CONDOMINIUM DWELLERS' HOUSING QUALITY PERCEPTION AND SATISFACTION IN ADDIS ABABA

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My Everlasting Father and Holy Saviour LORD JESUS CHRIST

The Apple of My Eye, Yedawit Zerihun

ABSTRACT

This research assesses Addis Ababa condominium dwellers housing quality perception and satisfaction in in four purposively selected condominium sites. The case study condominium sites were Lideta and Gotera from inner city, and Bole Ayati l and Jemmo ll from urban periphery. It examines condominium quality variation between floors of both inner city and urban periphery condominium sites. We identified 30 housing quality indicators, which were grouped into seven domains. Satisfaction was measured using 11- point Likert Scale. In addition, qualitative analysis was performed to get in-depth insight about sites and floors variability. The 2D GIS and 3D GIS spatial analysis techniques were integrated to statistical analysis to visualize the sites and floors quality variability. The main finding of the study is that the dwellers of condominium are generally satisfied by having a dwelling for their family. There were variation in the level of satisfaction among dwellers depending on whether the condominium is located in inner city or urban periphery, ground floor or top floor. The result show that 54% of the respondents were satisfied, 42% dissatisfied and 4% were neither satisfied nor dissatisfied in the overall condominium quality. The satisfaction variation shows that the majority of inner city condominium sites respondents were satisfied while the majority of urban periphery condominium sites respondents were dissatisfied. On the other hand, the satisfaction and perception for ground floor was slightly higher than other floors as well as negative perception and low preference for top floor. Unaffordability, structure inconvenience for home-based business, absences of children playground, absence of adult recreation centre, absence of elevators and ramp, day and night bar noise and lack of living experience in multi-storey houses were the main contributing factors to dwellers dissatisfaction irrespective of site location and floor level. Inner city condominium sites respondents were satisfied with accessibility domain than the respondents in urban periphery site specifically, Jemmo ll. This study suggests that future condominium sites development should consider social service accessibility, particularly in urban periphery. The condominium project office should also pay attention to improving housing quality, providing different housing finance options, awareness creation on management of shared structure and space to enhance housing satisfaction and fulfilling need and expectation of dwellers and to improve their quality of life.

Keywords: housing satisfaction, housing quality index, condominium, quality of life, inner city, urban periphery, Lideta site, Gotera site, Bole Ayati l site and Jemmo ll site

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1. INTRODUCTION

1.1. Background

A house is defined as a home, shelter, building or structure that is a dwelling or a place for habitation (Samaratunga, 2013, p.35). Beyond its physical condition, the author explained housing as a reflection of a personality, living condition, aspirations and social-cultural identity. The physical condition of house has different typologies depending on the country's context. Housing typologies in Addis Ababa include sheds, villas, row houses, apartments and condominium (Cherenet and Sewnet, 2012).

Condominium, the heart of this study, is a four story building that mix residential and commercial purpose housing units within a building. Condominium has been launched as a pilot project in 2003 and then it became a massive housing program since 2004 in Addis Ababa. Despite, the Condominium Project Office has put an effort to constructing condominiums for low and middle-income group two main problems have become feasible during implementation period. First, numbers of condominium housing units have been very much lower than the demand. Second, its quality fails to satisfy dwellers (Adamu, 2012).

Housing satisfaction and perception has become a subject of interest in many quality of life studies because of its effect on every aspects of life (Ilesanmi, 2012; Lee and Park, 2010; McCrea, Shyy, and Stimson, 2013; Mohit, Ibrahim, and Rashid, 2010; Zainal, Kaur, Ahmad, and Khalili, 2012; Zebardast, 2008). There has been a general implication that research evidence help to improve housing satisfaction and individual's quality of life.

Housing studies assess dwellers housing satisfaction by using objective, subjective or mixed indicators. Objective housing satisfaction indicators are mostly considered physical housing unit characteristics and neighbourhood location characteristics. In this method, housing satisfaction is assessed by collecting secondary socio-economic and spatial data. Subjective housing satisfaction indicators are derived from dwellers perception and evaluation with housing quality. It used primary data source only. Mixed housing satisfaction measurement considers subjective and objective indicators, which derived from primary and secondary data sources. This study follows the later approach; this is because it is necessary to provide better understanding of housing quality.

Capturing individuals housing satisfaction and perception is not as merely as evaluating observable housing condition. According to Inah Sylvester et al. (2014) housing satisfaction goes beyond objective housing quality, it consider how well the house meet the dwellers need and expectation. Dwellers needs and preferences vary depending on housing type, residential location, socioeconomic condition, countries cultural and policy issues. Moreover, previous studies pointed that housing location distance from inner city (e.g. Lovejoy et al., 2010; McCrea et al., 2013) and housing unit distance from the ground floor (e.g. Mukim, Haque, and Moore, 2011) have effect on dwellers' housing satisfaction.

Therefore, this research purposively select Lideta and Gotera condominium sites from inner city and Bole Ayati l and Jemmo ll condominium site from urban periphery to look at location effect on dwellers housing satisfaction and perception. In addition, housing units from ground floor to fourth floor were assessed by using similar housing quality indicators. The motive behind this was identifying housing quality gap and inform decision makers to address the dweller's need and expectation on their planning.

1.2. Justification

Despite housing satisfaction having been frequently studied in the Global South, more attention has been given for housing shortage than housing quality (Ilesanmi, 2012). Similarly, in Addis Ababa housing studies have been focus on quantity and cost aspect (Adane and T/Giorgis, 2012; Addis Ababa Housing Development Project Office, 2005; UN Habitat, 2011). Housing quality is a vital influential factor in housing satisfaction (Cook and Bruin, 1994; Ilesanmi, 2012; Mohit et al., 2010). Therefore, it is rational to emphasis on housing quality to assess the dwellers housing satisfaction and its impact in their quality of life. The research output might inform housing developer, architect and urban planner to consider dwellers' need and preference in future housing project and local development plan.

Secondly, even if there have been a number of efforts to measure housing quality using statistical analysis techniques, the integration with spatial analysis tools is still in its infancy. The integration between statistical analysis and spatial analysis is important for comprehensive understanding of objective and subjective indicators of housing quality satisfaction. Therefore, this study contributes on assessing dwellers' housing perception and satisfaction through integration with statistical analysis and geo-information science.

1.3. Problem Statement

Addis Ababa Housing Project Office managed to construct 175,246 housing units in the past decade; however, reports and blogs criticized its effort concerning failure to meet residents' needs and expectations in quantity and quality aspect. The condominium has pitfall in fulfilling basic infrastructure and social service in some urban periphery sites (Tadele, 2012). In addition, it failed to fully consider dwellers' culture and preference in construction design (Ingwani, Gondo, Gumbo, and Mazhindu, 2010). They further pointed that malfunctioning of water pipe, sanitary system, door and window are exposed dwellers for extra maintenance and replacement costs. Because of poor housing management (Adamu, 2012), lack of skill in utilizing share facilities (Deribie, 2014), its potential risk for young children (Tiumelissan and Pankhurst, 2013) condominium negatively perceived by residents.

On the other side, few studies were focused on condominium contribution for housing stock, job creation and urban renewal (Haregewoin, 2007; UN Habitat, 2011). However, in Addis Ababa no study has explicitly investigated the effect of condominium quality in dwellers' housing satisfaction and its implication on quality of life. Therefore, this research assesses condominium dwellers housing quality satisfaction and perception variability by emphasis housing unit location distance from inner city and distance from ground floor.

1.4. Research Objective

The main objective of this research is to assess Addis Ababa condominium dwellers' housing perception and satisfaction at inner city and urban periphery condominium sites, including vertical variability according to different floors within a building.

The specific objectives

- To examine the variability in housing perception and satisfaction of dwellers' in both inner-city and urban periphery condominium sites
- To examine the variability in housing perception and satisfaction of dwellers' living on different floors of both inner-city and urban periphery condominium sites

- To visualize housing quality variability of both inner city and urban periphery sites by 2D and 3D GIS
- To explore the significance of dwellers' housing perception and satisfaction considerations in housing development

1.5. Research Question

Objective 1: To examine the variability in housing perception and satisfaction of dwellers' in both inner-city and urban periphery condominium sites

- What are the main contributing factors for sites variability?
- Which site dwellers are highly satisfied in relative term?

Objective 2: To examine the variability in housing perception and satisfaction of the dwellers' living on different floors of both inner-city and urban periphery condominium sites

- What are the contributing factors for variability on floors within a building of both inner city and urban periphery condominium?
- Which floor dwellers' are highly satisfied in relative term?

Objective 3: To visualize housing quality variability of both inner city and urban periphery sites by 2D and 3D GIS

- What are the resulting spatial patterns of housing quality variability of both inner city and urban periphery sites in 2D and 3D GIS visualization?
- What is the implication of the resulting 2D and 3D visualization?

Objective 4: To explore the significance of dwellers' housing perception and satisfaction consideration in housing development

- How do dwellers' perceive about condominium housing quality?
- What is the policy implication of dwellers' perception and satisfaction in housing project?

2. REVIEW OF HOUSING SATISFACTION STUDIES

2.1. Quality of Life and Housing Domain

Quality of life (QoL) studies recognized that it is a function of quality of life domains, such as housing, built-up environment, financial and material well-being. Marans and Stimson (2011, p. 4) argue that people living place, housing condition will influence their QoL. Another study by Zebardast (2008) found that housing provision improve individuals quality of life. Despite the fact that housing is a determinant of QoL, housing quality affect the states of QoL and the dwellers' satisfaction. To detect QoL with housing domain (Robert and Stimson, 2011) identified objective, subjective and behavioural indicators. Some of indicators in these categories were residential density as an objective indicator, housing and neighbourhood satisfaction as a subjective indicators and residential mobility as behavioural indicators. Mukim, Haque, and Moore (2011) study shows that satisfaction with neighbourhood also affects residents' life satisfaction. Lee and Park (2010) finding revealed that housing satisfaction was a main determinate of quality of life among temporary resident in the USA. Thus, this research concern was how dwellers housing satisfaction affect the quality of life.

2.2. Neighbourhood Location Preference and Satisfaction

Neighbourhood location in this research context is merely a spatial location of a house in certain neighbourhood whether in inner city or urban periphery. In housing studies housing location is an important element of housing satisfaction (Teck-Hong, 2012). Thus, everyone prefer to live in a location to maximize own utility and residential satisfaction. Lovejoy et al. (2010) define location preference as a function of set of residential (e.g. location of job and social tie) and non-residential factors (e.g. housing type and housing unit space). Sirgy and Cornwell (2014) also explained neighbourhood preference and life satisfaction in terms of social, economic and physical feature of neighbourhood. For instance, good social interaction with neighbours and neighbourhood social tie can determine neighbourhood stability, by implication increase housing satisfaction. Thus, residents prefer a neighbourhood with respect to certain important characteristics that more satisfied them regardless of a specific neighbourhood objective condition (McCrea et al., 2013).

Previous neighbourhood satisfaction studies in Global North held in different urban areas found interesting results. For instance, Lovejoy et al. (2010) found that California residents who reside in traditional neighbourhood had higher level of satisfaction than who reside suburb neighbourhood. Further, they explained that perception of liveliness and diversity was important attributes for a traditional neighbourhood residents while economic homogeneity for a suburban neighbourhood residents. Besides, neighbourhood amenity and safety were equally important for both neighbourhoods. On the contrary, McCrea, Shyy, and Stimson (2013) found that in South East Queensland, Australia residents who live inner city, suburban, outer suburban and coastal had similar levels housing satisfaction across the neighbourhoods. More interestingly, they explained that residents' subjective satisfaction relating to access, nature and community varied little across the neighbourhoods even though the objective condition of these attributes much varied. Another study by Dennis and Rent (1987) in Charlotte, North Carolina show that residents were satisfied in new residential locations even though they scattered in newly developed eight public house project scattered across the city. These was because they were satisfied with new location better housing quality, good neighbour, school accessibility even though the location inaccessibility with public transportation, shopping and jobs. Therefore, the research considered condominium location, as an important determinates of housing satisfaction.

2.3. Building Height Effect on Housing Satisfaction

Various housing studies have been dealt with building height effect by comparing and contrasting row house, low and high-rise building dwellers satisfaction. Gifford (2007) review on the consequences of living high-rise building found that it was less optimal for children and social relations. Similarly, Wilkinson (1999) reviewed that multi-storey dwellers express consistent compliant. Samaratunga (2013) argued that high raise low cost housing structure was not convenient for urban poor to have home-based business. Mukim et al. (2011) found that housing satisfaction decrease that floor level increases. Sungur and Cagdas (2003) claimed that dwelling story level has effect on residents' satisfaction. Based on this review, this research assesses floor level effect on dwellers satisfaction with qualitative and quantitative data.

2.4. Housing Perception and Satisfaction

Perception is a process by which individuals organize and interpret their sensory impressions in order to give meaning to their environment (Dhingra and Dhingra, 2011, p.64). However, individuals' positive or negative perception about their house may or may not reflect objective condition of a house. Studies on housing perception explore on residents' perception of their housing conditions. Kahlmeier, Schindler, Grize, and Braun-Fahrländer (200l) study on residents' perception found that satisfaction with apartment related with their well-being than infrastructure accessibility, suitability and social life. Study by Statistics New Zealand (2013) found that residents' housing perception varied with their age, ownership status and material wellbeing. Another studies by Teck-Hong (2012), Lee and Park (2010), Blake and Darling (2014) found that residents' socio-economic attribute such as income level, marital status, family size, gender and ownership status were important determinants of housing perception.

In housing studies the term housing satisfaction and residential satisfaction used interchangeably. For instance, Ilesanmi (2012) define housing satisfaction as a dwellers satisfaction gain from housing unit satisfaction and neighbourhood satisfaction. Whereas Ibem (2011) define housing satisfaction as satisfaction from housing unit only and residential satisfaction as satisfaction from housing unit plus neighbourhood. In this research context, housing satisfaction means satisfaction with housing unit characteristics and satisfaction with social, physical and spatial characteristics of the site.

Housing satisfaction in view of (Mohit et al., 2010) is an absence of dwellers complaints and matching between desired and actual housing condition. They further explained that in case of mismatch between desired and actual, residents might urged to either revising their need, improve housing condition, or moving to another residential place. This case was feasible in Addis Ababa low income residents (Abebe and Hesselberg, 2013). Samaratunga (2013) emphasised housing adjustment role to maximizing hosing satisfaction and adaptation to minimize housing dissatisfaction. He further explained mode of adjustments such as residential mobility and residential adaptation to reduce cultural and family norms deficit that affect housing satisfaction.

Somehow, level of housing satisfaction is influenced by county development context, urban planning policy and housing policy (Elsinga and Hoekstra, 2005). However, many developing countries residents do not have luxury housing choices due to housing shortage (Inah Sylvester et al., 2014). This problem makes majority of house seekers low preference in available housing option and simply seek a house to live. According to Jansen (2013) low preference and adaptation increase level of satisfaction even though the objective housing condition is poor.

To review Addis Ababa condominium perception and satisfaction a few researches are available regarding dwellers perception. Abebe and Hesselberg (2013) examine the socioeconomic wellbeing of the relocated

people from slum area into condominium and other slum area. They used qualitative analysis to explore respondents' perception. Their finding show that some respondents dislike condominium due to inconvenience for their informal businesses even though they were benefited with improve over their pervious residential place. Tiumelissan and Pankhurst (2013) study present the view of caregiver and children, those living in designated for redevelopment and those already moved into condominium. They assessed respondents view in qualitative and quantitative methods. They found that most respondents considered condominium as potentially risky house for children, elderly people, disabled and pregnant. These findings and local knowledge about condominium motivated the researcher to contribute this body of literature by using qualitative and quantities approaches with integration of spatial analysis tool.

2.5. 2D and 3D GIS Application for Housing Satisfaction Analysis

GIS is an analytical tool to integrate spatial context in wider arena of urban planning. In housing studies as well, it is cable of providing information about spatial distribution of public and private house hot spots, slum area, low and high rise buildings neighbourhood, housing market analysis and housing quality analysis (Olajuyigbe, Osakpolor, and Adegboyega, 2013; Pellenbarg and Steen, 2005). They applied 2D GIS for spatial analysis.

Malumpong and Chen (2014), and Muzzarelli (2012) claimed that 3D GIS more effective in communication result than 2D GIS. Besides, they pointed that map visualization is as important as map contents. However, there is 3D GIS application in urban scale as well as at building scale is limited. There were limited concern for 3D model validity due to accuracy, reality, and representativeness of the real world (Kim, 2005). A few studies for example, Cao and Lu (2012) applied 3D GIS to identified shortest evacuation route from in a floor.

This research aims to apply 3D GIS for condominium quality analysis at neighbourhood level (site) as well as at floor level. The motivation behind applied 3D GIS was to explore its capability and its believe that visualize building analysis in 3D GIS is more appropriate method of visualization than 2D GIS. However, the 3D model output representativeness with real world building was the limitation of this research. Furthermore, in the course of analysis, it was difficult to visualize all site features and building architectural features. Despite these limitations, the main concern, i.e. analysing housing satisfaction variation between floors within a building already addressed.

2.6. Housing Quality Indicators

Quality of any entity has a subjective dimension and having an objective reality (Mukim et al., 2011, p. 4). This study considered sets of housing quality indicators to measure quality of condominium. To select appropriate indicators the condominium technical manual volume lll[1] was used as a reference (Ministry of Urban Development and Construction, 2006). In addition, Based upon literature from various source (see table 2-1) housing quality indicators that affect dwellers housing satisfaction, this research consider thirty housing quality indicators and further groped into seven housing quality domains.

- Structure and space domain: it refers to the structure and space of housing units, construction quality and support features within a building;
- Affordability domain: play a role in dwellers satisfaction as they feel housing cost as a burden (if it is unaffordable) or as an asset (if it is affordable);
- Accessibility domain: affect dwellers satisfaction due to their housing location expending less or high time cost, money cost and service cost to accesses a service

[1] Condominium technical manual volume lll is a manual that contained detail condominium construction

- Utility and service domain: its supply adequacy and service level affect a dwellers satisfaction in various way such as fair cost or extra cost burden to access utility facility or accessing sharing facilities
- Sanitation domain: a service level affect dwellers health and related issue, it perhaps leads to complicated environmental problem
- Neighbourhood attraction: it hinder or maximize dwellers satisfaction with support services in a certain neighbourhood
- Noise and security: affect dwellers satisfaction feeling safe and secure in a certain neighbourhood

Table 2-1 Housing quality indicators in selected studies

Housing Quality Indicators	Studies
Structure and space domain	
Structure quality	Olajuyigbe, Osakpolor, and Adegboyega (2013); Kowaltowski et al. (2006)
Dwelling unit space	Zebardast (2008); Mohit et al. (2010)
Staircase quality	Mohit et al. (2010); Sungur and Cagdas (2003)
Corridor space	Elsinga and Hoekstra (2005);
Room area	Zebardast (2008)
Number of rooms	Elsinga and Hoekstra (2005)
Number of floors of building	Zebardast (2008)
Affordability domain	
Down payment/Mortgage repayment	Teck-Hong (2012); Elsinga and Hoekstra(2005); Kahlmeier et al.(2001)
Rent price	Elsinga and Hoekstra (2005)
Accessibility domain	
Availability of mode of transport	Olajuyigbe et al. (2013); Mohit et al.(2010)
Proximity to work place	Teck-Hong (2012); Mohit et al. (2010)
Proximity to school	Mohit et al. (2010)
Proximity to health centre	Mohit et al. (2010)
Proximity to shopping centre	Mohit et al. (2010)
Utility and service domain	
Water supply	Olajuyigbe et al. (2013); Zebardast (2008)
Electricity supply	Zebardast (2008)
Telephone network connection	Zebardast (2008)
Multipurpose hall	Zebardast (2008); Mohit et al. (2010)
Sanitation domain	Olajuyigbe et al. (2013)
Solid waste disposal	Mohit et al. (2010)
Drainage system functionality	Mohit et al. (2010)
Neighbourhood attraction domain	
View and green area	Olajuyigbe et al. (2013)
Neighbourhood neatness	Olajuyigbe et al. (2013)
Recreational service	Teck-Hong (2012)
Parking lot	Kahlmeier et al. (2001)
Children playground	Kahlmeier et al. (2001)
Noise and security domain	
Noise	Kahlmeier et al. (2001)
Safety and security	Mohit et al. (2010)
Social network	Mohit et al. (2010)

2.7. Conceptual Framework

In this study, three conceptual pillars were developing to link a framework. First, identifying housing quality indicators those have effect on dwellers perception and satisfaction. Then, they were categorized as 30 main housing quality indicators and supportive socioeconomic factors. Even though literatures recognized housing policy and urban planning influence on residents housing perception and satisfaction, this research not critically look at their effect. Secondly, how site characteristics and floor level affect dwellers perception and satisfaction. In the investigation, dwellers satisfaction and perception computed based on place they live. Third, a relationship between housing quality indicators and quality of life became assessed.

The conceptual framework flowchart (Figure 2.1) consists of four components: housing quality indicators, socioeconomic factors, location characteristics and policy issue. The framework suggests that dwellers' housing satisfaction and perception is directly influenced by housing characteristics and site characteristics. It also suggests that dwellers' perception is influenced by their income level, homeownership status, family size, previous residential experience and expectation about current dwelling. Besides, urban planning policy, which determine site location, and housing policy which determine housing features and housing delivery strategies have influence dwellers residential place preference. These relationships were analysed in this study.

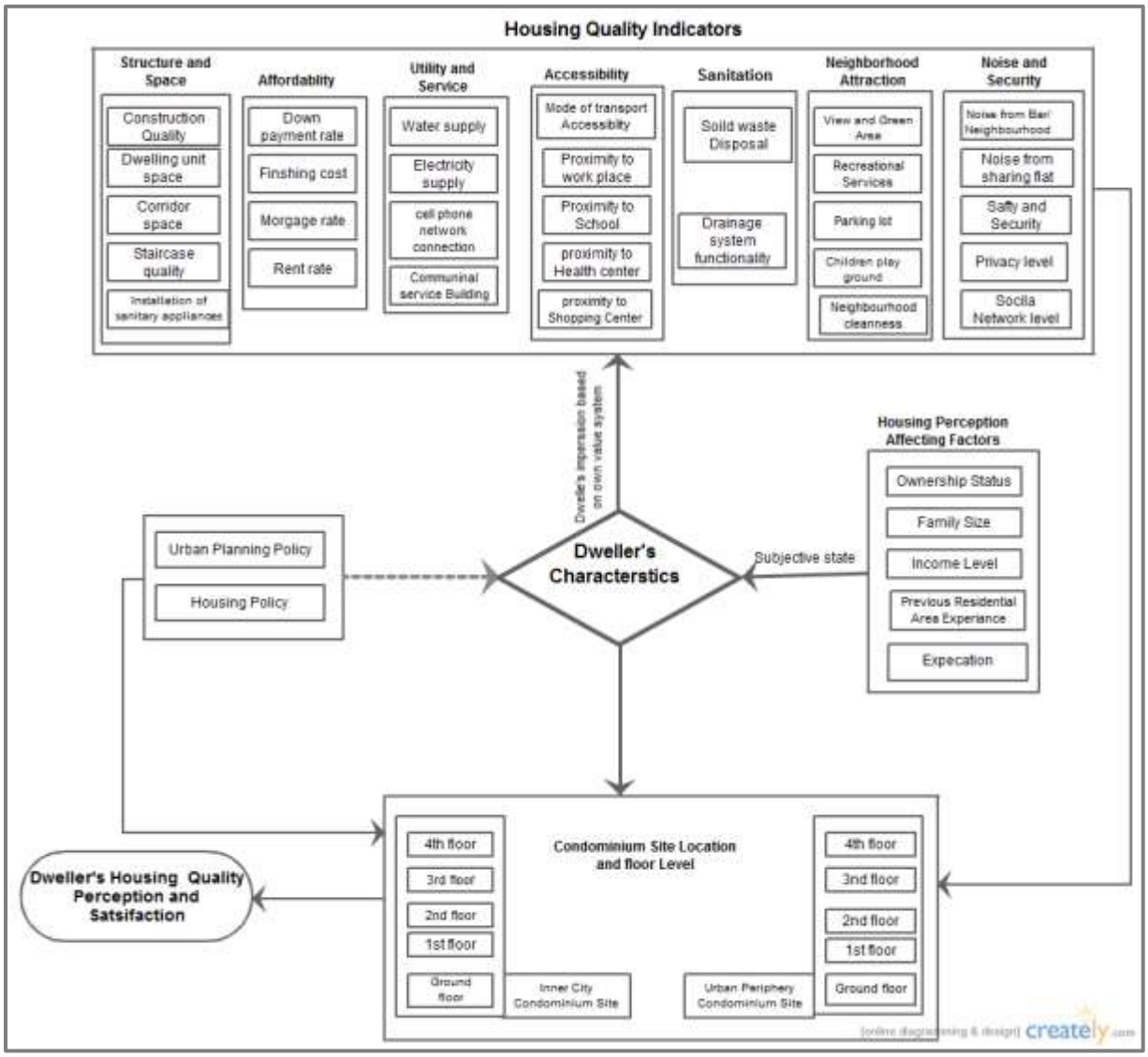

Figure 2.1 The research conceptual framework

3. THE CONTEXT OF STUDY

3.1. Description of Case Study Area

Addis Ababa, the capital city of Ethiopia, was a case study area. The city is located at 90 1' 48" N and 380 44' 24" E, almost at centre of the country. Currently the city accommodates 3.2 million inhabitants within ten sub-cites (Ethiopia Central Statistical Agency, 2013). Every year 90,000 to 120,000 new residents migrate to the city (UN Habitats, 2007). According to Haregewoin (2007), 60,000 housing units per annum needed to accommodate the shortage. The city faced 300,000 housing units accumulated backlog. On the other hand, majority of housing conditions have been substandard and dilapidated (UN Habitats, 2007). These implies that the city has both quality and quantity problems. In response to these, Addis Ababa condominium project launched to improve the housing quality and increase the housing stock. Currently condominiums have been constructed in 140 inner -city and urban periphery condominium sites (Figure 3.1).

The case study was undertaken in two inner city and two urban periphery condominium sites[2]. Lideta and Gotera sites located at inner city while Jemmo II and Bole Ayati I at urban periphery of Addis Ababa (Figure 3.1, Appendix Figure 2, 3, 4 and 5). Lideta site is being constructed by demolishing slum area while Gotera site was open land. Jemmo ll and Bole Ayati l sites were farmland. It is appropriate to assess the housing quality variation in these sites with the intention of considering dwellers needs and expectation in the future condominium development. The sites selection criteria were based on condominium housing units, infrastructure facility, site distance from inner city, previous knowledge about the sites. Addis Ababa Condominium Project database show that 11,353 housing units have been constructed in the case study sites since 2008 (Table 3-1).

Table 3-1 Sampled site condominium housing units

Condominium site	Number of blocks	Number of communal service building	Housing Unit
Lideta	41	Not built	1859
Gotera	78	6	2433
Bole Ayati l	161	28	4501
Jemmo 11	98	17	2560
Total			11,353

Source: Addis Ababa Condominium project office, 2014

3.2. Overview of Addis Ababa Condominium Project3

In response to housing quality and quantity problems, condominium has been launched as a pilot project with initiative of GIZ (German Federal Enterprise for International Cooperation) in 2003. Then Addis Ababa condominium project, which is officially known as Integrated Housing Development Program (IHDP) handover it to scale-up into citywide in 2004. Its main goal is enable low and medium income residents to own decent and affordable condominium (Ministry of Works and Urban Development, 2010). The current approaches to solve the city housing problems were through massive housing construction promote quality of life in the study area.

[2] Site in this research refers to the area for which the condominium blocks have been constructed

[3] Addis Ababa condominium project office, integrated housing development project (IHDP), condominium project office use in this research interchangeably

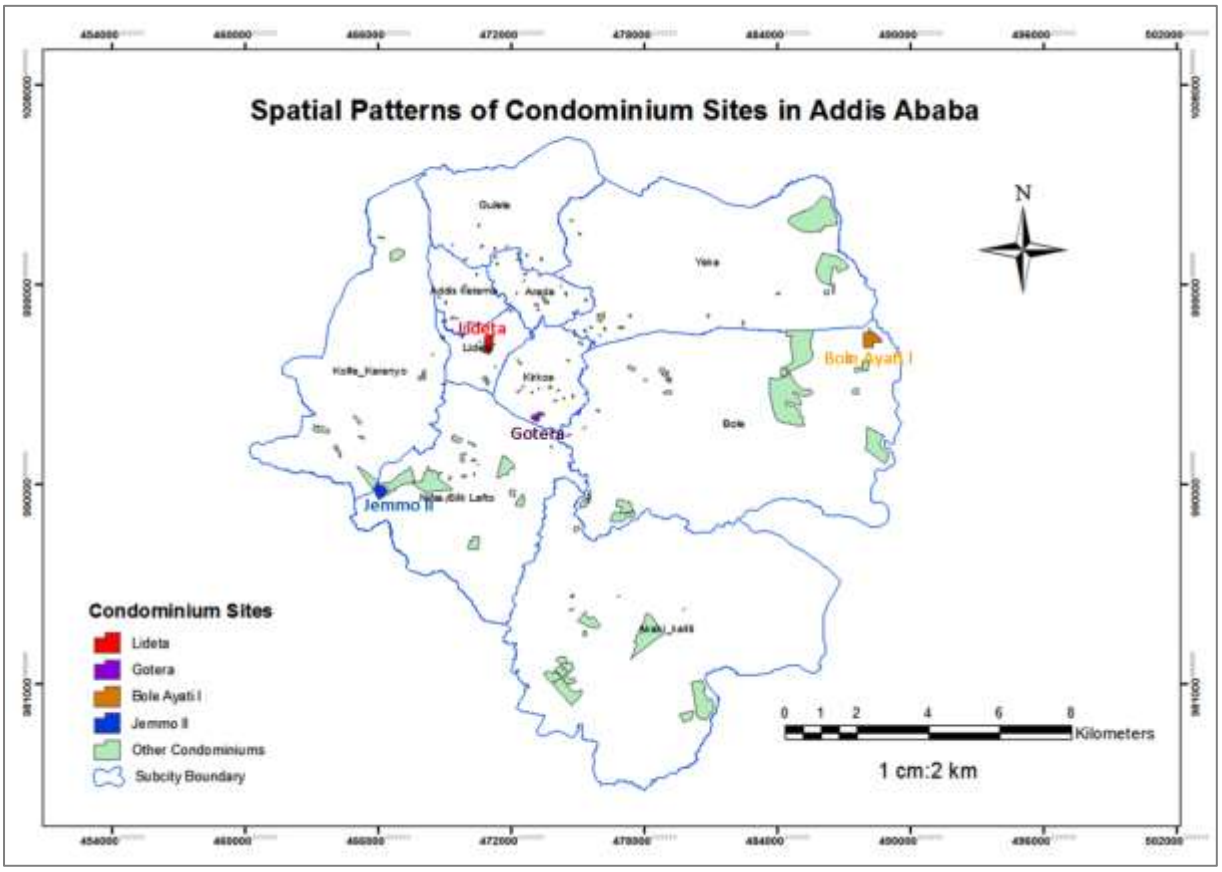

Figure 3.1 Map of Addis Ababa showing the location of condominium sites and four case study sites

Condominium Design

A condominium in Addis Ababa is a four-storey building that mixes private and collective ownership, and mixes purposes (residential and commercial). The owners' share some building structure (e.g. staircases and corridors) and common facilities (e.g. parking lot and communal buildings). Some building ground floor used for commercial purpose. A communal is a one-story building block serve as condominium committee office, multipurpose hall, traditional kitchen and slaughtered house. All case study sites except Lideta have communal service building. A four-story condominium contains 30 to 35 housing units and studio[4], one bedroom, two bedrooms and three bedrooms housing typologies. The housing unit on average have 20 - 69 square meters area. Average housing unit area and housing typology distribution within a site show one-bedroom represent 40% of housing units population in a site (Table 3-2).

Table 3-2 Housing typology distribution

Housing typology	Housing unit area (sq. meter)	Housing typology percentage per site
Studio	20-25	16
One bedroom	30-35	40
Two bedrooms	45 – 55	29
Three bedrooms	60-65	8
Commercial housing unit	To be decided as per the housing typology	7

source: (Ministry of Works and Urban Development, 2010)

4 Studio is a typical housing typology has one room used as a living room, bedroom, kitchen and a small separate bathroom.

Ownership structure and Housing Delivery Strategy

All condominium housing units were given to Addis Ababa city residents who have no private house in the city. With the condition that the units cannot be sold before 5 years but owners can rent house. The reason behind this was securing tenure for low and middle-income residents who cannot afford to buy land and expensive house in the city. Thus, all housing units are privately owned and the Condominium Project Office cannot provide rent housing units for the residents i.e. all the tenants are let house from landlord.

Housing delivery strategy in this research refers to a procedural strategy from registration to owning condominium. The two main housing delivery strategies are without lottery for urban renewal project relocated person and with lottery for eligible residents. The general screening processes of these two groups are:

1) Urban renewal relocated person eligibility criteria to own condominium
    - a legal private homeowner or public house tenant in renewal area
    - willingness to move condominium
    - willing to pay 20% down payment
    - make collateral agreement with Bank
1. Other Homeowner
    - A registered house seeker in office database
    - Won the lottery
    - Confirmation letter city administration who has no house in the city
    - Willing to pay 20% down payment
    - make collateral agreement with Bank

The delivery strategy show of 175,246 housing units until constructed 108,210 housing units have been delivered for new homeowners in nine rounds (Table 3-3). Among eligible house seeker registered in 2005, only 25% won lot, the rest 75% are in waiting list for next round housing lottery. Besides, city residents who missed registration in year 2005 and new city migrate after this year could not participate in lottery. The demand and supply mismatch in Addis Ababa was contributed for high rent price and housing selling price.

Table 3-3 Delivered condominium housing units in nine round

Round	Year	Studio	One bedroom	Two bedrooms	Three bedrooms	Total
1st	2006	4,118	5,677	6,548	2,645	18,988
2nd	2007	2,592	5,070	6,263	1,106	15,031
3rd	2009	2,695	3,679	3,626	735	10,735
4th	2010	2,797	6,755	4,108	1,372	15,032
5th	2010	3,088	4,719	2,028	934	10,769
6th	2011	1,255	4,467	2,747	1,531	10,000
7th	2012	2,952	3,594	433	321	7,300
8th	2013	1,326	4,665	2,952	1,155	10,098
9th	2013	2,570	4,423	2,330	934	10,257
Total		**23,393**	**43,049**	**31,035**	**10,733**	**108,210**

(Source Addis Ababa Housing Project Office, 2014)

Housing Finance

Housing finance is an important element in housing delivery system, homeownership and affordability analysis. Commercial Bank of Ethiopia (CBE) is a main provider of housing finance for project office and eligible homeowner. It provides 80% of housing loan for eligible homeowners who afford to pay 20% of down payment and willing to pay the remaining 80% of housing cost with 9.5% interest rate within 20 years loan period. After loan agreement between new homeowner and Bank, it gives one-year grace period to start monthly down payment. Condominium financing strategy is presented in. Table 3-4. During course of data collection, housing financing strategy was the main concerns for low-income homeowners.

Table 3-4 Condominium financing strategy

	Studio	1 bed room	2 bed room	3 bed room
*Average price per sq. meter	1481.00 Birr	1931.00 Birr	2523.00 Birr	2633.00 Birr
Down payment	20%	20%	20%	20%
Grace period	1 year	1 year	1 year	1 year
Interest rate	9.5%	9.5%	9.5%	9.5%
Average monthly mortgage	450	700	1400	1600
Repayment period	20 years	20 years	20 years	20 years

Source: (Abebe and Hesselberg, 2013)

Note: * the average price per square meter is usually revised by current construction cost

In this chapter, attempt was providing additional information about the study area and overview of the condominium. Specifically, it identified the spatial pattern of the condominium sites, background information about condominium, condominium design, delivery strategy and housing finance strategies. According to Ibem (2011) housing design and provision are influenced partly by external factors such as political, socio-economic and cultural context of where housing scheme operates. It was noted that provide background information on raised issues required for insight how to affect dwellers perception and satisfaction.

4. RESEARCH DESIGN

The fundamental research question of interest was assessing condominium dwellers' housing quality satisfaction and perception. The research has employed comparative research design in four selected case study condominium sites. It has compared inner city and urban periphery condominium sites and compared different floors of both sites using similar housing quality indicators. Then research design flow chart (Figure 4.1) and research matrix (Table 4-1) were developed to show the flow of the research-the stated objectives, the raised questions, the required data to answer the questions and the data analysis methods to produce the results .

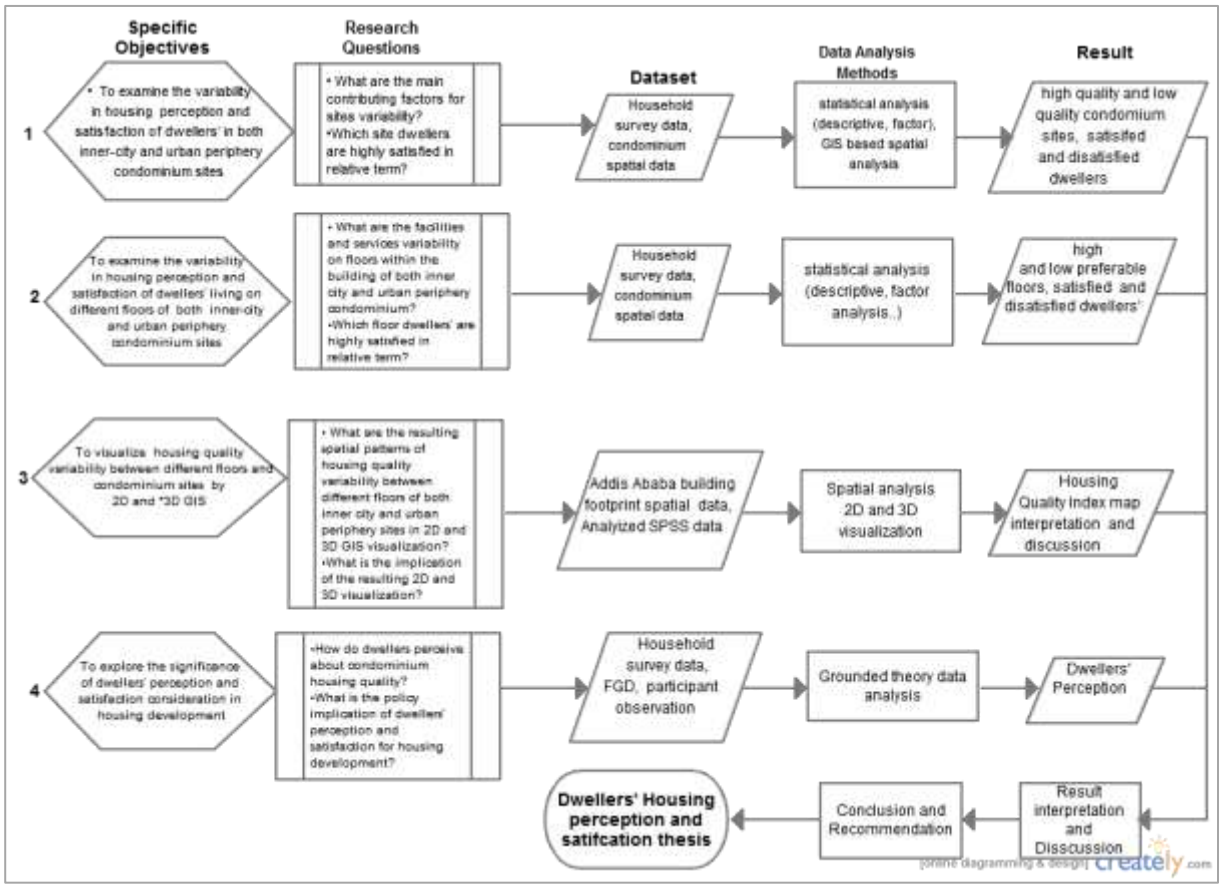

Figure 4.1 Research design flowchart

4.1. Data Type and Data Collection Tecniques

The data was collected from primary and secondary sources. The primary data was collected using household survey, focus group discussion, officials' interview and participant observation. The secondary data was collected from Addis Ababa Condominium Project Office, booklet, brochure and report; from Addis Ababa Land Development and Management Bureau administration and cadastre building shape file. Information from journal articles, books, published and unpublished reports were used to support the discussion. The population of this study was 140 condominium sites and their 108,210 housing units. Of these, sampling frame of the housing units consist of 11,353 in four purposively selected sites Lideta, Gotera, Bole Ayati l and Jemmo ll site (Table 3-1 and Table 3-4). 263 housing units were selected for the analysis. Household survey was conducted to assess the respondents housing satisfaction.

Table 4-1 Research Matrix

Specific objectives	**Research Questions**	**Required data**	**Data processing software**	**Data analysis technique**	**Output**
Objective 1: To examine the variability in housing perception and satisfaction of dwellers' in both inner-city and urban periphery sites	• What are the main contributing factors for sites variability?	Household survey data	SPSS and Excel	Descriptive statistics	•descriptive analysis Tables, bars, radar, lines
				Factor analysis	•factor loading value
	•Which site dwellers are highly satisfied in relative term?	Spatial data Processed SPSS data	Arc Map	Statistical data integration with GIS environment	•Factor analysis map, • Housing quality index map •social service accessibility map
Objective 2: To examine the variability in housing perception and satisfaction of dwellers' living on different floors of both inner-city and urban periphery condominium sites	• What are the facilities and services variability on floors within the building of both inner city and urban periphery condominium?	Household survey data	SPSS and Excel	Descriptive statistics, Factor analysis	•descriptive analysis Tables, charts, graphs •factor loading
	•Which floor dwellers' are highly satisfied in relative term?				
Objective 3: To visualize housing quality variability between different floors and condominium sites by 2D and *3D GIS	• What are the resulting spatial patterns of housing quality variability between different floors of both inner city and urban periphery sites in 2D and 3D GIS visualization?	• road centreline social service Spatial data, • Building footprint spatial data (cadastre data) •Processed SPSS data	Arc Map ArcScene,	• Statistical data integration with GIS environment •calculate housing quality index •2D and 3D visualization	•high and low quality sites •floor quality variability index •housing quality index map
	•What is the implication of the resulting 2D and 3D visualization?	Resulting spatial pattern map, literature, condominium program document		•data interpretation	•interpretation and discussion •conclusion •recommendation
Objective 4: To explore the significance of dwellers' perception and satisfaction for housing development	•How do dwellers perceive about condominium housing quality?	Household survey, FGD, Participant observation			•pictures and testimony •discussion
	•What is the policy implication of dwellers' perception and satisfaction for housing development?	Condominium project document, report literatures		Grounded theory (Qualitative data analysis)	•interpretation and discussion •conclusion •recommendation

During the course of sample size decision, time, resource and data management challenge are an important points. Minimize sampling errors also taken into consideration in sample size. de Vaus (2002) cited in Mukim et al. (2011) recommend that at least 200 sample size is necessary to minimize sampling error up to 7%. Accordingly, a total of 263 households were selected for household survey. Purposive sampling was used to select case study sites. The main reason was selecting best representative of inner and urban periphery sites. Stratified random sampling technique was used to select sample households, building blocks and housing units. Sites' local development plan was used to classify building blocks into strata. From the selected a four-story building block five households' (of one from each floor) were interviewed. For households in the floors, which had no dwellers' during the hour of data collection, a housing unit with the same floor number was selected from the next building. Accordingly, from inner city condominium site, 67 housing units distributed in 14 blocks were sampled from Lideta site. similarly 66 housing units from 13 blocks in Gotera site, 70 housing units from 14 blocks in Bole Ayati l site and 60 housing units from 12 blocks in Jemmo ll sites.

Focus group discussion (FGD) was conducted with three to five condominium committees to collect in-depth qualitative data about the overall site condominium quality in each site. The discussion was taken place in two ways: first discussion on the overall housing domain in open space and then walking across a site to capture evidence on raised condominium conditions.

Data collection was held from September 29 to October 21, 2014 in Addis Ababa. During this phase, all possible tasks and procedures of data collection was implemented. In the first week, the researcher contacted concerned government officials and informed about the research purpose to establish contact person to conduct interview and to collect relevant secondary data. This followed by visiting case study condominium sites and hiring four research assistants for household survey.

Originally, the questionnaire was written in English and translated to Amharic to smooth data collection. Before collecting the actual data, a pilot data was collected for testing the questionnaire on the site. To increase a likelihood of respondents' presence all interviews were made between the hour 4:30 pm and 8:30 pm on weekdays and 10:30 am to 6:30 pm in weekends. Every day collected data was cleaned and checked. At meanwhile, the focus group discussions and secondary data was collected.

Qualitative and quantitative data were collected for the research. Structured questionnaire was prepared for household survey and it includes both qualitative and quantitative data type. It comprised three sections: the first section sought to obtain information socioeconomic characteristics of respondents; it has categorical type of quantitative data. The second section includes seven housing quality domains: structure and space, affordability, utility and service, accessibility, sanitation, neighbourhood attraction, noise and security. All domains encompass two to five housing quality indicators. It has Likert scale type of quantitative data. The third section is qualitative open-end questions to elicited respondents perception on overall housing condition.

Scherpenzeel and Saris (1993) cited in Beuningen and Moonen (2014, p. 5) recommended 11-point Likert scale for satisfaction measurement by considering satisfaction scale sensitivity. Accordingly, this research adopt 11-point Likert scale aims to give wide range of selection options for dwellers' to estimate their satisfaction level. Davern and Chen (2010); Rezvani et al. (2012) also used 11-point Likert scale in their research to measure satisfaction. In this research, respondents were requested to tell their level of satisfaction from 0-10 scale. '0' standing for extremely dissatisfied and '10' standing for extremely satisfied.

Semi-structures qualitative questionnaire was prepared for focus group discussion and officials' interview. It was open-end type and content focused on overall housing quality domains, condominium contribution for quality of life and suggestion for future housing development (see Appendix 3 and 4).

Spatial data was one of the required data for analysis. Accordingly, Addis Ababa city administration, all condominium sites, road centreline, school, health and market centre spatial data were collected for 2D GIS analysis. Building spatial data was used for 3D GIS spatial analysis.

4.2. Data Analysis

The coded household survey data was SPSS 22 for statistical analysis. All household survey data was cleaned for the analysis. It also transformed and export to Table and dbf format for further analysis in Excel and ArcGIS. Photos and respondents reflection were also coded for qualitative data analysis. A combination of qualitative and quantitative techniques including statistical analysis, photos and maps illustration and participant viewpoints were used. Analysed data with both techniques of has been further supported by literatures to made argumentation.

4.2.1. Data Verification by Factor Analysis

Factor analysis was computed to verify sample adequacy, significance test to verify theory based housing domain classification suitability for index calculation. It was also helpful to uncover strong indicators for dwellers' satisfaction level during data aggregation of index computation. According to Rezvani et al. (2012) and Tesfazghi, Martinez, and Verplanke (2010), prior to data analysis data verification and suitability of data was performed. Prior to extraction, Varimax with Kaiser Normalization rotation method and Bartlett's Test measure were applied to test sample size adequacy and significance test. Sampling adequacy and significant level test value have been tested with > 0.6 and < 0.05 respectively. Principal Component Analysis (PCA) method data was to extract data. Seven factors were fixed to extract 30 housing quality indicators. Seven factors was fixed because of verify whether theory based seven housing quality domains were best suited or not. Then Eigen values greater than one and loading value grater that 0.5 considered for result presentation and interpretation.

4.2.2. Housing Quality Index Measurement

The study selected 30 main housing quality indicators to construct housing quality index. The housing quality indicators were grouped into seven housing quality domains for sub index computation as follows:
(1) *Structure and space domain*: It include structure quality, dwelling unit size, installation of sanitary appliances, corridor space and staircase quality indicators.
(2) *Affordability domain*: include down payment, finishing cost, mortgage cost and rent cost indicators
(3) *Utility and service domain:* It includes water supply, electricity supply, cell phone network connection and communal service building indicators.
(4) *Accessibility domain*: It includes mode of transport availability, proximity to working place, school, health centre and shopping centre.
(5) *Sanitation domain:* It includes solid waste disposal and drainage system indicators
(6) *Neighbourhood attraction domain:* It includes green area, parking lot; children play ground, adult recreation centre and neighbourhood cleanness indicators
(7) *Noise and security domain:* It includes absence of bar noise, absence of sharing flat noise, feeling safe and secure, privacy level and social network indicators.

To construct the final housing quality index a number of procedures were done. Firstly, indicators were derived from respondents' scores. Secondly, seven domain sub-indices were constructed aggregating separate indicators. Finally, housing quality index (HQI) was constructing all housing domains sub-indices.

Accordingly, housing domain sub-indices and final housing quality index were calculated following equation 1 and 2.

Housing Quality Domain Sub-Index

Housing quality domain sub-index in this research indicate that a specific domain of those seven housing quality domains. It can be measured by using the following equations adapted from (Mohit et al., 2010).

$$\boldsymbol{HQSIdx = \frac{\sum_{i=1}^{N} yi}{\sum_{i=1}^{N} Yi} \times 10} \quad (1)$$

Where *HQSId* is the housing quality domain sub-index of a respondent with a domain *x,* of the condominium quality*, N* is the number of indicators being scaled under domain *x*, yi is the actual score by a respondent on the *ith* indicator and *Yi* is the maximum possible score that *i* could have on the scale used. *(For instance at 0 to 10 point Likert scale HQSIdx* may has less than or equal *to 10).*

Housing Quality Index (HQI)

Housing Quality Index (HQI) is calculated based on a dweller's score on housing quality domains sub-indices. Domains are structure and space, affordability, utility and service, accessibility, sanitation, neighbourhood attraction and noise and security. HIS is derived from domain indices. Mathematical calculation:

$$\boldsymbol{HQI = \frac{\sum_{i=1}^{N1} ssi + \sum_{i=1}^{N2} afi + \sum_{i=1}^{N3} usi + \sum_{i=1}^{N4} aci + \sum_{i=1}^{N5} sai + \sum_{i=1}^{N6} nai + \sum_{i=1}^{N7} ns\,i}{\sum_{i=1}^{N1} SSi + \sum_{i=1}^{N2} AFi + \sum_{i=1}^{N3} USi + \sum_{i=1}^{N4} ACi + \sum_{i=1}^{N5} SAi + \sum_{i=1}^{N6} NAi + \sum_{i=1}^{N7} NSi} \times 10} \quad (2)$$

Where *HQI* is housing quality index of respondent with condominium quality*; N1, N2, N3, N4, N5, N6* and *N7* are number of variables selected for scaling under each domain of housing quality, while *ssi, afi, usi, aci, sai, nai and nsi* represent the actual score of a dweller on the *ith* indicators in the domains. *SSi, AFi, USi, ACi, SAi, NAi and NSi* are the maximum score for the *ith* indicators in the structure and space, affordability utility and service, accessibility, sanitation h neighbourhood attractiveness, and noise and security domains respectively.

4.2.3. Housing Satisfaction Percentage Measurement

Dwellers' satisfaction percentage was derived from the Likert scale 0 to 10. Then dweller's score for each housing quality indicator index less than 5 was interpreted as dissatisfied, score equal to 5 was interpreted as neither dissatisfied nor satisfied and score greater than 5 was interpreted as satisfied based on the method adapted from (Inah Sylvester et al., 2014).

The site and floor indices as well as satisfaction percentage are presented in Table and chart format. To support statistical data, pictures and dweller's reflection were included in the results section.

4.2.4. Floor Variation Measurement

To measure floor variation index value the researcher used the above index equations and satisfaction interpretation (section 4.5.2 and 4.5.3). The only difference in methodology was disaggregating the main dataset into four sites and disaggregates each site dataset in to ground floor, 1st floor, 2nd floor, 3rd floor and 4th floor. This was done because of the need achieve research objective 2 and further for 3D spatial analysis.

4.2.5. Spatial Interpolation Techniques in 2D and 3D Model

Mapping helps to visualize social service accessibility variation between sites. In addition, it provides supportive information to subjective accessibility analysis that described in earlier section. The 2D model was applied to assess the sites proximity for health centre, school and market centre. To compute proximity analysis, we applied multi-ring buffer technique; we constructed buffer rings by 500-meter distance range to the nearest service centres within 3000-meter radius. The reason of selecting this technique was the acquired spatial data quality could not allow performing network analysis and service potential. Consequently, we considered only public health care centre, public school and medium to large market centre. It was necessary to excluding private health care centres and schools from analysis due to they were unaffordability for the majority of condominium dwellers.

The 3D model was mapped from condominium buildings cadastral data. The 3D visualization has undergone number of working processes: 1st, retrieved case study sites from all condominium sites shapefile. 2nd, clip buildings within a boundary of case study condominium sites. 3rd, selecting condominium building footprint. 4th, assigned unique ID for each condominium buildings. 5th, assigned estimated average height for residential and communal service building. 6th, in 3D analyst GIS extension (ArcScene) create 3D feature, paste building layers for each floor, 7th , join building attribute Table with household survey data as of floor and site. 8th extrude and offset the base height. Finally visualize 3D HQI of each floor layer as of the site. The summery of all of the above workflows are presented in the Figure 4.1 methodology flowchart.

In setting up 3D GIS spatial tool the question of how to develop a representation of condominium blocks, floors and its domains were addressed. Accordingly, for spatial interpolated we used neighboring Voronoi[5] (Thiessen) polygons technique. It was used by Olajuyigbe et al. (2013) to predict housing quality perception. Above all we assumed that there would have housing quality variation within a site in terms of utility and service availability, sanitation, neighbourhood attractiveness, noise and security domains and somehow with structural and space domains. The later components variation within a site was mostly a structural quality variation due to contractor or subcontractor capacity, dwelling unit area variation in the same housing typology and interior design (e.g. 1 bedroom unit area and interior design). On the other hand, we assume that all buildings within a site have similarity in social service facility. Therefore, proximity analysis of 2D maps of school, health centre and shopping centre were produced in site scale instead of blocks scale.

[5] Neighboring Voronoi is used to divide the site covered by the sampled building into Thiessen or proximal blocks

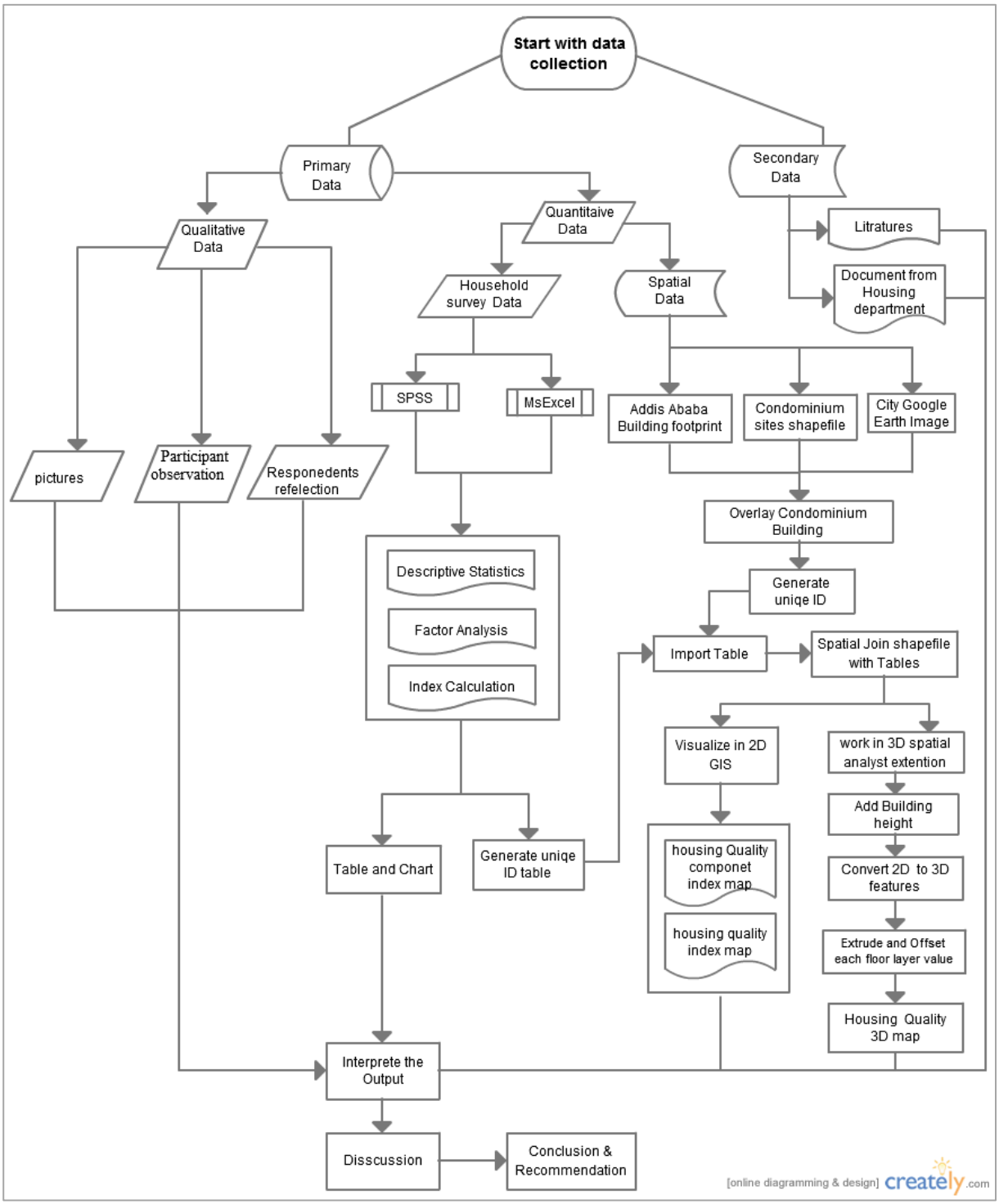

Figure 4.2 Research methodology flowchart

5. RESULTS

5.1. Respondents' Socioeconomic Characteristics

The sample consists of 263 respondents drawn from 263 housing units in four condominium sites. Of these 68.4% of respondents were females and 31.6% were males. The higher percentage of female respondents in the sample may be a reflection of the project office affirmative action[6] for females to own condominium. Their family characteristics show that majority (60.8%) of respondents have 3 to 5 family members. Previous study by Mohit et al. (2010) found that if the family size increase the housing satisfaction become decrease.

5.1.1. Crowdedness

The research considers these variables relationship to assess housing crowdedness. The result indicate that the majority of respondent who have 3 to 5 family size live in one bedroom (Figure 5.1). UN Habitat (2009) define overcrowding as low number of square meters per person and more than three persons share one room. According to Cook and Bruin (1994) if more than one person share a room, it is an indicator of overcrowding. Average area of one bedroom housing typology is 30-35 square meter containing living room, bedroom, kitchen, bathroom and toilet (Table 3-2). If the family size exceeds three in one bedroom, housing typology children could not have private room for study and sleep. It is clear indication of majority of respondents live in overcrowded housing unit. Studies show that crowdedness is an sign of poor housing quality (Cook and Bruin, 1994) and bad objective quality of life (Berhe, Martinez, and Verplanke, 2013). It has also negative effect for housing satisfaction and health (Kahlmeier et al., 2001). According to Lee and Park (2010) family size is negatively related with housing satisfaction. If number of rooms and dwelling unit size are small, it significantly affects housing satisfaction.

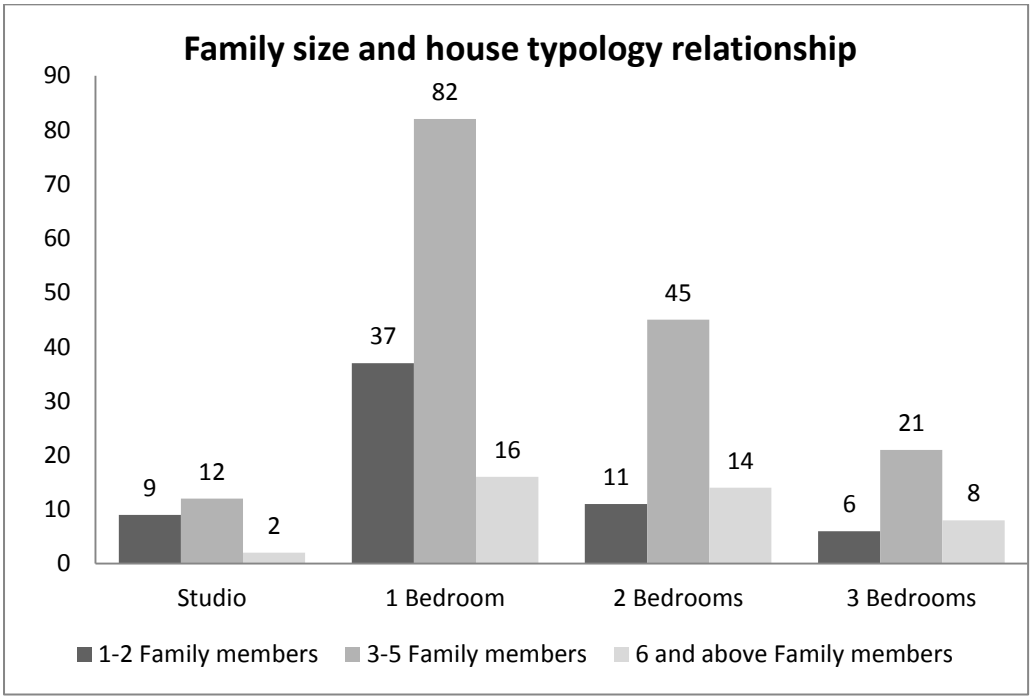

Figure 5.1 Respondents family size and housing typology relationship

[6]Addis Ababa condominium project office grant 30% of the lottery for female as an affirmative action to favour them to own condominium

5.1.2. Ownership Status

In Jemmo ll and Bole Ayati l condominium sites, more than 50% of respondents were homeowners while in Lideta and Gotera sites (inner city) more than 50% of respondents were tenants (Figure 5.2). One of the condominium project objectives was to provide houses for residents who have no houses in the city. However, the sample result shows majority of homeowners let their houses. The contribution of homeownership for housing satisfaction is further explained in section 5.3.4

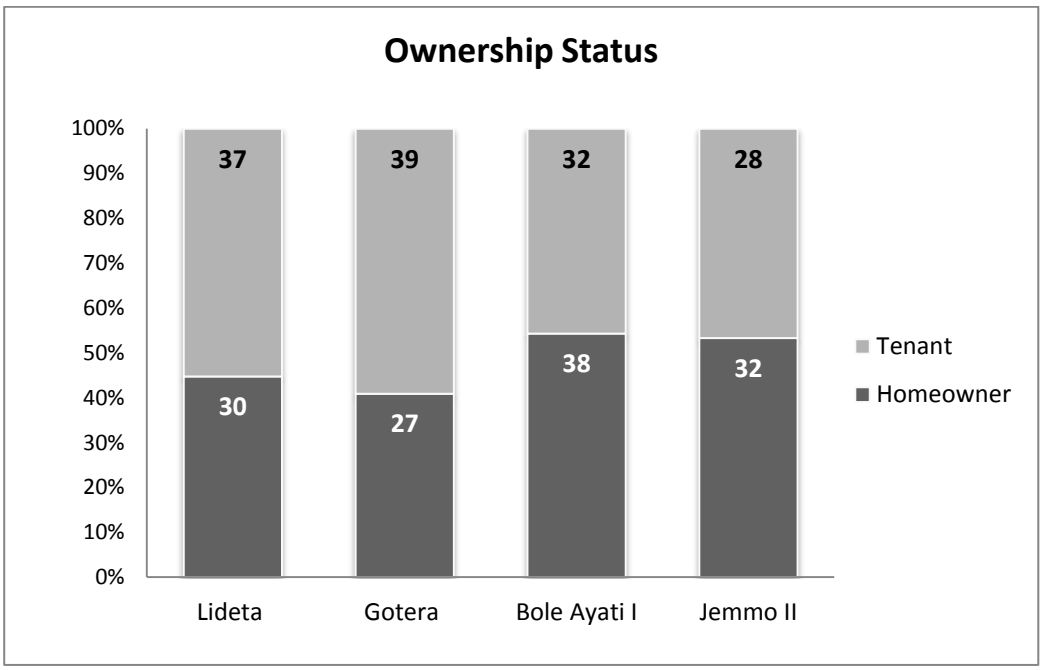

Figure 5.2 Ownership status in sampled condominium sites

5.1.3. Housing Cost

In this research, respondents were not asked specifically their income level. Instead, we asked about the share of housing cost of their income. Housing cost in this study context refer to a share of income spent as rent or mortgage repayment. The result reveals that majority (60%) of tenants and homeowners spend more than 30% of their income for housing rent and mortgage. In the extreme 12.6% of homeowners were unable to repay their mortgage and it paid by their children (Figure 5.3). According to Cook and Bruin (1994) if the housing cost exceed 30% of income it is considered as burden for residents. Another study by Elsinga and Hoekstra (2005) show that housing cost has significant influence on lowering housing satisfaction. UN Habitat (2009) define affordable house, as housing cost do not take up a high portion in their income. The finding implies that condominium was expensive house for majority of dwellers. It also indicated that high housing cost was main contributing factor for low affordability index and dissatisfaction that explained in section 5.3. and section 6.1.3.

The overall implication of exploring respondents socioeconomic characteristics, specifically, family size, housing typology, ownership status and housing cost have an effect on variation in perception of housing satisfaction. Above, it is expected that housing satisfaction and quality of life of dwellers can be related to respondents' characteristics.

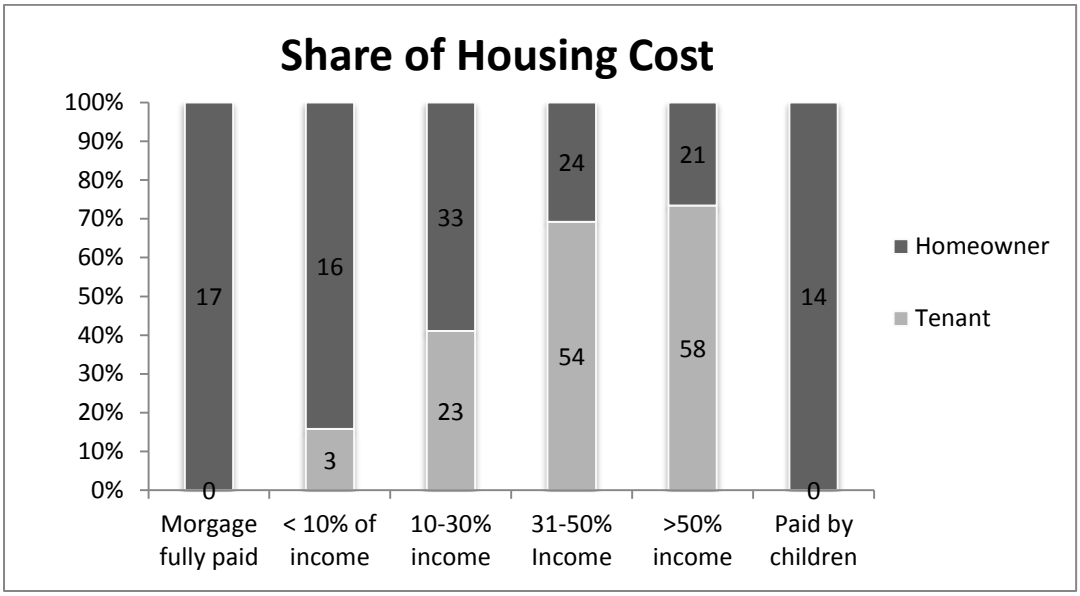

Figure 5.3 Share of housing cost

5.2. Factor Analysis

In this analysis, the values were 0.792 and 0.000, these confirmed that samples were adequate to analysis and variance was significant. Eigenvalues ≥1 and loading value >0.5 were applied to extract factors. According to Zebardast (2008, p. 318) communality is the sum of the square of the factor loadings which indicates the proportion of the variance for each variable accounted for by the seven factors. Thus, the communinality values in principal component analysis were greater than 0.45 (Table 3-2), which indicated that the extracted factors represent the housing indicators well. The result revealed that the extracted seven factors explained 61.29% of the housing quality indicators. Among them, factor 1 explained for 24.86% of variance in housing satisfaction across 263 respondents while the remaining six factors explained 36.43% of sampled variance. Factors are interpreted as housing quality domains as follows:

Factor 1: this factor can be interpreted as accessibility domains. It includes five indicators (Mode of transport availability, Proximity to health centre, school, shopping centre and work place) with loading value range from 0.68 to 0.86. All indicators are positively correlated with the factor and explained 24.86% of variance. This indicated that higher the loading value, the more site accessible for dwellers. By implication highly contributed for dwellers housing satisfaction.

Factor 2: Indicators in factor 2 include sanitary appliance installation, green area, parking lot, neighbourhood cleanness and drainage system indicators. They are combination of sanitation and neighbourhood attraction domains. This may be statistical interaction of the indicators common characteristics explains neighbourhood condition. Positively correlated loading values imply they positively contributed for housing satisfaction.

Factor 3: it include dwelling unit space, corridor space, staircase quality, it could be interpreted as structural and space domains. All of indicators loading value range from 0.58 to 0.73 are positively correlated. It can indicate that high structural quality and the sufficient dwelling unit space highly contributed for housing quality satisfaction.

Table 5-1 Factor loading matrix

	Factor							
Indicator	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**Communalities**
Proximity to health centre	.87							.84
Proximity to public school	.86							.82
Proximity to shopping Centre	.76							.63
Proximity to work place	.73							.67
Mode of transport availability	.68							.57
Green area		.68						.60
Sanitary appliance installation		.68						.63
Parking lot		.63						.52
Neighbourhood cleanness		.60						.64
Drainage system		.58						.56
Solid waste disposal								.49
Dwelling unit space			.73					.64
Corridor space			.70					.59
Staircase quality			.63					.56
Structural quality			.58					.48
Cell phone network			.58					.55
Social network				.76				.68
Privacy level				.60				.55
Feeling safe and secure				.60				.45
Absence of sharing flat noise					.72			.59
Absence of bar noise					.70			.53
Communal service building								.66
Water supply						.82		.72
Electricity supply						.66		.62
Children playground							.85	.73
Recreation service							.62	.60
Eigenvalue	6.46	2.5	1.75	1.54	1.44	1.22	1.03	
% Explained variance	24.86	9.61	6.72	5.93	5.53	4.67	3.96	
% Total explained variance	61.29							

Extraction Method: Principal Domain Analysis

Rotation Method: Varimax with Kaiser Normalization.[a]

a. Rotation converged in 8 iterations.

Factor 4: it related with safety and security domains. The loading value of social network 0.76, privacy level 0.6 and feeling safe and secure 0.6. Positive value implies that they influence dwellers to reside in the site positively.

Factor 5: we can call as noise level. It includes indicators of absence of noise from sharing flat and bar. The positive correlation suggests that, the higher the loading value, the higher dwellers preference for quiet block and site.

Factor 6: we can be interpreted as utility factor, include water supply with loading value 0.82 and electric supply with 0.66. This loading value shows their supply sufficiency contribution to maximize housing satisfaction.

Factor 7: represent neighbourhood attraction. It encompasses children playground and recreation service indicators with 0.85 and 0.62 loading value respectively. This may indicate if the site may have these facilities, the probability of a dwellers satisfaction would be higher.

5.3. Factors Affecting Housing Quality Satisfaction and Perception

5.3.1. Variation in Housing Quality Index Dwellers Living in Different Sites

As the survey was administered in four different condominium sites in Addis Ababa, it was a research question to answer if there were housing quality variation between sites. The overall sampled sites HQI was 5.62. The HQI variability between Lideta, Gotera, Bole Ayati l and Jemmo ll sites was 6.23, 6.16, 5.14 and 4.48 respectively (Table 5-2). When we look at respondents' response variation between sites, the standard deviation (SD) and frequency distribution Table present large variation (see Appendix Table 1, 2, and 3). The SD of Lideta, Gotera, Bole Ayati l and Jemmo ll were 2.7, 2.9, 3.0 and 2.6 respectively. This tells us in all sampled sites there was responses heterogeneity. Figure 5.4 also illustrates housing quality domains (structure and space, utility, accessibility, affordability, sanitation, neighbourhood attraction, noise and security) indices variability between the sites. It suggests that all sites were varied in housing satisfaction domains as well.

Lideta Site Housing Quality Index Statistical analysis shows that Lideta HQI was the highest score compared to other sites. The site has relatively higher domain indices with sanitation (8.03), structure and space (7.08) while lower with utility and service (4.21), and neighbourhood attraction (4.99). In terms of indicators, the site had greater indices variance range from 0.65 with communal building to 8.84 with level of privacy. The highest index was registered in room space sufficiency, staircase quality, drainage system functionality, solid waste disposal, green area, neighbourhood cleanliness, parking lot and privacy level (Table 5-3). This implies that even though the site has higher HQI than other sites it does not mean higher score in all indicator and domain indices.

Gotera Site Housing Quality Index: Gotera site HQI follow Lideta site. The domain index analysis show the site 8.16 and 6.21 with accessibility domain and utility and service domain respectively (Table 5-2). The domains indices were slightly higher than other sites. Affordability domain sub- index 6.4 does not mean majority of respondents satisfied in it. The percentage of satisfied respondent analysis shows only 40% of respondents were satisfied with accessibility domain (Figure 5.6). This could be high satisfaction variation between homeowner and tenants. The domain encompasses indicators related to tenants and homeowners. In other words, tenants were dominant in the site and their score had more weight than homeowners did. In addition, it scored highest indices with mode of transport availability, proximity to workplace, children school, health centre and shopping centre than other sites. Similar to other sites, rent cost, communal service building, children playground adult recreation centre indicators scores were very low. This suggests that despite Lideta and Gotera are located in inner city condominium they had difference in site characteristics. The point here, it is difficult to treat all inner condominium sites as similar in addressing the quality problem in the site. This suggests the need to identify their unique characteristic and respond to it.

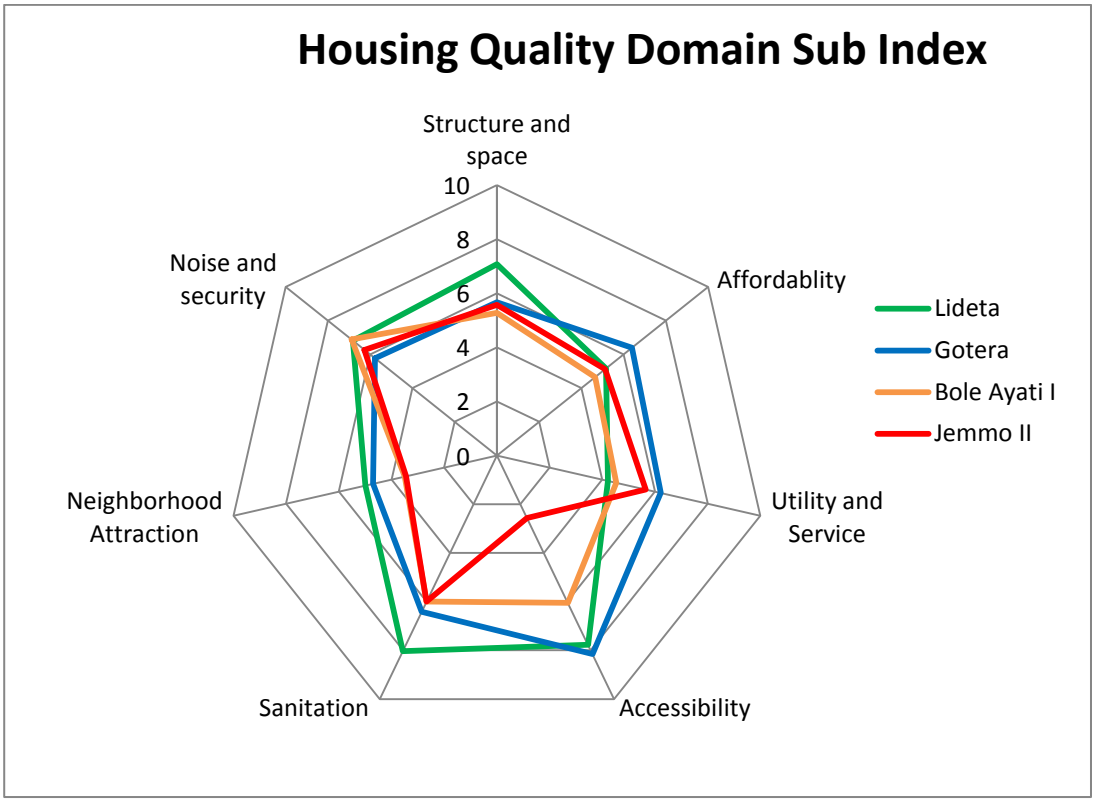

Figure 5.4 Housing quality domain sub index in sampled sites

Bole Ayati l Site Housing Quality Index: Bole Ayati l site had third place in HQI. The domains indices result show sanitation, accessibility, space and structure had slightly higher than 5 while neighbourhood attraction, affordability, utility and service below 5 (Table 5-2). More specifically in terms of quality indicators indices of 30 housing quality indicators, almost half scored below 5. For instance, sanitary appliance installation, corridor space, finishing cost and electricity supply indices were lowest compared to other sites. The respondents score implies that almost half of housing indicators needs improvement.

Jemmo ll Site Housing Quality Index: Jemmo ll site had the least HQI with 4.48. The major contributing housing quality domains for lowest index were accessibility (2.56) and neighbourhood attraction (3.45). Similar to Bole Ayati 1 site, half of the quality indicators indices were below 5. Particularly, proximity to health centre and children school indices value were extremely low 0.08 and 0.67 respectively. Adult recreation centre index was also 1.07. This suggests that the site had critical quality problems. Water supply was the only indicator with a score of 8.00 (Table 5-2).

5.3.2. Variation in Housing Quality Satisfaction Dwellers Living in Different Sites

The overall satisfaction percentage result revealed that 54% of the respondents were satisfied, 42% dissatisfied and the rest 4% were neither satisfied nor dissatisfied. However, when we disaggregate respondents' responses per site, we have seen variations between sites. The percentage of satisfied respondents in Lideta 61%, Gotera 63.5%, Bole Ayati l 48.6% and Jemmo ll 42.6% (Figure 5.5). The result also suggest that in inner city majority of respondents satisfied in housing quality while in urban periphery majority dissatisfied. This suggests that inner city condominium dwellers were more advantageous than urban periphery. The finding was in line with previous finding (Ingwani et al., 2010)

Table 5-2 Housing quality indices

	Housing Quality Indicators	Inner City		Urban periphery		Overall
		Lideta	Gotera	Bole Ayati I	Jemmo II	Index
1	Structural quality	5.97	5.63	5.23	5.23	
2	Room Space	7.32	5.15	5.53	6.53	
3	Sanitary Appliances Installation	7.26	5.46	4.5	4.75	
4	Corridor Space	6.84	5.71	4.57	6.11	
5	Staircase Quality	8	6.38	6.58	5.26	
	Structure and Space Domain	**7.08**	**5.67**	**5.28**	**5.58**	**5.9**
1	Dawn Payment	6.57	7.94	5.48	6.21	
2	Finishing Cost	5.64	5.88	4.09	4.11	
3	Mortgage Repayment	5.43	7.69	5.17	7.11	
4	Rent Cost	3	4.08	3.87	3.06	
Affordability Domain		**5.16**	**6.4**	**4.65**	**5.12**	**5.33**
1	Water Supply	3.16	8.9	4.48	8.00	
2	Electricity Supply	5.9	8.05	4.96	6.47	
3	Cell Phone Network Connection	7.13	6.66	6.2	5.09	
4	Communal Service Building	0.65	1.25	2.49	3.03	
Utility and Service Domain		**4.21**	**6.21**	**4.53**	**5.65**	**5.15**
1	Mode of Transport Availability	7.26	8.18	7.64	4.09	
2	Proximity to Workplace	7.9	8.37	5.61	4.68	
3	Proximity to School	8.42	7.79	6.64	0.67	
4	Proximity to Health Centre	8.13	8.47	5.02	0.08	
5	Proximity to Shopping Centre	7.19	7.98	5.37	3.31	
Accessibility Domain		**7.77**	**8.16**	**6.05**	**2.56**	**6.14**
1	Solid Waste Disposal	8.29	5.6	5.46	6.83	
2	Drainage System Functionality	7.77	7.24	6.54	5.17	
Sanitation Domain		**8.03**	**6.42**	**6.00**	**6.00**	**6.61**
1	Green Area	7.48	6.02	4.33	4.29	
2	Parking Lot	7.77	5.88	4.61	5.51	
3	Children Playground	1.23	1.49	1.48	1.62	
4	Adult Recreation Centre	2.03	4	1.7	1.09	
5	Neighbourhood Cleanliness	6.45	6.1	5.37	4.72	
Neighbourhood Attraction Domain		**4.99**	**4.47**	**3.50**	**3.45**	**4.10**
1	Absence of Bar Noise	7.29	5.15	6.42	5.97	
2	Absence of Sharing Flat Noise	6.1	5.36	5.4	4.56	
3	Feeling Safe and Secure	5.61	5.49	7.44	6.5	
4	Privacy Level	8.84	7.8	7.57	7.53	
5	Social Network	6.24	5.05	7.56	6.78	
Noise and Security Domain		**6.82**	**5.77**	**6.88**	**6.27**	**6.44**
Housing Quality Index (HQI)		**6.23**	**6.16**	**5.24**	**4.84**	**5.62**

Note: red colour indicate index value below 5 in 0 -10 point Likert scale

In terms of housing quality domains, all sites respondents were satisfied with sanitation, noise and security domains and they were dissatisfied with affordability and neighbourhood attraction (Figure 5.6). For both inner and urban periphery site the most important attribute for housing satisfaction were structure and space, accessibility and affordability domains. Accessibility domain was relatively higher in inner city than urban periphery condominium sites. This finding corroborates the findings of previous studies (Ingwani et al., 2010; Dennis and Rent, 1987).

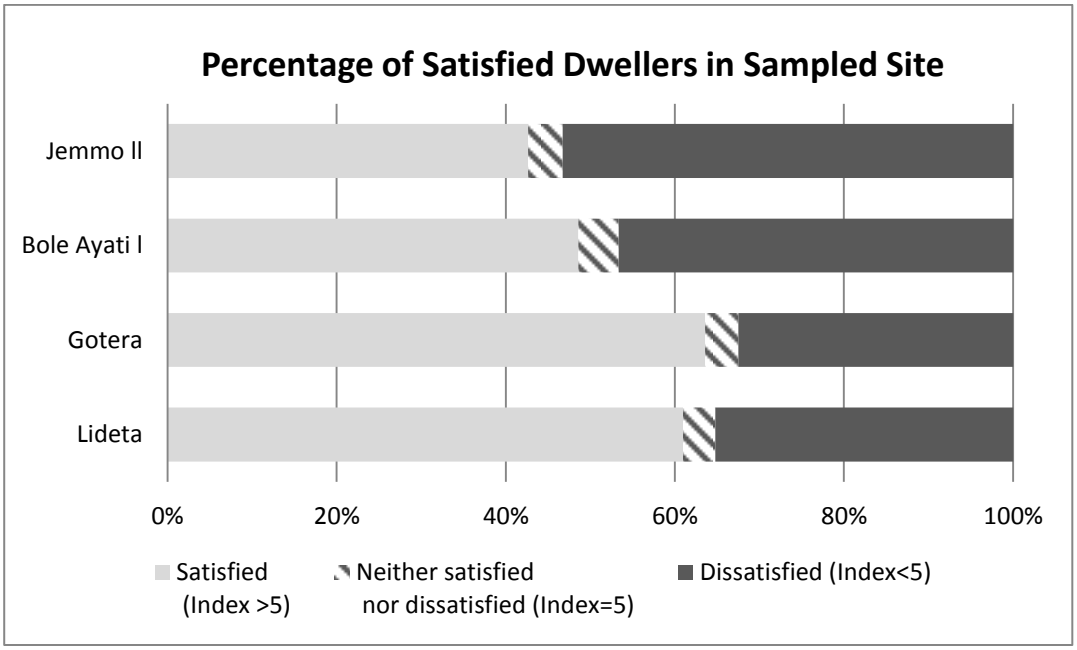

Figure 5.5 Percentage of satisfied dwellers in sampled sites

In Lideta site, housing quality satisfaction percentage was 61% (Figure 5.5). When we disaggregate it into housing quality domains: 83% of respondents express satisfaction with both sanitation and accessibility. Similarly, 77% of respondents were satisfied with structure and space domain and with noise and security domain. On the contrary, both in utility and service domain and affordability domain only 33% were satisfied (Figure 5.6).

Irrespective of the domains, majority of respondents were satisfied with green area, solid waste disposal and parking lot indicators while they were dissatisfied with water supply shortage and absence of communal service building, absence of children playground and adults recreation centre. In contrary to other sites, Lideta site has two recreation centres not yet open for service (Figure 5.7). This suggests that building recreation centre could not satisfy the dwellers. Thus, the condominium Project Office should open the centres for dwellers.

Respondents' reflections with satisfied indicators do not necessarily mean that they were in perfect condition and no need of improvement. Instead, it indicates how much those indicators were valued for them. The majority also reported that condominium was much better than their previous residential house while less than their expectation. This finding supported by the findings of (Dennis and Rent, 1987), who reported that dwellers satisfaction related with improvement over previous residential. Besides, respondents compared the site with those of urban periphery site condominiums they considered themselves as lucky by comparing site accessibility. This could suggest that it is important to consider expectation and previous experience in addition to objective housing condition in subjective satisfaction analysis.

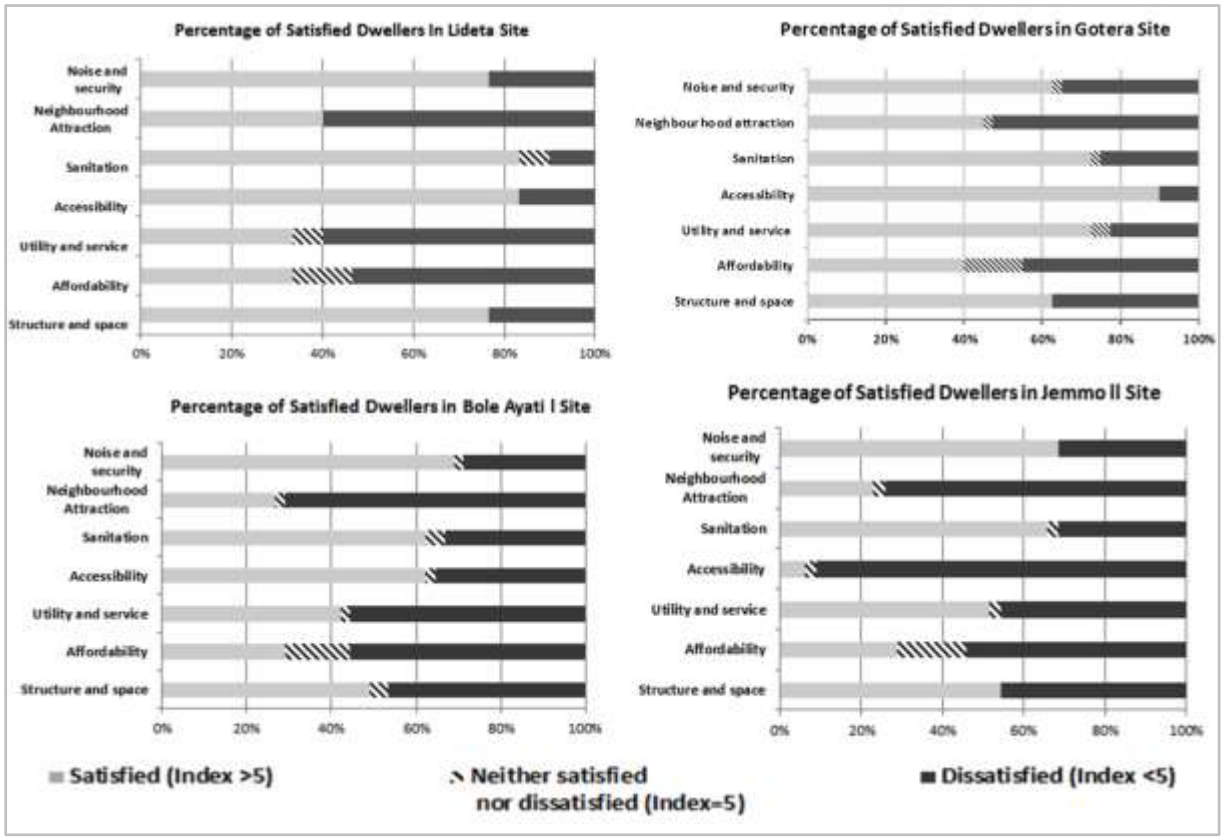

Figure 5.6 Percentage of satisfied dwellers with housing quality domain in sampled sites

Recreation centre in Lideta site not yet opened for public

Figure 5.7 Lideta site garbage bin and recreation centre

The percentage of Gotera site respondents who indicated satisfaction in overall housing quality was 63.5% (Figure 5.5) which was the highest of the sampled sites. When we disaggregate this percentage into domains, 90% of respondents were satisfied with accessibility and followed by 73% both sanitation, utility and service domain (Figure 5.6). On the other hand, majority of respondents were dissatisfied with affordability and neighbourhood attraction. Even though the site was unaffordable to majority of respondents' were satisfied and willing to live there. These could be related to accessibility, water supply and/or lack of affordable quality house in the surrounding. This result support Berhe et al, (2013) finding on reason of satisfaction of dwellers' with unaffordable house.

On the other hand, irrespective of domains, respondents were less satisfied due to day and night bar noise. Especially, respondents who live in nearby place of "*Chechenia*[7]", they pointed out that they were dissatisfied by both bar noise and other evil social practice (e.g. prostitution, Shisha, drugs etc.) which are not acceptable in residential place. The following reflection and photo indicate the situation in Gotera (Figure 5.8).

Because of night bar music and drunker noise, we cannot sleep before 11 PM. During the daytime, we do not have place to park car, it occupied by bar customers. Some of bars sell drugs and Shisha. We fear drug addicted, we live insecure site. This is not the right place for residence and children rise (Gotera site respondent no. 23)

Figure 5.8 Gotera site bar with respondent's reflection

According to Gotera site respondent's, the reason of dissatisfaction was highly associated with feeling insecure and demand to live in a place where free from evil social practice. This suggest that if the condominium project allow residential and commercial housing units in the same building it should put right and restriction for conflicting interest parties i.e. bar owner, customers and residents.

Majority of Bole Ayati l site respondents were dissatisfied in overall housing quality. Even though they were satisfied with accessibility, sanitation, noise and security domains, they were very dissatisfied with neighbourhood attraction, affordability, structure and space, utility and service domains (Figure 5.6). Despite Bole Ayati l site is situated far away from the inner city, previous friends and relatives the respondents were satisfied with social network indicators. This could be due to making new friendship and/or adapting to the site. Some of evidences show that they started new informal organization such as "*iqubi and idiri*[8]". This finding is supported by Lord and Rent (1987) that respondents move to new scattered site project were satisfied due to new place adaption.

Of Jemmo ll site respondents 90% dissatisfied with accessibility domain and 74% with neighbourhood attraction domain (Figure 5.6). This can be due to remoteness of the site aggravated by unavailability of convenient mode of transport and inadequate facilities in the site. This could be revealed by using Bajaj[9] and horse-cart for mode of transport (Figure 5.9). In addition, they were dissatisfied with this mode of transports high tariff because of increasing cost of life.

Majority of Bole Ayati l and Jemmo ll respondents' were dissatisfied with corridor space narrowness, high finishing cost, high rental cost, water supply shortage, electricity interruption, poor indoor electric line installation, communal service building, poor sanitation appliance installation, poor green area management, underservice parking lot, absence of children's playground and absence adult recreation

[7] Chechenia: in Gotera site nickname given to a particular place that indicate hotspot of bar and drugs

8 Idiri is an informal organization to handle funereal service and to support affected one in life treated ill situation

Iqubi is an informal saving and revolving fund system

[9] Bajaj is a three wheel motorcycle

centre. In addition to respondents reflections some of pictures were collected as evidence (Figure 5.9, 5.10 5.12 and additional explanations). This suggests that the Condominium Project Office should provide children playground, control construction quality and assure construction material quality.

Figure 5.9 Children playground and mode of transport in Jemmo ll

Water leak on the wall and roof (Bole Ayati 1)	*Poor electric meter installation (Bole Ayati 1)*	*Staircase (Jemmo ll)*

Figure 5.10 Structural quality problem in urban periphery condominium sites

Irrespective of site-specific variation, respondents were reported that service level gap in communal service building. In all sampled site except Lideta it was originally built for multipurpose hall, common traditional kitchen, hand washing laundry or slaughterhouse services. These were important for dwellers to attempt cultural demand and for those dwellers previously had traditional kitchen continue their activities in new location. However, in all sites of they were under service and/ or used for other purposes. For instance, some condominium committees let them for other purpose. For example, metal workshop in Jemmo ll, kindergarten in Gotera and clinic in Bole Ayati l (Figure 5.11). Moreover, some of them were not yet transferred to committees to use for targeted purpose. On one hand, because of the absence or lack of its service dwellers were facing problems to host special occasions like funeral, weeding, celebrating holiday together and for other social gathering. These concerns were very much related to cultural customs of Ethiopians.

Communal building used as Kindergarten in Gotera site	Communal building used as metal workshop in Jemmo ll site

Figure 5.11 Communal service building current situation

Respondents repeatedly mentioned housing units finishing stage as a cause of dissatisfaction. According to government officials' explanation, these housing units have been completed at 80% finishing stage (Figure 5.12). Some of housing units were vacant, this is because of some were reserved for urban redevelopment relocated person and some were already transferred to lottery winners not yet homeowners entered. Here, respondents' complaints about two issues: first the finishing stage exposed them for high cost and second, this vacant house conditions. They were not being comfortable because of both ugly physical conditions and risk of security i.e. they fear it will attract some illegal owners who pose danger to the building security. They also suggest that project office should transfer vacant house or make proper protection and control. This implies that housing perception affected by individual perception and neighbourhood social and physical conditions. Gifford (2007) on his review explained that how a fear of stranger leads to fear of crime and affect dwellers satisfaction.

Mostly, small dwelling unit, poor design and badly proportionated room space particularly for kitchen and bathroom. Materials used for wall partition and ceiling are not sound and water proof. Most of the doors, windows, electric sockets were not well functioning and bedrooms and kitchens do not have doors. Interior housing unit does not paint in all sites. Regarding electricity supply, the problem was multi faced; power interruption from main hydropower source, from overload on transformer and from poor electricity installation and low quality electricity appliance. The research revealed that condominium could be a decent dwelling place by homeowner extra effort (compare Figure 5.12 which shows housing unit condition at 80% finishing level and 5.17 which shows after finished by homeowners). The quality variation of two housing unit confirmed finishing cost for condominium is unaffordable for majority low-income homeowners.

Other important issue raised by some respondents were condominium structural and neighbourhood convenience related to laundering. Respondents who do not afford to buy washing and drying machine mentioned that condominiums are not suitable for such activities. This was because of small housing unit and small corridor size not comfortable to hand wash clothes as they did it previous residential location. Specifically, families with young children reported that difficult to manage it daily. Moreover, they were dissatisfied on absence of secured and safe drying place, because of stolen experience and fear of it. Previous study has shown that laundry and washing area are significant factors affecting housing satisfaction.

80% finishing housing unit interior part in Bole Ayati l

80% finishing housing unit exterior part in Jemmo ll

Figure 5.12 Condominium housing unit finishing stage

Low-income particularly relocated from inner city respondents expressed that they were dissatisfied in affordability and condominium structural inconvenience for their home-based business as follows:

> *I relocated here 3 years ago because of inner city urban redevelopment project. When I was in pervious location, I have a private house I do not have to pay rent or mortgage. When I decided to move condominium, I thought my previous housing compensation cover all condominium housing unit cost but it cover only 50% cost. Formerly, I sold 'tela, enjera and baltina wetetoch', my livelihood was depend on it. Here the housing structure not allows doing these. Now I do not have money to feed my family and I could not pay mortgage for the last 3 year. I fear that one-day housing department take my house and I become homeless (Bole Ayati l respondent 30).*

According to respondent, reasons of dissatisfaction in condominium were inability to pay mortgage and structural inconvenience for home based business. These threaten her tenure security and question of survival. Another respondent also reflect her current situation as follows:

> *Formerly I lived in kebele house in inner city, monthly I paid only 10 Birr. When I was there, I made "tela and enjera as livelihood; now I cannot make them. I do not have own income to pay monthly instalment and I am dependent on children income. My children pay 462 Birr for it. The housing unit space is very small; it cannot accommodate all of my stuff. Due to such sadness now, I am sick (Bole Ayati 1 respondent 14).*

This also indicates that providing house for the poor without facilitating their work place is creating social burden for other family members. Unlike developing country, there is no social security system in Addis Ababa. Here the low income group, relocated from slum area facing paradoxical situation, better off housing condition than previous residential place and losing their livelihood and consequently unable to pay mortgage and unable to feed themselves. This implies that if people worry about the housing cost and living in tenure insecure condition it cannot satisfy in housing quality whatever it is better. On the other side, condominium owners, whose livelihood was based on daily labour and informal sectors, have wished to move back to slum area by renting their house. They supposed to pay monthly dawn payment from rent income and aim to restart their informal work in slum area. Moreover, for condominium dweller the costs were not only paying regular monthly mortgage or their maintenance cost but also additional cost burden for sharing areas: sewerage system, gardening, security and other related cost. Inability to cover all

of these costs sometimes forces tenants to move out from the site. This implies providing housing for the poor without access to job cannot improve their quality of life instead making them poorer.

In general, the qualitative analysis show that condominium quality problems highly associated with technical and management failure in condominium. The technical issues include structural engineering, architecture and design and urban planning. Management failures include lack of housing finance option, weak construction quality control, lack of experience on shared place and facilities management. Moreover, lack of feedback from previous condominium projects also contributed to make the same quality problems repeatedly. Hauge, et al. (2012) cited in Samaratunga (2013) suggest that professionals and decision-makers should take responsibility for these kind of failures.

5.3.3. Variation of Housing Satisfaction and Perception Dwellers Living in Different Floors

Examine if there were variation with housing perception and satisfaction of dwellers' living on different floors of both inner city and urban periphery condominium sites was one of objectives of this study. This interest was derived from local knowledge about dwellers residential preference, culture and some features of condominiums', however; it was quite a challenge to get similar studies to elaborate the theory and conceptual framework to assess floor variability. To overcome the limitation, participant observation, focus group discussion and further respondents reflection were taken into account. Then for analyse only few indicators were purposely selected from the total 30 indicators used in section 5.2.1. The indicators were water supply, staircase, absence of noise from sharing flat, sanitary appliance installation, finishing cost, rent cost and other indicators identified during discussion. They were analysed using qualitative and quantitative methods.

Before qualitative analysing of floors satisfaction and perception, it was interesting to know each floor contribution for overall housing quality index using 30 indicators. The HQI result show there was slight variation in each floor as of their perspective sites. In overall HQI ground floor contribution was highest while second floor the least (Appendix Table 1 and 2 and Appendix Figure 1). However only water supply index was selected for index analysis.

Water supply indices as of floors shows residents on lower floors are more satisfied with water supply than those on the upper floors (Figure 5.13). The index variation between sites also shows residents live in Gotera and Jemmo ll were more satisfied with water supply than those in Lideta and Bole Ayati sites. This was because water pressure decrease when a housing unit distance from the ground floor increase. Bole Ayati l and Lideta site respondents' expressions show that how the sites water supply shortage aggravates with low water presser on upper floors (Figure 5.14). It exposed respondents spend extra time and cost to buy water from vendor. According to respondent explanation, to buy water from the vender she spent 500 times the tap price. They cannot have enough water for cooking, cleaning, laundering, flush toilet, morning shower and so on. Particularly, large family size dwellers' and family with kids were facing chronic water shortage. As of their explanation, the problems of water pressure were multi-faced. In one way, too low water pressure exposed them for chronic water shortage, in other way too high pressure. In latter case, they frequently replace faucet washers. The problems derived from improper feed of water pressure to the top floors. Furthermore, there was no rooftop tank to deliver water for top floor. This implies that water supply shortage and improper pressure affect their housing satisfaction of top floor dwellers. Cherenet and Sewnet (2012) described low water pressure problems in Addis Ababa apartments.

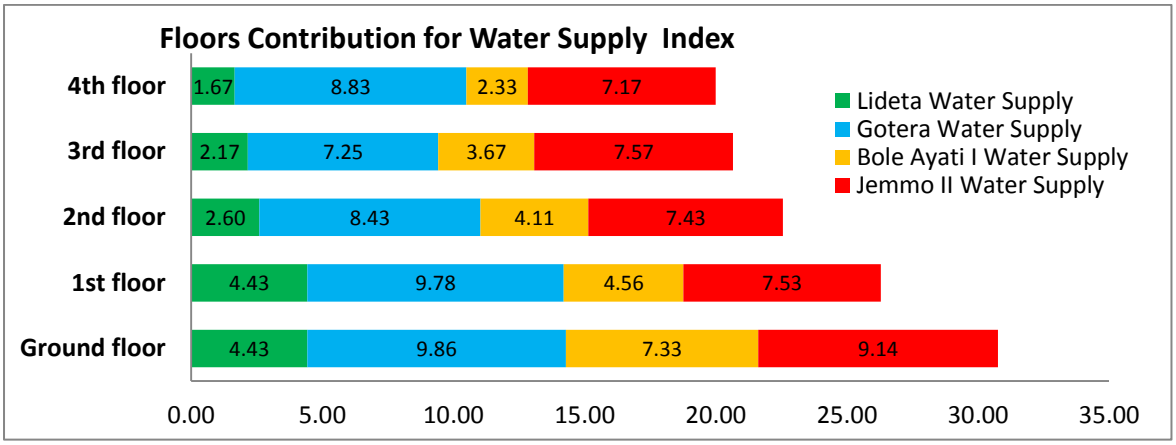

Figure 5.13 Water supply variation as of floor and site

Mostly the water has come one day per week after 11:00 PM for only 2 or 3 hours. Even if we filled with water tanker, it is not enough for a week. We buy 100 litters water from vender, we spend 100 Birr including daily labourer cost. When I collect 100 litters from my tap, it cost only 20 Cent. (Lideta site respondent 4)

Figure 5.14 Water supply shortage with respondent's reflection in Lideta site

With respect to staircase, elevators, ramp and emergency exit were found to be very much important for top floors dwellers particularly for children, elder, pregnant and disabled. As of the expectation, respondents of top floors dislike climbing stairs to access their housing units. Their reasons of dissatisfaction were not only absence of elevators, ramp and emergency exit but also staircase quality and space. The staircases quality aspect was attached to constructed material quality and space sufficiency to move with or without carrying goods. In this regard in some sampled building for instance, in Jemmo ll site the edge of staircase terrazzo started broken even though buildings are less than four year (Figure 5.10). In other sites, slope of external staircase vertical circulation was steep slope. The metal staircase also was wavy, especially during night, it was noisy for housing units nearby staircase. Some elderly owners, families with kids who live in top floors express dissatisfaction with this regard fear of fallen of children and scary for them during play and move on it. Particularly they perceived negatively about external staircases and internal staircases with wider grill protection, short wall corridors. Many respondents mentioned that elders, disabled and pregnant women are unable to move freely (Figure 5.15 reflection). Their negative perception about top floor was not only experiencing the danger but also they had heard kids had physically disabled and died falling down from upper floor. Wilkinson (1999) found poor quality staircase is a reason for home accident. Besides, its narrowness exposed goods breakdown was quite common during move in and out. Respondents particularly tenant reported that due to fear broken of goods they decided to stay in top floor even though they wish to move out. Here, the key strategies to satisfy top floor dwellers should be matching dwellers characteristics (family and health situation) and preference to building features (Gifford, 2007).

According to Kahlmeier et al. (2001) the relative importance of housing quality varies across different culture. This was true in this study housing quality indicators, noise from sharing flat specifically noise

from ceiling and sanitary appliance installation. From structural quality problem, we found that condominium is not sound proof and have leaking problem unless homeowners make improvement. Here, because of structural characteristics, problems were varying depending on floor level. while floor one, two and three dwellers are making noise and facing leaking problems, ground floor dwellers are facing noise and leaking problems and fourth floor making noise and leaking problems to housing units. As of their explanation, noise from ceiling (upstairs) housing units was quite common on those housing units that do not have tiles. Source of noise were not only loud movies or speak loudly but also doing any activities such as walking, moving furniture, flashing water, cooking and so on. For instance, upper floor water flush from bathroom is noisy for downstairs dwellers and at the same time making leaking problem unless sanitary appliances are maintained well. In addition, majority of 4th floor respondents have faced roof leaking problems due to unfit sheet metal of their roofs. In extreme case, these make disputes between sharing flat dwellers and have negative impact on social network and lower privacy level. The study reveals that in terms of maintenance cost and social cost ground floor are less costly while fourth is high costly. Respondents, who were facing such unpleasant outcomes, express negative perception about condominium. This indicate that how structural quality affects dwellers perception and social network in condominium environment. Kahlmeier et al. (2001) explained how perceived noise from neighbour affects the dwellers life.

One of the objectives of this research was to know the variation in dwellers satisfaction at different floor level. The results revealed that majority of condominium dwellers prefer to live in ground floor while only few in fourth floor. However, all explain advantages and disadvantages of living in each floor irrespective of preferences. Respondents who prefer to live in ground floor explained that it was good in terms of easy movements, saving energy and time climbing staircase, water pressure, and doing daily activity on ground. On the other hand, privacy was seen as a problem for them because of all upper floor dwellers movement around their floor and noise when children playing in their corridors. Frequency of experiencing stolen was high on ground floor. Despite all condominium site construct with drainage and sewerage pipe, ground floor dwellers expressed dissatisfaction with sewerage system frequent burst and blockage problem. Respondent explained this as follows: "*I am happy in living ground floor but because of poor drainage system flush from the upper floors, I am dissatisfied. This is because the swept has bad smell (Jemmo ll site respondent 1)".* Above all, they were dissatisfied with trash throw away from upper floors and extra burden to clean their surroundings.

On the contrary, some respondents are satisfied with their house not because it is top floor but because it is secured. Specifically, respondents, where their blocks nearby main roads prefer to live in upper floor. The respondents explained this as follows: "*Even though I am living in fourth floor, climbing the stair is not a big deal for me. I am not worry about my house security. If someone broken my house he cannot take it my property because anyone can easily catch up him before he reach ground floor".*

On the other hand, some of residents are implemented housing adjustment principle to live in fourth floor. They spent high housing cost to improve housing quality and to maximize their life satisfaction, even though absence of elevator problematic for their visitors. One respondent reflect the overall situation of living in fourth floor, we support his explanation with photo (Figure 5.15). This implies that to increase housing satisfaction in any floor dwellers perception and adaptation play an important role.

In summary, quantitative result show majority of respondents had positive perception and prefer to live in ground floor than top floors. In addition, tenants pay more for the ground floor and it rent price decrease as the floor level increase. This could be related to absence of elevators, inadequate water pressure, less or no living experience in multi-storey buildings and perceive top floors as less comfortable. Given the

existing Addis Ababa population growth it is difficult to provide row-family house for all. This suggests that project office should do more awareness creation on living multi-storey house to culture of tolerance.

5.3.4. Ownership Status Effect on Housing Satisfaction

Previous housing satisfaction studies tend to indicate that ownership status significant determinates of satisfaction variation. During the course of qualitative data collection, the issue raised by homeowners and tenants push us to differentiate satisfaction by ownership status. In addition, it is necessary to link socioeconomic characteristics and housing quality indicators to assess housing satisfaction and perception. Tenants' affordability domain indices were much lower than homeowners' while with accessibility domain both have almost equal index (Figure 5.16). Unlike developed countries, there is no social house system or housing cost subsidy for those who cannot afford to pay housing cost. Mortgage cost or rent cost in Addis Ababa is the responsibility of the dwellers no matter how high the cost might be. This implies affordability is a significant determinates for housing satisfaction variation of tenants and homeowners.

I am living in 4th floor I spent money more than the total price of the house for finishing only. Living in fourth floor is very costly compare to other floor. We spent extra cost for ceiling and roof maintenance than other floor. We do not have elevator, ramp and emergency exit. My mother visited me only once in the last two years. She was not capable of walk on stair, to reached fourth floor she took 40 minutes. However, I am started to enjoy quality of life. I have freedom and I do not worry about rent cost escalation. I have nice bathroom, kitchen and living room (Jemmo ll site respondent 16)

Figure 5.15 Furnished condominium house in Jemmo ll site

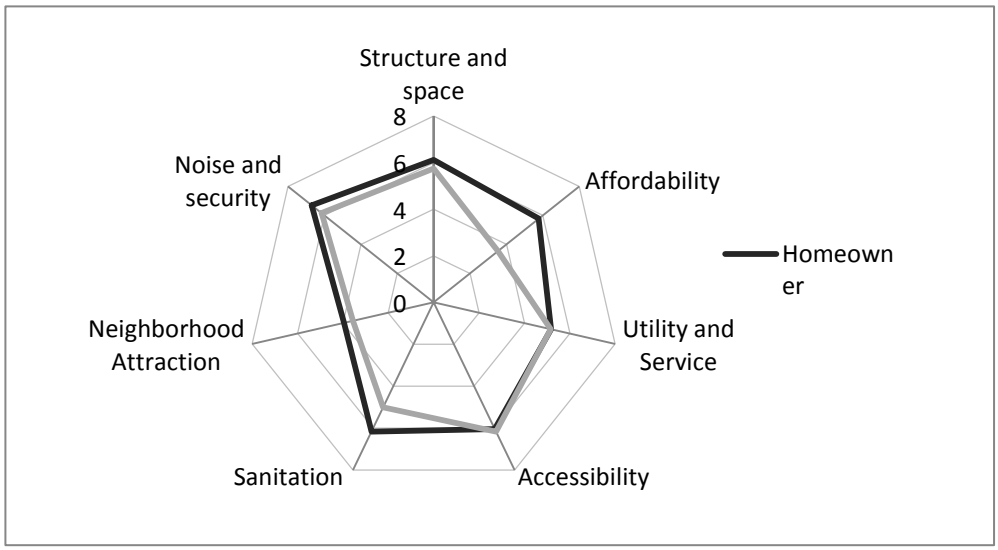

Figure 5.16 Homeowners and tenants housing quality indices variation

Some homeowners that their satisfaction on condominium despite they are unable to pay mortgage and they are family income dependent they are satisfied. They are prioritizing over improvement in previous housing location, sanitation and homeownership. One respondent explained her satisfaction as follows:

"I was live in kebele house, which was located in slum area. When I move to condominium I do not have money to pay but my son have to pay on behalf of me. For me condominium is like a paradise I cannot compare it from previous residential location. It is clean environment and better service facilitation. I am very much satisfied in condominium (Lideta site respondents 11).

Some tenants also satisfied in condominium despite it is unaffordable for them. For them the important things are access to basic services, site location, service and utility facilities in housing units and privacy. One of respondent state her satisfaction as follows

Even though I spend half of my income for rent cost, I am satisfied in Lideta condominium. It is near to my work place, clean house, nice bathroom and modern kitchen. Here, I freely used water, electricity and toilet, no one control me. I saved time and energy, it simplify life (Lideta site respondents 23).

In addition to satisfaction with the service facilities and housing quality, homeowners were satisfied with condominium ownership, enjoying stable life, tenure security and living without fear of rent incremental. Mohit et al., (2010) finding also show homeowners' are more satisfied than tenants' despite with similar housing quality.

Apart from housing quality, tenants housing satisfaction is affected in external factors, such as lack of clear-cut tenancy agreement and intervention of illegal condominium broker (middleman). They frequently treated and exposed for sudden rent cost increment, unnecessary moving out cost and forced eviction. These could contribute to lower housing satisfaction by shelving tenure security and financial capacity. Respondent who rent condominium in Bole Ayati l explained the situation as follows:
When I rent the house, I pay 3 months' rent in advance to sign 6 months contact. At the end of contract, the rent price increase almost by 50%. Here, broker plays a great role in rent price increase, he act as homeowners. In every new tenancy agreement, he will get 20% of commission from both tenant and landlord. This is business for him, he does not care about tenants and so he urges a landlord to increase rent price for the sake of his commission (Bole Ayati l respondent 18).

The above homeowner and tenants satisfaction variation implies the importance of homeownership for housing satisfaction. Homeowners are satisfied with condominium because of homeownership, experiencing freedom and stable life. These are an important ingredient for quality of life (Elsinga and Hoekstra, 2005; Zebardast, 2008). They also satisfied because of it considered as a family asset and is sign of financial security (Zakerhaghighi, Khanian, and Gheitarani, 2014).

On the other hand, housing cost burden and poor tenancy agreement are playing significant role for housing dissatisfaction through increasing cost of life, tenure insecurity and gloomy wealth accumulation (Cook and Bruin, 1994; Agnew, 2014; UN Habitat, 2007). This suggest that to improve condominium dwellers, particularly tenants, housing satisfaction and quality of life, improving housing and neighbourhood condition are not the only solution; protecting their right and controlling illegal broker intervention also necessary.

5.4. Housing Satisfaction Analysis with Site Location Characterstics With 2D GIS

One of the specific objectives of this research was assessing and mapping housing satisfaction variation of inner city and urban periphery condominium sites using GIS. To achieve this among housing quality indicators we consider health centre, school and market centre proximity across the city with respect to the sampled sites.

Visualize public health care centre and hospitals facilities spatial pattern in the sites enables to visualise physical[10] accessibility of service centres meanwhile identify better off and worse off sites. When we analysed public health centres within 3000-meter radius from Lideta, Gotera, Bole Ayati I and Jemmo ll sites, we found 19, 13, 2 and 1 respectively (Figure 5.17). In terms of public hospital, Lideta have 4 and other sites do not have it. It confirmed the reason behind health care centre respondents' satisfaction variation between inner city urban periphery sites (see details Appendix Table 3).

Spatial patters of primary and secondary school facilities within 3000-meter radius from the sites across the city in Lideta, Gotera, Bole Ayati l and Jemmo ll site were 35, 8, 3 and 2 respectively (Figure 5.18). It indicates that both uneven-distribution across the sites an inadequate service provision in urban periphery. On the other hand, in Bole Ayati l there is one primary school within 500-meter radius but it cannot accommodate all of the site children. This implies less service potential in nearby place was a great challenge for urban periphery sites. Thus, it pushes families to spend high cost for children school fee and transportation. (For more information on spatial distribution of schools, please see appendix Table 4).

The analysis considered only medium and large size market centres. The distribution of marker centres within 3000 metere radius show Lideta site access 58, Gotera 41, Jemmo ll one and Bole Ayati l no market centre (Figure 5.19). Although small shops are found in all condominium sites, respondents report that they were failed to satisfy the majority interst with asking prices , good and service provision. Above this the shopping culture of the city residents acknoweldge an open market but it was not available in nearby place for urban perphery sites (Appendix Table 5).

Proximity analysis was found that there was uneven and unfair service provision between sites. From point of view of physical accessibility, we can say that inner city condominium sites are relatively better-off while urban periphery site worse off. This suggests that project office and urban planner should consider provision of service in fair and cost effective manner before as well as after condominium site built up.

[10] Physical accessibility in this context consider only spatial location of service area irrespective of service quality and potential of population serviced

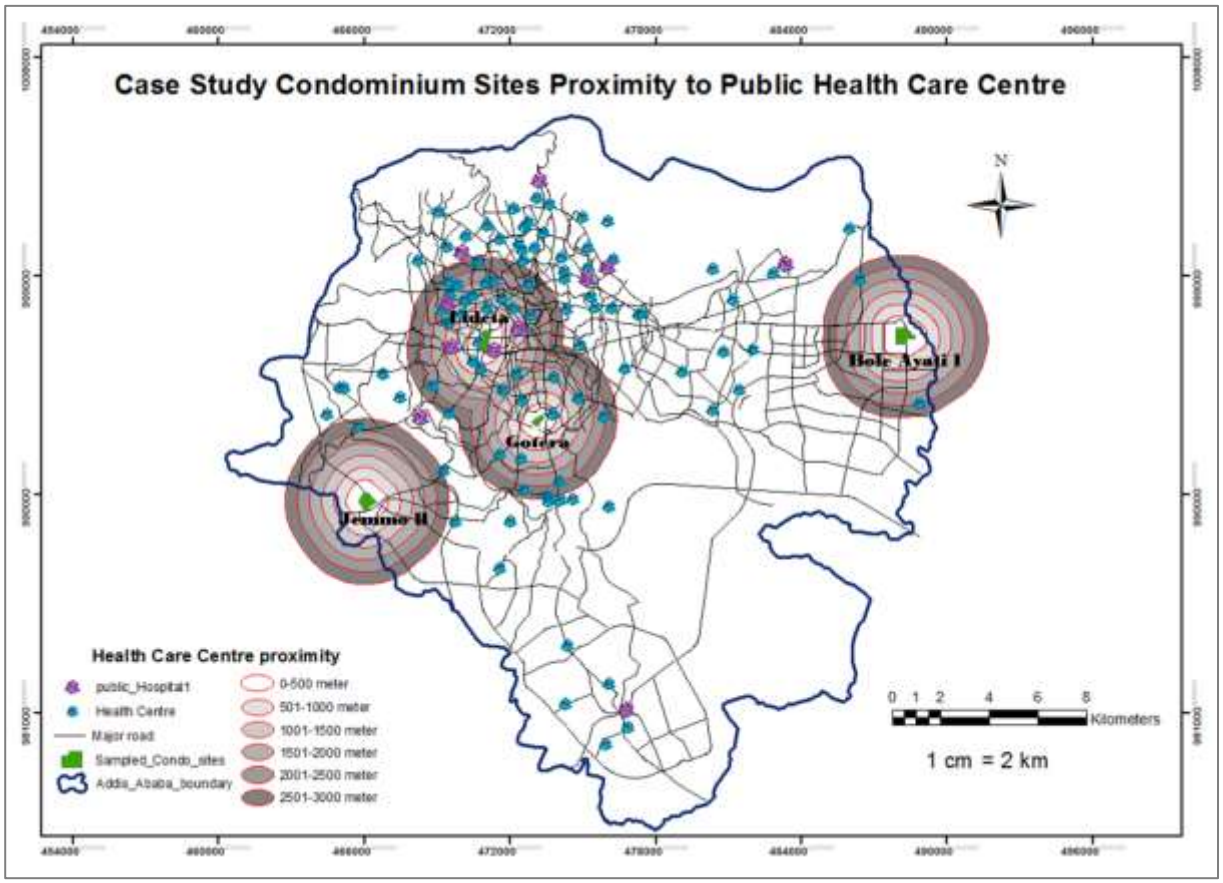

Figure 5.17 Health care centre proximity analysis 2D GIS map

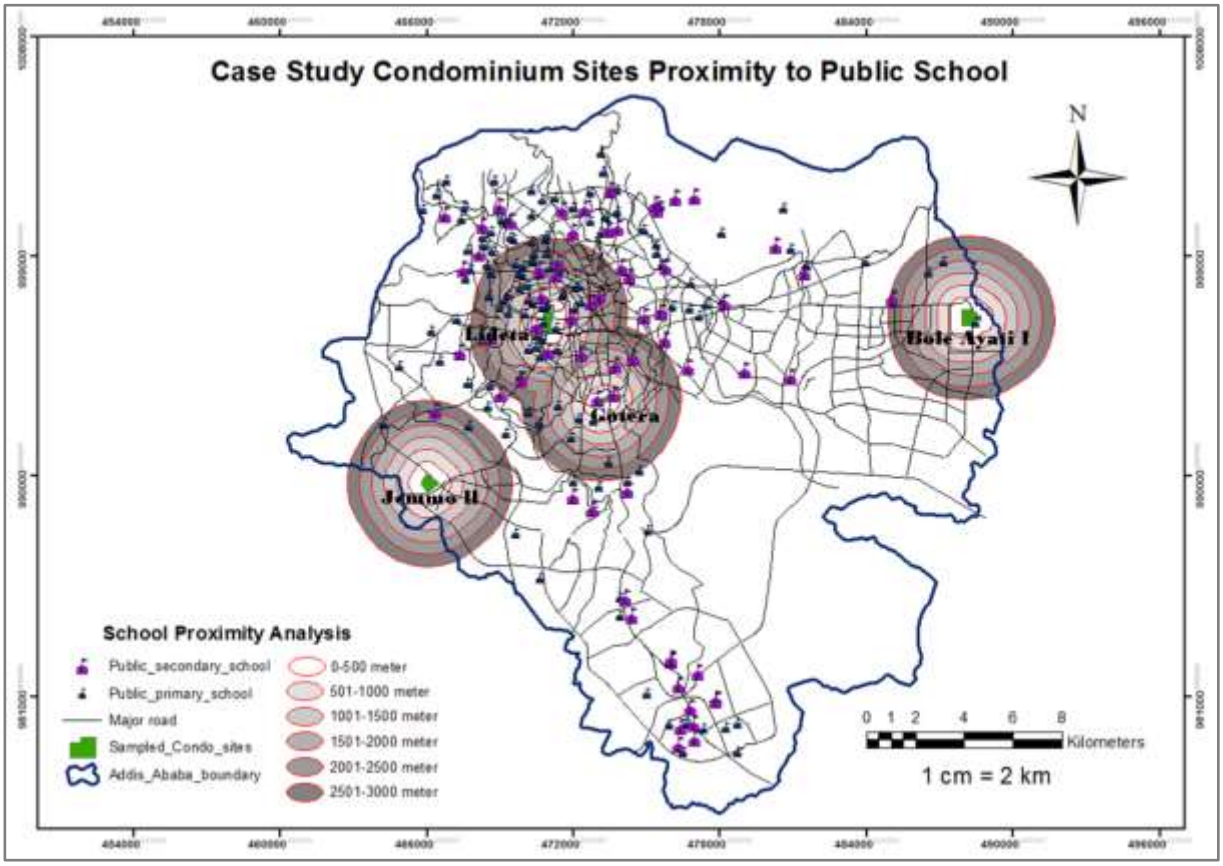

Figure 5.18 School proximity analysis 2D GIS map

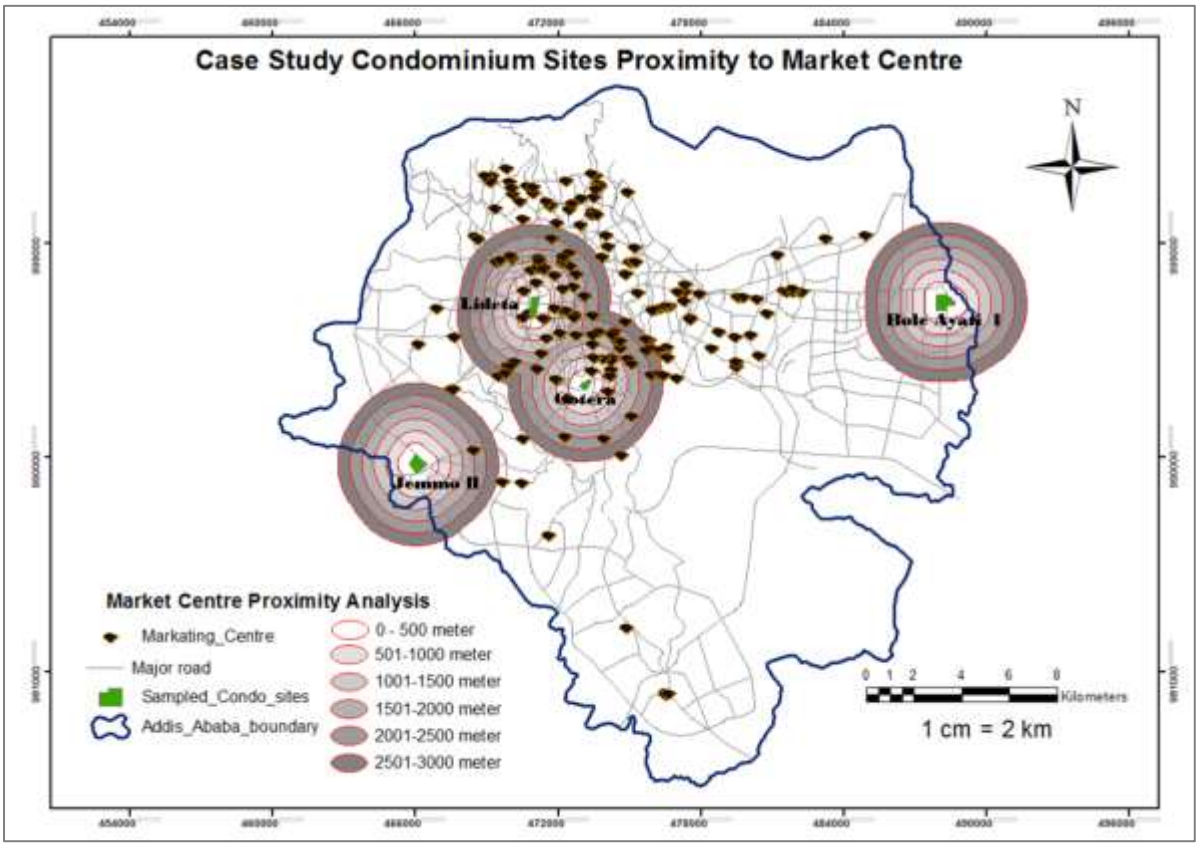

Figure 5.19 Market centre proximity analysis 2D GIS map

5.5. Housing Quality Index Analysis with 3D GIS

One of the research specific objectives was 3D visualization of housing quality variability between different floors of both inner city and urban periphery sites. The result obtained from spatial analysis shows wide range of HQI variation between floors and sites. The variability of HQI was categorized in graduate colour. The low index was visualized with red colour and high index with dark green. HQI in site level show that in Lideta site from 3.05 to 8.32, Gotera from 3.2 to 7.04, Bole Ayati l from 2.36 to 8.16 and Jemmo ll from 3.17 to 6.93 (Figure 5.20 – Figure 5.27). When we look at HQI spatial patters at site level, dark green and light green are dominate colour in Lideta site while yellow and orange colour in Jemmo ll site. This implies Lideta site had relatively high HQI than Jemmo ll, by implies Lideta respondents score higher value their housing unit than Jemmo ll respondents. On the other hand, all sampled sites have very low HQI and relatively high HQI. The value indicates heterogeneity in respondents' response (for detail value variation please refers Appendix Table 1, 2, 3, 4, and 5).

The pattern of HQI at building and floor level shows some buildings have similar HQI from ground floor to fourth floor while the majority have variation between floors. From in-depth discussion, local knowledge about the condominium and from literature (e.g Mukim et al., 2011), it was expected that gradual HQI decrease as the floor number increase. However, the sites ground floor shows low to high HQI, similarly low to high in the fourth floor (Figure 5.20 –5.27). This implies not all ground floors dwellers were very satisfied and not all fourth floor dwellers were very dissatisfied even though their housing unit distance from the ground vary. In addition, in all site some buildings upper floors have higher HQI than lower floors. This may be resulted from the respondents' perception variation and/or sampled housing unit quality variation. To generalize HQI of floors variation more sample size, similar housing quality and targeting respondents who have similar background might be necessary.

Figure 5.20 Lideta condominium housing quality index 3D GIS map

Figure 5.21 Lideta condominium ground floor housing quality index 3D GIS map

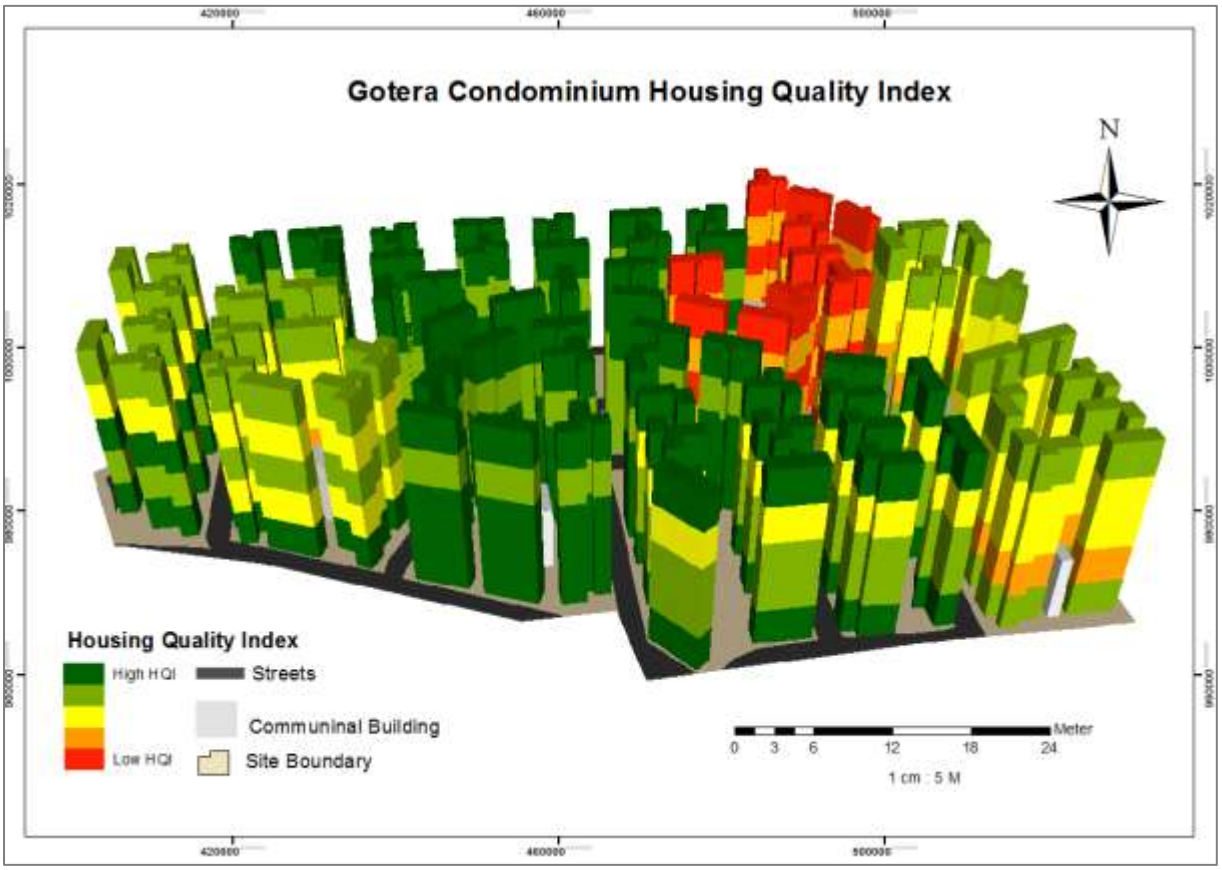

Figure 5.22 Gotera condominium housing quality index 3D GIS map

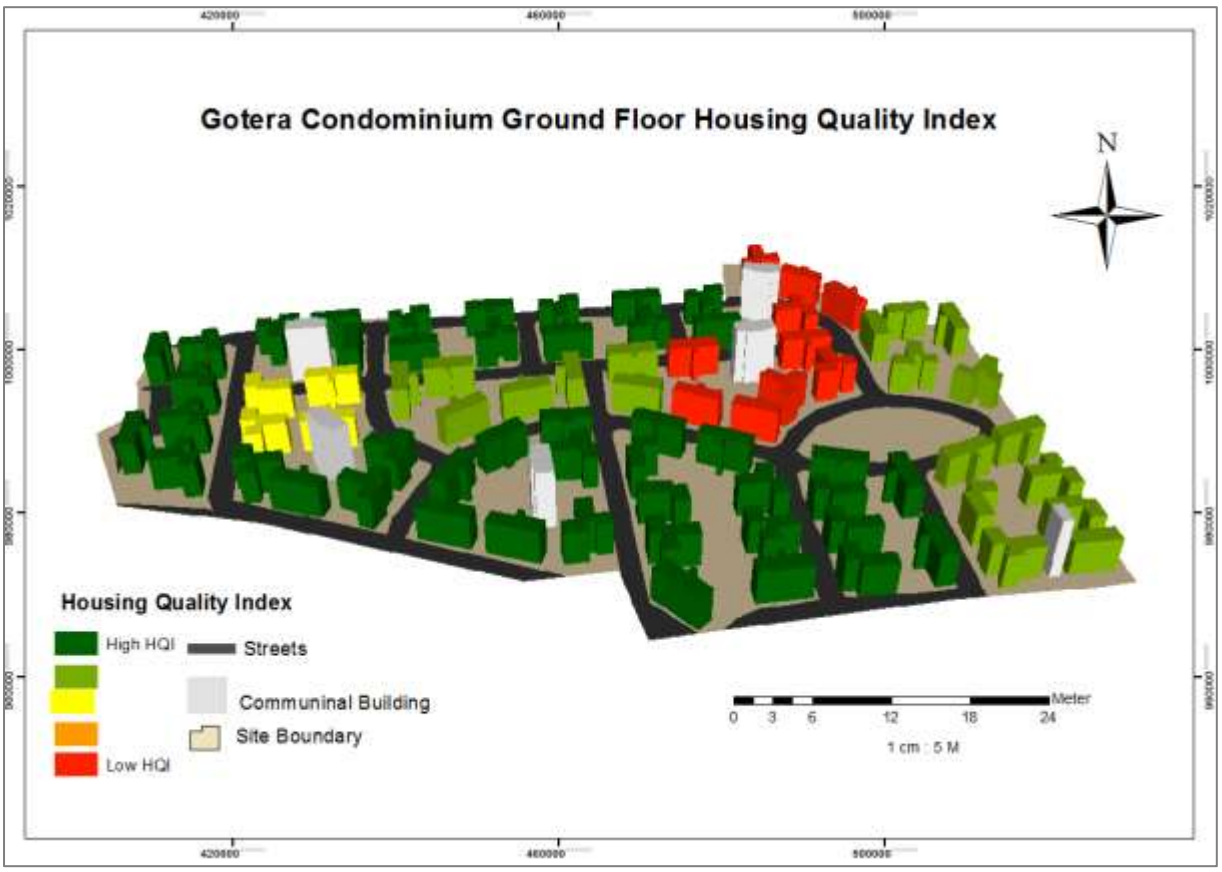

Figure 5.23 Gotera condominium ground floor housing quality index 3D GIS map

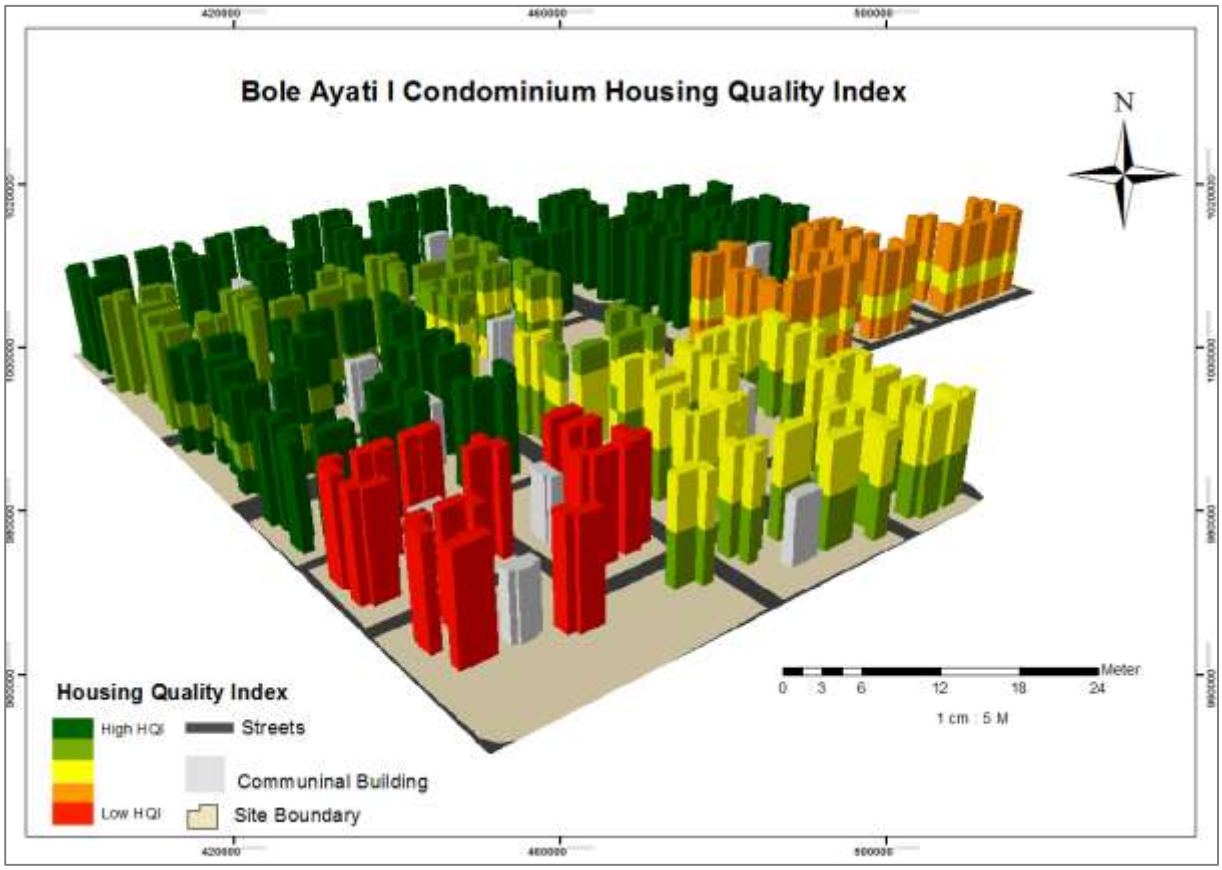

Figure 5.24 Bole Ayati l condominium housing quality index 3D GIS map

Figure 5.25 Bole Ayati l ground floor housing quality index 3D GIS map

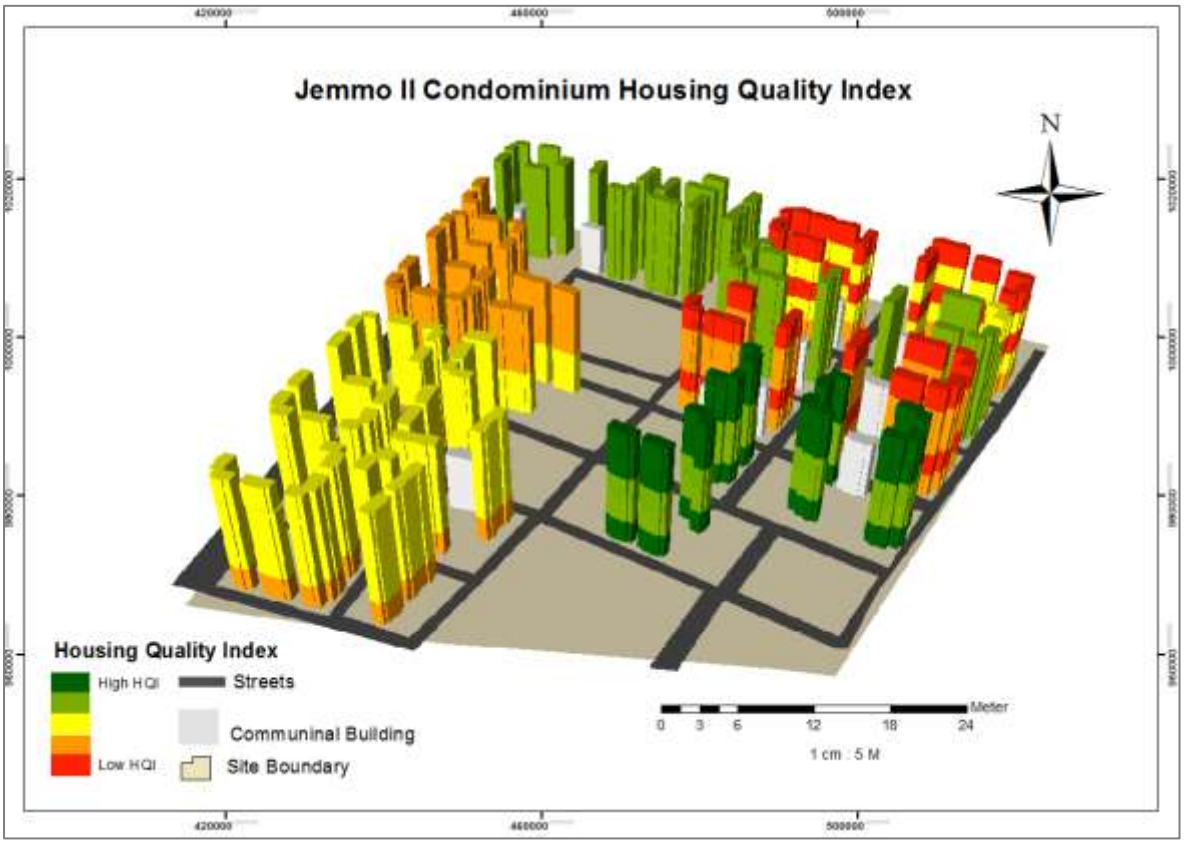

Figure 5.26 Jemmo ll condominium housing quality index 3D GIS map

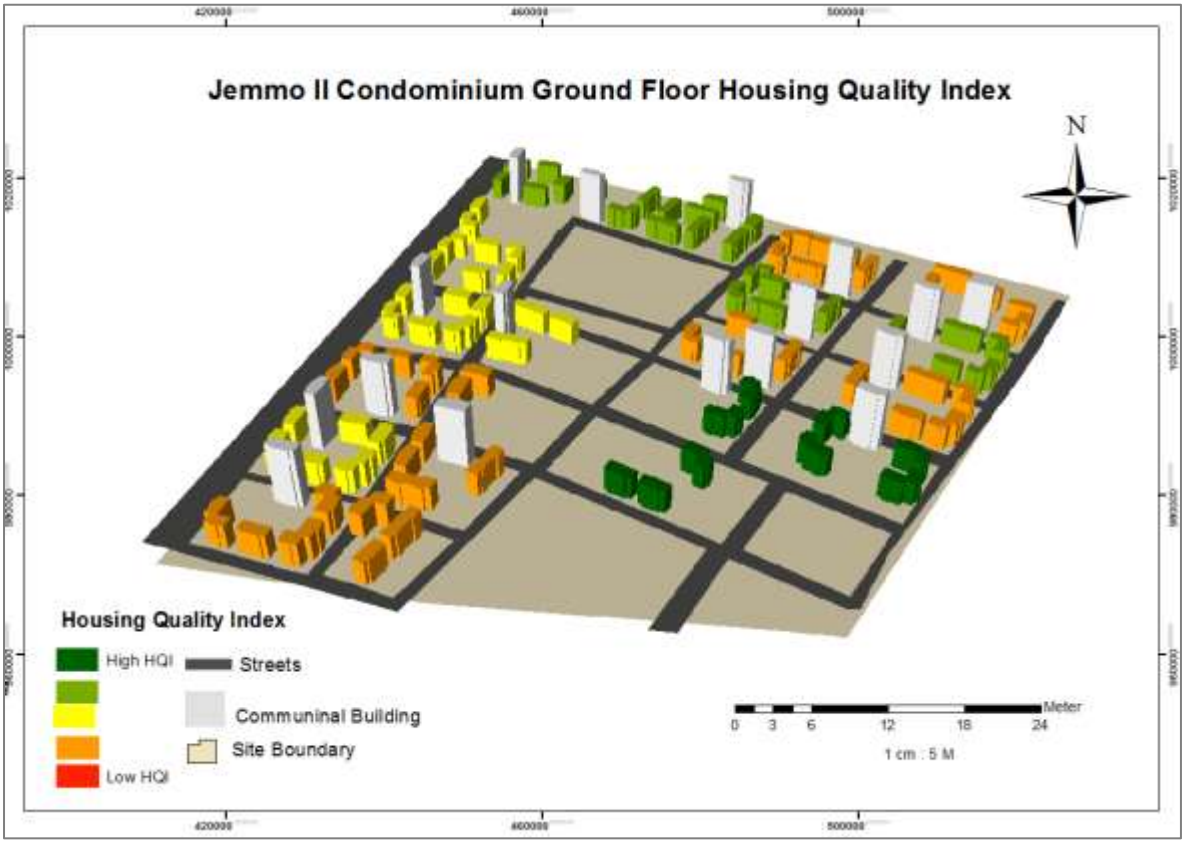

Figure 5.27 Jemmo ll condominium ground floor housing quality index 3D GIS map

5.6. Major Contributing Factors to Low Condominium Quality in Addis Ababa

From the focus group discussion, government officials' interview and report review we found that the major contributing factors for low condominium quality as follows

From Government Side

- Failure to revise national building code according to dwellers demand and existing situation (e.g. absence of elevator)
- More attention and coverage is given for housing units quantity than quality
- Provide house for the poor without proper facilitation for their livelihood and employment opportunity
- Low public consultation in design appraisal
- Ineffectiveness of technical manual of condominium construction
- lack of strict construction quality supervision and inspection
- advocating low cost house but failure to achieve cost effectiveness i.e. resource wastage during construction
- low capacity of contractor, consultant, micro, and small-scale enterprises, who participate in condominium construction
- Experienced corruption with purchasing and manufacturing low quality construction material, fraud with construction contractual agreement
- Lack of coordination between utility service provider and sanitation and environment protection agencies

From Dwellers Side

- Lack of experience on living multi-storey house
- Lack of commitment on managing sharing area
- Failure to follow and /or adopt the condominium management guideline
- Loose coordination between condominium owner and Condominium Project Office

5.7. Summary of Causes of Condominium Housing Satisfaction

Causes of Satisfaction	Causes of Dissatisfaction
• Contribute for homeownership • Privately own water tape, electric meter, toilet facility • Relatively better residential place than slum • Relatively better sewerage system and solid waste disposal • Better quality kitchen • Positive influence on housing unit space management • Experience modern life style • Strength culture of tolerance between sharing flat • Positive impact on neighbourhood design • Urban land management efficiency	• Low quality construction • Narrow housing unit space • High finishing cost • Short time for down payment • Long time between winning house and possessing • Lack of option for housing finance • High interest rate • High rent cost • Lack of clear tenancy agreement act • High level of intervention of broker in housing market • Structural inconvenience for low income group to do home-based business • Absence of elevators, ramp and emergency exit • Fear of young children falling from upstairs • Stair climbing difficulty for disabled, elderly

	and pregnant • Lack of experience on living multi story building • Noise from sharing flat, bar and entertaining shop • Feeling of insecurity and fear of crime because of bars and drug house • Leaking from sanitary appliance and roof • Inaccessibility of urban periphery site • Low water pressure in upper floor • Absence of children playground • Absence of adult recreation centre

6. SYNTHESIS OF HOUSING QUALITY DOMAINS TO QUALITY OF LIFE

6.1. Condominium Satisfaction and Perception

Housing satisfaction is one of popular researched topic in quality of life study. The purpose of this section is discussing factors that affecting condominium dwellers satisfaction within the context of body of knowledge and relevant research. It focus on major housing domains namely: site aesthetic, structure and space, affordability, utility and service, accessibility, sanitation, neighbourhood attraction, noise and security effect on dwellers satisfaction and perception.

The overall condominium dwellers' housing satisfaction was slightly higher than dissatisfaction. Housing satisfaction percentage result show that inner city condominium sites percentage was above average while urban periphery condominium below average. Previous finding by Abebe and Hesselberg (2013); Ingwani et al., (2010) confirmed that in Addis Ababa inner city condominium site dwellers were advantageous than urban periphery. On the other hand, the result show ground floor score was slightly higher than top floors and negative perception and low preference for top floors.

6.1.1. Site Aesthetic Domain

Pervious finding has shown that aesthetic value such as building density, streets, public space arrangement and connection have significant effect on residents satisfaction (Yang, 2008; UN Habitat, 2003). When we evaluate the case study sites aesthetic visual impact with respect to site plan, blocks connection, external block paint evenness, street light and surface structure of roads; Gotera site attractive and Jemmo ll site less attractive. Although there was similarity in building floor level in the sites, aesthetic attributes seems less considered in Jemmo ll. In addition, we observed that there was variation within the site. For instance, in Jemmo ll and Bole Ayati ll, blocks distant from Main Street do not have streetlight or having electric pole without light. It an important attribute for feeling safe and secure and proliferation of quality of life (Kowaltowski et al., 2006). This suggests that to increase housing satisfaction level in less attractive sites, project office should improve their overall conditions.

6.1.2. Structure and Space Domain

Structure and space domain were compiled structural quality, dwelling unit space, staircase quality, corridor space and sanitary appliance installation indicators. The research found 60% of respondents were satisfied in this domain. When we look at percentage of satisfied respondent variation as of their site the highest was Lideta with 77% while the lowest Bole Ayati l with 49%. Some of reasons of satisfaction was relatively better housing facilities (privately own kitchen, toilet, electric meter and water pipe) and over improved housing quality than their previous residential place. Previous study by Dennis and Rent (1987) confirmed improved housing quality than pervious residential place was a determinates of housing satisfaction.

On the other hand, their reasons of dissatisfaction were narrow housing unit, leaking problem, narrow staircase, poor electricity installation, malfunctioning of door and window, absence of elevation, ramp and emergency exit. Similarly Zainal et al. (2012) investigated that narrow space, leaking problem, bad window and floor condition negatively affect residents satisfaction. Surprisingly, Condominium Project Office ignores to encompass elevator, ramp and emergency exit feature in condominium project in all these massive construction even though dwellers were complaint. The research suggests that to pay attention to improve critical housing quality problem. Moreover, it suggests that to revise condominium technical manual and building code to meet needs and expectations various dwellers. This will enhance condominium dwellers overall satisfaction in future project.

The research found that structure and space domain affects dwellers psychological and socioeconomic aspects. Satisfaction with this domain was specifically related with suitability for home based business, suitability for children, elders, disabled, comfort, enough space to live and level of privacy. Sungur and Cagdas (2003) investigate that sufficient housing space increase level of privacy and by implied increase housing satisfaction. On the contrary, Kahlmeier et al. (2001) found that housing quality satisfaction associated with dwellers wellbeing than suitability for children and social life.

6.1.3. Affordability Domain

An examination of survey result reveals that most of the respondents were dissatisfied with affordability domain. This claim is affirmed by the result that shows that 32.7%, of the respondents were satisfied, 52% were dissatisfied and 15.3% were neither satisfied nor dissatisfied. This shows condominium was unaffordable for the majority of respondents. In earlier findings in section 5.1.3, which indicated that, the majority of respondents spend more than 30% of their income for housing cost. Unaffordability might relate with Addis Ababa inhabitant economic situation. UN Habitat (2007) found that 2/3 of the city residents live in subsistent level and 1/3 below poverty line. This might indicated that condominium was unaffordable for majority of dwellers whose income is fall in this group.

The existing situation of unaffordability of condominium was multifaceted and so complicated in affect every aspect of dwellers life. When we look at it from owner side: The condominium project office urged the condominium lottery winner to pay a 20% down payment within two month. For those who do not have to adequate saving may probably lose their lot chance. Or else they have to lend money for down payment from private lender with high interest rate, at the same time loan agreement with bank for the rest 80% of condominium cost repayment. Besides, the Project Office deliver house with 80% completion and the rest will be expected to be finished by new homeowner. Although some dwellers, whose income was depend on home-based business, managed to cover all the cost, they faced new challenge. The housing condition was not convenient for their business or no customer in new location, they unable to cover previous loan as well as monthly instalment. These entire burdens push low-income group to decided one of these, rent or sell their condominium and back to slum area, their children or relative cover the cost or totally lose their house by bank and private lender loan. These leads to not only housing dissatisfaction, it may lead to tenure insecurity, worry, health problem, budget constraint for other expenses and affect all part of their life. This implies that provided unaffordable house and inconvenient house for their business is pushing poor to poorer. Samaratunga (2013); Agnew (2014) support this finding by discussing how unaffordable house affect in dwellers overall life. This suggests that reconsider varieties housing finance option for urban poor. Provision of housing should not be the only solution to improve the dwellers quality of life. This findings also support by Abebe and Hesselberg (2013) finding why low income resettles were dissatisfied in condominium.

From the tenant side also high rent cost with sudden and frequent rent increase negatively affect housing satisfaction level whether the housing quality good or not. It affect their plummeting saving capacity, increase living cost, hinder wealth accumulation and increasing feeling of tenure insecurity. This could be the result of housing demand and supply incompatibility with weak governing system of housing market. Thus, the Condominium Project Office should provide different housing delivery strategy with accommodate the tenants i.e. delivering rent condominium housing units and encourage private real-estate owners in condominium delivery.

Although Condominium Project Office aim to provide affordable and decent condominium house for low and middle-income, this study found that failed to achieve it. Agnew (2014) found that affordable house enhances the quality of life of individuals. Another study by Chakrabarti and Zhang (2010) argued that

unaffordable house could have negative effect on local economic growth. This shows housing provision without housing subsidy or adequate housing finance scheme could not be a solution to improve the residents' quality of life. Although it became successful in house delivery for low income group in long run unaffordability plus unemployment may lead to eviction, tenure insecurity, debt burden and other social crisis.

6.1.4. Utility and Service Domain

The result shows that 50% of the respondents in utility and service domain were satisfied, 46% of the respondents were dissatisfied, while 4% felt they were neither satisfied nor dissatisfied. In terms of site variation in Gotera and Jemmo ll sites 72.5% and 51.5% of respondents were satisfied respectively. In Bole Ayati l, 42.5% of respondents were satisfied and in Lideta 33.5%. The finding revealed that although all condominium units are connected to utility the service level is still low. Frequent electric interruption, water supply shortage and inadequate water pressure, poor mobile network connections are quite common. Poor utility service level, specifically water supply and electricity supply have negative effect on dwellers housing satisfaction by increasing cost of living in condominium. As explained in section 5.3.3 to buy water from the vender they spent 500 times tap price. Besides this improving water accesses implies less cost burden, reducing water related disease and improving quality of life (UN Habitat, 2009). In the same token, electricity interruption also pushed dwellers to used charcoal, which is very expensive than electric bill, which affect the environment and their health. This suggests that connecting utility without adequate service level could not improve housing satisfaction.

6.1.5. Accessibility Domain

The result shows that 60% of respondents were satisfied with accessibility domain, 38% dissatisfied and 2% neither satisfied nor dissatisfied. However, the range of satisfaction variation between sites were Jemmo ll 5.7% respondents were satisfied while Gotera 90%. This huge social service variation implies the Condominium Project Office failed to satisfy urban periphery sites dwellers in service provision. Inaccessibility affects the dwellers satisfaction in many ways. For example, families relocated in urban periphery site in the middle of academic year, their children travel long distance to previous school location or else forced to school dropout. Shopping centre inaccessibility also exposed dwellers to spent high cost to bought goods and travel long distnce for shopping. Unavailablity of mode of transport increase travel cost (e.g. walking distance to access the mode of transport, transport waiting time, transportation cost) and service cost of individuals to access the service. These cost has direct implication on site and house unaffordability, i.e. it increase direct housing cost plus high service cost due to housing location. Dwellers' housing dissatisfaction may aggravate if a site may have low or no employment access for low income or informal worker. This implies that inaccessible site location has increase the budgetary constraint and decreasing wealth accumulation by increasing expenses. Previous finding also suggested that accessible house improve quality of life (Yang, 2008; Olajuyigbe et al., 2013). Zainal et al. (2012) also found that it increase person mobility and strengthen social network. The implication is fair and proper basic service intervention in order to improve the quality of life of urban periphery sites.

6.1.6. Sanitation Domain

Unlike other housing quality domains all site of respondents were satisfied with sanitation domain. The overall satisfaction percentage in this domain was 71%. The satisfaction variation between the site also show 83.3% of respondents of Lideta were satisfied, flowed by Gotera 72.5%, Bole Ayati l 62.2% and Jemmo ll 65.7%. This could be because of the sites are more convenient to solid waste collection and the sewerage system are connected during construction. Moreover, the majority of respondents perceived, as

condominium is a clean environment than their previous residential place or slum area. Previous finding also acknowledge condominium is better in sanitation (Tiumelissan and Pankhurst, 2013; Abebe and Hesselberg, 2013). Improved sanitation: improve individual health condition and decrease vulnerability to disease and epidemic (UN Habitat, 2009) and improve quality of life (Zainal et al., 2012).

6.1.7. Neighbourhood Attraction

Neighbourhood attraction domain includes green area, neighbourhood cleanness; children play ground, adult recreation centre and parking lots indicators. The respondents' satisfaction with this domain show that 33.7% satisfied, 64.3% dissatisfied and 2% were neither satisfied nor dissatisfied. The satisfaction variation between the site also show that percentage of satisfied residents in Lideta, Gotera, Bole Ayati l and Jemmo ll were 40%, 45%, 26% and 23 % respectively. This implies condominium sites were failed to consider these attribute to satisfy the dwellers demand. Particularly missing children playground from the site plan indicates less or no attention for children on the site. Because of absence of playground, the children were urged to play on the corridor, staircase, street and addicted to computer games. This may expose play depravation. In addition, families spent more time on keeping children or feeling insecure when they play on unsafe places particular families with young children. Accessibility of recreation centre also neighbourhood satisfaction and quality of life improvement (Dennis and Rent, 1987).

Availability of sufficient and convenient parking lot is an important indicator for those having private vehicle. In all sites there is place for parking but the provided space were not sufficient, inconvenient for parking and no security system. These may lead to myriad challenges like stealing of parts of vehicles and automobile collision. The site plan considered green area, but the majority of space were without plantation, particularly Jemmo ll and Bole Ayati I site. It seems lack of awareness on important of green area vegetation and lack of coordination to plant common places.

6.1.8. Noise and Security Domain

The overall noise and satisfaction domain show that 69% of respondents were satisfied. The satisfaction variation between the sites also shows Lideta site 76.7%, Gotera 62.5%, Bole Ayati l 68.9% and Jemmo ll 68.6%. This implies that the majority of respondents satisfied with noise and security domains. It also found that in all site the majority of respondents were satisfied with social. This finding contrary to Abebe and Hesselberg (2013) finding which dwellers are dissatisfied in condominium social network. For satisfied respondents the cause could be accepting social change and/ or adopting new environment. Their started to form new association (e.g. *idiri, iqubi*) as a traditional residential area to strength social network perhaps the implication of adopting new environment. Social network in Addis Ababa is an important element in condominium life for developing culture of tolerance, smoothing conflict and accumulating social capital. It is an important element not only housing satisfaction but also for the overall life satisfaction. Similarly, Sirgy and Cornwell (2002) found that satisfaction with neighbours and tie with community significantly contribute for life satisfaction.

Safety and security are an important attribute for those sites frequently experience crime. With this regard respondents stress the importance of strength fence, gated locked and guardhouses manned service to control thieves and stranger frequent visit. However, Lideta and Gotera experience show dwellers are frequently experienced stolen even though the sites have such facility. The researcher belief that spatial separation is not the only solution for safety and security, instead strengthen societal network, promote social safety program, strength community police and ensure street lighting would have better result to alleviate driving factors of crime and social evils.

6.2. Condominium Contribution for Qulaity of Life

In Addis Ababa, much is unknown on the outcome of condominium contribution in addressing housing need of different income group and its impact on their quality of life. As indicated earlier, this study examine is how the condominium has contributed to improved quality of life or standard of living of dwellers. Numerous researches examined housing as a domain of quality of life and its effect on other domains such as material wellbeing, health, financial capability and general wellbeing of individuals (Zebardast, 2008). It is for this reason that the following section summarizes only the major condominium contribution for quality of life.

This study considered dwellers' housing satisfaction level as an indication of the quality of life. The research found that satisfaction and dissatisfaction determinants about condominium. The main finding of the study is that the dwellers of condominium are generally satisfied by having a dwelling for their family. Satisfied dwellers acknowledged that condominium contribution for modern life style, positive influence on saving culture, homeownership, sanitation improvement, improvement over previous housing location, a relief from chronic house shortage, culture of tolerance and mutual understanding among neighbours, better housing space management, privacy, freedom of using facilities and utilities. These factors are important ingredients for quality of life improvements. Previous studies held on housing and quality of life support this finding (Dunny and Kyle, 2007; Ilesanmi, 2012; Zebardast, 2008).

On the other side, dissatisfied dwellers depreciates condominium contribution for quality of life. The main causes are associated with housing cost burden, structural inconvenience for home-based business, absence of recreation and children playground, urban periphery site inaccessibility for basic social services. Therefore, previous studies suggest that housing condition to improve quality of life of dwellers should be affordable (Agnew, 2014), structurally convenient for low income group (Samaratunga, 2013), accessible (Zainal et.al., 2012), recreation and public amenities (Richards, O'Leary, and Mutsonziwa, 2006). A better understanding of their impact on dwellers satisfaction and overall quality of life will helps decision maker to responds on the gap.

Condominium project at macro level also has impact on overall quality of life. Ministry of Works and Urban Development (2010), Addis Ababa Housing Development Project Office (2005) reports and publication claimed that condominium project contribute for housing provision, thousands of job creation for micro and small-scale enterprise, strength of construction sectors and consultants, slum clearance, improvement in urban design, infrastructure development, alleviating social problem and poverty. Another study by UN Habitat (2011); Haregewoin (2007) also support this claim.

Evaluating the project performance and overall contribution for project beneficiaries' quality of life and city development as a whole are not the concern of this study. However, from the perspective of urban planning, habitat agenda and millennium development goal support the condominium project contribution for quality of life improvement. When we evaluate the housing condition of Addis Ababa, specifically slum area, condominium site is better serviced in terms basic infrastructure, public amenities, land use effectiveness and have improved site plan. Literature advocate these determinants improve urban quality of life (Serag El Din, Shalaby, Farouh, and Elariane, 2013; Yang, 2008). According to UN Habitat (2009) of the list of habitat agenda indicators: durable house structure, affordable house, tenure security, housing finance, access to basic service, solid waste disposal, slum clearance and mode of transport; condominiums in general have improvement in Addis Ababa housing conditions and general wellbeing of the city residents. However, these improve the urban quality of life and dwellers quality of life in sustainable way only the decision-makers will address the identified housing quality gaps.

6.3. Summery of Key Findings

From the quantitative and qualitative data analysis, the study key finding summarize as flows:

- The majority of housing units were 1 bedroom, and majority of one bed room occupied by 3 to 5 family size, and this is indication of crowdedness
- Majority of respondents spent more than 30% of their income for housing cost, this is indication of condominium is unaffordable for majority
- Overall sampled sites HQI was 5.62, and HQI variation of sites show that Lideta 6.23, Gotera 6.16, Bole Ayati l 5.24 and Jemmo ll 4.84.
- The overall condominium satisfaction was 54 % and the site satisfaction variation show that inner city respondents were satisfied and urban periphery dissatisfied
- All respondents acknowledge that condominium improved residential place than slum but housing quality was less than their expectation
- All sites were satisfied with sanitation domain and noise and security domain while all sites were dissatisfied with affordability domain and neighbourhood attraction domain
- There was huge accessibility satisfaction variation among inner city and urban periphery condominium site, for instance 90% of Gotera respondents were satisfied while Jemmo ll only 5.7% were satisfied
- The satisfaction and perception for ground floor was slightly higher than other floors as well as negative perception and low preference for top floor
- Not all respondents were satisfied with ground floor and not all respondents were dissatisfied with 4th floor
- Dissatisfaction and negative perception for top floor was associated with absence of elevators and ramp, potential risk for young children, low water pressure and lack of living experience in multi-storey house
- Homeowners satisfaction were greater than tenants satisfaction

7. CONCLUSION AND RECOMMENDATION

7.1. Conclusion

The main objective of this research is to assess Addis Ababa condominium dwellers' housing perception and satisfaction variability living on different floors of both inner city and urban periphery condominium sites. The main finding of the study is that the dwellers of condominium are generally satisfied by having a dwelling for their family. There were variation in the level of satisfaction among dwellers depending on whether the condominium is located in inner city or urban periphery, top floor or ground floor, better housing structural quality, accessibility of the condominium to major public service and utilities. Unaffordability, structure inconvenience for home-based business, absences of children playground, absence of adult recreation centre, absence of elevators and ramp, day and night bar noise and lack of living experience in multi-storey houses were the main contributing factors to the dissatisfaction of dwellers irrespective of site location and floor level.

On the other hand, the satisfaction and perception for ground floor was slightly higher than other floors as well as negative perception and low preference for top floor. The variation in satisfaction with respect to floor mainly associated with low water pressure power, absence of elevators, ramp and emergency exit, noise coming from ceiling, leakage from sanitary appliance and roof. However, to generalize the finding further verification is necessary. It is because this research did not control variables[11] besides floor variation, such as housing unit space, interior housing quality and respondent socioeconomic characteristics. Furthermore, of 30 indicators some of them are not significant effect on floors variation (for example, accessibility). Therefore, to come to conclusion on floors housing quality index variation with statistical analysis further investigation is necessary.

The perception of respondents about housing quality show both positive and negative. The positive perceptions were associated to homeownership, sanitation, privacy, availability of private water tape and electric meter and relatively better house and service facility as compared to slum. On the other hand, the negative perceptions were associated with financial constraint, considering previous location as a better place for the home based business, lack of living experience in multi-storey buildings, structural inconvenience for elders and physical disabled and potential risk of young children.

Based on the research findings, improving physical quality of buildings in terms of structure, space design, improving sites socio-physical characteristics of sites would increase condominium dwellers' satisfaction level. Taking the structural, physical, social, and economic and cultural needs of the dwellers' into account in the design, and construction of communal service building would improve housing quality and quality of life of the dwellers'.

7.2. Policy Implication

The main implication of the finding of this study is that condominium project office should consider the interest of the dwellers in the efforts to improve quality of condominium. The quality can be enhanced through integrated improved housing structure, site characteristics, socioeconomic and post occupancy housing management concept. Addis Ababa condominium project office, should take following measure to maximize dwellers housing satisfaction.

[11] Control variables in this research context indicators that used to measure the satisfaction variation between floors held constant in an analysis. For example to measure floors should conduct survey household with similar background using the same housing unit characteristics

The policy implication indicate that the future construction of condominium should be in responsive to dwellers needs in terms of improve overall structure quality, increase in dwelling unit space and best suit design. If the structure quality improves, the level of dissatisfaction and negative perception about condominium could decreases. Another policy potion is to build capacity of contractor, consultants and micro and small-scale enterprises and control construction material quality.

The policy implications are needed to arrange different methods of payment modality make down payment in several instalments, access long-term credit, lowering interest rate, increase housing finishing percentage from 80% to 100%. The issue of relocated homeowner need more attention. Providing house without livelihood is like make the poor poorer. In addition, formulate a tenancy agreement legal framework, controlling illegal broker intervention to protect the tenants' right are important. Promoting real-estate developer and housing cooperatives a measure to minimize housing demand and supply gap.

Accessibility in urban periphery site was the main reason for housing dissatisfaction. It need short term and long-term policy response. Regarding short term, response particularly for Jemmo ll site the city administration should launch public bus stops with proper connection to main dwellers destinations. Concerning health centre facility as a short-term response of the city administration should start ambulance service in the sites. In the long-run the city administration need also to plan construction of schools, health centre and open market centres in nearby places to address the needs of dwellers who cannot afford to buy services from private sectors.

On the other side, homeowners and tenants those not afford to live in condominium were let out their housing unit back to slum and/ or more convenient place for their life. The policy implication is that housing policy should provide more housing design options according to their income level, physical disability and need and expectation of society. Furthermore, awareness creation strategies also are required regarding managing sharing housing structure as well as space and to strengthen social network. These contribute for fostering urban quality of life.

Detached house or row house is not realistic option in current population growth and demand of house in case of Addis Ababa. This in turn raises issues of how to construct the quality condominium to satisfy all income groups, age group, disabled. Particularly relocated homeowners who do not have livelihood to pay mortgage in extreme case those do not have anything to feed themselves need practical solution to ensure livelihood and homeownership. The condominium program also should consider children need by providing playground and constructing safe staircase and protected corridor wall. Elders and disabled who are unable to climb staircase need special attention, even though some homeowners are privileged to get the ground floor. This solution only considered those disabled before owning the condominium, others who physically disabled after own the house and elders live in very troubled situation because of absence of stair and ramp. The issue of tenants also seems out of condominium mandate, but a department, housing transfer and post occupancy management, under Addis Ababa condominium project office should pay attention to protect their right as dwellers. Therefore, the research creates a pathway for urban professionals and housing developers to move beyond providing house is not the only solution to satisfied dwellers and improve the quality of life.

7.3. Contribution of the Reasearch

Housing satisfaction and perception research is not new in developed countries. Literature in Addis Ababa condominium context was limited. It is also imperative to ask how previous studies addressed the subject. In this regards no study has been explicitly address the condominium dwellers satisfaction and perception with mixed methods approaches i.e. by mixing statistical, qualitative and spatial analysis methods.

7.3.1. Contribution for Urban Planning

As urban planner, imperative to ask, "What is the research finding implication for urban planning?" The finding shows that how site characteristics affect respondents' level of satisfaction. The majors' one were site a**e**sthetic view, accessibility, neighbourhood attraction, noise and security aspects. Neighbourhood attraction domain in all sites and accessibility domain in urban periphery were the main determinates for respondents dissatisfaction. Planners should look at how to create favourable conditions to improve site characteristics with improving existing situation and planning new service location. In terms of accessibility, planners should play a greater role by planning new service location, by incorporating children playground and adult recreation centres. Furthermore, from mixed land use (mixing residential and commercial use) perspective, planner should pay attention in current situation of day and night bars in the sites i.e. social cost and benefit should be studied beside their effect on housing dissatisfaction.

7.4. Limitation of the Study and Recommendation for Further Study

In empirical literatures survey it was quite challenging to find floor variation effect on housing satisfaction and perception. Besides, lack of similar study in Addis Ababa context was a challenge. To compensate these empirical literatures in high-rise buildings and developing country, low cost housing studies were reviewed.

Value variation and satisfaction from person to person has its own limit on subjective measure of quantitative analysis, most residents are satisfied on their housing conditions regardless of objective condition because of some important elements satisfying them (Berhe et al., 2013; McCrea et al., 2013). To overcome subjective based quantitative analysis limitation, qualitative analysis such as picture and textual code, and spatial analysis were used to enhance result reliability.

Spatial data quality was one of limitations of the study. Particularly data coding inconsistency and missing of important attributes (population size) were the challenge during analysis. For instance, the building had no height value, z-coordinate value, building ID on data and building ID on ground was quite different. Number of building on data and on site was different. To overcome this limitation extensive data editing techniques was implemented. Among these, building that was not on ground was using Google Earth image and site local development plan, then analysis was made after assigning new ID and height value. The road network also topological error (have dangles, intersection and overlapping) problem. Because of time limitation, the researcher cannot edit this entire problem to perform network analysis of service area. Instead, I perform multi ring buffer to analysis proximity.

Based on this research finding some recommendations exist for further research. To get a full picture of existing condominium condition in Addis Ababa more sample sites, sample blocks and respondents are recommended. Furthermore, an effort should be put to collect quality spatial data that having building heights, demographic and socio economic characteristics of condominium dwellers; social service point data and road centreline. This will allow for mapping quality 3D building map, to perform network analysis, population serviced and to recommend potential social service location in future planning. Using a city engine 3D Geo information tool and Google Sketch also a suggested to for 3D visualization.

During the course of the research, the researcher realized that housing quality could not be assessed only by reviewing international standards and indicators. During further investigation, some of housing quality issues raised was unique and perhaps only visible in case of Addis Ababa. Therefore, housing quality indicators should be selected and considered in the local context as much as possible.

Furthermore, housing satisfaction and perception is wide and complex i.e. it includes architectural, economic, social, cultural, environmental, geographical and political issues. The scope of this research does not fully address all of these elements; instead focus on housing unit characteristics, locational attributes and few socioeconomic aspects with respect to urban planning. Finally developing a macro research project is a suggested direction for further research.

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APPENDICES

Appendix Table 1 inner city condominium sites housing quality index and standard deviation

Housing Quality Indicators		Inner City			
		Lideta		Gotera	
		HQI	Standard Deviation	HQI	Standard Deviation
1	Structural quality	5.97	2.4	5.63	2.2
2	Room Space	7.32	2.5	5.15	2.4
3	Sanitary Appliances Installation	7.26	3.0	5.46	2.9
4	Corridor Space	6.84	3.1	5.71	3.1
5	Staircase Quality	8	2.7	6.38	2.9
1	Dawn Payment	6.57	3.9	7.94	4.1
2	Finishing Cost	5.64	3.3	5.88	3.2
3	Mortgage Repayment	5.43	3.5	7.69	4.1
4	Rent Cost	3	2.3	4.08	2.6
1	Water Supply	3.16	2.4	8.9	2.0
2	Electricity Supply	5.9	2.9	8.05	1.9
3	Cell Phone Network Connection	7.13	2.5	6.66	2.8
4	Communal Service Building	0.65	1.8	1.25	1.1
1	Mode of Transport Availability	7.26	2.8	8.18	2.4
2	Proximity to Workplace	7.9	2.4	8.37	2.1
3	Proximity to School	8.42	2.4	7.79	2.5
4	Proximity to Health Centre	8.13	2.8	8.47	2.4
5	Proximity to Shopping Centre	7.19	2.8	7.98	2.5
1	Solid Waste Disposal	8.29	2.2	5.6	3.3
2	Drainage System Functionality	7.77	2.4	7.24	3.0
1	Green Area	7.48	2.3	6.02	3.1
2	Parking Lot	7.77	2.6	5.88	3.0
3	Children Play Ground	1.23	2.7	1.49	2.6
4	Adult Recreation Centre	2.03	2.7	4	3.8
5	Neighbourhood Cleanliness	6.45	2.8	6.1	3.2
1	Absence of Bar Noise	7.29	3.4	5.15	3.7
2	Absence of Sharing Flat Noise	6.1	3.1	5.36	3.4
3	Feeling Safe and Secure	5.61	2.7	5.49	3.1
4	Privacy Level	8.84	1.9	7.8	2.8
5	Social Network	6.24	3.5	5.05	3.7
Site standard deviation (SD)			**2.7**		**2.9**
Housing Quality Index (HQI)		**6.23**		**6.16**	

Appendix Table 2 Urban periphery condominium sites housing quality index and standard deviation

Housing Quality Indicators		Urban Periphery			
		Bole Ayati l		Jemmo ll	
		HQI	Standard Deviation	HQI	Standard Deviation
1	Structural quality	5.23	2.4	5.23	1.8
2	Room Space	5.53	3.0	6.53	2.3
3	Sanitary Appliances Installation	4.5	3.0	4.75	2.8
4	Corridor Space	4.57	3.1	6.11	3.1
5	Staircase Quality	6.58	2.9	5.26	3.3
1	Dawn Payment	5.48	3.6	6.21	2.6
2	Finishing Cost	4.09	2.8	4.11	2.9
3	Mortgage Repayment	5.17	3.4	7.11	2.7
4	Rent Cost	3.87	2.6	3.06	2.8
1	Water Supply	4.48	3.4	8.00	1.9
2	Electricity Supply	4.96	2.6	6.47	2.4
3	Cell Phone Network Connection	6.2	2.3	5.09	2.8
4	Communal Service Building	2.49	2.9	3.03	3.3
1	Mode of Transport Availability	7.64	2.3	4.09	2.6
2	Proximity to Workplace	5.61	2.8	4.68	2.4
3	Proximity to School	6.64	2.7	0.67	2.1
4	Proximity to Health Centre	5.02	2.6	0.08	0.4
5	Proximity to Shopping Centre	5.37	2.9	3.31	2.5
1	Solid Waste Disposal	5.46	2.7	6.83	2.5
2	Drainage System Functionality	6.54	2.8	5.17	3.3
1	Green Area	4.33	3.4	4.29	2.9
2	Parking Lot	4.61	3.7	5.51	2.8
3	Children Play Ground	1.48	3.2	1.62	2.7
4	Adult Recreation Centre	1.7	3.2	1.09	1.9
5	Neighbourhood Cleanliness	5.37	3.1	4.72	2.9
1	Absence of Bar Noise	6.42	3.7	5.97	3.3
2	Absence of Sharing Flat Noise	5.4	3.2	4.56	2.7
3	Feeling Safe and Secure	7.44	2.6	6.5	2.3
4	Privacy Level	7.57	2.8	7.53	2.8
5	Social Network	7.56	2.9	6.78	2.6
Site standard deviation (SD)			**3.0**		**2.6**
Housing Quality Index (HQI)		**5.24**		**4.84**	

Appendix Table 3 Frequency distribution Table of the main dataset (N=263)

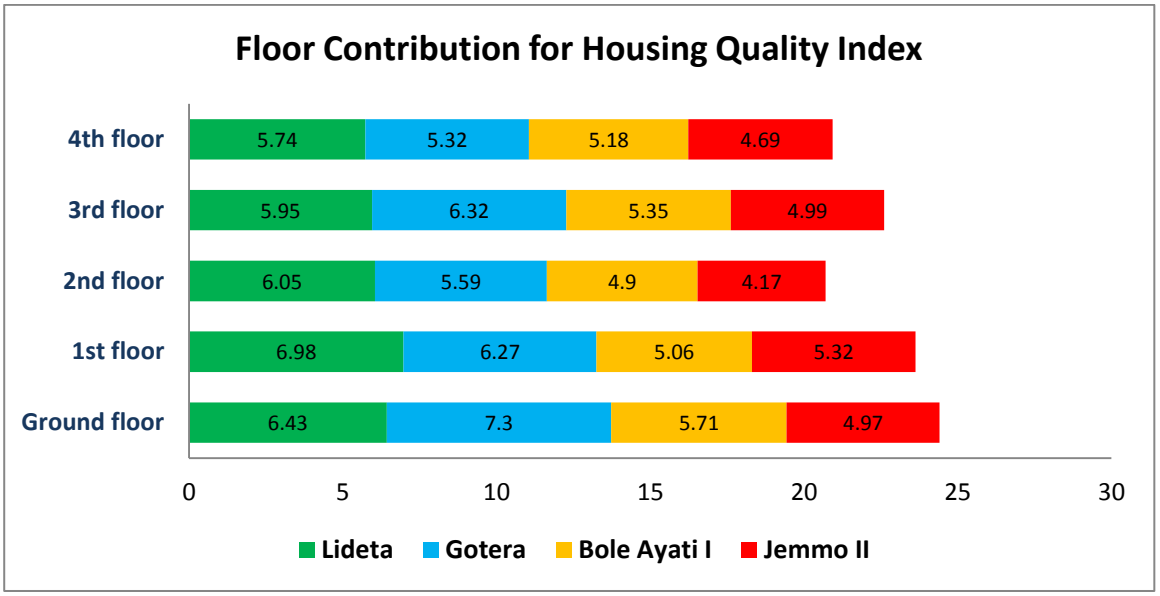
Housing Quality Indicators	Likert Scale	Median	Mode	Range	Minimum	Maximum
Structural quality	0 -10	5	5	10	0	10
Room Space	0 -10	6	5	10	0	10
Sanitary Appliances Installation	0 -10	5	10	10	0	10
Corridor Space	0 -10	5	5	10	0	10
Staircase Quality	0 -10	5	10	10	0	10
Dawn Payment	0 -10	5	10	10	0	10
Finishing Cost	0 -10	5	5	10	0	10
Mortgage Repayment	0 -10	6	10	10	0	10
Rent Cost	0 -10	4	5	10	0	10
Water Supply	0 -10	7	10	10	0	10
Electricity Supply	0 -10	7	5	10	0	10
Cell Phone Network Connection	0 -10	7	8	10	0	10
Communal Service Building	0 -10	0	0	10	0	10
Mode of Transport Availability	0 -10	8	10	10	0	10
Proximity to Workplace	0 -10	7	10	9	1	10
Proximity to School	0 -10	7	10	10	0	10
Proximity to Health Centre	0 -10	5	0	10	0	10
Proximity to Shopping Centre	0 -10	6	10	10	0	10
Solid Waste Disposal	0 -10	7	10	10	0	10
Drainage System Functionality	0 -10	8	10	10	0	10
Neighbourhood Cleanliness	0 -10	6	10	10	0	10
Green Area	0 -10	5	5	10	0	10
parking lot	0 -10	6	8	10	0	10
Children Playground	0 -10	0	0	10	0	10
Adult Recreation Centre	0 -10	0	0	10	0	10
Absence of Bar Noise	0 -10	7	10	10	0	10
Absence of Sharing Flat Noise	0 -10	6	10	10	0	10
Feeling Safe and Secure	0 -10	7	10	10	0	10
Privacy Level	0 -10	9	10	10	0	10
Social Network	0 -10	7	10	10	0	10

Appendix Table 4 Floor Contribution for Housing Quality Index in Inner City Condominium Site

Housing Quality Indicator	Inner City									
	Lideta					Gotera				
	Ground floor	1st floor	2nd floor	3rd floor	4th floor	Ground floor	1st floor	2nd floor	3rd floor	4th floor
Structural quality	5.57	6.57	5.80	6.17	5.67	7.13	5.88	4.89	4.50	5.67
Room Space	5.43	8.00	7.80	7.50	6.50	6.50	5.13	3.78	5.63	4.83
Sanitation appliance installation	7.14	7.00	8.00	8.33	6.00	6.25	5.50	6.89	4.63	4.83
Corridor space	8.57	8.29	7.40	7.33	4.00	8.13	5.75	4.33	5.00	4.33
Staircase quality	8.43	9.14	8.60	8.33	4.83	8.00	8.25	5.33	5.63	4.00
Dawn Payment cost	6.25	8.50	6.50	3.50	7.50	7.33	9.00	5.75	9.00	8.00
Finishing Cost	6.50	8.00	4.50	3.50	5.25	7.00	6.00	4.25	8.00	5.00
Mortgage cost	6.50	7.00	0.50	4.50	6.50	9.00	7.25	5.50	8.50	8.00
Rent Cost	3.00	3.20	3.00	3.00	2.50	4.40	3.50	2.60	5.00	4.50
Water Supply	4.43	4.43	2.60	2.17	1.67	9.86	9.78	8.43	7.25	8.83
Electricity supply	6.14	5.57	6.40	4.67	6.83	8.88	8.13	8.22	7.25	7.50
Cell phone network connection	6.57	8.29	8.00	7.17	5.67	8.88	7.14	5.11	6.13	4.83
Communal building service	1.00	0.29	0.00	1.83	0.00	1.50	0.29	1.22	2.13	0.50
Availability of mode of transport	9.14	8.14	8.00	5.00	6.83	9.38	7.88	8.11	7.71	6.00
Proximity to Workplace	8.71	8.00	9.20	7.33	7.50	9.25	8.13	9.22	8.50	7.67
Proximity to school	8.86	9.14	9.00	8.33	6.67	9.17	7.13	8.25	8.13	5.50
Proximity to Health centre	8.93	8.71	8.40	7.67	8.33	8.78	8.29	9.44	8.57	6.20
Proximity to Shopping centre	8.14	8.29	6.80	5.17	7.17	9.00	8.13	8.22	8.25	6.33
Solid Waste disposal	7.86	9.29	7.60	8.50	8.00	7.25	6.43	6.00	6.13	4.83
Drainage system	6.86	7.71	7.40	9.50	7.50	8.88	5.75	8.00	8.13	8.17
Green area	7.43	7.57	7.60	6.83	8.00	7.88	5.50	6.67	5.75	4.50
Neighbourhood cleanness	5.43	6.86	6.80	6.67	6.67	8.00	6.29	7.56	5.13	5.33
parking lot	6.57	8.33	8.00	8.83	7.33	7.63	5.29	5.00	6.50	4.83
Children Playground	1.17	2.71	0.00	1.67	0.17	3.13	2.60	1.11	2.88	1.00
Adult Recreation centre	4.17	1.43	0.00	2.33	2.00	4.57	4.38	3.22	4.75	2.50
Absence of Bar Noise	7.71	8.29	9.40	4.83	6.33	5.88	5.50	3.50	5.88	5.20
Absence of Sharing Flat Noise	5.86	7.71	5.40	6.00	6.33	6.38	6.00	2.89	5.88	3.80
Feeling Safe and secure	6.14	5.86	4.60	6.17	5.00	6.00	4.88	5.00	5.75	4.83
Privacy level	7.71	9.71	8.80	8.83	9.17	8.38	8.29	6.33	8.25	7.33
social Network	6.68	7.43	5.50	6.83	6.20	6.86	6.00	2.78	4.88	4.80
HQI Site Vs. Floor	**6.43**	**6.98**	**6.05**	**5.95**	**5.74**	**7.30**	**6.27**	**5.59**	**6.32**	**5.32**

Appendix Table 5 Floor Contribution for Housing Quality Index in Urban Periphery Condominium Site

	Urban periphery									
	Bole Ayati I					Jemmo II				
	Ground floor	1st floor	2nd floor	3rd floor	4th floor	Ground floor	1st floor	2nd floor	3rd floor	4th floor
Structural quality	5.11	5.33	5.00	5.63	5.44	6.00	5.43	5.86	4.71	4.80
Room Space	6.67	5.00	4.56	5.75	5.22	6.14	7.14	6.57	7.14	6.00
Sanitation appliance installation	5.67	5.22	4.22	2.78	4.78	5.71	5.00	4.29	4.71	5.50
Corridor space	4.44	4.11	4.33	5.63	4.38	6.17	7.43	5.29	6.57	6.50
Staircase quality	8.25	5.00	6.11	7.75	5.63	5.60	6.71	4.43	6.57	3.00
Dawn Payment cost	5.60	4.86	9.50	4.60	5.50	5.50	8.20	4.67	7.50	5.50
Finishing Cost	4.00	3.14	4.00	5.80	3.75	5.50	4.20	4.00	7.50	1.50
Mortgage cost	5.80	4.86	6.00	6.00	3.50	8.50	8.00	4.33	7.50	6.25
Rent Cost	4.00	6.50	3.00	2.25	5.00	3.67	2.50	2.25	4.00	3.50
Water Supply	7.33	4.56	4.11	3.67	2.33	7.53	9.14	7.43	7.57	7.17
Electricity supply	4.89	4.44	4.22	5.44	5.88	6.97	7.43	5.43	5.71	5.83
Cell phone network connection	7.44	6.67	6.11	5.89	5.00	7.16	5.33	4.71	5.00	4.67
Communal building service	2.00	1.25	1.63	3.33	4.22	2.33	4.14	3.29	1.43	2.00
Availability of mode of transport	7.11	6.33	8.43	7.78	6.44	3.14	5.33	3.14	4.14	5.67
Proximity to Workplace	6.22	5.56	6.11	4.33	5.33	4.14	6.71	4.43	4.33	3.60
Proximity to school	7.44	7.00	7.13	6.50	4.78	1.43	1.00	0.29	0.00	0.00
Proximity to Health centre	5.11	4.89	5.00	5.25	4.89	0.00	0.14	0.29	0.00	0.00
Proximity to Shopping centre	5.63	3.78	5.67	5.67	5.44	2.71	4.29	3.29	3.29	3.33
Solid Waste disposal	7.22	5.67	3.78	4.89	5.78	6.71	8.29	6.43	6.71	6.00
Drainage system	6.78	6.11	5.33	6.22	7.44	5.14	5.00	4.43	4.57	7.00
Green area	3.67	5.11	4.00	4.67	4.67	5.14	0.71	4.14	3.29	4.80
Neighbourhood cleanness	5.44	5.22	4.22	5.89	6.33	4.14	4.86	4.00	5.14	5.67
parking lot	5.50	4.89	3.78	5.38	4.22	5.57	7.44	5.00	4.86	6.17
Children Playground	1.67	1.44	2.44	2.00	0.00	1.29	1.17	0.50	1.86	1.67
Adult Recreation centre	2.89	2.89	0.00	2.44	0.44	0.00	1.65	0.86	1.57	1.17
Absence of Bar Noise	6.11	5.78	5.67	4.75	7.22	7.29	5.29	5.71	6.43	6.20
Absence of Sharing Flat Noise	6.78	4.00	4.13	5.89	6.33	5.50	4.33	3.14	4.57	6.33
Feeling Safe and secure	7.67	7.33	6.00	7.75	8.44	5.86	8.57	6.29	5.86	5.67
Privacy level	7.33	7.00	6.67	8.33	8.22	7.00	7.29	5.71	9.14	8.33
social Network	6.56	8.00	5.89	8.33	8.78	7.14	7.00	4.86	8.00	6.83
HQI Site Vs. Floor	**5.71**	**5.06**	**4.90**	**5.35**	**5.18**	**4.97**	**5.32**	**4.17**	**4.99**	**4.69**



Appendix Figure 1 Floor contribution for housing quality index

Appendix Table 6 Number of Health facilities within 3000 meter radius

Distance from the sites	Health facility	Inner city condominium site		Urban Periphery condominium site	
		Lideta	Gotera	Bole Ayati l	Jemmo ll
0-500 meter	Health centre	1	1	-	-
	Hospital	1	-	-	-
501 – 1000 m	Health centre	-	1	-	-
	Hospital	3	-	-	-
1001- 1500 m	Health centre	4	1	-	-
	Hospital	2	-	-	-
1501-2000 m	Health centre	6	6	-	-
	Hospital	-	-	-	-
2001 -2500 m	Health centre	6	2	1	-
	Hospital	-	-	-	-
2501-3000 m	Health centre	2	2	1	1
	Hospital	-	-	-	-
Aggregate within 3000 m radius	Health centre	19	13	2	1
	Hospital	4	-	-	-

Appendix Table 7 Number of school within 3000 meter radius

Distance from the sites	School facility	Inner city condominium site		Urban Periphery condominium site	
		Lideta	Gotera	Bole Ayati l	Jemmo ll
0-500 meter	Primary	6	-	1	-
	Secondary	1	2	-	-
501 – 1000 m	Primary	9	2	-	-
	Secondary	3	-	-	-
1001- 1500 m	Primary	6	1	-	-
	Secondary	4	1	-	-
1501-2000 m	Primary	9	1	-	-
	Secondary	3	1	-	-
2001 -2500 m	Primary	2	2	2	2
	Secondary	2	1	-	1
2501-3000 m	Primary	3	2	-	-
	Secondary	-	1	1	-
Aggregate within 3000 m	Primary	35	8	3	2
	Secondary	12	4	1	1

Appendix Table 8 Number of Market centre in 3000 meter radius

Market Distance from the sites	Inner city condominium site		Urban Periphery condominium site	
	Lideta	Gotera	Bole Ayati l	Jemmo ll
0-500 meter	5	1	-	-
501 – 1000 m	2	5	-	-
1001- 1500 m	10	5	-	-
1501-2000 m	17	6	-	-
2001 -2500 m	10	11	-	1
2501-3000 m	14	13	-	-
Aggregate market centre within 3000 m	58	41	-	1

Appendix Figure 2 Lideta site

Appendix Figure 3 Gotera site

Appendix Figure 4 Bole Ayati l site

Appendix Figure 5 Jemmo ll site

Appendix 2 **Questionnaire for Household Survey**

My name is Tigist A. Gebrewold MSc student in University of Twente, The Netherlands. The purpose of this study is to assess Condominium Dwellers' Quality of Life Perception and Satisfaction in Addis Ababa. The reason behind to assess the dwellers' satisfaction is to identify the housing quality effect on dwellers perception and satisfaction level and to indicate potential quality problems for future policy intervention. All answer you give is kept confidential. Therefore, I kindly request you to give real and honest answers for the following questions. I would like to thank you for your invaluable time devoted to respond the questions.

Questionnaire code

Name of Assistant
Interview Date
Sub city
Condominium Site name
Block number
Story number 1) Ground floor 2) Story one 3) Story two 4) Story three 5) Story four
House number

I. Socioeconomic data

1. Gender 1) male 2) female
2. Family size 1) 1-2 2) 3-5 3) 6 or above
3. Ownership status 1) Owner 2) Tenant
4. Percentage of income goes to rent or mortgage 1) below 10% 2) 11-20% 3) 21-30% 4) 31-40% 5) 41 -50% 6) Above 50%
5. House type 1) Studio 2) 1-bed room 3) 2-bed room 4) 3- bedroom

II. Housing Quality Indicators

For this questionnaire part, please indicate your level of satisfaction from zero to 10. Value **"0"** stands for "extremely dissatisfied" and **"10"** stands for "extremely satisfied". You have right to tell your experience in detail on each indicators.

Structure and space		Affordability	
6	Your satisfaction level with structure quality 0 1 2 3 4 5 6 7 8 9 10	10	* Your satisfaction level on dawn payment affordability 0 1 2 3 4 5 6 7 8 9 10
7	Your satisfaction level with room space sufficiency 0 1 2 3 4 5 6 7 8 9 10	11	* Your satisfaction level on finishing cost affordability 0 1 2 3 4 5 6 7 8 9 10
8	Your satisfaction level with corridor space 0 1 2 3 4 5 6 7 8 9 10	12	* Your satisfaction level on monthly mortgage repayment affordability 0 1 2 3 4 5 6 7 8 9 10
9	Your satisfaction level with stair quality 0 1 2 3 4 5 6 7 8 9 10	13	** Your satisfaction level on rent cost affordability 0 1 2 3 4 5 6 7 8 9 10
	Your satisfaction level in sanitation system installation 0 1 2 3 4 5 6 7 8 9 10		

*skip this question for tenant ** skip this question for house owner

Utility and Service		Neighbourhood Attraction	
14	Your satisfaction level with water supply 0 1 2 3 4 5 6 7 8 9 10	27	Your satisfaction level at neighbourhood green area 0 1 2 3 4 5 6 7 8 9 10
15	Your satisfaction level with electricity supply 0 1 2 3 4 5 6 7 8 9 10	28	Your satisfaction level with parking lot 0 1 2 3 4 5 6 7 8 9 10
16	Your satisfaction level with cell phone network connection 0 1 2 3 4 5 6 7 8 9 10	29	Your satisfaction level at children plays ground 0 1 2 3 4 5 6 7 8 9 10
17	Your satisfaction level with communal service building? 0 1 2 3 4 5 6 7 8 9 10	30	Your satisfaction level with recreational service of your site 0 1 2 3 4 5 6 7 8 9 10
			Your satisfaction level in neighbourhood cleanness 0 1 2 3 4 5 6 7 8 9 10
Accessibility		Noise and security	
18	Your satisfaction level with availability of mode of transport 0 1 2 3 4 5 6 7 8 9 10	31	Your satisfaction level absence of noise from day and night bar 0 1 2 3 4 5 6 7 8 9 10
19	Your satisfaction level with your house proximity to your work place 0 1 2 3 4 5 6 7 8 9 10	32	Your satisfaction level absence of noise from sharing flat 0 1 2 3 4 5 6 7 8 9 10
20	Your satisfaction level with your house proximity to public school 0 1 2 3 4 5 6 7 8 9 10	33	To what extent do you feel safe and secure in your neighbourhood? 0 1 2 3 4 5 6 7 8 9 10
21	Your satisfaction level with your house proximity to public health centre 0 1 2 3 4 5 6 7 8 9 10	34	Your satisfaction level at privacy feeling 0 1 2 3 4 5 6 7 8 9 10
22	Your satisfaction level with your house proximity to shopping centre or market 0 1 2 3 4 5 6 7 8 9 10	35	Your satisfaction level at neighbourhood social network 0 1 2 3 4 5 6 7 8 9 10
Sanitation			
23	Your satisfaction level in solid waste disposal service 0 1 2 3 4 5 6 7 8 9 10		*In Question 31 and 32 high value in indicate high noise and low satisfaction and vice versa
24	Your satisfaction level in drainage system connection 0 1 2 3 4 5 6 7 8 9 10		

36. Could you tell me any challenge experienced because of living in condominium?
37. How do you perceive about your floor?
38. To what extent condominium affects your quality of life?
39. Could you tell me any suggestion about further housing quality improvement?

Appendix 3 **Questionnaire for Focused Group Discussion**

My name is Tigist A. Gebrewold MSc student in University of Twente, The Netherlands. The purpose of this study is to assess Condominium Dwellers' Quality of Life Perception and Satisfaction in Addis Ababa. The reason behind to assess the dwellers' satisfaction is to identify the housing quality effect on dwellers perception and satisfaction level and to indicate potential quality problems for future policy intervention. All answer you give is kept confidential. Therefore, I kindly request you to give real and honest answers for the following questions. I would like to thank you for your invaluable time devoted to respond the questions.

Questionnaire code
Interview Date
Sub city
Condominium Site name
Number of participants

1. How do you evaluate your condominium site quality in terms of the following housing quality domains
    - Neighbourhood attractiveness
    - Noise and security
    - Accessibility
    - Utility and service provision
    - Sanitation
    - Affordability
    - Structure
2. Which floor are you preference? Why?
3. How do you perceive condominium contribution for quality of life of dwellers?
4. What do you suggest for further policy intervention in housing quality improvement?

Appendix 4 **Questionnaire for Government official**

My name is Tigist A. Gebrewold MSc student in University of Twente, The Netherlands. The purpose of this study is to assess Condominium Dwellers' Quality of Life Perception and Satisfaction in Addis Ababa. The reason behind to assess the dwellers' satisfaction is to identify the housing quality effect on dwellers perception and satisfaction level and to indicate potential quality problems for future policy intervention. Therefore, I kindly request you to give real and honest answers for the following questions. I would like to thank you for your invaluable time devoted to respond the questions.

Questionnaire code
Interview Date
Position title

1. How do you evaluate condominium quality in terms of the following housing quality domains

    - Neighbourhood attractiveness
    - Noise and security
    - Accessibility
    - Utility and service provision
    - Sanitation
    - Affordability
    - Structure
2. How do you intervene in some condominium quality problems that contribute for dwellers dissatisfaction?
3. How do you perceive condominium contribution for quality of life of dwellers?
4. What do you suggest for further policy intervention in housing quality improvement?