, 2010; Alaghbari et al., 2011b; Clinton, 2014; Isalou, Litman and Shahmoradi, 2014; Calnan, 2015); Fisher, Pollakowski and Zabel (2009); Suhaida et al. (2011); Kalia (2013); Yao (2013); Velma Zahirovich-Herbert (2014); Ghar47 (2015); Javaid (2016)
Rental costs in relation to incomes	(Casallo Blanco et al., 2005; Cavill and Sohail, 2005; Fisher, Pollakowski and Zabel, 2009; Maliene and Malys, 2009; Banuls and Turoff, 2011; Podvezko, 2011; Zami, 2011; Rafi, Wasiuddin and Siddiqui, 2012; Xia and Chan,

	2012b; Kalia, 2013; Mulliner, Smallbone and Maliene, 2013; Enterprise, 2014; Isalou, Litman and Shahmoradi, 2014; Birko, Dove and Ozdemir, 2015; Gocer, Hua and Gocer, 2015; Jozi, Shoshtary and Zadeh, 2015; Karachi, 2015; Renzi and Freitas, 2015; Risberg et al., 2015; Wang et al., 2015; Zuo, Zhong and Kang, 2015; Mulliner, Malys and Maliene, 2016)
Interest rates and mortgage availability	Cavill and Sohail (2005); Rizvi (2009); Nenova (2010); Rizvi (2010); Kalia (2013) Hjort and Widen (2015)
Availability of social and private rented accommodation	UN-Habitat (2008); Maliene and Malys (2009); Andrea Bacova (Flexibility and Variability et al. (2011); Kalia (2013); Mulliner, Smallbone and Maliene (2013); Mouzughi, Bryde and Al-Shaer (2014); Marom and Carmon (2015); Mulliner, Malys and Maliene (2016); Napoli, Trovato and Giuffrida (2016); Roberts (2016), Anacker, (2019)
Residual income measure	Stone, (2006); Hertz, (2015)
Availability of affordable home ownership products	Mulliner et al. (2013)
Social Criteria	
non-housing expenses: cost of commuting and transportation, expenses to use health and education facilities, cost of clothing, utilities, transportation to work, child and health care, savings for retirement and emergencies, starting up a small business and pursing higher education, premium price for better environment and neighbouring surroundings, a chronic medical condition in the family, elderly parents or kids with special needs, days out, meals and foreign holidays	Anacker, 2019; Drew, 2018; Sawhill, 2018, Cohen, 2017; Meen, 2018 Hertz, 2015
Geographic location, social pressures, neighbourhood and environmental issues, etc.	(Sohail, Maunder and Cavill, 2006; Maliene and Malys, 2009; Podvezko, 2011); Rafi, Wasiuddin and Siddiqui (2012); (Kalia, 2013; Mulliner, Smallbone and Maliene, 2013; Albert, Hallowell and Kleiner, 2014; ILO, 2014;

	Mouzughi, Bryde and Al-Shaer, 2014; Rossi and Civitillo, 2014; Worldometers - Elaboration of data by United Nations, 2015; Mulliner, Malys and Maliene, 2016)
Safety (Crime level)	Albert, Hallowell and Kleiner (2014)
Access to employment opportunities in the closest proximity of the affordable housing	Fisher, Pollakowski and Zabel (2009); Geneva (2013); Albert, Hallowell and Kleiner (2014); Calnan (2015) <Low income housing in Pakistan with focus on urban housing_10_Oct_2015.pdf>); Bank ; Sohail, Maunder and Cavill (2006); Stone (2006); Tirmzi (2007); Fisher, Pollakowski and Zabel (2009); Nenova (2010); Alaghbari et al. (2011b); Clinton (2014); Isalou, Litman and Shahmoradi (2014); Calnan (2015)
Access to public transport services	(Sohail, Maunder and Cavill, 2006; Isalou, Litman and Shahmoradi, 2014; Jozi, Shoshtary and Zadeh, 2015) Casallo Blanco et al. (2005); Fisher, Pollakowski and Zabel (2009); Albert, Hallowell and Kleiner (2014); Hjort and Widen (2015)
Access to good quality schools	Fisher, Pollakowski and Zabel (2009); Podvezko (2011); Al Shareem et al. (2014); Amjad and MacLeod (2014); Calnan (2015); Wang et al. (2015), (Zami, 2011; Al Shareem et al., 2014),
Access to shops	Casallo Blanco et al. (2005), Mulliner and Maliene (2012)
Access to leisure facilities	Mouzughi, Bryde and Al-Shaer (2014), Mulliner and Maliene (2012)<Workplace Risk Assessment and Managment for Small and Medium Sized Enterprises_18_Apr_2015.pdf>); Geneva (2013)
Access to open green public space	Mouzughi, Bryde and Al-Shaer (2014), Mulliner and Maliene (2012)<Workplace Risk Assessment and Managment for Small and Medium Sized Enterprises_18_Apr_2015.pdf>); Geneva (2013)
Quality of housing	Fisher, Pollakowski and Zabel (2009); Maliene and Malys (2009); Mulliner, Smallbone and Maliene (2013); Mulliner, Malys and Maliene (2016)
Affordable housing is that which is adequate in quality and	(Fisher, Pollakowski and Zabel, 2009; Maliene and Malys, 2009; Sohail and Cavill, 2009b;

location other basic living costs or threatens their enjoyment of basic human rights'	Sohail and Cavill, 2009a; Hallowell and Gambatese, 2010c; Amjad and Idara-e-Taleem-o-Agahi, 2012; Mulliner, Smallbone and Maliene, 2013; Albert, Hallowell and Kleiner, 2014; Amjad and MacLeod, 2014; Popovic et al., 2014; Gocer, Hua and Gocer, 2015; Wang et al., 2015; Mulliner, Malys and Maliene, 2016),
The notion of reasonable housing costs in relation to income: that is, housing costs that leave households with enough income to meet other basic needs such as food, clothing, transport, medical care and education	Australia National Housing Strategy (1991); Burke (2004)
Affordability is not simply a matter of housing costs and income levels; it is about people's ability to obtain housing and to stay in it	Housing New Zealand Corporation (2005)
Desirability of neighbourhood area	Mulliner and Maliene (2012)
Deprivation in area	Mulliner and Maliene (2012)
Presence of environmental problems (e.g. litter, traffic)	Casallo Blanco et al. (2005), Mulliner and Maliene (2012), Cavill and Sohail (2005); Hallowell and Gambatese (2010c); Pannucci and Wilkins (2010); Zami (2011); Albert, Hallowell and Kleiner (2014); Cheng (2014); Popovic et al. (2014), Isalou, Litman and Shahmoradi (2014)
Built Environment and Environmental	
Housing affordability is a multi-dimensional issue that affect households, including economic, environmental and social aspects (Mulliner and Maliene 2011).	Amaratunga et al. (2002); Maliene and Malys (2009); Hallowell and Gambatese (2010c); Adegbehingbe (2011); Folaranmi (2011); Huang and Hsu (2011); Madawaki (2011); Stanley and Orobowale (2011); Zami (2011); Mulliner, Smallbone and Maliene (2013); Albert, Hallowell and Kleiner (2014); Mouzughi, Bryde and Al-Shaer (2014); Birko, Dove and Ozdemir (2015); Carrilho da Graça, Daish and Linden (2015); Gocer, Hua and Gocer (2015); Ibrahim, Costello and Wilkinson (2015); Jozi, Shoshtary and Zadeh (2015); Risberg et al. (2015); Wang et al. (2015); Zuo,

	Zhong and Kang (2015); Mulliner, Malys and Maliene (2016)
Access to open green public space	Huang and Hsu (2011); Zami (2011); Mulliner, Smallbone and Maliene (2013); Albert, Hallowell and Kleiner (2014); Birko, Dove and Ozdemir (2015); (Calnan, 2015); Ibrahim, Costello and Wilkinson (2015); Jozi, Shoshtary and Zadeh (2015); Mulliner, Malys and Maliene (2016)
Quality of housing	Fisher, Pollakowski and Zabel (2009); Maliene and Malys (2009); Mulliner, Smallbone and Maliene (2013); Mulliner, Malys and Maliene (2016) authority interview
Energy efficiency of housing	Isalou, Litman and Shahmoradi (2014); Gocer, Hua and Gocer (2015); Risberg et al. (2015); Wang et al. (2015); Zuo, Zhong and Kang (2015)
Availability of waste management facilities	Casallo Blanco et al. (2005), Mulliner and Maliene (2012), Cavill and Sohail (2005); Hallowell and Gambatese (2010c); Pannucci and Wilkins (2010); Zami (2011); Albert, Hallowell and Kleiner (2014); Cheng (2014); Popovic et al. (2014), Isalou, Litman and Shahmoradi (2014)
Presence of environmental problems (e.g. litter, traffic)	Cavill and Sohail (2005); Hallowell and Gambatese (2010c); Pannucci and Wilkins (2010); Zami (2011); Albert, Hallowell and Kleiner (2014); Cheng (2014); Popovic et al. (2014), Waseem et al. (2011)
Housing affordability is also dependent on social and environmental criteria such as geographic location, social pressures, neighbourhood and environmental issues, etc.	(Sohail, Maunder and Cavill, 2006; Maliene and Malys, 2009; Podvezko, 2011); Rafi, Wasiuddin and Siddiqui (2012); (Kalia, 2013; Mulliner, Smallbone and Maliene, 2013; Albert, Hallowell and Kleiner, 2014; ILO, 2014; Mouzughi, Bryde and Al-Shaer, 2014; Rossi and Civitillo, 2014; Worldometers - Elaboration of data by United Nations, 2015; Mulliner, Malys and Maliene, 2016)

Economic, social and environmental criteria should also be considered to assess the housing affordability. Housing affordability is a multi-dimensional issue that affects households, including economic, environmental and social aspects Access to open green public space; quality of housing; energy efficiency of housing; availability of waste management facilities; presence of environmental problems (e.g. litter, traffic)	(Sohail, Maunder and Cavill, 2006; Maliene and Malys, 2009; Podvezko, 2011); Rafi, Wasiuddin and Siddiqui (2012); (Kalia, 2013; Mulliner, Smallbone and Maliene, 2013; Albert, Hallowell and Kleiner, 2014; ILO, 2014; Mouzughi, Bryde and Al-Shaer, 2014; Rossi and Civitillo, 2014; Worldometers - Elaboration of data by United Nations, 2015; Mulliner, Malys and Maliene, 2016)
Research related to Pakistan	
Affordable Housing in Pakistan Habitat International. A Comparative Analysis of the Role of the Private Sector as Education Providers in Improving Issues of Access and Quality. Academic effectiveness of private, public and private-public partnership schools in Pakistan. Restricting of research and development in Pakistan Science Vision. What Does Minimum Wage Get You in Lahore, Pakistan? Something Far Away from the Pakistani Middle Class P.D. Urban Land and Housing Market in the Punjab, Pakistan. Urban Studies. Beautiful House for Rent in G-11/4 Pakistan housing market enjoys price uptick in 2015. Pakistan Minimum Wage and House Price. The three major cities: Rise and fall in property prices.	(Dowall and Ellis; Afshar, 1991; Niazi and Khetran, 2001; Pakistan, 2001a; Pakistan, 2001c; Hasan and Mohib, 2003; Casallo Blanco et al., 2005; USAID, 2005; Sohail, Maunder and Cavill, 2006; Tirmzi, 2007; Pakistan and America, 2008; Cook, 2009; Pakistan, 2009; Shirazi, 2009; Pakistan, 2010; Rizvi, 2010; USAID, 2010; Tariq, 2011; Waseem et al., 2011; Amjad and Idara-e-Taleem-o-Agahi, 2012; Jahangir, 2012; Lodhi, 2012; Masood Rafi, Wasiuddin and Hameed Siddiqui, 2012; Rafi, Wasiuddin and Siddiqui, 2012; Today, 2012; Haq, Khan and Khurshid, 2013; Report, 2013; Sheikh et al., 2013; Amjad and MacLeod, 2014; Aslam, 2014; Enterprise, 2014; Kakakhel, 2014; Malik and Sajjad, 2014; Siddiqui, 2014; Tariq, 2014; Butt, 2015; Ghar47, 2015; Islam, 2015; Islamabad, 2015; Jabeena, Shengb and Aamir, 2015; Journalists, 2015; News, 2015; Rizvi, 2015; Shahid, 2015; Statistics, 2015; Worldometers - Elaboration of data by United Nations, 2015; Gerrity, 2016; Javaid, 2016; Shaikh, 2016; Sharafat and Sharafat, 2016; Shaikh, 2017; Islamabad, 2018)

Understanding Slums: A Case Study of Karachi Pakistan. Pakistan Real Estate. Ghar 47. Enhancing Builder Finance in Pakistan. Economic benefits of low-income housing in Pakistan. Housing Crises in Pakistan: Review of Population Growth and Deficiencies in Housing Laws and Policies. The Need of Research Culture in Pakistan. Current situation of Pakistan's real estate market, and its long-term economic forecast. Slums in Islamabad. Earning $2 a day, 60.19% population live below poverty line. . A pilot study of researching the research culture in Pakistani public universities: the academics' perspective. . In conversation with Jawad Aslam: The challenges of providing affordable housing in Pakistan. . Assessment of fire hazard in Pakistan. Disaster Prevention and Management. Pakistan confronts with challenges of housing backlog of 9 million units. Study on the State of Domestic Commerce in Pakistan. Punjab Public-Private Partnership for Infrastructure Ordinance 2009. Pakistan Demographic and Health Survey. Pakistan Standard Industrial Classification (All Economic Activities) Revision 4. National Housing Policy of Pakistan 2001.	

Assessment of fire hazard in Pakistan. Disaster Prevention and Management. Monsoon is not that pleasant in slums. International Housing Challenge: Overview of Issues and Answers. Lack of funds affecting research and development. Pakistan's Real Estate Divide. Housing in Equality in Pakistan: The Case of Affordable Housing. Income Tax Slabs - Financial Year 2015-2016 Pakistan. Factors contributing to lack of interest in research among medical students. Architecture: Using Mud to Build Homes. Pakistan's Urbanization Effective regulation for sustainable public transport in developing countries. Household Integrated Economic Survey (HIES). Facilitating Community Development with Housing Microfinance: Affordable Housing Solution in Pakistan after Disasters. Facilitating Community Development with Housing Microfinance: Appraising Housing Solutions for Pakistan after Disasters. Sustainable Urban Development Strategies for the Provision of Low-Income Housing in Pakistan. . No more living on the Ravi. USAID Country Profile: Pakistan, Property Rights and Resource Governance.	

Land Tenure and Property Rights in Pakistan. Epidemiology of major incidents: an EMS study from Pakistan. Pakistan Population Forecast.	

The literature reviewed (Table 2.7), helped to make better understanding of global affordable housing situation. Global affordable housing best practices (Section 2.5) aided to find out a possible solution for affordable housing in Pakistan. Later this Table 2.7 provided a base and material to develop a questionnaire for the fieldwork survey.

2.13.2 Difference between housing and non-housing expenses

Literature review indicates (Table 2.8) that housing affordability is a mixture of housing and non-housing issues related to social, environmental and economic criteria. A difference between two major household expenses have been presented in Table 2.8 derived from the literature.

Table 2.8: Housing and non-housing expenses with references

Type of expenses	Items	References
Housing costs or expenses	Primary dwelling: Gross rent; mortgage interest payments; mortgage protection premiums; capital repayments of mortgage. Primary dwelling: Rent 1: gross rent; less housing benefit, rebates and allowances received.	Morduch & Schneider, 2017; Warren & Tyagi, 2003; Prochorskaite et al. (2016); Giles (2003); Harris and Giles (2003); Horsfield (2015); Office for National Statistics, UK (2015); Desmond (2016);

	Mortgage: mortgage interest payments; mortgage protection premiums; capital repayment of mortgage. Outright purchase: deposits for secondary dwelling; council tax, mortgage, insurance Charges: council tax; water charges; service charge for rent; refuse collection, including skip hire. Moving to a new house: property transaction - purchase and sale transactions. other payments: maintenance and repair of dwelling; central heating repairs; house maintenance etc.; paint, wallpaper, timber; equipment hire, small materials. Alterations and improvements to dwelling central heating installation. DIY improvements: double glazing, kitchen units, sheds etc. Home improvements - contracted out: bathroom fittings ; purchase of materials for capital improvements. Household insurances: structure; contents; household appliances.	Cohen (2017); (Anacker, 2019);
Non-housing expenses or life's other necessities	Non-housing expenses such as: cost of commuting and transportation; expenses to use health and education facilities; cost of clothing, every day utilities; child and health care; savings for retirement and emergencies; food, ill member of the household, kids with special needs, days out, meals and foreign holidays, issues such as housing design, features, structure, quality and location, end-users' geopolitical and socio-economic situations, demands/needs and some other criteria as well Other non-housing prospects such as: starting up a small business and perusing higher education; premium price for better environment and neighboring surroundings; school going children; a chronic medical condition in the family, elderly parents or kids with	Prochorskaite et al. (2016); (Anacker, 2019); (Drew, 2018; Sawhill, 2018); AHURI (2019); (Cohen, 2017); (Hertz, 2015)

	special needs; days out, meals and foreign holidays, etc.,	

2.13.3 Affordable housing versus housing affordability

In the United States and in Britain, housing affordability is usually expressed in terms of 'affordable housing', however, housing affordability is not a characteristic of housing, and it is a relationship between people and housing (Stone, 2006). Government's subsidized housing for low-income households is called affordable housing, whereas, housing affordability is a general level of household income relative to a general level of housing price, as explained by O'Toole (2017). Affordable housing is often measured by dividing median home prices by median family incomes (Fisher, Pollakowski and Zabel, 2009; Boulkedid et al., 2011; Baranoff, 2016).

2.13.4 Income threshold to assess the housing affordability of low-income households in Pakistan

In the context of this research, 30% of the income to expense ratio will be used as a guidance reference. It is a standard income threshold to assess the housing affordability and has been used by the US government since 1981 (Schwartz and Wilson, 2018). Previous studies (Fisher, Pollakowski and Zabel, 2009; Dülgeroğlu-Yüksel, 2010; Waseem et al., 2011; Amjad and Idara-e-Taleem-o-Agahi, 2012; Amjad and MacLeod, 2014; Isalou, Litman and Shahmoradi, 2014; Kakakhel, 2014;

Elkins, 2018; Meen, 2018; Schwartz and Wilson, 2018) have quoted 30% IER criteria as standard and have not found it to be invalid. Table 2.9 presents the income threshold for low-income households of Pakistan.

Table 2.9: Income threshold for Pakistan

Criteria	Income Per day	Exchange Rate: Rs. 163
Poor	$2 (USD) a day	Rs. 326 PKR
Low Income	$2.01-10 a day	Rs. 326-1631
Lower middle income	$10.01-20 a day	Rs. 1631-3262
Upper middle income	$20.01-50 a day	Rs. 3262- 8156
High income	More than $50 a day	More than Rs. 8156
Source: XE.com as of 28th June 2019		

The underlying theory is that those on upper income level and spend more than 30 percent of their funds on housing do so as a personal choice and such housing expenses have no or little impact on the household's ability to spend money on life's other necessities (such as food, health care, education etc.) (AHURI, 2019). Anacker (2019) have divided households into following categories based on their income: i. most low-, very low- and extremely low-income. The parameters given in Table 2.9 have been set to determine the household income threshold for low-income households in Pakistan for this research.

2.13.5 Housing situation in Pakistan

Housing situation in Pakistan has also been reviewed (Table 2.7) to highlight the challenges, indicators and housing structure. A review of literature related to housing situation in Pakistan (Section 2.10 and 2.11) provided a logical approval for this

research study for example, the population of Pakistan is around 192 million (estimated at July 2016, Table 2.6) and the daily News (2015) reported that Pakistan need almost 9 million housing units to facilitate low and middle income population. Population is the biggest challenge to provide affordable housing in Pakistan, as it ranks number 6 in the list of countries by population. A labourer on daily wages earns almost $2 a day (Kakakhel, 2014). HBFC is the only government subsidized housing finance company and use IER to assess the housing affordability and they use minimum of 60-70% loan to value ratio (HBFC, 2019). Literature review (NHP, 2001) has revealed that, there is an eminent need for new housing policy and strategy to tackle the deficit situation in the country especially for the low-income segment of the population.

The literature reviewed related to Pakistan (Table 2.7) build up the argument to find the answer for the research questions (Section 1.3) and provides a logical reason to conduct this research.

3   CHAPTER THREE: RESEARCH METHODOLOGY

3.1   Introduction

The forgoing chapter is about the concept of affordable housing and the housing affordability assessment criteria. It requires some clarification of underlying philosophical assumptions and usage of appropriate research method(s) to make a research study valid and to establish knowledge. This chapter mainly focused on the conceptual and philosophical clarification of affordable housing concept, how and why building affordable housing for the low-income households in Pakistan. The chapter presents a review of research methodology used for this research study. This chapter, therefore, review some literature to find the best-suited philosophical assumptions and design strategies to support this research study. At the outset, common philosophical assumptions have been reviewed and presented and both positivistic and the interpretive paradigm have been reviewed to establish their suitability for the agenda of this research. Later, the chapter highlights the research methodologies, and research design used in this study including strategies, tools, collection of data and analysis methods involved in the study.

3.2   Description of research paradigms and philosophies

According to Morgan (2007) 'paradigm' is a set of beliefs to guide a field within science studies, whereas, Creswell (2014) calls it 'worldview' instead, some researchers also referred it as an 'epistemological stance' or in simple words a shared belief within a specific subject area (Morgan 2007). Mainly the process of a research project is to explore the unanswered questions and implication of

philosophies within a framework. It is vital to make the research process unbiased and the findings reliable, for that it needs some testing procedures, methods and techniques (Kumar, 2011). There are three major research dimensions in a research process: i. Ontology, ii. Epistemology and iii. Methodology. Research paradigm is a comprehensive scheme of interrelated perception and practice that outline the nature of investigation along these three dimensions (Terre Blanche and Durheim, 1999). In research, 'paradigm' is a set of beliefs to guide a field within science studies (Morgan, 2007); it is also known as 'worldview' (Creswell, 2014). Paradigm is a conceptual framework shared by group of scientists, which help them to establish an appropriate model to examine a research problem and to find solution to it (Kuhn, 1962). A research paradigm can be denoted as a cluster of fundamental conceptions, theories, variables and research problems attached to consistent methodological strategies and tools (Munyua and Stilwell, 2012; Burrell and Morgan, 2017). The term paradigm has been derived from the historical events during the scientific researches, where it has been used as a 'cluster of beliefs which dictates the scientists in a particular subject area that influenced what should be done and how the results should be interpreted' (Bryman, 2008). Paradigms direct the researcher about existence of knowledge and comprehended how it can be known while legitimising the manner to conduct a research. In simple words, paradigms are more like lenses that help a researcher to view phenomena (Polit and Beck, 2004).

Ontology – is a branch of philosophy concerned with articulating the structure of the world and the nature (Wand and Weber, 1993). It is about the assumptions made regarding the nature of reality to be investigated (Munyua and Stilwell, 2012; Akkuzu

and Uyulgan, 2016; Burrell and Morgan, 2017), or the knowable and what can be known about the reality (Snape and Spencer, 2003).

Epistemology – refers to the nature of the relationship between the knower (the researcher) and it signifies (Hirschheim, Klein, and Lyytinen, 1995) the nature of human understanding and knowledge which can possibly be developed through alternative approaches of investigation and using different types of inquiry tools (Munyua and Stilwell, 2012; Akkuzu and Uyulgan, 2016). Some researchers also referred it as a shared belief within a specific subject area (Morgan 2007). According to Byrne (2001), epistemology is a philosophy of knowledge and assumes a divide between one is being and knowing. Epistemology stipulates the nature of relationship or the nature of the knowledge between the researcher and the way the knowledge is acquired (Munyua and Stilwell, 2012). It offers a broader set of assumptions about the best ways of reviewing the nature of the world.

Methodology – is a way to practically finding out whatever a researcher believes can be known and how to investigate it (Kothari, 2004; Akkuzu and Uyulgan, 2016; Igwenagu, 2016; Elmabruk, 2018; Melnikovas, 2018). Research methodologies explore and define the purpose of the research and present the rationale and the philosophical assumptions that underlie a study or a scientific method (Igwenagu, 2016; Elmabruk, 2018; Melnikovas, 2018). It helps to choose the key methodological patterns and paradigms to provide a broader framework for the research approach chosen for a research study (Kothari, 2004; Boulkedid et al., 2011; Albert, Hallowell and Kleiner, 2014; Igwenagu, 2016; Elmabruk, 2018; Melnikovas, 2018). Mainly the process of a research project is to explore the unanswered questions and implication

of philosophies within a framework (Munyua and Stilwell, 2012; Burrell and Morgan, 2017). It is vital to make the research process unbiased and the findings reliable, for that it needs some testing procedures, methods and techniques (Kumar, 2011). Methodology is the philosophical basis for using a research method (Munyua and Stilwell, 2012; Albert, Hallowell and Kleiner, 2014; Mulliner, Malys and Maliene, 2016).

In some way, exploring an appropriate philosophical position and to translate it into a coherent research practice, there is a need to take some practical considerations regarding researcher's own belief, the subject area, the time, availability of finances for research project, and access to primary and secondary data (Saunders, Lewis and Thornhill, 2019). Research philosophy offers to develop a framework of thinking, helps establish capacities of thinking and increases the configuration between what we think and what we do (Paul, 1993 and Honderich, 1995). Philosophy, at the heart of it, is a systematic scrutiny of the assumptions and collective wisdoms (Root, 1993) that underlies action and thought.

In apprehending the prospective efficacy of philosophy, there needs a system of thought and action (Bohm, 1994). The philosophical knowledge claims to represent the set of major assumptions in relation to the world, place of an individual in it and the relationships between the researcher and the world. The assumptions related to the research philosophy *(ontology); knowing (epistemology) and acting (axiology)'* (Denzin and Lincoln, 2000). Cresswell (1994) philosophically identifies five sets of major assumptions related to real knowledge:

a. Question of ontology – how to know what is true?

b. Question of epistemology – what are the values that go into it?

c. Question of axiology – how to interpret/write about it?

d. question of rhetoric

e. question of methodology – the process of studying it

(Source: Kuhn, 1970; Gioia and Pitre, 1990; Creswell, 1994).

The ontological and epistemological position and orientation within the research paradigm determines the entire course of the research project, it is vital for a researcher to recognise and understand it (Hussey and Hussey, 1997).

The word philosophy is Greek word meaning 'the love of wisdom (Cavalier, 1990), it encapsulates the wisdom. It involves rational about research questions, analyses, trying out new ideas and possible opinions in the favour and against them and speculating how theories really work (Ruona, 2000). The term research philosophy refers to a structure of assumptions and beliefs regarding development of knowledge. These assumptions guide the research philosophy, strategy and methods to adopt (Melnikovas, 2018) and to develop a research design to answer the research question.

The two leading research paradigms have been advocated in this chapter i.e., and interpretivism (qualitative) and positivist (quantitative) paradigms (Cook and Reichardt, 1979; Easterby-Smith, 1991; Denzin and Lincoln, 2000 and Creswell; 1994). In the literature (Cook and Reichardt, 1979; Easterby-Smith, 1991; Denzin and Lincoln, 2000 and Creswell; 1994) the term interpretivism has been referred interchangeably with the phenomenological concept as a paradigm. However, the concept of interpretivism has been opted to use for this research work. It is also

significant to note that phenomenology is associated to inductive reasoning, whereas, positivism to the deductive reasoning (Akkuzu and Uyulgan, 2016). Some researchers (Babbie, 1998 and Creswell, 1994) however, believe that, in practice, social and scientific inquiry involve an alternation between induction and deduction. Where, through the deductive phase, researcher lean towards observations, while, during the inductive phase, researcher be likely to find reasons from observations.

This research has a wider context of development of housing affordability assessment criteria, which is very much based on the housing stakeholders' perceptions and responses towards the subject area. The nature of the problem in the context to the housing affordability and affordable housing study, require a wider approach and focus remain on individuals' responses (Robson, 2011), observation and the data results. In this research, several groups of stakeholders are involved based on their demographic demarcation in Pakistan. A survey-based approach was used to collect primary data related to the interpretivism approach to develop a new housing affordability phenomenon for the region of Pakistan. During the inductive phase, in social science inquiry, researcher tends to 'reason from' their observations (Babbie, 1998; (Munyua and Stilwell, 2012; Creswell, 2014; Burrell and Morgan, 2017).

Social research or social sciences and the environmental studies are built mainly on four research philosophies that dominate the research approach (Hunt, 1991; Easterby-Smith, Thorpe and Lowe, 2002), social constructivism, post-positivism, transformative and pragmatism (Creswell, 2014).

3.2.1 Positivism

A French philosopher called August Comte introduced positivism paradigm to explore social reality. According to him, true knowledge and awareness are based on experience of sense and observation that is achieved by experiment and observation; and they are the best ways to understand and explore human behaviour. At the ontological level, positivists believe that knowledge is objective and measurable (Sheikh et al., 2013), reality is objectively given and can be measured using characteristics which are independent to the researcher, to their tools and instruments (Cavill and Sohail, 2005; Sheikh et al., 2013; Larisch, 2014; Zuo, Zhong and Kang, 2015). The positivistic researchers have tendency to rely on numerical data, using statistical handling to establish conclusions based on a theory testing. The positivistic approach has an ability to identify, measure, and evaluate any phenomenon with an explanation and rationale (Neville 2007). The positivist approach also has the flexibility to break the subject area into small elements for better understanding of the subject (Amaratunga et al, 2002; Greener, 2008). It also uses theory-testing techniques to check whether the empirical data (field observations) behave in a predicted way. Positivism uncovers truth and present it by empirical means (Henning, Van Rensburg and Smit, 2004). Systematically, in order to improve accuracy in the depiction of relationship and parameters, researchers adopt scientific methods to generate knowledge with the help of numerical quantification (Henning, Van Rensburg and Smit, 2004). While, ontology considers the reality as independent of social construction, on the other hand positivist position upholds that scientific knowledge is based on facts. A researcher

can adopt an 'objectivist' perspective (a realist ontology: real world and belief in an objective) if the research study involves a constant and invariable reality. A realist ontology is a detached epistemological stance based on a belief that peoples' statements and opinions are either false or true, wrong or right. A belief where methodology that relies on manipulation and control of reality can be employed.

Positivism regards human behaviour as controlled, passive and determined by peripheral environment. Hwang (1996) associates positivist thing with diverse practices and theories for example, logical positivism (non-realism), behaviourism, empiricism, Comtean-type positivism and cognitive science. Positivistic paradigm sustained to effect social research in the latter half of the twentieth century, until then criticizers from two unconventional traditions confronted its domination: critical postmodernism and interpretive constructionism. It was challenged due to lack of subjectivity in interpreting social reality. Its critics argued that in the process of scientific inquiry, objectivity should be replaced by the subjectivity. Critical postmodernism and constructionism offer theoretical, methodological and practical approach to a research (Gephardt, 1999).

A modern objectivist perspective named post-positivism (Phillips, 1990) claims that, though the object of our survey exists independent and outside of human mind, it cannot bring acute accuracy with our perceived observations. In simple terms, it is almost impossible to reach complete objectivity, nonetheless it pursues as an ideal model to standardise our pursuit for knowledge. As expressed by Cook and Campbell (1979), this signifies the critical realist ontology. In order to gather wider knowledge and information, mostly quantitative and experimental methods are

associated with positivist approach. However, in recent years, the positivist emphasis has been shifted to a degree by curiosity in using qualitative methods (Gephardt, 1999).

3.2.2 Interpretivism

Interpretivism researchers believe that the reality is based on individual's subjective experiences and involvements of the external world (Cavill and Sohail, 2005; Calnan, 2015); hence, they may adopt an inter-subjective ontological and epistemology assumption that reality is socially created (Easterby-Smith, 1991; Creswell; 1994; Denzin and Lincoln, 2000).

Interpretivists are anti-foundationalists according to Willis (1995), they believe there is no specific process to knowledge or there is no single correct route, where, foundationalism is a view regarding the knowledge and justification, where knowledge and justified belief are based on foundation of non-inferential knowledge (Hassan and Fumerton, 2018). According to Walsham (1993) that in the interpretive tradition, there are, no incorrect or correct theories and they should be judged according to the impact they have on the researcher as well as those involved in the similar projects. They endeavour to develop their theories from the field by a comprehensive scrutiny of the phenomenon of their interest. The Interpretivists believe that knowledge and its meaning are based on the interpretation, yet, there does not exist any objective knowledge that is independent of reasoning and human thinking (Gephardt, 1999). Myers (2009) argues that the whether reality is socially constructed or given, proposition of interpretive researchers is that it can only be

accessed via social constructions such as language, shared meanings and consciousness. Interpretive assumptions are underpinned by interpretation and observation. Interpretivists research thus observe a phenomenon to collect information about an incident to latter interpret it to make it meaningful information by depiction and inferences or by judging the match between the abstract pattern and information (Munyua and Stilwell, 2012; Burrell and Morgan, 2017).

The Interpretivists, attempt to precisely decode, describe and interpret the meanings of phenomena happening in the normal social setting through qualitative researchers (Fryer, 1991). The interpretative paradigm shares the theoretical assumptions of qualitative research, which assumed that social reality is developed and sustained by the subjective experience of individuals involved in the situation (Morgan, 1980). The researchers working in the framework of the interpretative paradigm are mainly focussed to explore the shared subjectivity and complexity to authenticate the contextualization to minimise the illusion about the research and the phenomenon being researched (Fryer, 1991). In general, qualitative research likely takes place in natural setting (Colón, Taylor and Willis, 2000; Amaratunga et al., 2002; Henning, Van Rensburg and Smit, 2004; Hallowell and Gambatese, 2010a; Creswell, 2014; Brady, 2015). Through this research paradigm, the focus remains on everyday activity; qualitative research is less likely to force a priori order in the collection of data. Qualitative research is more focused to idiographic descriptions, embryonic themes and less driven by very explicit categorical frameworks and hypotheses (Cassell & Symon, 1994). As it can lead a researcher to build an explanation to a hypothesis, therefore, could be most useful for

exploratory and inductive research (Ghauri & Kjell, 2005). Ting-Toomey (1984) presents three features of qualitative investigation within the fundamental philosophies of the interpretative paradigm, qualitative research is:

i.   The study of figurative discourse that contains of the investigation of communication and versions.

ii. The study of the interpretive philosophies, which is used to make sense of peoples' symbolic actions.

iii. The study of circumstantial principles such as the roles of the physical setting on the participants, a set of situational events that guide the explanation of discourse.

The interpretivist paradigm is a social science that deal with human action and behaviour (Giddens, 1974). This research paradigm has a clear inter-relationship between the research (what is being researched) and the researcher. Confirming what truly exists in the human and social world rest on the researcher's philosophical assumptions and interpretation, and interpretative scrutiny of idiosyncratic meanings base upon experiential rules henceforth the development of the methodological techniques, particularly the typology of coherent action (Giddens, 1974).

It is considered that interpretivism is the most applicable paradigm for this research work as it pursues to solve the research questions as stated in section 1.3. This research seeks to determine what the common trend is in term of the necessary housing affordability assessment criteria that need to be required by housing professionals involved in the process of delivering affordable housing in Pakistan. The housing professionals involved in delivering affordable housing have diversity

in their levels of actions skills. Seeking to establish a housing affordability assessment criterion through these different participants' opinion and perception levels in the process of delivering affordable housing indisputably have to be within the interpretative paradigm. As the focus of this research by nature is in lived experience and dynamic process rather than stagnant and static reality. Qualitative by default, it is useful to develop meaning through participants involved in this study, and observe the context within which the housing professionals respond, create a new theory and indulge into the process by which their actions and events take place. Qualitative paradigm is useful to understand what lies behind any occurrence and phenomenon (Strauss and Corbin, 1990). Phenomenology, in addition, is closely associated to the interpretivism paradigm as it orbits around the meaning of the participants' lived experiences in a research study about a phenomenon (Munyua and Stilwell, 2012; Burrell and Morgan, 2017). Human experiences and the structures of consciousness are explored through this approach (Creswell, 1998 and Patton, 1990). As the notion of the lived world is rooted in this research, therefore, phenomenological approach is important for this research. Rather than observing it as a disinterested scientist, the researchers involved in this type of research act in human and social world. The researcher deals with human relationships within the world instead of the reality of the world.

Interpretivism, according to Creswell (2014) is also known as social constructivism, mainly emphasises on the subjective and idiosyncratic meanings that an individual establishes regarding the world and considered the main paradigms for social research (Hunt, 1991; Easterby-Smith, Thorpe and Lowe, 2002). However, critical

postmodernism is also considered appropriate paradigm for social science studies (Gephart 1999). Feminism and Constructivism, Interpretivism (Byrne, 2001) are three core qualitative paradigms for social research (Munyua and Stilwell, 2012).

3.3 Research Philosophy and Methodology Used for This Research (adoption of Resarch Onion)

Research process is more like a road map, which helps to achieve research objectives by hitting one post after another. Research process includes serval actions and series of necessary steps to carry out research and desired sequencing of the steps (Kothari, 2004).The track of this map is determined by the subject area of the research and research question.

The research process in this study establishes a gradual and systematic development of research progress. It involves identifying of housing affordability assessment criteria, verification, assessment, analysis, and then development of housing affordability framework and then expressing it. All these methodical activities are based on primary and secondary sources from which framework and conclusion are formulated. The process to develop knowledge and our view about the knowledge influences the philosophy we adopt (Burrell and Morgan, 2017; Melnikovas, 2018; Saunders, Lewis and Thornhill, 2019), embarking to develop knowledge could also be addressing to a specific problem in a particular scenario (Saunders, Lewis and Thornhill, 2019).

'Research' is something that a researcher undertakes to investigate about their subject area in a systematic way, thereby to understand and gain knowledge (Saunders et al, 2009). The data is collected and interpret in a defined and strategic

manner. Hence, the research may be well-defined in terms of analysis of existed knowledge in a specific area together with the establishing a new slant on the existed knowledge (Riley et al., 2000).

According to Saunders, Lewis and Thornhill (2019) research methodology involves the hypothetical and theoretical frameworks that help to learn various methods and techniques which are used to conduct a critical research study, carry out analytical tests, experiments and surveys. As described by Saunder et al (2009), the 'Research Onion' structure warrants a reliable, effective and reliable research and covering all areas of research methods related to this research. Research process will cover each of the related layers of the research onion (Figure 3.1) which was essential for the success of this research.
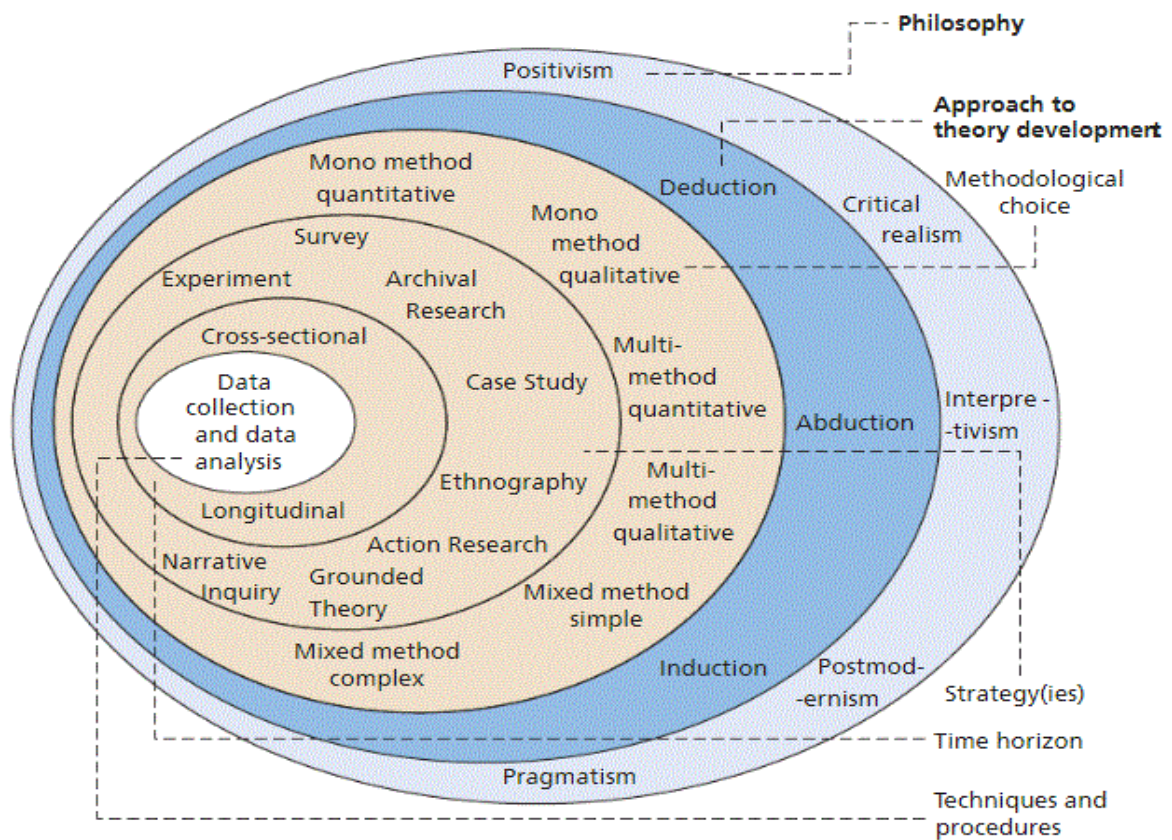
Figure 3.1: Research Onion
Source: (Saunders, Lewis and Thornhill, 2019)

3.3.1 Philosophy used for this research: Interpretivism)

The first layer of the Research Onion presents the research philosophy. Research

philosophy can be related to the nature of the knowledge and to create knowledge.

Research philosophies guide the researcher the way they see the world, by selecting

methods and approach as part of that strategy. None of the philosophies is better

than the other, but a chosen philosophy affects the point of view of the researcher

and therefore, choosing a philosophy needs to be done carefully. Two of the mostly used philosophies named as i. Positivism, ii. Interpretivism have been discussed in Section 3.2.1 and 3.2.2.

The researcher seeks to comprehend the differences of opinion that exist between people and the world as per their point of view; for this reason. This research has adopted the interpretivism philosophy. Interpretivism philosophy is adopted to for human does not object and is suitable for social science research (Saunders et al. 2007). Therefore, based on the fact this research is related to interpretivism philosophy as it seek to get opinion of several housing stakeholders including end-users about their concept of affordable housing, which can be influence by their economic, social and environmental position in the community, living standard and personality.

3.3.2 Inductive reasoning

The next layer of the Research Onion (Figure 3.1) is the research approach Research design for a research project is like an architectural plan for construction of a building. According to Saunders et al (2019) there involve series of decisions before making an appropriate choice for an overall approach to the research design and data collection techniques. The research approach is the generalisation of data collected for conducting the research (Creswell, 2014; Robson, 2011; de Vaus, 2002; Bryman, 2012). A research project always needs a theory (Saunders e al (2007), it is not necessarily needed in the research design but is presented in the data results and conclusion.

This research follows inductive approach, according to Jonker and Pennink (2010), the inductive approach refers to the approach in which raw data is collected and is polished through a proper process to generate theory out of the data. It does not follow any proper structure because there is no hypothesis development but data is only added to reach a theory (Dowall and Ellis; Amaratunga et al., 2002; Salama, 2006; Osteras et al., 2008; Lodhi, 2012; Rafi, Wasiuddin and Siddiqui, 2012; Creswell, 2014; Baker, Mason and Bentley, 2015). This approach explores a social phenomenon to acquire experiential patterns that function as the start of a theory and is typically used in qualitative research (Dowall and Ellis; Amaratunga et al., 2002; Creswell, 2014; Baker, Mason and Bentley, 2015).

This research comprehends to develop an affordable housing framework for low-income households in Pakistan that requires the data to be more unstructured and detailed rather than specific (Amaratunga et al., 2002). Therefore, this research study has followed the inductive approach. The general nature of the social science research requires researcher to use the inductive approach to carryout research, as the finding of the study cannot be specific. Therefore, no hypothesis is developed at the start of the research and no well-defined structure is followed (Amaratunga et al., 2002).

3.3.3 Research strategy

Saunders et al (2019) emphasises that the selection of a research strategy is dependent to research question and objectives, the range of knowledge, available recourses and the time and the philosophical verification of the researcher.

Research methods; refer to the methods a researcher use to perform their research processes including data collection (Figure 3.2). Research methods determine the tools used to gather information to answer to the research problem (Saunders et al 2009).
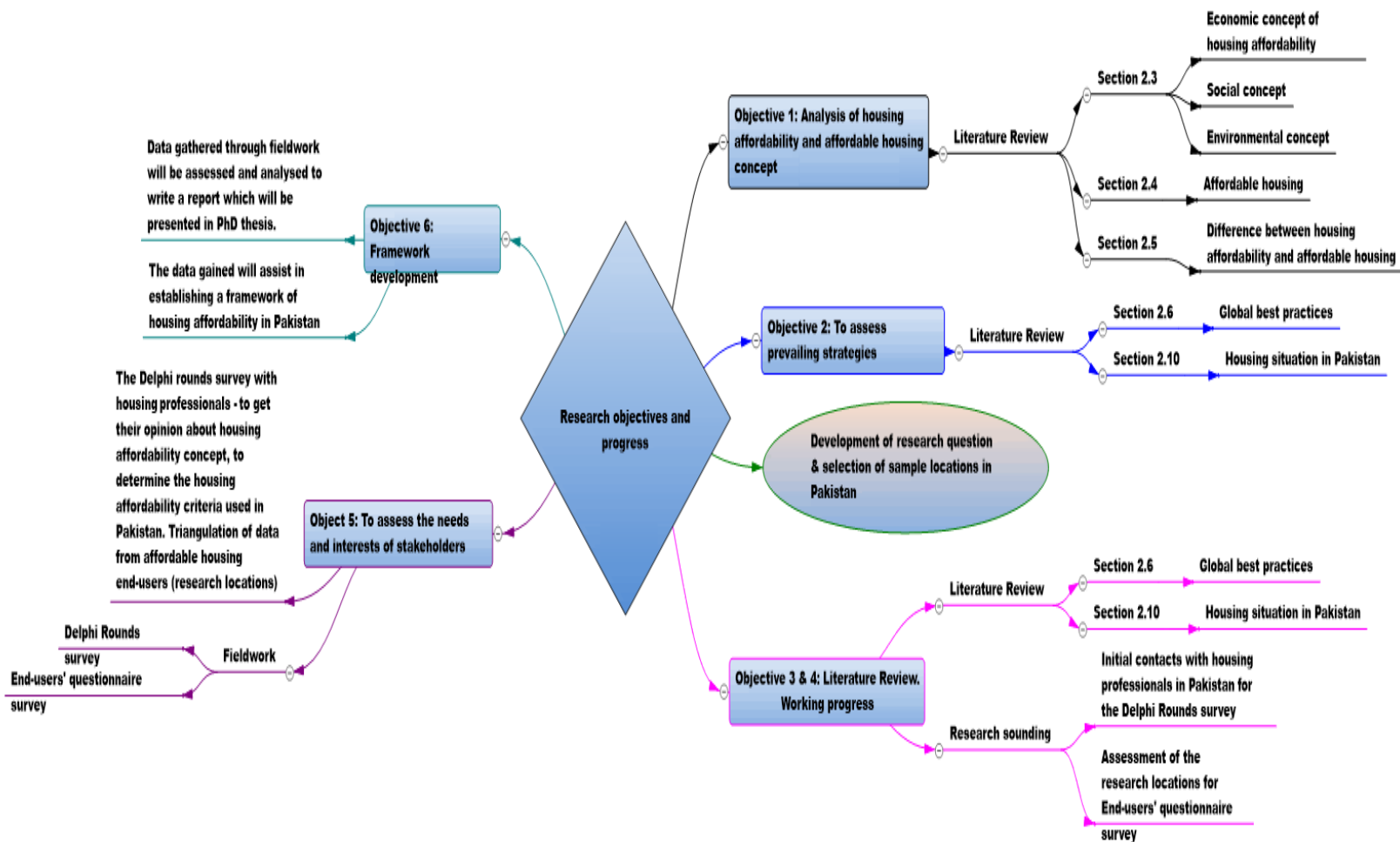
Figure 3.2: Research process flow chart

3.4 Resesrach Choice (mixed methodology)

More than one data collection tools can be used when using mixed methodology. Mixed methodology can use both qualitative and quantitative methods and strategies in mixture with primary as well as secondary data. Mixed methodology is getting popular for social science and business management studies (Curran and Blackburn 2001).

In this research mixed method were adopted, where qualitative and quantitative data finding tools and analysis procedures were followed; parallel, either at the same time or sequential, one after the other, but not combined (Saunders et al., 2007). Delphi method was used to determine the level of importance housing professionals attribute to each of housing affordability assessment criteria. The Delphi methods have been used due to its hybrid nature (Sourani and Sohail, 2013; Sourani and Sohail, 2014), as it falls into both qualitative and quantitative research paradigms.

3.4.1 Delphi methods

According to Ameyaw et al. (2016), the Delphi methods are a systematic procedure to achieve consensus among a chosen panel of experts. A major element of this method is the anonymous opinion of experts and unanimous consensus among them which makes the research meaningful and reliable (Albert, Hallowell and Kleiner, 2014; Ceric, 2014; Sourani and Sohail, 2014; Brady, 2015). The data is only collected from experts so that it is relevant, reliable and answers the research questions. Questionnaire survey is a useful tool for Delphi methods to collect the data (Sourani and Sohail, 2015; Hallowell and Gambatese, 2009).

The technique is used for this research study because the topic requires a few experts in the housing field who recognise the research problem and can commend on advantages and disadvantages of different affordable housing developments in Pakistan. Affordable housing framework cannot be suggested based on the opinion by individuals, who are not experts in the field. Therefore, the research involved a panel of experts in the field for example, housing professionals, town planners, builders and academics.

The development of the Delphi methods, disseminations, data collection, analysis and reporting has been described in Figure 3.3 given below the developed housing affordability assessment criteria (Table 2.7) needed to be verified before recommending it to other housing stakeholders in Pakistan. As shown in the Figure 3.3 survey was conducted with the housing professionals in Pakistan which had three different rounds. After every round the partisans were informed about their individual and group results.

Figure 3.3: The Delphi methods framework.

3.5 Questionnaire design

The key words, housing, affordable housing, housing affordability, Pakistan, low-cost housing etc., were used to assess the scope to which housing affordability and affordable housing criteria had been acknowledged by the previous researchers and the housing industry. Most of the literature regarding housing affordability was based on the income to expense ratio (IER). Some researchers however stressed to consider the environmental (Khalil and Husin, 2009; Mulliner, Smallbone and Maliene, 2013; Albert, Hallowell and Kleiner, 2014; Mulliner, Malys and Maliene, 2016; Prochorskaite et al., 2016); social criteria of housing (UN-Habitat, 2008; Maliene and Malys, 2009; Andrea Bacova (Flexibility and Variability et al., 2011; Duleroglu-Yuksel, 2011; Mulliner, Smallbone and Maliene, 2013; Mulliner, Malys and Maliene, 2016; Napoli, Trovato and Giuffrida, 2016; Roberts, 2016). Housing markets, housing affordability and household economics fluctuate throughout the years (Prochorskaite et al., 2016), however, social and environmental aspects of housing such as local amenities and immediate neighbourhood mostly remain the same. Therefore, the literature review of this research concentrated to develop a framework to use the entire three housing affordability assessment criteria, i.e., economic, social, and environmental.

Research from both developing and developed countries were used to determine the global affordable concept and housing affordability assessment criteria for low-income households in Pakistan.

The units of recording and procedures – the old paradigm of affordability states the value of affordable housing in the quantifiable attributes of dwellings and their related cost (Jewkes and Delgadillo, 2010; Mulliner, Smallbone and Maliene, 2013). Figure 3.4 shows housing affordability assessment criteria derived from previous housing affordability researches (Section 2.13, Table 2.7).

Housing is a common problem in developed and developing countries alike; many methods have been tried to tackle the issue of housing discrepancy over the last three to four decades. This research emphasizes that an affordable housing framework in Pakistan might endeavour to resolve the conflicts among 'demand', 'need' and 'supply' in the country especially for low-income households. It has been observed that there is an idiosyncrasy between bottom-up and top-down housing supply to fulfil effective and fair housing provision in Pakistan. Some of the famous affordable housing models have been studied to find the perfect fit for Pakistan. Based on the literature review income threshold has also been determined.

Each housing affordability criterion was prudently scrutinised, to ascertain whether a criterion has been addressed by the previous researchers. The stage of testing and coding as set by Robson (2011) has been followed for the purpose of analysis of the HAAC.

3.6   Survey poulatin

Sample selection is divided into two major categories: i) probability and ii) non-probability sampling. In the earlier one, each member of the population gets an equal chance to be selected to participate and is based on selection process. Commonly,

participants' sampling is favoured due to its representation of the whole population. Participants' sampling needs a sampling frame, which is the list of the whole population (Robson, 2011). However, participants' sampling is not always possible due to unavailability of sampling framework or lack of resources. In social sciences studies, occurrences of sampling are at an increase (Punch 2005). It is also not always necessary when piloting, generating hypothesis or developing scales (De Vaus, 2002). In these instances, non-probability sampling is the most feasible form to use where some individuals have a better chance of being selected than others are. Using non-probability, sampling it has been ensured that the researcher has approached the respondents in accordance with their convenience as well as the convenience of the research.

After selecting the sample, a questionnaire was then prepared containing the criteria of the housing affordability identified through the literature as shown in Figure 3.5. The questionnaire was distributed amongst the respondents to gather their responses and to analyse it later.

Housing affordability criteria
Economic
Housing expenses: rent, monthly mortgage payment, household income or monthly installment, water/gas/electricity and utility bills, etc.
Non housing expenses: traveling cost, health cost, etc.
Housing affordability is related to income
A household should not pay more than 30% of their income for housing
The housing affordability is not just a result of changes in housing costs, but is also a result of changes household income.
House prices in relation to incomes
Rental costs in relation to incomes
Interest rates and mortgage availability
Availability of social and private rented accommodation
Availability of affordable home ownership products
Social
Safety (Crime level)
Access to employment opportunities in the closes proximity of the affordable housing
Access to public transport services
Access to good quality schools
Access to shops
Access to leisure facilities
Access to open green public space
Quality of housing
Affordable housing is that which is adequate in quality and location other basic living costs or threatens their enjoyment of basic human rights'
The notion of reasonable housing costs in relation to income: that is, housing costs that leave households with sufficient income to meet other basic needs such as food, clothing, transport, medical care and education
Affordability is not simply a matter of housing costs and income levels; it is about people's ability to obtain housing and to stay in it
Desirability of neighbourhood area
Deprivation in area
Presence of environmental problems (e.g. litter, traffic)
Environmental
Housing affordability is a multi-dimensional issue that affect households, including economic, environmental and social aspects (Mulliner and Maliene 2011).
Access to open green public space
Quality of housing
Energy efficiency of housing
Availability of waste management facilities
Presence of environmental problems (e.g. litter, traffic)

Literature review of housing affordabilty criteria

The Ecoonomic Criteria of Housng affordability
Monthly rent in relation to household income
House price (to buy) in relation to household income
Travelling cost to your work place from your home
Cost of maintaining (repair etc.) the house
Cost of incremental expansion of the house
The Social Criteria of Housing Affordability
Location in terms of accessibility to the local shops, education centres, health facilities etc.
Accessibility to local transport for work and general commute
A place of prayer close to your home
Internal privacy (e.g., separate sitting place for male and female guests in the house due to cultural reasons
External privacy (no internal view of the house from outside and from the neighbouring houses due to cultural reasons)
The Environmental Criteria of Housing Affordability
Durable building Design (suitable to cope with the weather, energy efficient
Flexible internal layout and design
Management and maintenance system for the housing building (to resolve the issues related to energy, services, cleaning, security, etc.)

Figure 3.4: Summary schematic of the process used to identify HAAC to develop a questionnaire for this survey.

3.6.1 Delphi survey population (housing professionals)

According to Novikov and Novikov (2013) sampling refers to the group of people or items selected from a population for analysis of the topic however, the group must be such that it is a fair representation of population so that data collected is true and reliable. This implies that a sample must not be too low to represent the population nor too high to make it impractical for the researcher to collect data. Usually samples for qualitative data are lower than quantitative data because they provide detailed insights while in quantitative data, responses are only one word.

As explained in the Section 1.2 of Chapter 1, below are the key reasons to choose Pakistan as the geographical focus for this research:

i.   61% of the population lives under the poverty line with a household income of $2 a day or below

ii.   there are no certain housing affordability assessment criteria available for this segment of the population

iii.   the National Housing Policy is almost 18 years old (being published in the year 2001) with no clear guideline to accommodate low-income households

According to Hallowell and Gambatese (2010a) the level of expertise of the panel member is the most important factor in the process of Delphi surveys. The experienced and skilled housing professionals cover the criteria given in Table 3.1. Initial contacts were established at the research sounding in Pakistan with housing professionals of both public and private sectors.

The participants of the Delphi surveys were members of a nationally recognized housing organisation or housing committee in Pakistan, recognized participants in housing or related field. They had minimum of five years' experience in the housing industry or any housing related field. Some of them were faculty member of an accredited organisation in higher education related to housing or engineering field, editor or writer about housing, construction, health and safety or risk management. They were qualified with a higher degree in civil engineering, housing, construction, project management, or any other related field. Some of them were registered architect, safety professional, town planner, facilities or operations manager.

A stringent selection criterion set by the previous researchers (Table 3.1) has been followed to select the participants for Delphi methods. Table 3.1 contains the references of the previous researches regarding the selection of survey population for the Delphi methods including the minimum criteria to be the part of this research.

Table 3.1: Guidance for selection of housing professionals for the Delphi surveys

References	Minimum requirement for potential experts
Powell, 2002; Okoli and Pawlowski, 2004; Manoliadis, Tsolas and Nakou, 2006; Yousaf, 2007; Hallowell and Gambatese, 2010b; Xia and Chan, 2012a; Albert, Hallowell and Kleiner, 2014; Ceric, 2014; Clinton, 2014; Birko, Dove and Özdemir, 2015; Che Ibrahim, Costello and Wilkinson, 2015; Renzi and Freitas, 2015	Member of a nationally recognized housing organizations/committee in Pakistan
	Recognized participation in housing or related field
	Minimum of 5-year experience in housing, town planning architectural field or any other housing related fielded
	Faculty member of an accredited organization of higher education in housing or engineering field
	Editor or writer about housing, construction, health and safety or risk management, etc.
	Higher degree in the subject of civil engineering, housing, construction, project management, or any other related field etc.
	Registered professional as an architect, safety professional, town planner, facilities or operation manager

Source: The concept originally conceived by Hallowell and Gambatese (2010b)

A brief introduction of the research, the Delphi methods and the survey participation invitation letter were sent out to the gatekeepers of the participating organisations. As explained in previous paragraph, the targeted housing stakeholders of Pakistan were highly qualified and experienced professionals working towards providing affordable housing for low-income households in Pakistan. The targeted professionals had a minimum of five years' experience in the housing field and had direct association in delivering the affordable housing in Pakistan. Targeted

participants had various job activities related to housing involving construction, operations, accounting and financing, policy development, software development, administration, managerial.

During the survey, it has also been observed that the people working in the middle to lower hierarchy in housing and construction industry in Pakistan are not very well educated and have been dragged into the industry out of necessity or due to job opportunities in the sector. In most cases, it was not their own choice of profession. Only a minority of the educated population are there in this industry, these people have specialized skills and degrees such as architectural and town planning etc., and hold higher posts in their organisations. In some case, they only have degrees but have minimum or no hands-on experience. Housing consultants and the architects are well-paid jobs with lucrative benefits in Pakistan and are the main attraction for the highly educated people.

Educated and skilled professionals are organisational heads, managers, directors, consultants. The fact cannot be denied that there is a possibility that the higher level of education amongst the respondent population could be due to the high competition amongst job seekers or an organisational turn to hire the best educated candidates. However, there is no doubt that an educated working force can offer high quality services to their clients and the organisation alike. In their organisational hierarchical order of the management; people in the bottom are with minimum (up to basic level) or no education at all, yet they have years of experience in the field. Most of them did not want to participate in the survey.

In Pakistan, there are almost 235 industries associated with housing and it is the second biggest industry in the country (Pakistan, 2001c). Various professional groups get involve in designing, developing and servicing affordable housing projects/schemes in Pakistan. During the literature review and review, contact details of some researchers, housing professionals and organisations working in Pakistan were found. A contact database and sample framework were established using the database of several housing associations, architects, developers, housing providers in Pakistan. These housing professionals were contacted via email and over the telephone. The list was vetted to select organisations/housing professionals primarily providing affordable housing in Pakistan, and the list resulted in 200 housing professionals, who took part in the piloting questionnaire. The survey was targeted at high level executive or management staff.

A similar strategy was adopted to contact the local authorities including House Building Finance Company of Pakistan (a public housing loan provider), Lahore Development Authority (LDA), Capital Development Authority (CDA), and the Housing Department of Pakistan.

3.6.2 Questionnaire survey population

During the field work survey, four numbers of affordable housing developments in total had been identified in Pakistan and two of the sample locations have been surveyed. One of the housing developments consisted of 1 to 2 bedrooms whereas, the other one had 1 to 3 bedrooms.

Low cost housing – 1 (LCH-1): This housing scheme is a private initiative. This development is almost 25 kilometres away from the main city centre.

Low cost housing – 2 (LCH-2): This housing scheme is a Public-Private Partnership initiative.

Most of the households/end-users of these low-cost developments are on low-income earning and earn on average Rs. 5,000/- to Rs. 10,000/- a month.

End users' survey along with the data analysis is discussed in Chapter 5.

3.6.2.1 End-users of affordable housing in Pakistan

According to Yates and Gabriel (2006) in the United Kingdom (UK) the households earning less than $367 a week are classed low-income households. In Pakistan 61% of the population lives under the poverty line with an income of $2 a day (Bank, 1993; Kakakhel, 2014; Awuah and Lamond, 2015). More than half of the population in Pakistan lives below the poverty line, and housing them is needed urgently. According to Merriam-Webster (2017) an end-user is an ultimate consumer of a finished product; end- user is a person who actually uses a particular product'. A user of property or house/housing has been called 'user' by previous researchers such as (Sulaiman, Baldry and Ruddock, 2005; Prochorskaite et al., 2016). The end-users could be living in the state housing; affordable housing provided by a corporate or private developer/builder; and or could be a private tenant, etc., with legal and lawful rights of abode. Therefore, in the context of this research an end-user is a person, living in or having the intention to occupy the affordable housing/low-cost income-housing unit to abide, live and perform day-to-day activities. The end-users are the most important stakeholders of housing in Pakistan; for the purpose of this

research they are called end-users of the affordable housing developments in Pakistan or in the short form the 'end-users'.

Employed persons – a person is considered in employment/employed if she/he worked for a minimum of one hour (Statistics, 2015) during one month. Even if the person is not working at present or did not work in the previous month, he/she had a job or ran a business enterprise such as retail shop, a farm worker or service provider establishment during the last year.

Employment status – employed persons are divided into the following categories: self-employed, employer, paid employee, unpaid family helper, and agricultural farm labourers (contract cultivator, owner cultivator or share-cropper); where, an employer is a business owner and may work himself as well as employing other workers for pay to help him in his business enterprise but may also have others working for him without pay. An employee by default is a paid worker who works for someone in exchange for salary/wages and which is paid in cash or in kind. An own account worker or self-employed is a person who owns a business enterprise (such as retail shop, etc.,) does not hire any person for wages/pay to help in the enterprise but may possibly have others working for him without pay, such as helpers from family. The self-employed persons are divided into following two categories:

- Professionals (such as architects, solicitors, etc. or persons who look after their own business enterprise themselves without any help from any other person.

- Professionals and those own account employers who run their own business enterprise with the help from family helpers unpaid only (family business).

Unpaid family helpers – these members of the household work for the family-based business without being paid or salaried. Though they are not paid in any form of rewards or remunerations, their works/labour result in household income increase; therefore, they are working or employed.

Earners – are all those persons aged 10 years (although child labour is illegal in Pakistan yet in some households under-aged children are the main bread earners) and above who are responsible for providing the household with material returns, cash or in kind. Earners can further be divided into two categories: (i) economically active (ii) not economically active. All employed persons fall into the economically active category. On the other hand, old aged pensioners and those in receipt of any incomes from other sources such as renting buildings and land (i.e. property owners) fall into the not economically active category.

Industry divisions represent the activities of the firm, office, establishment or department in which a person is employed or the kind of business in which he/she works.

Pakistan Standard Industrial Classification (PSIC) (2010) is currently used to define Industry divisions: these industry divisions are divided into – agriculture/fishing; mining and quarrying; manufacturing; electricity/gas and water; construction; trade/hotels and restaurants; transport and storage; finance and real estate; community services; and other activities which are not defined here.

Major occupation groups – an occupation describes the nature of work undertaken by an individual; in Pakistan, Pakistan Standard Classification of Occupations (PSCO) (1994) is currently used to define the occupational groups:

Senior public officials; legislators; managers; professionals; technicians and associate professionals; clerks; service workers/shop and market sales workers; skilled agriculture and fishery workers; craft and related trade workers; plant and machine operators and assemblers; elementary occupations; and armed forces.

In order to differentiate perception and opinions between housing professionals and end-users living in the affordable housing developments in Pakistan; the data gathered from the Delphi methods was to be cross scrutinized with the questionnaire surveys with the affordable housing end users in Pakistan. The comparison results have been integrated in the affordable housing framework for Pakistan. The end-user, in the context of this research project is a member of the household, with a household income between $50 - $100.

End-users are not bound to a job or professional activities; the nature of their job may vary according to their educational, social and geographic status. This research did not discriminate against anyone based on race, religion, gender etc.; any member of the household with low-income aged 18 years or above was eligible to participate.

3.7   Survey Piloting

One of the priorities of this research was to gain a comprehensive consensus about the definition and the selection of housing affordability assessment criteria. The idea was to verify the significant and usable criteria of housing affordability identified through the literature review. Before, embarking for the fieldwork surveys, a pilot questionnaire survey was conducted with the housing professionals in Pakistan. Questions were developed broadly to communicate the economic, social and

environmental criteria of housing affordability. The criteria established through literature review (Table 2.7 and 2.8) was used as a base to develop the Delphi methods and end-user survey questionnaires.

Initial contacts were made via a personalized cover email which contained a brief introduction of the research with the contact details of the researcher. At the research sounding, informative talks were given at two major universities in Pakistan. Gatekeepers of the housing professional organizations were reminded up to three times via emails/phone calls (one every week) to fill up the questionnaires. The survey data was coded and was imported to Excel and SPSS computer programmes for subsequent analysis.

The occupancy evaluation survey (OES) method introduced by Leaman and Bordass (2005) was used to evaluate HAAC. A questionnaire used by Carlopio (1996); Limited (2013) has been used as a template to set the pattern and the design of the questionnaires for this research.

The pilot questionnaire had closed ended questions covering economic, social and environmental criteria of housing affordability; however, the option was given to the participants to add or comment in the questionnaire. The questionnaire had 34 items in total. The surveys were broadly divided into three major criteria (1) financial (2) social (3) environmental criteria of housing affordability for the analysis purposes. This division has helped to categorically analyse the survey data. The pilot survey helped to determine the clarity of questions, aims and responses including the time duration to complete a questionnaire. In the questionnaires, participants were asked to provide their comments or feedback regarding the survey. Almost 200 hard copies

of the questionnaires were prepared and were sent out to the Heads of the architectural and engineering departments of two well reputed universities along with the organisations providing housing services in Pakistan. The snowballing technique (Atkinson and Flint, 2001) was used. The staff members of the universities and the housing services providing organisations were asked to pass it on to their colleagues or contacts. Generally, respondents found the piloting survey straightforward and easy to complete. A total of 151 (76%) responses were received and no major comments or correction were suggested by the respondents.

Piloting data responses were analysed to make some adjustment to the Delphi methods questionnaires. The Delphi Round-1 questionnaire was developed and sent out to 151 respondents, who took part in the piloting survey research and responded with their contact details and consent to take part in Delphi methods.

3.8 Statistically Significant Tests

The type of statistical analysis which, can be implicitly executed, will partially be subject to these categories, for instance, only frequencies can be considered for nominal data whereas calculating central tendencies (mean and median) would not be appropriate. There are wide range of statistical tests available to perform on interval and ratio data. However, for its collection, it requires additional resources, and effort on behalf of the respondents, which is not always be justified.

The questionnaires surveys administered in this research consisted of both nominal and ordinal data. Mainly demographics data was nominal, and analysis for this data was limited to frequency calculations. However, the core HAAC questions yielded Likert scale rating and ranking as ordinal data. The measures of central tendency

(mean and median) were used to rank the criteria in terms of importance according to the housing stakeholders. Some disagreement for using such analytical techniques on ordinal data have been acknowledged (e.g. discussions by Knapp, 1990; Jamieson, 2004). Yet, it is commonly used approach to interpret preference surveys (Tveit, 2009) as it is a convenient and basic interpretation of rating scores.

Tests to measure central tendency – in the survey questionnaires, the criteria in terms of importance according to the stakeholders yielded ordinal data with rating questions. These questions were measured using the rating and the central tendency (median and mean). This approach is common to be used in interpreting preference surveys and is a simple and useful technique in rating score surveys (Tveit, 2009). In order to perform some statistical tests SPSS was used. Primarily, this survey sought to elaborate the level of significance (Likert scale) of the HAAC. Central tendency has mean, median and mode as the valid measures (Statistics, 2019). Therefore, descriptive analysis was an appropriate tool to find out the results of the data; through this method, measures of spread and central tendency were measured.

Measures of central tendency are used to learn about a value which best represent an entire group of the research population. The median or the mid-value is a useful comparison of the mean scores (Chatfield, 2018). The mean score is summed up value by adding all given variable together and dividing the calculated sum by the number of participants who responded to that variable. The median value is recognised by identifying the midpoint in a set of scores, whereas, the mode

represents the most frequent score in the data set. Mode values are mostly more useful when data set is not numerical by nature. Generally, median values could be useful when extreme scores are presented in the data and the mean score could thus be considerably affected and slanted by such extreme scores.

Standard deviation measures the spread and variability including testing the strength of the central tendencies. Standard deviation is an average amount of variability and signifies the spread among data scores around the mean. The mean scores become more precise if the standard deviation values are lower, while higher standard deviation represents the differences between scores and indicates that a different of central tendency test could be more suitable as a result.

3.8.1 Kolmogorov-Smirnov, Mann Whitney U and Factor Analysis Tests

It is important that data follow a normal a symmetrical, 'bell shaped' curve, in order to determine whether to use parametric or non-parametric tests. Parametric tests assume that survey data is normally distributed; vice versa non-parametric equivalents should be carried out if data does not follow normal distribution. Non-parametric tests are more useful for studies using Likert scales where data is ordinal (Nanna and Sawilowsky, 1998; Chuck, 2014; Statistics, 2019).

Figure 3.5 shows the analytical tests required for the data of this research.

Data type	Non-Parametric tests	No of groups	Appropriate tests
• Ordinal scale of measurement • Data is not normally distributed • Independent groups	Non-parametric test required	Accepting or rejecting the null hypothesis → Kolmogorov-Smirnov Comparing differences between 2 groups → Mann Whitney U test Summarising the variables → Factor analysis	
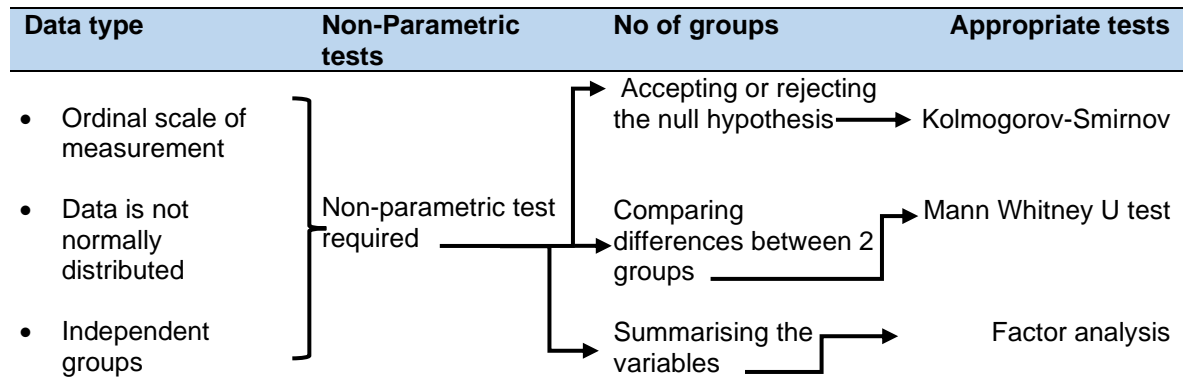
Figure 3.5: Summary of data analysis required for this research

In order to select the correct analytical test Figure 3.5 presents the required test for the data analysis. As Figure 3.5 suggests, this research needs Kolmogorov-Smirnov test to check the symmetrical normality or 'bell-shaped' curve of the data and to justify the parametric or non-parametric test required for this research data. Mann Whitney U test will compare the differences of the housing professionals and the end-user's data responses. Factor Analysis test will confirm whether, the data can be further summarised to the most critical HAAC using SPSS.

Chapter 6, Section 6.7 further explains the statistical tests carried out for the research data.

3.9 Inclusion and exclusion criteria for piloting questionnaires

Descriptive and frequency analysis was carried out using a computer-based programme 'Statistical Package for the Social Sciences (SPSS)'. After the frequency analysis of the piloting questionnaire; any questions with a mean score equal to and less than 2.4 (≤ 2.4) was taken off from the questionnaire. The questions with mean scores of ≥ 2.5 (equal to or more than) were added to the refined Delphi Round questionnaire. The refined Delphi questionnaire had a total 24 items comprising of economic, social and environmental criteria of housing affordability.

3.10 Chapter Summary

The Research Onion (Figure 3.1, source: Saunders, Lewis and Thornhill, 2019) has been followed to determine the philosophical positioning of this research. A mixed methods approach was adopted, where quantitative and qualitative data was used to get the housing stakeholders opinion regarding the affordable housing concept.

4 CHAPTER FOUR: SURVEY REPORT OF DELPHI METHODS

4.1 Introduction

This chapter represents the analysis of the Delphi methods conducted with the housing professionals in Pakistan which also fulfil the Objective 4 and 5 set out in Section 1.4 of the Chapter 1. Closed ended questions were used for the Delphi methods questionnaire to get the opinion of the housing professionals. The survey questionnaire had four sections comprising of, i) general, ii) economic, iii) social, iv) environmental criteria of housing affordability. This chapter begins with the analysis of the data from the general questions that had multiple choice answers including questions related to demographic data of the respondents. The analysis then presents the rating of the economic, social and environmental criteria based on the Likert measurement scale of importance ranging from 1 to 5, where, '1' = not important at all; '2' = slightly important; '3' = fairly important; '4' = important; '5' = critically important.

This chapter also shows the results of the several statistical tests carried out to validate the research data; Excel and Statistical Package for the Social Science (SPSS) programme have been used to carry out these statistical analysis tests. Using SPPS necessary percentile, rating, frequencies, descriptive analysis tests have been performed as well. This chapter concludes with summary of the data analysis along with the conclusions.

4.2 Delphi Methods

Delphi methods are an expert way of investigation that consists of two or more rounds in which, the second and later rounds of the survey results and the outcome of the previous round are given as feedback (Cuhls, 1998); Hanafin, 2004; Birko, Dove and Ozdemir, 2015; Birko, Dove and Özdemir, 2015; Brady, 2015; Renzi and Freitas, 2015). The Delphi methods survey has been established as a suitable tool to investigate the embryonic differences of opinion within and between the key stakeholders or groups of stockholders regarding a item. These differences of opinion could be due to differences of situation, focus and the context, however, main themes is to keep the respondents to be accounted for their responses in a methodical way (Hanafin, 2004; Birko, Dove and Ozdemir, 2015; Birko, Dove and Özdemir, 2015; Brady, 2015; Renzi and Freitas, 2015). The aim of the Delphi methods questionnaire is, therefore: to get a consensus about affordable housing concept to develop a framework for future developments for low-income households in Pakistan.

4.2.1 The Delphi Round-1

As explained in Chapter 3, Section 3.8.1 earlier, based on the piloting survey, a refined questionnaire was designed which had 26 closed ended items (questions) in total. The items 1 to 7 were of a general nature, whereas, items 8 to 13 included questions of economic criteria housing affordability; 14 to 19 were about social criteria of housing; items 20 to 23 about environmental criteria; whereas, items 24 to 26 were about personal information including consent about the follow-up rounds.

Round-1 questionnaire using hard copies with an information sheet and consent form were given to the gatekeepers of the selected organisations. The copies were forwarded to 151 respondents who took part in the piloting survey and gave their consent to participate in Delphi surveys.

After 1 week, a reminder email was sent out to the gate keepers also to the participants. After 2 weeks, another reminder email was sent out to the participants, followed by phone calls to the gatekeepers to arrange collection of the Delphi Round-1 questionnaires. Round-1 questionnaires were received and 64% of participants responded.

The data was analysed, and a provisional report was developed, to assess the characteristics of the questions asked in the first round, central tendency measures were used on the frequency of the responses, along with standard deviation, mean and mode using SPSS. The first round was to determine the level of consensus about housing affordability under the scopes of economic, social and environmental criteria of housing affordability that may affect a low-cost household. The identified HAAC given in Section 2.13, Table 2.7 and Table 2.8 have been verified by the housing professionals in Pakistan. Delphi methods are an important research instrument which uses a systematic procedure to get a consensus among a chosen panel of experts (Ameyaw et al. 2016). As explained in the section 3.8 of the previous chapter, a major element of the Delphi methods are to maintain the anonymity of expert opinion that makes this research meaningful and reliable (Birko, Dove and Ozdemir, 2015; Birko, Dove and Özdemir, 2015; Brady, 2015; Renzi and Freitas, 2015). In the second round, participants were given the results of the

previous round. The survey questionnaire had their individual response along with the overall response from the participants.

General Criteria

The Table 4.1 shows the results of the Delphi Round-1 and has verified and confirmed the housing affordability assessment criteria identified through the literature review of previous research. The result of this data was added to the Delphi Round-2 questionnaire.

G. 1: Table 4.1 indicates that 41% housing professionals are agreed that low-income falls between $100-150 a month.

G. 2: 49% of the Delphi Round-1 survey population is agreed to have '2' persons sharing a room for the low-income household or low-income housing in Pakistan.

G. 3: an agreement can be seen by the 30% of the Delphi Round-1 survey population is agreed to have development of new towns for the low-income household in Pakistan.

G. 4: 28% of the survey population is agreed that mortgages is the answer to support low-income households.

G. 5: 16-20% should be maximum housing expense per month for the low-income household in Pakistan.

G. 6: 16-20% should be maximum non-housing expense per month for the low-income household in Pakistan.

G. 7: according to housing professionals the Government of Pakistan should at least contribute 10-15% per month towards housing and non-housing expenses for the low-income household in Pakistan.

Table 4.1: Data result of Delhi Round-1 General Criteria.

Housing Criteria	Code	Miss.	Mean	Std. Dev.	Sum	Scale	Scale explained	Freq.	% age	Criteria Verified. Yes/No.
Low income range	G.1	0	2.76	0.99	265	3	Rs. 10001 - 15000 ($100-150)	39	41%	Yes
Room sharing per person	G.2	0	2.40	0.91	230	3	2 Persons	47	49%	Yes
Recommended future affordable housing	G.3	0	2.64	1.15	253	4	Developing New Towns	29	30%	Yes
Recommended financial product	G.4	0	4.27	2.03	410	7	Mortgages	27	28%	Yes
Housing expense per month	G.5	0	3.68	1.40	353	6	16-20%	34	35%	Yes
Non-housing expense per month	G.6	0	4.11	1.86	395	7	16-20%	25	26%	Yes
Govt. Contribution to low-income household	G.7	2	3.37	1.75	317	5	10-15%	21	22%	Yes

The median or the mid-value is a useful comparison of the mean scores (Chatfield, 2018). It should be noted that in the Delphi round 1, the respondents were asked general questions for which they were provided options. This means that the questions in round two were closed-ended.

Results of the economic criteria

The data results given in Table 4.2 show that a total 96 housing professionals have mostly rated economic criteria as 'important or critically important' for a low-income household. Hence, the results of the Delphi Round-1 have verified and confirmed the housing affordability assessment criteria. The result of this data was added to the Delphi Round-2 questionnaire.

Table 4.2: Data result of Delhi Round-1 economic criteria.

	Code	Miss.	Mean	Std. Dev.	Sum	Scale	Scale explained	Freq.	% age	Criteria Verified. Yes/No.
Monthly rent	Eco. 1	0	4.25	0.99	408	4	Important	32	33%	Yes
House price	Eco. 2	0	4.38	0.86	420	4	Important	37	39%	Yes
Travelling cost	Eco. 3	1	4.15	0.97	394	5	Critically Important	40	42%	Yes
Cost of maintenance	Eco. 4	0	4.19	0.94	402	5	Critically Important	43	45%	Yes
Cost of incremental expansion	Eco. 5	0	3.89	1.20	373	5	Critically Important	37	39%	Yes

Results of the social criteria

The data results given in Table 4.3 show that, based on the mean score, housing professionals have mostly rated Soc-3 & Soc-5 as 'critically important', Soc-1 & 2

'important' and Soc-4 as 'fairly important' for a low-income household. Hence, the results of the Delphi Round-1 have verified and confirmed the housing affordability assessment criteria. The result of this data was added to the Delphi Round-2 questionnaire.

Table 4.3: Data result of Delhi Round-1 social criteria. Total responses 96. (Source self-study)

	Code	Mean	Std. Dev.	Sum	Range or Scale	Scale explained	Freq.	% age	Criteria Verified. Yes/No.
Location	Soc. 1	3.52	1.27	338	4	Important	28	29%	Yes
Accessibility to transport	Soc. 2	3.53	1.14	339	4	Important	38	40%	Yes
A place of prayer close home	Soc. 3	3.32	1.32	319	5	Critically Important	24	25%	Yes
Internal privacy	Soc. 4	3.38	1.28	321	3	Fairly Important	29	30%	Yes
External privacy	Soc. 5	3.55	1.31	334	5	Critically Important	30	31%	Yes

Results of the environmental criteria

The data results given in Table 4.4 show that, based on the mean score, housing professionals have mostly rated Env-1 as 'critically important' and Env-1 & 2 'important' rating for a low-income household. Hence, the results of the Delphi Round-1 have verified and confirmed the housing affordability assessment criteria to be added to the Delphi Round-2 questionnaire.

Table 4.4: Delhi Round-1 environmental criteria. Total responses 96. .

Criteria	Code	Mean	Std. Dev.	Sum	Range or Scale	Scale explained	Freq.	% age	Criteria Verified. Yes/No.
Durable building Design	Env.1	3.92	1.13	376	5	Critically Important	37	39%	Yes
Flexible internal layout and design	Env.2	3.41	1.15	327	4	Important	40	42%	Yes
Management and maintenance system	Env.3	3.53	1.14	339	4	Important	36	38%	Yes

4.2.2 Delphi Round-2

The data from the first round was tested with methods used by Sourani and Sohail (2015), Hallowell and Gambatese (2009) to develop an unbiased report, unbiased testing procedures and analysing techniques (Kumar, 2011). Based on the findings results an unbiased preliminary report was established to develop the Delphi Round-2 questionnaire.

A similar procedure was used to disseminate the second-round questionnaires amongst the 96 respondents. Hardcopies of the surveys were given to the Gatekeepers of the housing professional organizations. A Follow-up system was developed and weekly phone calls and email reminders to gatekeepers were sent. All the participants were reminded up to three times via emails/ (one every week) to fill up the questionnaires. The data was collected, coded and transferred to Excel and SPSS computer programmes for subsequent analysis.

4.2.3 Delphi Round-3

In continuation of the Delphi methods survey, the Gatekeepers were requested to disseminate the final-round questionnaires amongst all the 79 respondents who took part in the second round. Hardcopies of the surveys were given to the Gatekeepers. The follow-up system protocols were followed, and phone calls were made to the gatekeepers to remind the participants via emails/ (one every week) to fill in the questionnaires. In this round, participants did not respond to the questionnaire and advised to consider the second-round ranking as the final response. The results are discussed in the following sections.

4.3 Report on Data Findings

This section of the chapter focuses on presenting the data findings to analyse the information regarding the respondents for presenting and interpreting the results in a comprehensive manner. As explained in earlier section, 96 survey copies were sent out to the housing professionals. A total 79 housing professionals responded to the final round.

4.3.1 The survey population

The survey population has been divided broadly into five categories as shown in Figure 4.1 below; it represents the industrial background knowledge of the respondents. The reason for asking this question from the respondents was to know the background to which the participants belong. The data result shows most of the survey population are sub-contractors which makes 25% of the survey population.

Academics, government officers and housing providers equally make the 19% of the survey population each. Housing consultants, housing professionals, architects, town planners are 18% of the survey population.
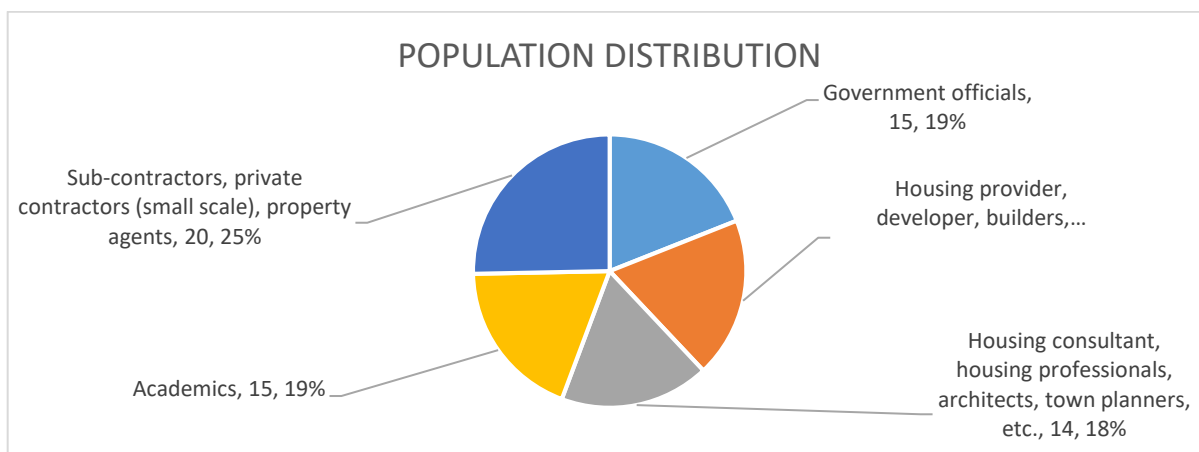
Figure 4.1: The Delphi methods surveys population distribution.

4.3.2 General criteria questions

General questions were asked from the respondents to verify housing affordability assessment criteria identified through the literature review; the questions had multiple-choice answers (MCA) to choose from. A frequency analysis of these housing criteria was carried out using SPSS, and mean, mode and standard deviations options were selected to carry out for the analysis.

G. 1. Income Range

The first question was to find out about their income range. The result obtained for this question shows low-income as perceived by the housing professionals in Pakistan. The data findings have verified and confirmed the literature (Kakakhel,

2014; Javaid, 2016) that in Pakistan, average income is significantly low in rural areas due to lack of job opportunities and prevailing low literacy rate. According to the data results shown in Figure 4.2, a household earning an income between Rs. 5000 – 10000 ($31 – 62) on average is to be considered on low-income. This means on average a low-income Pakistani individual earns almost $50 US dollars a month.

	<Rs. 5000 ($5)	Rs. 5001 – 10000 ($50-$100)	Rs. 10001 - 15000 ($100-150)	Rs. 15001 - 20000 ($150-200)	Any other
Responses	4	6	62	7	0
Percentage	5.06	7.59	78.48	8.86	-
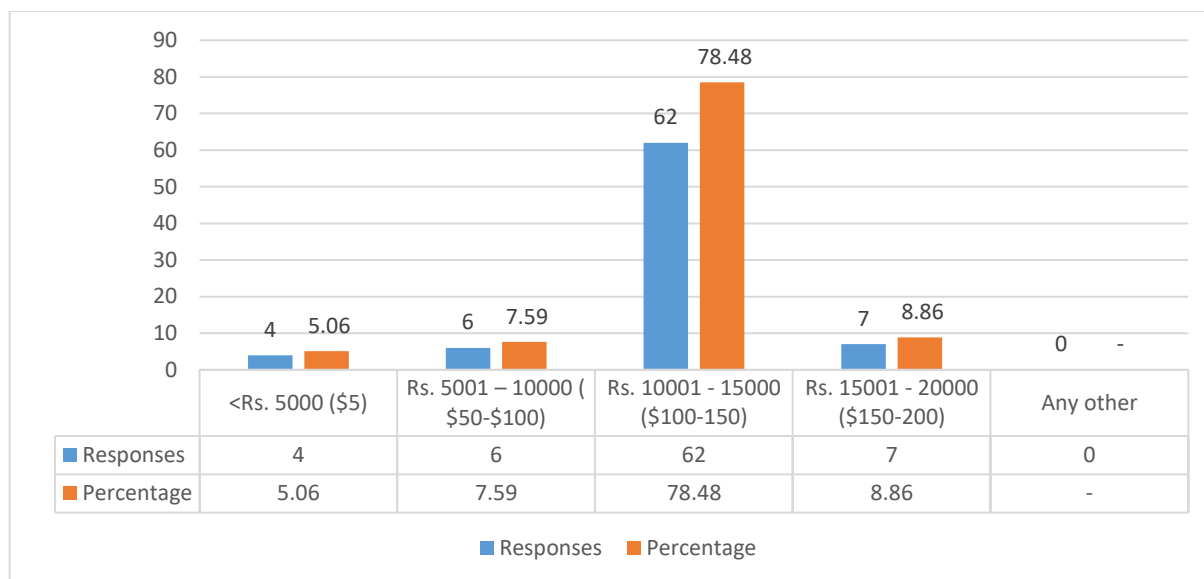
Figure 4.2: Income threshold to determine low-income households.

G. 2. Room sharing

Based on general observation, it can be said that on average a typical house size in urban area of Pakistan is between 5-10 Marlas (1 Marla = 272.25 square feet) of land. Most houses are double storeyed with 2 – 4-bedrooms and a sitting room; however, in urban areas this size is gradually squeezed to 2 – 3 Marlas with one to two beds along with a sitting room in the front of the house.

During the survey, it has been observed that a normal household consist of 6 to 7 members living and eating together in one house. In some cases, 6-7 members of a

household live and share a single room in a rented property or in a slum. According to Rizvi (2009); Nenova (2010); (Rizvi, 2010) currently on average 3 persons share a room in a household in Pakistan.

The data given in Figure 4.3 shows that almost 62% of the housing professionals in Pakistan have agreed that no matter what the house size is (in Marlas), no more than 2 people should share a room. According to 17.7% of respondents, 3 persons can share a room, whereas, 8% opted for 4 persons sharing a room, which might have been suggested due to the large households' sizes with 6-7 members in a family as stated by the results of the Delphi surveys.

	1 x Person	2 x Persons	3 x Persons	4 x Persons	5 x Persons	6 x Persons	7-10 Persons	Any Other
Ranking	10	49	14	6	0	0	0	0
Percentage	12.66	62.03	17.72	7.59	-	-	-	-
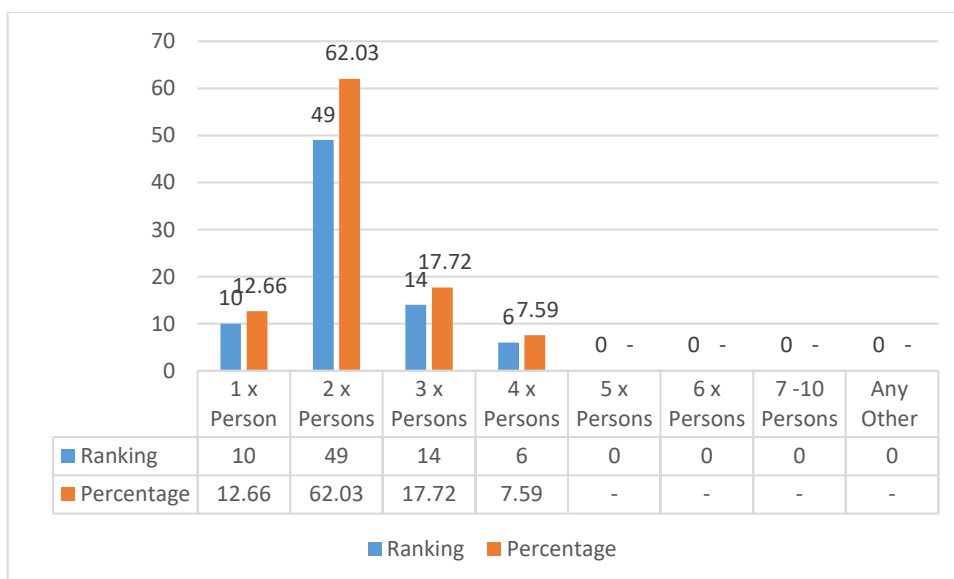
Figure 4.3: Room sharing.

G. 3. Most feasible form of the housing to accommodate the households with low income

The pilot questionnaire had an open-end response column to give 'other' suggestions. One respondent filled it as, *'develop new towns and build new houses there'.* In the Delphi survey questionnaire, this response was added as 'option 4' (develop new towns). In the survey, respondents were asked to give their suggestions and possible solutions to tackle the housing problem without compromising agricultural land.

Figure 4.4 shows that 47% of the housing professionals are agreed to develop multi-storey or vertical development comprising housing apartments in the cities; which may help to keep the boundaries of the cities intact where they are. Whereas, a notable 27% are agreed to develop new towns which might help to reduce the housing deficit in Pakistan.

The recent trend of rapid urbanization has resulted in densely populated urban cities; and a higher influx of migration is causing expansion of the major cities around the world (Amjad and MacLeod, 2014; Isalou, Litman and Shahmoradi, 2014; Calnan, 2015; Newman, Kosonen and Kenworthy, 2016). Pakistan is one of the countries that has been urbanized immensely; as a result, the major cities of Pakistan are swelling and compromising agricultural land to accommodate their city expansion. This research suggests that the development of new towns with multi-story housing apartments could be the most suitable option to accommodate low-income households. However, a sustainable solution of housing cannot be offered at the cost of agricultural land. Based on the results presented in Figure 4.4, it can be said that the primary results of this research coincide with the secondary information presented in the Section 2.8 of the literature review.
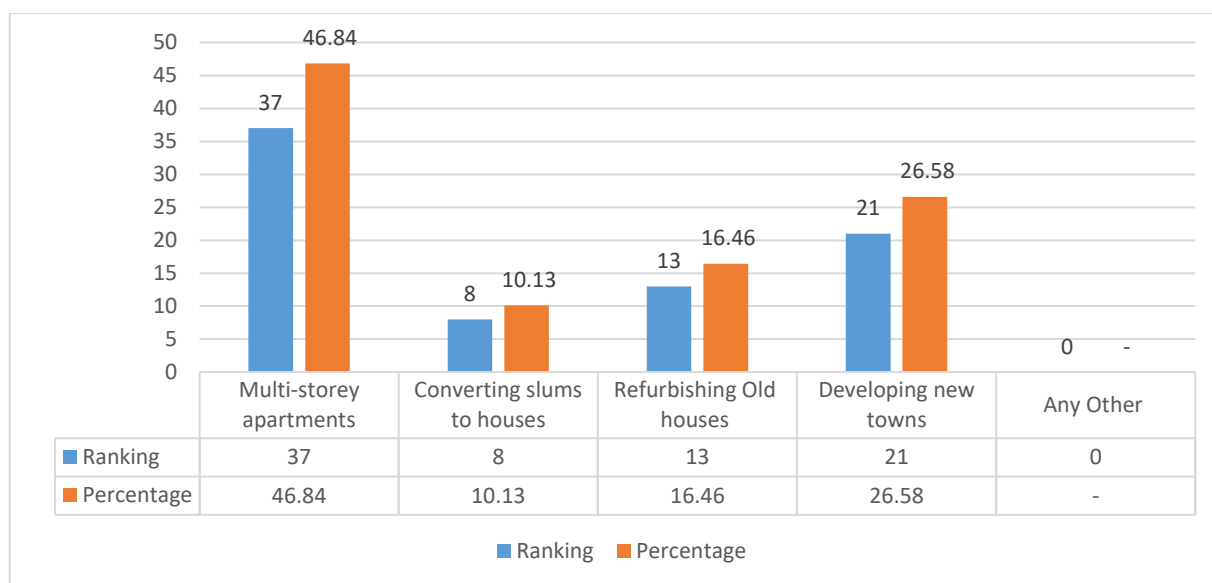
Figure 4.4: Suitable future housing for low-income households.

G. 4. The most suitable financial product to help new homebuyers in Pakistan

According to the analysis, 65.8% of respondents preferred the use of mortgages by a bank to finance a house. 7.6% respondent have suggested the use of loan by the Government of Pakistan. 19% of the respondents are agreed that a loan by 'the House Building Corporation of Pakistan (HBFC)' is the best option. HBFC Pakistan is a sub-section of the State Bank of Pakistan (SBP) and is the only government organization that provides loans for construction/buying of a house in Pakistan.

Technically, loan by government has scored an accumulative 26.7% of the survey population. The reason for this response could be since government loans for housing are considered less stringent and easy to repay with lower interest rate (mark-ups). In addition, most of the Pakistani population lives under the poverty line;

that's why housing professionals want government to do something for the betterment of the people with low-income. Figure 4.5 gives a visual depiction of the responses regarding suitable a financial product to buy a house.

	Loan by Govt. (1)	Private Lender	Mortgages through banks	work loan	House Building Finance Corporation of Pakistan (HBFC) house...	NGOs	Islamic Banking	Community (Committee arrangements)	Any Other
■ Ranking	6	0	52	6	15	0	0	0	0
■ Percentage	7.59	-	65.82	7.59	18.99	-	-	-	-
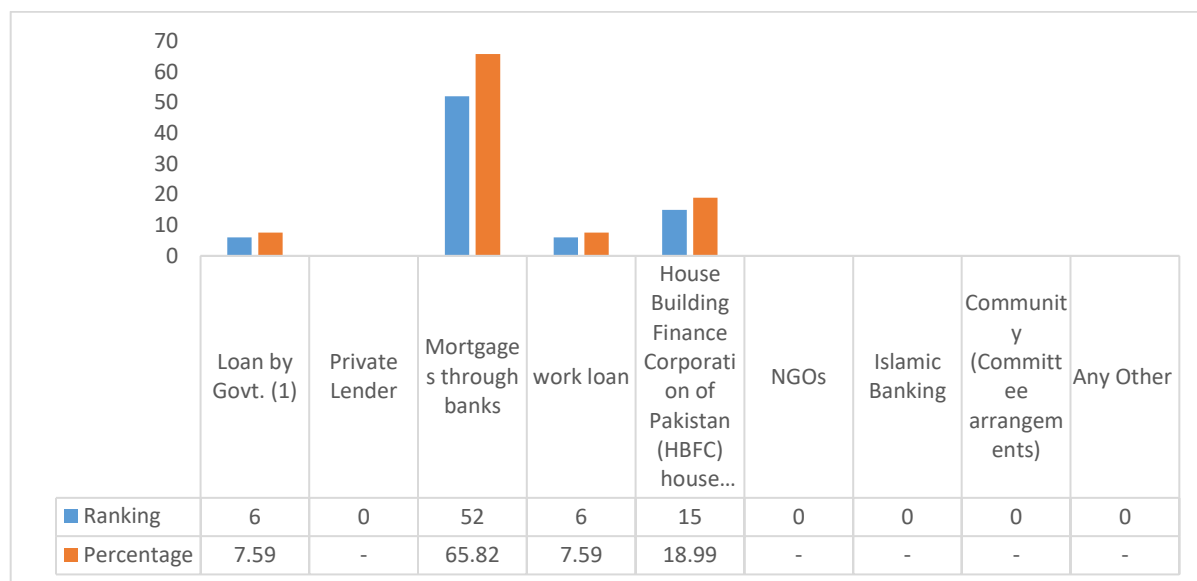
Figure 4.5: Responses on suitable financial product.

G. 5. Maximum funds a low-income household should spend on housing expenses per month

In this question, experts' opinion was sought to determine a monthly threshold of income a low-income household should spend on their housing expenses. Figure 4.6 shows that 43% (34 out of 79) respondents) of the housing professionals of Pakistan are adamant that a low-income household should not spend more than 31-40% of their total income on housing expenses.

The data results given in Figure 4.6 confirm the notion claimed by the previous researchers such as (Fisher, Pollakowski and Zabel, 2009; Dülgeroğlu-Yüksel, 2010; Waseem et al., 2011; Amjad and Idara-e-Taleem-o-Agahi, 2012; Amjad and

MacLeod, 2014; Isalou, Litman and Shahmoradi, 2014; Kakakhel, 2014). The data result confirm that a household should not spend more than 30% of the total monthly household income on monthly rent, water, gas and electricity bills (also known as housing expenses).

	<10%	10-20%	21-30%	31-40%	41-50%	50-100%
■ Ranking	3	10	12	34	14	6
■ Percentage	3.8	12.7	15.2	43.0	17.7	7.6
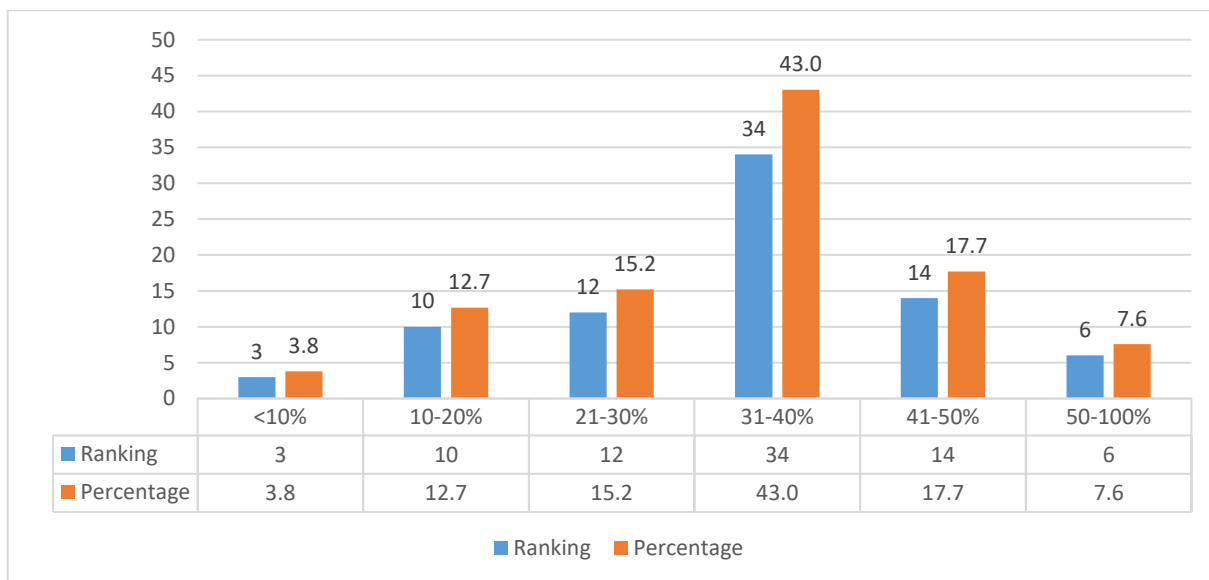
Figure 4.6: House expense per month.

G. 6. The maximum of non-housing expenses a household on low-income should spend per month

As described in Figure 4.7, 55.7% of the housing professionals are agreed that non-hosing cost should not be more than 16-20%.

	<10%	10-20%	21-30%	31-40%	41-50%	50-100%
■ Ranking	0	9	6	44	3	17
■ Percentage	0.0	11.4	7.6	55.7	3.8	21.5

■ Ranking ■ Percentage
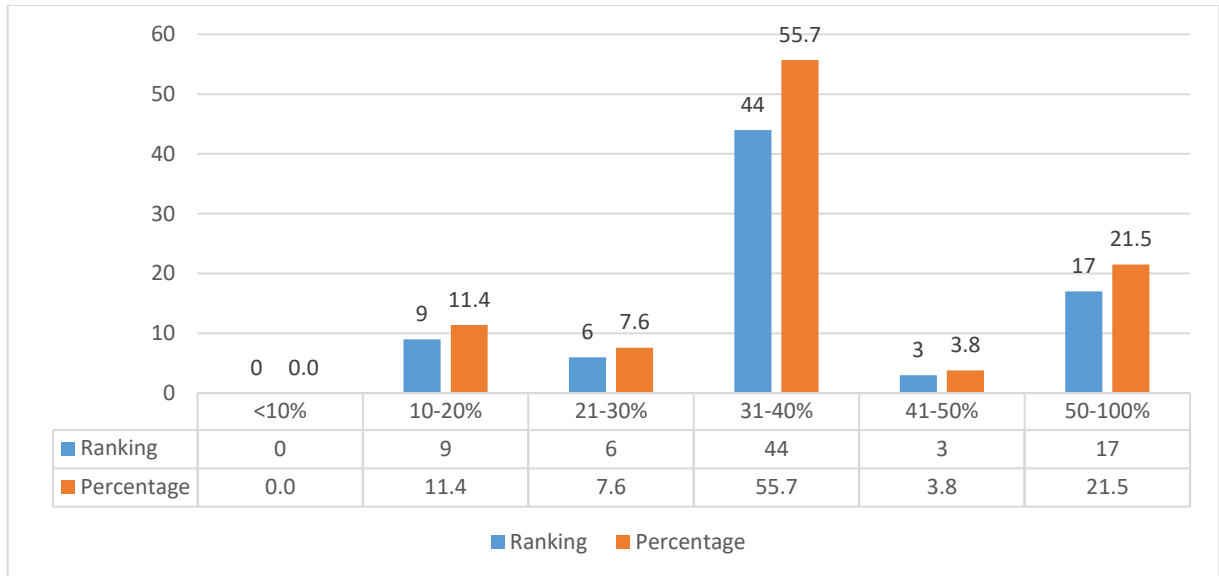
Figure 4.7: Non-housing expense per month

Q. 7. The percentage of housing expenses, the government of Pakistan should contribute to a low-income household per month

During the survey, it was revealed that, in a recent initiative, the Government of Pakistan has announced an income support programme for low-income households called *'Benazir income support'* programme. Through this programme an eligible household gets Rs. 1500 ($15) a month to support their household expenses.

	<10%	10-20%	21-30%	31-40%	41-50%	50-100%
Responses	3	11	24	8	22	11
Percentage	3.8	13.9	30.4	10.1	27.8	13.9
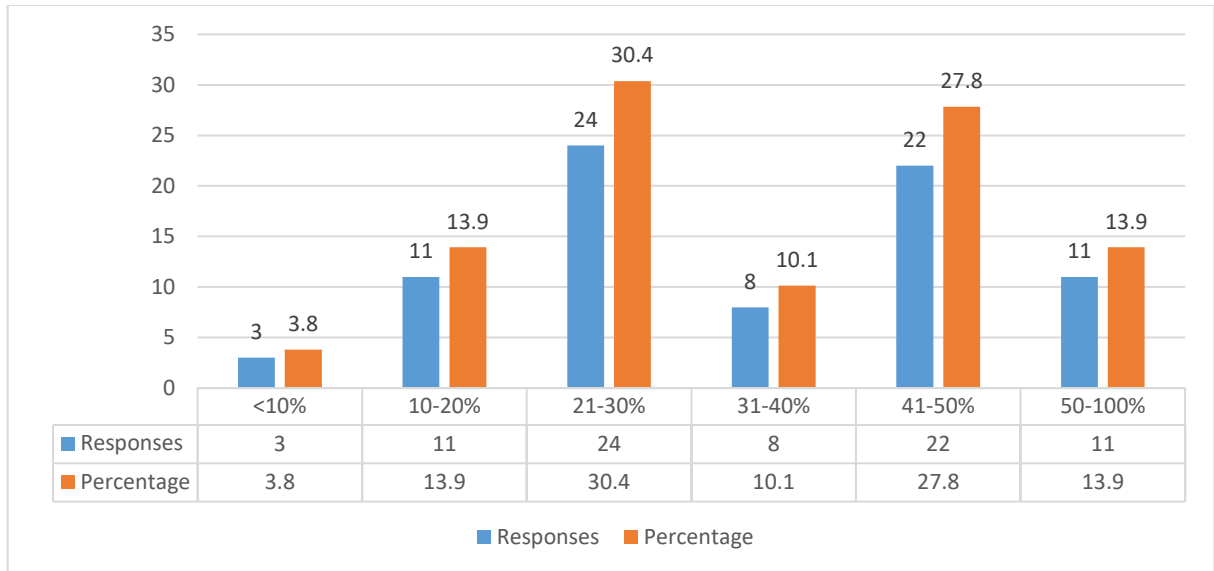
Figure 4.8: State contribution towards household expenses.

It is clear from Figure 4.8 that the whole of the survey population is agreed for the government to pay its contribution towards a household's monthly expenses. Most of the survey population at the rate of 30.4% wants the State of Pakistan to contribute at least 16-20% monthly towards the housing expenses for a low-income household. The State has no proper welfare system to support such households.

This section was to determine the general criteria of the housing affordability. The data findings have refuted a claim made by the previous researchers (Nenova 2010, Rizvi 2015) about average three persons should share a room in a house. The results given in Table 4.5 show that housing professionals in Pakistan suggested that a maximum of two persons should share a room in a house. The data findings have confirmed the international IER 30% threshold set by the previous researchers (Fisher, Pollakowski and Zabel, 2009; Dülgeroğlu-Yüksel, 2010; Waseem et al., 2011; Amjad and Idara-e-Taleem-o-Agahi, 2012; Amjad and MacLeod, 2014; Isalou, Litman and

Shahmoradi, 2014; Kakakhel, 2014; Elkins, 2018; Meen, 2018; Schwartz and Wilson, 2018).

A brief synopsis of the data findings can be seen in the Table 4.5 here.

Table 4.5: General criteria of housing

Delphi round – 2: housing affordability criteria in general Total participants: 79							
G. No.	Housing Criteria	Mean	Med.	Mod.	Std. Dev.	Sum	Scale with max %age	% age
1	Low income range	2.91	3.00	3	.603	230	3 = Rs. 10001-15000 ($ 100-150)	78.5 %
2	Room sharing per person	2.20	2.00	2	.758	174	2 = persons per room	62.0 %
3	Recommended future affordable housing	2.23	2.00	1	1.29 0	176	1 = multi-storey apartments	46.8 %
4	Recommended financial product	3.30	3.00	3	1.03 0	261	3 = mortgages	65.8 %
5	Housing expense per month	3.81	4.00	4	1.21 0	301	4 = 16-20% of total household income	43.0 %
6	Non-housing expense per month	4.16	4.00	4	1.19 2	329	4 = 16-20% of total household income	55.7 %
7	Govt. Contribution to low-income household	3.94	4.00	3	1.43 0	305	3 = 16-20% of household expense per month	30.4 %

Data responses for the general criteria were analyzed as shown in Table 4.5 which

verifies the expected results.

4.3.3 *Economic criteria of housing affordability*

This section of the survey was set around the economic criteria of housing

affordability. Questions asked in this segment of the questionnaire were related to

house price, monthly rent or mortgage instalment, travelling and commuting costs

etc. The data presented in Table 4.6 has used the similar format used by (Sourani

and Sohail, 2014) to show the data results of their research.

Eco-1. Monthly Rent

This criterion gained an accumulative response of 100% with the Likert scale of 4 and 5 in the questionnaire. Table 4.6 shows that 83.5% respondents considered monthly rent to be the 'critically important' and the rest of the 16.5% of the survey population considers that this housing criterion is an 'important' factor that may have an impact on low-income households' quality of life and their welfare. A breakdown of the responses has been given in Table 4.6

Table 4.6: Rating scores provided by the housing professionals for the economic criteria

ID	Criterion	Mean	Std. Dev.	Rank based on mean score	% of experts' voting for the criterion as					% of experts voting for the criterion as			Total Est.
					5	4	3	2	1	5 or 4	5 or 4 or 3	2 or 1	
Eco. 1	Monthly rent in relation to household income	4.84	0.373	1	83.5	16.5	0	0	0	100	100	0	100
Eco. 2	House price (to buy) in relation to household income	4.82	0.384	2	82.3	17.7	0	0	0	100	100	0	100
Eco. 3	Travelling cost to your workplace from your home	4.66	0.552	4	69.6	26.6	3.8	0	0	96.2	100	0	100
Eco. 4	Cost of maintaining (repair etc.) the house	4.68	0.468	3	68.4	31.6	0	0	0	100	100	0	100
Eco. 5	Cost of incremental expansion of the house	4.3	0.868	5	53.2	27.8	15.2	3.8	0	81	96.2	3.8	100
Eco. 6	Others	0	0	0	0	0	0	0	0	0	0	0	0

Eco-2. House Price

Table 4.6 shows that 29% of the respondent population are agreed to give 'house price' a critical importance rating '5'. During the data collection; it has been observed that low-income household will struggle to buy a house in any of the major cities unless their circumstances change, or government takes some initiative to provide them affordable housing.

Eco-3. Traveling cost to workplace

Location of a house is one of the most dominant criteria to determine the house price; it affects most the households with limited or low-income. It has been observed that most of the low-cost housing developments either from the private or government sector are at the outskirts of the major cities. These remote locations are not easy to reach and have limited or no public transport. During the survey, it has been noticed that along with the house prices and travelling cost, people with low-income prefer to stay in the shanty towns as they don't have to pay the maintenance or repair costs as set by the local or the private housing societies. The low-income segment of the population lives as second-rate citizens in the outskirts of the cities. This is the why this criterion in the question has gained an accumulative response of 100% with the Likert scale of 3, 4 and 5 and 96.2% on the accumulative basis of 4 & 5. Table 4.6 shows that almost 70% respondents considered that the travelling cost to workplace is 'critically important' and the rest of the 31.6% of the survey population considers that this housing criterion is 'important'.

Eco-4. Cost of maintenance

As mentioned above, the households with low-income prefer to stay in the shanty towns to avoid maintenance and repair costs. This criterion gained an accumulative response of 100% with the Likert scale of 4 and 5. Table 4.6 shows that 68.4% respondents considered monthly rent to be 'critically important' and the rest of the 31.6% of the survey population considers that this housing criterion is an 'important' housing affordability criterion.

Eco-5. Cost of incremental expansion

The cost of periodical and incremental expansion of a house is a vital criterion of housing affordability in Pakistan due to the extended family system (Mumtaz, 1995; Nikodem, 2018; Schwartz and Wilson, 2018; Anacker, 2019; Commission, 2019; Matt and Marshall, 2019; Saunders, Lewis and Thornhill, 2019). Culturally, people stay in a joint family system and expand their house as their children grow older or get married. In most cases, people are unable to buy different accommodation for a newly wedded couple or for grown-up kids. The responses in Table 4.6 reflect that the housing professionals of Pakistan are familiar with the situation and have responded to the question accordingly, 53.2% of the respondents believe it is a 'critically important' criterion of housing affordability.

In Pakistan, the land price is cheaper in rural areas with lower taxes and other charges. Government and private developers in Pakistan tend to develop low-cost housing in the suburban and rural areas to avoid high tax rates and other associated surcharges. This move falls on end users who cannot and do not want to travel to

these remote locations. Remote development sites and difficult access routes always have downsides, which cost end users more money and time.

Typically, people travel to work to earn their livelihood and need to travel because they are required to perform a work activity; the demand for travelling is generally a result of the demand for their work activities. For affordable housing, it is, therefore, reasonable to minimize the cost and time of travel for their dwellers. Evidence and theories suggest that the time of travelling dominates the decision about the source of and the destination of travelling (Handy and Clifton 2001).

4.3.4 Social criteria of housing affordability

Worldwide housing affordability is assessed based on the income to expense ratio whereas, this research considers that affordability of housing and affordable housing requires a more humanistic approach in finding answers for related issues rather than simply numerical and empirical justification. This section of the survey was set around the social criteria of the housing ((Table 4.7); questions asked in this segment of the survey are related to the social elements of human life that have some significance in housing affordability.

Table 4.7: Rating scores provided by the housing professionals for the social criteria

| ID | Criterion | Mean | Std. Dev. | Rank based on mean score | % of experts' voting for the criterion as | | | | | % of experts voting for the criterion as | | |
					5	4	3	2	1	5 or 4 or 3	2 or 1	Total Est.
Soc. 1	Location in terms of accessibility to the local shops, education centres, health facilities etc.	4.43	0.673	1	53.2	36.7	10.1	0	0	100	0	100
Soc. 2	Accessibility to local transport for work and general commute	4.14	0.693	2	31.6	50.6	17.7	0	0	100	0	100
Soc. 3	A place of prayer close to your home	3.18	0.958	5	8.9	29.1	32.9	29.1	0	70.9	29.1	100
Soc. 4	Internal privacy (e.g., separate sitting place for male and female guests in the house due to cultural reasons	3.89	0.816	3	24.1	44.3	27.8	3.8	0	96.2	3.8	100
Soc. 5	External privacy (no internal view of the house from outside and from the neighbouring houses due to cultural reasons)	3.70	0.806	4	19.0	34.2	44.3	2.5	0	97.5	2.5	100
Soc. 6	Other social criteria	0	0	0	0	0	0	0	0	0	0	0

Soc-1. Location in terms of accessibility to the local shops, education centres, health facilities etc.

As results show in Table 4.7, in Pakistan, most of the low-cost housing developments are on the outskirts of the major cities in Pakistan; and the end-users choose to buy or rent cheaper houses in these areas. They spend most of their household income and their time commuting to their workplace every day. The data presented in Table 4.7 shows that 53% of the housing professionals consider accessibility to local shops and health facilities as 'critically important', whereas for 37% it is 'important'; this makes it the most important social criterion.

Soc-2. Mean score of the accessibility to local transport for local and general commute:

Evidence and the theories suggest that the time of travelling dominates the decision about the source and destination of travelling (Handy and Clifton 2001); this theory is also important and can be applied in terms of house buying and renting choice. Table 4.7 shows that almost 32% of the survey population has suggested this criterion of housing affordability to be *'critically important'*, while 51% consider it to be 'important'. As per data results this criterion has been ranked at the second place in hierarchical order.

The land price is comparatively cheaper in rural areas with lower taxes, less government restrictions as compared to the major cities in Pakistan. This research suggests that, an affordable housing development should be in a reasonable location to minimize the cost and time of travel for the end-users.

Soc-3. A place of prayer near the house

Pakistan is an Islamic country and most of the population is Muslim (90% of the whole population) with very strong Islamic beliefs and practices. This research expected that this housing criterion would get most of the No. 5 of the Likert scale i.e., *'critically important'* responses, but, the responses suggest otherwise; as shown in Table 4.7 only 9% of the population has rated it as *'critically important'*, yet 29% have consider it as an *'Important'* criterion of housing. On the hierarchical ranking list, this criterion has gained the lowest ranking in its group.

Soc-4. Internal privacy

In Pakistan, women are not allowed to mix with men (other than immediate family or siblings); and are obliged to observe parda (veil/hijab). Surprisingly, Table 4.7 shows that the question has gained only 24% of the 'critically important' rating and 44% as 'important'.

Soc-5. External privacy

Comparatively, respondents are more concerned about the external privacy from people peeping or being able to investigate the house from outside. Table 4.7 shows that responses for Likert scale 5 gained 19% whereas, scale 4 gained 34%.

Soc-6. Any other social criteria

No responses have been recorded for this question.

4.3.5 Environmental criteria of housing affordability

This section of the survey has been set around the environmental criteria that tend to influence the housing and non-housing affordability of an end-user. In this section

of the questionnaire, housing professionals were asked to rank environmental criteria.

Env-1. Durable building design

Durable layout and building design of the house is a very important housing factor especially for low-income households because of the flexibility of use, maintenance costs and repairs. Housing professionals' response in Table 4.8 below shows that almost 24% of the survey population suggests it is a 'critically important' part of housing affordability whereas 68% consider it *'Important'*, ranking these criteria at the top of the hierarchical list.

Env-2. Flexible internal layout and design

Flexible internal and external layout and design of a house may help to control the internal temperature of the house which may reduce their non-housing costs. In this section of the questionnaire, it has been observed that the respondents do look out for environmental criteria while considering an affordable housing such as spatial layout, storage space, lack of privacy, noise, energy efficiency and HVAC systems etc. Internal layout and design of a house is equally important as of the external design; the layout design should be flexible to adjust end-user's lifestyle around it. The data shown in Table 4.8 shows that 9% of the respondents suggested that it is 'critically important' part of housing affordability, however, 58% of the respondent population considers it as an *'important'* criterion of housing affordability.

Env-3. Management and maintenance system

Management is a vital part in running a housing development smoothly and efficiently, especially in the countries like Pakistan. Table 4.8 shows that according

to 68.4% of the housing professionals it is a *'critically important'* criterion of housing affordability. Having a properly working management and repair system could be an important part of housing affordability; for example, a working heating, ventilation, and air-conditioning (HVAC) system in a house is an essential part of our lives. Our lives are dependent on the technology, electric, gas and water supplies etc. in Pakistan, the temperature during the summer time reaches up to 45-50 degrees Celsius; and in the winter the temperature goes down to freezing, therefore, it is vital to have a working HVAC system in the house. Nevertheless, this is a benefit that only middle and upper class can afford; affordable housing comes with the basic facilities without any air-conditioning and heating system in the house.

Table 4.8: Rating scores provided by the housing professionals for the environmental criteria

ID	Criterion	Mean	Std. Dev.	Rank based on mean score	% of experts' voting for the criterion as					% of experts voting for the criterion as		
					5	4	3	2	1	5 or 4 or 3	2 or 1	Total Est.
Env. 1	Durable building Design (suitable to cope with the weather, energy efficient	4.16	0.541	1	24.1	68.4	7.6	0	0	100	0	100
Env. 2	Flexible internal layout and design	3.76	0.604	2	8.9	58.2	32.9	0	0	100	0	100
Env. 3	Management and maintenance system for the housing building (to resolve the issues related to energy, services, cleaning, security, etc.)	3.61	0.687	3	0	68.4	27.8	0	3.8	96.2	3.8	100
Env. 4	Other environmental criteria	0	0	0	0	0	0	0	0	0	0	0

4.4 Chapter Summary

It has been observed that most housing professionals provide their services to the high-end and middle-income people, however, there are some housing developers particularly working to provide housing to low-income households. The Delphi methods survey mainly focused on the latter who are working towards providing general needs housing for low-income households in Pakistan. Housing professionals were selected as explained in the Chapter 3 (Section 3.7.1) and based on the responses that were obtained from the pilot study that has been explained in the Section 3.9.

A total number of 151 Delphi first rounds questionnaires were sent out to the housing professionals in Pakistan. In the first round, 96 responses were received back. In the second round, the questionnaires that included results from the first round were sent out to the 96 respondents who gave their consent to participate in further surveys. Out of the questionnaires sent, 79 responses were received in the final round. The dropout indication has been given in Table 4.9 and the justification for this drop out has been presented in Table 4.10.

As stated earlier in the section 4.2, the hypothetical, experiential and theoretical work pertaining to affordable housing mainly focused on the economic efficiency. Delphi survey have confirmed and verified claims made by the previous researchers as stated in Table 4.9 to consider social and environmental criteria without compromising the affordable housing user experience.

Table 4.9: Indication of Delphi surveys dropout rate for this research

Indication of Delphi survey dropout rate for this research					
Survey		Piloting	Round 1	Round 2	Round 3
	Participants invited	Responses	Responses	Responses	Responses
Total	200	151	96	79	79
% age		75.50	63.58	82.29	100.00

Table 4.10: References to indication of Delphi survey dropout rate

Indication of Delphi Survey dropout rate					
Survey		Piloting	Round 1	Round 2	Round 3
	Participants invited	Responses	Responses	Responses	Responses
Al Saleh	35	NA	33	27	32
Brent & Kruger	91	NA	7		
Gorghious	8384	NA	2585	1060	
Gough	242	NA	88	Workshops	
Iniyan et al	300	NA	151	72	NA
Terrados et al	13	NA	9		
Valette et al	250	NA	86	56	39
Wehnert et al	3461	NA	668	418	
Wilenius & Tirkkonen	142	NA	98	2 x group discussions of 20 participants	2 x group discussions of 20 participants

5 CHAPTER FIVE: AFFORDABLE HOUSING END-USER'S SURVEY REPORT

5.1 Introduction

This survey is an attempt to establish housing affordability perceived by the affordable housing end-user(s) or users of low-cost housing schemes (LCH) in Pakistan. Affordable housing end-user(s) and the end-user(s) are inter-changeable terms for this research. During the field work survey in Paksitan,two our affordable housing developments were identified as sample locations, in Pakistan. These developments claim to provide cheaper housing to low-income hosueholds on comparatively lower rates than the normal market price. The developed HAAC was transformed into a questionnaire. The research questions included in the survey were related to the Research question (Section 1.3, for example to explore any available housing developments available for low-income households in Pakistan. Furthermore, the aim of the survey was to validate the HAAC with the end-users ranking, and to establish the differences in opinions about housing affordability amongst the end-users and the housing professionals.

Two were selected to be used as sample locations in Pakistan. A questionnaire was developed using HAAC (Table 2.7, 2.8 & 2.9) some additional questions were added to establish the formation and income level of the end-users of the affordable housing in Pakistan.

The sample locations selected were: (i). Low-Cost Housing (LCH)-1 (Katchi Abadi: slums and squatters) (ii). LCH-2 (PPP project) were selected for the sample locations and one hundred households were chosen for this survey. One hundred

households were chosen for survey, which allowed this research to observe housing conditions of low-income households living in so-called affordable housing developments, along with validating the HAAC verified by the housing professionals through the Delphi methods. This chapter presents the data results and the findings report.

5.2 Triangulation of HAAC: Questionnaire Survey

Mostly, low income households in Pakistan do not have access to adequate housing or shelter. In order to assess the housing conditions and housing quality for the end-users living in one of the affordable housing societies in Pakistan, this survey was conducted to evaluate the housing conditions and the amenities attached to it, along with triangulation of the developed housing affordability assessment criteria (HAAC). As suggested by Rojas and Medellin (2011) this survey helped to determine the provided housing services experienced by the households. This questionnaire survey was conducted on two affordable housing developments in Pakistan to gain end-users' perception and views regarding the developed affordable housing concept.

The data findings allowed a scrutiny of the housing conditions of households with low-income and to evaluate their current housing situation. Adequate housing or a shelter is not easy to define (Meen, 2018; Anacker, 2019) however the quality and living standard of an end-user should define its meaning. Households living with less than a predefined housing condition should be considered as in an inappropriate condition and hence would need either improvement to their present one or a new

shelter (Rojas and Medellin (2011). This survey was also used to determine the affordable housing development's situation in Pakistan.

Unit price of the sample affordable housing development in Pakistan: the main reason for this criterion was to avoid expensive and luxury private sector developments. However, it is difficult to keep this criterion constant due to the housing market situation.

Location of the sample affordable housing development: During the review of the previous literature regarding housing in Pakistan, key words such as 'affordable housing', 'low income housing in Pakistan', low cost housing in Pakistan, PPP project, etc., were used to search any available sample locations in Pakistan. Search result identified four sample locations, these sample locations were visited at the piloting stage of the survey and initial contacts were made with the management of these housing developments. Figure 5.1 shows the situation of one of the affordable housing developments in Pakistan.

These housing projects aimed at providing housing to low-income households, two sample locations were selected out of four sample locations identified. Their claim to provide low-cost housing is an attractive feature and held significant value to contribute to this research. It also helped to assess the housing affordability of individuals and families who acquired houses in these projects. A questionnaire survey was developed, containing questions about end users' perception of housing affordability based on their personal experiences living in low-cost houses.

Figure 5.1: Sample affordable housing location in Pakistan for the field survey

A total one hundred questionnaire were disseminated in two affordable housing developments. One of the housing developments had a management office within the development and was used as guide to drop of the questionnaire survey. End-users were chosen based on duration of their stay in the development. All the respondents were living in these housing developments for minimum of two years. Hard copies of the questionnaire survey were distributed and was collected later. Most of the end-users were uneducated and could not read, so the questionnaire was read out to them to get their responses. Researcher had to fill the questionnaire

surveys on their behalf. People who could read were given the hard copies of the questionnaire to fill in.

Age of the sample affordable housing development: According to Huong and Soebarto (2003), new developments reflect the modern preferences and practices in housing design. Selected housing developments were mostly built during the period of 2012- 2015. Some of them are still under working progress.

This research follows a phenomenological paradigm, and research strategy is about investigating a phenomenon in a real-life context Chawla and Sodhi (2011), it is suitable for current study as the situation is practical for low-income households of Pakistan and the study is specific to these households. Questionnaire surveys were carried out to look at a real-life problem faced by the housing end-users and to address the problem by proper in-depth investigation.

During the field work survey, four numbers of affordable housing developments in total had been identified in Pakistan and two of the sample locations have been surveyed. One of the housing developments consisted of 1 to 2 bedrooms whereas; the other one had 1 to 3 bedrooms.

Low cost housing – 1 (LCH-1): This housing scheme is a private initiative. This development is almost 25 kilometres away from the main city centre. LCH-1 offers a maximum of 2-3-bedroom houses with a kitchen and bathroom. Buyer pays a deposit and remaining balance pays in instalments. This housing scheme is mainly for the high-end income end-users, only 10 to 20 houses are offered to middle-income households, who are bound to construct their own house to dwell in it. This practice helps the developers to sell more plots at a higher price. The price of the

house varies on the size of the plot and number of bedrooms which varies between Rs. 3500,000 to Rs. 55, 00,000. End-users pay almost Rs. 50,000 to Rs. 100,000 per month.

Low cost housing – 2 (LCH-2): This housing scheme is a Public-Private Partnership initiative. The government has provided land to a private company that offers 1-2-bedroom houses with a kitchen and bathroom on instalments. This development is almost 30 kilometres away from the main city centre. The price of the house varies on the size of the plot and number of bedrooms which varies between Rs. 9,00,000 to Rs. 25,00,000, end-users pay almost Rs. 100,000 (Pakistani rupees) as a deposit and rest is paid in instalments which range between Rs. 9,000 and 25,000 per month.

Most of the households/end-users of these low-cost developments are on low-income earning and earn on average Rs. 5,000/- to Rs. 10,000/- a month.

This research followed a conventional method to evaluate the housing conditions by determining the lack of housing services experienced by the households, a criterion determined by researchers such as (Rojas and Medellin, 2011). This questionnaire survey was based on the premise that the interaction and experienced shared by the end-users would be able to suggest some approvals for good quality housing supply (Abdul-Aziz and Kassim, 2011; Boulkedid et al., 2011; Kalia, 2013; Limited, 2013; Sheikh et al., 2013) in informal and formal housing markets in Pakistan.

The developed housing affordability assessment criteria (Section 2.13, Table 2.7, 2.8 & 2.9) was used to develop the questionnaire to be used for the survey. Each

question in the survey aimed to extract the required information based on end-users' personal experience rather than their perception.

5.2.1 The end-users of the sample affordable housing development:

Daily and monthly total household income shown in Section 2.11 of Chapter has been categorized as low-income for a household for the purpose of this research (World Bank 2015, Kakahel 2015, and Tariq 2013). End-users of this research has been explained in Section 3.7.2; they earn between $50-$100 a month (Section: 2.3.1 Income threshold) and live in one of the chosen sample locations as described in Section 5.1 earlier.

5.2.2 Measurement Scale Used for the Surveys (Likert Scale)

These questionnaires had four parts; the first part had general questions, with an option to select a box from the multi-choice answers. The following section of the questionnaire had similar questions used in the Delphi methods, regarding economic, social and environmental criteria of housing. In this section, Likert 5-point importance scale such as (1) not important at all; (2) slightly important; (3) fairly important; (4) important; (5) critically important was used, for this research. Footprints of these researchers (Jacoby and Matell, 1971; Vagias, 2006; Østerås et al., 2008; Brown, 2010; Culley, 2011; Rådestad et al., 2013; Birko, Dove and Ozdemir, 2015; Risberg et al., 2015) have been followed to choose five points Likert scale.

5.3   Justification for This Survey

The Government of Pakistan has been unable to provide housing for 6th most populated country in the world (Malik and Sajjad, 2014; Tariq 2014; Amjad and Macleod, 2014). The old paradigm of affordability is only measured through the quantifiable attributes of dwellings and their related costs (Dülgeroğlu-Yüksel, 2010). An acceptable and humane housing affordability measure should consider non-housing costs (Mulliner and Maliene 2012) due to geographical location, accessibility to amenities, jobs, schools, safety (due to terror threats).

At present there is no set criteria other than the IER to assess the housing affordability for low-income households in Pakistan. In Pakistan, the National Housing Policy (2001) has no clear policy to accommodate low-income households earning $2-$5 a day (Kakakhel, 2014). There is an acute need for some research to establish the affordable housing concept for low-income households in Pakistan and review the paradigms of affordable housing to learn about the relationships between the process, the product, and the socio-cultural aspects of the targeted populations in Pakistan.

This research anticipates being able to establish a better understanding of ans affordable housing and what it does to low-income households in Pakistan. This research may not be able to become a definitive guide due to the time, funding, limitation and research scope, yet data findings have offered a framework to make stakeholders' decision making more informative regarding future affordable housing projects. Some suggestions have been made to review 18 years NHP (2001) which has never been reviewed ever since its launch. This research will also provide some

references to auxiliary and comprehensive reading for the research community for further investigation in the field. Data collected through the questionnaire survey has been analysed using SPSS which is a widely used statistical package. The fundamental reason for using this analysis technique is to allow the researcher to obtain descriptive statistics and frequencies of each of the close ended questions that were asked from the participants in the end-users' questionnaire survey.

5.4 Questionnaire Survey Report

The following sections provide the data findings report of the end users' survey.

5.4.1 *General criteria of housing*

The questions asked in the general section of the questionnaire were of personal and informative nature. This section had 16 items in total; respondents had multiple choice answers (MCA) to choose from. This additional information provides the demographic data of the survey population which was gathered to determine the economic and social situation of a household with low-income. This information can be used for the further auxiliary research in the housing sector in Pakistan.

Frequency measures of central tendency have been measured (Table 5.1) showing the findings of frequency, mean, mode and standard deviation. Descriptive and Frequency analysis tool was used in SPSS to carry this statistically significant test. Mean, Mode and Median values of the descriptive and frequency analysis using SPSS have been presented in Table 5.1. Last two columns of Table 5.1 show the multi-choice answers (MCA) responses with the highest percentage of the responses. For example, using the averaging measurement (mean score) for G. 1,

in the survey population a low-income household has six family members on average.

Table 5.1: General criteria with mean scores, sum with highest response percentage based on end-users responses.

Q. No.	Criteria	Miss.	Mean	Median	Mode	Std. Deviation	Sum	Response with max. percentage	%age
	General criteria of housing								
	Total participants: 91								
G. 1	Family size	0	5.20	5.00	6.00	1.33	473.00	6 = -6 Persons in the family	28%
G. 2	Working family members	0	1.66	1.00	1.00	1.09	151.00	1 = only 1 member works in the family	64%
G. 3	School going family members	0	2.21	2.00	1.00	1.34	201.00	1 = only 1 member goes to school in the family	39%
G. 4	House Size_no of rooms	0	2.37	2.00	2.00	0.80	216.00	2 = rooms (that doesn't include separate living/drawing room)	59.30%
G. 5	People sharing a room	2	3.75	4.00	2.00	1.59	334.00	2 = persons share a room	33%
G. 6	Own or renting the house	2	1.81	2.00	2.00	0.40	161.00	2 = renting the house	79.10%
G. 7	House type in use	0	3.01	4.00	4.00	1.01	274.00	4 = New town	51%
G. 8	Recommended future affordable housing	0	2.59	3.00	4.00	1.37	236.00	4= developing new towns	44.00%
G. 9	Financial products used to buy or rent	0	2.45	2.00	2.00	1.38	223.00	2 = private lender	43%
G. 10	Recommended financial products	0	2.40	2.00	1.00	1.86	218.00	1 = loan by government	45%
G. 11	Household income per month	0	2.96	3.00	3.00	0.67	269.00	3 = Rs. 10001 - Rs. 125000	69.2
G. 12	Housing expenses per month	0	5.41	6.00	6.00	0.92	492.00	5 = 51% - 100%	59%
G. 13	Non-housing expenses per month	0	5.75	6.00	6.00	0.55	523.00	6 = 51% - 100%	79.10%
G. 14	Savings	0	1.95	2.00	2.00	0.23	177.00	2 = No savings at all	95%
G. 15	Should you get state contribution in housing expenses	0	1.00	1.00	1.00	0.00	91.00	1 = Yes, government should support	100%
G. 16	State contribution towards housing expenses	0	5.63	6.00	6.00	1.02	512.00	5 = Rs. 17501 - 20000	85%

General questions give an insight about the end-users' personal life including the type of the household population and their income level that could be a useful information for the analytic process. To analyse the general questions 'Mode' value has been used to measure the responses for each question.

G. 1. How many family members are there in your household?

Table 5.2: Family size.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	3 Person	11	12.1	12.1	12.1
	4 Person	21	23.1	23.1	35.2
	5 Person	16	17.6	17.6	52.7
	6 Person	25	27.5	27.5	80.2
	7-10 Person	18	19.8	19.8	100.0
	Total	91	100.0	100.0	

Most families in Pakistan particularly people with low-income and from the rural areas live in a joint family system, where parents and all their male children live in the same house after their marriage. This question was significant to determine the average family size of a low-income household in Pakistan. Table 5.2 shows that almost 28% of the survey population had 6 members, whereas, almost 20% of them had 7-10 members in their household. These family members consist of husband and wife with four or five children, and some of their children are married too with children of their own.

This question was asked to determine a suitable house size for a low-income household. On average a typical house size in urban area of Pakistan is between 5-10 Marlas. Most houses have single storey with 2 to 3 rooms, these are multipurpose rooms and are used to server all purposes including kitchen, sitting room and

bedroom. The claims made in the Chapter 2, section 2.8 earlier have been verified on average 4-5 members share a room.

G. 2. How many family members work in the family?

Table 5.3: Working family members.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1 Person	58	63.7	63.7	63.7
	2 Persons	17	18.7	18.7	82.4
	3 Persons	10	11.0	11.0	93.4
	4 Persons	1	1.1	1.1	94.5
	5 Persons	5	5.5	5.5	100.0
	Total	91	100.0	100.0	

This question was to determine how many members of the household need to work to cover their daily expenses. The data results in Table 5.3 show that almost 64% of the data population has a single working member in the family. As per Table 5.3, 19% of the survey population have 2 persons working, 11% have 3 members working, 1% of the population have 4 working members and 5% have 5 persons working in their family. Most of these working family members are skilled persons such as tailors, electricians, drivers, masons. 64 % of the survey population has single breadwinners, who must look after all the kids and probably the elderly parents as well. The unemployment rate in Pakistan is at an all-time high and stands at the rate of 6% and is persistent since 2016 (Trading Economics Pakistan, 2018). In most cases, people cannot get a suitable job due to the high unemployment rate in the country.

G. 3. How many family children in the family are at school?

Table 5.4: School going family members.

School going family members

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1 child	35	38.5	38.5	38.5
	2 children	26	28.6	28.6	67.0
	3 children	16	17.6	17.6	84.6
	4 children	8	8.8	8.8	93.4
	5 children	2	2.2	2.2	95.6
	6 children	4	4.4	4.4	100.0
	Total	91	100.0	100.0	

This question was to determine how many family members go to school that might have a significant impact on their family budget. The data result in Table 5.4 shows that almost 39% households have at least one school-going child.

Currently, the literacy rate in Pakistan is 58% as of January 2019; authorities vow to raise it to 70% in four years by providing school access to the approximately 22.8 million students, improving the education system among all ages with modern technology.

Female: 51.8%

Male: 72.5%

Source: Education in Pakistan (2019)

In Pakistan, the situation of the public schools is poor; sometimes the school has no basic services such as drinking water, washing facilities and in some cases no classrooms (building). People desire and tend to send their children to private schools, which is very expensive and unreachable for most low-income households.

G. 4. Size of end-user's house

After finding out the size of the family, it was vital to know the size of the house under end users' use. This information is vital as it can be used to develop future affordable housing developments for low-income households. Table 5.5 shows that almost 8% of the survey population have a house with a single room. This single room house, to further clarify, does not have a separate living room space, no separate kitchen, even in some cases, they do not have sanitation facilities. Keeping in mind the results from Table 5.2, it is difficult to provide accommodation/shelter for 7-10 people, which is 20% of the survey population. Table 5.5 shows that 59% of respondents have houses with only 2 rooms and this does not necessarily include living room and kitchen separately. Only 12% of the respondents have 4 rooms in their house.

Table 5.5: House size - no of rooms.

House Size – no of rooms

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1 room	7	7.7	7.7	7.7
	2 rooms	54	59.3	59.3	67.0
	3 rooms	19	20.9	20.9	87.9
	4 rooms	11	12.1	12.1	100.0
	Total	91	100.0	100.0	

G. 5. Opinion about the maximum members of a family that should share a room.

During the survey, it has been observed that a normal household in urban cities of Pakistan consists of six to seven members, living and eating together in one house. This member per house ratio is more in rural and northern areas due to joint family

system. Extended families with ten or even up to twenty family members live jointly in a bigger house, where, the eldest member of the family is in-charge.

Table 5.6: Room sharing

People sharing a room

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1 Person	1	1.1	1.1	1.1
	2 Person	30	33	33.7	34.8
	3 Person	9	9.9	10.1	44.9
	4 Person	16	17.6	18	62.9
	5 Person	19	20.9	21.3	84.3
	6 Person	11	12.1	12.4	96.6
	7-10 Person	3	3.3	3.4	100
	Total	89	97.8	100	
Missing	System	2	2.2		
Total		91	100		

Table 5.6 shows that only 1% of the respondents do not share a room with anyone else. On the extreme end 7 to 10 members of a family share a room and this is a 3% representation of the survey population. According to the data results, the highest room-sharing population stands at 34%, in their household only 2 persons share a room, whereas, in second place 21% of the population states that 5 persons share a room in their household.

G. 6. Own or rent a house

Figure 5.2 shows that almost 81% of the survey population lives in a rented house and only 19% of the respondents own a house.

Type of tenure: ownership or renting

Own	19%
rent	81%
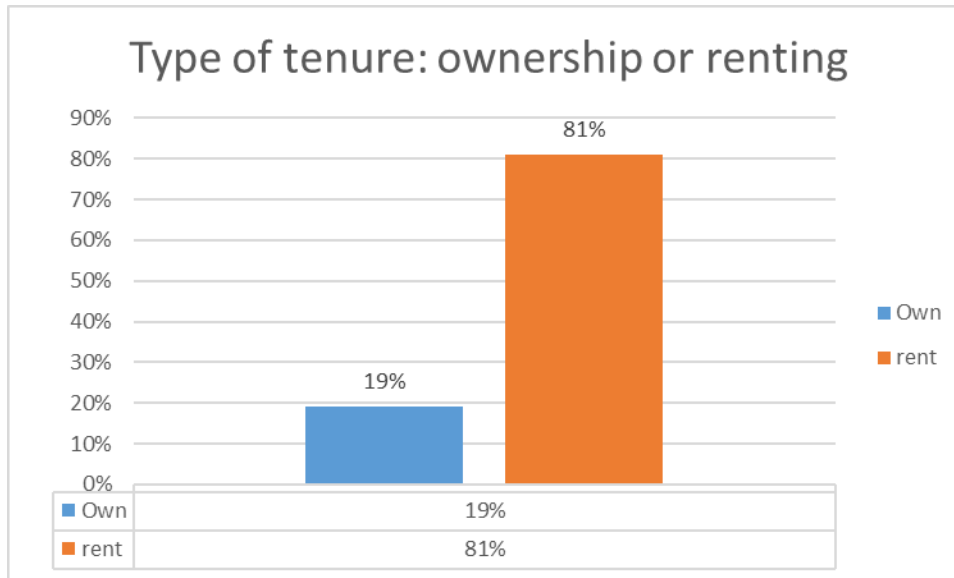
Figure 5.2: Own or rent a house.

G. 7. Type of property in use

This question was to determine the contemporary trend to accommodate low-income households in Pakistan. Figure 5.3 depicts that almost 51% of the respondents live in a newly developed accommodation. Whereas, 49% live in an unplanned type of property otherwise called shanty towns.
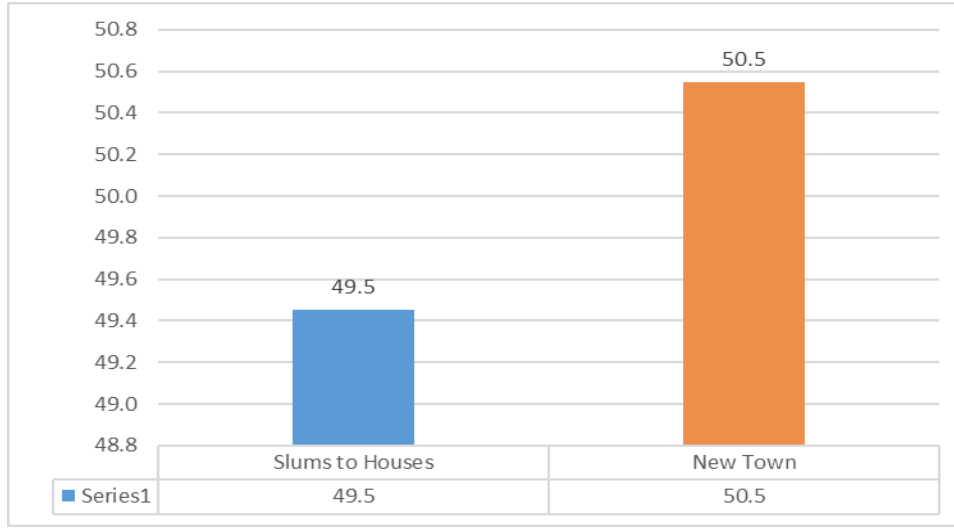
Figure 5.3: Type of property in use.

	Slums to Houses	New Town
■ Series1	49.5	50.5

G. 8. Recommended future affordable housing as per end-users' responses

The recent trend of rapid urbanisation has resulted in densely populated urban cities. This migration influx is causing expansion of the major cities around the world (Coit, 1991; Gabriel et al., 2005; Yates and Gabriel, 2006; Tirmzi, 2007; Maliene and Malys, 2009; Dülgeroğlu-Yüksel, 2010; Amjad and MacLeod, 2014; Isalou, Litman and Shahmoradi, 2014; Calnan, 2015; Newman, Kosonen and Kenworthy, 2016). In recent years, major cities in Pakistan are highly affected by urbanisation and are swelling even though compromising the agricultural land.
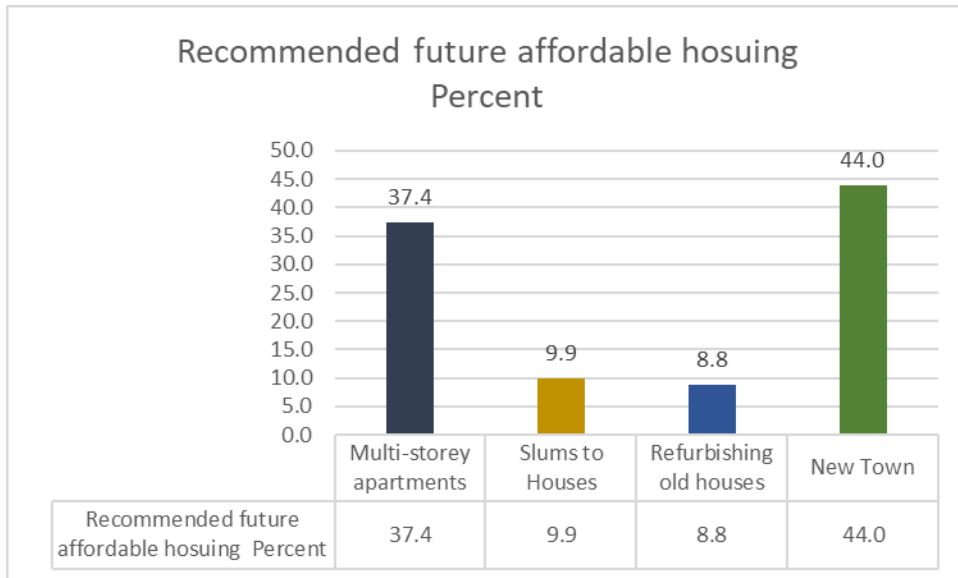
Figure 5.4: Recommended future affordable housing.

This question is to ask what the possible solution is to tackle the problem of housing without compromising agricultural land. Figure 5.4 shows that almost 44% of the population have voted for the 'New Towns' and 37% have voted for the 'Multi-storey apartments' and 10% have opted for converting 'slums to new houses' whereas 9% wanted to refurbish old houses.

G. 9. Financial products used to buy or rent a house

Table 5.7: Financial product used to buy or rent by the end-users.

Financial products used to buy or rent

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Loan by Govt	24	26.4	26.4	26.4
	Private Lender	39	42.9	42.9	69.2
	Mortgages	1	1.1	1.1	70.3
	Work Loan	19	20.9	20.9	91.2
	House Building Finance (HBFC)	7	7.7	7.7	98.9
	Islamic Banking	1	1.1	1.1	100.0
	Total	91	100.0	100.0	

In Pakistan, the House Building Finance Corporation (HBFC) is a public department which gets funding and financing from the State Bank of Pakistan (SBP). HBFC provides loans to build a house to the public, but does not provide loans to rent a house. HBFC has very stringent borrowing criteria and most low-income households do not qualify for the loan due to the income to expense ratio (IER) criterion of borrowing. That is why Table 5.7 shows that only 26% of respondents have access to the public loan and 43% have used private lenders (it is fair to call them loan sharks due to very high interest rates charged). Only 1% have used 'mortgages.

G. 10. The financial products end users have recommended to buy or rent a house
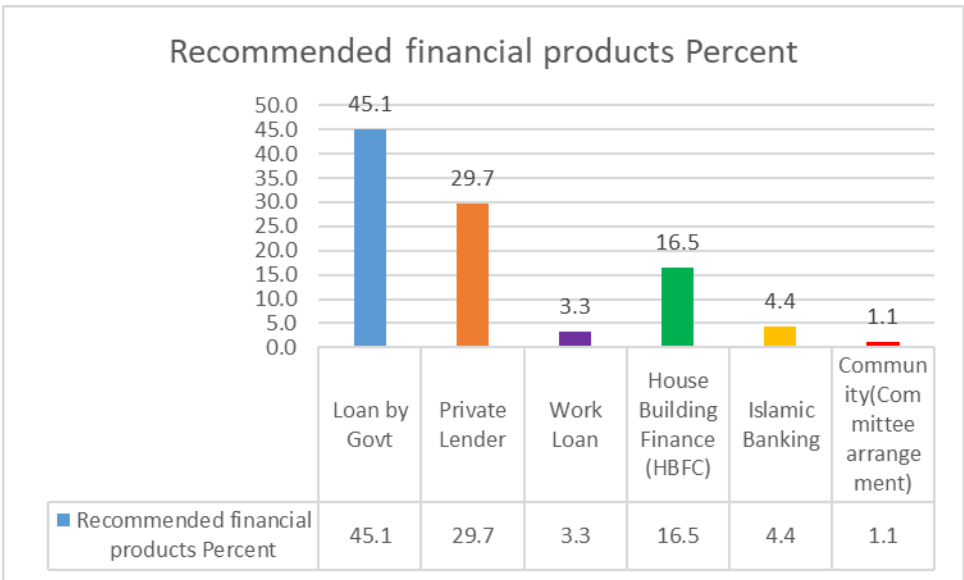
Figure 5.5: recommended financial products.

The data given in Figure 5.5 shows that 45% of the respondents have recommended 'loan by government' as a useful financial product to buy or rent a house. However, government do not offer any loans to rent a property but to buy. The reason for this answer could be the low interest and no hidden fees or charges etc., rate as compared to other financial products available. In the second place 30% of the survey-population preferred a 'private loan' due its easy availability and less stringent criteria, although the interest rate is way too high as compared to other financial products.

G. 11. Monthly household income

Table 5.8: Household income per month.

Household income per month

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Rs. 5000-7500	4	4.4	4.4	4.4
	Rs. 7501-10000	10	11.0	11.0	15.4
	Rs. 10001-12500	63	69.2	69.2	84.6
	Rs. 12501-15000	14	15.4	15.4	100.0
	Total	91	100.0	100.0	

This response has confirmed the claims made by researchers (Bank, 1993; Kakakhel, 2014; Awuah and Lamond, 2015) that a low-income household earns $2 to $5 a day in Pakistan. Table 5.8 shows that 4% of the survey population earns around $32 to $ 47 and 69 % of the population earns between $62-$60 a month and 14% of the population earns around $62 to $94.

G. 12. Monthly housing expenses such as rent, mortgage, loan repayments, electricity/water/gas bills, housing taxes, TV licence & sky cabling charges, maintenance and security charges, etc.

This question sought end-user's opinion regarding the percentage of the monthly total income, they spend on their household expenses per month. Table 5.9 depicts that 59% of the households spend most of their household income every month.

Table 5.9: Housing expense per month.

Housing expenses per month

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	11-20%	3	3.3	3.3	3.3
	21-30%	1	1.1	1.1	4.4
	31-40%	6	6.6	6.6	11.0
	41-50%	27	29.7	29.7	40.7
	51-100%	54	59.3	59.3	100.0
	Total	91	100.0	100.0	

The literature (Fisher, Pollakowski and Zabel, 2009; Dülgeroğlu-Yüksel, 2010; Waseem et al., 2011; Amjad and Idara-e-Taleem-o-Agahi, 2012; Amjad and MacLeod, 2014; Isalou, Litman and Shahmoradi, 2014; Kakakhel, 2014) suggests that a household should not spend more than 30% of the total monthly household income on housing expenses such as monthly rent, water, gas and electricity bills.

G. 13. Monthly expense on non-housing (travelling cost, medical cost, school fees and leisure)

As given in Table 5.10, 79% of the households spend 51-100% of their household income on the housing expenses. Women are not allowed to work especially in rural and northern areas of Pakistan, yet some women work from home. Sometimes these works could be in exchange for food or household items. This type of work is occasional and seasonal and not guaranteed, so cannot be classed as an income. In monetary terms, the survey population spend almost Rs. 20000 ($126 USD) on their non-housing expenses per month.

Table 5.10: Non-housing expenses.

Non-housing expenses per month

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	21-30%	1	1.1	1.1	1.1
	31-40%	2	2.2	2.2	3.3
	41-50%	16	17.6	17.6	20.9
	51-100%	72	79.1	79.1	100.0
	Total	91	100.0	100.0	

Household spending for the rest of the survey population is between 21-50% ($50 to 175 USD) of their household income, which is dependent on location, house size and the number of family members etc.

G. 14. Saving per month

Figure 5.6 shows that only 5% of the survey population has some sort of savings for their rainy days and 95% of the survey population has no savings at all.
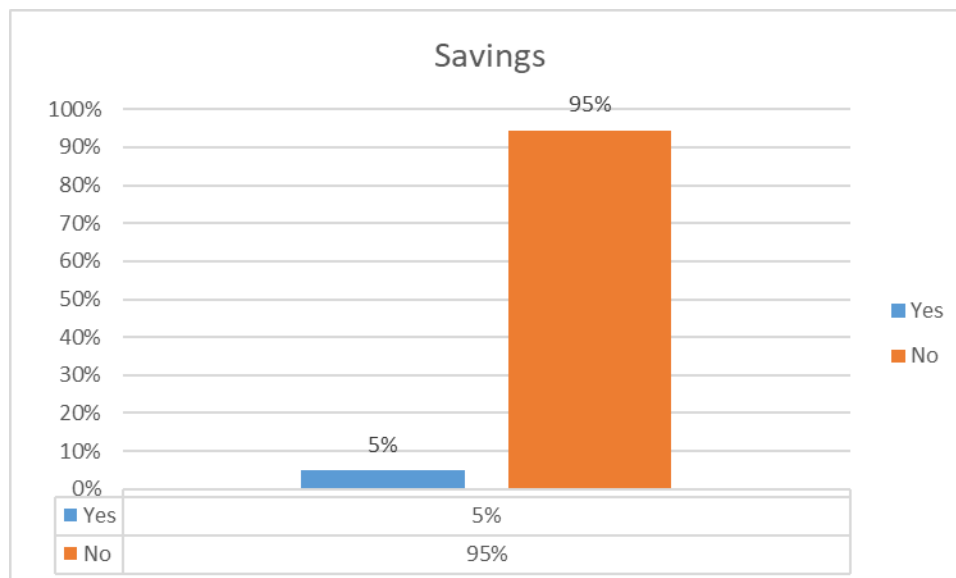
Figure 5.6: Savings.

G. 15. Should government support low-income households?

Table 5.11: State's support towards housing expenses.

Should you get state contribution in housing expenses

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	91	100.0	100.0	100.0

As Table 5.11 shows, this question had only 'yes' or 'no' boxes to tick and 100% of the survey population desires the State to contribute towards their housing expenses. In Pakistan, there is no proper welfare system to support such households.

G. 16. If answered yes, then how much?

This was continuity of the previous question, where the respondents were asked how much the state should contribute towards the household expenses every month to a low-income household. The results in Figure 5.7 shows that 86 % of the responses were in favour of getting 51-100% (i.e., almost Rs. 17501 to 20000: $110 to 126 USD) a month from the government.
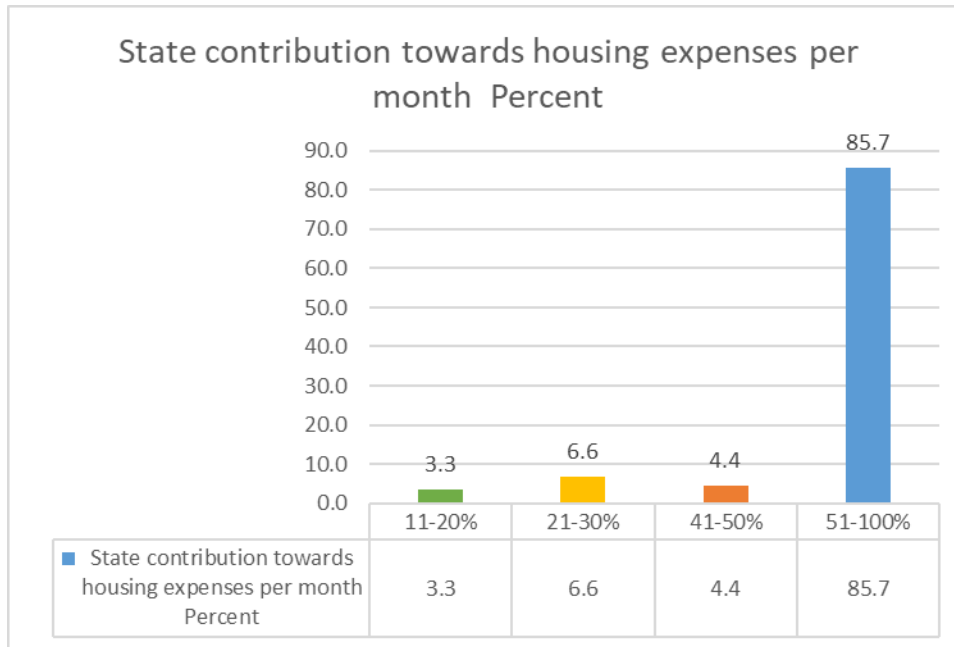
Figure 5.7: State's support as determined by the end-users.

In the year 2008, the government of Pakistan started an income support programme for low income households called 'Benazir income support' programme. Through this programme an eligible household gets Rs. 1500 ($9) a month to support their household expenses.

5.4.2 Economic criteria of housing affordability

This section of the questionnaire included questions that were related to economic criteria of housing affordability also known as housing expenses that may affect the financial situation of a low-income household. This group of criteria is the most influential and includes widely recognized IER.

The Likert scale of importance was used in this section where, '1' = not important at all; '2' = slightly important; '3' = fairly important; '4' = important; '5' = critically

important. Respondents were asked to select one of the importance criteria against each question. The questions related to economic criteria had six items in total (Soc-1 to Soc-6). In order to analyse those questions, SPSS and Excel computer-based programmes have been used: Figure 5.8 shows the mean value of the economic criteria of housing affordability using frequency analysis in SPSS computer programme.
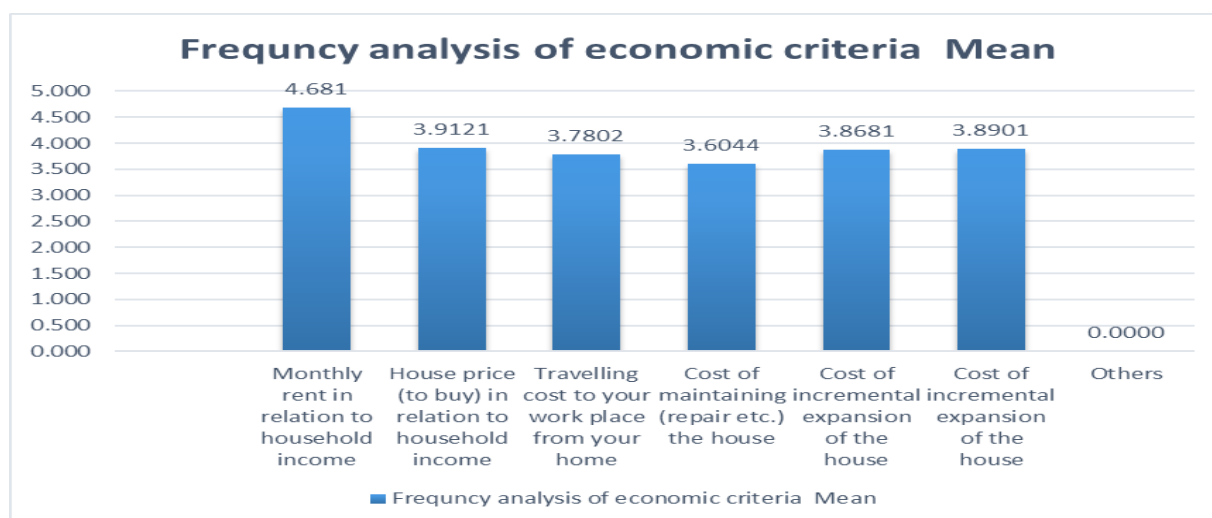
Figure 5.8: Analysis of economic criteria means.

The mean, mode, and median and standard deviation values have been presented

in the Table 5.12:

Table 5.12: Frequency analysis of economic criteria of housing affordability

					Statistics			
		Monthly rent in relation to household income	House price (to buy) in relation to household income	Travelling cost to your workplace from your home	Cost of maintaining (repair etc.) the house	Cost of incremental expansion of the house	Cost of incremental expansion of the house	Others
N	Valid	91	91	91	91	91	91	91
	Missing	0	0	0	0	0	0	0
Mean		4.681	3.9121	3.7802	3.6044	3.8681	3.8901	.0440
Median		5.000	4.0000	4.0000	4.0000	4.0000	4.0000	.0000
Mode		5.0	4.00	4.00	3.00	4.00a	5.00	.00
Std. Deviation		.4685	.90245	.98660	1.04221	1.03504	1.06927	.41931
Sum		426.0	356.00	344.00	328.00	352.00	354.00	4.00

a. Multiple modes exist. The smallest value is shown

Eco-1. Monthly Rent

Table 5.13 shows that 68% of respondents consider monthly rent to be a 'critically important' criterion of housing affordability which affects low-income households' choice of the house, quality of life and their wellbeing.

Table 5.13: Monthly rent

Monthly rent

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Important	29	31.9	31.9	31.9
	Critically Important	62	68.1	68.1	100.0
	Total	91	100.0	100.0	

Eco-2. House Price

During the data collection, it has been noticed that the house prices near the city centres in the major cities of Pakistan are unbelievably high and beyond the buying power of a low-income household. Monthly household income declared by the end-users in Table 5.14 is between Rs. 10001 – 12500 ($62 to $78 USD). It is very unfortunate that with their current household income and savings a low-income household would never be able to buy a house in any of the major cities in Pakistan. Probably, this is why the respondents have given this criterion a cumulative 100% responses where 68% responded it as 'critically important and 32% responded it as an important' affordability criteria.

Table 5.14: House price.

House price (to buy) in relation to household income

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Slightly Important	5	5.5	5.5	5.5
	Fairly Important	26	28.6	28.6	34.1
	Important	32	35.2	35.2	69.2
	Critically Important	28	30.8	30.8	100.0
	Total	91	100.0	100.0	

Eco-3. Travelling cost to workplace

The data result given in Table 5.15 shows that the 25% of the respondents rate it 'critically important', for almost 40% it is an 'important' criterion and for 25% it is a 'fairly important' housing criterion. The sample locations surveyed for this research are located at the outskirts of the major cities in Pakistan with no access to public transport and are not easy to reach. It is difficult for school-going end-users of these developments to travel to an education centre. These developments have no decent schools and colleges available in their catchment area. School-going children have to travel by bus or private means of travelling to get to their education places. Commuting costs influence their household income and all in all end-users spend more time and their resources on travelling.

Table 5.15: Travelling cost to workplace.

Travelling cost to your workplace from your home

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Not Important at All	2	2.2	2.2	2.2
	Slightly Important	7	7.7	7.7	9.9
	Fairly Important	23	25.3	25.3	35.2

		Frequency	Percent	Valid Percent	Cumulative Percent
	Important	36	39.6	39.6	74.7
	Critically Important	23	25.3	25.3	100.0
	Total	91	100.0	100.0	

Eco-4. Cost of maintaining (repairs etc.) the house

Table 5.16: Cost of maintaining the house.

Cost of maintaining (repairs etc.) the house

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Not Important at All	4	4.4	4.4	4.4
	Slightly Important	6	6.6	6.6	11.0
	Fairly Important	32	35.2	35.2	46.2
	Important	29	31.9	31.9	78.0
	Critically Important	20	22.0	22.0	100.0
	Total	91	100.0	100.0	

In Pakistan, overall housing stock consists of 21% pukka houses (properly built with bricks and mortar) on the other hand 39-40% are katcha makan (built with mud and temporary material) katcha houses. Most people in rural areas and the households that took part in this survey, mostly lived in katcha houses. End-users have to alter their house according to the weather requirements. Table 5.16 shows that 22% of the population consider it 'critically important' and 32% of the population believe it to be an 'important' criterion of housing affordability.

Eco-5. Cost of incremental expansion in the house

In Pakistan, a house is considered to be a status symbol in the society, bigger and better houses are a must-have asset and a proud possession. People spend lots of money to show off their wealth and power. Culturally in Pakistan, male children tend to stay with their parents even after their marriage, as their family grows, they build an extra room in an extension to their house. The results given in Table 5.17 explain

that   35% of population consider it 'critically important', 32% of the population believe it to be 'important' while 23% consider it to be a 'fairly important' criterion of housing affordability.

Table 5.17: Cost of incremental expansion of the house.

Cost of incremental expansion of the house

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Not Important at All	3	3.3	3.3	3.3
	Slightly Important	6	6.6	6.6	9.9
	Fairly Important	21	23.1	23.1	33.0
	Important	29	31.9	31.9	64.8
	Critically Important	32	35.2	35.2	100.0
	Total	91	100.0	100.0	

Eco-6. Any other suggestions

None recorded.

5.4.3   Social Criteria of Housing Affordability

In this section of the questionnaire the questions related to the social criteria of housing such as the location of the housing development in terms of accessibility to the local shops, education centres, health facilities, local transport for work and general commute etc. were included. Social criteria of housing affordability also intersected with the financial situation of a low-income household, for example, location of the house determines its value and the price and affects a house buyer's selection to buy it. Similarly, this section had six items (Soc-1 to Soc-6), respondents were asked to select one of the importance criteria against each question such as, '1' = Not Important at All; '2' = Slightly important; '3' = Fairly important; '4' = Important; '5' = critically important.

Soc-1. Location

Table 5.18: Location.

Location in terms of accessibility to the local shops, education centres, health facilities etc.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Not Important at All	1	1.1	1.1	1.1
	Slightly Important	8	8.8	8.8	9.9
	Fairly Important	7	7.7	7.7	17.6
	Important	45	49.5	49.5	67.0
	Critically Important	30	33.0	33.0	100.0
	Total	91	100.0	100.0	

In Pakistan, land is cheaper in rural areas with lower taxes and other charges. Government and the private developers in Pakistan tend to develop low-cost housing at the suburban and rural areas to avoid high rate tax and other associated surcharges. This move falls on end users who cannot and do not want to travel to these remote locations. Remote development sites and difficult access routes always have down turns; which cost end users more money and time. Easy access to the housing location is a very useful built environmental factor in terms of end user's wellbeing and performance and easy reach location could save time and energy. Data results given in Table 5.18 shows that 33% of the responses rated this criterion as 'critically important' and 50% as 'important'.

Soc-2. Accessibility to local transport for general commute

Table 5.19: Accessibility to local transport for general commute.

Accessibility to local transport for work and general commute

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Slightly Important	2	2.2	2.2	2.2
	Fairly Important	14	15.4	15.4	17.6
	Important	37	40.7	40.7	58.2
	Critically Important	38	41.8	41.8	100.0
	Total	91	100.0	100.0	

The data given in Table 5.19 shows that almost 42% of the population consider this criterion to be 'critically important'. Demand of travelling generally is the result of work demand and activities. An affordable housing development should be in a reasonable location to minimize the cost and travel time for end-users.

Soc-3. A place of prayer

Pakistan is an Islamic country and the majority of the population is Muslim, most of them have very fundamental Islamic ideology. This research expected the results shown in Table 5.20 even the highest importance ranking 5 of the Likert scale, still a cumulative percentage of scale 4 and 5 shows 84.7%.

Table 5.20: A place of prayer.

A place of prayer close to your home

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Slightly Important	5	5.5	5.5	5.5
	Fairly Important	9	9.9	9.9	15.4
	Important	45	49.5	49.5	64.8
	Critically Important	32	35.2	35.2	100.0
	Total	91	100.0	100.0	

Soc-4. Internal privacy

Table 5.21: Internal privacy.

Internal privacy (e.g., separate sitting place for male and female guests in the house due to cultural reasons

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Slightly Important	3	3.3	3.3	3.3
	Fairly Important	7	7.7	7.7	11.0
	Important	38	41.8	41.8	52.7
	Critically Important	43	47.3	47.3	100.0
	Total	91	100.0	100.0	

In Islamic culture women are not allowed to meet or greet any men other than the immediate family members, it is mandatory for women to observe the veil (parda) especially in rural and northern areas of Pakistan. The data results in Table 5.21 depicts the importance of this housing criterion, a cumulative percentage of scale 4 and 5 shows 89.1%.

Soc-5. External privacy

Table 5.22: External privacy.

External privacy (no internal view of the house from outside and from the neighbouring houses due to cultural reasons)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Not Important at All	2	2.2	2.2	2.2
	Slightly Important	3	3.3	3.3	5.5
	Fairly Important	4	4.4	4.4	9.9
	Important	40	44.0	44.0	53.8
	Critically Important	42	46.2	46.2	100.0
	Total	91	100.0	100.0	

This question is related to privacy as well and has a very significant role in selection of a house to buy or to let. As expected, respondents are equally concerned about their external privacy, Table 5.22 shows that Likert scale 4 and 5 gained a cumulative mean score of 90.2 % which is slightly higher than the Soc-4 (internal privacy).

Soc-6. Others

No responses have been recorded.

A collective frequency analysis of the social criteria has been presented in the Table 5.23 that shows the mean, mode, median, sum and standard deviation values.

Table 5.23: Social criteria of housing affordability

	Soc-1	Soc-2	Soc-3	Soc-4	Soc-5	Soc-6
N	91	91	91	91	91	91
Missing	0	0	0	0	0	0
Mean	4.0	4.2	4.1	4.3	4.3	0
Median	4.0	4.0	4.0	4.0	4.0	0
Mode	4.0	5.0	4.0	5.0	5.0	0
Std. Deviation	0.9	0.8	0.8	0.8	0.9	0
Sum	368.0	384.0	377.0	394.0	390.0	0
Percentiles	4.0	4.0	4.0	4.0	4.0	0
	4.0	4.0	4.0	4.0	4.0	0
	5.0	5.0	5.0	5.0	5.0	0

5.4.4 Environmental criteria of housing affordability

The questions regarding this criterion (Env-1 to Env-3) had the similar layout as the previous sections, where the respondents were asked to select one of the importance criteria against each question such as, '1' = Not Important at All; '2' = Slightly important; '3' = Fairly important; '4' = Important; '5' = critically important.

Env-1. Durable building design

Layout and design of the household is a very important housing affordability criterion, especially for low-income households because of repairing and maintaining costs etc. Responses in Table 5.24 shows that almost 40% of the survey population suggests it is an important part of housing affordability whereas 11% consider it a critically important criterion.

Table 5.24: Building design.

Durable building Design (suitable to cope with the weather, energy efficient

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Not Important at All	21	23.1	23.1	23.1
	Slightly Important	9	9.9	9.9	33.0
	Fairly Important	15	16.5	16.5	49.5
	Important	36	39.6	39.6	89.0
	Critically Important	10	11.0	11.0	100.0
	Total	91	100.0	100.0	

Env-2. Flexible internal layout and design

Internal layout and design of a house is equally important as the external design. It is vital because kids stay with their parents even after their marriages, therefore, the layout design should be flexible to adjust one's lifestyle around it. The data in Table 5.25 shows that 36.3% of the respondents suggested that it is an important part of

housing affordability whereas 18.7% consider it as critically important. Flexible internal and external layout and design of a house may help a household to reduce their non-housing costs.

Table 5.25: Flexible internal layout and design.

Flexible internal layout and design

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Not Important at All	11	12.1	12.1	12.1
	Slightly Important	17	18.7	18.7	30.8
	Fairly Important	13	14.3	14.3	45.1
	Important	33	36.3	36.3	81.3
	Extremely Important	17	18.7	18.7	100.0
	Total	91	100.0	100.0	

Env-3. Management and Maintenance of the house

HVAC system can be classed as part of the internal layout and design of a house; in the modern age an HVAC system is an essential part of our lives and our lives depend on technology, electric, gas and water supplies etc. This question was to determine the energy efficiency, quality of services provided and the management's efficiency to resolve any facilities management issues etc. The data in Table 5.26 shows that 28.6% of the responses suggested that it is a critically important criterion of housing affordability whereas 34.1% consider it an important factor of housing affordability.

Table 5.26: Housing management and maintenance system.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Not Important at All	6	6.6	6.6	6.6
	Slightly Important	9	9.9	9.9	16.5
	Fairly Important	19	20.9	20.9	37.4
	Important	31	34.1	34.1	71.4
	Extremely Important	26	28.6	28.6	100.0
	Total	91	100.0	100.0	

Env-4. Others

No data has been recorded.

5.5   Summary of the Results

The aim of the project was to assess the affordability criteria for Pakistan to design policies and controls and to make suggestions to the government, NGOs, and private developers. The findings of the end-user questionnaire verify the criteria and issues identified through the literature review as explained in section 2. Furthermore, during the literature review on many occasions, it was not clear about the exact characteristics, attributes, and desires of the people pertaining to owing a house. Available literature regarding the housing situation in Pakistan only consisted of the reasons and benefits of such low-income housing projects in Pakistan; but rarely covered low-income households. In this regards, findings of the end-user survey are linked and related with the literature review, because the gaps in the literature review are being covered by the findings of end-user questionnaire.

In the economic criteria section, affordable housing end-user's opinion was sought, the survey findings given in Figure 5.9 indicate that, affordable housing end-users in Pakistan have ranked 'economic criteria' at the highest importance level. This could be due to poverty, and lack of resources in deprived areas. However, housing affordability assessment requires a more humanistic approach in finding a suitable solution to accommodate low-income households. All the organisations need to work together to find a solution in tackling the housing deficit, energy poverty and housing related issues.

This statistical data given in Figure 5.9 shows the mean, median, mode and standard deviation values of frequency analysis using SPSS. Responses regarding the highest ranked environmental criterion, a sum of the responses have been used to

draw this. According to Leeman and Bordas (2005) *'acceptance and avoidance'* behaviour happens when an end-user receives the facility (an affordable housing in the context of this research) to use with its related advantages; and avoids the facility due to its associated weaknesses and flaws.

A detailed account of the primary information has been provided with the help of SPSS tables and graphs. The primary findings are linked with the secondary information gathered from the literature and through the fieldwork observations. Secondary information it has been indicated that housing affordability significantly influences the quality of life the households and individuals and affects their well-being, health, employment and financial flexibility. Establishing who, how many and where members of the low-income household population are being affected by unaffordable housing is a major enduring emphasis of both investigation and strategy. From the primary findings of this study it has been pointed out that affordable housing is where the individual is able to afford a house with their available income. In this regard, it has been stated by Linneman and Megbolugbe (1992) that the housing affordability approach reflects whether a household can afford a house (to buy or rent) based on their household income. In Pakistan almost 60.19% of the total population is living below the poverty line and an average household income of such families is up to $50 dollars a month (Kakakhel, 2014). The government of Pakistan has been unable to meet the demands of an increasing population and the need to provide affordable housing for such households. Similarly, it has been found from the survey that has been carried out as part of the

study, that the household affordability is not completely met in the region of Pakistan because of the growing population below the poverty line.

In order to analyse the data for general questions frequency, standard deviation, mean and mode values have been measured through SPSS. The questionnaire consisted of descriptive questions, which enquired about the characteristics of the respondents; such as number of family members, children, school going family members and size of rooms in the house etc. In order to analyse these characteristics, descriptive statistics were appropriate statistics. Meanwhile, no other tests were applicable on the following data, if data was collected on the Likert scale questionnaire, then some inferential statistics tests could have been used. Mean is the average and is computed as the sum of all the observed outcomes from the sample divided by the total number of events. Mode in a data set is the value with the highest frequency. The Median is a middle value. Standard deviation is an average amount of variability and also signifies the spread among data scores around the mean. The figure 5.9 shows the hierarchical list of the end-users' survey results based on the mean scores:
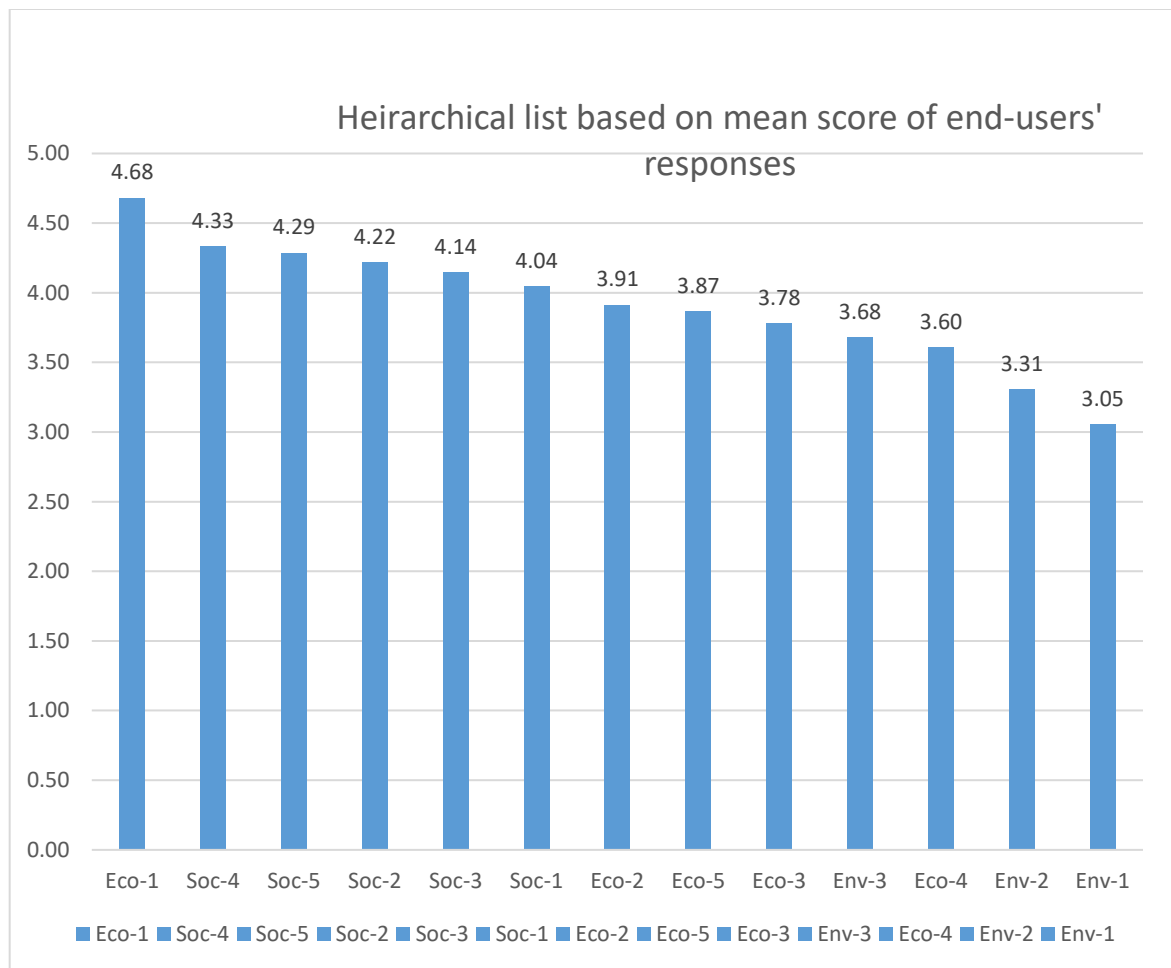
Figure 5.9: Hierarchical list of the end-users' survey results based on the means scores

6 CHAPTER SIX: DATA COMPARISON BETWEEN HOUSING PROFESSIONALS AND END-USERS

6.1 Introduction

The purpose of this chapter is to compare the data from the Delphi methods surveys with that of the end users of affordable housing developments (low-cost housing societies) in Pakistan. Most of the questions in the surveys were the same, however, some additional information was asked from the end-users to establish the true picture of the housing situation in Pakistan. The data responses of the housing professionals are based on their perception and the opinion; however, the end user's responses are based on their personal experience and day-to-day involvement with the affordable housing facilities.

6.2 Rationale

This research conducted two surveys from two different types of populations. Two different surveys were; questionnaire survey from end users and Delphi methods from major stakeholders related to the affordable housing in the Pakistan. The results of both methods were different but were strongly connected to each other, and overall fulfil the objectives of the study. Therefore, it is necessary to compare, contrast, analyse and discuss the results together to form the most important findings from both survey methods.

6.3   Comparison of Demographic and General Data Findings

As stated in the previous chapter section 5.2, most of the end-users are not very well educated, the majority of the affordable housing end-users are working class people on odd jobs. Most of them work on a daily wage's basis with no guaranteed work. Most of them work in the city centres and have to travel every day to their workplace, kids have to travel up to 2-3 hours a day to their education centres.

Housing professionals were divided in to five group and majority of professionals are sub-contractors 25%, followed by 19% each of government officials and the housing providers etc. 18% of the housing professionals were either architects or the town-planners etc. Table 6.1 also shows housing professionals' job description too.

Table 6.1 gives a comparison of general criteria by the housing professionals and the end-users. The table shows Mean, Median, Mode, and Standard Deviation, sum of the frequencies and the responses with the maximum percentage of the responses. The Delphi survey questionnaire had seven similar items to the end-user's questionnaire; it was to compare the responses from these two major stakeholders of the housing. Highlighted rows in Table 6.1 show both responses from the end-users and the housing professionals to compare the responses between them.

6.3.1   *Room sharing (end-users: G. 5 vs housing professionals: G. 2)*

The data results show that both housing professionals and the end-users are agreed that not more than two people should share a room in a house. However, in real life

as explained in Chapter 5, the number of family members in end-users' households varies and ranges from 3 to 10 members living and sharing a house.

6.3.2 Recommended future affordable housing (end-users: G. 8 vs housing professionals: G. 3)

There is a contrast in the responses, 37.4% of end-users have voted for the new houses, whereas, almost 47% of the housing professionals have voted for multi-storey apartments.

6.3.3 Housing expenses per month (end-users: G. 12 vs housing professionals: G. 5)

According to the end-user's responses (79.1%) they spend almost all of their household income on housing expenses every month. Whereas, 43% of housing professionals think that they should not spend more than 40% of their household income per month.

6.3.4 Recommended financial product to buy or rent a house (end-users: G. 10; housing professionals: G. 4)

A diversity in the opinion in the responses is eminent and contradictory to each other, 39% end-users prefer 'loan by government' and on the other hand 66% housing professionals responded in favour of 'mortgages' from banks.

6.3.5 Household income per month (end-users: G. 11 vs housing professionals: G. 1)

Both housing professionals and the end-users are very close in their responses to this question. According to the data, results from the affordable housing end-users, 69.2% of end-users earn $100 to $125 per month. On the other hand, 79% of housing professionals have guessed that an end-user earns $100 to $150 a month.

6.3.6 Non-Housing expenses per month (end-users: G. 13; housing professionals: G. 6)

End-users' data has interesting findings here; they have claimed in the previous question that they spend almost all of their household income per month on their housing expenses. The data results raise the question here: how do they meet other non-housing expenses?

During the fieldwork it was observed that Pakistan has a joint family system and they live together in one house (ignore the house size), sometimes families get help in the shape of food and other household items from their extended family. Especially married women get lots of financial and other support from their parents etc. In addition, some housewives work from home to get financial support from the community. It has also been noted that low-income households have a very simple lifestyle, sometimes without electricity and other utilities, and therefore, they do not have to pay hefty utility bills.

Table 6.1: General criteria with mean, median mode scores etc., with the highest response percentage based on the End-users and Housing Professionals responses

	General criteria of housing	Miss.	Mean	Med.	Mod.	Std. Dev.	Sum	Responses with max. percentage	Resp. %age
G. 1	Family size	0	5.2	5	6	1.33	473	6 = 6 Persons in the family	28%
G. 2	Working family members	0	1.66	1	1	1.1	151	1 = only 1 member works in the family	64%
G. 3	School going family members	0	2.2	2	1	1.34	201	1 = only 1 member goes to school in the family	39%
G. 4	House Size (no of rooms)	0	2.38	2	2	0.8	216	2 = rooms (that doesn't include separate living/drawing room)	59.30%
G. 5	Room sharing (end-users)	2	3.75	4	2	1.6	334	2 = persons share a room	34%
G. 2	Room sharing (housing professionals)	0	2.2	2	2	0.76	174	2 = persons per room	62.00%
G. 6.	Own or renting the house	2	1.81	2	2	0.4	161	2 = renting the house	81%
G. 7.	House type in use	0	3.01	4	4	1.01	274	4 = new town	51%
G. 8	Recommended future affordable housing (end-users)	1	2.59	3	4	1.37	236	1 = new houses	44%
G. 3	Recommended future affordable housing (housing professionals)	0	2.23	2	1	1.29	176	1 = multi-storey apartments	47%
G. 9	Financial products used to buy or rent	0	2.5	2	2	1.38	223	2 = private lender	43%
G. 10	Recommended financial products(end-users)	0	2.4	2	1	1.86	218	1 = loan by government	45.10%
G. 4	Recommended financial product (housing professionals)	0	3.3	3	3	1.03	261	2 = mortgages	66%
G. 11	Household income per month (end-users)	0	2.956	3	3	0.67	269	3 = Rs. 10001 - Rs. 12500 ($100 – 125)	69.2
	Low income range (housing professionals)	0	2.91	3	3	0.603	230	3 = Rs. 10001-15000 ($ 100-150)	79%
G. 12	Housing expenses per month (end-users)	0	5.41	6	6	0.92	492	5 = 51-100%	30%
G. 5	Housing expense per month (housing professionals)	0	3.81	4	4	1.21	301	4 = 31-40%	43%
G. 13	Non-housing expenses per month (end-users)	0	5.74	6	6	0.55	523	5 = 51-100%	79.10%
G. 6.	Non-housing expense per month (housing professionals)	0	4.16	4	4	1.192	329	4 = 31-40% of total household income	56%
G. 14	Savings	0	1.945	2	2	0.23	177	2 = No savings at all	95%
G. 15	Should you get state contribution in housing expenses	0	1	1	1	0	91	1 = Yes, government should support	100%
G. 16	Percentage of state contribution towards housing expenses (end-users)	0	5.62	6	6	1.02	212	6 = 51-100%	86%
G. 7.	Percentage of state contribution towards housing expenses (housing professionals)	0	3.94	4	3	1.43	305	3 = 16-20% of household expense per month	30.40%

Legends: Housing professionals
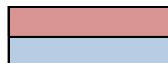
End-users

6.4 Comparison of Economic criteria of housing affordability

The economic criteria comparison by the housing professionals and the end-users. Individual criteria have also been separately compared to show the differences between Likert scale responses amongst two groups. The responses given in the comparison are the number of respondents out of total respondents who responded to that particular importance scale (1 to 5).

Table 6.2: Comparison of economic criteria.

		Not important at all (1)	Slightly important (2)	Fairly important (3)	Important (4)	Critically important (5)
Eco-1	H. Pros	0	0	0	13	66
	End Users	0	0	0	21	58
Eco-2	H. Pros	0	0	0	14	65
	End Users	0	5	24	25	25
Eco-3	H. Pros	0	0	3	21	55
	End Users	2	6	22	26	23
Eco-4	H. Pros	0	0	0	25	54
	End Users	4	6	28	21	20
Eco-5	H. Pros	0	3	12	22	42
	End Users	1	6	20	23	29

6.4.1 Monthly rent (Eco-1)

The comparison given in Table 6.2 shows the significance of this criterion for both the housing professionals and the end-users in Pakistan. According to the comparison given in Table 6.2, 66 of the housing professionals have marked this criterion as 'critically important' and the remaining 13 marked it as important on the other hand end-users similarly, 65 of the end-users claimed it to be critically important and 14 end-users have marked it as 'important (4).

6.4.2 House price (Eco-2)

Housing professionals have a diversity in their opinion regarding house price, whereas, on the other hand for the end-users' 'house price' is either an important or critically important matter of their housing affordability. In Pakistan, it has been observed that due to the very high housing price and unavailability of suitable financial products, a low-income household with an income between $2-$10 a day would never be able to buy a house in any of the major cities.

6.4.3 Travelling cost to workplace (Eco-3)

Travelling cost (Eco-3) and the house price (Eco-2) are inter-related and affect each other. The location of a house determines the house price and value and the travelling cost affects the household budget.

Cost of maintenance (Eco-4)

It has been observed during the fieldwork survey that people with low-income prefer to stay in the shanty towns to avoid hefty utility bills, maintenance charges and repair

costs etc. This criterion gained a 'critically important' scale by 54 housing professionals including 'important' responses by 25 housing professionals. End-users on the other hand have mixed responses to this question as shown in Table 6.3.

Table 6.3: Comparison of Eco-4.

Cost of maintenance (Eco-4)						
		Not important at all (1)	Slightly important (2)	Fairly important (3)	Important (4)	Critically important (5)
Eco-4	H. Pros	0	0	0	25	54
	End Users	4	6	28	21	20

6.4.4 Cost of incremental expansion (Eco-5)

As explained in chapter four regarding the Delphi Rounds analysis, periodic maintenance and incremental expansion of a house is one of the major expenses a household have to meet (Mumtaz, 1995; Nikodem, 2018; Schwartz and Wilson, 2018; Anacker, 2019; Commission, 2019; Matt and Marshall, 2019; Saunders, Lewis and Thornhill, 2019). In Pakistan, staying with the parents even after getting married is a common practice, especially families with low-income. The most common reason is the affordability to buy or rent different accommodation for newly wedded couples or for grown up kids. The responses in Table 6.4 reflect that 42 housing professionals have ranked it a 'critically important' criterion of housing affordability.

However, end-users have mixed responses, because they cannot afford this cost and most of the time they are not worried about maintenance and cleanliness of their dwelling as long as they have shelter to stay in.

Table 6.4: Comparison of Eco-5.

Cost of maintenance (Eco-5)						
		Not important at all (1)	Slightly important (2)	Fairly important (3)	Important (4)	Critically important (5)
Eco-5	H. Pros	0	3	12	22	42
	End Users	1	6	20	23	29

6.4.5 Any other criteria missed (Eco-6)

No response recorded

The comparison of responses of end users and housing professionals on the importance of the economic criteria has been presented in Figure 6.1. It can be observed from this figure that economic criteria and environmental criteria have been ranked as critically important for the end users. Figure 6.1 also shows that on many occasions end-users have ranked the economic, social, and environmental criteria somehow 'critically important' to 'important', but in contrast the industry professionals of the affordable housing have ranked these criteria mostly to be 'critically important'. It implies that industry professionals have a better

understanding and they have a better idea than end-users do regarding the housing affordability and its assessment criteria.
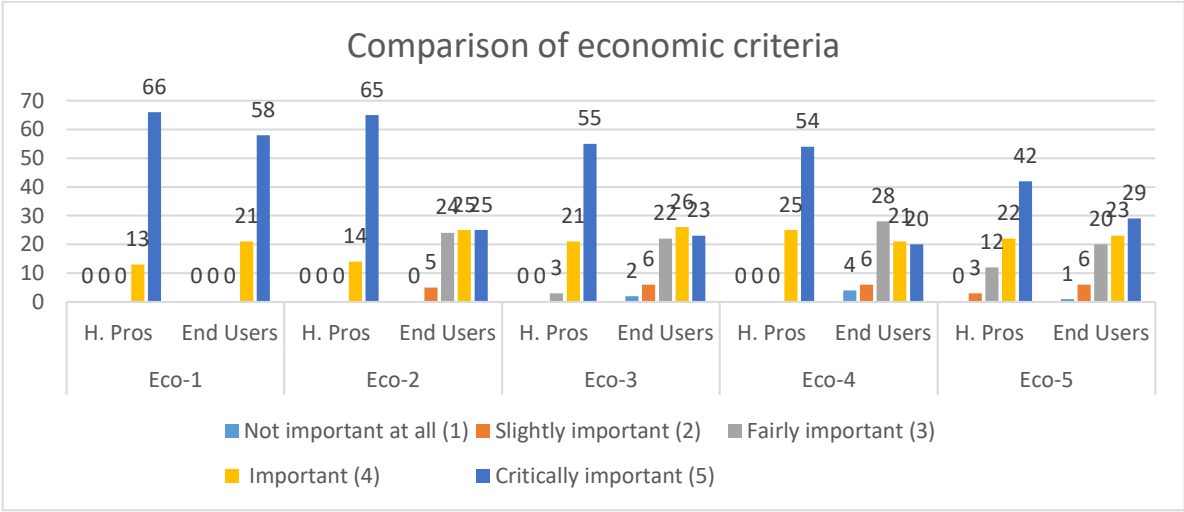
Figure 6.1: Comparisons of Economic Criteria

6.5   Comparison of Social Criteria of Housing Affordability

Figure 6.2 shows how many housing professionals and the end-users who took part in these surveys responded to a particular Likert scale ranking of social criteria.
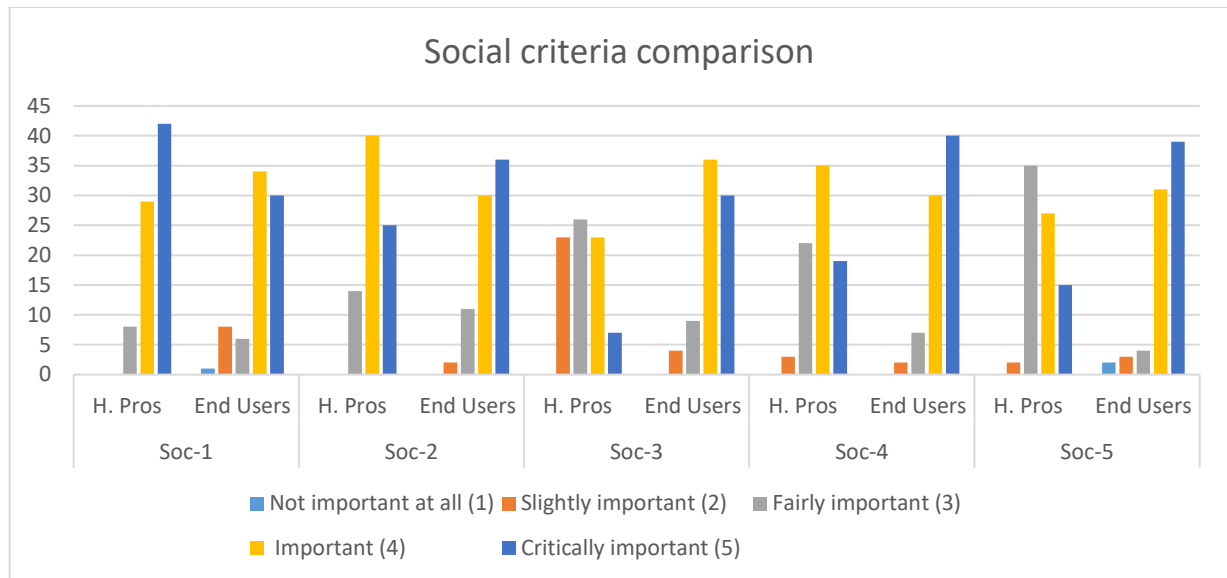
Figure 6.2: Social criteria comparison

6.5.1 Location of a house in terms of accessibility to the local shops, education centres, health facilities etc. (Soc-1)

As stated in Chapter five section 5.2, most of the end-users in the survey belong to labour and working class and live in deprived areas in Pakistan. They mostly commute every day to work in the city centres. Identified sample locations (low-cost housings developments) for the survey are at the outskirts of the major cities in Pakistan. House price and rent are comparatively cheap in peripheries of cities as mentioned in Section 2.5. Therefore, the end-users choose to buy or rent cheaper houses in these areas, and spend their time and money commuting to their work place every day.

The data result comparison in Figure 6.2 shows that the housing professionals are more concerned about this housing affordability criterion than the end-users, although, it should have been other way around, 42 housing professionals claimed

it to be 'critically important' and 29 as 'important'. There is a possibility that the end-users' might be working locally; yet 30 of them responded to it as 'critically important' and 34 of them as 'important'.

Table 6.5: Comparison of Soc-1.

Location (Soc-1)						
		Not important at all (1)	Slightly important (2)	Fairly important (3)	Important (4)	Critically important (5)
Soc-1	H. Pros	0	0	8	29	42
	End Users	1	8	6	34	30

6.5.2 Comparison of accessibility to local transport for local and general commute (Soc-2)

House buying and renting choice is determined by the destination (location) for travelling and the resources used to travel (Handy and Clifton 2001). Table 6.5 notes that 25 of the housing professionals' selected Likert scale '5' and 40 of them selected option '4' of the survey. Whereas, 36 end-users suggested this criterion of housing affordability to be *'critically important'*, while 30 considered it to be 'important' and 11 of them as 'Fairly important' and remaining 2 selected the option 'slightly important'.

The importance of this criterion as explained by the previous researchers can be seen in Sections 2.3, 2.5 and 2.4.5 of the Chapter 2. Nevertheless, it cannot be stressed enough that, a better housing location can save money, time and energy

as suggested by the previous researchers. Soc-1 and Soc-2 are interrelated and affect each other in terms of time, money and effort. The survey result given in Table 6.6 confirms the criteria identified through the literature (Casallo Blanco et al., 2005; Sohail, Maunder and Cavill, 2006; Fisher, Pollakowski and Zabel, 2009; Ming, 2012; Mulliner, Smallbone and Maliene, 2013; Isalou, Litman and Shahmoradi, 2014).

Table 6.6: Comparison of (Soc-2)

Comparison of accessibility to local transport for local and general commute (Soc-2)						
		Not important at all (1)	Slightly important (2)	Fairly important (3)	Important (4)	Critically important (5)
Soc-2	H. Pros	0	0	14	40	25
	End Users	0	2	11	30	36

6.5.3 A place of prayer near the house (Soc-3)

Pakistan is an Islamic country and the majority of the population is Muslim (90% of the whole population) with very strong Islamic beliefs and practices. It was expected that this particular criterion would get most of the No. 5 of the Likert scale i.e., *'critically important'* responses from both housing professionals and the end-users. But the responses suggest otherwise; as shown in Table 6.7, only 7 housing professionals and 30 end-users believed it to be *'critically important'*.

Table 6.7: Comparison of Soc-3.

A place of prayer near the house (Soc-3)						
		Not imp. all (1)	Slightly imp. (2)	Fairly imp (3)	Imp. (4)	Critically imp. (5)
Eco-5	H. Pros	0	23	26	23	7
	End User	0	4	9	36	30

6.5.4 Internal privacy (Soc-4)

Table 6.8: Comparison of Soc-4.

Internal privacy (Soc-4)						
		Not imp. all (1)	Slightly imp. (2)	Fairly imp (3)	Imp. (4)	Critically imp. (5)
Soc-4	H. Pros	0	3	22	35	19
	End Users	0	2	7	30	40

In Pakistan, women are not allowed to mix up with men (other than immediate family or siblings); and are obliged to observe parda (veil/hijab). Criterion comparison given in Table 6.8 shows that 19 housing professionals gave it an option '5' and 35 an option '4'. 40 of the participants from the end-users group think it a critical criterion and 30 ranked it as option '4'.

6.5.5 External privacy (Soc-5)

Comparatively respondents from the end-users' group are more concerned about the external privacy, for example, people peeping into their house. Table 6.9 shows that 39 end-users responded for Likert scale 5, scale 4 was marked by 31 respondents. Simultaneously 15 housing professionals selected option '5'.

Table 6.9: External privacy (Soc-5).

External privacy (Soc-5)						
		Not imp. all (1)	Slightly imp. (2)	Fairly imp (3)	Imp. (4)	Critically imp. (5)
Soc-4	H. Pros	0	2	35	27	15
	End Users	2	3	4	31	39

6.5.6 Any other social criteria (Soc-6)

No responses have been recorded for this question.

6.6 Comparison of Environmental Criteria of Housing Affordability

This section of the survey was set around the environmental criteria that affect the housing and non-housing affordability of an end-user.
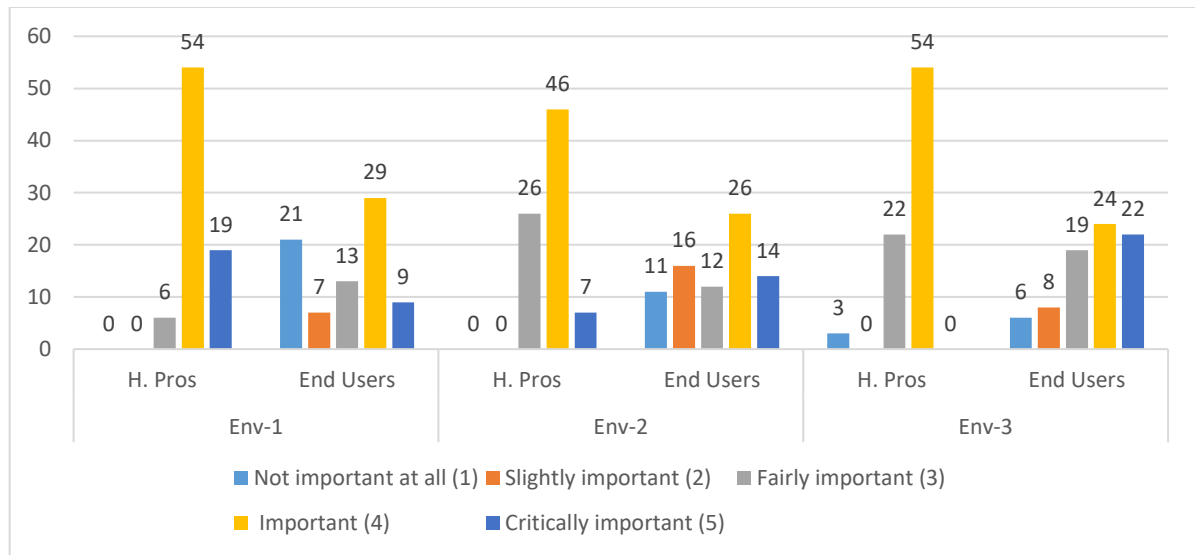
Figure 6.3: Comparison of environmental criteria

A comparison of environmental have been presented in this section as shown in Figure 6.3, the figure shows that majority of the housing professionals have rated this criteria to be 'important' (Likert scale 4) on the other hand end-user don't seems to bother about this criteria and majority of them rated it to be fairly important.

6.6.1 Durable building design (Env-1)

Durable layout and building design of the household is a very important housing criterion especially for low-income households.

Table 6.10: Comparison of Env-1.

Durable building design (Env-1)						
		Not imp. all (1)	Slightly imp. (2)	Fairly imp (3)	Imp. (4)	Critically imp. (5)
Eco-5	H. Pros	0	0	6	54	19
	End Users	21	7	13	29	9

A durable and flexible layout in a house reduces maintenance and repair costs repairs etc., the comparison given in Table 6.10 shows that 19 housing professionals' and 9 of the end-users marked it 'critically important', whereas, 54 housing professionals' and 29 of the end-users marked it as an 'important' criterion of housing affordability.

6.6.2 Flexible internal layout and design (Env-2)

It is considered that a flexible internal and external layout and design of a house may help to control the internal temperature of the house which may reduce their non-housing costs. It also allows them to adjust make maximum use of it to accommodate the household members. In this section of the questionnaire, it has been observed that the respondents do note environmental criteria when choosing affordable housing such as spatial layout, storage space, lack of privacy, noise, energy efficiency and HVAC systems etc.

Table 6.11: Comparison of Env-2.

Flexible internal layout and design (Env-2)						
		Not imp. all (1)	Slightly imp. (2)	Fairly imp (3)	Imp. (4)	Critically imp. (5)
Eco-5	H. Pros	0	0	26	46	7
	End Users	11	16	12	26	14

Internal layout and design of a house is equally important as the external design; the layout design should be flexible to adjust end-users' lifestyle around it. The data shown in Table 6.11 shows that 7 of the housing professionals and 14 end-users suggested that it is a 'critically important' part of the housing affordability assessment criteria. However, 46 housing professionals and 26 end-users considered it as an 'important' criterion of housing affordability.

6.6.3 Management and maintenance system (Env-3)

In recent years due to the global climatic changes, we experience extreme weather conditions, and construction has been influenced by these climatic changes, for example, a working heating, ventilation and air-conditioning (HVAC) system in a house is an essential part of the building design. Buildings are dependent on technology, electric, gas and water supply etc., having a working management and repair system is an important part of housing affordability. In Pakistan, the temperature during the summer times rises up to 45-50 degrees Celsius; and in the winter, the temperature goes down to freezing, therefore, it is vital to have a working

HVAC system in the house. Unfortunately, this is a benefit that only middle and upper class can afford; affordable housing comes with the basic facilities without any air-conditioning and heating system in the house.

Table 6.12: Comparison of Env-3.

Management and maintenance system						
		Not imp. all (1)	Slightly imp. (2)	Fairly imp (3)	Imp. (4)	Critically imp. (5)
Eco-5	H. Pros	3	0	22	54	0
	End Users	6	8	19	24	22

Table 6.12 shows, management is a vital part in running a housing development smoothly and efficiently, but surprisingly no housing professionals have rated it to be '5', however, 22 of the end-users have rated it as '5' on Likert scale.

6.7 Statistical Tests to Analyse the Data

Following section presents the relevant statistical tests carried out to validate this research.

Generally, data can be divided into four types:

Nominal data – is based on the groups with no mathematical relationship between them for example, gender, etc. These categories however can be statistically coded, but their statistical analysis will only be restricted to basic descriptive manipulation.

Ordinal data – can be categories according to the ranks and scales such as Likert scale. However, it cannot be expected to have equal data points amongst the intervals.

Interval data – can be categorised as the third level of measurement which has quantified level of difference amongst the data points and values such as dates and temperature etc.

Ratio data – also has characteristics of interval data along with additional quality of meaningful zero value (length, etc.).

The type of statistical analysis which, can be implicitly executed, will partially be subject to these categories, for instance, only frequencies can be considered for nominal data whereas calculating central tendencies (mean and median) would not be appropriate (Harris, Taylor and Taylor, 2005; Statistics, 2019). There are wide range of statistical tests available to perform on interval and ratio data. However, for its collection, it requires additional resources, and effort on behalf of the respondents, which is not always be justified.

The questionnaires surveys administered in this research consisted of both nominal and ordinal data. Mainly demographics data was nominal, and analysis for this data was limited to frequency calculations. However, the core HAAC (Likert scale rating and ranking) questions yielded ordinal data. The measures of central tendency (mean and median) were used to rank the criteria in terms of importance according to the housing stakeholders. This data entails interpreting the rating scale as having interval qualities. Some controversy for using such analytical techniques on ordinal data have been acknowledged (e.g. discussions by Knapp, 1990; Jamieson, 2004). Yet, it is commonly used approach to interpret preference surveys (Tveit, 2009) as it is a convenient and basic interpretation of rating scores.

6.7.1   Reliability/internal consistency

Cronbach's alpha test is the mostly used measure of internal consistency ('reliability'). It is commonly performed when the questionnaire survey contains multiple Likert scale and you require to determine the reliability of the scale (Statistics, 2019).

Cronbach's alpha coefficient test was performed to decide the internal consistency of the Likert scale used in the survey to rate the degree of importance of the housing affordability assessment criteria (HAAC) (from (1) 'not important at all'; (2) 'slightly important'; (3) 'fairly important'; (4) 'important'; (5) 'critically important'). The Cronbach's alpha coefficient values range from 0 to 1, where, higher score indicates greater reliability of the scale. A reliable score should preferably be above 0.7 (Pallant, 2005). Cronbach's alpha coefficient was calculated as 0.8 (approx.) for the

5-point scale that was used within the study (Figure 6.4). This value is above 0.7 and indicates a good internal consistency, therefore, the scale used to rate criteria importance can be considered reliable with the sample in this study.

Reliability Statistics	
Cronbach's Alpha	N of Items
0.769	13

A value > 0.7 indicates a good internal consistencay

Figure 6.4: Cronbach's alpha (α) values for the importance scale

6.7.2 Tests to measure central tendency

The questionnaires administered in this research contained both ordinal and nominal data. In the questionnaires, the criteria in terms of importance according to the stakeholders yielded ordinal data with rating questions. In statistics, measure of central tendency (or a central tendency or typical value) is a probability distribution, it is also known as a location or centre of the distribution. The arithmetic mean, the median and the mode are the most common measures of central tendency (Statistics, 2019).

The general questions in the survey were measured using the rating and the central tendency (median and mean). This approach is common to be used in interpreting preference surveys and is a simple and useful technique in rating score surveys (Tveit, 2009). In order to check the central tendencies of the data a Descriptive Analysis of Frequencies of the data simple frequency perform some statistical tests SPSS was used. Primarily, this survey sought to elaborate the level of significance

(Likert scale) of the HAAC. Central tendency has mean, median and mode as the valid measures (Statistics, 2019). Therefore, descriptive analysis was an appropriate tool to find out the results of the data; through this method, measures of spread and central tendency were measured.

Measures of central tendency are used to learn about a value which best represent an entire group of the research population. The median or the mid-value is a useful comparison of the mean scores (Chatfield, 2018). The mean score is summed up value by adding all given variable together and dividing the calculated sum by the number of participants who responded to that variable. The median value is recognised by identifying the midpoint in a set of scores, whereas, the mode represents the most frequent score in the data set. Mode values are mostly more useful when data set is not numerical by nature. Generally, median values could be useful when extreme scores are presented in the data and the mean score could thus be considerably affected and slanted by such extreme scores.

Standard deviation measures the spread and variability including testing the strength of the central tendencies. Standard deviation is an average amount of variability and signifies the spread among data scores around the mean. The mean scores become more precise if the standard deviation values is lower, while higher standard deviation represents the differences between scores and indicates that a different of central tendency test could be more suitable as a result.

6.7.3 Kolmogorov-Smirnov (K-S) test

It is important that data follows a normal a symmetrical, 'bell shaped' curve, in order to determine whether to use parametric or non-parametric tests. Parametric tests assume that survey data is normally distributed; vice versa non-parametric equivalents should be carried out if data does not follow normal distribution. Numerical and visual are two ways to assess the normality of the data. Visual assessments needs the kurtosis and skew-ness values of the curve gained from the graphed data. Kolmogorov-Smirnov (K-S) determine whether the distribution significantly varies from normal distribution. As a result of these tests, if the values are found 5% ($p<0.05$) then the distribution is significantly different from a normal distribution. Vice versa, if the results show non-significant value ($p>0.05$) then the data sample is not significantly different and is considered as normally distributed (Harris, Taylor and Taylor, 2005; Statistics, 2019).

In order to check the normality of the data, the K-S test was conducted for both housing professionals and end-users group using SPSS. A summary of the test results is given in Table 6.13 K-S test for normality illustrates the test statistics, degree of freedom (df) and significance (sig).

Table 6.13 shows summary of the results of K-S test carried out using SPSS, shown in the Table 6.13, indicates the K-S test (D), degree of freedom (df) and significance. Table shows that the significance value for all variable is well below (>0.05), which shows that the distribution of results in the stakeholders' samples significantly deviates from normal distribution, which makes a way to conduct the nonparametric tests.

The significance values for all criteria are well below 0.05 (Sig<0.05), hence, the data in this study fails to meet the requirement for parametric test and therefore, non-parametric test seems to be appropriate for the statistical analysis tests.

Table 6.13: Results of Kolmogorov-Smirnov test showing null hypothesis between housing professionals and end-users' responses

Tests of Normality							
Users		Kolmogorov-Smirnov[a]			Shapiro-Wilk		
		Statistic	df	Sig.	Statistic	df	Sig.
ECO_1	1	0.433	91	0	0.587	91	0
	2	0.506	79	0	0.447	79	0
ECO_2	1	0.198	91	0	0.854	91	0
	2	0.5	79	0	0.463	79	0
ECO_3	1	0.236	91	0	0.875	91	0
	2	0.428	79	0	0.622	79	0
ECO_4	1	0.186	91	0	0.883	91	0
	2	0.434	79	0	0.586	79	0
ECO_5	1	0.21	91	0	0.862	91	0
	2	0.321	79	0	0.761	79	0
SOC_1	1	0.305	91	0	0.794	91	0
	2	0.333	79	0	0.738	79	0
SOC_2	1	0.257	91	0	0.806	91	0
	2	0.263	79	0	0.799	79	0
SOC_3	1	0.276	91	0	0.796	91	0
	2	0.194	79	0	0.864	79	0
SOC_4	1	0.283	91	0	0.761	91	0
	2	0.239	79	0	0.855	79	0
SOC_5	1	0.273	91	0	0.718	91	0
	2	0.274	79	0	0.827	79	0
ENV_1	1	0.26	91	0	0.847	91	0
	2	0.379	79	0	0.713	79	0
ENV_2	1	0.252	91	0	0.879	91	0
	2	0.326	79	0	0.758	79	0
ENV_3	1	0.233	91	0	0.868	91	0
	2	0.4	79	0	0.585	79	0
a. Lilliefors Significance Correction							
Users = 1	End-Users						
Users = 2	H. Professionals						

This table shows that the significant level for the variable is p<0.05, that shows that the data is significantly different from a normal distribution

K-S test which specified a non-normal distribution of scores among housing professionals and the end-users, which established the need to use non-parametric tests. It is perceived that non-parametric tests are not as powerful as their parametric counterparts, however, the Mann-Whitney test it widely accepted as the most valid method to use in order to accurately test the data in this study (Pallant, 2010; Chuck,

2014; Statistics, 2019). Nevertheless, they are extremely valuable as they permit analysis of data that does not follow the strict requirements of normal distribution. Furthermore, non-parametric tests are usually more suitable where data are ordinal, using Likert measurement scales (Nanna and Sawilowsky, 1998; Pallant, 2010; Chuck, 2014; Statistics, 2019) – as is the case in this study.

Mann-Whitney works by ranking data, ignoring the group from which the data came from, it is a non-parametric tests and has been discussed below. Mann-Whitney test works on the principle that if there were no difference between groups, then each group would have a similar number of low and high ranks (Field, 2013). Therefore, the scores are ranked from lowest to highest, the lowest score is assigned a score of 1, the next higher score a rank of 2, and so on, inspection of sums of the ranks will indicate which group gave lower or higher ranking.

6.7.4   Mann-Whitney U test

The Mann-Whitney U test is a useful statistical tool to compare the differences between two independent groups when the dependent variable is either interval or ordinal, and not normally distributed. In some cases, it is considered to be a non-parametric alternative to the independent t-test. Mann-Whitney U test, instead of comparing the means of two groups converts the scores of continuous variable to ranks, across the two groups (Pallant, 2005; Pallant, 2010; Statistics, 2019). Mann-Whitney U test was carried out using SPSS, for each criterion in order to conclude whether there is a statistically significant difference between the levels of

importance provided by the housing-professionals (n=79) and end-users (n=91).

Using significance (α) level of 0.05, the null hypothesis (H$_0$) for each criterion is as follows:

H$_0$: There is no tendency for the ranking by end-users to be significantly higher or lower than for the housing professionals.

In order to provide a measure of the size of the difference: effect size (*r*) for each criterion was also calculated using the equation (where *z* is the corresponding *z* value and *N*=170):

$$r = \frac{z}{\sqrt{N}}$$

The results, including the test statistic (*U* value), effect size (r), *z*-value, *p*-value and the resulting decision regarding H$_0$ are shown in table 6.14.

Table 6.14 shows the pairwise comparison of housing professionals and the end-users responses. Initial level of significance (α) was adjusted to reduce the chance of Type I error (Field, 2013) and to keep it below 5%; the procedure is called The Bonferroni procedure (Corder and Foreman, 2009; Pallant, 2010; Field, 2013; Statistics, 2019). This procedure was conducted because, as a result of carrying out several tests on the same data inflates the chance that type I error will be made to above the critical 5%, and the null hypothesis (H$_0$) may therefore be erroneously rejected when it should not be (Field, 2013).

The Bonferroni procedure fundamentally divides the level of significance (for this study α=0.05) by the numbers of test that are needed to be performed, and to adjust, more stringent, α level is used to establish significance in the pairwise comparison.

The formula given below can be used to adjust the number of comparisons required for the data:

$$= \frac{k(k-1)}{2}$$

As per the formula 'k' is the number of groups being compared, in this study, the number of comparisons that would need to be made is 2, and therefore the α-level using the Bonferroni adjustment would be 0.05/2 = 0.025.

Table 6.14 shows that the p-value for three of the criteria (Soc-2, Env-2, Env-3) are greater than 0.05 (>0.05), there for the null hypothesis (H_0) for these criteria cannot be rejected, indicating that there is no statistical difference in the rating for these features buy end-users and the housing professionals. Although for the rest of the ten criteria, the p-value is much lower than 0.05 and the H_0 can therefore, be rejected showing that there are some statistically significant difference between two groups. The p-value is below 0.01 for Eco-2, Eco-3 Soc-3, Soc-4; Soc-5, Env-1 which shows a very high statistical significance. Table clearly shows that the housing professionals gave higher ranking (specified by the higher mean ranking) to the Economic Criteria as indicated in the Table 6.14 such as Eco-1(monthly rent) Eco-2 (house price), Eco-3 (traveling cost), Eco-4 (cost of maintenance), Eco-5 (cost of incremental expansion to the house). On the contrary the end users' have ranked Social and Environmental criteria instead as shown in the table for example, Soc-1 (Housing location), Soc-2 (accessibility to local transport), Soc-3 (a place of prayer), Soc-4 (internal privacy), Soc-5 (external privacy), Env-1(durable building design), Env-2 (flexible internal layout), Env-3 (management and maintenance services).

The effect sizes (r values) for all thirteen criteria are in small to medium range of effect[3]. The magnitude of Soc-3 (a place of prayer) is at the highest effect at the size of 0.329, followed by Env-3 (management and maintenance services), Env-2 (flexible internal layout), Eco-1(Rent), Soc-1 (Housing location) and thus making Eco-5 (cost of incremental expansion to the house) the lowest effect size.

Table 6.14 shows that the p-value for three of the criteria (Soc-2, Env-2, Env-3) are greater than 0.05 (>0.05), there for the null hypothesis (H_0) for these criteria cannot be rejected, indicating that there is no statistical difference in the rating for these features buy end-users and the housing professionals. Although for the rest of the ten criteria, the p-value is much lower than 0.05 and the H_0 can therefore, be rejected showing that there are some statistically significant difference between two groups. The p-value is below 0.01 for Eco-2, Eco-3 Soc-3, Soc-4; Soc-5, Env-1 which shows a very high statistical significance. Table clearly shows that the housing professionals gave higher ranking (specified by the higher mean ranking) to the Economic Criteria as indicated in the Table 6.14 such as Eco-1(monthly rent) Eco-2 (house price), Eco-3 (traveling cost), Eco-4 (cost of maintenance), Eco-5 (cost of incremental expansion to the house). On the contrary the end users' have ranked Social and Environmental criteria instead as shown in the table for example, Soc-1 (Housing location), Soc-2 (accessibility to local transport), Soc-3 (a place of prayer), Soc-4 (internal privacy), Soc-5 (external privacy), Env-1(durable building design), Env-2 (flexible internal layout), Env-3 (management and maintenance services).

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[3] Cohen (1988), 0.1=small effect, 0.3 medium and 0.5=large

The effect sizes (r values) for all thirteen criteria are in small to medium range of effect[4]. The magnitude of Soc-3 (a place of prayer) is at the highest effect at the size of 0.329, followed by Env-3 (management and maintenance services), Env-2 (flexible internal layout), Eco-1(Rent), Soc-1 (Housing location) and thus making Eco-5 (cost of incremental expansion to the house) the lowest effect size.

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[4] Cohen (1988), 0.1=small effect, 0.3 medium and 0.5=large

Table 6.14: Results of Mann-Whitney U test showing the statistically significant differences between the levels of importance according to the housing professionals and end-users

Mann-Whitney U Test										
Ranks		**N**	**Mean Rank**	**Sum of Ranks**	**Mean**	**K-S: 2 sample**	**Std. Deviation**	**50th (Median)**	**Asymp. Sig. (2-tailed)**	**Result**
	Users	*N*		*U-Value*		*z value*			r value	
ECO_1	1.00	91	79.41	7226.50						
	2.00	79	92.51	7308.50	4.75	-2.317	0.433	5.00	0.021	Reject H_0
	Total	170	4.75							
ECO_2	1.00	91	62.77	5712.00						
	2.00	79	111.68	8823.00	4.34	-7.168	0.842	5.00	0.000	Reject H_0
	Total	170								
ECO_3	1.00	91	64.74	5891.00						
	2.00	79	109.42	8644.00	4.19	-6.358	0.923	4.00	0.000	Reject H_0
	Total	170								
ECO_4	1.00	91	61.41	5588.50						
	2.00	79	113.25	8946.50	4.11	-7.306	0.985	4.00	0.000	Reject H_0
	Total	170								
ECO_5	1.00	91	75.98	6914.50						
	2.00	79	96.46	7620.50	4.07	-2.872	0.983	4.00	0.004	Reject H_0
	Total	170								
SOC_1	1.00	91	76.55	6966.50						
	2.00	79	95.80	7568.50	4.22	-2.774	0.841	4.00	0.006	Reject H_0
	Total	170								
SOC_2	1.00	91	88.67	8069.00						
	2.00	79	81.85	6466.00	4.18	-0.977	0.743	4.00	0.329	**Retain H_0**
	Total	170								
SOC_3	1.00	91	106.66	9706.00						
	2.00	79	61.13	4829.00	3.69	-6.304	1.003	4.00	0.000	Reject H_0
	Total	170								
SOC_4	1.00	91	97.71	8892.00						
	2.00	79	71.43	5643.00	4.12	-3.729	0.816	4.00	0.000	Reject H_0
	Total	170								
SOC_5	1.00	91	102.09	9290.00						
	2.00	79	66.39	5245.00	4.01	-5.002	0.890	4.00	0.000	Reject H_0
	Total	170								
ENV_1	1.00	91	67.19	6114.00						
	2.00	79	106.59	8421.00	3.57	-5.672	1.201	4.00	0.000	Reject H_0
	Total	170								
ENV_2	1.00	91	79.73	7255.50						
	2.00	79	92.15	7279.50	3.52	-1.745	1.062	4.00	0.081	**Retain H_0**
	Total	170								
ENV_3	1.00	91	89.60	8154.00						
	2.00	79	80.77	6381.00	3.65	-1.260	0.982	4.00	0.208	**Retain H_0**
	Total	170								

Users:
1 =   End-Users
2 =   Housing professionals

Figure 6.5 shows that ranking attributed to each criteria by the stakeholder and end users. Figure 6.5 indicate that the housing professionals have mostly rated the economic criteria Eco-1(monthly rent) Eco-2 (house price), Eco-3 (traveling cost), Eco-4 (cost of maintenance), Eco-5 (cost of incremental expansion to the house) critically important (Likert scale 5). Soc-1 (Housing location), Soc-2 (accessibility to local transport), Soc-3 (a place of prayer), Soc-4 (internal privacy), Soc-5 (external privacy), Env-1(durable building design), Env-2 (flexible internal layout), Env-3 (management and maintenance services) have gained important (Likert scale 4) which shows a very high statistical significance. Figure 6.5 clearly shows that the housing professionals gave higher ranking (specified by the higher mean ranking) to the Economic Criteria as the critically important.

End-users as indicated in the Figure 6.5 rated Eco-1 (monthly rent) as the critically important (Likert scale 5). Rest of the criteria such as Eco-2 (house price), Eco-3 (traveling cost), Eco-4 (cost of maintenance), Eco-5 (cost of incremental expansion to the house) Soc-1 (Housing location), Soc-2 (accessibility to local transport), Soc-4 (internal privacy), Soc-5 (external privacy), Env-3 (management and maintenance services) maintenance services) have gained important (Likert scale 4). However, Soc-3 (a place of prayer), Env-1(durable building design), Env-2 (flexible internal layout), have gained fairly important (Likert scale 3) rating.

Ranking	Housing Professionals	End Users

The colour circles represent rating for each criterion given by housing pros. And end users

Eco-1: Monthly rent in relation to household income	Soc-3: A place of prayer close to your home
Eco-2: House price to buy in relation to household income	Soc-4: Internal privacy for example separate sitting place for male and female guests
Eco-3: Travelling cost to your work place from your home	Soc-5: External privacy (no internal view of the house from outside and from the neighbouring houses due to cultural reasons)
Eco-4: Cost of maintenance	Env-1: Durable building Design (suitability to cope with the weather changes)
Eco-5: Cost of incremental expansion of the house	Env-2: Flexible internal layout and design
Soc-1: Location in terms of accessibility to the local shops, education centres and health facilities	Env-3: Management and maintenance system for the housing building (to resolve the issues related to energy, services, cleaning, security, etc.)
Soc-2: Accessibility to local transport for local and general commute	

Figure 6.5: Schematic comparison the difference of opinions between housing professionals and end-users based on Mann Whitney U test

Table 6.15: Hierarchical list of HAAC

Ranking order	Criteria		Users: 91	H. Pros: 79	Total: 170
		Code	Mean	Mean	Mean
1	Monthly rent	Eco-1	4.68	4.84	4.75
2	House price	Eco-2	3.91	4.82	4.34
3	Location	Soc-1	4.04	4.43	4.22
4	Travelling cost	Eco-3	3.78	4.66	4.19
5	Accessibility to transport	Soc-2	4.22	4.14	4.18
6	Internal privacy	Soc-4	4.33	3.89	4.12
7	Cost of maintenance	Eco-4	3.6	4.68	4.11
8	Cost of incremental expansion	Eco-5	3.87	4.3	4.07
9	External privacy	Soc-5	4.29	3.7	4.01
10	A place of prayer close home	Soc-3	4.14	3.18	3.69
11	Management and maintenance system	Env-3	3.68	3.61	3.65
12	Durable building Design	Env-1	3.05	4.16	3.57
13	Flexible internal layout and design	Env-2	3.31	3.76	3.52

Table 6.15 shows hierarchal order of the HAAC, which is based on the descriptive

statistics for both the housing professionals and the end-users in Pakistan and mean

scores of central tendencies have been used.

The data summarises that amongst the economic criteria 'monthly rent (Eco 1)' has

been rated the critically important housing affordability criterion, second place is the

house price. Social Criteria of housing affordability, location (Soc-1) has gained third

place. It is fair to say that location of the house determines the price and the renting

yield. Commuting cost to workplace (Eco-3) has gained fourth place in the chart.

Accessibility to amenities was placed at the fifth place. At sixth place is internal privacy (Soc-4), Eco-4 and Eco-5 are at the seventh and eighth place respectively. External privacy (Soc-5) is at ninth place, Pakistan is a Muslim country, and it was considered that the 'place of prayer (Soc 3)' would score the highest amongst the social criteria, whereas, the data result in 6.15 shows that it has scored the tenth place. Management system (Env-3) is at the eleventh place and durable building Design (suitable to cope with the weather changes) (Env-1) has gained the second place, leaving interior layout and design at the last place.

6.7.5 Factor Analysis (FA)

Factor analysis (FA) test helps to differentiate between inter-related variables/items, summarising content of lots of variables/items (questions) by a few items, developing scores for attributes, checking the validity of scales, checking a scale is unidimensional for Cronbach Alpha (Chan, 2014). Factors analysis summarises the factors (questions) into a smaller number (questions) to represent the inter-relation and co-relation amongst these factors. Estimated factor score can be created for each of the attributes including summary stats; scale can also be validated with this test to check the unidimensional (Williams, Onsman and Brown, 2010) of the scale which is necessary for running Cronbach Alpha (Chan, 2014). Factor analysis according to Cudeck (2000), is a set of techniques to explain the correlations among variables in terms of more fundamental objects known as main factors. In simple terms, each new main factor comprises fractional information from the basic

variables. The aim of factor analysis are to define the sum of underlying core influences, and to compute the magnitude to which each variable is related to the factors, and to gain fundamental statistics around their nature from detecting which factors add to the performance of which variables (Bełej et al., 2016). Factor analysis is purely a way to sort objects, with an objective to analyse the variables and dividing it into subsets, anticipating that new variables are discrete from other groups, and homogeneous within a group (Widaman 1993, Majors and Sedlacek 2001). It is mostly used as a method for grouping variables rendering to a related correlation design. In this capacity, the principal concept of FA is to observe multiple variables, which have analogous patterns of responses due to their relationship with an original embryonic variable, a factor that cannot be measured otherwise [Thompson (2004); Zmarzłowski and Jałowiecki (2008); Lewandowska (2014); Sterev (2014)].

Generally, factor analysis helps to covert correlated variables to gain new variables called main factors, which are uncorrelated. Hence, the use of factor analysis methods makes it possible for a number of principal variables to be summarize to a new synthetic variables which are smaller in number quantity. Significantly, the new main factors do not lose their descriptive values (Bełej et al., 2016).

Therefore, factor analysis:

i.   Reduce large number of variables into smaller number of factors (smaller in quantity)

ii.   Co-variation is due to latent variable that exert casual influence on observed variables

iii.   Communalities – each variable's variance that can be explained by factors (if any of the variable cannot explains its characteristics 100% it is called latent variable).

The HAAC obtained from the literature (Section 2.13.2) have been transformed into a ranking list. Further analysis, such as usage of algorithms to categorise the hidden factors be determined by the initial analysis of this matrix. The average correlation coefficients assume values of less than 0.32 (Williams, Onsman and Brown, 2010; Bełej et al., 2016); if the values of correlation coefficients are lower or none then the variables are highly correlated with any of the others. Table 6.16 shows a simple descriptive statistical values as part of the factor analysis test. Value given in the Table 6.16 are the mean, standard deviation (Std. Dev.) and the total number of participants.

Table 6.16: Results of Mann-Whitney U test showing the descriptive levels according to the housing professionals

	Descriptive Statistics			
		Mean	Std. Deviation	Analysis N
Eco-1	Monthly rent in relation to household income	4.75	0.433	170
Eco-2	House price to buy in relation to household income	4.34	0.842	170
Eco-3	Travelling cost to your work place from your home	4.19	0.923	170
Eco-4	Cost of maintenance	4.11	0.985	170
Eco-5	Cost of incremental expansion of the house	4.07	0.983	170
Soc-1	Location in terms of accessibility to the local shops, education centres	4.22	0.841	170
Soc-2	Accessibility to local transport for local and general commute	4.18	0.743	170
Soc-3	A place of prayer close to your home	3.69	1.003	170
Soc-4	Internal privacy for example separate sitting place for male and female	4.12	0.816	170
Soc-5	External privacy (no internal view of the house from outside and from th	4.01	0.890	170
Env-1	Durable building Design (suitability to cope with the weather changes)	3.57	1.201	170
Env-2	Flexible internal layout and design	3.52	1.062	170
Env-3	Facilities mangement system	3.65	0.982	170

The KMO and Bartlett Statistical tests **–** One of the assumptions to apply factor analysis is to check the sample size issue and the KMO and Bartlett's test value less than 0 (sig=0.000), the values of KMO are between 0 and 1. A value of 0 shows that the sum of partial correlations is large relative to sum of correlations, indicating diffusion in the pattern of correlations (hence, factor analysis is appropriate (Field, 2005). A value near to 1 shows that pattern of correlations are comparatively compact and so factor analysis should crop discrete and reliable factors. The data value given in Table 6.16 is 0.5 which falls into the range of being mediocre (Field, 2005). KMO test in Table 6.17 shows that minimum of two questions in the survey are related to each other.

To use factor analysis there is need for some relationship between variables and if the R-matrix were an identity matrix then all correlation coefficients would be zero. Bartlett's measure checks the null hypothesis that the original correlation matrix is an identity matrix. The values given in Table 6.17 informs that R-matrix is not an identity matrix; Bartlett's test is highly significant as ($p < 0.001$) to show that factor analysis is appropriate.

Table 6.17: Results of KMO & Bartlett's test showing the statistically significant for factor analysis test

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		0.732
Bartlett's Test of Sphericity	Approx. Chi-Square	943.877
	df	78
	Sig.	0.000

p < 0 indicates a good internal consistencay

Correlation Test – Table 6.18 shows abridged values of R-matrix, the top part of the table contains the Pearson correlation coefficient amongst all pairs of variables, while bottom part contains the one-tailed significance of these coefficients. On the scan of significance values, it has been found that majority of values are greater than the permissible size of 0.3, and thus it provides the conditions for carrying out further work. On further scanning of the Table 6.18, no value greater than 0.9 was found; determinant of the correlation matrix was checked and found at the value of 0.007. Therefore, there was no cause of concern and no singularity of data found (Field, 2005; Belej et al., 2016) and elimination of any variable is not needed.

Visual inspection of the Table 6.18 shows a perfect and symmetrical diagonal loadings of value amongst the data results.

Total variance output given in Table 6.18 shows that eigenvalues associated to each linear component initial extraction, after extraction and after rotation. Initial extraction SPSS has found 13 linear variables within the data set. The eigenvalues associated with each variable represent the variance described by that linear value along with percentage of variance explained, so criteria 1 explains 24.498% of total variance.

Table 6.18 further explains that first few criteria show relatively large amount of variance, while subsequent criteria shows small amounts of variance. Factor analysis extracts all variables with eigenvalues greater than 1 leaving only five factors. Extraction Sums of Squared Loadings show the same values as the values before extraction, except the values for the discarded criteria are ignored (table has no values after 5th criterion. Final part of the table shows the Rotation Sums of

Squared Loadings, where rotation has the effect of optimizing the factor structure and one consequence for these data is that the relative importance of the fifth criterion is equalized. Initial rotation criterion 1 accounted for considerably more variance than the remaining as shown in Table 6.18 (30%[5] compared to 19%, 13%, 9%, 8%;), and after extraction it accounts for only 20% of variance compared to 38%, 56%, 69%, 77% respectively.

Therefore, the data given in Table 6.18 shows that there is possibility to make new 5 group of factors.

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[5] the values of the initial values and rotational loadings from Table 6.18 are rounded to nearest zero

Table 6.18: Level of agreement within each stakeholder group (Intra-Class Correlation)

		Eco-1	Eco-2	Eco-3	Eco-4	Eco-5	Soc-1	Soc-2	Soc-3	Soc-4	Soc-5	Env-1	Env-2	Env-3
						Correlation Matrix								
Correlation	Eco-1	1.000	0.066	0.028	0.062	-0.028	-0.026	-0.117	-0.066	0.037	-0.023	-0.046	-0.094	-0.179
	Eco-2	0.066	1.000	0.679	0.542	0.386	0.403	0.355	-0.137	0.112	0.097	0.471	0.334	0.294
	Eco-3	0.028	0.679	1.000	0.648	0.494	0.365	0.243	-0.091	0.181	0.091	0.463	0.335	0.322
	Eco-4	0.062	0.542	0.648	1.000	0.567	0.285	0.167	-0.093	0.043	0.012	0.369	0.174	0.033
	Eco-5	-0.028	0.386	0.494	0.567	1.000	0.124	0.233	0.034	0.225	0.236	0.146	0.039	0.100
	Soc-1	-0.026	0.403	0.365	0.285	0.124	1.000	0.550	0.096	0.236	0.289	0.242	0.334	0.003
	Soc-2	-0.117	0.355	0.243	0.167	0.233	0.550	1.000	0.139	0.373	0.408	0.075	0.105	0.016
	Soc-3	-0.066	-0.137	-0.091	-0.093	0.034	0.096	0.139	1.000	0.473	0.521	-0.223	-0.056	0.070
	Soc-4	0.037	0.112	0.181	0.043	0.225	0.236	0.373	0.473	1.000	0.674	-0.072	0.035	0.070
	Soc-5	-0.023	0.097	0.091	0.012	0.236	0.289	0.408	0.521	0.674	1.000	-0.051	0.131	0.133
	Env-1	-0.046	0.471	0.463	0.369	0.146	0.242	0.075	-0.223	-0.072	-0.051	1.000	0.756	0.453
	Env-2	-0.094	0.334	0.335	0.174	0.039	0.334	0.105	-0.056	0.035	0.131	0.756	1.000	0.545
	Env-3	-0.179	0.294	0.322	0.033	0.100	0.003	0.016	0.070	0.070	0.133	0.453	0.545	1.000
Sig. (1-tailed)	Eco-1		0.195	0.357	0.212	0.357	0.367	0.065	0.196	0.317	0.382	0.276	0.113	0.010
	Eco-2	0.195		0.000	0.000	0.000	0.000	0.000	0.037	0.074	0.103	0.000	0.000	0.000
	Eco-3	0.357	0.000		0.000	0.000	0.000	0.001	0.119	0.009	0.119	0.000	0.000	0.000
	Eco-4	0.212	0.000	0.000		0.000	0.000	0.015	0.115	0.291	0.438	0.000	0.012	0.336
	Eco-5	0.357	0.000	0.000	0.000		0.054	0.001	0.330	0.002	0.001	0.029	0.309	0.098
	Soc-1	0.367	0.000	0.000	0.000	0.054		0.000	0.108	0.001	0.000	0.001	0.000	0.485
	Soc-2	0.065	0.000	0.001	0.015	0.001	0.000		0.036	0.000	0.000	0.165	0.087	0.419
	Soc-3	0.196	0.037	0.119	0.115	0.330	0.108	0.036		0.000	0.000	0.002	0.234	0.182
	Soc-4	0.317	0.074	0.009	0.291	0.002	0.001	0.000	0.000		0.000	0.174	0.325	0.184
	Soc-5	0.382	0.103	0.119	0.438	0.001	0.000	0.000	0.000	0.000		0.256	0.044	0.041
	Env-1	0.276	0.000	0.000	0.000	0.029	0.001	0.165	0.002	0.174	0.256		0.000	0.000
	Env-2	0.113	0.000	0.000	0.012	0.309	0.000	0.087	0.234	0.325	0.044	0.000		0.000
	Env-3	0.010	0.000	0.000	0.336	0.098	0.485	0.419	0.182	0.184	0.041	0.000	0.000	

Initial findings of the factor analysis – Table 6.19 was subjected to comparative factor analysis (CFA). 'All variance is common', which is the initial assumption of the principal component analysis; therefore, before extraction the communalities are all 1. To shows the common variance in the data structure, common variance in the data structure have been labelled as Extraction. The amount of the variance in each variable that can be explained by the retained factors is represented by the communalities after extraction (Field, 2005). After extraction, some of the factors are rejected and so some data is lost. Table 6.19 indicates that there is no extraction value less than 0.32 (<0.32), therefore, data extraction is good for analysis. Therefore, Table 6.19 shows that 83.2% of the variance associated with question 1 is common, or shared, variance.

Table 6.19: Total variance explained

Total Variance Explained									
Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	3.86	29.691	29.691	3.86	29.691	29.691	2.599	19.993	19.993
2	2.409	18.533	48.224	2.409	18.533	48.224	2.377	18.286	38.279
3	1.64	12.614	60.839	1.64	12.614	60.839	2.254	17.338	55.618
4	1.129	8.683	69.521	1.129	8.683	69.521	1.751	13.471	69.089
5	1.012	7.784	77.305	1.012	7.784	77.305	1.068	8.216	77.305
6	0.619	4.763	82.069						
7	0.544	4.186	86.254						
8	0.434	3.339	89.593						
9	0.361	2.774	92.367						
10	0.318	2.442	94.81						
11	0.275	2.115	96.925						
12	0.227	1.744	98.669						
13	0.173	1.331	100						
Extraction Method: Principal Component Analysis.									

In the Delphi surveys and for the end-users' questionnaire surveys, Likert scale ranking of importance (1-5) was used. Table 6.20 of 'communalities' shows the initial inspection of the inter-item correlation matrix that revealed that Soc-2 (accessibility to local transport) as compared to all other items in the table. Statistical output presented in Table 6.20 'table of communalities' before and after extraction, the inspection of loadings presented in the table reveals that the standardised regression weight for Soc-2 is very low (0.565).

Soc-2 (accessibility to local transport for commuting), travelling generally is a result of demand for the work- or job-related activities as (Section 4.3.4), and an affordable housing development should be in a reasonable location to minimize the cost and time of travel for the end-users. However, the land price is comparatively cheaper in rural areas with lower taxes, less government restrictions as compared to the major cities in Pakistan.

Housing professionals and the end-users were asked to rank this item (Soc-2: accessibility to local transport), the could be two reasons for the lower loading for this item, i. most housing professionals have access to their own transport and commuting does not really effect their daily routine, ii. Mostly bread earner of the house live closer to their job. On the other hand, may be end-users did not understand the question properly.

In case of Eco-3 (Traveling cost to workplace) table of communalities (Table 6.20) indicate the highest loading for this item (0.850). Location of a house is one of the most dominant criteria to determine the house price that affects the housing affordability of low-income household as explained in Section 3.4.3. Affordable

housing developments in Pakistan are mostly at remote locations, with very limited

or no public transport. During the survey, it has been noticed that along with the

house prices and travelling cost, people with low-income prefer to stay in the shanty

towns as they don't have to pay the maintenance or repair costs.

Table 6.20: Communalities with extraction loadings based on the factor analysis

		Communalities		
			Initial	Extraction
Eco-1	Monthly rent in relation to household income		1.000	0.952
Eco-2	House price to buy in relation to household income		1.000	0.694
Eco-3	Travelling cost to your workplace from your home		1.000	0.763
Eco-4	Cost of maintenance		1.000	0.758
Eco-5	Cost of incremental expansion of the house		1.000	0.769
Soc-1	Location in terms of accessibility to the local shops, education centres and health facilities		1.000	0.796
Soc-2	Accessibility to local transport for local and general commute		1.000	0.753
Soc-3	A place of prayer close to your home		1.000	0.652
Soc-4	Internal privacy for example separate sitting place for male and female guests		1.000	0.739
Soc-5	External privacy (no internal view of the house from outside and from the neighbouring houses due to cultural reasons)		1.000	0.783
Env-1	Durable building Design (suitability to cope with the weather changes)		1.000	0.799
Env-2	Flexible internal layout and design		1.000	0.839
Env-3	Facilities management system		1.000	0.753

Extraction Method: Principal Component Analysis.

The scree graphs (Figure 6.6) of proper values indicates that housing affordability criteria can be further divided into 5 groups or are significant (Kaiser Criterion). Scree plot also shows the component matrix containing the loadings of each variable onto each factor. Loading less than 0.3 were supressed in the output. Factor analysis result has generated 5 new variables or groups.

Scree Plot

Economic criteria: Eco1, Eco-2, Eco-3, Eco-4, Eco-5

Social crieria: Soc-3, Soc-4, Soc-5

Environmental crieria: Env-1, Env-2, Env-3

Total HAAC to retain after FA= 11

Eigenvalue

Total number of criteria
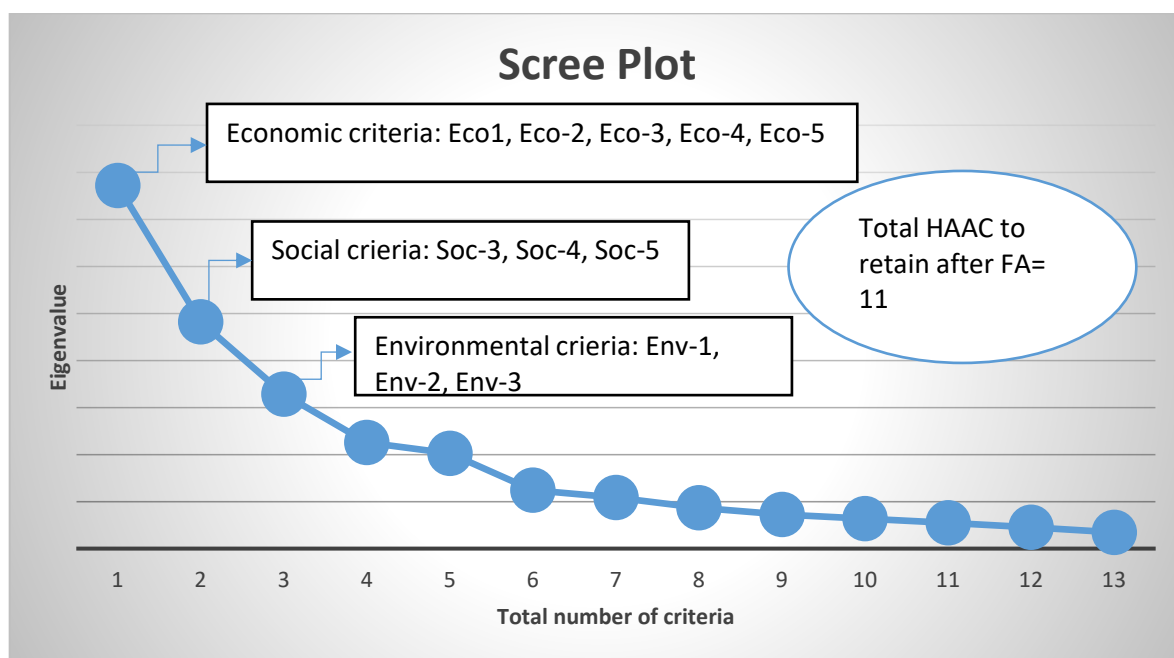
Figure 6.6: Scree plot to show the most critical housing affordability assessment criteria to retain after factor analysis

In the next phase, so-called own value of each of the new factors was establish. The results have been presented in Table 6.20, from the 13 variables describing housing affordability assessment criteria, the 5 new main factors covered approximately 71% of the original information. The first factor covered nearly 24%, while the second

factor – nearly 16%, third approximately 13%, fourth approximately 10% and fifth approximately 8%.

Table 6.21: Variance to show the percentage of new group of HAAC

Total Variance Explained							
	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings[a]
Compon ent	Total	% of Variance	Cumulativ e %	Total	% of Variance	Cumulativ e %	Total
1	3.860	29.691	29.691	3.860	29.691	29.691	2.961
2	2.409	18.533	48.224	2.409	18.533	48.224	2.326
3	1.640	12.614	60.839	1.640	12.614	60.839	2.692
4	1.129	8.683	69.521	1.129	8.683	69.521	2.254
5	1.012	7.784	77.305	1.012	7.784	77.305	1.126
6	.619	4.763	82.069				
7	.544	4.186	86.254				
8	.434	3.339	89.593				
9	.361	2.774	92.367				
10	.318	2.442	94.810				
11	.275	2.115	96.925				
12	.227	1.744	98.669				
13	.173	1.331	100.000				
Extraction Method: Principal Component Analysis.							
a. When components are correlated, sums of squared loadings cannot be added to obtain a total variance.							

Factor analysis uses several assumptions and rotation, in order to determine, there are no coefficient value available that is >0.5 amongst the new factors (group of housing affordability criteria) Oblimin rotation method was applied to carryout principal component factor. This test will also inform about the rotation of the data is

either orthogonal (Oblimin) or oblique. The values shown in Table 6.21 shows that no factor other than the factor itself. The values are not near to zero, yet are not greater than 0.5.

Table 6.22: Component correlation matrix (Orthogonal relation between HAAC)

Component Correlation Matrix					
Component	1	2	3	4	5
1	1.000	.047	.243	-.280	.073
2	.047	1.000	-.037	-.138	-.135
3	.243	-.037	1.000	-.178	-.015
4	-.280	-.138	-.178	1.000	-.083
5	.073	-.135	-.015	-.083	1.000
Extraction Method: Principal Component Analysis. Rotation Method: Oblimin with Kaiser Normalization.					

Table 6.22 justifies the deletion of two of the HAAC Soc-1 (Housing location) at -0.887, Soc-2 (accessibility to local transport) -0.809, ($p<.001$). The retained 11 items show a reasonable congruity.

It is clear from the Table 6.22 that the Economic criteria is at the highest in ranking Eco-1(monthly rent: 0.958), Eco-2 (house price: 0.708), Eco-3 (traveling cost; 0.821), Eco-4 (cost of maintenance: 0.854), Eco-5 (cost of incremental expansion to the house: 0.823). Social criteria Soc-1 (Location: -0.887), Soc-2 (Local transport: -0.809) therefore, have been deleted. Soc-3 (a place of prayer: 0.792), Soc-4 (internal privacy: 0.828), Soc-5 (external privacy: 0.857), Env-1(durable building design: 0.848), Env-2 (flexible internal layout: 0.899), Env-3 (management and maintenance services: 0.782).

Table 6.23: Structure matrix to show the obsolete and the new group of most critical housing affordability assessment criteria based on Factor Analysis

	Structure Matrix					
		Component				
		1	2	3	4	5
Eco-4	Cost of maintenance	0.854				
Eco-5	Cost of incremental expansion of the house	0.823				
Eco-3	Travelling cost to your workplace from your home	0.821		0.462	-0.359	
Eco-2	House price to buy in relation to household income	0.708		0.463	-0.500	
Soc-5	External privacy (no internal view of the house from outside and from the neighbouring houses due to cultural reasons)		0.857		-0.320	
Soc-4	Internal privacy for example separate sitting place for male and female guests		0.828			
Soc-3	A place of prayer close to your home		0.792			
Env-2	Flexible internal layout and design			0.899		
Env-1	Durable building Design (suitability to cope with the weather changes)	0.359		0.848		
Env-3	Facilities management system			0.782		
Soc-1	Location in terms of accessibility to the local shops, education centres and health facilities				-0.887	
Soc-2	Accessibility to local transport for local and general commute		0.343		-0.809	
Eco-1	Monthly rent in relation to household income					0.958

Extraction Method: Principal Component Analysis.
 Rotation Method: Oblimin with Kaiser Normalization.

6.8   Summary of the Results

The objective of this chapter was to compare and contrast the results of surveys from end users and professionals and stakeholders from the housing industry. A visual comparison of the mean scores between the two results can be seen in the summary schematic showing the importance rating for the 16 housing affordability assessment criteria given by both housing professionals and the end-users.

The analysis then presents the rating of the economic, social and environmental criteria based on the Likert measurement scale of importance ranging from 1 to 5. The comparison schematic summary presented in Figure 6.5 of the importance rating for the 13 housing affordability assessment criteria given by housing professionals and the end- users, suggests that professionals have better understanding of the end-users' needs, requirement, and their motivations. The results of the survey discover that end-users do not give more importance to the economic, social, and environment criteria for the affordable housing projects. However, the affordable housing industry professionals give more importance to economic, social, and environment criteria for the affordable housing projects. Therefore, it can be determined that there are various complications that need to be understood before initiation of the affordable housing projects in the Pakistan, since, affordable housing project professionals and stakeholders have identified economic, social, and environment criteria effectively which reflects all needs, desires, and wishes of end-users in Pakistan.

The researcher compared the findings of the Delphi survey along with the findings of the end-users' questionnaire surveys for the purpose of reaching out to a useful conclusion and consensus about the findings as shown in Figure 6.5. A detailed survey was conducted with end-users to ensure that the judgement of this study is correct, by matching the results that were obtained from the Delphi rounds with the results from end-users a consensus was reached and the housing affordability assessment criteria identified through the literature (Table 2.7) verified and validated. Moreover, the findings of this research have been connected with the previous literature. By coinciding the results of Delphi rounds with the literature as well as the end-user study, the researcher has been able to reach a consensus that was required in order to reach the conclusion.

7 CHAPTER SEVEN: PROPOSED AFFORDABILE HOUSING FRAMEWORK FOR LOW INCOME HOUSEHOLDS IN PAKISTAN

7.1 Introduction

The main aim of the study was to propose an affordable housing framework for the low-income households in Pakistan, with respect to the findings and analysis of the study as well as concluding remarks, housing affordability framework for Pakistan has been proposed in this chapter. This framework is based on the literature review and the data findings, and is an original contribution to the knowledge within the context of Pakistan. It is anticipated that the proposed framework can help the stakeholders and the authorities to analyse the different dimensions of how affordable housing can be made possible for households belonging to lower working class. This research has established that IER is not an appropriate housing affordability measure for the low-income households in Pakistan, usually housing affordability is related to income to rent or price ratio but it often ignores associated non-housing criteria such as sustainable environment, health, green areas, social environment such as facilities, schools, commuting, hospital etc. Therefore, this chapter outlines the proposed affordable housing framework for Pakistan derived from the literature review and the research findings

This is an assessment framework, which will allow housing stakeholder to make better-informed decisions including usage of a new measure of 'area affordability' to assess the distribution and housing situation across different metropolitan jurisdictions of Pakistan. This research is first of its kind to develop HAAC for the low-income households and to investigate the affordable housing situation in

Pakistan. The proposed framework is a unique concept for the region and an original contribution to the knowledge within the context of Pakistan. It is anticipated that the proposed framework can help the stakeholders and the authorities to analyse the different dimensions of how affordable housing can be made possible for households belonging to lower working class.
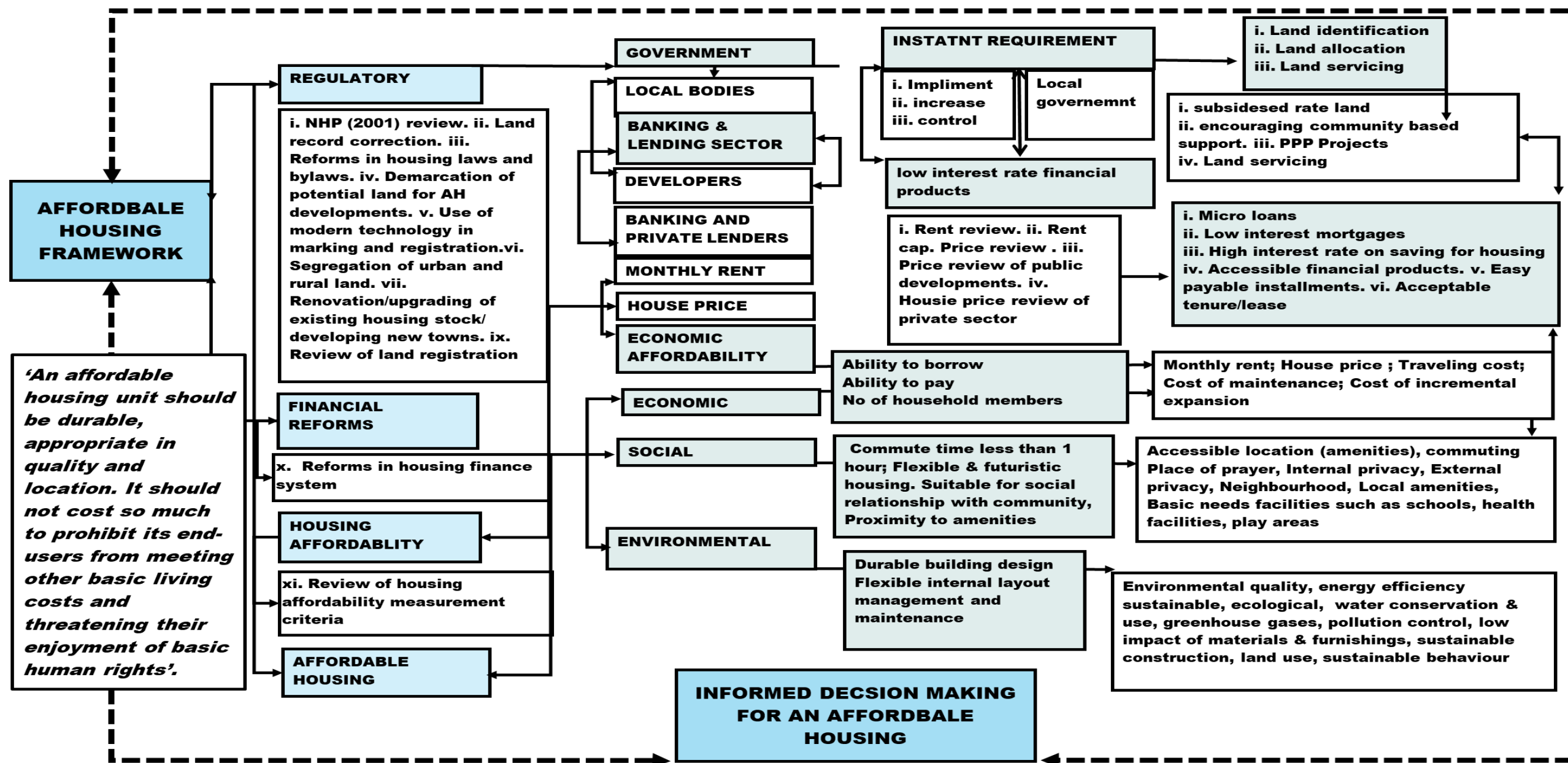
AFFORDBALE HOUSING FRAMEWORK

'An affordable housing unit should be durable, appropriate in quality and location. It should not cost so much to prohibit its end-users from meeting other basic living costs and threatening their enjoyment of basic human rights'.

REGULATORY

i. NHP (2001) review. ii. Land record correction. iii. Reforms in housing laws and bylaws. iv. Demarcation of potential land for AH developments. v. Use of modern technology in marking and registration.vi. Segregation of urban and rural land. vii. Renovation/upgrading of existing housing stock/ developing new towns. ix. Review of land registration

FINANCIAL REFORMS

x. Reforms in housing finance system

HOUSING AFFORDABLITY

xi. Review of housing affordability measurement criteria

AFFORDABLE HOUSING

GOVERNMENT

LOCAL BODIES

BANKING & LENDING SECTOR

DEVELOPERS

BANKING AND PRIVATE LENDERS

MONTHLY RENT

HOUSE PRICE

ECONOMIC AFFORDABILITY

ECONOMIC

SOCIAL

ENVIRONMENTAL

INSTATNT REQUIREMENT

i. Impliment ii. increase iii. control | Local governemnt

low interest rate financial products

i. Rent review. ii. Rent cap. Price review . iii. Price review of public developments. iv. Housie price review of private sector

Ability to borrow
Ability to pay
No of household members

Commute time less than 1 hour; Flexible & futuristic housing. Suitable for social relationship with community, Proximity to amenities

Durable building design
Flexible internal layout management and maintenance

i. Land identification
ii. Land allocation
iii. Land servicing

i. subsidesed rate land ii. encouraging community based support. iii. PPP Projects iv. Land servicing

i. Micro loans
ii. Low interest mortgages
iii. High interest rate on saving for housing
iv. Accessible financial products. v. Easy payable installments. vi. Acceptable tenure/lease

Monthly rent; House price ; Traveling cost; Cost of maintenance; Cost of incremental expansion

Accessible location (amenities), commuting Place of prayer, Internal privacy, External privacy, Neighbourhood, Local amenities, Basic needs facilities such as schools, health facilities, play areas

Environmental quality, energy efficiency sustainable, ecological, water conservation & use, greenhouse gases, pollution control, low impact of materials & furnishings, sustainable construction, land use, sustainable behaviour

INFORMED DECSION MAKING FOR AN AFFORDBALE HOUSING

Figure 7.1: Proposed affordable housing framework for the low-income households in Pakistan

7.2 Application of the Proposed Affordable Housing Framework (AHF)

Anticipated usage and application of the AHF has been explained in Figure 7.2. However, the ultimate usage remains dependent upon the discretion of the housing stakeholders in Pakistan. .

7.2.1 Modify

The housing affordability is more than economic criteria of housing, it is a compound combination of, social of housing, which is equally important to consider assessing the housing affordability of a low-income household in Pakistan. However, in most developing and developed countries including Pakistan, housing affordability is measured on IER with a standard threshold of 30% of the household income per month as IER has been explained Section 2.3.1 earlier. Furthermore, it has been confirmed by the housing professionals in Pakistan (Figure 4.6) that a low-income household should not spend more than 30% of their monthly household income on housing expenses. Section 2.14.1 and 2.14.2 explains housing and non-housing expenses in detail.
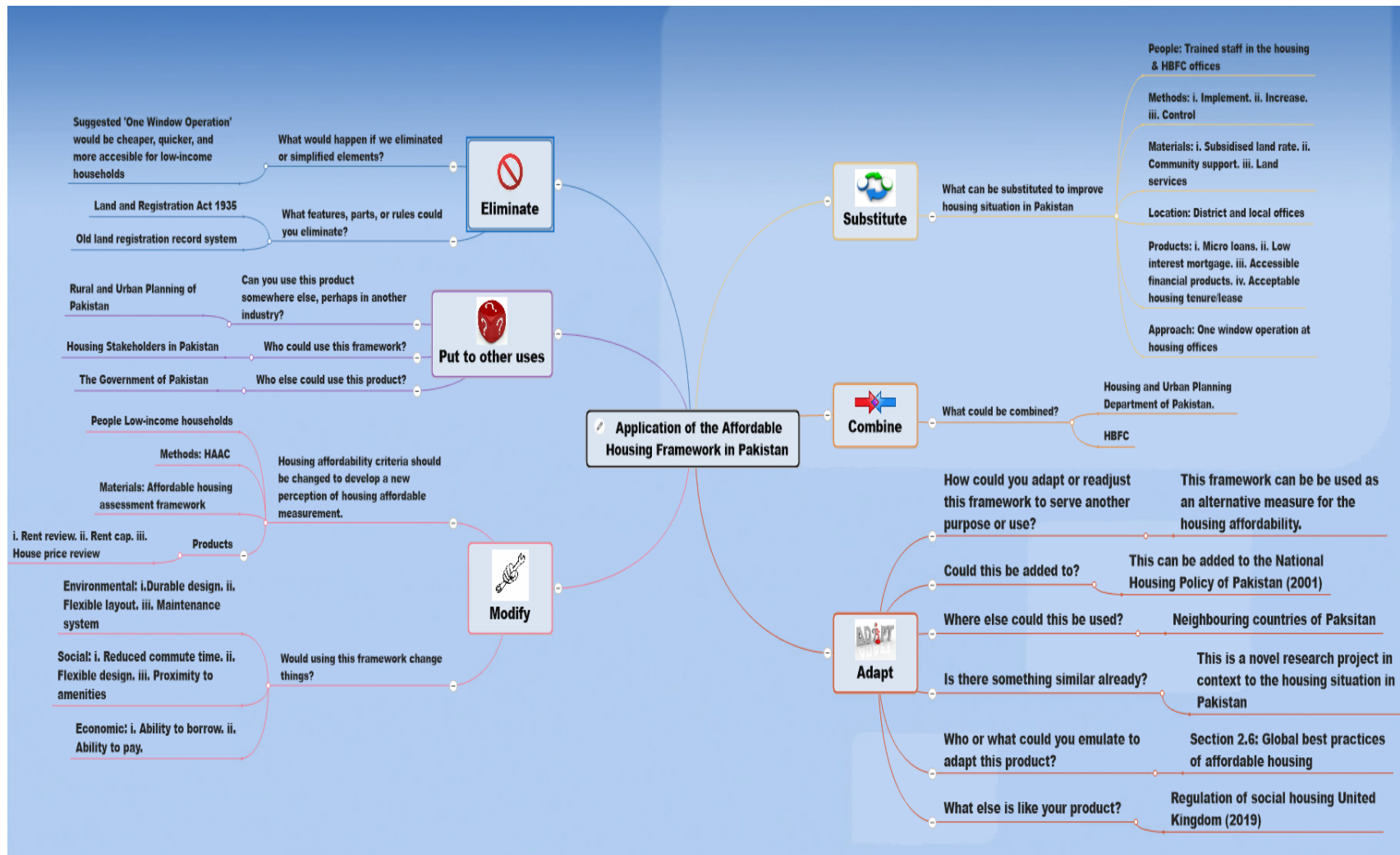
Figure 7.2: Application of Affordable Housing Assessment Criteria

There is a need for essential changes in measuring housing affordability assessment criteria, as suggested in affordable housing framework (Figure 7.2). The framework in Figure 7.2 suggests that there is need to transform current housing strategies Housing stakeholders need to change their perception regarding the housing affordability assessment criteria. It should be reformed to more compassionate approach considering low-income households. This might help to solve housing problem and may boost future AFH developments. This change will strengthened the housing system and will help the stakeholders to encourage new investment into the industry.

There is a need to review the renting strategy in Pakistan, the Brooke Amendment could be applied to cap the rent for a certain period, following measures should be taken to assess the housing affordabilty: i. Economically, ability to borrow, ability to pay. ii. Socially, an affordable housing should be in minimum chatchment area with a reduced commute time and within proximity to local amenities, has a flexible design. iii. Environmentally, it has a durable design and flexible internal and external layout. A complete facilites management system should be in place for the management and maintenance of the affordable housing development.

7.2.2 Substitute

What can be substituted to improve housing situation in Pakistan?

People – there is a need to get trained and skilled staff in the housing departments and at the House Building Finance Company's office in Pakistan.

Method – Implementation: of revised National Housing Policy (2001)

Increase: the supply of subsidized land for the provision of affordable housing to cater the low-income households in Pakistan

Control: there is a need to restrain the unchecked housing and renting market in Pakistan.

Material - Land ownership and tenure registration etc., are recorded and registered using the traditional registration system introduced by the British Empire in 1822 (British India Act 1882). During the fieldwork survey it has been observed that the land registration process has many flaws and is a very chaotic process. The manual registration system is slow and expensive; there should be the use of modern technology for registration and marking of the land along with the changes made in the tenure system and land registration.

Land Acquisition: Land is one of the main inputs for housing; NHP (2001) defined three acute mechanisms of the housing supply procedure, i.e., (a) identification, (b) allocation and (c) servicing. Legal bottlenecks and bureaucratic hurdles regarding property and land acquisitions are the major contributor in the housing crisis in Pakistan. There is a dire need for revision of property laws on land to make provision for transparency and a unified market-oriented evaluation system and procedure; which would inevitably minimize the litigation involved.

Land registration and tenure system: National Housing Policy of Pakistan (NHP 2001) suggests that there is a parallel land registration and tenure system to the official land tenure and registration system which operates outside the formal land registration and transfers. These informal arrangements range from indigenous collateral pledges, oral commitment and power of attorneys, etc. These parallel

systems have caused inherent problems; registration fees evaders and the land mafias thrive on the system's anomalies. All the informal and timeworn tenure systems should be restructured to convert them into registered and formal social contracts. Simultaneously, all the Government authorities, at all levels, should integrate such contracts into their mainstream registration system; so that the preference of communities and house owners along with the need of the state are met.

Land disposal system – Affordable housing framework (Figure 7.2) proposed to bring in the uniformity to the land disposal system, which will help the land registration system to be reformed and will boost the market orientation and transparency. All the discretionary powers and quotas should be withdrawn immediately, while plots of land for all types should be disposed of in an open auction; however, amenity plots such as hospitals, recreational parks, school, universities are exempt including the plots reserved for low-income groups. The plots earmarked in mega plans /infrastructure plans/outlined development plans for low income households should be subsidized and disposed of at an affordable rate.

Land information system – An ample usage of modern information technology (IT) such as modern computers, remote detecting devices and methods, satellite images, GIS mapping, aerial mosaics, etc., are needed to develop an information system. This modern technology will help to record accurate and up-to-date evidence about land availability, land classification, inventory, settlement patterns and land values in both rural and urban areas. This should be made a binding requisite at all levels of authority, and to complete this task should be a responsibility

of the Provincial Government along with all the other authorities, agencies and local bodies within 3 years.

Over the period of time the affordability of a household in Pakistan has not improved when compared to income; the average household income is almost PKR 12,000 – 15,000/- a month (Aslam, 2014). According to Nenova (2010) and Gerrity (2016) there has been a property price rise trend, the cost of a high-end plot of land (Bahria Town Lahore) is now almost 2100 PKR per sq. feet as compare to 35 PKR per sq. feet in the year 2010 as presented in the World Bank's report. The World Bank's report further states that India have effectively stabilised the land price intensifications by prudently axed urban planning and land-use strategies that gives a chance of housing affordability to lower – middle income households (Nenova, 2010).

In Pakistan, there's need for a fresh devolution plan and as an immediate measure: in rural and urban settlements in their individual jurisdictions all the regional, municipal and local bodies should categorize the state's land plots and other lands for housing development. Through various innovative measures such as land banking, the land availability should be enlarged on a constant basis to supply for no less than 5 to 10 years development plan needs.

Products – Housing Finance: at present HBFC is severely constrained in its functioning as well as in achieving the scope of its activities; lending and loan operations at present have been suspended with limited disbursement capacity. Housing framework application (Figure 7.2) recommends that HBFC should be made efficient and effective and its role expanded through following measures:

The Affordable Housing Framework (AFH) (Figure 7.1) stresses to develop affordable housing for the rural population and the poor with different mechanisms such as free land ownership, low interest rate finance, cross-subsidy, etc. AFH emphasize on research and development to make construction cost effective along with land availability, resource mobilization, incentives for homeownership, and incentives to builders and developers. Non-availability of housing finance at an affordable mark-up (bank interest rates) is another reason for the housing problem in Pakistan.

Lack of finance is one of the major constraints in new affordable housing developments growth and maintenance. The activities of the financial institutions such as banks, investment and insurance agencies have been confined because they cannot offer affordable mark-ups for the majority of the low earning population; therefore, their financial products are limited to a narrow market of high-income groups. House Building Finance Corporation (HBFC) is the only official housing finance institution; which is also tied to several constraints

Location – The provincial governments of Pakistan, development agencies and other bodies should ensure that the building by-laws and legal formalities are streamlined and simplified to facilitate the developers/builders and constructors and the common person in the closest proximity to their place of living.

Approach – for all the housing and planning matters, one window operation should be used to provide stakeholders, National Building Codes of Pakistan, guidelines for formulation and revision of provincial and local geographic and environmental conditions.

7.2.3 Adapt

How could this framework be readjusted to serve another purpose of use?

AHF can be useful for relocations, resettlement, and redevelopment and up grading of katchi abadis, slums and squatter settlements, building regulations, building by-laws and planning standards should be revised to permit incremental development and lowering of planning standards to make it cost effective for low-income groups. Moreover, The Federal Government of Pakistan, in coordination with the Provincial Governments of Pakistan, can use this framework to update the National Building Code and National Reference Manual on Planning and infrastructure standards (originally, these manuals were developed by the Ministry of Housing, Environment and Urban Affairs in 1986).

Where this could be added?

This research recognizes that one of the major weaknesses in meeting the housing targets in Pakistan is long-term housing planning. The housing sector can be stimulated in a systematic manner with the help of proper plans and implementation, cost effectiveness and environmental quality. There are no approved plans to guide the city planners and other housing professionals, the building and zoning regulations which were out-dated could not be updated and brought in line with the realities on the ground.

The development of slums, katchi abadis and squatter settlements, camps in urban and rural areas of Pakistan are due to lack of planning. The beneficiaries of this lack of planning and building and zoning regulations are the land and building mafias. A

more effective governance is required in urban areas to prevent illegal squatting and land seizures and to allocate land for low-income housing.

Incorporating the revenue and tax system with local law and statutory law along with establishment of a land registration system of records to standardized registries and documentations might reduce property land-based conflicts and could increase tenure security. One of the barriers in the Housing industry is the red tape file culture due to corruption-mafia; these land reforms could also rectify such urban land issues. In urban areas government owns a substantial amount of urban land; local and government authorities should play a proactive role to address industrial and housing needs of the land.

Where else this framework could be used.

This AHF could be used across all regions in Pakistan and also in the neighbouring countries of Pakistan.

Is there something similar already?

This is a novel research on affordable housing in Pakistan.

Who or what could you emulate to adapt this framework?

Global best practices given in Section 2.6 (Table 2.2) have been consulted to adopt this framework.

What else is like affordable housing framework?

 It is a new concept and has not been used in the past into Pakistan

7.2.4 Combine

The provincial departments in collaboration with other departments and bodies should identify and provide land to development agencies and the private sector builders and developers on concessionary rates subject to the condition that proportionate subsidy is passed on to the 'target groups' i.e. the low-income group, poor and needy and the rural population.

The Provincial departments and allied departments and bodies should identify state land for rural housing in and around the existing villages, settlements and towns preferably towards the growth patterns of the existing settlements which is free from reburial encumbrances. Part of the sale proceeds of valuable public land should be set aside to provide plots for low income housing and housing for the poor and needy at concessionary rates.

Infrastructure Development – Infrastructure is a vital part for the success of any new housing project/scheme; it is a part and parcel of the daily operation of the housing project. Non-availability of the infrastructure for the development of any housing scheme may cause a number of failures even for well-planned and well-organized housing projects and schemes. In the past, Surjani Town in Karachi Pakistan and dormant housing schemes in other major urban centres have been a failure due to non-availability of basic infrastructure facilities. The quality of infrastructure itself determines the quality of living environment in any planned housing schemes or areas. Essentially, the quality of life in slums, squatter settlements in katchi abadis is poor and unhealthy due to non-availability of adequate infrastructure.

AHF stresses that in order to ensure creation of a healthy and habitable environment, it is necessary that trunk infrastructure is timely available and also the quality of infrastructure within the areas planned for housing is adequate.

Development of intermediate and secondary towns – One of the most critical problems of different major urban centres is the migration from the rural and suburban centres. The growth rate ranges from 3.5% to 4.5% per annum putting a very substantial burden on the amenities and the infrastructure. The city Governments have not been able to cope with the ever-increasing demands of amenities, utilities and services due to a combination of reasons including resource constraints. The net result is obvious from the ever-deteriorating environment and non-availability of adequate amenities in our major urban centres like Karachi, Lahore and Peshawar, etc. In order to ensure that the development activity spreads throughout the country, employment opportunities are available to the rural and suburban population close to home and to reduce pressures on the urban centres, it is absolutely necessary that steps are taken by the Provincial Government to develop satellite, intermediate, secondary and industrial towns.

A countrywide programme should be undertaken for development of satellite, intermediate, secondary and industrial towns as employment centres of the future, especially, for the rural population and to further reduce migration to urban centres. Incentive packages should be prepared by the provincial Governments, development agencies and other bodies concerned for local and international investors, developers and constructors to undertake development of intermediate, secondary, satellite and industrial towns.

7.2.5 Eliminate

Exemption from all types of taxes **–** all new construction of housing on plots measuring up to 150 square yards and flats/apartments having an area of 1,000 square feet, should be exempt from all types of taxes for a period of 5 years.

Designing and construction – housing loaning agencies and companies and developers should provide standard and cost-effective designs and plans to the prospective homebuilders.

Special Measures for the Rural Poor – realizing the urgency and gravity of the situation of the rural poor special measures are identified below for implementation: The provincial governments should examine the possibility of granting proprietary rights to individuals and families residing in houses constructed on 'Shamlat Deh' (right to occupy under the Squatters Law) and state land to promote rural housing. Subsidized micro loaning facilities should be extended for rural housing construction and improvements through micro-financing system and institutions like Khushhali Bank, Zakat funds. The role of local bodies in planning, determining needs and preparing action plans to mitigate the housing shortages should be effectively defined including resource mobilization at the local level. Construction clinics should be established in rural areas to provide guidance and advice for cost effective, durable and environment friendly construction.

Some of the Land and Property Laws are very old such as The Transfer of Property Act (1882), Land Revenue Act (1967), Stamp Duty Act (1899) and Registration Act (1908). The National Housing Policy (NHP, 2001) was originally introduced in the year 2001 that makes it almost 18 years old. It should also be noted that at the time

of publication of the NHP (2001) the population of Pakistan was almost 140 million. According to the results of the National Consensus held in the year 2018, it has reached approximately 220 million (for details see Chapter 3, section 3.5). The Government of Pakistan needs to make some holistic changes and amendments to the policy as suggested in the framework given in Figure 7.1. Keeping these facts in mind, the framework suggests that the NHP 2001 needs drastic amendments and on an urgent basis to tackle the housing situation in Pakistan.

What other product or process could be used?

Financial reforms – the proposed framework (Figure 7.1) stresses that, it is important for the Government of Pakistan to bring a number of financial reforms, including accessible and affordable financial products such as, micro loans, better mortgage rates, lower interest rates for borrowers and higher interest rates on savings. Until, the housing finances and funding mechanisms for low-income households are transformed; many households perhaps will never be able to meet housing affordability assessment criteria of housing loan or any other financial product.

An estimated house price near the major city centres of Pakistan starts from USD $10,000 (Rs. 160,00000) of Based on the online HBFC online assessment calculator Figure 7.3 shows that low-income households are only eligible for Rs. 187,000 for a monthly instalment of Rs. 3,000 for a tenure of 14 years. It cannot be stressed enough for the provision of easily accessible house buying and house building loans

through House Building Finance Company (HBFC) of Pakistan (a public office funded by the State Bank of Pakistan). According to HBFC's online eligibility calculator (2019) it has been learnt that the minimum threshold monthly income to borrow between Rs. 500,000 ($5000 approx.) from HBFC Pakistan for a term of 20 years is between Rs. 40000 - Rs. 50000 ($300-$400); which is way beyond the reach of low-income households. Rizvi (2009) states that housing debt to GDP (percent) in Pakistan is 1%; he further claims that the government's response in tackling affordable housing for the low-income segment is *'slow and small'*.
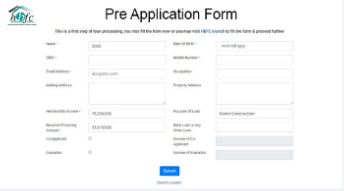
Figure 7.3: HBFC loan calculator

This situation in Pakistan is getting worse due to non-implementation of housing policy, lack of management/administration, the rapid urbanization and population growth. These reforms will be further discussed in the next chapter.

Need of Land Reforms – as mentioned in Figure 7.1, this research has established that 'land' is the principal input towards housing. The amendments in housing should start with considering 'land' that is the principle input of housing. In addition, the framework shows that three main steps will be involved in the process of making amendments in the housing affordability policy; these steps include identification,

allocation and servicing the land. The Housing Department of the Government of Pakistan needs to identify land which can be used for low-cost affordable housing in the country. Subsidized land should be supplied to the relevant department(s) or pre-qualified private sector builders to develop AH. Government should take responsibility to provide infrastructure and maintain and service it after the construction. In order to implement these steps, the policy measures are required to ensure that adequate housing is being offered to all households with low income. This process includes encouraging community-based support, provision of affordable land and providing government support to the private sector in order to achieve the development of affordable housing.

There should be more attention given to urbanisation, population control, growth of squatter settlements and the price of material. The amendments should also be associated with land record collection, updated information systems, laws, regulations and bylaws and demarcation of state's parcels and privately-owned land for the development of housing affordability.

It has been established that there is a need for a comprehensive improvement package aiming at both the structural and immediate causes of rural poverty. Until the year 2016 due to irregularities in the system, a visible festering socio-economic discontent can be found in both urban and rural life. The policies/suggested in the act mentioned above have never been implemented; now is the time to bring about profound modifications in land policy and practice.

Provisions will include micro finance and low-cost land to the communities and individuals and offering them other suitable financial products.

Tenure transformation – the government of Pakistan should restructure and implement the tenure transformation and land reallocation programs. An immediate action is needed for reforms in the civil and customary land conflict and adjudication mediation procedures and institutions. Government should support nationwide efforts to strengthen access to land for women headed families and the landless and state held land can be used for the purpose; and strengthen urban land access and tenure security of poor households by recognizing and documenting their land registries. Government of Pakistan should introduce, one window operation for land claims of poor households, and provision of funds for legal aid and local dispute mediation as an immediate land reform. Provide training and material support for land administration and legislative systems. There is an acute and immediate need for water and forest rights reforms for the better management of these resources and greater community control. Support and encourage government authorities' divestiture of large farms and perpetuating inequitable distribution of land along with exploitative labour practice.

7.3 Put to other uses

In order to make these arrangements, it is important to have the involvement of all stakeholders in the new and future housing policies because the development of the system of housing is only possible with the participation of the stakeholders.

Can this framework be used somewhere else, perhaps in another industry?

To improve infrastructure – this framework can be used in rural and urban planning of Pakistan. Among the housing problems faced by the urban population

of the region, the most pervasive is lack of infrastructure, followed by deficient building materials and overcrowding. The size of the problem is still large. The estimates made in this study indicate that in 2006 lack of infrastructure affected almost 19 million households. Further, about seven million households needed a new shelter and nine million needed significant improvements to their houses due to poor construction materials or overcrowding. Cross-country analysis shows that each country was facing a different combination of problems and was improving its housing conditions at a different pace, which indicates that it is highly unlikely that a 'one-size-fits-all' solution exists. Future housing needs are estimated at three million units per year for the next two decades. Without the capacity of the formal housing sector to supply these houses, households will be driven to informal solutions that contribute to the large qualitative shortages still afflicting the region.

7.4 Beneficiaries

Housing stakeholders could use this AHF; the above-mentioned proposed affordable housing framework (AHF) (Figure 7.1) for Pakistan shows the affordability threshold based on which housing and non-housing expenses are set. This affordability threshold is internationally accepted but the literature and data findings have argued that a lay worker earns less than $2 per day (which means that the worker lives in unfavourable environmental conditions. In addition, the housing market only targets the ones with high incomes whereas people with low incomes are neglected. Considering these issues, the proposed framework shows the three main criteria which should be given attention by housing authorities:

i. **Economic:** The first criterion is economic under which the main components should be monthly rent, house price, travelling cost, cost of maintenance and cost of incremental expansion. As per the framework, the criteria for assessing economic criteria in housing affordability include individual ability to borrow, ability to pay and the number of household members.

ii. **Social:** the second main factor is social under which the components are accessible location, commuting, place of prayer, internal privacy and external privacy. Within these social criteria, housing affordability assessment criteria would include flexible housing which can suit the overall future needs of people; the housing which is suitable for social relationships with the community and proximity to the amenities.

iii. **Environmental:** the last but not the least important factor that is required being considered in the housing policy is environmental. The main environmental components are durable building design, flexible internal layout and management and maintenance. In this way, the main assessment criteria for housing affordability will encapsulate energy efficiency of dwelling, sustainable transport, water conservation and efficient use, greenhouse gas emissions, low pollution, low environmental impact of furnishings and material and construction. It will also include the facilities that sustain environmentally friendly behaviour and ecological use of land.

Table 7.1: Beneficiaries of the research

Beneficiary	Benefits of assessment framework to stakeholders
Contractors Developers Consultants Academics Housing associations Contractors Developers Consultants Government officials	Comprehensive assessment criteria of affordable housing can be useful to make informed decisions regarding housing affordability matters. Can be a useful tool to amend and facilitate housing policymaking. Provision of affordable housing development and monitoring it. Promoting and maintaining sustainable, healthy and high quality of life for the affordable housing communities. Assistance in recognizing the areas that would be more appropriate for new development of affordable housing, and areas, which may not be appropriate. Aid in finding areas, which may involve unconventional and alternative arrangements of investment to increase end users' affordability and to create more affordable communities. A systematic development of criteria to use, compare and rank the affordable housing Aid in development of academic course work for trainee housing professionals etc.
Low-income households/affordable housing end-users Wider society	Use the framework to make more informed decision regarding housing affordability issues. Make better choices on house buying Help in choosing alternative affordable housing developments Help to identify the affordable housing that best fits the end users' different requirements and preferences. The application of the model in practice will assist in creating affordable, sustainable and high-quality communities for society to reside in.

7.5   Proposed housing unit for the low-income households in Pakistan

The research finding suggested that, in Pakistan, there is a joint family system and mature and married family members live in the same house with their parents and other siblings. In addition to developed affordable housing framework, a low-income household unit plan is being suggested (Figure 7. 4). It has enough liveable space and pre-defined housing quality and standards. This affordable housing unit contains 3-bed rooms and have flexibility to extend as needed. This housing unit is suitable for 5-6 family members and is flexible to expand when the number of family members increases. The household living with less than the predefined housing attributes would be considered living in inappropriate conditions.

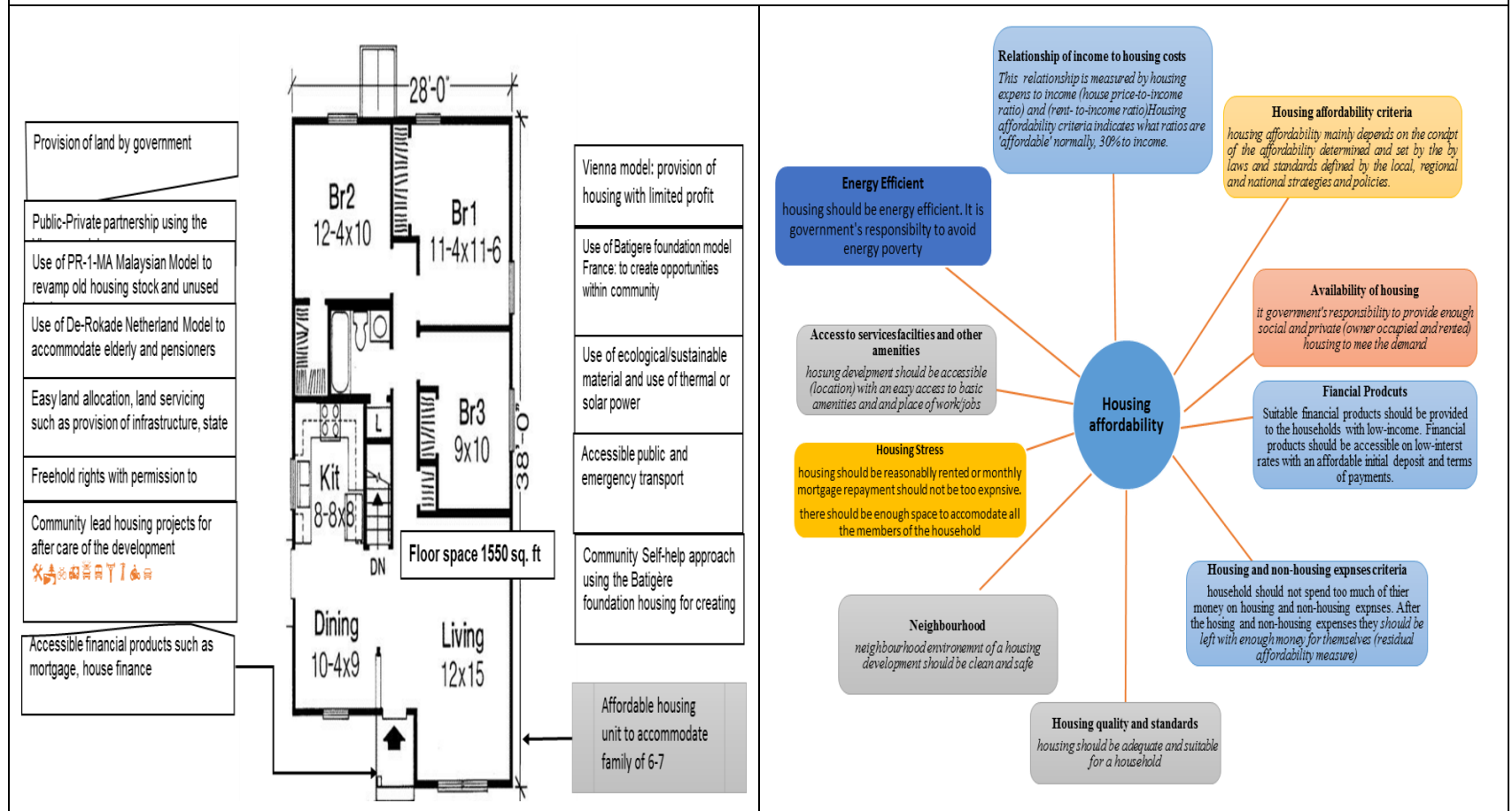# Affordable house for a low-income household in Pakistan

Provision of land by government

Public-Private partnership using the

Use of PR-1-MA Malaysian Model to revamp old housing stock and unused

Use of De-Rokade Netherland Model to accommodate elderly and pensioners

Easy land allocation, land servicing such as provision of infrastructure, state

Freehold rights with permission to

Community lead housing projects for after care of the development

Accessible financial products such as mortgage, house finance

Br2
12-4x10

Br1
11-4x11-6

Br3
9x10

Kit
8-8x8

Dining
10-4x9

Living
12x15

DN

Floor space 1550 sq. ft

28'-0"

38'-0"

Vienna model: provision of housing with limited profit

Use of Batigere foundation model France: to create opportunities within community

Use of ecological/sustainable material and use of thermal or solar power

Accessible public and emergency transport

Community Self-help approach using the Batigère foundation housing for creating

Affordable housing unit to accommodate family of 6-7

Housing affordability

Relationship of income to housing costs
This relationship is measured by housing expens to income (house price-to-income ratio) and (rent- to-income ratio)Housing affordability criteria indicates what ratios are 'affordable' normally, 30% to income.

Housing affordability criteria
housing affordability mainly depends on the condpt of the affordability determined and set by the by laws and standards defined by the local, regional and national strategies and policies.

Energy Efficient
housing should be energy efficient. It is government's responsibilty to avoid energy poverty

Availability of housing
it government's responsibility to provide enough social and private (owner occupied and rented) housing to mee the demand

Access to services facilties and other amenities
hosung develpment should be accessible (location) with an easy access to basic amenities and and place of work/jobs

Fiancial Prodcuts
Suitable financial products should be provided to the households with low-income. Financial products should be accessible on low-interst rates with an affordable initial deposit and terms of payments.

Housing Stress
housing should be reasonablly rented or monthly mortgage repayment should not be too expnsive.

there should be enough space to accomodate all the members of the household

Housing and non-housing expnses criteria
household should not spend too much of thier money on housing and non-housing expnses. After the hosing and non-housing expenses they *should be left with enough money for themselves (residual affordability measure)*

Neighbourhood
neighbourhood environemnt of a housing development should be clean and safe

Housing quality and standards
housing should be adequate and suitable for a household

Figure 7.4: Proposed affordable housing unit

7.6   Chapter Summary

Affordable housing is defined differently across the economies and it is difficult to determine the minimum level of income to make a low-income households eligible for the affordable housing scheme. It has been established that in Pakistan, low-income household do not meet the eligibility requirement for a loan or housing finance. It is, therefore, difficult to make a policy and regulations to deal with this issue. Households vary in range of family sizes and income and spend most of their income on housing and non-housing expenses. This research confirms the notation that housing consumption should not be more than 30% of the income of the people. It is critical to define the policy effectively pertaining to the beneficiaries of policies, and which type of group will be required to have support from the government.

There should be an acceptable standard of housing unit which must reflect the community's views pertaining to requirements to live comfortably; based on an appropriate location. Affordable housing should also include the basic amenities such as running water, sanitary facilities, access and proximity to the schools and hospitals.

Currently, Pakistan is going through some major political and financial crises; however, the housing market is flourishing. Housing is considered a profitable business and some private developers have developed several high-end housing developments such as Defence Housing Authority (DHA), Bahria Town and Fizaia Housing Societies in major cities of Pakistan. These housing societies meet the international standards of housing and attract not only the local but also the non-resident Pakistani's (NRP) investment.

The Pakistani housing market has created new investments and business opportunities in the major cities of Pakistan. On the other hand, it has also contributed to rapid urbanization that has escalated the demand for affordable housing. A high-end housing market expansion has also supplemented a higher house price appreciation, which has made it nearly impossible for a low-income household to get into homeownership. The higher cost of buying a house has boosted the letting market. Potential buyers from the low-income segment of the population are forced to become tenants instead. These tenants, after meeting their housing expenses are left with no money for their non-housing expenditures.

The results indicate that, on average, the proportion of urban households facing housing shortages is declining. This decline holds for households of all income levels, particularly those in the lower quintiles of the income distribution structure. It is vital for a low-income household to keep the affordability equilibrium, the slightest imbalance in the criteria can cause a big impact on housing affordability. The AHF define affordable housing (Figure 7.1) as given as:

'An affordable housing unit should be durable, appropriate in quality and location. It should not cost so much to prohibit its end-users from meeting other basic living costs and threatening their enjoyment of basic human rights'.

The authorities with this framework will be able to analyse the different dimensions of how affordability can be made possible for lower working-class people. So that suitable housing can be achieved with adequate social and political will and government support, investment from the private sector, motivation and support from the housing professionals to gain a ground-breaking level of affordable

housing. In the year 1996, United Nation Habitat (UNH) directed governments to take appropriate action to protect, promote and provide suitable housing for their citizens.

8   CHAPTER EIGHT: CONCLUSIONS

In this chapter, key findings from each part of the thesis have been collated and distilled to reveal the conclusion to address the aim, objective and the research question set out in the introduction. The literature review helped this research in three ways: firstly, it helped to gain knowledge and understanding regarding the housing, affordable housing and housing affordability in its holistic sense. Secondly, literature on the housing was explored to establish a synopsis of the current housing situation in Pakistan for a deeper review of the housing policies and their implications and effect on the end-users. Finally, from the understanding gained in the first two parts, a housing affordability assessment criteria (HAAC) was developed for an affordable housing with a specific focus on low-income households in Pakistan. The developed HAAC was verified by the housing professionals in Pakistan using Delphi methods, which was further triangulated and validated through a questionnaire survey with the end-user of affordable housing in Pakistan. An ample part of this chapter is based on the discussion of the regarding the data results. The chapter later presents the limitations of this research and concludes with recommendations for future research and final remark.

8.1   Objective 1, 2 & 3: Key Findings from Literature Review

The literature review had three stages: firstly, a review was carried out to get information regarding affordable housing and primary theories of housing affordability and its measurement criteria to analyse the key methods and criteria used to assess housing affordability. Secondly, literature on housing and affordable

housing, for a deeper understanding of housing situation in Pakistan. Lastly, the knowledge and information gained in the first two stages a framework has been developed for affordable housing with a focus on low-income households.

Housing is a basic right for every income group whether high, middle or low-income (UN-HABITAT 1974; Suhaida et al., 2011; Meen, 2018), and there is no definitive way to outline housing affordability (Hertz, 2015). Given below are some basic affordable housing concept:

8.1.1 Research methodology

Research methodology helps to solve research problem in a methodical way (Kothari, 2004; Boulkedid et al., 2011; Albert, Hallowell and Kleiner, 2014; Melnikovas, 2018). Methodology determines the way to undertake a research. Research methodology articulates the methods to help a researcher to find the answer for the research question by gathering related information (Fisher, 2004). A methodology does not provide solution for a research problem, and it should not be confused with a method. It offers the theoretical underpinning instead, which helps to understand which method, set of methods or best practices that can be applied to specific case, for example, to calculate a specific result (Igwenagu, 2016). Research methodologies explore and define the purpose of the research and present the rationale and the philosophical assumptions that motivate a study or a scientific method. Research methodology defines the research methods to be used also considering the logic behind using these methods.

8.1.2 Economic criteria of housing affordability

Housing affordability can be assessed on income to expense ratio (IER) as a basic technique (Davidson, 2016), it is widely used and accepted by the stakeholders, as for many households, housing expense is their main outgoing and on-going expense (Baker, Mason and Bentley (2015).

The expenditure approaches – housing affordability is a term, which is defined, as one being capable of paying rent without experiencing financial problems (Robinson et al, 2006). Affordability indicates the value of affordable housing in the measurable (quantifiable) attributes of dwellings and their related costs (Dülgeroğlu-Yüksel, 2010).

Housing affordability approach – reflects whether a household can afford a house (to buy or rent) based on their household income. Housing affordability is normally measured on economic criteria; however, affordability is not simply a matter of housing costs and income levels; it is about people's ability to obtain housing and to stay in it (Housing New Zealand Corporation, 2005). The expenditure approach of housing affordability is to recognize the needs of those households who cannot access housing market without assistance. This approach is earnings relative (Madawaki, 2011) and is based on the premise of providing a decent home for every household at a price within their means (Dülgeroğlu-Yüksel, 2010).

A reasonable housing costs should leave households with enough funds to meet other basic needs, such as food, clothing, transport, medical care and education, etc., (Calnan, 2015; Baranoff, 2016; Javaid, 2016; Napoli, Trovato and Giuffrida, 2016; Sharafat and Sharafat, 2016; Yap, 2016; Elkins, 2018; Herbert, Hermann and

McCue, 2018; Islamabad, 2018; Anacker, 2019; Matt and Marshall, 2019) (Matt and Marshall, 2019) Australia National).

Housing Expenses (or household expenditures) – household expenditures can be divided into three groups (Cohen, 2017; Anacker, 2019): somewhat fixed, less flexible, and more flexible.

Somewhat fixed – these fixed expenses have very limited room to reduce for example, taxes, utility bills.

Less flexible – cost of education and health care, these premiums are typically not negotiable.

More flexible – typically rent payments are due on the first day of every month, and may have a grace period of three to five days during which most property owners will not charge penalties or start an eviction (Desmond, 2016). Mortgage repayments are also fixed expenditures (Cohen, 2017).

Non-housing expenses (life's other necessities) – are costs of commuting and transportation, expenses to use health and education facilities (Mulliner et. al, 2014; Meen 2018), cost of clothing, utility items, transportation to work, child and health care (Sohail, Maunder and Cavill, 2006; Pakistan and America, 2008; Prochorskaite et al., 2016), retirement plans. Emergencies and starting up a small business and pursing higher education (Anacker, 2019).

Residual measure approach – focuses on the variance between housing costs and incomes rather than the income to expense ratio. Residual income influence users' choice to buy or rent a house (Mulliner and Maliene, 2015).

Income to expense ratio threshold (30% of IER) – No more than 30 percent of the monthly gross household income should be spending on housing, for renters, that 30 percent includes utilities (Elkins, 2018). The literature review of previous housing studies (Fisher, Pollakowski and Zabel, 2009; Dülgeroğlu-Yüksel, 2010; Waseem et al., 2011; Amjad and Idara-e-Taleem-o-Agahi, 2012; Amjad and MacLeod, 2014; Isalou, Litman and Shahmoradi, 2014; Kakakhel, 2014; Elkins, 2018; Meen, 2018; Schwartz and Wilson, 2018) have confirmed the use of the IER 30% as a standard housing affordability threshold.

8.1.3 Social criteria of housing affordability

A households budget get an influence by challenges of affordable housing and housing affordability, leaving less funds to buy food, household utilities, transportation to work, child care and health care expenses and reducing their savings for retirements, emergencies, and other prospects, such as starting a small business or pursuing higher education. These challenges may also affect end-users' quality of life and result in decreased future affordable housing developments (Anacker, 2019).

Commuting cost – Housing location is one of the most influential housing affordability assessment criteria, commuting (travelling) cost effects a homebuyer's choice of buying a house at a suitable location (Casallo Blanco et al., 2005; Sohail, Maunder and Cavill, 2006; Fisher, Pollakowski and Zabel, 2009; Ming, 2012; Mulliner, Smallbone and Maliene, 2013; Isalou, Litman and Shahmoradi, 2014). Land price is cheaper at the outskirts of a city centre, yet conversely the

transportation cost typically increases as distance increases from city centre. Deceptively, housing near the periphery could be affordable for some due to lower costs, yet the commuting expenses will increase due to the distance from the city centre (workplace) making it unaffordable.

Social criteria of liveability – a house is incomplete without the availability of basic amenities and infrastructure for example, electricity, communication, water, transportation, health facilities, and schools, police station, and facilities management mechanisms. Infrastructure and basic amenities as well as community features jointly make a housing development affordable and a liveable space.

Habitat agenda – an affordable housing is adequate in quality and location, and does not cost so much to prohibit its occupants meeting other basic living costs and threatens their enjoyment of basic human rights' (UN-HABITAT, 2011). UN-HABITAT (1974) declared 'Shelter for everyone' and it has been embedded in the UK's housing policy. According to the UK's housing policy, 'everyone should have the chance to afford a decent home, in a community of their own choice' [CLG, 2011a, mentioned by (Mulliner, Smallbone and Maliene, 2013)].

Housing Stress – a household is under housing affordability stress (HAS) if they are spending more than 30 per cent of their household income (Hertz, 2015).

Housing stress is an alternative measure for all types of housing stresses not just the housing affordability or cost stress. The significant aspects of both housing stress and affordability entail a subjective judgement to ensure that their meanings always remain open to reinterpretation and scrutiny (Gabriel et al., 2005; Yates and Gabriel, 2006; Yates et al., 2007).

The term 'affordable' can be defined, as one being able to pay without facing financial difficulty; 'But how does one decide exactly when they are in financial difficulty' (Robinson *et al,* 2006). Affordable housing in old paradigms is a value of housing related to its attributed costs (Dülgeroğlu-Yüksel, 2010), in simplest terms this equation (Mumtaz, 1995) can be expressed as follows:

Available funds = price of housing

Explanation: Available funds are equal to price of housing.

'Will I Live There' (WILT) standard (Mayday 2016), which means all properties must meet health & safety and fitness standard and has adequate conditions for humans to live in (Ni Direct, 2019). Figure 2.1 house is decent in quality within a sustainable community, has an accessible and more affordable ownership. Hence, 'affordable housing' as a term indicates the housing that supports lower earning households for an appropriate shelter without facing undue financial adversity (Milligan *et al.* 2004 quoted by Labin et al. 2014; Meen, 2019).

8.1.4 *Affordable housing versus housing affordability*

Housing affordability usually is expressed in terms of 'affordable housing', however, housing affordability is not a characteristic of housing, it is a relationship between people and housing (Stone, 2006). Affordable housing is a government-subsidized housing development for low-income households (O'Toole, 2017).

8.2   Objective 2: Housing in Pakistan

It was implicit for this research to establish the housing situation in Pakistan; the related and relevant literature (Table 2.8: research related to Pakistan) was reviewed:

Cost of building and construction material is one of the major issues in most countries around the world. The price rise in construction material causes increased housing price and rent which consequently affect a layperson's ability to buy or rent a decent housie of their own choice.

In Pakistan, the urban rich live close to the city centres or major places of employment, while the urban poor reside along urban edges and peripheries. The poor are being pushed to distant peri-urban locations, which substantially increases commuting costs (Majale, Tipple and French, 2011).

In recent years, a fully market-oriented housing market has emerged in response to the economic transitions in Pakistan. The residential housing market in Pakistan has been supplemented with higher inflation rate and house price appreciation, urbanization, and an escalating demand for housing due to foreign investments through non-resident Pakistanis (NRPs).

Property tax in Pakistan is imposed by the provincial government that is levied on the value of the property (Sharafat and Sharafat, 2016) tax regime has been explained in Table 2.3.

Nearly 50% of Pakistani population in major urban centres lives in slums, katchi abadis and squatter settlements. The mushrooming growth of slums and katchi abadis in urban areas is the product of unprecedented population growth, rapid

urbanization and large-scale influx of refugees forcing unauthorized encroachments on urban spaces especially state land including strategic, hazardous areas in and around river beds, abutting on nallas, near railway tracks and the like. An end-user, in the context of this research project is a member of the household, whose household income is around $50 (Rs. 5235.50) a month. This shows the severity of the problem as Yates and Gabriel (2006) defined lower-income households as those with a disposable income of less than $367 a week.

In Pakistan, credit is essentially tied to collateral assets, which excludes all those who do not own any land title, and no credit support mechanism exists for providing urban poor access to the land market (Javaid, 2016; Sharafat and Sharafat, 2016; Islamabad, 2018).

Lack of finance is one of the major constraints in new affordable housing developments' growth and maintenance. The activities of the financial institutions such as banks, investment and insurance agencies have been confined because they cannot offer affordable mark-ups for the majority of the low earning population; therefore, their financial products are limited to a narrow market of high-income groups. House Building Finance Corporation (HBFC) is the only official housing finance institution; which is also tied to several constraints.

8.2.1 Parameters of Housing Affordability

Housing affordability parameters, their implications, limits, terms during the design until the production of housing, for low-income households in Pakistan:

Available Funds – The funds available to a household might be in the form of cash or assets. Household income may consist of foreign remittances, receipts, which are received regularly and are of a recurring nature.

Informal Loans – some household may get access to some type of an informal loan. They are unregulated and informal loans without constituting any formal operations yet are based on personal reference of the household and community customs. Most likely they are unrecorded, unofficial does not come under any legal codes.

Formal Loans – this type of loan comes from a formal business entity, bank, lending organisation. At the constitution of this type of loan both parties (lender and borrower) bound themselves into a legal contract (Rizvi, 2015; Javaid, 2016; Cohen, 2017).

The amount and reason of the loan through a formal loan and who can borrow depends on the criteria and the terms and conditions set by the lending organisation. House Building Finance Company (HBFC) is a public lending body working under the State Bank of Pakistan and Figure 2.4 shows the eligibility criteria (HBFC, 2019) to buy a house in Pakistan.

Ability to repay – it is one of the most critical criteria in calculating the eligibility to borrow (Small Entity Compliance Guide 2013).

The housing price – the price of housing is dependent on the other associated functions such as location, price of land, building material, labour cost, infrastructure, fees/taxes and other charges etc., (Mulliner et al, 2016; Meen, 2018; Anacker, 2019).

The cost of building – price of a unit or house is determined by the cost of construction and the area to be built (Casallo Blanco et al., 2005; Kalia, 2013; Al Shareem et al., 2014; Albert, Hallowell and Kleiner, 2014).

Infrastructure and Services – as well as the land and the unit price, the cost of infrastructure and the services provided depend on their quality and quantity (Dowall and Ellis; Casallo Blanco et al., 2005; Sohail, Cavill and Cotton, 2005; Pakistan, 2009; Rafi, Wasiuddin and Siddiqui, 2012; Mouzughi, Bryde and Al-Shaer, 2014; Newman, 2015; Newman and Geoffrey Shen, 2015).

8.3   Objective 1: Verification and validation of developed HAAC

This research sought to explain housing professionals and affordable housing end users' perception regarding housing affordability and affordable housing, which is highly subjective matter as explained in Section 3.2. This can be influenced by stakeholders' ethos and personal views towards it. There is a possibility that socio-economic situation, location, culture and other criteria of housing affordability (Mulliner, Malys and Maliene, 2016) can also influence stakeholders' views. Housing affordability assessment criteria (Figure 3.6) was verified using the Delphi methods; it can also be called an opinion survey of housing professionals and other stakeholders. The aim of this verification phase was to determine the level of importance that housing professionals attribute to each of housing affordability assessment criteria. Housing professionals were chosen based on their experience and skills criteria given in Table 3.1.

This research used Delphi methods to collect the primary data which is a systematic procedure to achieve consensus among a chosen panel of experts for an unbiased

testing procedure and validation of the housing criteria. A major element in this technique is the anonymous opinion of experts and unanimous consensus among them that makes the research meaningful and reliable. As stated earlier, a major feature of this technique is that it conducts data collection in an anonymous way however, such data is only collected from experts so that it is relevant, reliable and answers the research questions.

The technique is useful for this research study because the topic required experts in the housing field with understanding of the housing problem and can commend on advantages and disadvantages of different housing developments in Pakistan. Therefore, the research involves a panel of experts in the field for example, housing professionals, town planners, builders and academics. The development of the Delphi methods, disseminations, data collection, analysis and reporting has been described in Chapter 4.

The end-users of affordable housing developments in Pakistan are the most important stakeholders for this research. Developed HAAC was verified by the housing professionals and then was validated by the end-users using a questionnaire survey.

8.4   Statistical Tests to Analyse the Data

Cronbach's alpha test - Cronbach's alpha coefficient test was performed to decide the internal consistency of the Likert scale used in the survey to rate the degree of importance of the housing affordability assessment criteria (HAAC) (from (1) 'not important at all'; (2) 'slightly important'; (3) 'fairly important'; (4) 'important'; (5)

'critically important'). The Cronbach's alpha coefficient values range from 0 to 1, where, higher score indicates greater reliability of the scale. A reliable score should preferably be above 0.7 (Pallant, 2005). Cronbach's alpha coefficient was calculated as 0.8 (approx.) for the 5-point scale that was used within the study (Figure 6.4). This value is above 0.7 and indicates a good internal consistency, therefore, the scale used to rate criteria importance can be considered reliable with the sample in this study.

Tests to measure central tendency – as explained in Section 6.7.2, descriptive analysis of frequencies was applied to measure the central tendencies of the data such as mode, median, mean and standard deviations.

Kolmogorov-Smirnov (K-S) tests – determine whether the distribution significantly varies from normal distribution, if the values are found 5% (p<0.05) then the distribution is significantly different from a normal distribution and if the results show non-significant value (p>0.05) then the data sample is not significantly different and is considered as normally distribute. In order to check the normality of the data, the K-S test was conducted for both housing professionals and end-users group using SPSS. The test results given in Table 6.13 illustrate degree of freedom (df) and significance (sig), the significance values for all criteria are well below 0.05 (Sig<0.05), which shows that the distribution of results in the stakeholders' samples significantly deviates from normal distribution. Hence, the data in this study failed to meet the requirement for parametric tests, therefore, non-parametric tests were applied.

Mann-Whitney U test – Mann-Whitney U test was carried out using SPSS (Section 6.7.4), for each criterion in order to conclude whether there is a statistically significant difference between the levels of importance provided by the housing-professionals (n=79) and end-users (n=91). Using significance (α) level of 0.05, the null hypothesis (H_0) for each criterion is as follows:

H_0: *There is no tendency for the ranking by end-users to be significantly higher or lower than for the housing professionals.*

The results, including the test statistic (*U* value), effect size (r), *z*-value, *p*-value and the resulting decision regarding H_0 are shown in table 6.14.

The results given in the Figure 6.5 shows a comparison of housing professionals and the end-users responses.

Table 6.14 presents the hierarchical list of the housing affordability assessment criteria based on the descriptive values of central tendencies i.e., mean.

Factor Analysis (FA) – generally, factor analysis helps to gain new variables called main factors, which are uncorrelated (Section 6.7.5). Hence, the use of factor analysis methods makes it possible for a number of principal variables to be summarize to new synthetic variables that are smaller in quantity. To use factor analysis there is need for some relationship between variables and if the R-matrix were an identity matrix then all correlation coefficients would be zero. The values given in Table 6.17 informs that R-matrix is not an identity matrix; Bartlett's test is highly significant as ($p < 0.001$) to show that factor analysis is appropriate.

Factor analysis test has generated a new list of HAAC which has been presented in

8.5 Objective: 5 Key Findings from Survey Analysis of Stakeholders

The aim of this survey was to rank the level of importance that housing professionals attach to each of the 13 housing affordability assessment criteria (HAAC) developed in Table 2.7, 2.8 & 2.9. This was achieved through the development of the Delphi methods conducted with the housing professionals in Pakistan.

8.5.1 Economic criteria of housing affordability

Eco-1. Monthly Rent

This criterion gained an accumulative response of 100% with the Likert scale of 4 and 5 in the questionnaire. Table 4.6 shows that 83.5% respondents considered monthly rent to be the 'critically important' and the rest of the 16.5% of the survey population considers that this housing criterion is an 'important' factor that may have an impact on low-income households' quality of life and their welfare.

Eco-2. House Price

During the data collection; it has been observed that low-income household will struggle to buy a house in any of the major cities unless their circumstances change, or government takes some initiative to provide them affordable housing. Table 4.6 shows that 29% of the respondent population are agreed to give 'house price' a critical importance rating '5'.

Eco-3. Traveling cost to workplace

This is the why this criterion in the question has gained an accumulative response of 100% with the Likert scale of 3, 4 and 5 and 96.2% on the accumulative basis of 4 & 5. Table 4.6 shows that almost 70% respondents considered that the travelling

cost to workplace is 'critically important' and the rest of the 31.6% of the survey population considers that this housing criterion is 'important'.

Eco-4. Cost of maintenance

This criterion gained an accumulative response of 100% with the Likert scale of 4 and 5. Table 4.6 shows that 68.4% respondents considered monthly rent to be 'critically important' and the rest of the 31.6% of the survey population considers that this housing criterion is an 'important' housing affordability criterion.

Eco-5. Cost of incremental expansion

In Pakistan, people stay in a joint family system and expand their house as their children grow older or get married. In most cases, people are unable to buy different accommodation for a newly wedded couple or for grown-up kids. The responses in Table 4.6 reflect that the housing professionals of Pakistan are familiar with the situation and have responded to the question accordingly, 53.2% of the respondents believe it is a 'critically important' criterion of housing affordability.

8.5.2 *Social criteria of housing affordability*

In Pakistan, the land price is cheaper in rural areas with lower taxes and other charges. Government and private developers in Pakistan tend to develop low-cost housing in the suburban and rural areas to avoid high tax rates and other associated surcharges. This move falls on end users who cannot and do not want to travel to these remote locations. Remote development sites and difficult access routes always have downsides, which cost end users more money and time. Evidence and

theories suggest that the time of travelling dominates the decision about the source of and the destination of travelling (Handy and Clifton 2001). This section of the survey was set around the social criteria of the housing (Table 4.7); questions asked in this segment of the survey are related to the social elements of human life that have some significance in housing affordability.

Soc-1. Location in terms of accessibility to the local shops, education centres, health facilities etc.

In Pakistan, end-users choose to buy or rent cheaper houses in periphery of city centres, and spend more money and time on commuting to work. The data presented in Table 4.7 shows that 53% of the housing professionals consider accessibility to local shops and health facilities as 'critically important', whereas for 37% it is 'important'; this makes it the most important social criterion.

Soc-2. Mean score of the accessibility to local transport for local and general commute:

Evidence and the theories suggest that the time of travelling dominates the decision about the source and destination of travelling (Handy and Clifton 2001); this theory is also important and can be applied in terms of house buying and renting choice. Table 4.7 shows that almost 32% of the survey population has suggested this criterion of housing affordability to be *'critically important'*, while 51% consider this criterion as 'important'*.* As per data results this criterion has been ranked at the second place in hierarchical order.

Soc-3. A place of prayer near the house

In Table 4.7 only 9% of the population has rated it as *'critically important'*, yet 29% have consider it as an *'Important'* criterion of housing. On the hierarchical ranking list, this criterion has gained the lowest ranking in its group.

Soc-4. Internal privacy

In Pakistan, women are not allowed to mix with men (other than immediate family or siblings); and are obliged to observe parda (veil/hijab). Surprisingly, Table 4.7 shows that the question has gained only 24% of the 'critically important' rating and 44% as 'important'.

Soc-5. External privacy

Comparatively, respondents are more concerned about the external privacy from people peeping or being able to look into the house from outside. Table 4.7 shows that responses for Likert scale 5 gained 19% whereas, scale 4 gained 34%.

8.5.3 Environmental criteria of housing affordability

This section of the survey has been set around the environmental criteria that tend to influence the housing and non-housing affordability of an end-user.

Env-1. Durable building design

Housing professionals' response in Table 4.8 below shows that almost 24% of the survey population suggests it is a 'critically important' part of housing affordability whereas 68% consider it *'Important'*, ranking this criteria at the top of the hierarchical list.

Env-2. Flexible internal layout and design

Flexible internal and external layout and design of a house may help to control the internal temperature of the house, which may reduce their non-housing costs. In this section of the questionnaire, it has been observed that the respondents do look out for environmental criteria while considering an affordable housing such as spatial layout, storage space, lack of privacy, noise, energy efficiency and HVAC systems etc. Internal layout and design of a house is equally important as of the external design; the layout design should be flexible to adjust end users' lifestyle around it. The data shown in Table 4.8 shows that 9% of the respondents suggested that it is 'critically important' part of housing affordability, however, 58% of the respondent population considers it as an *'important'* criterion of housing affordability.

Env-3. Management and maintenance system

Management is a vital part in running a housing development smoothly and efficiently, especially in the countries like Pakistan. Table 4.8 shows that according to 68.4% of the housing professionals it is a *'critically important'* criterion of housing affordability. Having a properly working management and repair system could be an important part of housing affordability; for example, a working heating, ventilation, and air-conditioning (HVAC) system in a house is an essential part of our lives. Our lives are dependent on the technology, electric, gas and water supplies etc. in Pakistan, the temperature during the summer time reaches up to 45-50 degrees Celsius; and in the winter the temperature goes down to freezing, therefore, it is vital to have a working HVAC system in the house. Nevertheless, this is a benefit that only middle and upper class can afford; affordable housing comes with the basic facilities without any air-conditioning and heating system in the house.

It has been observed that most housing professionals provide their services to the high-end and middle-income people, however, there are some housing developers particularly working to provide housing to low-income households. The Delphi methods mainly focused on the latter who are working towards providing general needs housing for low-income households in Pakistan. Housing professionals were selected based on the responses that were obtained from the pilot study that has been explained in the Chapter 3 section 3.9.

A total number of 151 Delphi first rounds questionnaires were sent out to the housing professionals in Pakistan. In the first round, 96 responses were received back. In the second round, the questionnaires that included results from the first round were sent out to the 96 respondents who gave their consent to participate in further surveys. Out of the questionnaires sent, 79 responses were received in the final round. The dropout indication has been given in Table 4.8 and the justification for this drop out has been presented in Table 4.9.

As stated earlier in the section 4.2, the theoretical, experiential and theoretical work pertaining to affordable housing mainly focuses on the economic efficiency. Delphi methods survey confirmed and verified claims made by the previous researchers (Table 2.8) to consider social and environmental criteria without compromising the affordable housing user experience.

8.6 Objective 4: Affordable Housing End-User's Questionnaire Survey Report

This survey is an attempt to establish housing affordability perceived by the affordable housing end-user(s) or users of low-cost housing schemes in Pakistan. A

total one hundred questionnaire were disseminated in two affordable housing developments. One of the housing developments had a management office within the development and was used as guide to drop of the questionnaire survey. End-users were chosen based on duration of their stay in the development. All the respondents were living in these housing developments for minimum of two years. Hard copies of the questionnaire survey were distributed and was collected later. Most of the end-users were uneducated and could not read, so the questionnaire was read out to them to get their responses. Researcher had to fill the questionnaire surveys on their behalf. People who could read were given the hard copies of the questionnaire to fill in.

8.6.1   General criteria of housing

The questions asked in the general section of the questionnaire were of personal and informative nature. This section had 16 items in total; respondents had multiple-choice answers (MCA) to select. This additional information was gathered to determine the real time economic and social picture of a household with low-income. This information can be useful for the further auxiliary research in the housing sector in Pakistan.

Table 5.1 gives an insight about the end-users' personal life including the type of the household population and their income level that could be a useful information for the analytic process.

G. 1. How many family members are there in your household?

Most families in Pakistan particularly people with low-income and from the rural areas live in a joint family system, where parents and all their male children live in the same house after their marriage. This question was significant to determine the average family size of a low-income household in Pakistan. Table 5.1 shows that almost 28% of the survey population had 6 members, whereas, almost 20% of them had 7-10 members in their household. These family members consist of husband and wife with four or five children, and some of their children are married too with children of their own.

This question was asked to determine a suitable house size for a low-income household. On average, a typical house size in urban area of Pakistan is between 5-10 Marlas. Most houses have single storey with 2 to 3 rooms, these are multipurpose rooms and are used to server all purposes including kitchen, sitting room and bedroom. The claims made in the Chapter 2, section 2.8 earlier have been verified on average 4-5 members share a room.

G. 2. Working family members

This question was to determine how many members of the household need to work to cover their daily expenses. The data results in Table 5.1 show that almost 64% of the data population has a single working member in the family. As per Table 5.1, 19% of the survey population have 2 persons working, 11% have 3 members working, 1% of the population have 4 working members and 5% have 5 persons working in their family. Most of these working family members are skilled persons

such as tailors, electricians, drivers, masons. 64 % of the survey population has single breadwinners, who have to look after all the kids and probably the elderly parents as well. The unemployment rate in Pakistan is at an all-time high, stands at the rate of 6%, and is persistent since 2016 (Trading Economics Pakistan, 2018). In most cases, people cannot get a suitable job due to the high unemployment rate in the country.

G. 3. How many family children in the family are at school?

This question was to determine how many family members go to school that might have a significant impact on their family budget. The data result in Table 5.4 shows that almost 39% households have at least one school-going child.

Currently, the literacy rate in Pakistan is 58% as of January 2019; authorities vow to raise it to 70% in four years by providing school access to the approximately 22.8 million students, improving the education system among all ages with modern technology.

Female: 51.8%

Male: 72.5%

Source: Education in Pakistan (2019)

In Pakistan, the situation of the public schools is poor; sometimes the school has no basic services such as drinking water, washing facilities and in some cases no classrooms (building). People desire and tend to send their children to private schools, which is very expensive and unreachable for most low-income households.

G. 4. Size of end user's house

After finding out the size of the family, it was vital to know the size of the house under end users' use. This information is vital as it can be used to develop future affordable housing developments for low-income households. Table 5.5 shows that almost 8% of the survey population have a house with a single room. This single room house does not have a separate living room space, no separate kitchen, even in some cases; they do not have sanitation facilities. It is difficult to provide accommodation/shelter for 7-10 people, which is 20% of the survey population. Table 5.5 shows that 59% of respondents have houses with only 2 rooms and this does not necessarily include living room and kitchen separately. Only 12% of the respondents have 4 rooms in their house.

G. 5. Opinion about the maximum members of a family that should share a room.

During the survey, it has been observed that a normal household in urban cities of Pakistan consists of six to seven members, living and eating together in one house. This member per house ratio is more in rural and northern areas due to joint family system. Extended families with ten or even up to twenty family members live jointly in a bigger house, where, the eldest member of the family is in-charge. Table 5.6 shows that only 1% of the respondents do not share a room with anyone else. On the extreme end 7 to 10 members of a family share a room and this is a 3% representation of the survey population. According to the data results, the highest room-sharing population stands at 34%, in their household only 2 persons share a room, whereas, in second place 21% of the population states that 5 persons share a room in their household.

G. 6. Own or rent a house

Table 5.1 shows that almost 81% of the survey population lives in a rented house and only 19% of the respondents own a house.

G. 7. Type of property in use

This question was to determine the contemporary trend to accommodate low-income households in Pakistan. Table 5.1 depicts that almost 51% of the respondents live in a newly developed accommodation. Whereas, 49% live in an unplanned type of property otherwise called shantytowns.

G. 8. Recommended future affordable housing as per end-users' responses

The recent trend of rapid urbanisation has resulted in densely populated urban cities. This migration influx is causing expansion of the major cities around the world (Coit, 1991; Gabriel et al., 2005; Yates and Gabriel, 2006; Tirmzi, 2007; Maliene and Malys, 2009; Dülgeroğlu-Yüksel, 2010; Amjad and MacLeod, 2014; Isalou, Litman and Shahmoradi, 2014; Calnan, 2015; Newman, Kosonen and Kenworthy, 2016). In recent years, major cities in Pakistan are highly affected by urbanisation. Cities are crossing their boundaries and compromising the agricultural land.

This question is to ask what the possible solution is to tackle the problem of housing without compromising agricultural land. Table 5.1 shows that almost 44% of the population have voted for the 'New Towns' and 37% have voted for the 'Multi-storey apartments' and 10% have opted for converting 'slums to new houses' whereas 9% wanted to refurbish old houses.

G. 9. What financial products end users' have used to buy or rent a house?

In Pakistan, the House Building Finance Corporation (HBFC) is a public department, which gets funding and financing from the State Bank of Pakistan (SBP). HBFC

provides loans to build a house to the public, but does not provide loans to rent a house. HBFC has very stringent borrowing criteria and most low-income households do not qualify for the loan due to the income to expense ratio (IER) criterion of borrowing. That is why Table 5.7 shows that only 26% of respondents have access to the public loan and 43% have used private lenders (it is fair to call them loan sharks due to very high interest rates charged). Only 1% have used 'mortgages.

G. 10. The financial products end users have recommended buying or rent a house

The data given in Table 5.1 shows that 45% of the respondents have recommended 'loan by government' as a useful financial product to buy or rent a house. However, government do not offer any loans to rent a property but to buy. The reason for this answer could be the low interest and no hidden fees or charges etc., rate as compared to other financial products available. In the second place, 30% of the survey-population preferred a 'private loan' due its easy availability and less stringent criteria, although the interest rate is excessively high as compared to other financial products.

G. 11. Monthly household income

This response has confirmed the claims made by researchers (Bank, 1993; Kakakhel, 2014; Awuah and Lamond, 2015) that a low-income household earns $2 to $5 a day in Pakistan. Table 5.8 shows that 4% of the survey population earns around $32 to $ 47 and 69 % of the population earns between $62-$60 a month and 14% of the population earns around $62 to $94.

G. 12. Monthly housing expenses such as rent, mortgage, loan repayments, electricity/water/gas bills, housing taxes, TV licence & sky cabling charges, maintenance and security charges, etc.

This question sought end user's opinion regarding the percentage of the monthly total income; they spend on their household expenses per month. Table 5.9 depicts that 59% of the households spend most of their household income every month.

The literature (Fisher, Pollakowski and Zabel, 2009; Dülgeroğlu-Yüksel, 2010; Waseem et al., 2011; Amjad and Idara-e-Taleem-o-Agahi, 2012; Amjad and MacLeod, 2014; Isalou, Litman and Shahmoradi, 2014; Kakakhel, 2014) suggests that a household should not spend more than 30% of the total monthly household income on housing expenses such as monthly rent, water, gas and electricity bills.

G. 13. Monthly expense on non-housing (travelling cost, medical cost, school fees and leisure)

As given in Table 5.10, 79% of the households spend 51-100% of their household income on the housing expenses. Women are not allowed to work especially in rural and northern areas of Pakistan, yet some women work from home. Sometimes these works could be in exchange for food or household items. This type of work is occasional, seasonal, and not guaranteed, so cannot be classed as an income. In monetary terms, the survey population spend almost Rs. 20000 ($126 USD) on their non-housing expenses per month.

Household spending for the rest of the survey population is between 21-50% ($50 to 175 USD) of their household income, which is dependent on location, house size and the number of family members etc.

G. 14. Saving per month

Table 5.1 shows that only 5% of the survey population has some sort of savings for their rainy days and 95% of the survey population has no savings at all.

G. 15. Should government support low-income households?

As Table 5.11 shows, this question had only 'yes' or 'no' boxes to tick and it is clear that 100% of the survey population desires the State to contribute towards their housing expenses. In Pakistan, there is no proper welfare system to support such households.

G. 16. if answer yes then how much?

This was continuity of the previous question, where the respondents were asked how much the state should contribute towards the household expenses every month to a low-income household. The results in Table 5.1 shows that 86 % of the responses were in favour of getting 51-100% (i.e., almost Rs. 17501 to 20000: $110 to 126 USD) a month from the government.

In the year 2008, the government of Pakistan started an income support programme for low income households called 'Benazir income support' programme. Through this programme an eligible household gets Rs. 1500 ($9) a month to support their household expenses.

8.6.2 Economic criteria of housing affordability

This section of the questionnaire included questions that were related to economic criteria of housing affordability also known as housing expenses that may affect the financial situation of a low-income household.

Eco-1. Monthly Rent

Table 5.13 shows that 68% of respondents consider monthly rent to be a 'critically important' criterion of housing affordability that affects low-income households' choice of the house, quality of life and their wellbeing.

Eco-2. House Price

During the data collection, it has been noticed that the house prices near the city centres in the major cities of Pakistan are unbelievably high and beyond the buying power of a low-income household. Monthly household income declared by the end-users in Table 5.14 is between Rs. 10001 – 12500 ($62 to $78 USD). It is very unfortunate that with their current household income and savings a low-income household would never be able to buy a house in any of the major cities in Pakistan. Probably, this is why the respondents have given this criterion a cumulative 100% responses where 68% responded it as 'critically important and 32% responded it as an important' affordability criteria.

Eco-3. Travelling cost to workplace

The data result given in Table 5.15 shows that the 25% of the respondents rate it 'critically important', for almost 40% it is an 'important' criterion and for 25% it is a 'fairly important' housing criterion. The sample locations surveyed for this research are located at the outskirts of the major cities in Pakistan with no access to public

transport and are not easy to reach. It is difficult for school-going end-users of these developments to travel to an education centre. These developments have no decent schools and colleges available in their catchment area. School-going children have to travel by bus or private means of travelling to get to their education places. Commuting costs influence their household income and all in all end-users spend more time and their resources on travelling.

Eco-4. Cost of maintaining (repairs etc.) the house

In Pakistan, overall housing stock consists of 21% pukka houses (properly built with bricks and mortar) on the other hand 39-40% are katcha makan (built with mud and temporary material) katcha houses. Most people in rural areas and the households that took part in this survey mostly lived in katcha houses. End-users have to alter their house according to the weather requirements. Table 5.16 shows that 22% of the population consider it 'critically important' and 32% of the population believe it to be an 'important' criterion of housing affordability.

Eco-5. Cost of incremental expansion in the house

In Pakistan, a house is considered to be a status symbol in the society, bigger and better houses are a must-have asset and a proud possession. People spend lots of money to show off their wealth and power. Culturally in Pakistan, male children tend to stay with their parents even after their marriage, as their family grows, they build an extra room in an extension to their house. The results given in Table 5.17 explain that 35% of population consider it 'critically important', 32% of the population believe it to be 'important' while 23% consider it a 'fairly important' criterion of housing affordability.

8.6.3 Social Criteria of Housing Affordability

In this section of the questionnaire the questions related to the social criteria of housing such as the location of the housing development in terms of accessibility to the local shops, education centres, health facilities, local transport for work and general commute, were included.

Soc-1. Location

In Pakistan, land is cheaper in rural areas with lower taxes and other charges. Government and the private developers in Pakistan tend to develop low-cost housing at the suburban and rural areas to avoid high rate tax and other associated surcharges. This move falls on end users who cannot and do not want to travel to these remote locations. Remote development sites and difficult access routes always have down turns; which cost end users more money and time. Easy access to the housing location is a very useful built environmental factor in terms of end user's wellbeing and performance and easy reach location could save time and energy. Data results given in Table 5.18 shows that 33% of the responses rated this criterion as 'critically important' and 50% as 'important'.

Soc-2. Accessibility to local transport for general commute

The data given in Table 5.19 shows that almost 42% of the population consider this criterion to be 'critically important'. Demand of travelling generally is the result of work demand and activities. An affordable housing development should be in a reasonable location to minimize the cost and travel time for end-users.

Soc-3. A place of prayer

Pakistan is an Islamic country and the majority of the population is Muslim, most of them have very fundamental Islamic ideology. This research expected the results shown in Table 5.20 even the highest importance ranking 5 of the Likert scale, still a cumulative percentage of scale 4 and 5 shows 84.7%.

Soc-4. Internal privacy

In Islamic culture women are not allowed to meet or greet any men other than the immediate family members, it is mandatory for women to observe the veil (parda) especially in rural and northern areas of Pakistan. The data results in Table 5.21 depicts the importance of this housing criterion, a cumulative percentage of scale 4 and 5 shows 89.1%.

Soc-5. External privacy

This question is related to privacy as well and has a very significant role in selection of a house to buy or to let. As expected, respondents are equally concerned about their external privacy, Table 5.22 shows that Likert scale 4 and 5 gained a cumulative mean score of 90.2 % which is slightly higher than the Soc-4 (internal privacy).

8.6.4 *Environmental criteria of housing affordability*

The questions regarding this criterion (Env-1 to Env-3) had the similar layout as the previous sections, where the respondents were asked to select one of the importance criteria against each question such as, '1' = Not Important at All; '2' = Slightly important; '3' = Fairly important; '4' = Important; '5' = critically important.

Env-1. Durable building design

Layout and design of the household is a very important housing affordability criterion, especially for low-income households because of repairing and maintaining costs etc. Responses in Table 5.24 shows that almost 40% of the survey population suggests it is an important part of housing affordability whereas 11% consider it a critically important criterion.

Env-2. Flexible internal layout and design

Internal layout and design of a house is equally important as the external design. It is vital because kids stay with their parents even after their marriages, therefore, the layout design should be flexible to adjust one's lifestyle around it. The data in Table 5.25 shows that 36.3% of the respondents suggested that it is an important part of housing affordability whereas 18.7% consider it as critically important. Flexible internal and external layout and design of a house may help a household to reduce their non-housing costs.

Env-3. Management and Maintenance of the house

HVAC system can be classed as part of the internal layout and design of a house; in the modern age an HVAC system is an essential part of our lives and our lives depend on technology, electric, gas and water supplies etc. This question was to determine the energy efficiency, quality of services provided and the management's efficiency to resolve any facilities management issues etc. The data in Table 5.26 shows that 28.6% of the responses suggested that it is a critically important criterion of housing affordability whereas 34.1% consider it an important factor of housing affordability.

The findings of the end-user questionnaire verify the criteria and issues identified through the literature review as explained in section 2. Furthermore, during the literature review on many occasions, it was not clear about the exact characteristics, attributes, and desires of the people pertaining to owing a house. Available literature regarding the housing situation in Pakistan only consisted of the reasons and benefits of such low-income housing projects in Pakistan; but rarely covered low-income households. In this regards, findings of the end-user survey are linked and related with the literature review, because the gaps in the literature review are being covered by the findings of end-user questionnaire.

In the economic criteria section, affordable housing end user's opinion was sought, the survey findings given in Figure 5.8 indicate that, affordable housing end-users in Pakistan have ranked 'economic criteria' at the highest importance level. This could be due to poverty, and lack of resources in deprived areas. However, housing affordability assessment requires a more humanistic approach in finding a suitable solution to accommodate low-income households. All the organisations need to work together to find a solution in tackling the housing deficit, energy poverty and housing related issues.

The data results support the claim to adopt a support-based approach (Mumtaz, 1995; Nikodem, 2018; Schwartz and Wilson, 2018; Anacker, 2019; Commission, 2019; Matt and Marshall, 2019; Saunders, Lewis and Thornhill, 2019. Similarly, the findings of this study also indicate that the support-based housing which is done in the form of four programmes that are selected as the sample settings are not sufficient for the purpose of fulfilling the needs of the public.

8.7 Achieving the objectives

This research explored the previous studies (Section 2.14.1 & 2.14.2 and Table 2.8) about housing affordability and affordable housing helped this research to create a theoretical research question and framework to make a base for further studies.

Objective One: to analyse an affordable housing concept perceived by the housing professionals in Pakistan.

Housing affordability is being able to pay without experiencing financial problems as explained in section 2.14.1. Objective one has two tiers: the first tier has been achieved through the literature review of previous studies on affordable housing. The second tier, however, required the opinion of housing professionals and experts to establish the unified meaning and definition of affordable housing that can be used in Pakistan; this will also be able to answer the Research Question (Chapter 1: section 1.3).

In the second tier to achieve this objective, the Delphi methods was used to get the concept of affordable housing perceived and adopted by the housing professionals in Pakistan. This survey has enabled this research to get information on the prevailing situation in Pakistan which may otherwise be difficult to interpret during the course of the research project.

This objective has been fulfilled as given below:

- A list of housing affordability assessment criteria was developed through the review of the literature given in Section 2.14, Table 2.8. These criteria were verified (the Delphi methods) and validated (the end-user survey) to generate

a consensus from the respondent group and correlate the informed judgement on the topic

- To edify and inform the participants as to the assorted and consistent feature of the subject

- This research has managed to interpret and ascertain any underlying theory or information leading to the diverse opinion regarding the concept of affordable housing prevailed in Pakistan, using the above-mentioned surveys. A hierarchical list of the economic, social and environmental criteria of housing affordability has been established as shown in Table 6.15.

- A comprehensive and conclusive description of affordable housing has been developed which can be used in Pakistan (Chapter 2, Section 2.5).

Objective two: to assess the prevailing strategies and policies regarding the affordable housing in Pakistan

It has been established that not much research has been carried out regarding the housing subject in Pakistan. However, a rigorous review of available literature for example (Afshar, 1991; Tariq, 2011; Malik and Sajjad, 2014; Rizvi, 2015; Shaikh, 2016) etc., on housing and housing affordability in Pakistan was carried out. It helped this research to identify the prevailing strategies and policies regarding the affordable housing in Pakistan. Secondary data regarding the prevailing strategies and policies including assessment of housing affordability was gathered from the government agencies.

Objective three: to analyse any available mechanisms and frameworks, which could support an affordable housing in Pakistan (Section 2.6).

Objective 4: to assess available affordable housing projects (sample locations) in Pakistan to formulate parameters to overcome the restraints and to make affordable housing more effective.

Objective three required analysis of the features, rationale and mechanism in provision of affordable housing from global best practices. This objective was achieved by analysing previous research studies regarding affordable housing projects (Section 2.6 and Section 2.10).

Available affordable housing projects in Pakistan were investigated to analyse the affordability criteria used for allocation/transfer of affordable housing to the end-users in Pakistan. Survey findings have helped to determine the degree of impact of the key criteria that influence a user's decision to choose affordable housing.

These objectives have also helped to answer fifth research question (Section 1.3) matching principles (a fundamental concept of accrual basis accounting that offsets revenue against expenses based on their cause-and-effect relationship. It states that, in measuring net income for an accounting period, the costs incurred in that period should be matched against the revenue generated in the same period.

The fieldwork surveys helped to assess the prevailing strategic framework in support of affordable housing systems in Pakistan. Surveys also helped to determine the role of the local governments, especially to provide distribution of urban and rural land, public amenities, and opportunities for future affordable housing developments.

Objective 5: to assess the needs and interests of stakeholders for affordable housing development.

The Delphi methods were designed to verify housing affordability assessment criteria identified through the literature review (Chapter 2). The Delphi methods helped to assess and analyse the needs and interests of the several stakeholders in the provision of affordable housing to the low-income affordable housing end-users in Pakistan.

Objective 6: to develop a framework of affordable housing applicable for Pakistan. Results of the data findings have helped to develop a workable affordable housing framework for Pakistan. If used by the stakeholders, it can make low-cost housing developments more useful for the end-users, maintaining sustainability and cost effectiveness without changing the quality of services rendered to the end-users. Contributing to the efforts made in the indoor environment preservation, less wastage of energy and economic growth for the organisation will enhance sustainability and building performance.

8.8 Hierarchical List of Housing affordability assessment criteria as Determined by the Housing Professionals and the End-users

A hierarchical list of housing affordability assessment criteria has been established based on the responses by the housing professionals and the end-users Table 6.15. The Delphi methods were based on the economic, social and environmental criteria of housing affordability. These survey responses were recorded on the Likert importance scale from 1 to 5 as explained in Chapter 3: section 3.8. The data results shown Table 6.15 shows the combined hierarchical list of the   economic, social and environmental criteria which is based on the mean scores i.e., the average score of the Likert scale responses.

The data summarises that amongst the economic criteria 'monthly rent (Eco 1)' has been rated the critically important housing affordability criterion, and (Env-3) leaving interior layout and design at the last place.

8.9   Research Limitations

During this study several limitations have been faced which needs addressing. Preliminary drawback was to discovering literature related to affordable housing and housing affordability in Pakistan. There is not much research work available to address housing related issues for the region of Pakistan. Only a handful research work available was, either too old or was related to economic issues related to housing. This limitation has been addressed by offering this research work as an auxiliary study and findings for future research related to housing situation in Pakistan.

It was established that the Delphi round survey is one of the most cost-effective and efficient techniques to collect the data from a group of housing professionals at once. The researcher wanted to conduct qualitative interviews with housing professionals and the affordable housing end-users to gain comprehensive understanding of the way in housing affordability is practically defined and assessed by the authorities. Also, owing to the time and financial resources the Delphi round survey was limited to housing professionals who could read and respond to the questionnaires. These professionals were the head of the departments or had a higher rank in their organisation. Another limitation in using the Delphi methods is related to self-reporting of the respondents, where, the data is subject to the respondent's bias and memories. It is one of the major requirements that the respondents of the Delphi

methods are rich in their expertise however, there were some participants who were not as efficient as others were, also some of the respondents were highly skilled and educated than others. In Pakistan, it was observed that most of the housing professionals working in the field or in operational positions in housing industry are not highly qualified. The researcher believe their skills and involvement in the sector would make this AHF particularly valuable and valid to be applied by these housing professionals in the field. To perform further research on affordable housing in Pakistan, it would be interesting to observe whether the opinions on HAAC importance, determined by higher ranked housing professionals in this study, differentiate with the sample obtained from the lower-ranked or illiterate professionals. In addition, a further study can be embarked to investigate about the broader housing affordability perceived by moderate- and high-income households in Pakistan.

Although, the developed HAAC through the literature review was verified using the Delphi round (qualitative) survey by the housing professionals covering both public and private sector across all regions in Pakistan and subsequently validated by the end-users.

Four numbers of government recognized affordable housing developments (or low-cost housing: LCH) were found in Pakistan. It was not possible to survey all of these housing developments due to time and the financial constraints. Therefore, only two sample locations were selected for the survey, and a sample size of houses was assumed to be 100 houses with 50 houses from each LCH development. This research mainly focused on the areas under probe and established the number of

participants at 100 and was open to the fact that this number can shrink or snowball at maximum of 10%. 50 households from each of the two sample locations, were invited to take part in the survey. The response rate was 91%. The researcher had great difficulty to read out and interpret the questionnaire to most of the uneducated participants.

Another, category of the limitations is related to the respondents; these limitations included, dishonesty of respondents to answer question with 100% accuracy due to many reasons such as protecting privacy, nervousness and feared. In addition, not every respondent was equally motivated to take part in the survey.

It is expected that the findings of this research will have an optimistic impact on housing professionals by persuading them to become more attentive on 'will I live there' (WILT) standard and quality issues in relation to affordable housing, supporting interested parties in executing more holistic housing affordability assessment procedure using the offered framework (Figure 7.1).

8.10 Recommendation for future research

This research may not be able to become a definitive guide due to the time, funding, limitation and scope; yet it anticipates being able to provide references to auxiliary and comprehensive reading and future research on affordable housing in Pakistan for the research community.

The government of Pakistan needs attention, interventions and assistance from both housing stakeholders and the research community in order to improve housing deficit and encourage future affordable housing developments in Pakistan. This

research study can be used a preliminary guide about affordable housing situation and housing affordability issues in Pakistan.

- **Affordable housing for medium and higher income household**

This research had a focus on the low-income households. It will be interesting to find out affordable housing perception of the medium and higher income end-users, and how do they rate the developed housing affordability criteria.

- **Developed affordable housing framework to be used in other developing countries**

An exceptional growth in South Asian property prices has been recorded in the last couple of decades (Figure 2.3), whereas one third of the urban population of these countries live in an absolute poverty as explained in the section 2.8.

As shown in the Table 2.3 housing situation in South Asian countries is almost the same, or in some cases is even worse than Pakistan. The developed affordable housing framework for low-income households can be applied (as it is) or with some adjustments to tackle the housing situation in the South Asian countries.

- **Review the National Housing Policy of Pakistan to facilitate low-income households**

The National Housing Policy of Pakistan was introduced in the year 2001; and at the time of the publication of the National Housing Policy of Pakistan 2001 (NHP), the population of Pakistan was around 140 million, whereas, current population of Pakistan stands at about 220 million. There NHP (2001) needs a review to make

some policies for future affordable housing projects around the country to house the 61% of low-income population. The housing deficit stands at almost 9 million units and is increasing rapidly. The developed affordable housing framework can be used to review the NHP (2001) as there is an urgent need for affordable housing developments to facilitate the lower income population.

8.11 Final Remarks

'Housing affordability', is one being able to pay without experiencing monetary problems and should not pay more than 30% of their monthly income towards housing expenses. Housing affordability is a multi-dimensional subject that affects households, including economic, environmental and social aspects. Housing affordability is an end users' ability to obtain housing and being satisfied for staying in it. In Pakistan, housing affordability is measured based on IER as the only criterion for the measurement. The study confirms that housing affordability is more than the link between housing and non-housing expenses, and is a complex phenomenon of eco-sociology and environmental criteria.

The main objective of this AHF is to provide affordable housing for the poor and needy of the urban and rural population. This can help Government of Pakistan to be transformed from a provider to a facilitator, and this transformation evolves to resolve the housing situation in country. This framework sets out the strategic methods of planning management, motivations and implementation of the policy and procedures to ensure suitable housing to all Pakistanis. It predominantly stresses affordability, especially for the low-income groups of the society. It commits to

develop affordable housing for the rural population and for the poor using different mechanisms such as free land ownership, low interest rate finance, cross-subsidy. The AHF highlights the need to make construction cost effective along with land availability, resource mobilization, incentives for homeownership, and incentives to builders and developers.

This research concludes with final words that

'Housing affordability is a compound phenomenon of economic, social and environmental housing factors'.

And

'An affordable housing is an adequate low-cost housing development made available for low income households to meets end-user's satisfaction, has better location, standard of quality and does not cost so much that it prohibits its end-users from meeting their other basic living costs or threatens their enjoyment of basic human rights.'

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10 Appendices

10.1 Survey Population

The Chief Minister of Punjab Pakistan – an introduction of this research along with data collection request was sent out to the office of the Chief Minister of the Punjab, Pakistan. The CM's office responded to the invitation and as per the direction of Mr. Mian Muhammad Shahbaz Sharif the Chief Minister (CM) of the Punjab, Pakistan; an initial meeting was held with the Secretary (Head) of the Housing Department Government of the Punjab to discuss this research project and the data collection opportunities within the State's Housing Departments.

Punjab Land Development Company – furthermore, a meeting was also arranged with the Chief Executive Officer (CEO) of the Punjab Land Development Corporation, Lahore a (public service company) to discuss the possibility of their participation in this research project.

Saiban- Khuda ki Basti – In private sector: contacts were also established with the pioneer of low-income housing developer Mr. Tasneem Sadiqui. Mr. Sadiqui is a very reputable housing expert and considered to be the Guru in affordable housing sector; with the help of UNO, he has developed four low-cost housing societies in Karachi and Lahore.

Figure 10.1: Mr. Tasneem A Siddiqui founder of affordable housing in Pakistan

Sahir Associates – is a very well-known and reputable Pakistan based organization and which have offices/branches all over the Pakistan and in the Republic of Turkey. They offers design, advice, construction, and equipment, along with housing which ranges from high end to low-income households. In their housing states they provide all the basic amenities such as local parks, banks, schools, shopping malls etc. They claim that they are the one who introduced idea of affordable housing in Pakistan.

Figure 10.2: Sahir Associates

Institute of Planner of Pakistan (IPP) – is a leading Pakistan based architects/planners/designers/town planner's professional body. It supports to all the housing service providers ranging from building design, civil engineering, advice, construction, and tools etc. They are working towards increasing awareness and standards of the housing services and value on behalf of their clients and to assist them in improving their trading positions through innovation and leadership.

Figure 10.3: Institute of Planners of Pakistan

Directorate General of Katchi Abadis – this is a government office based in Lahore working under Government of the Punjab Pakistan. Main objective of the Directorate is to deter the mushroom growth of Katchi Abadis (slums/shanti houses).
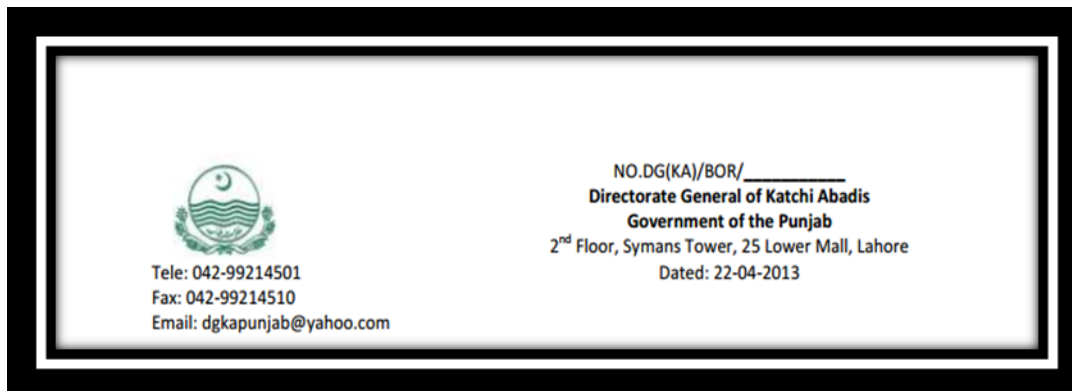
Figure 10.4: Directorate General of Katchi Abadis

Lahore Development Authority – this is a government office based in Lahore working under Government of the Punjab Pakistan.

Figure 10.5: Figure 10.6: Lahore Development Authority

Figure 10.7: Office of the Lahore Development Authority, Lahore Pakistan

Karachi Development Authority – this is a government office based in Karachi working under Government of the Punjab Pakistan.

Figure 10.8: Karachi Metropolitan City (Karachi Development Authority) web page
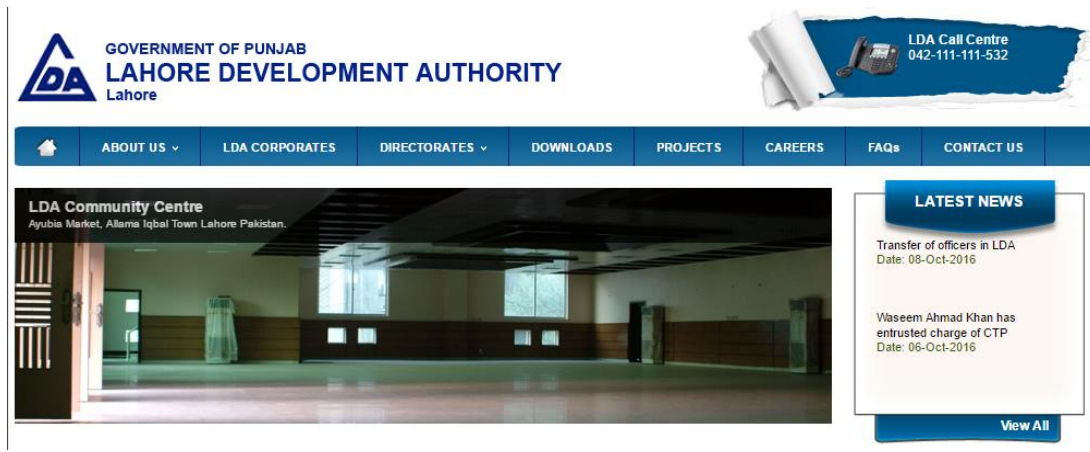
Capital Development Authority – this is a government office based in Islsmabad working under Government of the Punjab Pakistan.

Figure 10.9: Capital Development Authority web page

Élan Partners Ltd - is a reputable housing solutions organization and has their head office in Islamabad Pakistan. They offers design, advice, construction, and equipment, along with housing which ranges from high end to low-income households. They mostly work in collaboration with the government of the Pakistan; they have claimed to introduce a term called *'Vector Mechanism of Housing'*. Vector mechanism is a complete package which explain what is the affordability of a person in a particular income group, how affordability can be enhanced, what sort of plot/house be given to him, how this plot/house be given him, how occupancy of plot/house be ensured, how people from higher income groups be bared to high jack plots/houses planned for lower income groups. The housing states provide all the basic amenities such as local parks, banks, schools, shopping malls etc. They claim that they are the one who introduced idea of affordable housing in Pakistan.
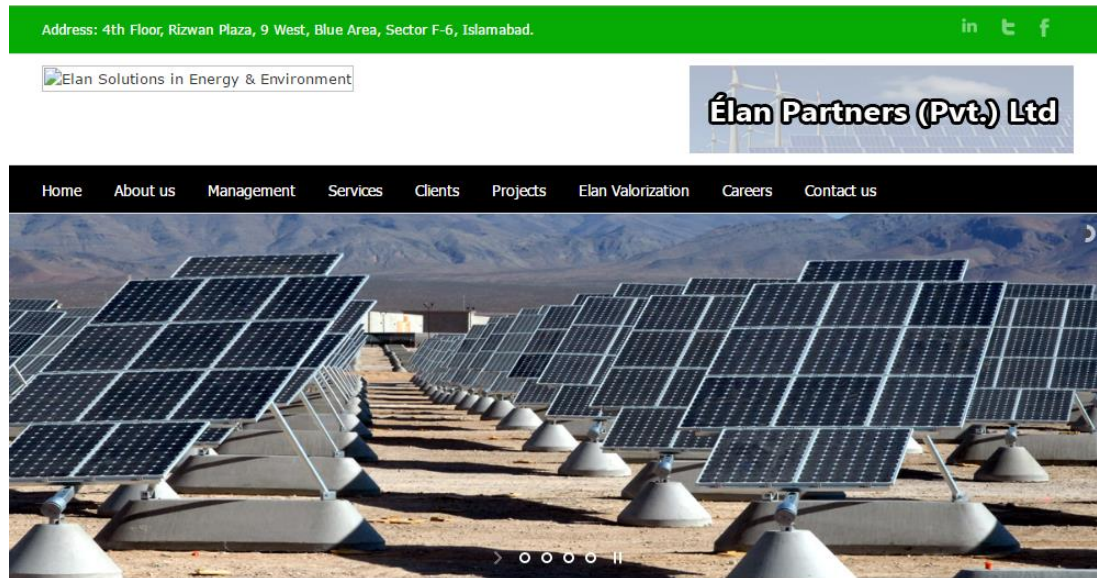
Figure 10.10: Élan Partners (Pvt.) Ltd. Web page

Ansar Management Company (AMC) – Mr. Jawad Aslam an American entrepreneur is the head of this company; they are based in Lahore and have other office across Pakistan. AMC self-claims that they are the only socially driven private sector business developing and implementing quality, affordable housing solutions for ordinary, hard-working Pakistanis. AMC aims to create thriving communities in which people flourish and are proud to be a part of.

Figure 10.11: Ansar Management Company

10.2 Target Group of the Survey/Panel size

Table 10.1: Targeted housing professionals

Categories of participants	Categories of participants	Type of survey	No.
Contractors, Developers, Consultants,	Members of Asia-Pacific Union for Housing Finance	Delphi Rounds	
	Members of the Institute of Planners of Pakistan		
	Sahir Associates (Khyaban-e-Amin Housing Development)		
	Saiban Housing Development		
	Asrar Management Company (AMC) (low-cost housing developers)		
	Élan Partners Private Limited		
	Asia Pacific Union for Housing Finance (APUHF)		
	Asrar Management Company, Low cost developers		
Govt. Officials	Staff member of Housing Department Government of Pakistan	Delphi Rounds	25
	Lahore Development Authority		
Academics	Academics of University of Management and Technology Pakistan	Delphi Rounds	25
	Academics of University of Engineering and Technology Pakistan		
Private Clients	Enclude Ltd Pakistan, Prism Ltd Pakistan	Delphi Rounds	25
	Paragon City Pakistan		
	Professionals such as architects, builders, housing contractors, town planners etc.) from private sector		
	Asia Pacific Union for Housing Finance(APUHF)		

Private Contractors	Institute of Planners of Pakistan (An Association of the Architects)	Delphi Rounds	25
Contractors, Developers, Consultants,	Members of Asia-Pacific Union for Housing Finance	Delphi Rounds	25
	Members of the Institute of Planners of Pakistan		
	Sahir Associates (Khyaban-e-Amin Housing Development)		
	Saiban Housing Development		
	Asrar Management Company (low-cost housing developers)		
	Élan Partners Private Limited		
Govt. Officials	Staff member of Housing Department Government of Pakistan	Delphi Rounds	25
	Lahore Development Authority		
	Capital Development Authority		
	Karachi Development Authority		
Affordable housing in Pakistan	LCH-1	Sample locations	100
	LCH-2		

1.1 Research Sounding at the University of Engineering and Technology, Pakistan
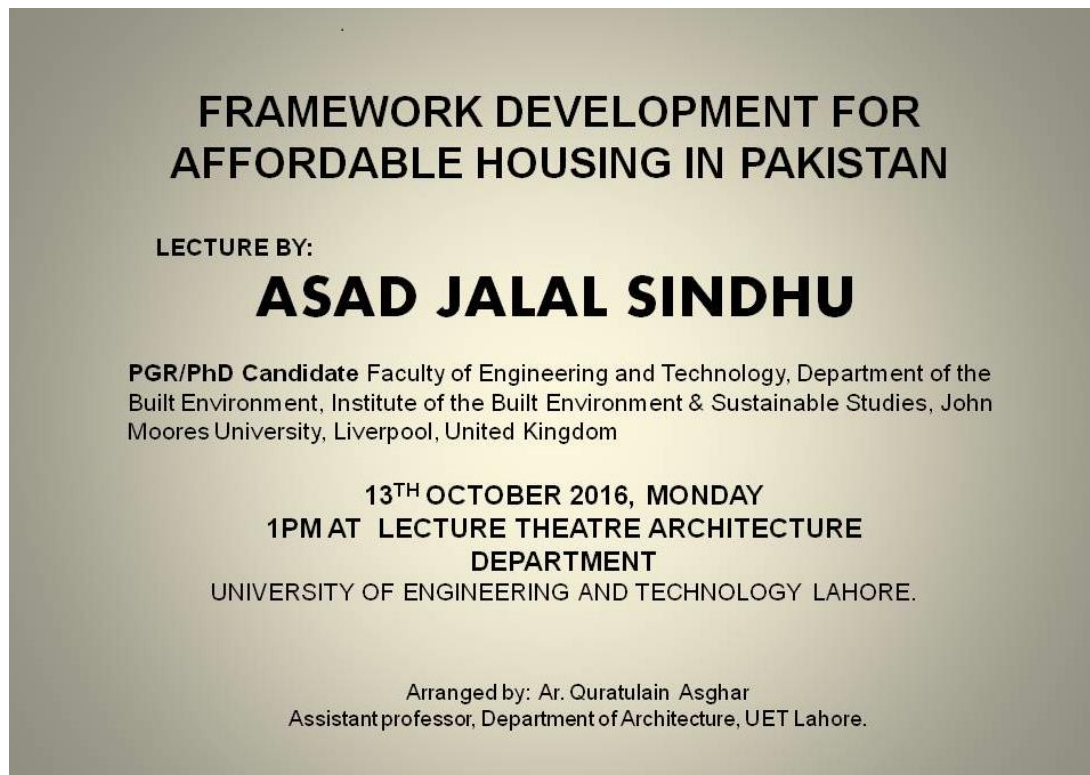
Figure 10.12: Research sounding lecture at the University of Engineering and Technology, Pakistan

10.3 Gate Keeper Information Sheet

Information Sheet

Title of Project:

DEVELOPMENT OF AFFORDABLE HOUSING FRAMEWORK FOR LOW-INCOME HOUSEHOLDS IN PAKISTAN

Name of Researcher and School/Faculty

My name is Asad Jalal Sindhu, a PhD Research Candidate at the Faculty of Engineering and Technology, Department of the Built Environment, Liverpool John Moores University (LJMU) Liverpool, UK.

Delphi Method

This questionnaire survey is the Delphi Methods which has three questionnaire rounds in total. The questions in the questionnaire are based on economic, social and environmental housing factors that may affect the housing affordability of a household with a low-income. This is to learn about the perception and the concept of housing affordability perceived by the housing professionals of Pakistan.

During the Delphi process: you and the member of your organisation will be asked to fill-up the Delphi First Round questionnaire. The responses of the Delphi First Round will be analysed to produce the Delphi Second Round survey. In the Second Round, the respondent will be informed about the mean score of the First Round; in this round, respondents will also have a choice to change your responses of the First Round.

Based on the analysis of the Second Round, the Third (final) Round will be developed in which respondents will be asked for the last time to review or amend their responses of the Delphi questionnaire.

All the questionnaires have been designed not to take more than 15 minutes of your precious time; at every round. Your support and collaboration for this research project will help to develop a survey report followed by a comprehensive concept of housing affordability.

	USD ($)	Pak Rupees
Please Note: for this research, the following daily and monthly total household income would be classed as low-income.		
Salary Per Day (Low income	$2- $5	Rs. 209 – Rs. 523
Salary Per month (Low income)	$50-$100	Rs. 5230 – Rs. 10460
Currency exchange rate for $1 (USD) = Rs. 104.60 (source: XE.com as of 16th June 2016).		

What is the reason for this letter to the Gatekeeper[6]?

The research project titled above is being conducting as the part fulfilment of PhD research project. You and your august organisation is being invited to support and collaborate to conduct interview surveys with your colleagues/staff members.

What is the purpose of the study/rationale for the project?

Your participation in this survey will help this project to:

better understand the concept and perception of housing affordability in Pakistan

establish and define a comprehensive housing affordability concept for the region of Pakistan

provide data to the government of Pakistan to review the National Housing Policy (2001)

housing needs for low-income households; and to improve the situation of affordable housing in the country in the low-income segments of the population

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[6] **Gatekeeper:** *the primary gatekeeper is the person or body with overall responsibility within that organisation, for example the head teacher of a school or the governing body of an association. Secondary gatekeepers are usually employees of that organisation.*

offer some suitable methods to analyse the housing affordability at the time of assessment of the low-income households in Pakistan

offer survey finding report (at the discretion of authorities at Housing Department in Pakistan) to review the National Housing Policy of Pakistan

to establish a framework to develop future affordable housing projects to meet end-user's needs in Pakistan

Based on the data collected through the surveys; this research project will be concluded with a comprehensive report. This report will be presented in the final thesis, which will be submitted as partial fulfilment of the requirements of LJMU in pursuing a degree of Doctor of Philosophy (PhD).

What we are asking you to do?

Your permission and consent is being requested to take part in this research project. The member of your organisation will be asked to fill Delphi Rounds questionnaires.

Why do we need access to your facilities/staff/students?

If allowed, your office building will only be used to conduct the survey in an allocated room/office during the allowed duration. No other facilities or equipments etc., will be used before or after the questionnaire or interview surveys.

If you are willing to assist in the study what happens next?

You will be asked to sign a consent form to take part in this research.

How we will use the information/questionnaire? Will the name of my organisation taking part in the study be kept confidential?

Confidentiality is an integral part of this research. Please be assured that your privacy will be maintained at every stage of the Delphi process and shall not be revealed or shared with any third party. Upon request, you can get access to your individual data analysis at any time and a copy of the final report will be sent out to you at the completion of the surveys. The final report will be presented in the final thesis, which will be submitted as partial fulfilment of the requirements of the Liverpool John Moores University (LJMU) in pursuing a degree of Doctor of Philosophy (PhD). The data collected during the surveys will be kept safe at the Liverpool John Moore University's secured office. The information of sensitive nature will be avoided; and personal information shall not be shared or disclosed to any third party. Only the anonymised data from the questionnaire surveys shall be used to develop a report.

What will be taking part involve? What should I do now?

You will be requested to fill up the Delphi Rounds questionnaire surveys.

Ethical Approval

This study has received ethical approval from Research Ethics Committee, Liverpool John Moores University (LJMU): *Ref. No. 6/BUE/005/31-08-2016.*

Contact Details of the Researchers

Should you have any comments or questions regarding this research or the researcher, you may contact the researchers on following:

Principal Researcher:	**Director of Studies:**
Asad Jalal Sindhu (PGR/PhD Candidate) ✆: a.j.sindhu@2015.ljmu.ac.uk; personal: Kannan_asad@hotmail.co.uk ☎: +44 07737664167	Dr. Vida Maliene (Director of Studies) ✆: v.maliene@ljmu.ac.uk
If you have any concerns regarding your involvement in this research, please discuss these with the researcher in the first instance. If you wish to make a complaint, please contact researchethics@ljmu.ac.uk and your communication will be re-directed to an independent person as appropriate.	
Postal address ✉: Department of the Built Environment, Institute of the Built Environment & Sustainable Studies, James Parsons Building, Byrom Street, Liverpool, L3 3AF, United Kingdom	

10.4 Gatekeeper Consent Form

Title of Project:

DEVELOPMENT OF AFFORDABLE HOUSING FRAMEWORK FOR LOW-INCOME HOUSEHOLDS IN PAKISTAN

Name of Researcher and School/Faculty

Asad Jalal Sindhu, PhD Research Candidate at the Faculty of Engineering and Technology, Department of the Built Environment, Liverpool John Moores University (LJMU) Liverpool, United Kingdom.

Please tick to confirm your understanding of the study and that you are happy for your organisation to take part in this questionnaire survey.

1. I understand that, this questionnaire survey is based on the Delphi Methods which has three rounds in total as explained in the information sheet.

2. I confirm that I have read and understand the information provided for the above study. I have had the opportunity to consider the information, ask questions and have had these answered satisfactorily.

3. I understand that participation of our organisation and members in the research is voluntary and that they are free to withdraw at any time, without giving a reason and that this will not affect their legal rights.

4. I understand that any personal information collected during the study will be anonymised and remain confidential.

5. I agree for our organisation and students/members to take part in the above study. ☐

6. I agree to follow the Electronic Data Protection Act 2005 of Pakistan and Data Protection Act 1998 Great Britain ☐

"I have read the information sheet provided and I am happy to participate. I understand that by completing and returning this questionnaire I am consenting to be part of this research study and for my data to be used as described in the information sheet provided"

Name of the Gatekeeper: _____ Signature: _____ Date: _____

Name of the researcher: Asad Jalal Sindhu   Signature: Asad Sindhu

10.5 Information Sheet and Consent Form

**Information Sheet and the Consent Form for the
Participants**

Title of Project:
DEVELOPMENT OF AFFORDABLE HOUSING FRAMEWORK FOR LOW-
INCOME HOUSEHOLDS IN PAKISTAN

To whom it may Concern:

Hello Madam or Sir,

My name is Asad Jalal Sindhu, a PhD Research Candidate at Department of the Built

Environment, Institute of the Built Environment and Sustainable Technology, Liverpool

John Moores University (LJMU) Liverpool, UK. This research survey titled above, is

being conducting as the part fulfilment of my PhD research project. Your support and

collaboration for this research project will help us to form a report which will be

presented in the final thesis. The final thesis will be submitted as partial fulfilment of

the requirements of LJMU in pursuing a degree of Doctor of Philosophy (PhD).

Data regarding this research will be collected through following ways: firstly, a

questionnaire survey will be disseminated amongst the housing professionals in

Pakistan. The questionnaire will mainly be focusing on learning about concept of

housing affordability perceived in Pakistan. Secondly, available case studies of

affordable housing will be observed to gain a gist of criteria regarding assessment of

the housing affordability of low-income households at the time of transfer of affordable

housing unit. Lastly, the data collected through questionnaires and case studies will

be triangulated with interviews with the housing professionals in Pakistan.

This research project aims to investigate into a comprehensive aspect of the housing affordability and affordable housing in Pakistan.

Please Note: For the purpose of this research the following daily and monthly total household income would be classed as low-income (World Bank 2015, Kakahel 2015, Tariq 2013). Currency exchange rate for $1 (USD) = Rs. 104.60 as of 16th June 2016 (source: XE.com).		
	USD ($)	Pak Rupees
Salary Per Day (Low income	$2- $5	Rs. 209 – Rs. 523
Salary Per month (Low income)	$50-$100	Rs. 5230 – Rs. 10460

Your participation in this survey will help this project to:

1. Better understand the concept and perception of housing affordability in Pakistan

2. housing needs for low-income households

3. establish and define a comprehensive housing affordability concept for the region of Pakistan

4. provide data to the government of Pakistan to review the National Housing Policy (2001)

5. assess the housing needs of the people and to improve the situation of affordable housing and housing ownerships in the country in the low-income segments of the population

6. offer some suitable methods to analyse the housing affordability at the time of assessment of the low-income households in Pakistan

7. offer survey finding report (at the discretion of authorities at Housing Department in Pakistan) to review the National Housing Policy of Pakistan

8. to establish a framework to develop future affordable housing projects to meet end-user's needs in Pakistan

All your details including contact details will remain confidential and all the data will be stored in a locked/secured locker/office at the Liverpool John Moores University, Liverpool, United Kingdom which will be destroyed after 5 years. You can get access to your own data if you wish to do so, no access will be allowed to any third party.

However, for the teaching/assessment purposes the research supervisors and teaching staff of the Liverpool John Moores University may look at the relevant and anonymous sections of any data collected during this surveys.

Time – *all the surveys (*questionnaire and interviews) are designed not to take more than 30-45 minutes.

Personal information – personal information is optional; participants have no obligation to provide their personal details. However, if the users provide any kind of personal information; this information and the response will remain strictly confidential and will only be used for the purpose of this research.

Finally, this research is not binding on any participants and you can withdraw at any time without giving any reason; at any stage of the research project.

Should you need any further information, want to withdraw need further information regarding this research or the researcher, details can be requested at following address:

Principal Researcher:	**Director of Studies:**
Asad Jalal Sindhu (PGR/PhD Candidate) ✆: <u>a.j.sindhu@2015.ljmu.ac.uk</u>; personal: Kannan_asad@hotmail.co.uk ✉ : *Department of the Built Environment, Institute of the Built Environment & Sustainable Studies,* James Parsons Building, Byrom Street, Liverpool, L3 3AF, United Kingdom. ☎: +44 07737664167	Dr. Vida Maliene (Director of Studies) ✆: v.maliene@ljmu.ac.uk ✉ : *Department of the Built Environment, Institute of the Built Environment & Sustainable Studies,* James Parsons Building, Byrom Street, Liverpool, L3 3AF, United Kingdom. ☎: +44 01512315090

10.6 Consent Form

I give my consent to be contacted for any further research study.

Yes	No

(Participant)

Print Name: _____

Signature: _____

Date: _____

Email or contact no.

(optional   for   further   correspondence):

_____

_

(Researcher)

Name: <u>Asad Jalal Sindhu</u>

PhD Candidate Liverpool John

Moores University, Liverpool

Signature:

_____

Date:

_____

_

10.7 Participants' Information Sheet

Participants' Information Sheet

Title of Project:

DEVELOPMENT OF AFFORDABLE HOUSING FRAMEWORK FOR LOW-INCOME HOUSEHOLDS IN PAKISTAN

You are being invited to take part in this research project titled above. Before you decide to take part it is important that you understand why the research is being conducted and what it involves. Please take time to read the following information. Ask us if there is anything that is not clear or if you would like more information. Take time to decide if you want to take part or not.

Name of Researcher and School/Faculty

My name is Asad Jalal Sindhu, a PhD Research Candidate at the Faculty of Engineering and Technology, Department of the Built Environment, Liverpool John Moores University (LJMU) Liverpool, United Kingdom.

What is the purpose of the study?

This research project aims to investigate into a comprehensive aspect of the housing affordability for the low-income[7] households and the provision of affordable housing in Pakistan. Your participation in this project will help us:

- better comprehend the concept and perception of housing affordability in Pakistan
- establish and define a comprehensive housing affordability concept for the region of Pakistan
- provide data to the government of Pakistan to review the National Housing Policy (2001)
- housing needs for low-income households; and to improve the situation of affordable housing in the country in the low-income segments of the population
- offer some suitable methods to analyse the housing affordability at the time of assessment of the low-income households in Pakistan
- offer survey finding report (at the discretion of authorities at Housing Department in Pakistan) to review the National Housing Policy of Pakistan
- to establish a framework to develop future affordable housing projects to meet end-user's needs in Pakistan

Based on the data collected through the surveys a report which will be produced and shall be presented in the final thesis. The final thesis will be submitted as partial fulfilment of the requirements of LJMU in pursuing a degree of Doctor of Philosophy (PhD).

Do I have to take part?

No. this research is not binding on any participants and you can withdraw at any time without giving any reason; at any stage of the research project. It is up to you to decide whether or not to take part. If you do you will be given this information sheet and asked

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[7] A daily income of $2-$5 (Rs. 209 – Rs. 523 Pakistani rupees) would be classed as low-income for the purpose of this research; currency exchange rate for $1 (USD) = Rs. 104.60 (PKR) as of 16th June 2016 (source: XE.com).

to sign a consent form. You are still free to withdraw at any time and without giving a reason. A decision to withdraw will not affect your rights.

What will happen to me if I take part?

This information should be written in language understandable to a lay person and should include:

Type	Time Duration	What will happen exactly during the survey
Questionnaire	30-45 mins.	You will be given a questionnaire regarding affordable housing situation in Pakistan. You can fill this questionnaire at your convenience during the office hours at your organisation's office building/premises.
Interviews	45-60 mins	You will be asked a few questions regarding affordable housing situation in Pakistan. This interview will be conducted at your organisation's office building/premises
Case Studies	45-60 mins	Your staff members might be asked some questionnaires regarding the affordable housing project. This survey also requires some of the information/data about the affordable housing project.

Are there any risks / benefits involved?

This research project is being conducted absolutely for educational and informative purpose and has no intention to harm or hurt anyone in any form or shape. There are no risks involve and before or during the survey if you feel uncomfortable or inconvenient, you can discontinue at any stage. This research does not offer any benefits of any kind.

Will my taking part in the study be kept confidential?

All your details including contact details will remain confidential and all the data will

be stored in a locked/secured locker/office at the Liverpool John Moores

University, Liverpool, United Kingdom which will be destroyed after 5 years. You

can get access to your own data if you wish to do so, no access will be allowed to

any third party. However, for the teaching/assessment purposes the research

supervisors and teaching staff of the Liverpool John Moores University may look

at the relevant and anonymous sections of any data collected during this surveys.

This study has received ethical approval from Research Ethics Committee, Liverpool

John Moores University (LJMU), United Kingdom: *Ref. No. 16/BUE/005.*

Contact Details of Researcher

Asad Jalal Sindhu (PGR/PhD Candidate)

✆: a.j.sindhu@2015.ljmu.ac.uk;

Personal: Kannan_asad@hotmail.co.uk | ✉ : Faculty of Engineering and
Technology, Department of the Built Environment, Institute of the Built Environment
& Sustainable Studies, James Parsons Building, Byrom Street, Liverpool, L3 3AF,
United Kingdom| ☏: +44 07737664167.

If you any concerns regarding your involvement in this research, please discuss
these with the researcher in the first instance. If you wish to make a complaint,
please contact researchethics@ljmu.ac.uk and your communication will be re-
directed to an independent person as appropriate.

10.8 Piloting Questionnaire

Title of Project:

DEVELOPMENT OF AFFORDABLE HOUSING FRAMEWORK FOR LOW-INCOME HOUSEHOLDS IN PAKISTAN

Dear Miss. Mrs. Mr. Dr. _____

Thank you for being part of this research project. Your support and collaboration for this research project will help us to form a report which will be presented in the final thesis. The final thesis will be submitted as partial fulfilment of the requirements of the Liverpool John Moores University (LJMU) in pursuing a degree of Doctor of Philosophy (PhD).

Your response to this questionnaire will help this project to:

9. establish and define a comprehensive housing affordability concept for the region of Pakistan
10. offer some suitable methods to analyse the housing affordability for low-income households in Pakistan
11. offer survey finding report (at the discretion of authorities at Housing Department in Pakistan) to review the National Housing Policy of Pakistan
12. to establish a framework to develop future affordable housing projects to meet end-user's needs in Pakistan

Please Note: For the purpose of this research the following daily and monthly total household income would be classed as low-income (World Bank 2015, Kakahel 2015, Tariq 2013). Currency exchange rate for $1 (USD) = Rs. 104.60 as of 16th June 2016 (source: XE.com).

	USD ($)	Pak Rupees
Salary Per Day (Low income	$2- $5	Rs. 209 – Rs. 523
Salary Per month (Low income)	$50-$100	Rs. 5230 – Rs. 10460

Personal Information

Q. 1.   Please tick the box of your relevant field of expertise, if missing please indicate in the space given below in this question.

Govt. Officials	Contractors/ Developers	Consultants	Academics	Private Client	Private Contractors
Any other					

Q. 2.   Please indicate below your current job title:

Q. 3.   Please tick the box below which represents the years of your experience in the field of housing:

<2 years	2-5 years	6-10 years	11-20 years	21 or more

Q. 4.   In your opinion what should be the maximum number of occupancy per 25.29 square meter (1 Marla).

1 Person	2 Persons	3 Persons	4 Persons	5 Persons	6 Persons	7-10 Persons	Other

Q. 5.   Currently on average 3 persons share a room in a household in Pakistan (Nenova 2010, Rizvi 2015); in your expert opinion what should be the maximum number of occupancy per room.

1 Person	2 Persons	3 Persons	4 Persons	5 Persons	6 Persons	7-10 Persons	Other

Q. 6.   Bearing in mind the current population rate of Pakistan; please indicate what is the most feasible form of housing to accommodate the people with low-income

New houses	Multi-storey apartments	Converting slums to houses	Private rented	Developing new towns	Refurbishing old houses
Other please identify:					

Q. 7. Which of the following sources could be the most suitable support for low-income households in their housing needs?

Loan by Govt.	Private Lender	Mortgages	help from family	work loan	House Building Finance	NGOs	Islamic Banking	Community (Committee arrangements)
Other								

Q. 8. The literature (Fisher, Pollakowski and Zabel, 2009; Dülgeroğlu-Yüksel, 2010b; Waseem et al., 2011; Amjad and Idara-e-Taleem-o-Agahi, 2012; Amjad and MacLeod, 2014; Isalou, Litman and Shahmoradi, 2014; Kakakhel, 2014) suggests that a household should not spend more than 30% of the total monthly household income on monthly rent, water, gas and electricity bills etc., (also known as household expenses); in your opinion, what percentage of the monthly total income, a low income household should spend on household expenses per month?

0-5%	6-10%	11-15%	16-20%	21-25%	26-30%	40-50%	60% or more

Q. 9. What percentage of the monthly total income, a low income household should spend

for non-household items related to housing affordability (e.g., traveling cost to work,

educational centre and medical facilities, etc.) per month?

0-5%	6-10%	11-15%	16-20%	21-25%	26-30%	40-50%	60% or more

Q. 10. Should the State of Pakistan contribute in household expenses (rent, water, gas and electricity bills etc.) to a low-income household?

Yes	No

Q. 11. If you have answered 'Yes' in the question above; what percentage of total housing expenses (e.g., rent and utility bills etc.) should the State of Pakistan contribute to a low-income household per month?

< 10%	10-15%	16-20%	21-25%	25-30%	30-40%	41-50%	60% or more

The Economic Factors of Housing Affordability

Given below are the economic factors (also known as housing expenses) of housing affordability; please rate them on the importance scale 1-5 (1 = Not Important At All; 2 = Slightly Important; 3 = Fairly Important; 4 = Important; 5 = Very important)

		Not Important at All (1)	Slightly Important (2)	Fairly Important (3)	Important (4)	Very important (5)
Q. 12.	Monthly rent in relation to household income					
Q. 13.	House price (to buy) in relation to household income					
Q. 14.	Travelling cost to your workplace from your home					
Q. 15.	Cost of travelling to an education centre for school going kids					
Q. 16.	Cost of maintaining (repair etc.) the house					
Q. 17.	Cost of incremental expansion of the house					
Q. 18.	If any of the economic factor(s) of housing affordability has been missed in the list given above, please indicate in the space provided below (use a separate sheet if needed).					

The Social Factors of Housing Affordability

Given below are the social factors (also known as non-housing expenses) of housing affordability; please rate them on the importance scale 1-5 (1 = Not Important at All; 2 = Slightly Important; 3 = Fairly Important; 4 = Important; 5 = Very important)

		Not Important at All (1)	Slightly Important (2)	Fairly Important (3)	Important (4)	Very important (5)
Q. 19.	Location in terms of accessibility to the local shops, education centres, health facilities etc.					
Q. 20.	Accessibility to local transport for work and general commute					
Q. 21.	A place of prayer close to your home					
Q. 22.	Internal privacy (e.g., separate sitting place for male and female guests in the house due to cultural reasons					
Q. 23.	External privacy (no internal view of the house from outside and from the neighbouring houses due to cultural reasons)					
Q. 24.	If any of the social factor(s) of housing affordability has been missed in the list above, please indicate it in the space provided below (use a separate sheet if needed).					

The Environmental Factors of Housing Affordability

Given below are the environmental factors of housing; please rate them on the importance scale 1-5 (1 = Not Important at All; 2 = Slightly Important; 3 = Fairly Important; 4 = Important; 5 = Very important)

		Not Important at All (1)	Slightly Important (2)	Fairly Important (3)	Important (4)	Very important (5)
Q. 25.	Durable building Design (suitability to cope with the weather changes)					
Q. 26.	Flexible internal layout and design					
Q. 27.	Heating, Ventilation and Air Condition Systems (HVAC) to cope with the changes in weather					
Q. 28.	End-User's personal control over HVAC System to adjust as per the weather					
Q. 29.	End-User's personal control over natural light and air circulation with windows to adjust as per the weather					
Q. 30.	Energy efficiency (e.g., usage of energy efficient equipments)					
Q. 31.	Quality of services provided in the communal areas in high rise buildings					
Q. 32.	Management and maintenance system for the housing building (to resolve the issues related to energy,					

		services, cleaning, security, etc.)					
Q. 33	If any of the environmental factor of housing affordability has been missed in the list above, please indicate it in the space provided below (use a separate sheet if needed).						

~Thank You Very Much~

Name (Optional): _____

Company   and   the   address:
_____

_____

_____

Mobile/PTCL/Land line no: _____

Email Address: _____

Once completed please hand it back to the researcher, email or post it to the address below:

Asad Jalal Sindhu
PhD Candidate [Built Environment]
E-mail: a.j.sindhu@2015.ljmu.ac.uk;
Postal Address: Faculty of Engineering and Sustainable Technology, Built Environment and Sustainable Technology (BEST) Research Centre, University of Liverpool John Moores, Henry Cotton Building, 15-21 Webster Street, Liverpool, L3 2ET, United Kingdom.

10.9 Delphi First Round Questionnaire

(Delphi 1ˢᵗ Round)

DEVELOPMENT OF AFFORDABLE HOUSING FRAMEWORK FOR LOW-INCOME HOUSEHOLDS IN PAKISTAN

Dear Miss. Mrs. Mr. Dr. _____

The questionnaire in hand is the First Round of the Delphi Method Surveys, which has three rounds in total. Your response for this questionnaire will be analysed to produce the Second Round. In the Second Round, you will be informed about the mean score of the First Round; in this round, you will also have a choice to change your responses for the First Round.

Based on the analysis of the Second Round, the Third (final) Round will be developed in which will be asked to review or amend your answers for the last time of the Delphi process.

All the questionnaires have been designed not to take more than 15 minutes of your precious time; at every round. Your support and collaboration for this research project will help to develop a survey report followed by a comprehensive concept of housing affordability.

Also, please be assured that your confidentiality will be maintained at every stage of the Delphi process and shall not be revealed or shared with any third party. Upon request, you can get access to your individual data analysis at any time and a copy of the final report will be sent out to you at the completion of the surveys. The final report will be presented in the final thesis, which will be submitted as partial fulfilment of the requirements of the Liverpool John Moores University (LJMU) in pursuing a degree of Doctor of Philosophy (PhD).

Please Note: for the purpose of this research, the following daily and monthly total household income would be classed as low-income (World Bank 2015, Kakahel 2015, Tariq 2013). Currency exchange rate for $1 (USD) = Rs. 104.60 as of 16ᵗʰ June 2016 (source: XE.com).		
	USD ($)	Pak Rupees
Salary Per Day (Low income	$2- $5	Rs. 209 – Rs. 523
Salary Per month (Low income)	$50-$100	Rs. 5230 – Rs. 10460

Q. 1. In your opinion, what income range (per month) given below would you class as low income? (The exchange rate given below is only a guide and does not reflect real amount of the exchange).

<Rs. 5000 ($50)	Rs. 5001 – 10000 ($50-100)	Rs. 10001 - 15000 ($100-150)	Rs. 15001 - 20000 ($150-200)	Any other

Q. 2. In your opinion what should be the maximum number of occupancy per room.

1 Person	2 Persons	3 Persons	4 Persons	Other

Q. 3. Please indicate what is the most feasible form of housing to accommodate the people with low-income.

Multi-storey apartments	Converting slums to houses	Refurbishing Old houses	Developing new towns

Please identify any other:	

Q. 4. Which of the following sources could be the most suitable support for low-income households in their housing needs?

Loan by Govt.	Private Lender	Mortgages through banks	work loan	House Building Finance Corporation of Pakistan (HBFC)	NGOs	Islamic Banking	Community (Committee arrangements)

Please identify any other:	

Q. 5. In your opinion, what percentage of the monthly total income a low income household should spend on household expenses i.e., rent, HBFC's house loan, housing finance instalment or mortgage repayments etc., per month?

0-5%	6-10%	11-15%	16-20%	21-25%	26-30%	35-40%

Q. 6. What percentage of the monthly total income, a low-income household should spend for non-household items related to housing affordability (e.g., traveling cost to work, educational centre and medical facilities, etc.) per month?

0-5%	6-10%	11-15%	16-20%	21-25%	26-30%	31-40%	41-50%

Q. 7. What percentage of total housing expenses (e.g., rent and utility bills etc.) should the State of Pakistan contribute to a low-income household per month?

< 10%	10-15%	16-20%	21-25%	25-30%	35-40%

The Economic Factors of Housing

Given below are the major economic factors also known as housing expenses that affect the housing affordability of a household with low-income. Please rate the following economic factor that may affect a household on a low-income. The importance scale 1 = Not Important At All; 2 = Slightly important; 3 = Moderately important; 4 = Important; 5 = Critically important).

		Not important (1)	Slightly important (2)	Moderately important (3)	Important (4)	Critically important (5)
Q. 8.	Monthly rent in relation to					

		Not important (1)	Slightly important (2)	Moderately important (3)	Important (4)	Critically important (5)
	household income					
Q. 9.	House price (to buy) in relation to household income					
Q. 10.	Travelling cost to your workplace from your home					
Q. 11.	Cost of maintaining (repair etc.) the house					
Q. 12.	Cost of incremental expansion of the house					
Q. 13.	If any of the economic factor(s) of housing affordability has been missed in the list above, please indicate it in the space provided below (use a separate sheet if needed)					

The Social Factors of Housing

Given below are the major social factors (also known as non-housing expenses) of housing affordability. Please rate the following social factors of housing that may affect a household on a low-income. The importance scale 1 = Not Important At All; 2 = Slightly important; 3 = Moderately important; 4 = Important; 5 = Critically important)

		Not important (1)	Slightly important (2)	Moderately important (3)	Important (4)	Critically important (5)
Q. 14.	Location in terms of accessibility to the local shops,					

	education centres, health facilities etc.				
Q. 15.	Accessibility to local transport for work and general commute				
Q. 16.	A place of prayer close to your home				
Q. 17.	Internal privacy (e.g., separate sitting place for male and female guests in the house due to cultural reasons				
Q. 18.	External privacy (no internal view of the house from outside and from the neighbouring houses due to cultural reasons)				
Q. 19.	If any of the social factor(s) of housing affordability has been missed in the list above, please indicate it in the space provided below (use a separate sheet if needed)				

The Environmental Factors of Housing

Given below are the major environmental factors of housing. Please rate the following environmental factors of housing that may affect a household on a low-income. The importance scale 1 = Not Important At All; 2 = Slightly important; 3 = Moderately important; 4 = Important; 5 = Critically important).

		Not important (1)	Slightly important (2)	Moderately important (3)	Important (4)	Critically important (5)
Q. 20.	Durable building Design (suitable to cope with the weather, energy efficient					
Q. 21.	Flexible internal layout and design					
Q. 22.	Management and maintenance system for the housing building (to resolve the issues related to energy, services, cleaning, security, etc.)					
Q. 23.	If any of the environmental factor(s) of housing affordability has been missed in the list above, please indicate it in the space provided below (use a separate sheet if needed)					

Personal Information

Q. 24. Please tick the box of your relevant field of expertise, if missing please indicate in the space given below in this question.

Govt. Officials	Housing Provider, Housing contractor, Developer, Builder, etc.	Housing Consultant, Housing Professional	Private Client (using or have used services of housing professionals) for housing	Sub-contractors (providing labour or any other services for the housing developers etc.)

Any other				

Q. 25. Please indicate below your current job title:

Q. 26. Please indicate below your contact details (optional):

----------------------- ~*Thank you for being part of this research project.*~ --------------------

Please return OR email this questionnaire to the researcher on following address:

Asad Jalal Sindhu

(PGR/PhD Candidate)

✆: <u>a.j.sindhu@2015.ljmu.ac.uk</u>;

personal: Kannan_asad@hotmail.co.uk

✉ : Built Environemnt and Sustainable Technology (BEST) Hub, Henry Cotton Building, 15-

21 Webster Street, Liverpool, L3 2ET, United Kingdom. ☎: +44 07737664167