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Thesis: Housing Social Spaces and its Influence on Social Capital Formation in Low-Income Housing, Dhaka, Bangladesh.

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Summary

The housing deficit in Bangladesh, particularly in Dhaka, has escalated into a major crisis in recent decades. This deficit not only refers to the physical quality, quantity, or urban space discrepancies but also includes the lack of non-physical and social features in housing (Borja, 2018). In Dhaka, most of the policies and research are focused on addressing quantitative and qualitative aspects, neglecting the social and cultural dimensions. Traditional socialization practices are formed through shared communal social spaces, where spontaneous social, cultural, and domestic activities promote a cohesive environment. These social spaces in Bengali housing complexes are as significant as physical amenities, and they allow the dwellers to interact and build social capital, particularly in low-income housing where resources are limited.

Considering the significance of socially significant spaces in housing settings, this research adopts the qualitative method and utilizes the lens of Lefebvre's spatial triad to examine the impact of social spaces on social capital formation in low-income housing. It explores how housing social spaces are conceived, perceived, and lived in fostering bonding and bridging capital in the context of Dhaka. By employing a case study approach, this research collected primary data through observation techniques and conducted interviews with 25 housing dwellers, and 5 housing experts. Additionally, secondary spatial documents were also reviewed to triangulate the primary data.

The research identifies that the spatial allocation of the studied housing is determined by socio-economic factors rather than individual preferences. Despite this fact, available social spaces significantly support enhancing social engagement and community ties. Findings underpin that the perceived, lived, and conceived spaces, as the independent variable, influence the dependent variable, bonding capital to a better extent which helps the communities to come together on a daily basis. However, only lived and perceived spaces moderately influence bridging capital formation, with results showing exclusion and gender imbalance. The research found no significant impact of conceived spaces on bridging capital formation.

This research underlines the importance of integrating housing social spaces that reflect low-income communities' cultural and social practices in fostering social capital. It contributes to urban housing literature by highlighting how dwellers utilize such spaces to build supportive community networks and also advocates for urban housing development that promotes functional and socially supported environments to improve the well-being of low-income communities in Dhaka.

Keywords:

Social space, Spatial hierarchy, Social Capital, Spatial triad, and Low-Income Housing.

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"Through this humble academic contribution, I dedicate this research to my late parents."

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Abbreviations

Abbreviation	Full form
IHS	Institute for Housing and Urban Development Studies
EUR	Erasmus University Rotterdam
DCC	Dhaka City Corporation
BBS	Bangladesh Bureau of Statistics
NGO	Non-Governmental Organisation
RAB	Rapid Action Battalion
OKP	Orange Knowledge Programme
SDG	Sustainable Development Goals
DV	Dependent Variable
IV	Independent Variable
BDT	Bangladeshi Taka
MoW	Ministry of Housing and Public Works

Chapter 1: Introduction

1.1 Background:

Due to political and economic forces, the quality of urban living in Dhaka has steadily declined in recent years, both socially and physically (Siddiqua, 2011). Despite numerous initiatives aimed at improving living conditions, a significant percentage of its inhabitants, particularly those in low-income brackets, continue to struggle to cope with inadequate housing necessities. These deficiencies are not only limited to physical structure but also essential social amenities. Housing development reflects the essence of society, embodying culture and internal social dynamics (Islam, 2003), and in the context of socially active, close-knit Bengali communities, social spaces are imperative for fostering social ties. The numerous studies consistently emphasize, how these spaces effectively contribute to improving the conditions of residential areas (Carmona, 2015; Woolley et al., 2004) by giving a way to engage with the wider environment and benefit from the human rights of a safe and social environment while considering the expression of cultural identity (Acioly, 2021; Chiodelli, 2016). However, these spaces are largely ignored and out of reach for low-income housing within the city. The Building Construction Act of 2008 in Dhaka, provided guidelines for allocating 4% communal space and 10% for open areas in the built environment (Siddiqua, 2011), besides, 91 percent of Dhaka's inhabitants from both planned and organic areas prefer inherent social and physical housing environments (Mowla, 2003; Siddiqua, 2011). However, due to limited financial resources, low-income populations often struggle to manage basic housing with social and physical infrastructure (Ahmed, 2014).

In tropical countries like Bangladesh, social spaces play functional, cultural, and environmental roles within the housing settings. Moreover, social spaces exhibit a hierarchy of spaces, which includes small yards to large outdoor communal spaces, as a result of the traditional practice of socialization (Siddiqua, 2011). These social spaces, which refer to unbuilt or built, semi-open, or open areas, are harmonious with the built environment and facilitate interaction, community bonding, and other social attributes (Gulati, 2020). Bonding capital involves social connection within homogenous groups (Putnam, 2000), and such an indoor or outdoor yard has the potential to facilitate a focal point for the development of bonding capital among family members, neighbors, or close friends by offering several levels of privacy and direct interaction (Munni, 2010; Siddiqua, 2011). Conversely, bridging social capital connects diverse individuals from various backgrounds (Putnam, 2000), where outdoor communal spaces provide arenas for people from various socioeconomic, and cultural backgrounds to exchange views and reinforce communal ties (Gulati, 2020; Siddiqua, 2011), which is fundamental for social support and mutual aid in low-income communities with limited resources.

Recent studies have extensively addressed the integral association between the housing and built environment along with the development of social capital (Chandrasekara, 2021; Forrest & Kearns, 2001). Jacob (1961) noted that neighborhood social networks play a self-governing role in developing a safe and active environment for people. Unfortunately, the amalgamation of these culturally supported social spaces within the urban fabric has been widely overlooked in the housing and planning policy (Siddiqua, 2011; Mowla, 2003), particularly for low-income and vulnerable populations (Lata, 2022), leading to a loss of communal and mutual support for the formation of social capital in Dhaka. Therefore, understanding the interplay between socio-spatial arrangements and community dynamics, thereby fostering social capital, is significant for providing comprehensive insights. For planners and policymakers, comprehending the social profile alongside the necessity of the physical infrastructure of housing is vital for the development of a more socially cohesive and inclusive city.

1.2 Problem Statement:

Roughly 1.8 million people in Bangladesh face an adequate housing deficiency, and around 0.88 million of them currently live in Dhaka, as reported by the Census of Population and Housing (BBS, 2022). Recent studies suggest that adequate housing is not only a physical asset but also incorporates social dimensions (Ayala et al., 2019). Around 35% of the 22.4 million people in greater Dhaka belong to the low-income bracket compared to other income groups. Dhaka, with an exponential annual growth rate of 3.3% (BBS, 2022), is immensely stressed to provide equal services in low-income housing areas. These housing areas often face dual challenges of high-density living conditions and inadequate access to amenities, compounded by a lack of sufficient socio-spatial layout in their immediate surroundings (Lata, 2022). These low-income housing more often tend to be located in unprivileged settings, characterized by poverty, social exclusion, and a lack of social infrastructure (Gelder, 2013; Lata, 2022).

The significance of built and un-built social spaces in housing has been highlighted by several researchers (Gulati, 2020). These spaces serve as more than mere physical extensions of living quarters, evolving into dynamic interactional spaces, and enriching the fabric of societies (Shabak, 2023; Siddiqua, 2011). Regardless of the legal framework introduced in March 2004, by the Ministry of Housing and Public Works, emphasizing requirements for a liveable environment, as the development regulation for housing projects (Siddiqua, 2011), in Dhaka, visible discrepancies still persist in the spatial distribution among different socioeconomic groups (Lata, 2022). Additionally, public and private housing projects significantly favor middle to upper-income groups over low-income and vulnerable groups (Lata, 2022). Furthermore, it demonstrates the disparities in housing consumption, affecting both the physical and social needs of different socioeconomic groups (Nahiduzzaman, 2012).

Empirical research shows social capital, in its bonding and bridging forms, portrays a dynamic role in determining community outcomes in the global south (Agnitsch et al., 2009). In Bengali culture, traditional socialization practices are formed through hierarchical indoor and outdoor yards into shared communal spaces, where spontaneous activities, including domestic-to-social practices, promote a collective environment and strengthen social ties (Munni, 2010; Siddiqua, 2011). Despite the cultural and legal context, the city's low-income communities are predominately marginalized and often suffer from the lack of necessary spatial provisions for their sociocultural practices (Lata, 2022). These communities, with limited or no access to available social spaces, face significant challenges in fostering social capital, leading to further marginalization, and hampering the ability to participate fully in communal and social life.

According to Lefebvre (1991), social relationships are formed through and in the organization of space, and these spaces are not static but rather continually shaped by ongoing social interactions (Massey, 2005). Besides, Lefebvre's spatial triad of perceived, conceived, and lived spaces, provides a framework to comprehend the interplay between individuals' perceptions, conceived standards, and lived experiences of space. A context like Dhaka, where municipal and public housing schemes often allocate comprehensive facilities of well-planned housing with social and cultural benefits for privileged communities, frequently overlooking low-income people, highlights the gap between the state's vision for the city and reality (Lata, 2022). Hence, it's necessary to understand the significance of traditional social spaces and their influence on the formation of societal ties for the well-being and proficiency in the day-to-day activities of low-income people (Woolley et al., 2004). Thus, this research aims to study how housing social spaces are conceived, perceived, and lived in fostering bonding and bridging capital in low-income demographics in Dhaka.

1.3 Research Gap:

Housing social space analysis for low-income demographics in contemporary urban research is absent due to planning and policy ignorance and is regarded as a rural matter. Existing research highlights the physical environment and its fundamental association with social capital (Chandrasekara, 2021). Many scholars have criticized the insufficient attention given to the social aspects of sustainable development (Bramley et al., 2009; Hemani & Das, 2015). Moreover, some scholars have explored the link between social sustainability and urban form (Hemani & Das, 2015; Bramley & Power, 2009), but these studies often lack an in-depth exploration of culturally enhanced social spaces in urban settings and are unable to provide a comprehensive framework to clarify their complexities (Jabareen & Eizenberg, 2020), particularly for low-income housing in Dhaka. Hence, there is a notable gap in understanding their influence on bonding and bridging capital from a more comprehensive lens, such as Lefebvre's spatial triad. Therefore, this study intends to fill the identified research gaps by demonstrating people's perceptions, conceptions, and living experiences in these social spaces and their influence on fostering social capital.

1.4 Research relevance:

1.4.1 Academic Relevance:

The existing studies on social capital in urban vulnerable populations consistently lack a well-developed analytical framework (Mpanje et al., 2018). Despite the availability of existing data on context-specific housing deficiency, it remains difficult to describe the social reality and its relation to the physical settings (Imeplan, 2021). Addressing this, more multi-faceted perspectives on social capital in low-income settings are required, to enhance the knowledge of its function and mechanism for promoting societal development (Seferiadis et al., 2015). This research's relevance lies in contributing to a clear understanding of the association between available social spaces in low-income housing, and their impact on the daily lives of this particular population's social capital formation. This study dwells on these gaps by exploring the real-time experiences of individuals in forming communal ties, particularly in forms of bonding and bridging capital. This study will utilize Lefebvre's spatial triad, which offers a framework to examine space from both social and physical perspectives in a specific setting where marginalization is a priority (Lefebvre, 1991). Furthermore, this research is expected to advance the understanding of spatial and context-specific practices, paving the way for a more socially inclusive interpretation of space (Banerjee, 2023).

1.4.2 Practical Relevance:

The practical insights gained from examining the spatial influence on social capital are crucial for policymakers and planners. These insights are imperative for integrating spatial consideration into the low-income housing context, as an essential component (Banerjee, 2023). The outcomes of this research are likely to aware and equip the planners and policymakers with deeper comprehensiveness to address housing's actual social needs based on culture and tradition. By examining the socio-spatial dynamics of Dhaka's low-income housing, this research will shed light on the spatial conditions necessary to create and preserve social capital, to improve the living conditions of low-income communities.

1.5 Research Objectives:

To comprehend the socio-spatial practices within low-income housing communities, this study aims to examine social capital formation through Lefebvre's spatial triad. The research objectives are to investigate how existing physical layouts of social spaces are perceived by people, conceived by planners and policymakers, and how they are experienced and lived by the people within the specific housing situation.

Therefore, the main objectives are:-

1. To examine the functionality and utilization of existing housing social spaces.
2. To examine how the availability and utilization of housing social spaces contribute to the development of bonding and bridging capital.
3. To identify how these spaces are perceived, conceived, and lived in the formation of bonding and bridging capital.

1.6 Research Questions:

Main Research Question: How do social spaces in low-income housing influence social capital formation in Dhaka, Bangladesh?

The research sub-questions:

1. How are the primary social spaces utilized by residents within the low-income housing in Dhaka?
2. What role do such spaces play in fostering bonding and bridging social capital among inhabitants?
3. What is the relationship between the perceived, conceived, and lived spaces with bonding and bridging capital in the observed housing?

Chapter 2: Literature Review

This literature review discusses a broader theoretical framework within the academic discourse, relevant to this research. This will contextualize the study by synthesizing the existing knowledge and theories and will connect with and build upon previous studies. This review is structured to start with a specific contextual understanding and then delve into the concept of social capital and Henri Lefebvre's spatial triad and their intersection within the housing context. Subsequently, it will conclude with a conceptual framework guiding further analysis.

2.1 Housing and Socio-Cultural Dimensions:

The social dimensions of housing settings are as important as the physical components it embodies. Extensive literature indicates that housing, while primarily composed of physical components, also comprises significant social dimensions, often referred to as the social architecture or intangible aspect (Borja, 2018; Cortés-Urra et al., 2024). These non-physical dimensions are experienced by individuals as they inhabit homes and form societal ties and relations (Cortés-Urra et al., 2024). The housing environment is a comprehensive factor in shaping and maintaining communities, acting as a fundamental feature of enhancing the quality of life, extending beyond mere statistics and fiscal matters (Ashraf, 2012). Ukoha and Beamish (1997) argue that the success of housing cannot be measured by the number of dwelling units added, it must address the appropriateness of these units to fulfill the actual social and physical requirements of individuals.

Cultural influence on the built forms of housing often portrays sociocultural values and traditions. Housing is not just a process of living in a setting; it is also a tangible manifestation of how people live (Oliver, 1987). The existing body of knowledge, particularly regarding space design and usage in traditional settlements, is extensive and complex, often competing with the theoretical validity (Ghafur, 2005). The housing discourse is inherently interdisciplinary, with various authors recognizing the significant role of culture in the organization and usage of space (Ghafur, 2005). Rapoport (1969), and Oliver (1987) are notably influential scholars in exploring the relationship between space organization, built environment, and culture. They agree on a link between culture and built forms (Ghafur, 2005). Rapoport (1983) broadly defines culture as a group of individuals with collective values and beliefs transmitted through enculturation where the built environment can either support or undermine lifestyles, value systems, and norms (Rapoport, 1973). Additionally, the family focus and community bonds are deeply integrated into the dwelling in its cultural contexts (Oliver, 1987), whereas Taylor and Harrell (1996) asserted that inhabitants prefer an environment influenced by social conditions in addition to safety and security.

The housing layout significantly influences the residents' interaction and development of societal relations (Farida, 2013), Jacobs (1961) claimed that traditional neighborhood arrangements improve social life, with tangible features enabling social interactions. Similarly, Gehl (1987) explored the relationships between usage and scale, while Bonaiuto et al. (1999) observed that a sense of belonging is one of the significant features in housing satisfaction. An appropriate spatial scale encourages individuals to participate in natural activities, and well-defined housing spaces foster community interactions (Farida, 2013) which is pivotal for long-term social capital formation.

In the context of Bangladesh, satisfying housing spaces are crucial for the holistic growth of the society. Bengali people are known for their vibrant community relationships, and often live in large extended households where living, praying, and fasting all together signify not just lifestyle but deep-rooted attachments. The strategic placement of traditional housing supports routine activities due to its inherent spatial character (Gulati, 2020). Over the years of co-

existence and growth, traditional Bengali housing spaces have developed intricate qualities that help communities thrive. In Dhaka, urban low-income families accomplish various formal and informal actions, which have societal significance and necessitate appropriate space. Different studies have shown that urban low-income households in planned, unplanned, or traditional housing utilize a hierarchy of spaces ranging from indoor to outdoor for such activities (Ghafur, 2005). Social and cultural norms and values specific to this group influence the daily expression and practice of their lifestyle. The nature and appropriation of various domestic and communal spaces within and surrounding housing are intimately linked to these expressions and practices. The dwelling and its broader spatial setting both shape and are shaped by lifestyles (Ghafur, 2005).

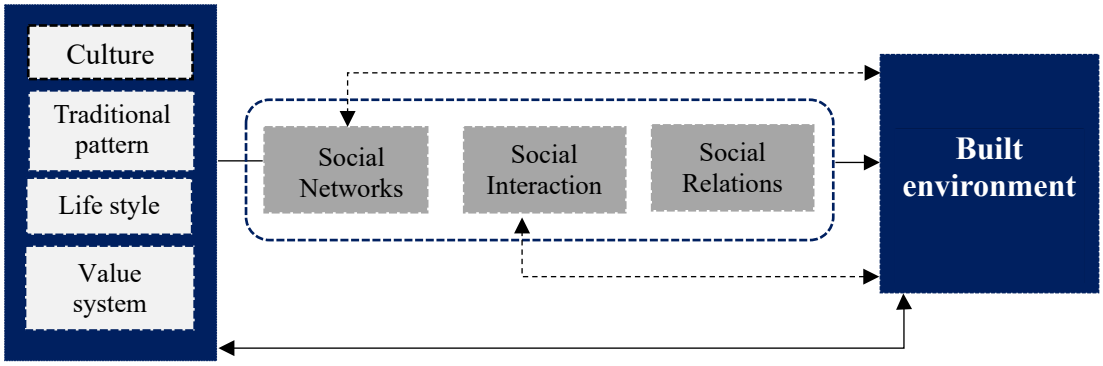


Figure 1: Synopsis of socio-cultural dimensions and built environment.

2.2 Traditional housing pattern in the context:

The components of housing form an ecosystem and act together as a single system. According to the Eminent architect Charles Correa housing functions as a part of a hierarchical system with several key elements including family space, intimate interaction areas, neighborhood spaces, and main urban areas, particularly relevant in tropical regions. These components are interdependent, with deficiencies in one that can potentially be compensated by the other. The composition and interactions of these elements can vary based on climate, socioeconomic status, and cultural patterns. Stacking units without addressing these hierarchical spaces is inadequate, as housing should be viewed as a comprehensive system (Islam, 2016).

Bangladesh, a country with a tropical climate, created a prototype of front-back or courtyard housing that was influenced by specific contextual factors like the country's climate, culture, social values, household structure, and resources. Thus, Bengali houses and housing have developed from the back-front notion to courtyard housing, which is symbolic of the foundation of Bengali residential architecture (Khan, 2021). It is difficult to define front-back or courtyard-based housing only in terms of the enclosure, according to Australian professor Robert Nelson (2014), because these yards allow us to experience the duality of being both inside and outside, enclosed yet open. Nelson further explained that they can be private or public, used for work or play, or even as a physical representation of a theatre, with the life story starting in the center of the structure. Within traditional Bengali housing, outdoor and indoor spaces have been arranged in order and individuals are habituated to be social in such social spaces, The development of a hierarchy of spaces as a result of this practice has made it possible to integrate living and working, family and neighborhood, and all socioeconomic groups (Siddiqua, 2011).

Introduced by central Asia, these dwelling patterns developed the fundamental layout for arranging spaces. These compact fronts, back, and inner courtyards were encircled or surrounded by houses, where they were utilized for domestic tasks and became essential

communal areas within hierarchies (Siddiqua, 2011). In addition to individual units, housing with these spaces creates social exchange opportunities. Each space provides a certain amount of privacy while also encouraging social interaction among residents (Siddiqua, 2011). The spatial division is particularly relevant in low-income housing, where the creation of social spaces is pivotal for social capital development. Within low-income housing, the thoughtful design of social spaces enhances the interaction and supportive networks. These spaces allow individuals to gather socially and engage in activities that foster a sense of community and mutual support when resources are limited (Gulati, 2020).

To make the city habitable for its people and meet all of their socio-cultural needs, it is essential to comprehend the area's traditional, indigenous dynamics. These dynamics differ significantly between developed and developing nations and vary from region to region (Siddiqua, 2011). However, increasing land values and socioeconomic factors have led to the subdivision of plots, a higher ratio of renters, and buildings with minimal peripheral setbacks (Siddiqua, 2011), this trend has significantly affected housing patterns for low-income and marginalized demographics. Rising land and housing processes make it unaffordable for them to secure housing, let alone incorporate social spaces. Without political and public intervention, housing accessibility for these groups is extremely difficult.

Integration of social spaces in low-income settlements, projects such as the Aranya Housing development in Indore, India by Architect Balkrishna Doshi demonstrates the potential for such designs to create socially supportive communities (Figure 2). This housing addresses living through a heterogeneous matrix of different income categories and responds well to the needs of different social strata by creating an inclusive environment conducive to social dynamics.

Figure 2: Aranya Low-cost Housing in Indore, by Architect Balkrishna Doshi.

According to the architect Doshi, what matters is not just the buildings but the homes where a happy community resides. Aranya Housing provides housing for over 80,000 individuals via a complex system of internal passageways, front and inner courtyards, and dwellings to ensure appropriate accommodation for the lower class.

The Belapur Housing Scheme 1985, furthered the notion of high-density incremental housing by creating hierarchical courts following the concept of equity. The importance of a neighborhood-responsive environment was emphasized, which makes sure that areas are usable and accessible to all residents (Gulati, 2020). These projects show that prioritizing social spaces in housing developments can promote social cohesion and build resilient communities.

2.3 Spatial hierarchy in housing in the context:

In traditional Bangladeshi housing, the hierarchy of spaces is distinctly structured to reflect the social norms, privacy needs along functional requirements. The arrangement followed the flow of public, semi-private, and private spaces, and in a few cases followed by service areas. In the hierarchy, where large courts or yards define the spontaneous transition from public and private realms, the distinctly defined visible private court follows the progression of semi-enclosed yards that open into larger community spaces for communal use (Gulati, 2020). In Dhaka, settlement patterns have experienced multiple shifts due to historical and political reasons, the basic physical and spatial order of a homogenous community comprised self-contained amenities resulting from vernacular patterns. This indigenous typology has been adjusted to changing social political and cultural needs (Siddiqua, 2011).

Figure 3: Hierarchy of spaces (Aranya Housing) and layout of the housing (middle).

The spatial order in Indigenous dwelling patterns offers openness to enclosed areas, maintaining a sequential relationship throughout with a demarcation between private and public domains. This private domain consists of innermost areas where only families interact, and private yards reserved for only family members. Then semi-private spaces move inwards or outwards, traditionally called *Baithak* or back-front yards offer privacy yet are accessible to people outside of the inner circle. Finally, public spaces are the outermost areas where communal interaction and gatherings occur (Siddiqua, 2011).

Table 1: The spatial order of private and public spaces and their usage in the context.

Level	User group	Use
Private	Household	Internal spaces, inner courts
Semi-private	A group of households	cluster of inner courts, front, and backyards
Semi-public	A large group of specific communities.	smaller grounds, small shop clusters, or religious platforms
Public	Completely open to any group	larger grounds, public facilities

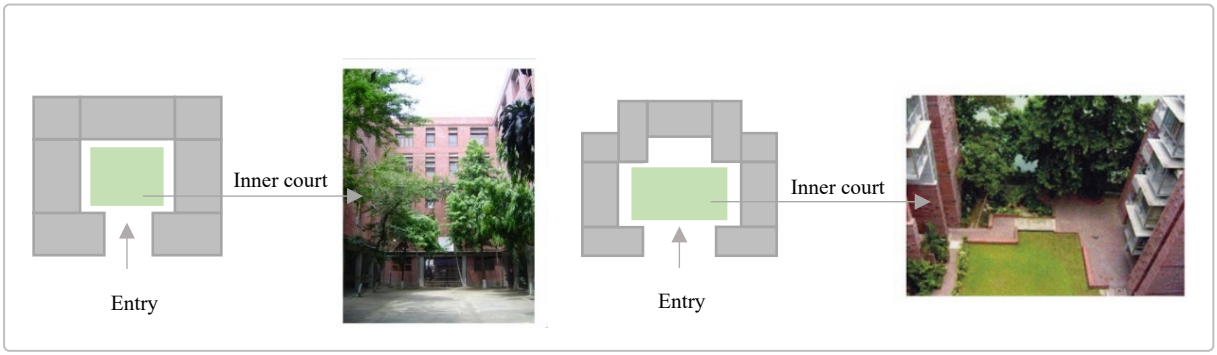


Figure 4: Types of inner courts, Source: (Siddiqua, 2011)

These front and back yards along with inner courtyards offer different degrees of privacy for the activities and interactions of women, children, and men (Figure 5). These are arranged hierarchically according to the relationships among the surroundings and the relationships between intersections, where neighborhoods have an impact on this spatial order (Siddiqua, 2011). Different levels of social spaces are created by this dynamic, from private to public space continuum (Mowla, 2002; Siddiqua, 2011).

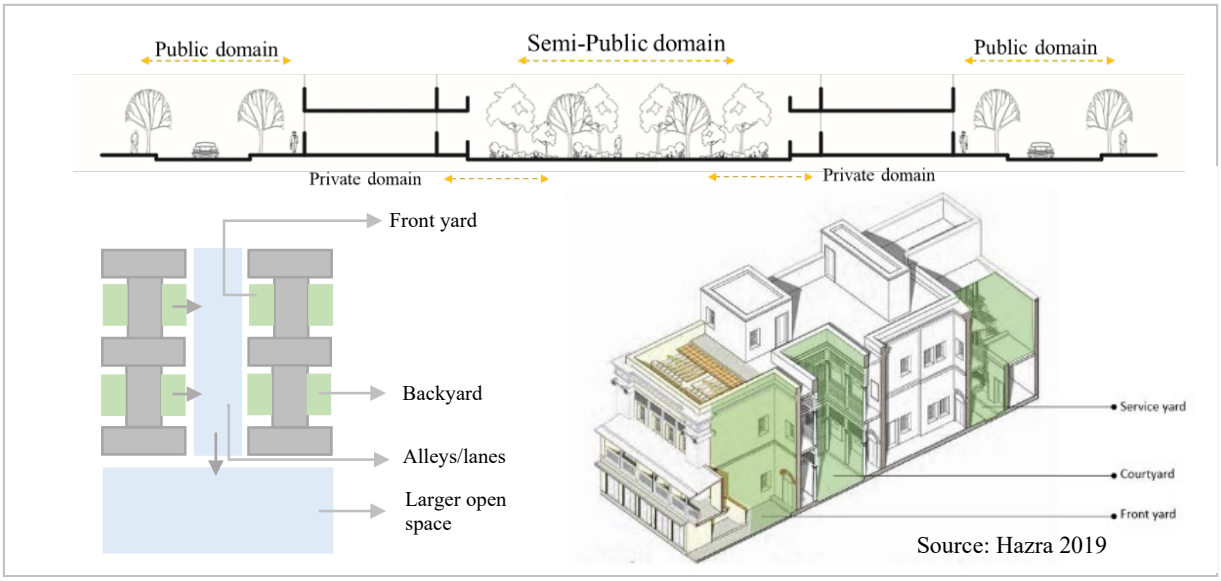


Figure 5: Public-private continuum and their association with housing units.

2.4 Low-income Housing in Context:

Bangladesh Bureau of Statistics (2010) reports that urban inhabitants in Dhaka are categorized into high, middle, and low-income clusters. Higher-income individuals (monthly income bracket tk 50,000-1,00000/ USD 425-850) have better housing accessibility for better economic stability offered by their income (Islam & Shafi, 2008). Historically, the capital Dhaka served as a residential area for economically and politically privileged people. However, the low-income group now significantly contributes to the capital's physical expansion and character building (Hasan & Ahmad, 1999). A significant portion of Dhaka's households fall into the low-income category among the various urban income groups, and they face significant obstacles in obtaining housing at the current market rate (Islam & Shafi, 2008).

Islam (2005) found that 35% of households in Dhaka City Corporation are classified as low-income, with monthly wages ranging from tk 5,000-10000, approximately USD 40– 80 (BBS, 2022). Significantly high land values in the DCC area, dramatic increases in material costs, and a lack of conventional housing credit sources have made housing unaffordable for low-income individuals (Haque & Aktar, 2016). Additionally, the density profile in low-income settlements is exceedingly high, ranging from 10 to 15 times greater than the overall concentration of the city (Hasan & Ahmad, 1999).

According to the review by Ghafur (2002), there are three primary means of obtaining housing in Dhaka for low-income individuals: The public sector (Government bodies and public institutes), NGOs (Aid sector), and the private segment. While the initiation of the private sector transformed the housing landscape for middle to upper-income groups, the challenge of addressing housing for low-income groups remains significant (Ghafur, 2005), The findings of the recent study specify that there is a substantial housing deficiency between the availability and demand for it, only 5.4% in Dhaka and 5.9% in all urban parts of low-income households are benefiting from public housing schemes (Ghafur, 2005). Given that these housing supplies consist of several forms;

- **Government Staff housing:** Employee housing is offered by government and semi-government organizations at reduced rental costs (Ghafur, 2005).
- **Squatter Resettlement housing:** These are semi-permanent units that accommodate squatters inside and around Dhaka City (HSD, 2000). This form of housing aims to provide more secure living conditions for those living in makeshift or illegal settlements.
- **Low-income housing:** Provided by the public sector and municipalities and is rented at subsidized rates to low-income households which they cannot afford in the private market (Ghafur, 2005).

Low-income households' access to housing is not a matter of choice within the housing market but it is determined by their labour market position and life circumstances (Ghafur, 2005). Their selection is not based on satisfaction, instead, access is decided through official allocation in the public sector. Consequently, even if the assigned housing does not align with their lifestyle, they adjust as they cannot afford alternatives (Ghafur, 2005).

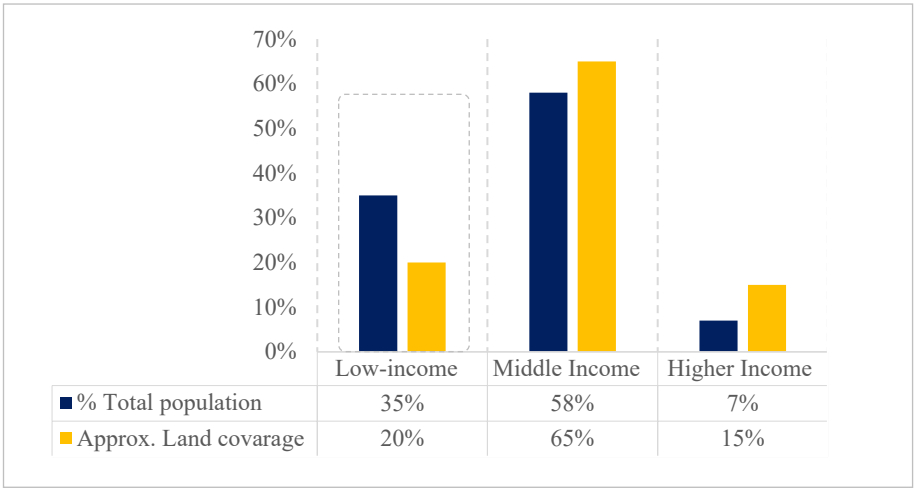


Figure 6: Allocation of land coverage and income groups.

The layout and utilization of spaces in urban housing in Bangladesh have evolved due to contextual factors related to economic, and demographic changes over the last few decades

(Ghafur, 2005). This way of utilizing spaces, additionally, makes social inequality worse by pushing low-income families into crowded, substandard housing, which can have detrimental unintended effects (Gutierrez, 2023). These housings do not offer adequate space for low-income households to engage in activities that have always been crucial for interaction and creating networks, particularly for women and children (Ghafur, 2005) and overall community well-being.

2.5 Public housing for low-income individuals:

Over the past 40 years, the public sector has provided direct or indirect subsidies for not more than 10% of all urban housing (Afroza, 2000), despite this, various government sectors are providing housing for both rentals and home ownership. However, there are very few subsidized housing options in the formal sector for low-income groups. Moreover, the pricing and delivery system determined for these provisions are often not accessible to low-income individuals. Among the different types of housing options provided by the public sector, government quarters are one of the prime options that are allotted for its employees based on criteria. Hence, as a structured entity, the Government stands as the single largest contributor to built-up housing, for its employees in Dhaka's housing market (Haque & Aktar, 2016), yet the issues of low-income housing are closely linked to factors like policy anomalies, availability of resources, lack of financial assistance and mostly priority considerations (Hasan & Ahmad, 1999).

Thus, the housing market in Dhaka is characterized by a significant shortage of units for low-income groups, public sector employees in these groups face intense competition for available housing, particularly where rents are low (Ghafur, 2005). Employees from lower-middle to low-income families who are unable to afford home ownership, primarily rely on rental housing (Yasmin, 2019; Yasmin & Nilufar, 2023). For these income groups, government staff housing remains the sole provider but these supplies are insufficient to meet actual needs (Yasmin & Nilufar, 2023). According to public sector accommodation guidelines, government employees are authorized to an average floor area based on the rental agreement, and in the context of Bangladesh, Government pay scale is used to classify income groups, reflecting the societal position of public employees (Chowdhury, 2013; Yasmin & Nilufar, 2023; Yasmin, 2019). Based on the general wage scale, the lowest grade employees (class three and four) range from grade eleven to twenty and are regarded as lower-middle to low-income people (table 2). The granted household units for this cluster range from 46.5 to 74.3 sqm (Ministry of Housing and Public Works, 1992; Yasmin & Nilufar, 2023). The government decided on a guide outlining housing space standards for its employees (Afroza, 2000; Yasmin, 2019). Despite this, the inadequate space allocation often fails to fulfill the requirements of the low-income demographics, impacting their quality of life and well-being.

Table 2: Allocation of floor area per the income category (Source: Afroze, 2000; Yasmin, 2019)

Category	Pay Grade	Allotted floor areas (sq. ft/sqm)
Class I	Grade 1-9	1800-1000 sq. ft /168-93 sqm
Class II	Grade 10-11	800 sq. ft / 74.32 sqm
Class III	**Grade 12-17**	**600 sq. ft / 55.74 sqm**
Class IV	**Grade 18- below**	**500 sq. ft / 46.45 sqm**

Following the independence in 1971, higher categories of officials were provided with bungalows ranging from 3000-4000 square feet. However, this prevails in both public and private section housing distribution.

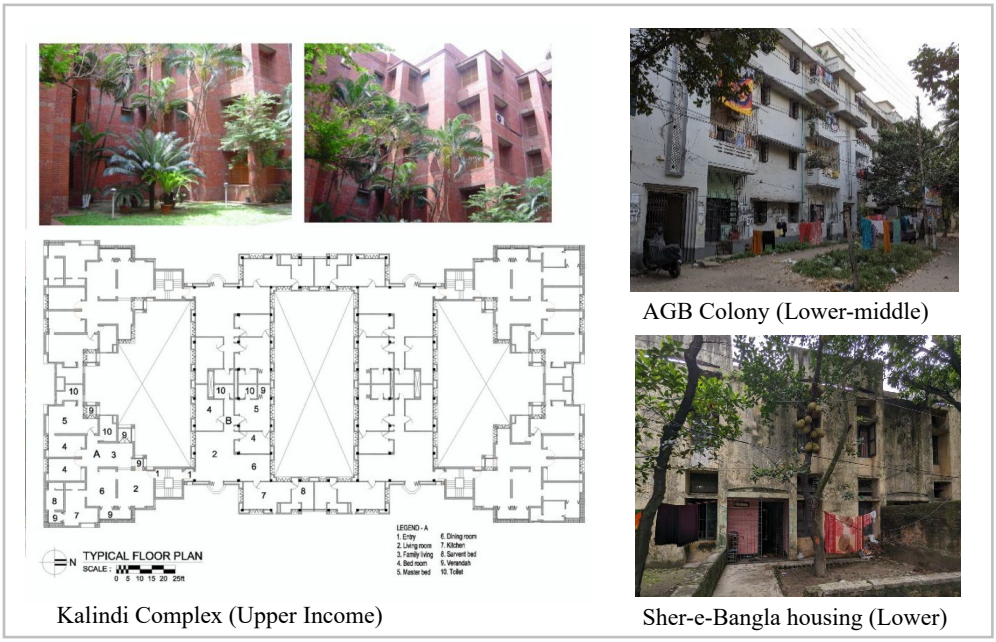


Figure 7: Housing outlook for different socio-economic groups.

Moreover, there was a significant shift towards more compact living arrangements (Figure 7). As part of this, the reduction of horizontal space allocation underlines the new development pattern that featured consolidated walk-ups instead of traditional spacious dwelling units with verandas and courts (Yasmin, 2019).

2.6 Notion of Social Capital:

Social capital, recognized as the fourth category, alongside financial, physical, and human capital. This capital developed within neighborhoods and communities, serves as a valuable asset formed through interpersonal connections (Hamdan et al., 2014). John Dewey employed the social capital term in the 20th century, describing it as a positive factor that emerges when individuals form meaningful connections with others (Plagens, 2011). In 1916, Hanifan discussed it in his work, and further, it was tackled by Jacobs in 1961. In order to comprehend social relations and social stratification, Bourdieu and Coleman developed the theory further in the 1980s (Hador, 2016). In 1990, the idea of social capital gained distinction in social science (Woolcock & Narayan, 2000). Recognition of social capital in everyday life relationships among neighbors, colleagues, and acquaintances- yields significant benefits for society (Hamdan et al., 2014). While at the micro-scale, it directly impacts family welfare, neighborhood stability, and quality of life, it also has a larger positive impact on developing an active community and an efficient economy (Stone & Hughes, 2002; Hamdan et al., 2014).

According to Jacobs (1961), social capital in urban communities is pivotal in determining the quality of life because it fosters interpersonal relationships characterized by trust and collaboration toward shared objectives. Social capital, as defined by Woolcock and Narayan (2000), is the customs along with networks that individuals share and rely on to support their collective action. Social capital, most notably by Robert Putnam (1993), was addressed as aspects that characterize societal life – networks, values, and trust that allow individuals to communicate more efficiently to accomplish shared goals. Several factors were included in Morrow's (1999) definition including sociability, connections and social support, reciprocity, and belonging with civic participation. The term was further elaborated by Cohen and Prusak (2001) to include the dynamic associations between people, mutual comprehension, and collective values that unite people in social structures and make collaborative endeavors possible (Hamdan et al., 2014).

Putnam (2000) used the terms bridging and bonding capital in his conceptualization of social capital, while bonding describes horizontal social norms and relationships that strengthen ties and associations within a group, usually between families or close friends. However, bridging capital refers to the horizontal relationships that exist among diverse demographic backgrounds (Halpern, 2005; Agger & Jensen, 2015). Later, linking social capital was added to these forms by Szreter and Woolcock in 2004 ((Prins, 2021). This third base of social capital is addressed in the conceived space in this research, which describes the hierarchical association between people and community and formal authority on the other side (Stone, 2001).

2.6.1 Bonding Social Capital:

Putnam (2000) defined bonding capital as the trusting relations that exist among members of groups who share similar characteristics (Prins, 2021). It is frequently regarded as the most common kind of social capital and is typically mentioned without a particular bonding prefix (Chandrasekara, 2021). This form of social capital is addressed through the associations between people who are similar to one another and function within the horizontal layers of social groups. It plays a crucial role in homogeneous communities to reinforce their identities (Chandrasekara, 2021). According to Vidal's (2004) argument, bonding social capital improves the connection between people who already are acquainted with one another.

For those with limited resources namely low-income vulnerable communities, bonding capital is particularly important since it significantly influences their ability to endure difficult situations. Bonding capital functions at the local scale, establishing strong, multifunctional ties within horizontal networks, and promoting empowerment. These two are the localized functions of bonding social capital (Chandrasekara, 2021), aiding members of disadvantaged groups with a variety of social and economic responsibilities primarily addresses the challenges that impoverished people encounter daily. According to Zhang et al. (2011) and Chandrasekara (2021), social networks with family and friends are often viewed as the source of bonding capital, providing essential emotional and practical support for overcoming daily obstacles. Social capital of this kind is extremely important for communities subjected to socioeconomic marginalization in the Global South to "get by" on day-to-day life basis (Mpanje et al., 2018).

The development of bonding capital in Dhaka's low-income housing is significantly aided by communal spaces like shared communal areas surrounding dwelling units. Regular direct interaction builds internal relationships, increases participation in events and activities, and cultivates a stronger sense of community. Strong social ties and support networks are developed in close-knit neighborhoods, as a result of regular interaction in these social spaces. Mutual support within closed networks allows communities to "get by" daily in terms of both economic well-being and personal fulfillment (Putnam & Goss, 2002; Mpanje et al., 2018).

2.6.2 Bridging Social Capital:

This Capital is defined by Szreter & Woolcock (2004) as the association between members of different groups who are distinguished by race, age, or religion, and they are based on mutual respect. Additionally, Putnam & Goss (2002) defined a connection between the emergence of bridging capital and the coming together of individuals of different backgrounds. Since the bridging capital is generated among groups including those with distant relationships, enables communication amongst various social groups. And is necessary while allocating the community's resources. As claimed by Shukla (2020) when people of different groups come together to work toward shared interests and goals, communities and individuals can access the resources they require.

Bridging capital is imperative for economically disadvantaged communities in the global south as it facilitates the connection between them to a range of networks that provide opportunities

and resources, allowing them to “get ahead” (Woolcock, 2005). While bonding capital ties people in similar contexts together, bridging capital allows access to a variety of people who can then provide access to a wide source of information as well as mutual support (Johnson et al., 2011).

In Dhaka, in the context of low-income housing, social spaces particularly those around the dwellings where individuals of varied ages, cultures, and genders can interact- are vital for the growth of bridging capital. These social spaces offer the development of social networks that expand beyond one’s immediate social circles. For instance, common shared areas in housing premises often act as venues for common gatherings and encourage the exchange of knowledge and resources that foster civic engagement. Through bridging capital, communities can "get ahead" by encouraging meaningful actions that result in socioeconomic advantages (Putnam & Goss, 2002; Mpanje et al., 2018; Woolcock, 2005).

2.7 Housing and social capital:

The understanding of housing necessities that encourage or hinder dwellers’ participation in social networks is crucial. Housing development has a significant influence on shaping social dynamics and consequently impacts social capital. The association between housing and social capital has received significant attention in recent academic literature (Chandrasekara, 2021). Social capital is particularly relevant for vulnerable people such as low-income to marginalized communities, who often lack economic and human capital but have the potential to advance strong social grids (Light, 2004; Zhang et al., 2011). This unique aspect of social capital has made a central point of sociological research (Islam, 2012).

Extensive studies have examined how the physical environment of housing influences the advancement of social capital (Chandrasekara, 2021). It is widely recognized that these milieus navigate a dynamic system in the progression of societal interactions and in building communal trust along with attachments, which are essential for civic involvement (Forrest & Kearns, 2001; Humphreys, 2007; Flint & Kearns, 2006) For instance, Dekker (2007) highlighted that neighborhood facilitates the development of trust and social bonds, which are fundamental for community actions and engagement in turn foster social capital.

Social interaction is influenced by several urban housing components, including layout, density, and societal heterogeneity (Fischer et al., 1977). When it comes to people, whom they interact with, and where they interact, the housing design can offer both opportunities and limitations. According to Yance's (1971) argument, the physical environment significantly impacts people’s relationships, particularly for those with limited resources as such low-income communities. Leyden (2003) claimed that the layout of societal order and housing neighborhoods affect social capital, and subsequently mental and physical well-being. Neighborhoods are effective contributors to communal ties as these serve as spaces of dwellings for shared events, locality, and cohesion (Wellman & Leighton, 1979).

As Pynoos et al. (1973) stated housing encompasses a complex bundle of reflections including privacy, setting, services, and investment. The poor-quality environment is one of the core aspects that scholars address for lower social capital and weaker neighborhood links (Moser et al., 2002). One of the earliest and most influential scholars to discuss social capital in the urban environment was Jane Jacobs (1961), who criticized modern planned cities for their failure to support these social networks, leading to a decline in community interactions (Chandrasekara, 2021). The decline in social interactions, especially among the lower-middle to marginalized low-income class, has highlighted the need for better social capital formation, with the built environment recognized as a key factor in achieving this goal. Poorly designed environments that hinder social interactions can negatively affect residents’ quality of life. Conversely, well-

designed environments promote social sustainability, particularly in crises (Chandrasekara, 2021). Moreover, understanding the built environment's influence on social capital has significant implications for housing practice (Chandrasekara, 2021). It suggests that thoughtful design and planning of residential areas can foster stronger social networks, enhance community resilience, and improve overall quality of life. This insight is particularly relevant for the global south, where this research context lies (Bangladesh).

2.8 The Concept of Social Spaces:

Initially, the social space term was used to describe groups of census areas that shared similar social and demographic characteristics (Shevky & Williams, 1949; Buttimer, 1972; Shevky & Bell, 1955). The alignment of social spaces and the correlation between movement patterns and the spatial distribution of social features were investigated by early pioneers of social area analysis (Bell, 1959; Greer, 1956; Buttimer, 1972). The term social space in the literature encompasses a composite socio-spatial concept that combines the subjective and objective aspects of space (Nilufar, 1997). The objective dimension describes a physical space set aside for social interaction among the group that shares interests, whereas the subjective dimension defines a physical space as experienced by members of a particular group. The communities including family, neighborhoods, economic, and urban sectors, and social spaces have evolved as a result of authors like Chombart (1956), who integrated the concepts of social space use and perception into a hierarchically organized activity system (Nilufar, 1997). Chombart de Lauwe (1956) defined social space in his Paris study as a framework that connected observable behaviors and external features of the environment and motivations (Buttimer, 1972).

Space is inherently linked to social reality because it replicates the ideals of the society to which it belongs (Adam, 2009; Lefebvre, 1991). By combining spatial and social phenomena, the space production perspective gives a degree of transparency and allows an investigation of the opportunities and challenges that particular groups encounter when deciding how appropriately space can be used. This viewpoint clarifies the relationship between people and government-provided spaces by identifying perception and lived practices. Within the extended scope of social space literature, this thesis only concentrates on the social spaces at the housing level. Following the definition, the spaces for low-income housing and the level of socio-spatial behaviors will be discussed.

2.9 Lefebvre’s Spatial Triad and low-income housing:

According to Lefebvre (1991), social space is defined by the relations of production and social relations. Lefebvre claims that spaces are viewed as a product and a means of production rather than as an object or a container. Space is considered a social reality or a collection of relationships and arrangements rather than a subject or an object (Lefebvre, 1991; Fuchs, 2018). Lefebvre differentiates between three aspects of social space, lived spaces of representation, conceived representations of space, and perceived spatial practices. He claims that in the triad of the perceived, lived, and conceived space, there is a relationship (Fuchs, 2018). These are addressed as the spatial triad (McCann, 1999).

Lefebvre's concept of space clarifies how individual preference shapes every aspect of spatial practice within the built environment of which housing remains as the sub-set (Lefebvre, 1976). The notion asserts that low-income housing is a portion of the built environment and it is a matter of struggle to acquire housing with proper facilities in a society where they are marginalized and at the bottom of the social scale (Emmanuel, 2012). Lefebvre argues that since the 20th century, a large portion of planning practice has been influenced by the division of function, form, and structure—a subsystem of the regular habitat (Butler, 2003; Emmanuel, 2012).

According to Lefebvre, when people are involved, space—including all of its facets—is created and changed into social space, meaning that space is both created and lived (Lefebvre, 1991). Both the production and quality of low-income housing are social processes. According to a Lefebvrian study, the intangible space of representations by authorities requires a deeper consideration and acknowledgment of the socio-spatial practices in representational spaces, such as housing for low-income people (Emmanuel, 2012). This knowledge is crucial for creating housing policies that are appropriate and can improve urban environments' quality of life. It is crucial to move from the general to the specific, in order to understand how low-income people, negotiate to achieve housing quality on a daily basis (Emmanuel, 2012).

2.9.1 Conceived Space:

Conceived space is conceptualized as the representation of space by the researchers, this abstract representation has an actual influence on space within socio-spatial practice as these are based on the values, principles, and visions of experts, decision-makers, and other individuals who have the ability to impose in the tangible world (Lefebvre, 1991; Wiedmann & Salama, 2012). Thus, Conceived space is grounded on the ideology and principles of external forces such as architects, planners, and designers (Wiedmann & Salama, 2012).

Formalization and standardization are common strategies used by governments to strengthen their hold on planning authority. One benefit of this strategy is that it offers frameworks for classifying and assessing performance (Lefebvre, 1991). Conceived space tries to shape the environment according to conventional ideals, but as a result, it frequently ignores the practices and lived experiences of the people who use these spaces.

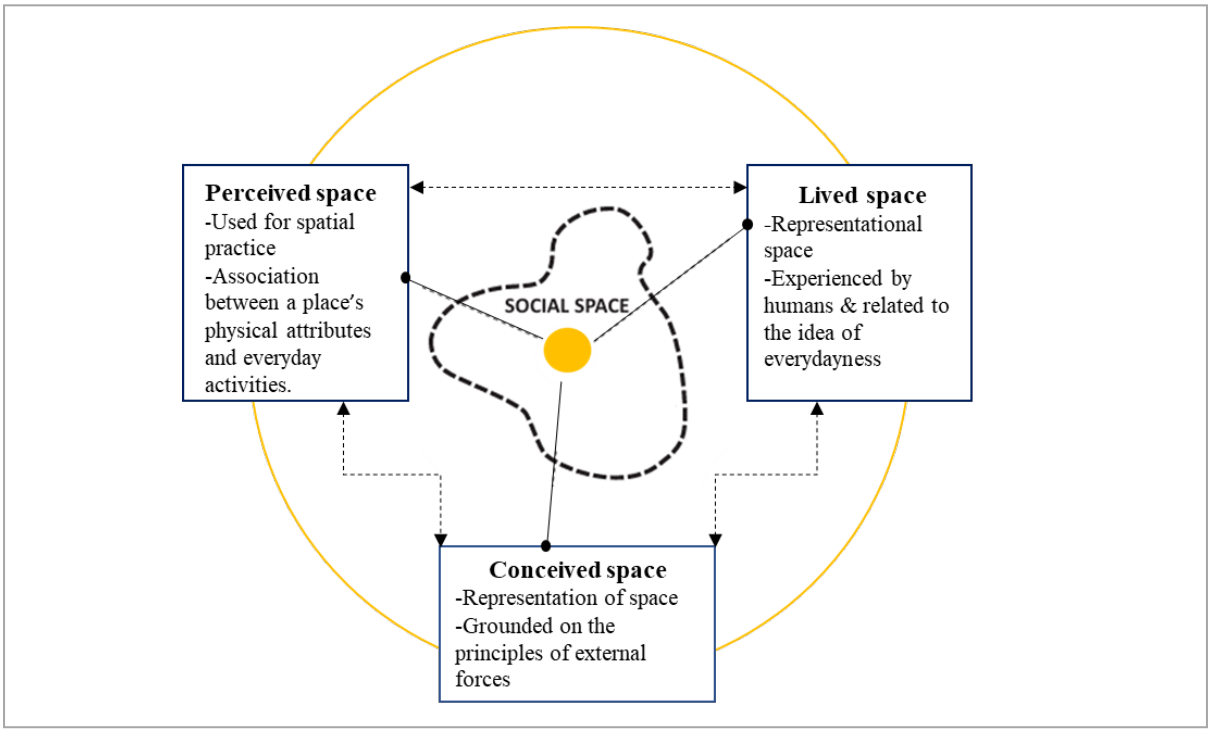


Figure 8: Lefebvre's Spatial Triad, Source: (Jiménez-Pacheco, 2018)

2.9.2 Lived Space:

Lived space denotes the direct, and non-verbal association that people have with space, as described by Lefebvre. Also referred to as representational space, it is experienced first-hand (Lefebvre, 1991). Particular places within a given locality can become focal points because of

their placement within the representational space of the community of the particular area (Lefebvre, 1991; Wiedmann & Salama, 2012).

Lived space describes space as it is experienced by humans and is related to the idea of everydayness (Lefebvre, 1991). These areas include people's actual actions within them as well as the decisions they make in response to the opportunities presented.

2.9.3 Perceived Space:

Perceived space, according to Lefebvre, is the area used for spatial practice. This is the place of movement and communication, the space where systems grow and take shape. It includes both the everyday patterns that each person follows and the networks that emerge from group actions. Lefebvre claims that the only way to objectively assess a society's particular spatial practice is to examine and study the network structure within it (Lefebvre, 1991; Wiedmann & Salama, 2012). Perceived space describes the association between a place's physical and everyday activities, regular life, and leisure (Lata, 2018).

2.10 Conceptual Framework:

Housing, according to Ashraf (2012), is the term used to define how communities are created and maintained—or not—and is essential to improving the quality of life for the inhabitants and the city as a whole and Emmanuel (2012) stresses the importance of considering social factors to fully understand low-income housing.

To answer the research question, the conceptual framework deconstructs the larger concepts from the study through smaller ones that can be found in the literature and illustrates the relationships between them. The independent variable is social space (X), and social capital (Y) is the dependent variable, meaning changes in social space (perceived, conceived, and lived) impact social capital (bonding and bridging). The association between social space and social capital formation will be examined to comprehend how variations in social space influence social capital formation within housing communities.

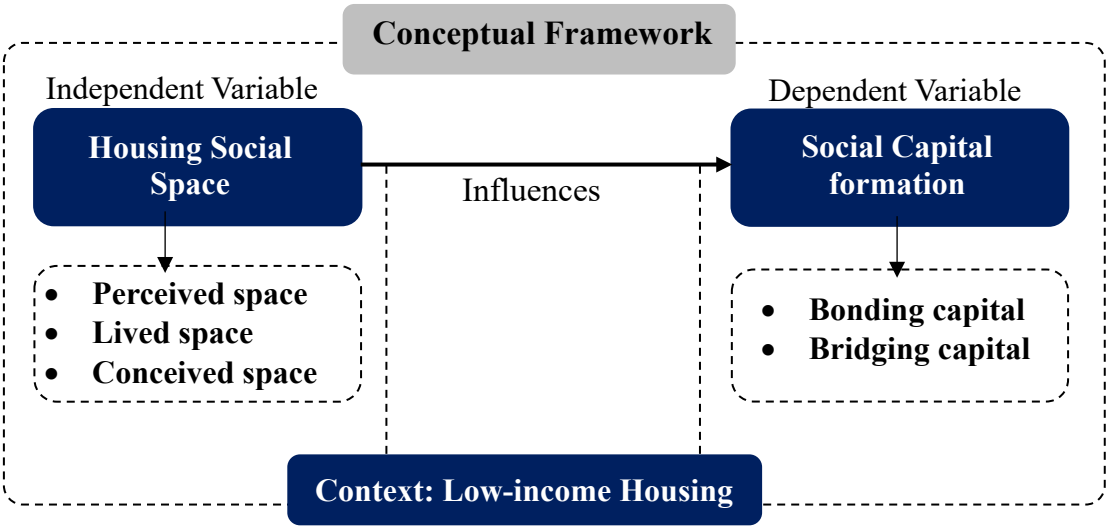


Figure 9: Conceptual framework

Chapter 3: Research Design and Methodology

This chapter outlines the methodological strategy of this research, including data collection, sample selection techniques, and the operationalization that has been adopted to address the main and sub-questions. This also outlines the data analysis process that has been applied to draw conclusions and recommendations. The conceptual framework presented in Chapter 2, has been operationalized into variables and measurable indicators for further analysis. Additionally, it discusses validity and reliability along with the limitations, followed by the decisions made to alleviate them.

3.1 Research Strategy:

Research strategy is an essential component of the research design. According to Kothari (2004), it involves setting up the conditions for collecting and analyzing data with a view to aligning relevance to the research purpose. The strategy selection depends on the research questions, available scientific knowledge, data sources, and objectives at hand. Given the study's aim and objectives, the strategy is explanatory and qualitative research, exploring the influence of social spaces on social capital formation within the low-income housing context of Dhaka, Bangladesh. Consequently, that study employs the case study method.

The case study approach, in this study, is the most applicable strategy, as the research question follows the "How" question and analyses real-life situations without manipulating the relevant context. It allows investigation of particular phenomena within real-life situations in order to explain the influence of spatial arrangements and bonding and bridging capital (Yin, 2009). Qualitative methods are being employed in this research to investigate the phenomenon in its natural environment by considering the interpretations that individuals make of it (Nije & Asimiran, 2014). This allows an in-depth investigation by looking at the available physical spaces in the context of low-income housing and provides insights regarding the influence of social capital formation.

Here, the justification for employing a "single" case study follows the rationale of using a well-formulated theory under the case area. Yin (2009) claims, that a single case study approach is justified when the study investigates a well-formulated theory in a setting, where certain conditions stimulate a set of propositions and their outcomes and can contribute to the existing theory. Therefore, this research employs a single case study and utilizes Lefebvre's spatial triad and theory of social capital within a specific context of low-income housing.

3.2 Research Approach:

Due to the explanatory research problem, this study includes an extensive literature review to comprehend the concepts, and variables involved. Since case study, the qualitative method involves examining a case by gathering comprehensive data from various sources (Creswell, 2007), this research utilizes direct observations as well as semi-structured interviews with inhabitants and relevant experts as primary data and uses drawings and documents as secondary data to explain the relationship between real-life events and phenomena. Hence, primary data has been gathered through interviews and observations, which have aided in contextualizing interaction patterns related to spatial layout (Filep et al., 2014).

Following this, social space and social capital concepts are operationalized and analyzed with the necessary variables and indicators. In the later parts, the research discusses the findings of the impact of social spaces on social capital, supported by scientific reasoning. The study will conclude with a context-specific explanation addressing the main research questions and sub-questions, along with possible implications for policymakers regarding the future development of low-income housing in Dhaka, Bangladesh.

3.3 Sampling:

In research, sampling is crucial, as it is hard to include the entire population due to time and resource constraints. Sampling is the process of selecting potential study units for gathering data from the entire population (Van Thiel, 2014). The chosen subset by the researcher serves as a representative sample for the whole population.

In this study, for in-depth interviews, non-probability sampling has been applied. The researcher collected 30 interviews, including with users of the housing and experts who have involvement in and relevance to the selected case (Van Thiel, 2014).

- A purposive sampling of 25 respondents from the housing has been conducted for semi-structured interviews based on a pilot survey (Appendix 4, Table 14). The user group selection was based on the range of individuals of different ages and genders who live in the selected housing. During the pilot survey, it was noticeable that people of different ages including young, middle, and elderly groups of both genders, utilize the spaces at different durations and hours of the day. So, it was preferable to include both genders and ranges of individuals to get comprehensive insights.
- For expert insights, interviews with three architects from both the private and public sectors have been conducted. The selection of expert architects and planners is based on their relation and relevance to the specific housing study. From there, snowball sampling was applied to reach the relevant experts further, and recommendations were obtained from the initial interviewees. To minimize the potential bias, an additional 2 interviews with expert academicians were conducted to get an overall housing space design and contextual overview.

Table 3: Number of respondents and selection criteria.

Method	Respondents	Sample size	Selection criteria
1. User	Residents		
In-depth interview	-Male	5	- Frequency of uses - Availability
	-Female	5	
	-Young (both male and female)	5	
	-Elderly (Male)	5	
	-Elderly (Female)	5	
2. Expert	Public and private sector		
In-depth interview	-Architect from Govt office	1	-Involvement with the overall housing sector
	-Architect related to housing	1	
	-Architects from the private sector	1	
	Academician		
	-Academic Expert in urban living	1	-Involvement with the overall low-income housing.
	-From Private University	1	
	Total	**30**	

3.4 Operationalization:

Variable	Sub-Variable	Dimensions	Indicators	Sub-Indicators	Collection method	Data Type & Analysis
Dependent variable **1. Social Capital** (Putnam, 2000)	**1.1 Bonding** (Putnam, 2000; Szreter & Woolcock, 2004)	**Strength of relations** (Mercy Corps, 2017)	Level of Interaction among Neighbors	# The extent to which inhabitants interact with each other (Frequency)	Semi-structured interviews, Observation	Qualitative; Primary Data (Atlas. ti)
				The emotional quality of the interaction among inhabitants		
			Type of interaction	# The nature of the interaction		
			Intensity of interactions	#The extent of meaningful interaction		
		Participation (Forrest & Kearns, 2001)	Participation in communal activity	# Residents' involvement in social and community activity	Semi-structured interviews. Observation	Qualitative; Primary data (Atlas. ti)
			The notion of participation	#The aspect of participation (positive/negative)		
	1.2 Bridging (Putnam, 2000; Szreter & Woolcock, 2004)	**Collective Action** (Agger & Jensen, 2015; Ostrom & Ahn, 2009)	Involvement in decision-making actions	#The extent to which residents can collectively contribute to decisions for the common purpose	Semi-structured interviews	Qualitative; Primary Data (Atlas. ti)
			Presence of ex/inclusive effort	#The existence of exclusive/inclusiveness in initiatives		
		Trust (Agger & Jensen, 2015; Forrest & Kearns, 2001)	Level of Trust among neighbors	# The existence of the belief that another individual will support in need	Semi-structured interviews	Qualitative; Primary Data (Atlas. ti)
			The presence of a willingness to share resources	# The extent to which inhabitants share resources.		

Table 4: Operationalization

Variable	Sub-Variable	Dimensions	Indicators	Sub-Indicators	Collection method	Data Type & Analysis
Independent variable **2. Social space** (Jiménez-Pacheco, 2018; Lefebvre, 1991)	**2.1. Perceived Space** (Carmona, 2021; Lefebvre, 1991)	**Accessibility** (Soltanian, 2015; Bramley et al., 2009)	Proximity to spaces available	# The ease of physical access to the spaces	Observation Plan analysis	Primary Qualitative; and Spatial Data; secondary data (Atlas. ti, Space syntax)
			The level of accessibility in available spaces	# The extent to which inhabitants can access the available spaces		
			The level of visibility of the space	#The extent to which the spaces are visible to residents		
		Safety (Soltanian, 2015; Bramley et al., 2009)	Perception of safety within and around the spaces	#To what extent do individuals feel safe using the space	Semi-structured interview	Qualitative; Primary Data (Atlas. ti)
			Presence of violence	# Occurrence of crime/violence		
	2.2 Lived Space (Carmona, 2021; Lefebvre, 1991)	**Activity & Usage** (Soltanian, 2015)	Diversity of activities	#Variations of activities	Semi-structured interviews; Observation	Qualitative; Primary Data, secondary data (Atlas. ti, space syntax)
				#Space shared for collective activities		
			Diversity of usage and users	#Level of Changes in usage pattern at different times		
				#Level of diverse Users		
		Sense of Belonging (Bramley et al., 2009)	Level of attachment to the place	#The extent to which an individual feels attached to the place.	Semi-structured interviews	Qualitative; Primary Data (Atlas. ti)
			Feeling of togetherness	# Individuals feelings of connectedness to their co-residents		
	2.3 Conceived space (Adams, 2009; Lefebvre, 1991)	**Design and planning intentions** (Sharmin et al., 2016)	Level of the integration of social needs	#The extent to which design intentions prioritize social uses	Semi-structured interviews	Qualitative; Primary, and secondary data (Atlas. ti, Space syntax)
			Compliance with standards	#The extent of alignment with regulations		
		Physical characteristic (Sirgy & Cornwell, 2002; Vinay, 2016)	The State of Physical Features	#The level of visual appearance and scale of the spaces.	Semi-structured interviews, observation	Qualitative; Primary Data (Atlas. ti)
			Consideration of the space comfort	#Compatibility of material & comfort		

3.5 Data-collection:

In this research, primary and secondary qualitative data as well as spatial data have been collected. Qualitative primary data is essential to assess the extent to which residents' experiences and daily lives revolve around the existing social spaces, with a particular lens on the role of fostering social capital. And, spatial data is required to portray a holistic picture of the spatial usages at the housing level.

3.5.1 Primary data:

3.5.1.1 Semi-structured interview:

For qualitative primary data, semi-structured interviews were carefully chosen as the most applicable data collection technique, as it allows the optimum amount of data collection in a timely and organized manner. The interview followed the interview guides (Appendix 1 & 2), involving indicators and both closed-ended and open-ended questions resulting from the selected variables and main concepts that are deliberated in the conceptual framework and operationalization within the research (Van Thiel, 2014). The interview enabled to identify individuals' content-specific spatial practices, and how these relate to their interactions and experiences revolved within and around these spaces. The interview allowed respondents to express their opinions, pursue clarifications, and offer the researcher a deeper understanding of the study at hand (Van Thiel, 2014; Godschalk & Mills, 1966).

Furthermore, expert interviews including, with practitioners and academicians, provided insights into the conception regarding the standards and design of the housing spaces. All the interviews were conducted in Bengali and then were transcribed and translated to English afterward, data were anonymized, and confidentiality was firmly followed in accordance with the consent form.

3.5.1.2 Direct observation:

Direct observation was conducted to get a spatial understanding regarding the occurrence of daily activities and involvements several times and in different spaces identified. The visual representations of the spatial dynamics of a societal phenomenon, allow the researcher to determine its distribution across a given area (Rucks-Ahidiana & Bierbaum, 2015).

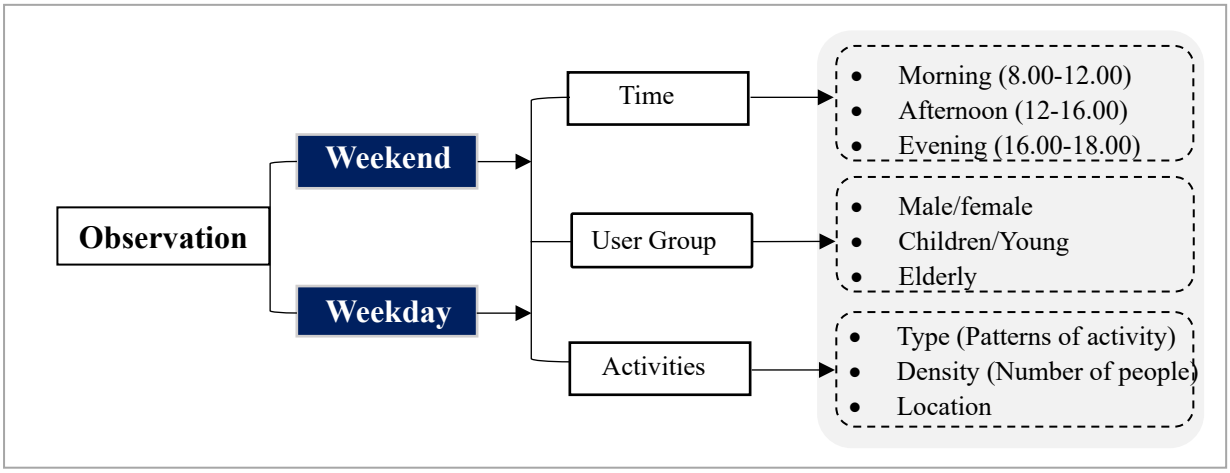


Figure 10: Criteria for observation.

Photographs, field notes, and freehand sketching were collected for further analysis. The observation was done following two approaches, first, by walking around the area multiple times on separate days of the week, and the other is through static observation at selected points of interest. Walking around the area, allowed the collection of relevant observations of the physical and social elements within the space.

While the static observation at pre-determined points provided insights into the users and their purposes for interacting with them. To support field observation, an observation guide was prepared based on the inhabitant's sociability, activities, and usage patterns of existing spaces (Appendix 3). Approval from the selected housing community was obtained beforehand to ensure ethical standards were followed.

3.5.2 Secondary data:

Secondary data were also necessary for comprehending the existing spatial characteristics and present conditions, which enabled an understanding of the spatial usage patterns of inhabitants at the housing level. According to Van Thiel (2014), secondary sources are used to enhance the relevance of the facts and viewpoints to the data gathered from primary sources.

For secondary data in this research, architectural drawings of the housing complex, planning documents of the area, and recent photographs were collected. They were collected from different sources including the Ministry of Housing and Public Works website, design documents, and data referred by the experts who participated in interviews.

3.6 Data analysis method:

For qualitative data such as in-depth interviews, Atlas. ti software has been employed for analyzing and linking textual sections from primary data. This tool facilitated systematic coding and thematic analysis, which allowed us to identify and comprehend the key patterns.

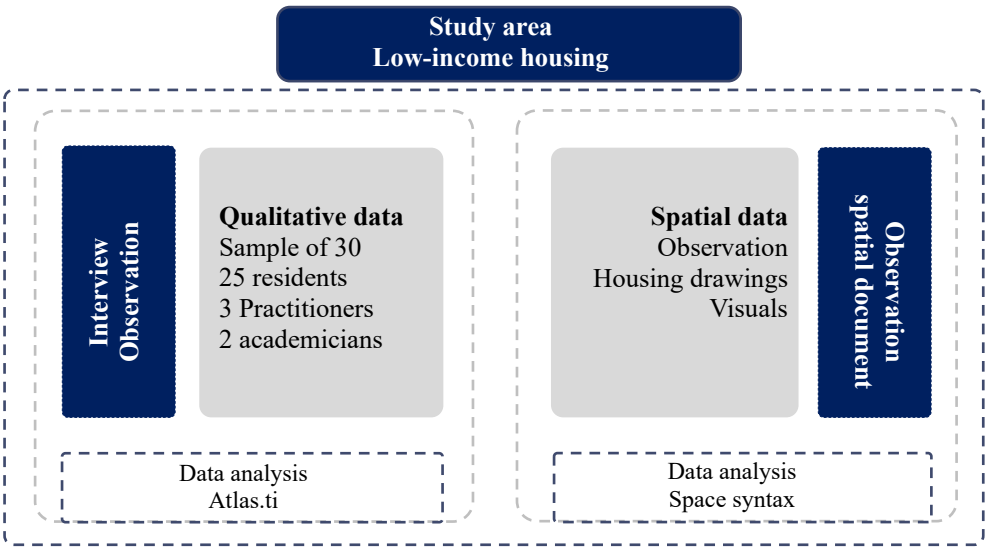


Figure 11: Data analysis methods

The interview transcript was sorted and analyzed by deductive coding using a codebook developed based on the operationalization table. However, in each transcript, important remarks and patterns that are associated with the phenomena were sorted and highlighted

distinctly to form relevant components for the coding process (Long et al., 2019). This process further aided in extracting thematic descriptions of the interviewee's experiences that enabled to link with identified indicators. To gain further insights, a co-occurrence table has been created to generate further understanding of the association between social space and social capital. This tool made it possible to see the frequency with which two codes were linked to the same quotations and to identify the relationship and patterns within each dimension. Thereby illuminating a relationship between indicators based on meaning determined by operationalization.

The findings are presented visually by using diagrams, charts, tables, and graphs. Collected spatial and secondary data have been analyzed by space syntax software to comprehend the degree of physical connectivity and integration. In the grounds of urban design, housing, and architecture, space syntax enables spatial analysis to comprehend the effects of layouts on behavior and social interactions (Hillier & Hanson, 1984).

3.7 Validity and reliability:

According to Robert Yin (1994), reliability is the likelihood that repeating the same operation will generate similar conclusions. To minimize the magnitude of the errors, every step of data collection, including interviews and observation, was documented with great attention (Yin, 2009). Interview guides were carefully prepared, and pilot interviews, as well as surveys, were conducted prior to the fieldwork to enhance reliability (Van Thiel, 2014). Furthermore, both the practitioner and academic expert interviews were included to increase reliability and reduce bias.

Although the case study approach allows to identify and describe the association among research objectives, by nature, the case study approach is context-specific (Lamker, 2014). According to Van Thiel (2014), internal validity can be enhanced by collecting plenty of empirical information. Hence, in this research, for internal validity, a diversified collection method has been applied for collecting data incorporating primary sources of in-depth interviews and observation, and secondary data as drawings and relevant documents have been used, finally integrated with relevant literature, and thus, adopting a triangulation approach.

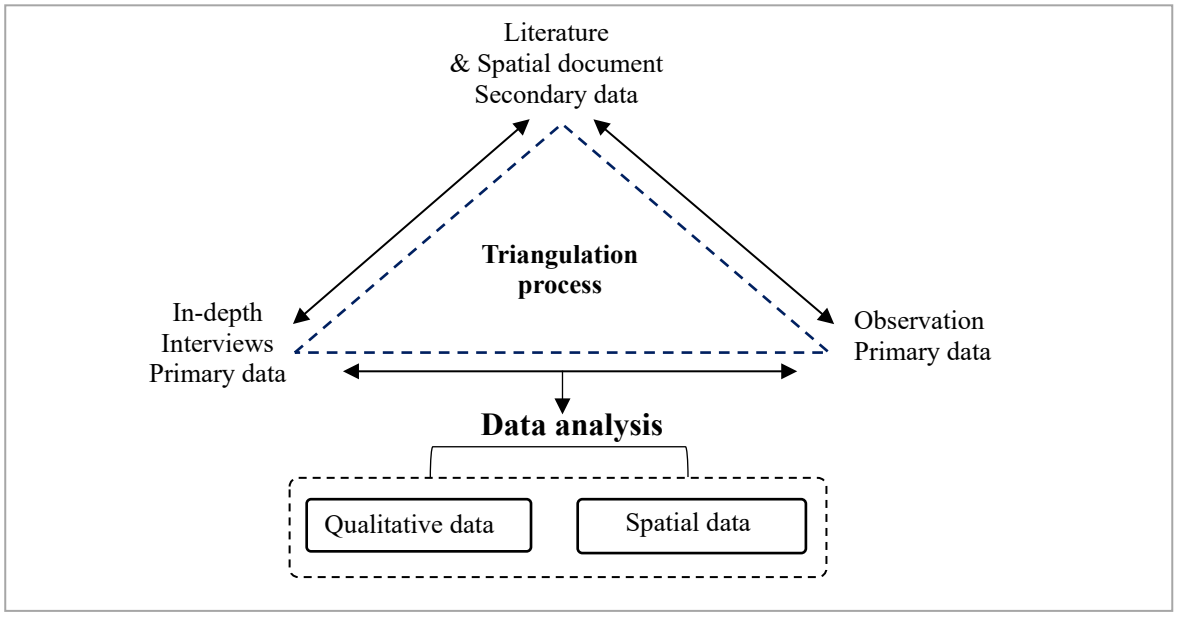


Figure 12: Triangulation process

And, external validity denotes the extent to which study outcomes to be generalized to other contexts (Van Thiel, 2014). In this research, due to the context-specific data, explaining the relation between the variables, the outcomes from the data analysis have a partial likelihood of not being generalized to other contexts. However, the operationalization of the two concepts was based on established theory, which may allow them to be studied in a similar situation. Additionally, the practical knowledge and outcomes from different contexts remain valuable in the field of social science (Lamker, 2014).

3.8 Scope and limitations:

This research has faced several limitations in its scope as well, various measures have been taken to mitigate these challenges effectively.

i. The sample size of the study is limited to 30 in total, which was not possible to increase any further due to time limitations. To counterbalance this limitation, the researcher has developed a more detailed operationalization and comprehensive interview questions to extract in-depth information from the study.
ii. The interview guides were prepared in English initially and translated as well as conducted in Bengali. Finally, the transcription was translated into English again for further analysis. Throughout the translation process, the indicators and inputs encountered linguistic inconsistencies, which may have affected the accuracy of the data collected. However, all the translations and transcriptions were done by the same researcher, which aided in maintaining consistency throughout the process.
iii. Finally, conducting research remotely posed challenges that required to be accounted for. To reach out to the targeted population and conduct research two experienced research assistants were selected. The observation method was first designed to aid the assistant in getting familiar with the housing context and social dynamics of the study area. Sequencing the process allowed the assistants to get acquainted with the inhabitants as well as gain trust and build rapport with them.
iv. Furthermore, interview recordings and visuals were the only sources in hand for the researcher to analyze the data collected, which posed an additional layer between the researcher and the interviewees. However, this challenge was alleviated by regularly discussing the interview results with the assistants, ensuring a more comprehensive interpretation of the data.

Chapter 4: Results, analysis, and discussion

4.1 Description of Case under this study: -

This research has been conducted in Dhaka, the capital of Bangladesh. The case study is located in Sher-e-Bangla Nagar, a neighborhood in the heart of Dhaka, which is home to significant government structures and sites. This region is a part of the larger Sher-e-Bangla Nagar, one of Dhaka's most significant political and administrative hubs. *Sher-e-Bangla Nagar housing* has been selected as a study area; is mainly used by government employees and their families. These housing, which is a part of the government's efforts to offer dwelling solutions to its employees, are usually distributed according to employment grade, position, and family size. The size and amenities of these living quarters differ based on the employee's position in the government hierarchy.

Figure 13: Location of Sher-e-Bangla Nagar housing in Dhaka

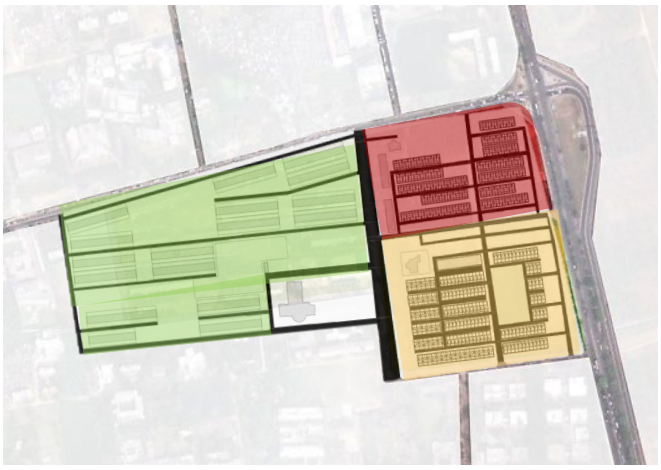
This case study meets all low-income housing criteria because of the government allocation process. This selected housing is composed of consolidated walk-up buildings, mostly ranging from single to double-storied structures. This type of housing is distinguished from other architectural styles by integrating living and service into a single unit and around 500-550 units, were planned on a 30-acre site. There are three types of housing units (types F, G, H) ranging from 480 sq. ft. to 984 sq. ft. allocated based on the employment position. The research focuses on types G and H (480 - 663 sq. ft.). These dwelling units are primarily occupied by individuals in the lower economic ranks of the government employment hierarchy, typically the lowest in the government job sector.

Figure 14: G- Type Housing Outlook (for Grade-III employees - double storied)

The housing selection was based on the demographic characteristics of residents and the spatial arrangement of the complex. Although these units were initially designed and allocated based on government employment conditions, few of the employees rent out their units due to their smaller size. The low-income status of the residents is evident, as these units are allocated based on income range, specifically targeting low-income employees verified by their pay scale.

Type H- Alleys

Type H outlook



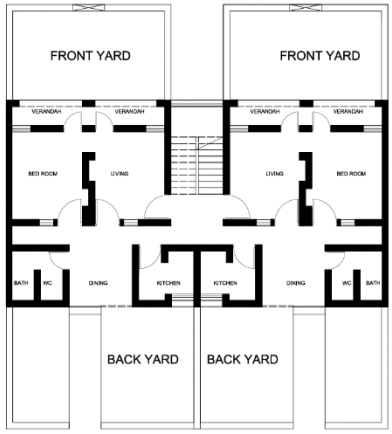
Allocation of three Types

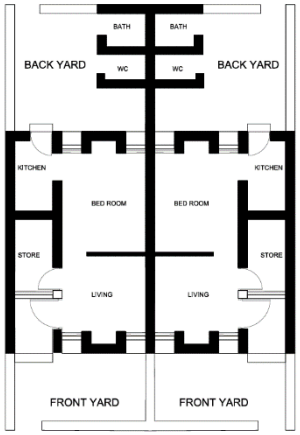
Type H (4th grade- single storied
Type G (3rd grade- Double storied
Type F (2nd grade- Double storied

Figure 15: Type H (for grade IV employees- single storied) left, Allocation of the types (Right)

Among the three housing typologies (Figure 15), the study has been conducted on Types G and H which accommodate diverse family compositions, including children and the elderly. Additionally, one of the primary selection criteria was the spatial layout of the housing, and this particular housing was designed as part of Dhaka's earlier master plan and includes the features of the traditional social spaces around the housing units. The design consists of a hierarchy of spaces, which comprises smaller yards, and few public spaces. The clusters are connected to the central spine through the intersection of spaces and pathways. These spatial elements are essential for investigating social capital formation, which is the focus of this study.

Figure 16: Open spaces and playfields inside the housing





Backyard (G type)

Figure 17: Unit plans (G & H type)

4.2 Socio-demographic characteristics of the sample:

In this part, the characteristics of the respondents are discussed. Socio-demographic characteristics of respondents include income, education, occupation, and age of people who are living in this particular housing. Although the respondents that have been interviewed have low-income backgrounds, yet age, profession, education, and income may cause a few variations in insights about the asked questions. Among the 25 respondents, 13 individuals were male and 12 were female including both elderly and young individuals (Table 5).

One of the main characteristics of the sample is their monthly income, while most respondents are government employees, the sample also includes business professionals, homemakers, and young individuals without regular income. To better comprehend the situation across different genders, the income of the respondents has been analyzed gender-wise. In the studied housing scenario, both male and female respondents are assigned units in accordance with their rank and scale, reflecting the distribution of housing units based on official hierarchy and income levels. The percentage and frequency of monthly income of both male and female respondents are shown below.

Table 5: Percentage of income range of male and female respondents (including elderly and young)

Serial	Gender		Frequency	Percentage	
1	Male (Including the elderly and young)		13	52%	
2	Female (Including the elderly and young)		12	48%	
	Total		25	100%	
	Monthly income range (BDT/Euro)	**Frequency**	**Percentage**	**Frequency**	**Percentage**
		Male		**Female**	
1	None	4	30.8%	6	50.0%
2	15,000-20,000tk / 118-157 euro	5	38.5%	2	16.7%
3	21,000-25,000tk /165-197 euro	3	23.1%	3	25.0%
4	26,000-30,000tk /205-236 euro	0	0%	1	8.3%
5	More than 30,000tk /236 euro	1	7.6%	0	0%
	Total	**13**	**100%**	**12**	**100%**

Interview data showed that the maximum number of male respondents, 38.5% are in the range of 15,000-20,000tk income group, and 23.1% are in the range of 21,000-25,000tk which represents their low-income status. 30.8% of males have no income which mainly consists of

elderly men and young students who are unemployed or retired, whereas, 50% of female respondents represent no income group, those are mainly homemakers and 25% of them belong to the income range 21,000-25,000 tk (Table 5).

Although most of the respondents are government employees, a significant portion of the sample consists of homemakers and elderly individuals, who have shown different service criteria. The result (table 6) suggests that 52% of the respondents of both genders are involved in public service, and 20% of women are homemakers. Only 4% of the sample comes from a business background, and 16% of the total sample consists of students, including both male and female respondents. The percentage and frequency of professions are shown below.

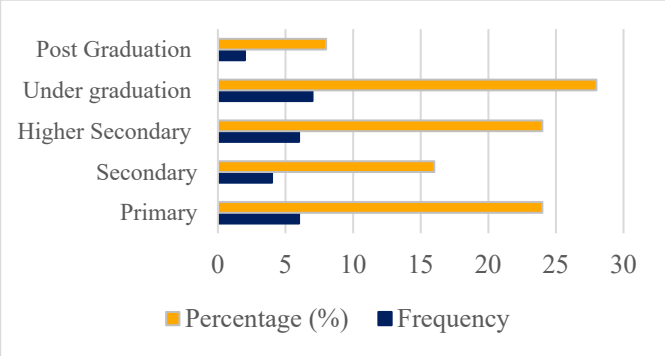
Table 6: Percentage of profession of respondents

Serial	Profession	Frequency	Percentage
1	Public service	13	52%
2	Retired	1	4%
3	Homemakers	5	20%
4	Business	1	4%
5	Student	4	16%
6	Others (Private service)	1	4%
	Total	**25**	**100%**

To comprehend the age range of male and female respondents, the ages of respondents have been divided into ten years of age divisions. From Table 7, the data suggests that 32% of respondents belong to the age range of 55 to 64 years old including both genders, and 24% of the respondents, which consist of both female and male respondents are in the range of 35 to 44 years. While 20% of the total sample consists of younger respondents between the ages of 14 to 24. The percentages of different age groups are shown in the following table.

Sl	Age (Years)	Frequency	Percentage
1	**14-24**	**5**	**20%**
2	25-34	2	8%
3	**35-44**	**6**	**24%**
4	45-54	2	8%
5	**55-64**	**8**	**32%**
6	65-74	1	4%
7	More than 74	1	4%
	Total	**25**	**100%**

Table 7: Percentage of different age groups of respondents



Graph 1: Percentage and frequency of education level of the respondents.

Among all the respondents, there are differences in education level, from Graph 1, the results demonstrate that among 25 respondents, 28% of the individuals have completed formal graduation, and 24% of them have completed primary education, most of them are women and only 8% of respondents have completed post-graduation.

4.3 Social Space:

The first research sub-question was to analyze how the primary social spaces are being utilized by the residents within the selected housing, hence, the analysis and findings are presented in this part based on the collected data which was conducted in Sher-e-Bangla Nagar housing, Dhaka. To answer the question, the analysis will follow the indicators demonstrated in operationalization and will break down the findings with the help of collected data.

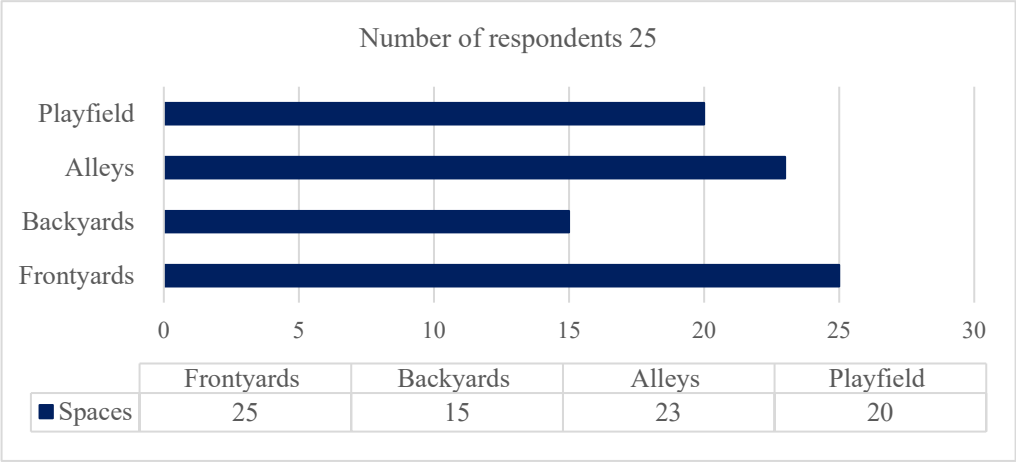
4.3.1 Perceived space:

Lefebvre (1991) defined perceived space as the domain of utilization for spatial practice, where movement and communication take place, thus a system takes shape. To analyze how spaces are perceived by the inhabitants in the studied area, this section will look into the accessibility of the available spaces along with the associated safety.

4.3.1.1 Accessibility:

To analyze accessibility, it is vital to look into the proximity and visibility of the available spaces. As noted by Gans (1961), proximity is crucial in the neighborhood since it develops a support system in times of crisis. Accessibility of physical (proximity) and visual (visibility) elements has been analyzed to understand occupants' perceptions of the spaces in this study.

During the interview, when asked about social spaces' proximity, the respondents pointed to a few spots that they found more accessible. From the 25 respondents, a few specific key spots were identified. Nearly all the respondents noted the front yard adjacent to their houses as a key point, with almost all having access to these front yards (Graph 2). The second location, which is in close proximity and accessible, is the alleys adjacent to yards, where they usually interact for casual communication. Finally, the young respondents have highlighted that they interact around the playfields, which is a 10 to 12-minute walk from their dwelling units on average. The accessible but less used space by respondents compared to the other spaces was identified as the backyards of the units, which is in line with the fact that private spots like backyards are less effective for building social ties compared to more public or semi-public social spaces.



Graph 2: Most accessible and used spaces, according to the respondents.

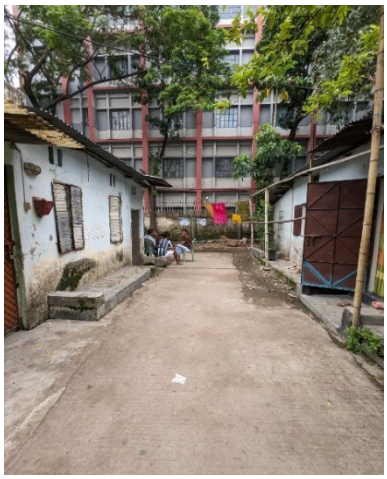
Another indicator analyzed under accessibility is the visibility of these spaces. According to Raman (2010), visibility is an important aspect that enhances the interactivity of social spaces, he claimed that social activities are connected to the visibility of and from the spaces. These

spaces that exist in the Sher-e-Bangla Nagar housing, are reported to be quite visible during the interview, and also highlighted by the respondent as being part of or adjacent to the living units.

"These spaces are just next to the house, not separate. They are right here, in the front or back……. and playfields are nearby, if I meet people, I meet them mostly on the side of the front road. But on the front yards, children play there, and women sit more often" – (30-year-old Male, June 2024).

Front yard

Front yards with adjacent Alleys



Back alley (H type)

Open field (both male and female using spontaneously)

Figure 18: Available social spaces inside housing premises.

Williams (2005) acknowledged that key design factors that are vital for fostering high levels of interaction and networking include better visibility, clustering, and positioning of the spaces, and social bonding is enhanced when occupants have possibilities for contact and are in proximity. In Sher-e-Bangla Nagar housing, when analyzing the layout, it is found that the front and backyards are clustered and placed adjacent to one another. The dwelling typology follows the traditional row house pattern, creating a similar outline for all units, hence, visually and physically interconnected. The front yards are immediately accessible from the alleys as well.

From the space syntax analysis:

- The visibility graph analysis of the housing spatial order reveals that areas with higher values are more open and visible, while areas with lower values are less visible.
- This analysis helps to understand how visibility changes as one moves around the housing social spaces whether through the front yards, narrow alleys, or main pathways.

The average visibility value of the selected area is 273.761 (Table 8), suggesting that each point within the space can be seen from a moderate number of other points, indicating a moderately visible environment. From (Figure 19) the analysis of the housing area shows a balanced spatial configuration. The primary pathway connecting each block and playfield has moderate visibility (light green lines in middle, Fig. 19), facilitating easy navigation. In contrast, the smaller alleys connecting each front yard have similar visibility values but less than those of primary ways (Blue lines, figure 19). This reduced visibility is because these alleys are narrow and have a secondary connection from the primary one, though it ensures more internal privacy.

Despite the fact, that a minimum of 12 and a maximum of 884 show a wide range of visibility from enclosed spaces to large open areas, it also indicates a few of the poorly visible areas (minimum value), for instance, the dead alleys at the end of a few blocks. This potentially causes navigation challenges and may raise safety concerns as well.

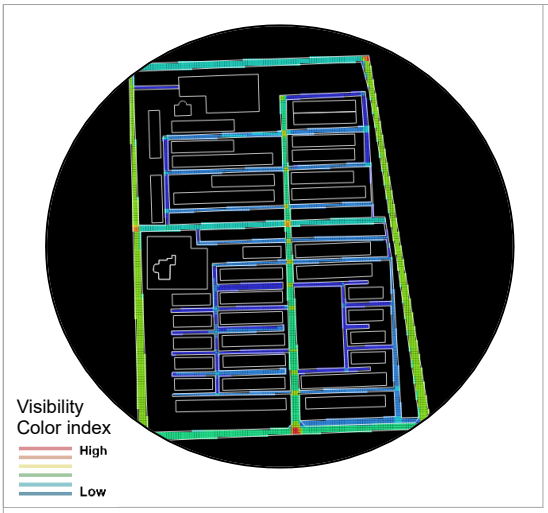


Figure 19: Visibility graph analysis

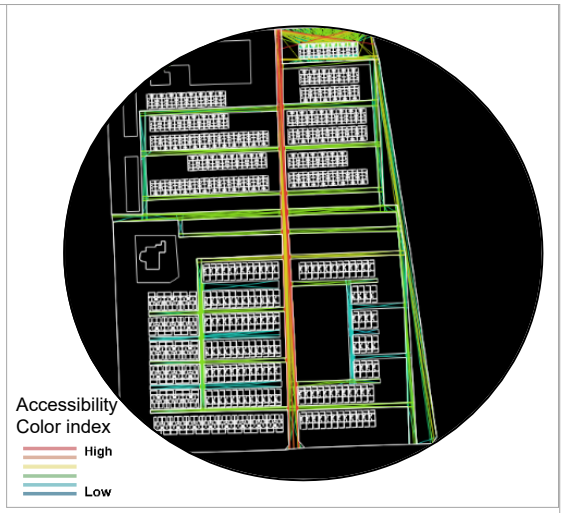


Figure 20: Axial line, R=3 (Local Integration)

Visibility graph analysis	
Value	**Attribute**
Average	273.761
Minimum	12
Maximum	884
Std Dev	168.884

Axial line analysis, Integration (HH) R3	
Value	**Attribute**
Average	4.4615
Minimum	1.94328
Maximum	7.49476
Std Dev	0.860441

Table 8: Visibility analysis values (left), Axial line analysis value (right)

Additionally, the axial line analysis (Figure 20) with a radius R=3 offers insight into the spatial configuration of connectivity and accessibility within a radius of three steps, meaning how connected these spaces are within a short walking distance (three steps in this case). The average integration value for all axial lines within the radius r=3 is 4.4615 (table 8) indicating a moderate level of connectivity, which implies that the spatial layout of the inner configuration is accessible within the immediate surroundings. A maximum of 7.49 indicates the highly central area which is the inner spine (figure 20, red line), that provides the connection to other

tertiary smaller alleys that connect units on both sides. Yet, the standard deviation of 0.860441 suggests that there is a moderate spread in the integration, meaning that there are differences in connectivity, though they are not very pronounced.

Both the interviewees' reflections and observations report are in line with the space syntax analysis. Both suggest that the units and spaces are positioned and designed in a way that the yards are clustered in proximity, which encourages activity and physical ease to reach them.

"Yes, we have spaces both in the front and back. Women sit more in the front, and we talk during walks. My mother is very fond of these spaces, she does not go out much, and she often spends time in the front yards" – (36-year-old female, May 2024).

4.3.1.2 Safety:

Another notion of perceived space in housing is how residents perceive safety and sense the level of security while using such social spaces that are currently available in the Sher-e-Bangla Nagar housing. Feeling safe and secure is regarded as one of the most critical aspects of social sustainability because these promote societal communication (Dempsey et al., 2011). While the notion of safety has been observed through tangible indicators, during the interview, most of the residents demonstrated a positive perception of safety around the spaces in housing. Almost all female respondents, including young and elderly women, expressed positive responses while using and walking around the spaces, even at night (Figure 21). Respondents mentioned that the presence of violence or crime occurrences is very unlikely inside the available spaces, even in the whole housing. The spaces adjacent to the units, such as the front and backyards, are mostly taken care of by the dwellers, and open spaces for common uses are well-lit, while further probing the questions, they also mentioned that spaces are used till late hours and are considered safe spaces for children to play.

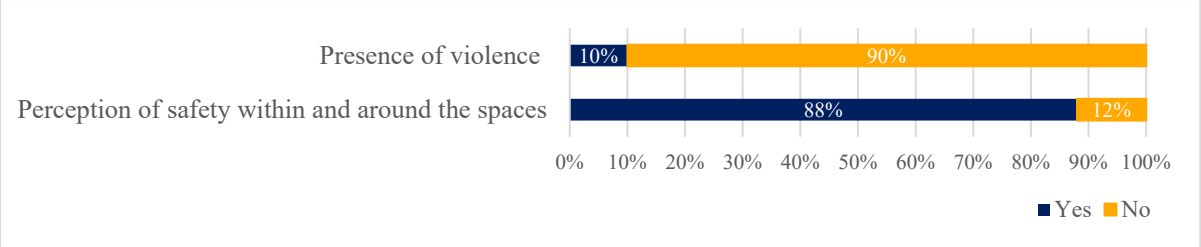
"It's always safe here, there are no crime issues. Children are safe, girls are safe too" – (55 years old female, June 2024).

"Ten years ago, it wasn't safe, I heard, but since I came, it feels very safe. There's much more safety now, nothing bad is heard. We haven't faced any trouble with family. Kids play safely"- (43-year-old male, June 2024*).*

	52 Female 01 Gr=42	50 Female 02 Gr=39	40, Female 03 Gr=43	36 Female 04 Gr=39	32 Female 05 Gr=39	65 Female Elder 01 Gr=40	59 Female Elder 02 Gr=42	58 Female Elder 03 Gr=39	56 Female Elder 04 Gr=45	55 Female Elder 05 Gr=41	25 Young 01 (Female) Gr=34	20 Young 03 (Female) Gr=43
• Safety: Perception of safety Gr=62	4	3	1	2	3	1	2	2	4	3	3	1
• Safety: Presence of violence Gr=30	1	1	1	1	1	1	1	1	1	0	0	1
Totals	**5**	**4**	**2**	**3**	**4**	**2**	**3**	**3**	**5**	**3**	**3**	**2**

Figure 21: Response by 12 female respondents about safety (Processed by author by Atlas. ti, 2024)

Atlas ti code document (female respondents) shows that almost all the females responded to the questions, only 2 of the respondents (Figure 21) had no response regarding the presence of violence or crime, as they are comparatively young or new in the housing to be aware of such occurrences. 10% of respondents (Graph 3) mentioned that spaces such as open fields are accessible to people outside of the housing dwellers, and this has caused distress to the overall situation a few times.



Graph 3: Respondents perceptions regarding the safety

After close observation and discussion with the respondents during the interview, it appears that prolonged intra-unit interaction, and community collective surveillance that arise from constant social interaction until late hours, including children playing around the social spaces, contributed to keeping these spaces safe to use. Also claimed by Jacobs (1961), the safest locations are those where there is natural surveillance by the inhabitants in her book "The Death and Life of Great American Cities."

"Yes, it's safe. We all walk around. We all know each other, so there's natural security" - (59 years old female, June 2024).

Another factor contributing to the lower incidence of violence or crime in these areas is the presence of an RAB (Rapid Action Battalion, a unit of Bangladesh Police) office within the housing complex. However, respondents expressed distress over the fact that this office occupies the space where the only community center was once situated, which in turn has caused fewer social and cultural events within the housing community. This situation highlights how, under the guise of public interest, low-income populations often become victims of spatial exclusion in the city.

"We used to do it frequently before and used to participate with family. Now, it's not the same as before. The old community center is no longer there; it's now a RAB office. However, it's not like we don't do it at all anymore. Just a few days ago, there was an event in open space" - (57-year-old male, June 2024).

4.3.2 Lived Space:

To identify the daily experience of the available social spaces by residents, this study examines the dimensions of activity and usage along with the sense of belonging under the sub-variable lived space. Along with interviews, observation on both weekdays and weekends was conducted to analyze the findings.

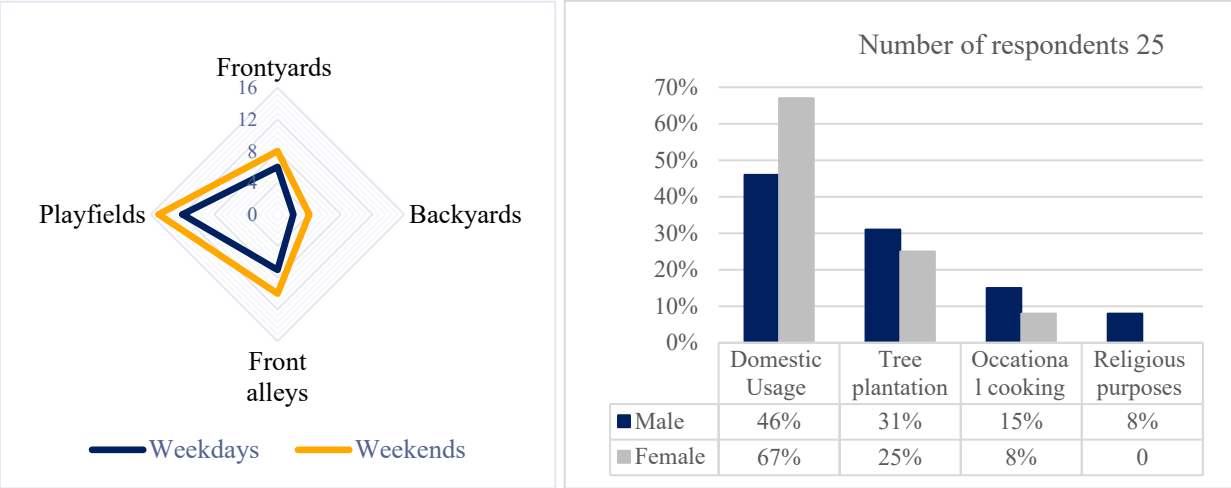
4.3.2.1 Activity and Usage:

According to Rapoport (1990), activities are the direct manifestations of lifestyle, and he particularly showed the association between activities and the built environment. In the case of Sher-e-Bangla Nagar housing, (Graph 4), results suggest that activities related to occasional cooking and religious purposes are lower in percentage among both genders. Only 8% of male respondents reported using front yards for religious purposes, such as *Milad* and 8% of females expressed, that they use yards for occasional cooking during the winter on birthdays or death anniversaries. However, these activities are organized in advance and regarded as formal, as people are required to be invited beforehand to participate collectively. For low-income populations, performing many household activities outside the living units, particularly for women and children has been addressed as an opportunity for socialization and developing networks, and the result also suggests that 67% of female respondents engage in household or

domestic activity on both weekdays and weekends, utilizing the hierarchy of spaces starting from the front and back yards. 31% of males highlighted, mostly elders, use social spaces for planting trees as a part of their leisure (Graph 4, right).

"As I said people do their regular chores, and women are the ones who mostly use these for their household work, we come from the office after 5, so if we can sit here on weekends, you see" – (30-year-old male, June 2024).

When asked where they mostly spend time or perform activities, most respondents pointed to the front yards and playfields adjacent to their living units. Observation over an 8-day period supported this claim. According to the observation report, an average of nearly 8 people used the front yards on weekends, while around 6 people used them on weekdays. The playfields have the highest average density, with about 12 people on weekdays and 16 people on weekends (Graph 4, left).

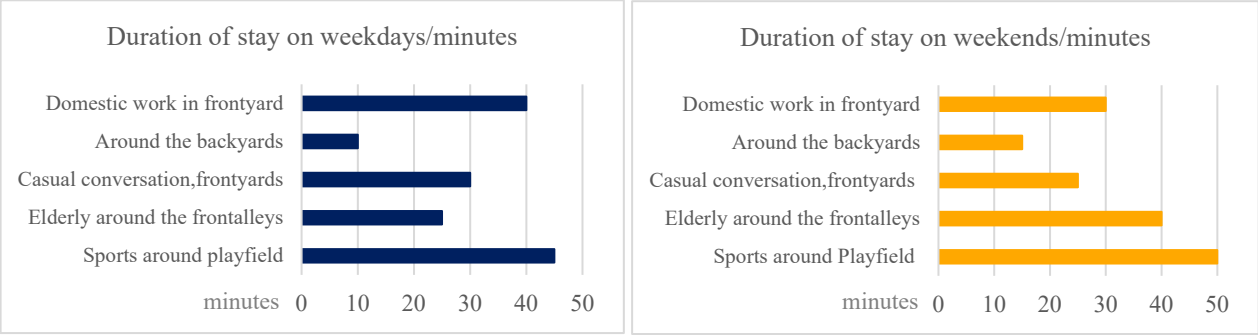


Graph 4: Density of people on weekdays and weekends (left), Usability of spaces (right)

Interestingly, it is found that people often use the front alleys located immediately next to the front yards for casual conversation when coming back from offices or mosques. From the observation report, on average, 10 people use these front alleys on weekends (Graph 4, left), which supports Xinyi's (2018) findings, that alleys or small lanes that are adjacent to traditional houses, encourage neighborhood residents to participate in a variety of events.

However, for this research, another aspect is to understand the effective use of these spaces during different hours of the week and how much time they spend as their lived experience. The observation report shows, that on weekends, women spend an average of 30 minutes in front yards for domestic activities (Graph 5). On weekdays, this increases to 40 minutes, mainly because they use these spaces for chores like drying clothes, cleaning, or taking care of the plants. Women (age 25-34) are seen gossiping while drying clothes in yards or taking care of children and find these as an activity to engage socially with inhabitants within the limited scope (Graph 6). Some women are observed to purposefully take their regular chores outside in the yards to engage in social interaction and exchange household utensils. On the other hand, during weekends front alleys are extensively used by men for 40 minutes on average, they spend time on the front alleys, looking after the children playing around, or buying groceries. But the backyard is the least used space, with people spending an average of only 10 minutes on weekdays. Interview respondents noted that backyards are often small or too dirty to use effectively.

"Yes, there is space, we use it. The front space is used; as you can see, there's laundry drying... The back isn't used much; it's a bit dirty, so we don't go there often. The front has a seating area, and in winter, neighbors come and sit. With so many plants, it feels like being in a village" --- (43-year-old male, June 2024).

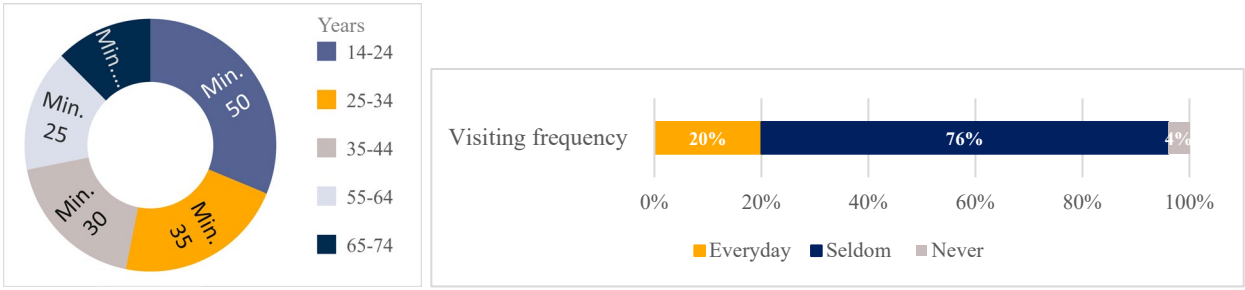


Graph 5: Duration of stay on weekdays (left) and weekends/ minutes (right)

According to Li & Liu (2006), public to semi-private spaces provide opportunities for events that encourage diverse groups, including children and elders. The result also suggests, that young individuals and children (aged 14-24) are found to spend the highest time around playfields both on weekdays and weekends (Graph 6), time has been recorded on weekends for 50 minutes on average (Graph 5 & 6).

"More on Fridays, children play mostly. I stay busy all day. The boys play here, I can see them from above, so I don't stop them. I don't let them go far; they play here in the front" – (58-year-old Female, June 2024).

With a further understanding of the extent to the access of diverse users in these spaces, 76% of respondents highlighted that their neighbors visit these spaces seldom, and only 4% of respondents expressed that their neighbors never visit the spaces (Graph 6, right).



Graph 6: Duration of average stay according to age group (left), Percentage of access by visitors (right)

From Visibility Graph analysis (space syntax map),

- The Visibility analysis of the cluster indicates that the warmer the color of the area, the higher the level of visibility, as shown (in Figure 22, color index).
- The color of the cluster map (figure 22) shows the front yards (yellow color) as visible and connected, suggesting a homogenous spatial configuration than the backyards (light green and blue color). In the context of row houses front yards are typically adjacent to each other, which indicates a cohesive layout where each unit's yard is visible from its neighboring unit.

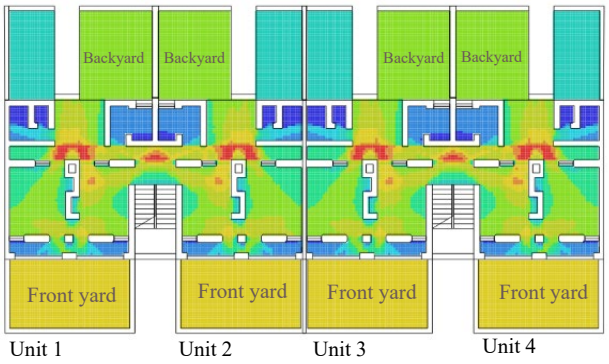


Table 9: Visibility analysis values of cluster

Visibility graph analysis	
Value	**Attribute**
Average	985.963
Minimum	34
Maximum	1743
Std Dev	335

Figure 22: Visibility analysis of the cluster of units

The average value across the entire analyzed space (4 units) is 985.963 (Table 9), indicating that on average, the spaces are relatively visible from a large number of other points within the analyzed space, with a maximum of 1743. Besides, the standard deviation of 335 points to a substantial variation in visibility, meaning there are significant differences in how visible individual yards are. For instance, front yards are more visible than backyards from inside the house and also from the alleys (figure 22, yellow colour indicates better visibility than green or blue). At the same time, this moderate visibility within units implies that while children and elders are around these spaces, they are under the surveillance of the unit visibility catchment.

4.3.2.2 Sense of belongings:

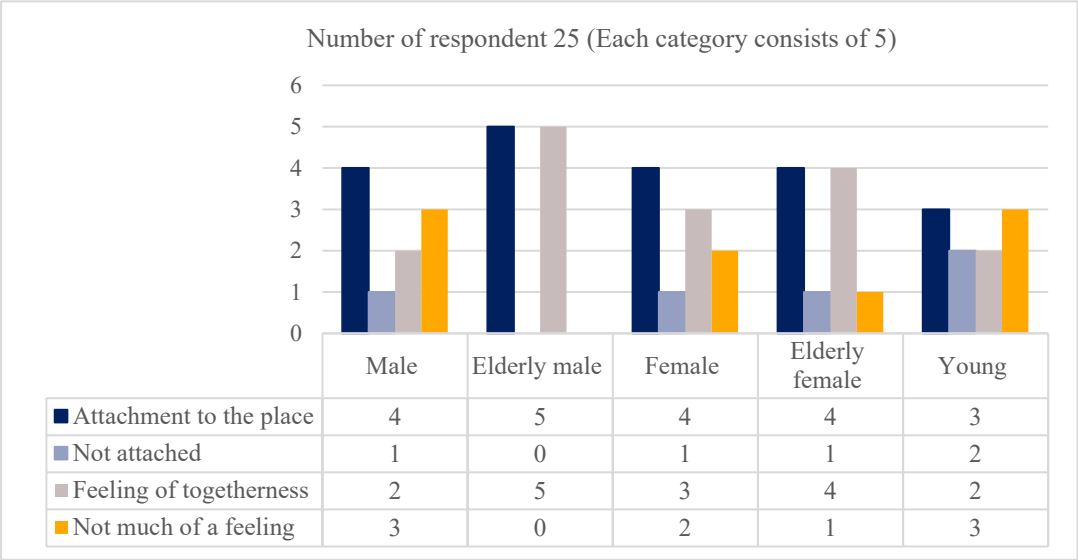
Young et al. (2004) claimed that the sense of belonging in a neighborhood is one of the many intricate notions scholars examine to understand individuals' perceptions and associations with their locality. Within the scope of this research, the initial attempt of the study was also to identify the socially significant spaces of housing and how these contribute to residents' feelings and connections. This is particularly important in low-income housing contexts where facilities are limited and social interaction often depends on day-to-day activities across different ages, genders, and backgrounds. In the Sher-e-Bangla Nagar housing, when the respondents were asked about their attachment to such spaces, different genders responded differently to this question. Notably, nearly all elderly men expressed deep affection for these available spaces and highlighted that engaging in both formal and informal activities outside the dwelling units has been crucial for maintaining their social networks.

"It's the area around the house; I like it. I feel connected. I don't need to go outside. I sit and chat here, I see everyone from here. It's good, Alhamdulillah" – (75-year-old male, June 2024).

According to Islam et al. (2021), any space has the potential to become frequented by individuals when they feel a sense of belonging towards it, over time, they start to feel a sense of ownership over the place, even without legally owning it. During the interview, the female respondents showed similar notions, nearly four out of every five female respondents (80% of females in each category), both older and middle-aged women have reported positive feelings regarding the available social spaces, as they highlighted that these are part of their household space and keep them connected with similar individuals through these (graph 7).

"Surely, we use it every day. In winter, we make pithas and dry various things. Otherwise, women sit and have tea sometimes" – (40 years old female, May 2024).

Female respondents emphasized that their social interactions often take place in these social spaces, sometimes these spaces become the most active venues for communication. This practice has developed from daily interaction, particularly through the use of front yards for various domestic activities.



	Male	Elderly male	Female	Elderly female	Young
Attachment to the place	4	5	4	4	3
Not attached	1	0	1	1	2
Feeling of togetherness	2	5	3	4	2
Not much of a feeling	3	0	2	1	3

Graph 7: Respondents response regarding attachment to the place and co-residents

Furthermore, when asked about the feeling of togetherness, which is the second indicator, almost 90% of elderly females and all elderly males (Graph 7) described feelings of togetherness regardless of gender, age, and background. In low-income housing communities, elderly people often choose to interact in shared spaces as a personal choice and an easily accessible source of companionship, due to the limited options for socializing and network building. As Keller (1968) highlighted, norms, individual preferences, and lack of alternatives are some of the reasons behind community involvement, and neighbouring.

Middle-aged males and young individuals reported being less connected with their co-residents and added further that, they spend most of their time outside and can only manage time for socializing inside the housing complex during weekends. Only 40% of male and young individuals (2 out of 5, each category) have reported that they feel connected with neighbors while a large portion of male respondents, 60% (3 out of 5) reported feelings of less attachment with other inhabitants (Graph 7). Additionally, they added that these social spaces are used as active socializing venues for females, children, and older people, there are no additional facilities for male individuals to appropriately utilize them.

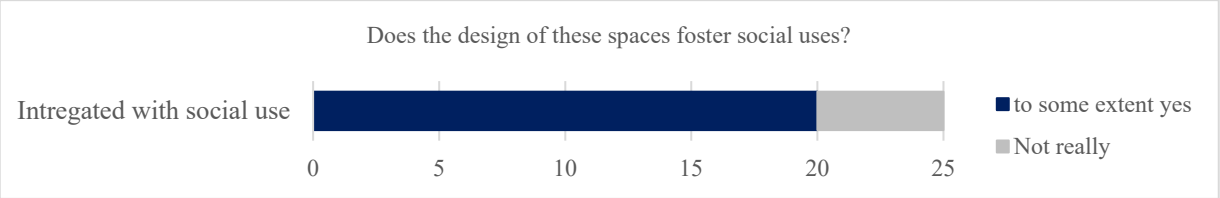
"There aren't any special facilities for personal development, but children play here, and they have an interest in playing, which is a form of development. Other than that, there's no club or anything like that"- (36-year-old male, June 2024).

4.3.3 Conceived space:

This research examined both expert views and user experience to understand how social spaces are conceived by architects and planners and how well these spaces meet the social needs of current residents. By analyzing the design intentions and physical characteristics of the housing, the study aimed to see how these two perspectives intersect.

4.3.3.1 Design and Planning Intentions:

In Sher-e-Bangla Nagar housing, the spaces that are adjacent to the back and front of the units are regarded as private- to semi-public spaces where many communal usages are accommodated. During the interview, respondents shared their views regarding the spaces being integrated to meet their social and communal needs as a part of their lifestyle. Interestingly, 20 respondents out of 25, responded with yes, and only 5 of them expressed distress over the space integration intentions (Graph 8). According to them, despite the spaces being old and small, they provide opportunities to perform many of their formal to informal activities in their daily lives. While the survey of this research was ongoing, one of the biggest festivals in the country, Eid-ul-Adha was being celebrated, and most people pointed out how these spaces are being utilized for such communal and social uses. They expressed how elderly and younger members of the family can also be part of any social act under the surveillance of the house.



Graph 8: Respondents' response regarding the integration of social needs

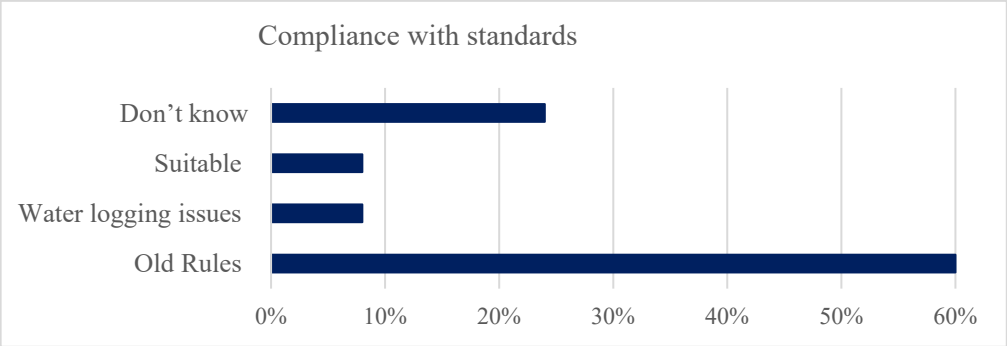
From the perspective of the expert,

"See, it's very tricky here in the Context of Bangladesh nowadays. The design of social spaces in housing complexes in Dhaka is intended to foster community interactions and social cohesion. Culturally we are a very socially active nation but with the scarcity of lands and price hikes, it's very difficult" – (Academic Expert in Urban and Housing, June 2024)

According to the expert from the government sector regarding the design intentions behind this low-income housing, these plans were based on the previous vision of Dhaka's masterplan when density and the land price were comparatively low, hence it was easier to achieve such low-rise housing with social spaces with a front and back concept. They further added that these spaces not only fulfill cultural and communal needs but also have a huge climatic impact in the context of hot, humid weather.

"The design of the traditional social spaces around the housing complexes such as courtyards, and front or back yards is to provide functional areas for household work, and recreational facilities primarily, but most importantly this space is also a key feature for the natural light and airflow in the housing. There are several preferences and considerations for prioritizing the development of social spaces in housing complexes" --- (Architect from public sector, June 2024).

However, according to designers, the land price has made it difficult to accommodate such spaces, particularly for low-income. With the growing density now, all these housing for lower rank holders are being envisioned with high-rises with necessary infrastructure and limited access to the playground, but not with traditional front or back or courtyard spaces. Further investigation regarding space compliance with standard rules, 60% of respondents reported these are based on old rules, and 8% expressed distress regarding non-compliance with rules as spaces have water logging issues during monsoons (graph 9).

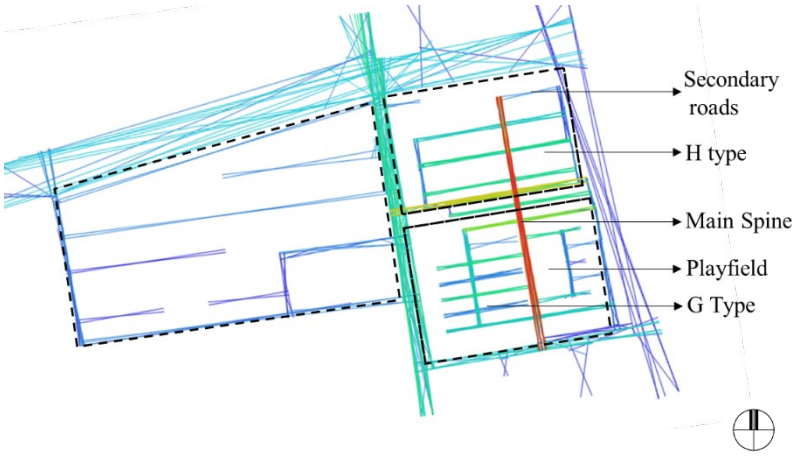


Graph 9: Response regarding standard compliance.

According to the experts, initially, spaces were designed to comply with standards, but due to the lack of supervision and regular monitoring, these spaces now face drawbacks.

"Challenges often arise from balancing regulatory requirements with practical design needs. As far as my experience, I have seen they do function well if we design social spaces in housing, but it's not very usual that we get a chance to do so, you know. But our main concern is to pay close attention to safety standards, accessibility, and environmental regulations, ensuring all designs meet or exceed these benchmarks while remaining functional" – (Academic Expert in Urban and Housing, June 2024).

From Spatial Analysis



Value	Attribute
Average	5.0895
Minimum	2.19085
Maximum	9.06582
Std Dev	1.228

Table 10: Local integration (R=3) values of the entire housing

Figure 23: Local integration (R=3) of the entire housing

- The local integration of the entire housing measures how easily different parts of a spatial configuration are connected and accessible from one another (Figure 23).
- Colour Index: The warmer the color (red, yellow, green), the better the connectivity.

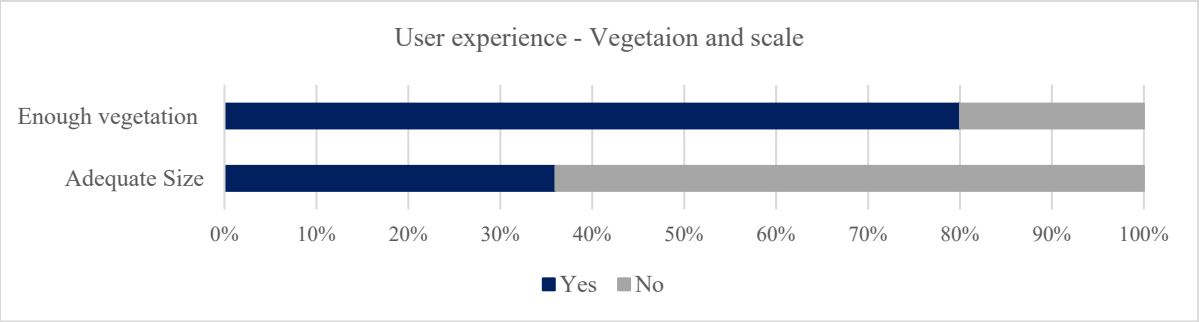
From local integration, the average integration value (Table 10) indicates that the spatial layout offers a well-connected and navigable configuration with a maximum of 9.06. Specifically (Figure 23), the configuration allows easy movement from the main spine (the primary thoroughfare, red line, fig 23) to the connecting alleys (secondary pathways, green lines). This interconnectedness helps residents to use the space more effectively, establishing a balance between the hierarchy of the spaces. This is beneficial for women to use and for children to navigate them well (Appendix 7).

4.3.3.2 Physical Characteristics:

To understand the spaces' physical characteristics, this research looked into the indicators that have been analyzed selectively to understand the technical (scale and material) and performance (Comfort) elements. As previously mentioned, these low-income units are allocated according to rank, which is at the lower end in Sher-e-Bangla Nagar housing. Thus, this housing accommodates the living quarters with smaller sizes which are, subsequently, expressed as inadequate in the views of respondents. When asked about the visual appearance concerning the scale of the spaces, 64% of respondents highlighted that these are smaller in size (Graph 10). They are adjacent to units or nearby to their living quarters, but these are insufficient in size. Also, observations suggest that many of the backyards are occupied with filth and left unused, discouraging enjoyment or appreciation.

80% of the respondents reported that the vegetation is enough, and they keep planting trees to make the spaces more comfortable and climatically sound. However, the results of the comfort in usability remain problematic. During the rainy season, they experience water logging issues, which makes the spaces uncomfortable to use. Also, there were initially three playfields on site for the whole community but one of the fields was recently taken away due to the construction of the metro rail without providing any alternatives.

"Yes, there are many, of these trees that I planted with my hand, there were more trees before, but we still have enough……. there used to be several fields to play in, but due to the work of the metro, one of the playgrounds is not available, which is why they (the children) cannot play. There is a possibility of going in another direction if the boys and girls are away from the playground now. There is some trouble in playing now"— (57-year-old male, June 2024).



Graph 10: Users' response about physical features

In the Sher-e-Bangla Nagar housing, most of the spaces, such as yards and alleys, are constructed with materials that are not highly durable, such as basic concrete and local bricks. These materials often struggle to withstand the region's harsh weather conditions, particularly heavy monsoon rains and high humidity. As a result, these spaces suffer deterioration over time. Experts from private organizations also mentioned during interviews, how material selection and comfort factors are vital for functionality.

".... material selection has a crucial impact on designing social space. It directly impacts functionality, aesthetic appeal, and sustainability. Another important thing is we have six seasons in Bangladesh. So, weather resistance plays a key in selecting the materials" -- (Architect from private organization, June 2024).

Concerning this particular housing, the expert mentioned that the housing was designed according to outdated regulations that did not account for advancements in materials or current standards for durability. At the same time, the size is determined by the lower rank of the allottees, resulting in smaller units. This indicates broader neglect by the authorities towards

this demographic, particularly regarding how the initial space allocation was conceived based on rank hierarchy rather than the housing needs of the inhabitants.

4.4 Social Capital:-

The second question was to examine the role of social spaces in fostering bonding and bridging capital. This section will analyze interview data to identify how bonding and bridging social capital are formed and will try to find the role of these social spaces in supporting social capital formation in the studied area.

4.4.1. Bonding Social Capital:-

4.4.1.1. Strength of relations:

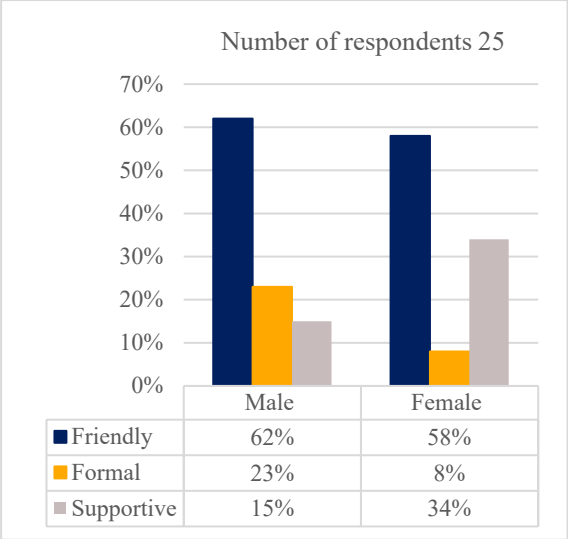
Authorities designed the housing dwelling units and allocated them to these low-income families, and these families came together in one place to live without having further options. In Sher-e-Bangla Nagar housing, interaction refers to the notion of person-to-person contact for various informal and formal drives, from non-committal to highly engaging interactions. One of the key outcomes of the interview analysis is that most of the male respondents (graph 11, right), 70% of them who attend the office five days a week, reported the frequency of interacting with co-residents almost every day while going to the office or on the way back home. They interact on the premises of their house around front yards or alleys. 23% of them highlighted that they interact twice a week while going to pray at the mosque or during weekend chores, happening in open spaces within the housing premise. No responses have been recorded for "never" in terms of interaction, which indicates the fact that in-person social interaction among residents is active. And results suggest, that 62% of them, including elders and young people expressed that their relationship with fellow inhabitants is friendly (graph 11, left).

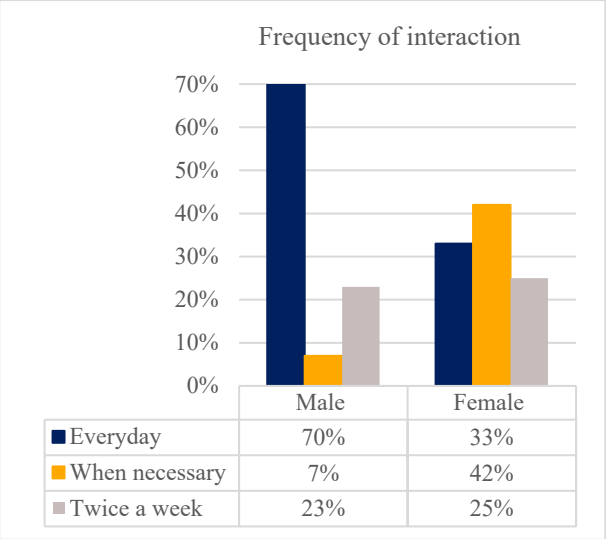
"I have neighbors above, below, and in front, and I have very good relationships with them. Some are seniors, some are juniors, and some are the same age. We meet regularly, more than once or twice every day…..... within the vicinity, while going to the mosque or the office"- (35-year-old male, June 2024).

"We meet neighbors every day; we see each other whenever we step out of the house. The men meet at the mosque, and the women meet right in front of the house. I usually see people while I am going to the office or when I am coming back. But mostly I talk during weekends during household work" --- (52-year-old female, June 2024).

34% of the female respondents (Graph 11, left) expressed that they find their neighbors supportive when needed. 42% of the females mentioned they interact with their co-residents around the spaces of dwelling units whenever necessary (Graph 11, right). Furthermore, female respondents, while performing household activities outside of the living units, interact with fellow female residents at a 33% frequency of everyday interaction.

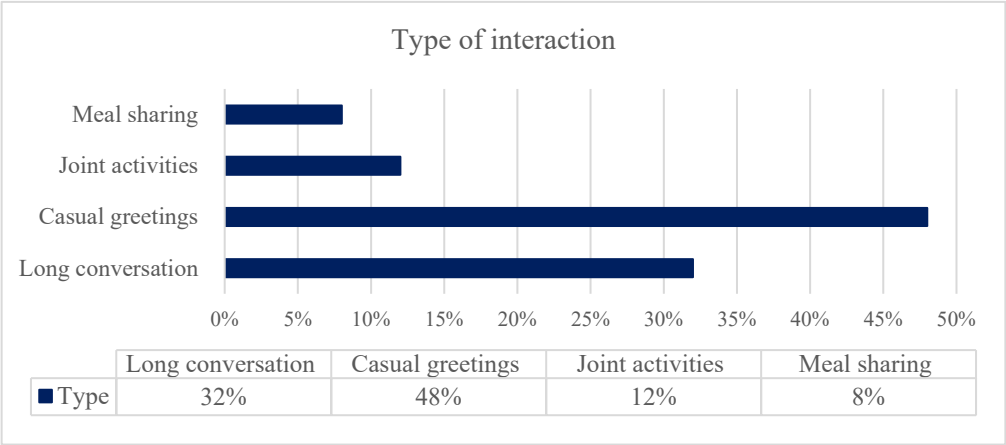
According to Leyden (2003), social capital and, consequently, both physical and mental health are impacted by the layout of areas and communities, Individuals are more likely to know their neighbors and be involved in the community because these conditions promote unintentional interactions. Similarly, the hierarchical space allocation in the Sher-e-Bangla Nagar housing, in the form of front or backyards, has facilitated the possibilities for meaningful interaction spots for female respondents, while the open spaces around the complex foster interaction for male individuals.





Graph 11: Emotional quality (Left) & frequency (right) of the interaction

Further probing the question regarding the type of interaction (Graph 12), only 8% of respondents reported that they barely share meals in such spaces as they are open to roads on one side. Moreover, 48% of respondents have mentioned that they interact casually by greeting *Salam* as a social courtesy (in Western culture, more similar to saying Hello) and asking about their well-being.



Graph 12: Percentages of types of interaction.

32% of the respondents have responded to having long conversations regarding different household or family issues while interacting with each other. 12% of the respondents, mostly young males, have mentioned they interact in joint activities or while playing sports together in the open spaces during weekends or Eid holidays (graph 12).

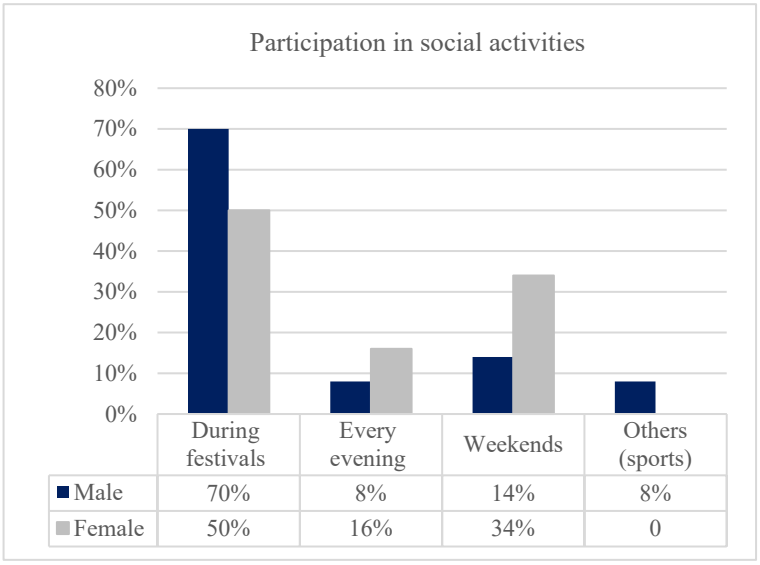
"…. excellent relationship. We see each other all the time and greet each other when we meet outside, we chat with neighbors from nearby houses…….. Meaning conversations about family matters. In family discussions, it's mostly about how everyone is doing. Just casual greetings. Since we are in service, if we see each other, we discuss family matters, we ask how the children are doing or how everyone is" ---- (57-year-old male, June 2024).

4.4.1.2 Participation:

To understand the extent and nature of low-income people's participation in social activities, it is vital to recognize that these social activities are often small in scale or very informal in such contexts. In Sher-e-Bangla Nagar housing, interview data suggests that 70% of male and 50% of female respondents tend to participate in social activities during festivals, while 34% of females highlighted that they participate in activities that usually take place during weekends, such as doing weekend chores together on their household premises (Graph 13).

Further probing the questions regarding their experience of participation and informal discussion with the respondents during the interview indicated that the demolition of the previous community space has reduced the frequency of social activities within the housing premises. In the absence of formal community space within the housing premises, the further notable spaces highlighted by the respondents are the front yards and open fields. This has led them to arrange activities formally or informally around the available spaces adjacent to dwelling units. Moreover, people in Sher-e-Bangla Nagar housing participate in social and cultural activities in these spaces when the nature of the event is public, like *Milad* or any birthday celebration in front yards or *Pohela Baisakh* (Bengali New Year) in open spaces.

"Yes, we do participate. Before, there were multiple events on the 31st with a pavilion in community space. Now, there are 1-2 events. If someone wants to organize an event, it depends on the location of their house—whichever is closer. If someone wants to hold an event in the field, they can. Recently, there was a reunion in this field" – (30-year-old male, June 2024).

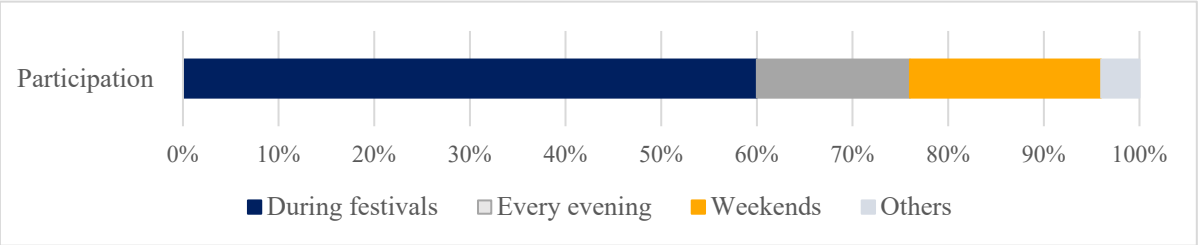


Graph 13: Percentage of participation in social activities

Additionally, they use the field to organize activities as well, as indicated. Even, some elderly individuals place their chairs in front of their doors to sit and watch people pass by, allowing them to easily engage in social activities.

"My mother and grandmother plant trees; my grandmother sits a lot here with a chair. She can't walk so much anymore, nor can she climb to the roof; she sits here with a chair" --- (18-year-old young male, June 2024).

Overall, regardless of gender, 60% of respondents reported they participate in social activities inside the housing with their family during any social, cultural, or religious events, and 20%, who are mostly elderly people, expressed their participation in religious activities, such as praying together every weekend (Graph 14).



Graph 14: Overall frequency of participation

The second indicator was to understand the positive or negative aspects of such participation, almost all the respondents reported that there is no exclusion or restriction on participation, even in terms of attending religious events.

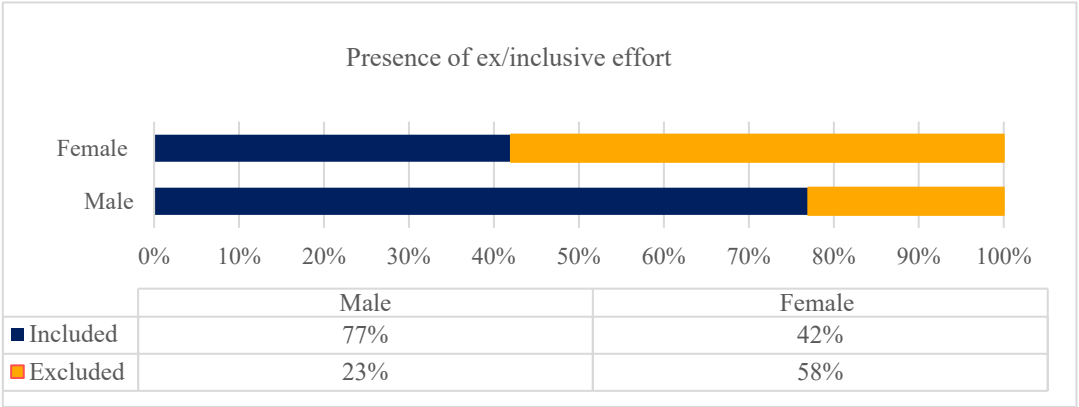
"Yes, yes, during every Eid, we all join together to decorate from one end to the other with lights. Families, including those who are tenants, join in. We all do it together and celebrate Eid together. We see each other during family programs and invite everyone. You see, neighbors are like our own relatives, sometimes more so than our actual family" ---(35 years old male, June 2024).

4.4.2 Bridging Social Capital:

4.4.2.1 Collective actions:

Collective actions such as contributions to decision-making in various communal initiatives are one of the essentials of developing social capital within the housing environment, which leads to further communal understanding and co-existence in the long run. According to the responses from the interviewed respondents, when asked about the inclusivity in collective decision-making, such as any community activity initiatives, the data reflects males' higher level of involvement than female respondents. From Graph 15, 77% of males highlighted inclusive decision-making efforts that exist in the community. Conversely, 58% of females reported being excluded from such actions, which indicates a gender imbalance.

"Women usually don't go, unless she is also the allotee. Some who don't have husbands go sometimes, but I don't go. There are meetings occasionally, and my husband attends"- (40-year female, May 2024).



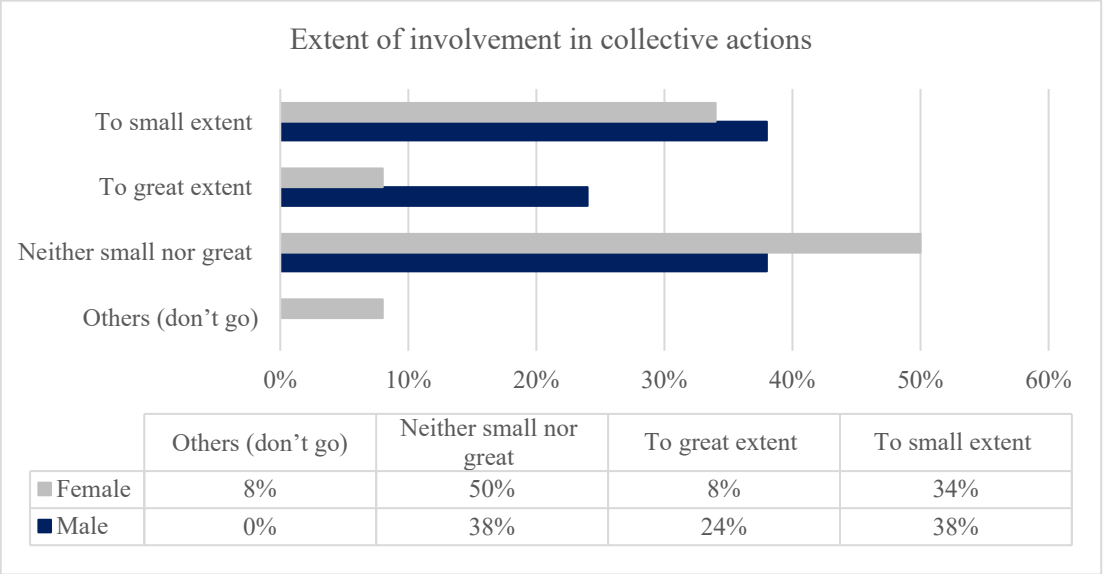
	Male	Female
Included	77%	42%
Excluded	23%	58%

Graph 15: Presence of exclusion and inclusiveness

These females are either homemakers or less willing to participate in such collective decision-making efforts. This outcome implies the general socio-economic fact of Bangladesh, where men are representative of any household. However, a few of the working women indicated that they are called if the allotment is under their names, which is another fact that there are attempts at inclusive initiatives. Besides, only 23% of male respondents, either retired or young are excluded from such collective efforts (Graph 15).

When examining the extent to which individuals contribute to collective actions, 38 % of males highlighted that they contribute to a small extent, and similarly, 34% of female allottees reported contributing to the same extent, indicating a gender balance. However, 50% of females who are homemakers reported they have no contribution or involvement in such initiatives, and 8% of female allottees expressed unwillingness to participate in collective actions despite being invited (Graph 16).

"Opinions can be shared collectively, there are no inconveniences. We respect everyone, both seniors and juniors. You know the juniors, their energy, commitment to work, and contributions are valued by us" – (58-year-old male, June 2024).



	Others (don't go)	Neither small nor great	To great extent	To small extent
Female	8%	50%	8%	34%
Male	0%	38%	24%	38%

Graph 16: Percentage of extent of involvement in collective action

Besides, 24% of males noted that they participate in and initiate many initiatives inside the premises to a great extent for religious programs like *Eid-e-Milad-un-Nabi* at mosque or *Milad* at their household premises. Overall, if any decisions are initiated inside the housing complex and allottees, either male or female are being invited, they can collectively voice their opinions.

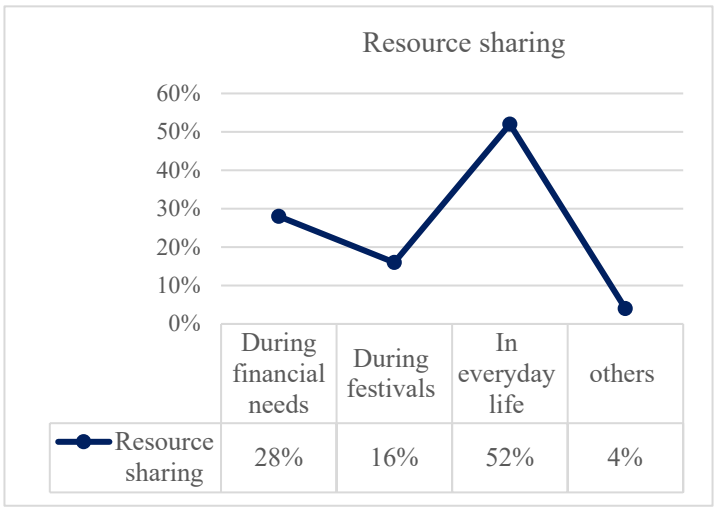
4.4.2.2 Trust:

In low-income housing, developing trust among inhabitants is crucial for facing any crisis. In Sher-e-Bangla Nagar housing, when asked about the mutual trust among them, almost all respondents, regardless of gender and age responded positively. By further probing the interview questions regarding any experience of such, it revealed that individuals use their social capital, particularly bridging capital, to acquire instrumental support such as using references, asking neighbors to take care of their child, medical assistance during emergencies, and so on. As Gifford (2007) highlighted, in environments characterized by positive social aspects, people are more inclined to assist each other in times of need.

"Yes, I have trust. I trust a few people a lot; they show up whenever needed and give a lot of support, and they have done so before……. When sick, they even call an ambulance and help. If someone dies, we all support them during that time. I have cooked and sent food several times" --- (40-year-old female, May 2024).

However, when asked about how they share their resources, such as time, effort, and goods, different reactions were reported. Among all the respondents, 52% highlighted they share resources in day-to-day life situations, either taking care of a neighbor's child, assisting elderly people, or sometimes sharing food (Graph 17). The second highest category was reported that 28% of the respondents expressed that they share assistance during each other's financial crisis, which captures their willingness to support each other in times of need more appropriately. Since they all belong to similar economic backgrounds in the low-income bracket, willingness to provide financial support implies the presence of internally developed social capital, as Dempsey (2011) identifies trust as an essential element for forming bonds between individuals and establishing long-term relationships that support them in crises.

"Yes, definitely, I trust my neighbors, in times of need, everyone comes forward, be it financial troubles or health issues" – (42-year-old male, June 2024).



Graph 17: Percentage of the tendency of resource sharing

Figure 24: During the festival (Eid), celebrating together

16% of respondents expressed that during festivals such as Eid or religious events, they also share resources or provide support if needed (Fig 24). Young et al. (2004) claimed that the ultimate sense of neighborhood encompasses social ties, feelings of attachment, level of trust in the community, and contribution to communal matters. In the case of Sher-e-Bangla Nagar housing, respondents' positive responses regarding trust indicate internal capital among them.

4.5 Relationship between Social Spaces and Social Capital Formation:

The third question of this research was to analyze the relationship between social spaces and the formation of bonding and bridging social capital. This section will analyze the influence of perceived, lived, and conceived space on social capital formation in the studied area. To analyze the association of each spatial triad, this study will look into the findings from ATLAS. ti (Appendix 5, Table 15).

4.5.1 Perceived space with Bonding and Bridging social capital:

Table 11 illustrates, the frequency of occurrences where different aspects of perceived space (accessibility and safety) are overlapped with indicators of bonding and bridging social capital. Accessibility shows a relatively strong connection with the strength of relations (18 co-occurrences) and a moderate association with participation (9 occurrences) in communal activities. This suggests, that if perceived social spaces are accessible, they strengthen social relations and foster frequent, and meaningful interactions, encouraging inhabitants to participate in community engagements. From a safety perspective, it illustrates a moderate association with the strength of relations and with the same co-occurrence frequency (6) with participation. Safety is influential in bonding social ties but slightly less pronounced compared to accessibility. This implies the fact that inhabitants are more likely to participate in communal activity if they feel safe, but this aspect alone does not significantly drive the participation compared to accessibility.

For bridging capital (Table 11), accessibility has a moderate impact on collective action (8), as previously analyzed, there exist exclusion aspects and initiatives that are more informal inside the housing community. Besides, trust has comparatively lower engagement with accessibility (4) and safety (5). Therefore, perceived spaces have a moderate effect on fostering bridging social capital and a comparatively better association with generating bonding social capital, according to the responses from the respondents.

Table 11: Co-occurrence of perceived space with bonding and bridging capital

		Perceived Space		No of quotation
		Accessibility	Safety	
		Frequency of co-occurrence		
Bonding social capital	**Strength of relations**	**18**	**6**	
	- Emotional quality			75
	-Frequency of interaction			45
	-Intensity of interaction			33
	-Type of interactions			52
	Participation	**9**	**6**	
	-In communal activity			59
	-The notion of participation			42
Bridging social capital	**Collective Action**	**8**	**4**	
	-Involvement in decision-making			58
	-Presence of in/exclusion			68
	Trust	**4**	**5**	
	-Existence of belief			36
	-Willingness to share			56

4.5.2 Lived space with Bonding and Bridging social capital:

The co-occurrence (Table 12) suggests that activity and usage of lived space have a relatively stronger association with the strength of relations (15 occurrences) and participation (14) in communal activity. Likewise, the sense of belonging has a similar impact (15) on the strength of relations but shows a moderate engagement with participation (10). Hence, this implies that activity and usage potentiality, as well as the sense of belonging, are both influential in bonding capital, but comparatively sense of belonging has a lesser association with communal participation. This suggests that the spatial layout with diverse activity and usage patterns helps to reinforce meaningful relations among inhabitants and encourages more participation, which in turn develops a stronger sense of belonging and attachment within the housing community.

Table 12: Co-occurrence of lived space with bonding and bridging capital

		Lived space		No of Quotations
		Activity & Usage	Sense of Belongings	
		Frequency of co-occurrence		
Bonding social capital	**Strength of relations** - Emotional quality -Frequency of interaction -Intensity of interaction -Type of interactions	**15**	**15**	 75 45 33 52
	Participation -In communal activity -The notion of participation	**14**	**10**	 59 42
Bridging social capital	**Collective Action** -Involvement in decision-making -Presence of in/exclusion	**8**	**9**	 58 68
	Trust -Existence of belief -Willingness to share	**5**	**14**	 36 56

Again, the indicators of bridging capital (Table 12), collective action (8), and trust (5) show moderate co-occurrences with activity and usage. However, there is a comparatively higher co-occurrence of trust (14) and collective actions (9) with a sense of belonging. This suggests that spaces with higher potential for activity and usage, as well as an inherent sense of belonging, foster interest in engaging in diverse collective initiatives. Nonetheless, only activity alone cannot motivate inhabitants to trust without building a sense of belonging. Overall, lived spaces have a stronger impact on bonding and bridging capital formation than perceived spaces.

4.5.3 Conceived space with Bonding and Bridging social capital:

The Co-occurrence from the ATLAS. ti (Table 13), suggests the association with design and planning intentions conceived by experts on bonding capital is relatively moderate in terms of strengthening relations and participation, and physical features appear to be less significant. Besides, bridging capital indicators also have less or no overlap with conceived space. This suggests that spatial design intentions may help strengthen internal relations by providing key interaction opportunities and enhancing participation, but conceived space has no relation to building trust or fostering internal decision-making initiatives as bridging capital. Bridging capital requires more coherent support rather than technical aspects of spatial arrangements, such as physical features.

		Perceived space		Lived space		Conceived space	
		Accessibility Gr=129	Safety Gr=92	Activity & Usage Gr=156	Sense of Belonging Gr=92	Design & Planning Gr=62	Physical Characteristics Gr=77
Bonding	Participation Gr=101	9	6	14	10	5	2
	Strength of Relation Gr=205	18	6	15	15	6	2
Bridging	Collective Action Gr=126	8	4	8	9	2	3
	Trust Gr=92	4	5	5	14	0	0

Table 13: Co-occurrence of conceived space with bonding and bridging capital

4.6 Summary of the findings:

This section will summarize the findings from the analysis of the variables (Social space and social capital) and will follow the structure provided by the research sub-questions, aiming to address them before drawing conclusions.

4.6.1 Social space:

First sub-question: How are the primary social spaces utilized by residents within the low-income housing in Dhaka?

In Sher-e-Bangla Nagar housing, which follows the traditional socio-spatial fabric, the primary social spaces are utilized in ways that offer diverse opportunities to foster community bonding and ties, despite the housing not containing contemporary modern facilities. Dwellers utilize available social spaces according to their needs and based on their activity patterns. For instance, the lived spatial experience of housing showed positive results, with closely placed front yards and backyards with adjacent alleys being used for regular interaction and daily activities. Due to the flexible nature of the social spaces around the housing, diverse users can engage in various formal or informal activities at different hours of the day or week, allowing the activity pattern and functionality to change for various purposes. Female respondents have a significant emphasis on socialization around the hierarchy of spaces, they often utilize these spaces as active venues for interactions. The elderly group also mentioned a great affection for the spaces and a deep attachment towards their fellow dwellers. As Can & Heat (2016) highlighted the fact that integration of neighborhood and connectivity has an impact on frequent social communication within it and subsequently developing a sense of belonging. Meanwhile, middle-aged men expressed comparatively minimal engagement due to time constraints and fewer possibilities to utilize the available spaces.

The row housing configuration facilitates diverse opportunities for social communication and utilization. However, the average connectivity and visibility value suggests, that the layout provides better and more integrated connectivity, but there are exceptional elements like the main spine (road), that skew the average to appear better, meaning it made the average value look better than it really is. As a result, the conceived design intentions show better results, but physical features, according to the respondents and experts, are insufficient such as lack of upgradation and the smaller yard size.

The high average of local integration value that indicates accessibility, may increase the likelihood of strangers' intrusion (Abbaszadegan, 2002), which is also indicated during the interview. As Hillier (2001) points out, the conceived space notion of settlement can be influenced by the limitations that socio-cultural factors impose on the local geometry. However, the spatial compactness and hierarchy of private-to-public patterns have reduced the likelihood to some extent, enhancing the perceived safety of the spaces even at night. Women and children have highlighted the natural surveillance while using them at different times of the day. According to Hillier & Hanson (1989), if the space facilitates the foundation of local communities, it can positively contribute to social sustainability and help reduce crime.

4.6.2 Social Capital:

Second sub-question**:** What role do such spaces play in fostering bonding and bridging social capital among inhabitants?

The surveyed area showed the presence of similar demographic characteristics, which provided the basis for examining bonding capital not only in terms of housing spatial outcomes but also by existing internal ties. The conceived interconnected spaces have increased the frequency of day-to-day life associations within the premises, leading to strengthening internal relations.

According to Gehl (1996), fostering more opportunities for interaction helps build and strengthen relations between individuals, which was evident in the context. Furthermore, respondents during the interview indicated that, due to the demolition of the previous community space, the frequency of social activities within the housing premises has been reduced. However, in the absence of formal community space, these available social spaces offer alternative scopes for the dwellers to participate in many formal events, such as reunions or New Year activities in open fields, as well as informal ones, such as religious events or households' chores in their yards. Therefore, the presence of such semi-private spaces adjacent to dwelling units and the public fields in the spatial hierarchy provides opportunities to build bonding capital among inhabitants.

On the other hand, perceived accessibility has increased the bridging capital among the neighbors to some extent. Despite this, collective action has some negative aspects of capital, there prevails exclusion and gender imbalance. Consequently, conceived space hasn't fully facilitated inclusivity among inhabitants. Nevertheless, the instances of collectively arranging events and supporting each other during crises show evidence of collective life among the dwellers.

Mutual trust among all respondents, regardless of gender and age, was recorded positively. This trust facilitates assistance in building positive social dynamics within the housing community. According to Nelischer (1997), a housing neighborhood is socially addressed as a natural educational unit that mirrors broader aspects of human values, potentially providing their offspring with their initial understanding of human behavior, interactions, affection, and trust. Therefore, while spatial benefits may not fully foster bridging capital, but significantly support bonding capital formation.

4.6.3 Third sub-question: What is the relationship between the perceived, conceived, and lived spaces with bonding and bridging capital in the observed housing?

In the studied housing, from the lens of Lefebvre's spatial triad, both aspects of perceived space, which are accessibility and safety have associations with bonding capital formation but have comparatively less effect on bridging capital. Lived spaces have the strongest relationship with bonding and bridging capital, as they facilitate frequent communication and foster a sense of belonging. But while conceived design and planning intentions moderately contribute to bonding capital, they fall short of bridging capital formation due to socioeconomic limitations.

Thus, the hierarchical spatial arrangements inside the Sher-e-Bangla Nagar housing have facilitated the possibilities for meaningful interactions and contribute to both bonding and bridging capital formation for individuals to different extents, which supports the idea by Pongsmas (2004) that, a well-utilized spatial layout somehow increases diversity and social happenings. Moreover, the findings on the role and relations of social spaces in the development of social capital signify the objectives for considering functional and socially constructed environments. These environments are more appropriate for accommodating human relations, particularly for low-income individuals, and facilitate the development of social capital to overcome any crisis. According to Jacobs (1961), social capital in urban communities is pivotal in determining the quality of life because it fosters interpersonal relationships characterized by trust and collaboration toward shared objectives.

Chapter 5: Conclusion and Recommendations

The research was focused on examining the influence of social spaces on social capital formation, particularly low-income housing in Dhaka. The primary research instrument was the qualitative data, gathered through interviews and observation, with the addition of spatial documents as a secondary source. To understand the influence, the study applied Lefebvre's spatial triad to analyze bonding and bridging capital, using a previously prepared operationalization frame. In this section, this research will address the main research question that was presented in Chapter One.

5.1 How do social spaces in low-income housing influence social capital formation in Dhaka, Bangladesh?

"Right to the city" refers to more than just ensuring amenities, employment opportunities, and accommodation; it also includes fostering activities and opportunities that contribute to the development of individual self-awareness and collective community experience (Ashraf, 2012). The research investigated how social spaces influence social capital formation, focusing on the perceived, conceived, and lived spatial experience. The findings and examination of the spatial layout of the studied housing, which was designed as a part of Dhaka's earlier planning scheme, revealed the traditional spatial hierarchy, with a clear distinction between private and public domains. As Agnitsch et al. (2009) highlighted the fact that when the design intentions of spatial configuration align with dwellers' social practice and cultural priorities, they are more likely to develop settings for the positive formation of social capital. This research supports their view and found positive results in the formation of bonding capital. The strength of internal relations among dwellers is meaningfully positive and frequently encourages their participation in communal engagement that fits in between physical accessibility and social milieus. However, the formation of bridging capital is less significant from the conceived space lens. Several interviews indicated signs of exclusion in collective actions, although a positive level of trust prevails among the housing dwellers.

The findings of perceived space in terms of accessibility and visibility reveal that when the spaces are in proximity, and visibility is achieved through thoughtful spatial patterns, significant utilization, and social engagement take place. This is in line with Wellman's (1979) notion that if dwellers in housing have effective accessibility, the situation encourages social engagement, thus strengthening relations among inhabitants. However, according to the spatial analysis, while the higher visibility average value of clustered front yards ensures the children's and elders' safety, the reduced visibility values of alleys due to the narrowness and secondary connection may raise some safety concerns, despite offering more privacy. In terms of lived experience, it indicated that spatial arrangement with front and backyards with adjacent alleys in dwellings that extended to public communal spaces has created a physical setting that enables diverse activities for users of different ages and genders. Both the space syntax analysis and observation results underpin that these spaces create the scope for women and elder groups' mobility within the premises. The hierarchical space allocation in the form of front or backyards has facilitated the possibilities for meaningful interaction spots for females, while the open spaces around the complex foster interaction for male individuals. As Jacob (1961) claimed, the organization of traditional neighborhoods has the potential to enhance social life. Finally, the conceived spaces, highlighted that the design intentions of the spatial layout created prospects for structured interaction areas but the physical features had no effect on utilization. Specifically, the spaces are not simply equipped nor updated to address the climatic adversity. However, this finding contrasts with existing research, such as that of Farida (2013), which

suggests the importance of physical features or appearance in social and neighborhood ties. Despite the spaces being smaller and lacking upgradation, the results from observation and interviews showed that dwellers effectively perform many of their daily formal and informal activities in these spaces and spend time together.

According to Fastinger (1957), meaningful social interactions between neighboring households are influenced by "homogeneity," which is defined as shared socioeconomic backgrounds, and as per Putnam (2000), bonding capital occurs among members of groups who share similar characteristics within the horizontal layers of social groups. In Sher-e-Bangla Nagar housing, it is very clearly visible from socio-demographic characteristics, that most of the dwellers belong to similar socio-economic platforms. That leads to forming better bonding capital, and findings underpin the strength of relations and participation in activities in an immediate circle to be very positively influenced by the perceived, lived experience in conceived spatial order. While bridging capital appears moderately linked, reflecting gender imbalance, and the trust that was highlighted positively is influenced by perceived and lived space, with no influence of conceived space. As noted by Szreter and Woolcock (2004), the relationships between members of various groups who are separated by class, race, or religion are based on respect but in this case, dwellers belong to mostly similar backgrounds except for the genders. This also feeds into the fact that bridging capital is likely to be moderately influential in this context than bonding capital. Besides, bridging capital can be generated in perceived practice and lived experience without having a specific conceived layout.

Finally, to conclude the main research question, the research supports the conceptual framework to some extent, explaining how perceived, lived, and conceived spaces as independent variables influence bonding capital to a significant extent and only lived and perceived spaces influence bridging capital. Hence, dependent variable bonding capital was found to support the communities to come together on a daily basis (Putnam & Goss, 2002), where the spatial layout offers the possible potentiality to accommodate daily communication. Conceived design layouts are likely to feed bridging capital in lived spaces better and perceived experience to a moderate extent. Thus, the research concludes with the notion that low-income demographics, those who are socially and economically underprivileged, can foster social capital among themselves through effective close-knit dwelling settings that can be advantageous in different aspects of life to overcome many inconveniences. This research contributes to the urban planning literature in general by illustrating how low-income individuals utilize constructed conceived spaces by a range of strategies, using spatial advantages, making formal to informal beneficial pacts to live, and perceiving as well as living the opportunities to generate social capital within limited conditions.

5.2 Limitations and Further Research Scope:

One merit of this research is that it examined a case study at a local housing scale; however, relying on a single case poses barriers to drawing broad conclusions. Further research could study several housing areas, which may likely yield more accurate conclusions. Some studies consider space syntax as a two-dimensional analysis tool, which also limits its effectiveness, a three-dimensional visual analysis tool can be a potential alternative for future studies.

Additionally, the above research was conducted in Dhaka, Bangladesh, which made it highly context-specific, and also focused on low-income housing. To broaden the scope, studies could examine different income groups in different regions. Another promising direction for further research is to focus particularly on women or elderly groups. This research revealed many captivating insights regarding women's perspectives and how social spaces are one of their primary choices for socialization, in the current socio-demographic scenario. Women have limited opportunities to socialize and develop social capital. Therefore, future research scope lies in exploring the gender-specific roles of social spaces in fostering social capital or focusing on age-specific aspects, such as the elderly. These dynamics can also provide valuable insights into the social fabric and improve the design intentions of housing social spaces.

5.3 Recommendations:

This research has highlighted the influence of social spaces on social capital, particularly the result suggesting the influence on bonding capital, it is imperative to create an inclusive and socially cohesive living environment in housing in the context of Bangladesh by honouring the inner spirit of culture and Indigenous pattern. The findings from the research highlight the scope of incorporating some options in current housing design so that user can accommodate their social needs. Following are the recommendations that are depicted from the research:

- Design and space allocation should incorporate a hierarchical order of space to maintain and foster communal interaction, for diverse age groups, ranging from children to the elderly.
- Ensuring visual and physical accessibility of internal and external spaces, housing planning should ensure the areas that are easily been accessible and visible to be reached by all to enhance the reach of the spaces in proximity.
- Segmentation of spaces must follow clarity and navigability by allocating interstitial spaces more visually pleasing and inviting. Security measures must be ensured to encourage the user to build a sense of community.
- In high-rise housing, vertical courtyards or buffer yards should be integrated, which may serve as a central venue for interaction, and can cater to community needs.
- Allowing the housing environment to keep pace with the harmony of natural forces, considering the natural setting, topography, and factors that enhance sustainability.

Flexibility in housing design should be addressed in planning and design so that in the future, any societal requirements can be integrated. Aligning housing patterns with cultural and social values, and nurturing social capital for development is vital, reflecting and representing the contextual spirit, and facilitating meaningful social life for future generations.

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Appendix 1:

Research Instruments: Interview Guidelines (for Residents/Users)

Date:	
Time:	
Interviewee:	

Interview Questions:

2. Background:	
Age:	
Gender:	
Education:	
Occupation:	
Income:	
Variable: Social Capital- Bonding	
Strength of Relations	1. Can you describe your relationship with your neighbors in this housing? - How well do you know your neighbors? - How is the emotional quality of any interactions? o Friendly o Formal o Supportive o Others (Specify)
	2. Can you tell me more about it? (For more details of the ones applied above)
	3. How often do you interact with your neighbors? o Once a week/day o Twice a week/day o When necessary o Everyday o Other (Specify)
	4. How do you describe the types of interactions you commonly engage in within the community spaces? o Long conversations o Joint activities/Sports o Casual greetings o Joint meals o Other (specify)
	5. Can you mention any recent interaction with your neighbor that is particularly meaningful to you?
Participation	1. Can you tell me about the activities you participate in within the Housing social spaces around you? - Do you or your family members usually participate in any social activities that take place here? - When do you participate most? o During festivals o Every evening o Weekends o Other (Specify)
	2. Where do these communal activities or events that you participate in take place? - (locate in the map)
	3. Can you mention any positive/negative aspects of this participation?
Social capital: Bridging	
Collective action	1. Can you tell me about your involvement in any decision-making actions within the housing environment?

	- Can you mention any particular initiatives or actions you were part of decision-making?
	2. How do your opinion or decision-making ability contribute to the community overall? o To a great extent o To a small extent o Neither great nor small o Others (Specify)
	3. Can you tell me more about it? (For more details of the ones applied above)
	4. Are there any restrictions/exclusions for anybody to make decisions collectively?
Trust	1. Can you describe how much you trust your neighbors? - Will you be willing to give your time or assistance to support if your neighbors need you? - Do you feel your neighbors will help/support you if needed?
	2. Can you share any experiences of such?
	3. When do the residents share their resources if required? o During financial needs o During Festivals o In everyday life o Others (Specify)
Social Space: Perceived space	
Accessibility	1. Where do you usually meet or interact with your neighbors? o (Locate in the map) - How well are these spaces accessible? o Is that far or close? - Do you have an inner court inside your house? - Do you have a front/backyard in your house?
	2. Can other people visit/access these yards/spaces?
	3. How visible these social spaces are? - Are there any issues that affect the visibility of these spaces? - Is it a private space or the public can use it?
Safety	1. Do you feel safe while using the social spaces in your community? - Do you feel your children are safe while using these common spaces? - Are these spaces well-ventilated and lighted? - Are these social spaces safe at night?
	2. Are there any particular incidents of crime or violence that affect your perception of safety in these spaces? - If yes, please specify
	3. Are there any restrictions that affect your safety concerns overall?
Social Capital: Lived space	
Activity & Usage	1. Can you describe the diversity of activities that you share with your neighbors in these spaces? - How do you share your back/courtyards/spaces around? o Domestic uses o Vegetation/planting o Religious purposes o Cooking o Others (specify)
	2. How does the pattern of usage change throughout the day?
	3. Do you allow your neighbors to come to front/back yards? - How often do they visit? o Everyday o Seldom o Never
	1. How attached do you feel to these social spaces?

Sense of Belonging	2. Can you please share any particular feelings of connectedness you have with your co-residents while using these spaces? - Do you think these social spaces can help you accomplish personal development? - If yes, please specify
Social space: Conceived spaces	
Design and planning intentions	1. Do you feel that the design of these spaces can foster social uses? - Are these spaces well integrated with community needs?
	2. How well are these spaces aligned with standard regulations?
Physical features	1. How do you describe the visual appearance of these spaces? - Do you feel the spaces are too wide or small in scale? - Are there enough greens?
	2. Do you find the material and comfort of these spaces are compatible?

Appendix 2: Interview Guide for architects/planners

Date:	
Time:	
Interviewee:	
Interview Questions:	

2. Background:	
Profession	
Institute	
Role /Position	
Social space: Conceived spaces	
Design and planning intentions	1. Can you describe how the design of these social spaces around housing complexes was intended to meet the social needs? - How do you determine the social uses in general? - Are there any preferences for prioritizing the social spaces? - Do you think these spaces are functioning well as intended? 2. In what way do you assess that current planning aligned with social demands? - During/after planning, have you applied any user group assessment? - How do you see the effectiveness of such spaces? - Do you think users are effectively using these spaces?
	3. Can you share your experiences regarding such designs that have cultural values? - Have cultural values been integrated into this complex? - How do you assess this? 4. Can you tell me more about this project's compliance with existing standard regulations? - Do you face any challenges incorporating such standards? - What attention do you have while designing with such standards?
Physical features	1. Can you share how you determine the scale of such spaces? - What are the prime scale determining factors? - Do you consider this space to be well-designed according to the built and open area ratio? 2. What is your opinion about the key features of such social spaces? 3. How does the visual appearance contribute to its functionality to the user group? - Does it have any influence? - Are there any safety concerns?

	4. How do you ensure the material selection of such spaces? - Can you explain the choices of material that can have an impact in designing these spaces? 5. Are there any specific criteria to ensure the comfort of the diverse users such as the elderly, and children in general? - How do you incorporate these criteria? - What are these criteria?

Appendix 3: Study Area Observation Guide:

Activity codes:		Age: Range	
1. Casual Conversation	4. Cultural activity	▪ 5-12	▪ 30 and above
2. Sports	5. Recreation	▪ 12-18	▪ Elderly
3. Domestic works	6. Other (specify)	▪ 18-30	

Weekdays (Sunday to Thursday) / Weekends (Friday & Saturday)

Day & Time	Interaction points	Activity	Duration of stay	User type	No of people (Density)	Notes

Appendix 4: List of interviewees

Sl.	Respondent	Date & Time	Age	Education	Occupation
1	Male 01	02-06-2024 - 4.00 pm	30	BBA	Draftsman, PWD
2	Male 02	02-06-2024 - 4.19 pm	35	H.SC	Office Assistant, PWD
3	Male 03	16-06-2024 - 4.09 pm	42	H.SC	Lab Assistant, Energy Division
4	Male 04	16-06-2024 - 3.17 pm	43	B.Sc.	Staff, Admin (Finance Ministry)
5	Male 05	16-06-2024 - 3.05 pm	36	B.Sc.	Staff, Accounts (Data Entry)
6	Female 01	16-06-2024 - 3.23 pm	52	B. Com	Staff, Govt. Law Dept.
7	Female 02	15-06-2024 - 11.48 am	50	B.Sc.	Staff, National Parliament
8	Female 03	24-05-2024 - 4.15 pm	40	8th	Homemaker
9	Female 04	24-05-2024 - 11.30 am	36	BBA	Accountant (Non-Govt.)
10	Female 05	24-05-2024 – 5.30 pm	32	10th	Homemaker
11	Elder male 01	16-06-2024 – 2.16 pm	75	8th	Retired
12	Elder male 02	16-06-2024 – 4.26 pm	58	8th	Accounts (Parliament)
13	Elder male 03	16-06-2024 – 4.00 pm	57	S.SC	Staff, Govt. Police
14	Elder male 04	16-06-2024 – 4.46 pm	56	H.SC	Staff, Panning Ministry
15	Elder male 05	16-06-2024 – 2.25 pm	56	8th	Shop Owner
16	Elder female 01	16-06-2024 – 4.15 pm	65	5th	Homemaker
17	Elder female 02	16-06-2024 – 12.30 pm	59	10th	Homemaker
18	Elder female 03	16-06-2024 – 12.56 pm	58	8th	Homemaker
19	Elder female 04	24-05-2024 – 6.00 pm	56	B.SC, MSc	National Security Dept.
20	Elder female 05	16-06-2024 – 2.31 pm	55	H.SC	Staff, Public hospital
21	Young male 01	16-.6-2.24 – 10.30 am	22	BBA	Student
22	Young male 02	16-06-2024 – 6.30 pm	18	B.SC	Student
23	Young male 03	16-06-2024 – 5.30 pm	14	9th	Student
24	Young female 01	15-06-2024 – 2.38 pm	25	H.SC	Staff, Mass communication, dept.
25	Young female 02	15-06-2024 – 3.20 pm	20	H.SC	Student

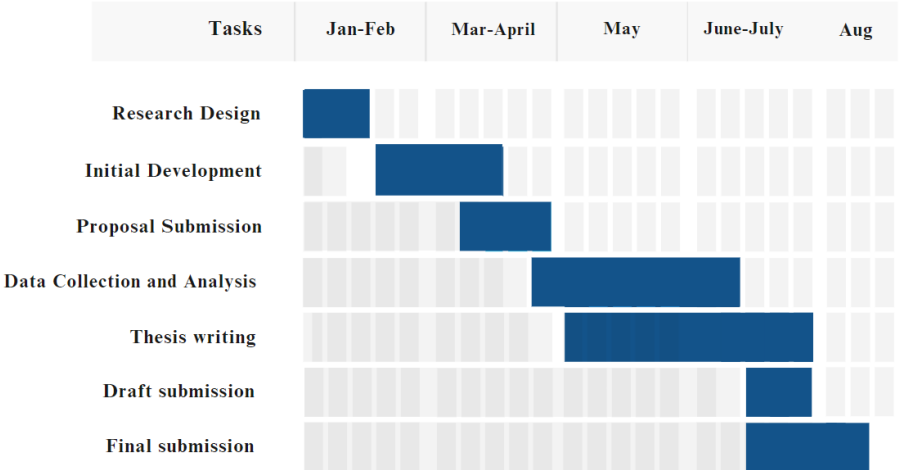
Table 14: List of interviewees

Appendix 5: Code list (Atlas. ti)

Table 15: List of codes ((generated from Atlas.ti.)

Code	Sub-codes	Grounded
Social Space		
● Accessibility		129
	● level of access	54
	● Proximity	48
	● Visibility	27
● Safety		92
	● Perception of safety	62
	● Presence of violence	30
● Activity & Usage		156
	● Changes in usage pattern	22
	● collective activities	37
	● Diverse users	40
	● Variation of Activities	57
● Sense of Belonging		92
	● Attachment	25
	● feeling of togetherness	67
● Design & Planning		62
	● Compliance with standards	33
	● Integration of social needs	29
● Physical Characteristics		77
	● Comfort and material	26
	● Visual appearance	51
Social Capital		
● Participation		101
	● In communal activity	59
	● The notion of participation (positive/negative)	42
● Strength of Relation		205
	● Emotional quality of interaction	75
	● Frequency of interactions	45
	● Intensity of interaction	33
	● Type of interaction	52
● Collective Action		126
	● Involvement in decision making	58
	● Presence of ex/inclusive effort	68
● Trust		92
	● Existence of belief	36
	● Willingness to share	56

Appendix 6: Thesis timeline



Appendix 7: Spatial analysis (analysis phases- Axial line, R=3, Local Integration)

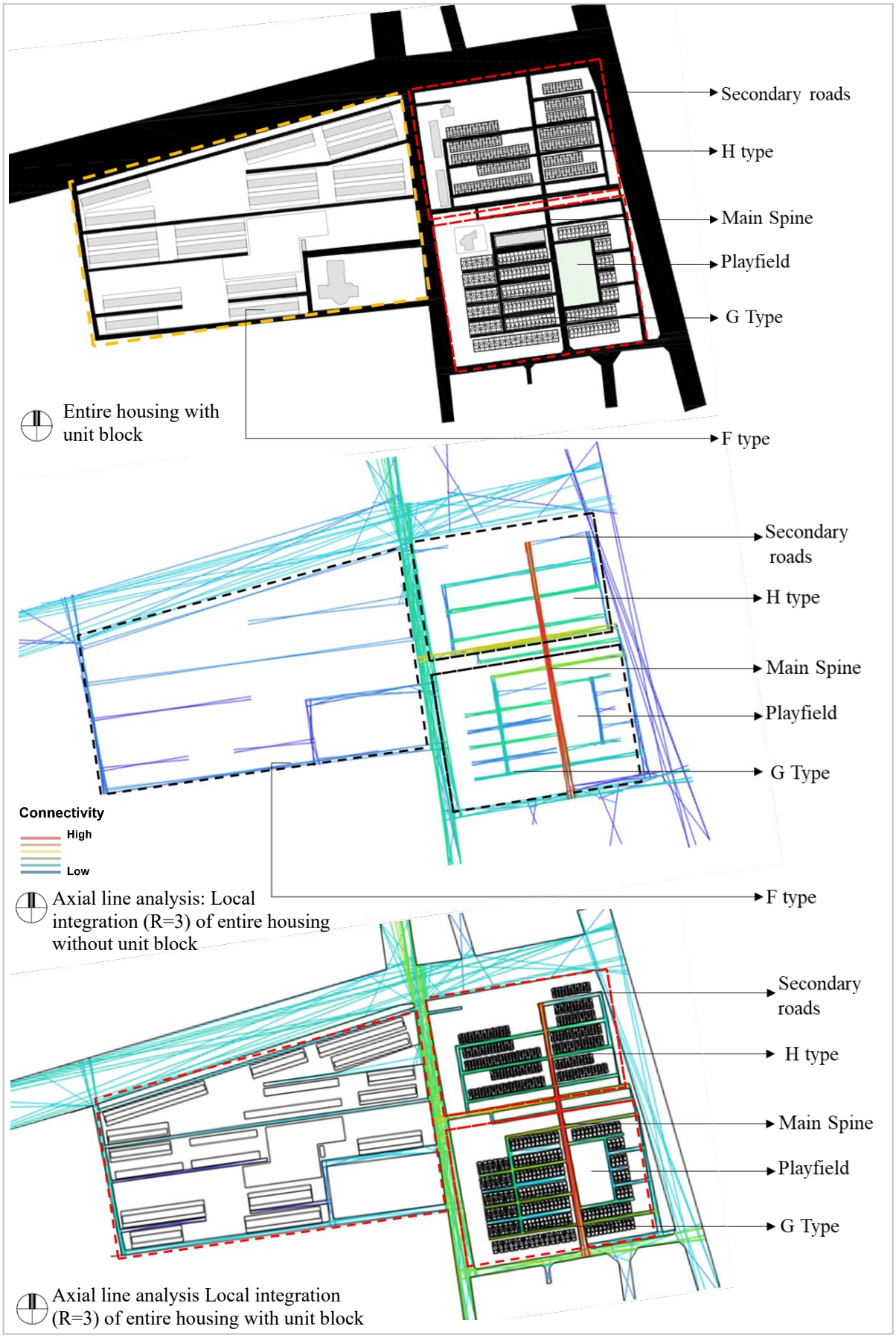


Figure 25: Axial line analysis Local integration (R=3) entire housing (Development of the phases)

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