Towards developing a design model for socially sustainable multi-storey housing in Vietnam: An environment-behaviour approach

A thesis submitted in fulfilment of the requirements for the degree of Doctor of Philosophy

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DECLARATION

I certify that except where due acknowledgement has been made, the work is that of the author alone; the work has not been submitted previously, in whole or in part, to qualify for any other academic award; the content of the thesis is the result of work which has been carried out since the official commencement date of the approved research program; any editorial work, paid or unpaid, carried out by a third party is acknowledged; and, ethics procedures and guidelines have been followed.

Kieu Hung Nguyen

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ABSTRACT

Changing socio-economic conditions in Vietnam since the 1986 Economic Renovation policy have demanded a different approach to designing multi-storey housing. Existing socialist housing estates are not suited to current urban lifestyles. Much of the debate about new housing typologies in Vietnam has focussed exclusively on technological solutions, and social aspects of multi-level dwellings have been left behind in design practice. There is thus a need for an alternative approach to multi-storey housing that is responsive to the social context of Vietnam. Through the lens of environment-behaviour study, the present research examines how to effectively accommodate the living arrangements and social behaviours of middle-income people in Vietnamese urban multi-storey housing. The three key issues examined are:

1. How the design of multi-storey housing can improve the level of privacy in high-density living environment.
2. How the design of internal spaces of multi-storey housing can respond to the living arrangement of middle-income people.
3. How public spaces in multi-storey housing can be designed to support social interactions.

This thesis addresses these questions using three selected case studies, in Da Nang and Ho Chi Minh City (HCMC). The data was collected by carrying out on-site observations and intensive, open-ended interviews with architects, planners, developers, residents and other related stakeholders. Surveys were also conducted with selected residents to statistically support the qualitative findings. The study used thematic analysis to identify the replicated features in the case studies.

The study identified design principles of multi-storey housing at three different scales, associated with three examined issues of residential privacy, living arrangements, and social interaction. At apartment scale, the organisation of internal spaces has a strong implication for the affordances of local living patterns. Through the patterns of internal space organisation across cases studies,
two domestic codes were identified, functioning as the ‘rules’ for spatial sequence and integration. At building scale, physical and perceived density appeared to have impacts on privacy through the level of perceived crowding. For physical density, internal space density appears to have more influence on perceived crowding than has external space density. For perceived density, the group size, defined by the length of the access corridor, is strongly related to the perceived crowding. For enhancing family privacy, entrance doors were modified, functioning as a boundary control. At settlement scale, the settings of public spaces that support social interaction are identified. Internal streets with wide sidewalks appear to be the ground for social activities. The footpaths system, including pedestrian routes and pedestrian nodes, is also a place for social interaction.

The study contributes to understanding of the environment-behaviour relationship in apartment housing in Vietnam, laying the groundwork for further development of a design framework for socially sustainable multi-storey housing. In a broader sense, the study offers a new way to interpreted social sustainability, via the lenses of environmental studies, and develops a method of spatial analysis related to the user’s behaviour.

*Keywords:*

Multi-storey housing; social sustainability; environment-behaviour; privacy; density; crowding; living patterns; social interaction; urbanisation; Vietnam.
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LIST OF ABBREVIATIONS

MSH: Multi-storey housing
EBS: Environment-behaviour studies
FAR: Floor Area Ratio
HCMC: Ho Chi Minh City
PMH: Phu My Hung
Chapter 1. Introduction

1.1 Context of the study

Multi-storey housing, an individual building or a group of residential buildings ranging from five to twenty stories in height, has become a popular choice for city dwellers in Vietnam. However, many social issues have emerged from the use of this housing form. After the economic transformation in Vietnam in 1986, known as the Doi Moi Policy, multi-storey housing in urban areas has increased in both scale and quantity. This housing model was mostly imported from foreign countries, without modification to meet the demands of local living habits. Surprisingly, there has been limited research on this housing typology to make improvements in terms of its social aspects in Vietnam. The present study thus responds to this need for research on the design of urban multi-storey housing, focusing on the social aspects of such housing.

Multi-storey housing, a product of new construction technology, was first introduced at the end of the nineteen-century (Plunz 1990). Since then, this housing form has been extensively employed in the United States and other Western countries, mainly as public housing for low-income groups. Simultaneously, social issues have been identified and extensively recorded for this housing type, which has been regarded at times as a disaster (Mumford 1995). As a result, there has been a gradual loss of confidence in this housing form, leading to the demolition of some housing projects, such as Pruitt-Igoe in St. Louis. In Western countries, attempts have been made to retrofit multi-storey housing to improve its social performance (Towers 2000). Researchers have thus begun to look back on the successes and failures of multi-storey housing, and to reassess the issues objectively. Studies indicate that the causes of past failures tended to be poor management, low quality of construction, and lack of maintenance, rather than deriving from the housing typology itself (Bristol 1991; Yuen 2005). Currently, in the context of rapid urbanisation, multi-storey housing has re-emerged, in Asian countries, in response to urban housing shortages. Most housing models, including design and construction technologies, have been imported from Western countries.
Similar to the situation in other Asian countries, rapid urbanisation in Vietnam has resulted in the rising demographic of middle-income groups, a lack of urban housing, and a surge in land prices. Middle-income people, whose incomes are from VND 15 million (US$715) to VND 30 million (US$1,430) a month, comprise a considerable proportion of the population of Vietnamese cities (Kengo 2015). This number has increased from 14.6 million people in 2011 to 21.5 million in 2014, and is projected to be 33 million in 2020, about a third of the population (Shira 2014; Thinh et al. 2011). Providing housing for mid-income people is a crucial step in overcoming the urban housing shortage. High land prices, a consequence of the overcrowded population, have become the major cause of urban housing shortages. The average land price is close to the world peak prices in such major cities as Ha Noi and Ho Chi Minh City (HCMC) (Tran, TNQ et al. 2008). Special attention should therefore be paid to the available land, especially in a context where land price represents the most significant part of housing cost.

Urban multi-storey housing in Vietnam has emerged as a response to the above circumstances. Middle-income people have been interested in multi-storey dwellings, as they can fulfil their housing desires in a cost-effective manner. Unlike the urban-rich class, who can afford large private villas in suburban areas, this group of people has been looking for more affordable but suitable real estate (Tam 2013). People in this middle-income group have tried to escape the effects of poverty in urban areas, such as crime, and to seek for a higher quality of amenities (Douglass & Huang 2007). They have focused on their quality of life, with concerns about household security and sufficient living space (Waibel 2006). From the government point of view, multi-unit housing is considered the most suitable mode of living for the vast majority of people, owing to the lack of land suitable for development in urban areas. State policies indicate that, by the year 2030, ninety percent of new housing stock in metropolitan cities such as Hanoi and Ho Chi Minh City will be apartment dwellings (MoC 2011). Such multi-storey housing projects can be financed by public-private partnership, or solely developed by the private sector (Geertman 2007).
Because of the speed of development, social aspects of multi-storey housing have tended to be left behind in the design process. During recent years, apartment housing has been developed towards being fully market-oriented real estate. Economic efficiency usually takes priority over considerations of locality in apartment design (Choi, Kim & Kang 2013). The lack of responsiveness to dwellers’ living arrangements might lead to a lack of functional spaces, poor social contact with neighbours, and unacceptable places for raising children.

As a result, there has been a mismatch between what people want and what they are provided. In some projects, the owners haven’t been satisfied with room layout and spatial function, thus making modifications to the organisation and interior design of their spaces to render them more suitable for their activities (Ly 2012). In other cases, residents have even decided to move out of their apartments due to the overcrowded environment and lack of amenities. Trung Hoa-Nhan Chinh was once the ideal place for middle-income people thanks to its convenient location. Recently, however, occupants have started to leave the area because of noise, lack of privacy, and overcrowded living conditions (Anh, D 2014).

Furthermore, public facilities such as open spaces, car parks, and sports facilities have been inadequately provided in those projects (Hai 2007; Phuong, Janis & Nur 2010).

The above outcomes, in a sense, indicate that those living settings have not been socially sustainable in their local context. In adopting housing models from elsewhere, designers have created unfamiliar environments for the local occupants, which are not always able to accommodate their living needs. In such a situation, where the residents’ expectations are not met, such housing can soon be abandoned (Davis, S 1997). The issue of living arrangements in multi-storey housing, therefore, must be studied regarding specific needs, and local ways of doing things.

This is where environment-behaviour studies, the EBS, emerges as an approach to bridge the gap between existing multi-storey housing design policy and practice on the one hand, and the needs of residents on the other. In particular, the present study will provide an understanding of the relationship between multi-storey
housing and its social uses, as the basis for addressing the related behavioural problems directly in the design process.

To develop a design model for socially sustainable multi-storey housing in Vietnam, it is important to bridge the gap in understanding of the relationships between the design and of the activities of residents. In the current design process, the housing concept is developed within the constraints of cost, functionality and aesthetics, with little attention paid to the behavioural determinants. The lack of evidence of and accountability towards the actual needs of occupants can lead to behavioural problems that adversely affect the sustainability outcomes. The design process needs a fundamental change that requires an understanding of behavioural determinants in multi-storey housing, to integrate these into the design process.

1.2 Existing research

Multi-storey housing is a relatively new housing type in Vietnam, but has rapidly developed in this context over recent decades. It was first introduced in Hanoi in the late 1940s (Dinh 2011), in developments known as the ‘KTT’, a collective housing quarter modelled after the Soviet housing system, called ‘micro-crayon’ (Bater 1980). After occupancy, severe shortcomings in this housing typology were exposed, in terms of its support of local living patterns. Occupants had to make significant modifications to the physical structures to accommodate their needs. These alterations illustrate the significant impacts of local living patterns on this new housing form. However, since Doi Moi, urban lifestyles have not been associated with those of Moscow but with those of other global cities such as Singapore or Hong Kong (Geertman 2007). Commercial multi-storey housing developed by the private sector has followed high-rise housing models from within the Asia Pacific region.

Recently, sustainability has been emerged as a key concept for housing development; however, the social dimension is often left off the design agenda. Current research on sustainable housing in Vietnam mostly concerns the environmental dimensions of sustainability (Huong & Soebarto 2003). Some studies have attempted to describe what sustainable housing development should
be, but there is a misunderstanding of the real meaning of sustainable housing (Ferrera 2011). Much research conflates sustainable housing with green housing (Huong 1998; Nguyen, AT 2013; Phuong, Janis & Nur 2010; Quan 2014). These interpretations of sustainable housing in research tend to be restricted to the technological point of view, and the social dimension is considered less, or sometimes ignored.

Nevertheless, lack of attention to social aspects of the design process might hinder the sustainable outcomes of multi-storey housing development. The cultural inexperience of people of living in high-rise housing, rather than the traditional row-houses, has created tensions and concerns. The dwellers have to adjust to vertical living, and the design of apartment units does not always respond to customary activities (Oleg Golubchikov & Badyina 2012). Conventional design, packed with repetitive units, floor plans and facades, cannot resolve the paradox between the old (traditional row house) and the new (modern apartment), regarding living patterns and conditions of life (Nguyen, D 2010). The multi-storey structures themselves are not the problem, but rather the design intention to carry on the current ways of living within them (James 2010).

With this unfamiliar housing type, it is unquestionable that current multi-storey housing in Vietnam has to deal with behavioural problems. It has no precedent to refer to within this context; and there has yet been no attempt to understand the range of residents’ needs. In the current design process typically employed in Vietnam, if the project schedules and budgets are tight, there are few opportunities for the designers to understand and integrate the needs of prospective residents. As a result, architects have to make assumptions about user needs and decide which built-environment form can best serve these assumed living requirements. If these assumptions and the actual needs are different, behavioural problems will adversely affect the sustainability outcomes. As mentioned above, the lack of evidence of and accountability towards the needs of occupants, especially middle-income people, hinder the success of this housing type.

Through the lens of environment-behaviour studies, three key behavioural issues in multi-storey housing have been identified: (i) residential privacy, (ii) local
living arrangements, and (iii) social interactions. Firstly, privacy, the ability to control the amount and type of contact individuals have with others, is one of the major concerns in this field of study. Multi-storey housing has been criticised for decreasing the level of residential privacy (Yuen & Yeh 2011). Research indicates that privacy in apartment dwelling has a close relationship with perceived crowding (Chan 1999). Crowding exists when privacy mechanisms are not functioning effectively, resulting in an excess of undesired social contact.

Secondly, another behavioural issue in multi-storey housing is accommodating local living arrangements. Although this housing type is believed to disregard locality, a study of Choi, Kim and Kang (2013) questions such belief, leaving open the possibility that apartments can accommodate local living arrangements. Thirdly, there is a growing concern about the lack of social interactions in multi-storey housing, which can have a negative impact on relationships between residents, including feelings of isolation and loneliness and a lack of social ties (Bonnie, John & Robert 1980; Renzetti & Maier 2002; Tonkiss 2005).

Associated with the above three issues are three main design components that emerge from a review of the literature: (i) managing density, (ii) internal space organisation, and (iii) public spaces. For residential privacy, it is believed that density has an important implication for controlling this social issue (Baum & Davis 1980). However, there are conflicting findings on the effectiveness of decreasing density for improving residential privacy. It is argued that social interactions in residential buildings can be managed through two interrelated components, spatial and social density. Regarding local living arrangements, internal space organisation has emerged as a response to this issue. Spatial organisation within an apartment unit represents a new way of looking at how buildings and space can be produced. It provides a supportive environment for residents to appropriate their living arrangement. In response to the issues of social integration, Newman, O (1972, 1995) and Holland et al. (2007) examined how public open spaces encourage people to have contact with each other in communities. Similarly, Gehl (1987, 2010) and Whyte (1980) investigated the relationship between activity levels and elements of the design of public spaces.
However, the issue of how to create outdoor spaces that attract residents to engage in social activities has not been adequately addressed (Zhang, W & Lawson 2009).

To date, however, there has been limited research on behavioural issues associated with Vietnamese urban multi-storey housing. Some studies have attempted to identify social problems for this housing type. For instance, Thanh (2011) points out that much of the existing multi-storey housing has not been sensitive to socio-cultural and religious determinants of life, factors that have been recognised as crucial to sustainable housing. Le (2002) observed that poor social relations in this housing type have been well documented. However, few of these studies suggest how to address the identified social issues. A review of the literature suggests that it might be useful to intervene in and to change the delivery process to deal with these problems. One approach, argued here, is to focus on the design framework to address the design dimension directly. To do that, it is necessary to understand the current situation in terms of how the design of housing deals with behavioural problems. Thus, the present thesis contributes to understanding of the environment-behaviour relationship in multi-storey housing in Vietnam, laying the groundwork for further development of such a design framework (see Figure 1.1).

1.3 Research problem

In the light of the above considerations, the gap in knowledge addressed in the present research is identified as a lack of research on the relationship between the current design of multi-storey housing and its related social uses, in the context of Vietnam. In particular, there is a need to understand the environment-behaviour situation in existing housing, within the framework of three key components: (i) residential privacy, (ii) local living arrangements, and (iii) social interactions.

1.4 Objectives of the study

The primary goal of the present research is to improve understanding of the design factors in relation to behavioural problems in multi-storey housing, and therefore, to help to develop socially sustainable multi-storey housing in Vietnam, and in other industrialising countries in Southeast Asia having similar socio-economic
conditions. In order to achieve this research aim, three objectives need to be met, as follows:

Objective 1: to identify the key behavioural issues associated with multi-storey housing and the specific design factors related to those problems;

Objective 2: to understand those key behavioural issues in the context of urban multi-storey housing for middle-income people in Vietnam;

Objective 3: to investigate the relationship between residents’ behaviours and specific design factors in current multi-storey housing in Vietnam.

Figure 1.1 Overview of the study

1.5 Research questions

The previous discussion and objectives presented above lead to the following central research question, which guides the analysis in the present study:
How does the design of recent urban multi-storey housing in Vietnam relate to occupants’ patterns of behaviour?

In order to answer the research question, the following sub-questions need to be addressed:

- What are the relationships between the design of multi-storey housing and the level of the privacy?

- What are the relationships between the layouts of the internal apartment spaces and people's living arrangements?

- What are the relationships between the design of the public spaces and people’s social interactions?

1.6 Case study approach

The present research looks at the above-three sub-questions, about the relations between the users and the spaces in multi-storey housing, by employing qualitative research with an interpretive mode, using case study as the main method. From the theoretical framework, this study is designed to further explore these relationships through fieldwork. A research plan with major steps is undertaken, including the collection and the analysis of related data, as follows.

To achieve the research aim, the present research employs a commonly accepted method in housing research, the case study. Case study is selected as the main strategy for the exploratory purpose of this investigation into a ‘real world phenomena’. According to Yin (2009), the choice of research method is influenced by two factors: (i) the type of research question, and (ii) the degree of focus on contemporary or past events. As per the exploratory question type, the present thesis focuses on ‘how’ the design of recent urban multi-storey housing in Vietnam relates to the actions of residents. For ‘how’ enquiries, researchers usually adopt the case study approach as a preferred strategy (Yin 2011). The major concern in doing case study research is the reliability of its procedures. However, different sources of data and systematic analysis can reliably generalise
findings from multiple cases by triangulation. The multiple-case design is difficult to handle, but provides greater confidence in its findings (Gillham 2000).

From the research questions above, factors that have implications for understanding the environment-behaviour relationship will be investigated. These factors are categorised under three key themes, emerging from a review of the literature: (i) the implications of density for residential privacy; (ii) the implications of internal space organisation for local living arrangement, and (iii) the key role of public spaces in social interaction.

Based on this framework, the data was collected via four main sources: (i) semi-structured interviews with various groups: residents, developers, authorities, architects and urban designers; (ii) observations in the form of structured walk-bys, timed observations, unstructured observations, and photography; (iii) project documentation, including drawings, project evaluation reports, and archive photos and documents; and (iv) statistical evidence from surveys.

The selected data was then analysed using thematic analysis and inter- and intra-case analysis. This study follows the process of Miles and Huberman (1994), consisting of the activities of data condensation and data conclusion/verification. Data condensation, or the first-order coding, refers to the process of selecting, focusing and transforming the data from the fieldwork. An initial coding scheme was developed based on three categories: (i) residential privacy, (ii) living arrangements, and (iii) social interactions. Through the analysis process, sub-codes were added to these themes as they emerged. When working with one source of data, for example interviews, evidence from other sources, such as field observations, project documents, and surveys, was also used to support the coding process. The data conclusion/verification, or the second-order coding, looks for patterns such as categories or themes, causes or explanations, and relationships between the design elements and residents’ behaviours. Both within-case and cross-case analyses were conducted in the present study. The study looked at the similarities and differences among three case studies, in the ways occupants coped with behavioural issues, and also by comparing their design characteristics.
1.7 Structure of the thesis

This thesis consists of eight chapters and is organised as follows.

Chapter 1 - Introduction

This chapter provides the background to the study, introduces a brief review of existing research, identifies the research problem, and frames the research questions. It also includes a brief overview of the response to the problem in the present research in terms of research methodology, research design; and an outline of all chapters.

Chapter 2 - Literature review

This chapter provides a discussion of critical issues and debates regarding social issues of existing multi-storey housing in Vietnam. The first part identifies the social problems, with a focus on behavioural issues and their impacts on residents’ satisfaction. From reviewing the literature, environment-behaviour, or environmental design research, emerges as a suitable approach for responding to these problems. The next part introduces a brief history of environment-behaviour studies, and highlights recurring issues related to multi-storey housing. These are identified as (i) residential privacy, (ii) local living arrangements, and (iii) social interaction. The following section then explores design responses to these behavioural issues. Three key design components associated with these three identified problems have emerged in the literature: (i) managing density, (ii) internal space organisation, and (iii) public spaces. The chapter identifies limitations in research on environmental design in the context of Vietnam, which have led to a lack of understanding about the situation of behavioural problems and their relationship with the design of multi-storey housing. From this review of the literature, a framework is developed to understand the relationship between the existing design of multi-storey housing and residents’ activities.

Chapter 3 - Research methodology

This chapter deals with the methodological issues in and research design for the present research. It firstly justifies and explains the selection of case study method, and the criteria for identifying relevant case studies. The next section
discusses data collection procedures and units of analysis. It emphasises the importance of qualitative data and the supplementary role of quantitative evidence. The chapter concludes with a discussion of the methods for the fieldwork investigation of the study.

Chapter 4 - Overview of case studies

This chapter includes three main parts. The first part is a presentation of the fieldwork conducted in the three selected case studies. The second part is an overview of the case-study sites, with a discussion of household profiles, housing situations, and surrounding urban contexts. The third part is a discussion on the different characteristics of residential building design related to behavioural issues. In brief, this chapter acts as a foundation to provide the related information necessary for the contexts of the case studies, and supports the further analysis and interpretation in the next three chapters, associated with the three themes: (i) the implication of density for residential privacy, (ii) internal space organisation for local living arrangements, and (iii) the key role of public spaces in social interaction.

Chapter 5 - Residential privacy

This chapter examines in detail the relationship between the design of current multi-storey housing and residential privacy. The high-density living environment, one of the most distinctive features of multi-storey housing, has been considered to be the main reason for the lack of privacy, that is, the ability to control the amount and type of contact individuals have with others. Conversely, privacy is recognised as the key variable in studying occupants’ responses to their high-density environment.

To develop a complete understanding of the determinants and mechanisms that affect the level of privacy in multi-storey housing, the present study explores how the design of the housing in the case studies delivers residential privacy. The interaction between residents and the given physical settings is studied by investigating relevant elements of privacy. Interviews with informants were conducted to gain insight into various aspects of privacy, such as variation in cultural background and interpersonal boundaries. A survey of selected residents
was carried out to assess the inhabitants’ feelings, opinions, and preferences regarding residential privacy. These methods were enhanced by the observation of privacy status, indicated by the close/open states and modifications of front doors to achieve the desired privacy.

Chapter 6 - Internal space organisation and living arrangements

This chapter explores the relationship between occupants’ activities and spatial configurations of the apartments. To understand the complexity of living patterns, not only occupants’ activities but also the ways they perceive, interact with, and make a change to their (physical) environments must be investigated. Interviews with selected residents and observations of everyday activities and spatial behaviours indicate how the order of internal spaces originated in and are appropriated from social life. This understanding will pinpoint the ways in which the architect should organise the apartment layout for local living patterns to be reproduced. The researcher was allowed, at different times during the day, to witness some key activities of the respondents and the way they used the provided spaces. Participants were also asked questions during the observation times to clarify their actions, behaviours, and preferences regarding the spaces.

Chapter 7 - Social interactions in public spaces

The principal purpose of this chapter is to understand the environment-behaviour relationships in outdoor spaces in the selected case studies. It explores the relationship between the design of public spaces and social interactions. The chapter has three main sections: (1) behavioural maps in the public areas; (2) social life in public spaces; and (3) physical settings for the affordances of social interactions. Firstly, the behavioural map provides information about people’s locations and the frequency therein of social contact, via observations. The next section focuses on what and where social interactions happened, through presentation and discussion of observations and interviews. This provides information about the type of space that attracts more people, and the ways residents can be encouraged to socially interact. This section also identifies the underpinning reasons that draws people out of their apartments to linger in
outdoor spaces long enough to meet and interact with each other. The final section analyses physical attributes of particular spaces that support social interactions.

Chapter 8 - Conclusions

This chapter provides a summary of key findings and discussion of the relevance of these findings for the field of environment-behaviour studies. It highlights the design components that can be further developed into a design framework for socially sustainable multi-storey housing in Vietnam. It also discusses implications for policy making and design practice for this housing type. Finally, the chapter discusses the limitations of the study, and suggests future directions for research on sustainable multi-storey housing design in other cultures and regions.

1.8 Significance of the study

This study makes a contribution to the field by providing understanding of behavioural determinants in multi-storey housing. One intended outcome of the study, on a theoretical level, is to offer an understanding of the relationship between this housing type and its social uses in urban contexts of Vietnam. As mentioned above, although several authors have attempted to point out the social problems of multi-storey housing, underpinning theories for interpreting those phenomena are still neglected. The present research has developed a framework for understanding the related behavioural issues, and analyses the relationship between these and the design elements.

On a practical level, a second intended outcome of the present study is to offer design principles, responding to these behavioural problems, as the basis for later development of a design framework for future practice. Based on this understanding, professionals can improve design at various scales, from the apartment unit to overall master planning levels, to improve the responsiveness of the physical environment to the occupants’ needs, values, and lifestyles. This approach can address architecture-behaviour problems in multi-storey housing and, therefore, make this housing type more socially appropriate for the given context. Furthermore, a third intended outcome of the study is in offering implications for design guidelines and policy making for this housing type.
Chapter 2. Literature review

2.1 Introduction

Emerging as a response to rapid urbanisation, the multi-storey apartment has caused much debate in the field of sustainable housing, due to its associated social problems. As a production of new construction technology, this housing typology requires its users, who are familiar with traditional low-rise housing, to adjust to the vertical living arrangement. This fact leads to tensions and concerns for such residents; in particular behavioural problems, as discussed in Chapter 1, that have emerged as a critical issue of this new housing type. A review of the literature indicates three key behavioural problems of multi-storey housing: (i) lack of privacy in dwelling units due to high-density settings (relevant issues: crowding, social isolation, and crime); (ii) difficulty in accommodating local living patterns; and (iii) lack of social interaction in public spaces (Altman 1975; Coleman 1985; Freedman 1975; Newman, O 1972; Yuen & Yeh 2011). The existence of these problems is a definite hindrance to the success of socially sustainable multi-storey housing.

In the context that social aspects are left behind in sustainable housing studies (An 1994; Huong & Soebarto 2003; Oleg Golubchikov & Badyina 2012; Turrent & Edwards 2000), environment-behaviour theory can provide insight into these problems, with a focus on the behavioural dimension of multi-storey housing (Snyder 1984). Sustainability is related to the concepts of liveability, quality of life, and residential satisfaction. As defined by IUCN (1980), sustainability is a development that improves the quality of human life while carrying the capacity of supporting ecosystems. Similarly, Newman, PW (1999) claims the goal of sustainability is the reduction of the use of natural resources while simultaneously improving economy and the quality of life. A review of the literature suggests that socially sustainable housing can be understood through the prism of three key issues related to quality of life: (i) basic needs such as well-being, safety, social cohesion, and self-dependence; (ii) way of life such as local lifestyle, user’s preference, and cultural aspirations; and (iii) social/communal life in a neighbourhood setting (Chiu 2012; Edwards & Turrent 2000; Edwards, B &
Turrent 2002; Oleg Golubchikov & Badyina 2012; Priemus 2005; Sivam & Karuppannan 2012; Thorkild 2006). As a result, environment-behaviour theory has emerged as a suitable approach for addressing social problems in multi-storey housing (Snyder 1984).

Despite efforts to identify possible causes of these behavioural problems, the findings, however, are still inconclusive. Some studies indicate a close relationship between behavioural issues and the design of tall residential buildings (Brian & David 2013; Coleman 1985; Edward 2009; Freedman 1975; Oleg Golubchikov & Badyina 2012) while others provide an opposite conclusion (Binder 2001; Yuen 2005). Difficulty in identifying the causes of these social problems can be traced back to the lack of evidence on user behaviours, their patterns of social interaction, and their social needs, in the design process. In current design practice, the multi-storey housing concept is developed within the constraints of cost, functionality and aesthetics, with little attention paid to behavioural determinants (Turner, JF 1986). The question for the present research context of Vietnam remains: what is the status of current multi-storey housing in the urban context of Vietnam regarding these identified problems?

Environment-behaviour studies in architecture are strongly related to the issues of social sustainability, because the latter concerns overall quality of life in the built environment (Brian & David 2013; Chiu 2012; Colantonio et al. 2009; Edwards & Turrent 2000; Edwards, B & Turrent 2002; Oleg Golubchikov & Badyina 2012; Priemus 2005; Sivam & Karuppannan 2012; Thorkild 2006; Williams, Jenks & Burton 2000). In the present research, three behavioural issues have emerged, associated with the three major problems for socially sustainable multi-storey housing: (i) residential density, (ii) local living arrangements, and (iii) social interaction and communication. It is important to note that privacy, in this study, is not defined in common-sense terms, which is very culturally specific. Privacy here is considered to be “selective control of access to the self or one's group” (Altman 1975, p. 18). Based on these behavioural problems, three main design components/scales are identified in the present research: (i) managing density, (ii) internal space organisation, and (iii) public and semi-public spaces in housing complexes. To this end, the gap in understanding, of the relationship between the
design of current multi-storey housing in Vietnam and its social uses, is addressed in the present research through exploring a proposed theoretical framework that comprises the three following key themes:

(i) The implications of density for residential privacy;

(ii) Implications of internal space organisation for local living patterns; and

(iii) The key role of public space in social interactions.

In the context of Vietnam, the negative impacts of behavioural problems in multi-storey housing have been well-documented (Dinh 2011; Geertman 2007; Procacci & Thao 2007). These issues are exacerbated because apartment housing is a relatively new living type in Vietnam. As mentioned in Chapter 1, it was first introduced in the 1940s in the form of a collective housing model, imported from the Soviet Union, namely the KTT (Dinh 2011). The lack of attention to local living patterns has already hindered the success of this housing type. Despite the lessons from the past, recently built multi-storey housing in Vietnam continues to face many behavioural problems, negatively affecting the sustainability of this housing type (Dinh 2011; Geertman 2007; Procacci & Thao 2007). The mismatch between how people lived with what has been recently provided for them is one of the most critical problems, leading to ineffective and unsustainable practice in the multi-storey housing. There is a need for an alternative approach to the design of this housing type, one that makes it responsive to the socio-cultural context of Vietnam.

Before providing details of analytical tools relevant to problems in the Vietnamese context (Sections 2.5, 2.6, and 2.7), this chapter reviews key concepts related to social considerations in multi-storey housing (Sections 2.2 and 2.3); and then discusses behavioural issues associated with the Vietnamese multi-storey housing in Vietnam (Section 2.4). Firstly, Section 2.2 provides more detail about the meaning and characteristics of socially sustainable multi-storey housing.
2.2 Environment-behaviour approach to sustainable housing design

2.2.1 Sustainable housing and its social aspects

Although sustainable housing has been studied extensively, the focuses of such research on social aspects are less well articulated to design practice, because of the complications involved in quantification and measurement of such aspects (Brundtland 1987; Liu 2011; McIntosh, Gray & Maher 2010; Retzlaff 2009; Yeang 2006, p. 15). These studies focus on enhanced environmental and energy performance as the primary method for design. In such studies, however, social needs have to date gained little or insufficient attention.

Attempts have been made to emphasise the role of social aspects in the delivery process of sustainable housing. Bay (2011) points out the growing importance of occupants’ needs, community, and social development in the approach to design. He argues that such aspects are more aligned with the Brundtland’s concept of sustainability. Similarly, Edwards and Turrent (2000, p. 21) interpret sustainable housing as the house “that meets the perceived and real needs of the present in a resource efficient fashion”. They emphasise the role of occupants’ needs in achieving sustainable housing. In the same vein, Williams, Jenks and Burton (2000) argue that physical aspects of housing contribute to the quality of life, but social and behavioural components are central to the success of a sustainable housing project. Despite those efforts, social sustainability is still implicitly defined in much of the literature because of its complexity (Van Kamp et al. 2003).

Given the broad variety of approaches, it is impossible to give an exhausted review of all definitions of sustainability in this thesis, and instead this study aims at offering an insight into social issues by looking at relevant concepts. Recent studies indicate a strong relationship between the concepts of social sustainability and quality of life (Camagni, Capello & Nijkamp 1998; Newman, P & Kenworthy 1999; Shafer, Lee & Turner 2000; Van Kamp et al. 2003). They are all about the relationship between people and the building environment, with the focus being on improving quality of life (Van Kamp et al. 2003). Quality of life in the present study refers to the degree of satisfactory character of life (Szalai 1980). More
particularly, it is about individual’s position in life in the specific context of culture and value system in relation to his/her expectations, standards, and concerns (Marsella, Levi & Ekblad 1997).

The social issues related to quality of life found in recent studies of sustainable housing can be divided into three main categories of concern: (i) basic needs (well-being, safety, social cohesion, and self-dependence) (Edwards & Turrent 2000; Priemus 2005; Sivam & Karuppannan 2012; Thorkild 2006); (ii) way of life (local lifestyle, user preference, and cultural aspirations) (Chiu 2012; Edwards & Turrent 2000; Oleg Golubchikov & Badyina 2012); and (iii) social life in a neighbourhood setting (Edwards, B & Turrent 2002; Priemus 2005; Sivam & Karuppannan 2012). As such, the design process of multi-storey housing needs fundamental change to respond to these social problems and integrate solutions in the design process.

2.2.2 Environment-behaviour studies

“Environment-behaviour research (also called "environmental design research" or "environmental psychology") is the study of the mutual relations between people and the physical environment and applications to improving the quality of life through environmental policy, planning, and design” (Moore 1984, p. 95).

In recent years, there has been a rapidly expanding literature on environment-behaviour with housing studies as the central topic. According to Hardie (1989), the home environment is the primary focus in environment-behaviour studies on developing countries. The question addressed in the present research is how to bridge the gap between providing functional shelter and a ‘home’ that meets and supports the household’s values (Hardie 1989).

Regarding the nature of the present research enquiries, environment-behaviour research encompasses three types of study: basic research, applied research, and research applications. Basic environment-behaviour research is the “generation of knowledge and the discovery of processes and systems to understanding design-behaviour interactions and to develop a theory of the environment in relation to human activity” (Moore 1984, p. 97). Applied environment-behaviour research is
concerned with addressing specific inquiries arising from immediate design problems. Environment-behaviour research applications comprise both basic and applied research types offering applications of their findings to specific environmental problems (Moore 1984).

The present study is considered as basic research in the field of environment-behaviour studies. The key objectives of the present research are: (i) to explore the situation of multi-storey housing in Vietnam (to generate knowledge of and discover insights into the housing delivery process); and (ii) to understand the relationship between current multi-storey housing and residents’ patterns of behaviour (that is, to understand design-behaviour interactions). The outcomes of this study are intended to form the basis for a design framework for socially sustainable multi-storey housing in Vietnam: that is, to develop a theory of the environment in relation to human activity.

2.2.3 Relationship between sustainable housing and environment-behaviour studies

It can be argued that the field of environment-behaviour studies in architecture is closely related to social sustainability because it concerns overall quality of life in the built environment. As discussed in many studies, the key issues of socially sustainable housing are mostly about improving quality of life, which is the main purpose of environment-behaviour studies (Brian & David 2013; Chiu 2012; Colantonio et al. 2009; Edwards & Turrent 2000; Edwards, B & Turrent 2002; Oleg Golubchikov & Badyina 2012; Priemus 2005; Sivam & Karuppannan 2012; Thorkild 2006; Williams, Jenks & Burton 2000).

Environmental design research seeks to identify how the quality of the environment is related to quality of life. On the one hand, the physical environment must support the style and quality of life desired by the people who use it. On the other hand, environmental adjustments are required due to constantly altering lifestyles, life situations, and stages in life cycle. In order to contribute towards making such adjustments, the present study explores environmental variables and critical outcome variables relevant to quality of life in multi-storey housing.
Without playing down the importance of saving natural resources, the present thesis focuses on the design process by addressing the relationship between people and their living environment. It tries to find ways of integrating psychological and spiritual well-being into the design principles of multi-storey housing. By doing this, professionals can “enhance the quality of the built environment, both the units themselves and the overall master planning, to improve the responsiveness to quality of life, including occupants’ needs, values, and lifestyles (Oleg Golubchikov & Badyina 2012, p. 42). Furthermore, the environment-behaviour approach makes it even more essential to move towards an evidence-based approach to design. The greater the architectural layout corresponds to residents’ patterns of behaviour, the better housing design will afford their activities and needs (Mehta 2013).

A central task of the present study is to specify functional relationships between given attributes of environment (design of current building) and relevant aspects of behaviour (patterns of social interaction). In the present research, three behavioural issues have emerged, associated with the three major problems for socially sustainable multi-storey housing: (i) residential density, (ii) local living arrangements, and (iii) social interaction and communication. In the next section, key concepts related to behavioural problems in multi-storey housing will be discussed.

2.3 Behavioural issues associated with multi-storey housing

2.3.1 Privacy and related issues

2.3.1.1 Residential privacy

Among socially sustainable problems related to basic needs, privacy is a major concern in environment-behaviour studies. Privacy is one of the most important aspects of quality of life, a basic component of socially sustainable housing. According to Turcotte and Geiser (2010), the key principle of sustainable housing is to maintain and, if possible, enhance its residents’ quality of life. To this end, sustainable housing must ensure the privacy for people who live in it (Brian & David 2013). In environment-behaviour studies, privacy is a key concept in
exploring the relationship between the physical environment and human behaviour (Altman 1975). Hardie (1989) also emphasises the importance of privacy, through mention of the problems of crowding in multi-storey housing.

A growing criticism of high-density apartment living is regarding its negative impact on the level of privacy, resulting in severe problems for quality of life. In developing cities, where the cost of land is extremely high, apartment unit sizes have been shrinking so to be affordable. The cramped living spaces, however, unfortunately have led to an overcrowded environment for city dwellers (Yeh & Yuen 2011). Multi-storey housing has been criticised for decreasing the level of privacy. The central considerations are that crowding interrupts action cycles, disrupts communications, and arouses feelings of stress (Esser & Greenbie 1978). The lack of control over the situation often leads to a decrease in the level of privacy (Pederson 1997). As a result, there are challenges for multi-storey housing design in providing a good living environment, as a suitable place for residential privacy (Shaftoe 2007).

Although privacy appears to be a universal phenomenon, the way it is manifested and experienced varies widely across different cultures. Rapoport (1969) claims that attitudes toward privacy are culturally shaped, and that such cultural-based attitudes have a great impact on housing forms. Similarly, Aiello and Thompson (1980) point out that the privacy phenomenon is closely tied to specific socio-cultural norms. Attitudes towards privacy also differ across different subcultures in the same geographic region. As a result, there is a need to explore privacy concept in the urban context of Vietnam. Design parameters, criteria and measures related to privacy are discussed in detail in Section 2.5.

2.3.1.1.1 Defining privacy

Although widely mentioned in the literature, the meaning of the term ‘privacy’ has remained vague and ambiguous. The most likely reason for this lack of clarity is that the term has been used across various disciplines. Another reason why privacy has not been clearly defined is that the term only reflects the idea of a particular society at a given time (Fischer 1971; Westin 1967). Some cultures
might appear to have little privacy compared to others; and the need for privacy changes in different periods of time (Newell 1994).

In environment-behaviour studies, the main research interests are environmental interaction and how the environment influences users. Westin (1967, p. 17) proposed one of the most influential theories of privacy, referring to the way in which “people protect themselves by temporarily limiting access to themselves by others”. Based on Westin’s theory and the core principles, Altman (1975) proposed one of the most important definitions of privacy. According to Altman (1975, p. 18), privacy is defined as “selective control of access to the self or to one's group”. In other words, privacy is the ability of individuals to control the amount and type of contact they have with others.

Altman’s definition has been extensively used in more recent studies, especially in environmental research. Newell (1994, p. 65) asserts that privacy is “a condition of separation from the public domain, which is voluntary and temporary”. This point of view has much in common with Altman’s perspective. The definition implies a selective control, because people (the self) voluntarily and temporarily separate from the public (others). Furthermore, the author also mentions privacy as a bidirectional process, seeking for a balanced input between the self and others:

The above perspective on privacy has been further developed in the field of multi-storey housing in the context of Asia-Pacific. In a study of Malaysian urban housing, Hashim and Rahim (2008, p. 94) use the term privacy to refer to “a two-way process involving the permeability of boundaries between oneself and others. It is an on-going process which involves the process of regulation”. The implication here is similar to that made by Altman (1975) regarding the bidirectional process. In another research on multi-storey apartment living in Australia, Kennedy, Buys and Miller (2015, p. 2) provide a working definition of privacy, as being able to be “measured by the extent to which residents can control the intensity of their interaction with neighbours”. The ‘extent to which’ residents could manage the intensity of integration with neighbours is comparable
to the selective control of the self to others in the definition by Altman cited above.

As a result, the present study adopts the analytic definition of privacy developed by Altman (1975) to explore the relationship between the design of multi-storey housing in Vietnam and the level of privacy. For a better understanding of the situation of privacy in existing tall residential buildings, relevant concepts and terminology encompassing this definition will be clarified and discussed. Considering privacy as an interactive condition of the person and environment, Altman (1975) proposes the privacy regulation model to explain the bidirectional process.

2.3.1.1.2 Privacy regulation model

The privacy regulation model is based on a set of definitions focusing on the inter-relationships of privacy, personal space, territoriality, and crowding. Among these relationships, privacy is the central concept that binds the four concepts together.

In this model, the level of privacy can be studied through the construct of desired privacy, achieved privacy, and optimum level of privacy (see Figure 2.1). Desired privacy is a subjective measure of an individual’s ideal level of social contact with others; whereas achieved privacy is the frequency of actual contact (Altman 1975). Privacy regulation is an optimising process in which the individual manages to achieve their desired level of privacy. According to this model, there are three social conditions, or privacy levels, in the regulation process: social isolation, crowding, and optimum. Accomplishing the desired level of privacy, or achieving optimum state, is a constant balancing act. When the achieved level is greater than the desired level of privacy, people feel isolated. If the achieved level is less than the desired level of privacy, individuals feel crowded (Gale & Park 2010). The optimal state exists when an individual achieves the ideal level of social interaction.
The design of housing and the level of privacy are closely related, because the built environment plays an important role in maintaining or avoiding social contact. The present study aims to identify design elements of multi-storey housing that effectively support occupants to control social interactions in and around their apartment units, for the ultimate aim of achieving the optimised level of crowding.

2.3.1.1.3 Privacy mechanisms

Central to Altman’s model is the privacy mechanism, which describes the means of attaining privacy through controlling the level of social contact. Pedersen (1999, p. 397) interprets this mechanism as “an optimisation process directed toward achieving a desired level of contact by one's self or group with others at a particular time and in a given circumstance”. As a result, the privacy mechanism can come in various forms according to circumstance and culture. Newell (1995, p. 97) asserts that “mechanisms included pulling down the blinds to provide visual privacy, locking the door, taking a shower, psychological withdrawal and the use of fantasy, averting the eyes, going to a wilderness area and using secret places”.

Figure 2.1 Diagram showing the relationship between privacy, personal space, territory, and crowding (Altman 1975, p. 7).
In the proposed model, Altman (1975) identifies four key privacy mechanisms: personal space, territory, verbal, and para-verbal. Personal space is an invisible area surrounding the body of an individual (Hall 1966). The term can be perceived as a personal space ‘bubble’ (Sommer 1969), “a sphere of space that a person may carry around with him/her, protected from outside intrusion” (Hashim, Mohamad Ali & Abu Samah 2009, p. 199). An intervention to this personal space creates tension or discomfort. In the Western view, personal space is central to any discussions of privacy (Hashim, Mohamad Ali & Abu Samah 2009). Limited personal space and excessive unwanted interaction are common factors affecting on privacy (Chan 1999).

Territory is another powerful privacy-regulation mechanism, associated with the control of territorial boundaries. Territory generally implies a bounded area that an individual defends and preserves as his own (Altman 1975). The act of protecting an area against or shielding it from others refers to boundary regulation. Territorial behaviour, therefore, is perceived as the regulation of the boundary between one’s own space and that of others (Newell 1995). To distinguish territory from personal space, Voordt and Wegen (2005, p. 193) point out that personal space is “invisible, mobile, tied to a particular individual and ‘portable’. The territory on the other hand is visible, reasonably static and tied to a particular location”.

Territory can be divided into three major types: primary, secondary, and public territory, based on how important it is to an individual or group; or how close it is to their everyday lives. “Primary territories are owned and used exclusively by individuals or groups, and these can be clearly identified as theirs by others, are controlled on a relatively permanent basis, and are central to the day-to-day lives of the occupants” (Altman 1975, p. 112). As a house is the primary territory of human beings (Nejadriahi & Dinceyurek 2015), an apartment unit is likely to be the primary territory of a resident in a multi-residential building. “Secondary territories are less central, pervasive, and exclusive; the term parallels the sociological distinction between primary and secondary groups” (Altman 1975, p. 114). Within the context of multi-storey housing, the secondary territory could be in the form of entrance halls, lift lobbies, and central hallways (Newman, O 1972).
Public territories have “a temporary quality, and almost anyone has free access and occupancy rights” (Altman 1975, p. 118). In multi-storey housing projects, public territories could be commercial zones, community centres, and spaces between buildings (Newman, O 1972). Internal roads, sidewalks, paths, and parking lots can also be perceived by the residents as public territories (Ford 2000). For the purpose of studying social interaction in open outdoor areas in the present research, the territory has been alternatively divided into public, semi-public, semi-private, and private space. This will be further discussed in Section 2.7.3 Categorising public spaces.

2.3.1.2 Residential crowding

The concept of crowding is widely seen as an important implication for residential privacy. According to the privacy model of Altman (1975), the social conditions of both crowding and isolation must be mitigated to achieve the optimised state of privacy. “The experience of crowding might be a result of limited space, as the freedom to adjust one’s physical proximity to others is reduced” (Edward 2009, p. 12). The close proximity may force individuals to experience some undesirable social interaction, and thus cause the sense of a lack of privacy (Mackintosh et al 1975; Saegert 1979). However, privacy and crowding cannot necessarily be equated because “crowding can exist even if there is the successful maintenance of privacy” (Altman 1975, p. 158).

As crowding is not a simple concept (Altman 1975), it is important to clarify its meaning for the present study. Baum and Valins (1979, p. 137) state that crowding is understood “as a subjective state, the stressful experience of limited space and/or too many people”. If people ‘feel’ crowded, the achieved level of privacy is lower than the desired level of privacy. Similarly, Edward (2009, p. 16) asserts that the perception of crowding refers to “the state of psychological stress that is associated with a negative appraisal of density. The experience of crowding is a result of limited space as the freedom of adjusting one’s physical proximity to others is reduced. This proximity, especially between people, may force individuals to undergo some unwanted social contact and cause psychological stress”. In the present thesis, however, crowding is viewed from the perspective of
control-based formulations. “Crowding is described as a social condition in which privacy mechanisms have not functioned effectively. This failure results in an excess of undesired social contact” (Altman 1975, p. 3).

While crowding and social isolation are two possible social situations that can occur in the privacy regulation process, there is much less research on social isolation. The first reason for the lack of research is that people might think the isolated situation is less likely to happen in multi-storey housing because of the number of people. However, research indicates that there may be less interaction between neighbours in multi-storey housing than in low-rise settlement, leading to situations of anonymity for the individual family (Yuen & Yeh 2011). The second reason for the lack of research is that most people can endure the unpleasant condition of isolation in small spaces without suffering any ill effects (Freedman 1975). Nevertheless, recent research indicates that experiencing social isolation for a long time might cause anxiety and stress-related behaviour (Yuen & Yeh 2011). As a result, the present study will pay attention to the social situation of isolation in multi-storey housing.

2.3.1.2.1 A model of crowding

Crowding is perceived based on both the characteristics of the situation and the personal and interpersonal attributes of individuals (Stokols 1972a, 1972b). Thus, understanding crowding requires an examination of its dimensions. For that purpose, (Altman 1975, p. 146) proposes a model of crowding as follows (see Figure 2.2).
This model includes four main components: (i) antecedent factors, (ii) internal subjective responses, (iii) overt coping behaviours, and (iv) psychological and physical costs (Altman 1975). The first component, antecedent factors, refers to factors that contribute to the desired level of privacy (situational definition). They are comprised of personal characteristics, interpersonal characteristics, and situational factors. Personal characteristics include personality and former experience in dealing with crowding. Interpersonal characteristics include social factors such as group cohesion or group structure. Situational factors denote physical features or setting, such as articulation of the spaces, layout, furniture and decoration. These factors are closely relevant to the design of housing.

The second component, internal subjective responses, refers to the assessment of the effectiveness of the boundary control process. Individuals subjectively compare the achieved privacy with their desired levels of privacy. If there is a mismatch between the two, stress is aroused. This motivates people to readjust the situation by using the third component, overt coping behaviours. These privacy mechanisms, closely related to the design of housing, were already discussed in Section 2.5.2.3. If boundary control mechanisms are not effective, crowding or social isolation is aroused, which might result in psychological and physical costs such as crime or social pathology.
2.3.1.2.2 Factors influencing the tolerance of crowding

From a review of the literature, it appears that the way people experience crowding is affected by physical, social, and psychological parameters. These parameters are developed from the situational definition factors in the model of crowding by Altman and Gover (1975). These criteria describe the ways the adaptation ability and tolerance of the persons concerned can be adjusted.

Personal factors include an individual’s personality and crowding experience. The criteria relate to personality include (i) age, (ii) gender, and (iii) the perception of crowding (Chan 1999). Crowding experience is determined by residents’ cultural background and their previous living environment (or their former housing types) (Chan 1999). For instance, different cultures have different tolerances of residential crowding. Asian people appear to have a high adaptation to a crowded living environment (Anderson Jr 1972; Schmidt, Goldman & Feimer 1976). Due to social and economic disadvantage, tolerance to overcrowding has been a part of the Asian way of life (Loo & Ong 1984).

Interpersonal characteristics include social factors such as group cohesion and group structure. The criteria to determine group cohesion comprise (i) the relationship of people who share the apartment unit (Altman & Gover 1975), (ii) neighbour relations (Bay 2004), and (iii) the degree of sharing (Yuen & Yeh 2011). The group structure is generally defined by the ability to form a group or cluster of residents on an apartment floor. Group size is one of the most important criteria that have implications for the design of multi-storey housing (Baum & Davis 1980; Baum & Valins 1979; Eoyang 1974).

Situation factors refer to the physical features or setting relevant to the design of multi-storey housing, comprising the two components of environment properties and task demands. Environment properties are determined by (i) the amount of space (Baum & Valins 1979; Chan 1999), (ii) the arrangement of space or the floor plan layout (Evans, Lepore & Schroeder 1996), and (iii) interior characteristics such as room colour (Evans, Lepore & Schroeder 1996) and lighting (Schiffenbauer et al. 1977). Regarding the task demands, perceptions of both control (Baum & Weiss 1987) and crowding in primary and secondary
territories (Esser & Greenbie 2011; Yuen & Yeh 2011) are important criteria for the tolerance of crowding, in their implications for the design of multi-storey residential environments. Residential crowding carries inevitable problems for privacy; but to what extent is still a question for the context of Vietnam.

2.3.2 Local living arrangements

Associated with problems relevant to the way of life, recent environment-behaviour studies have been concerned with the local living arrangements in multi-storey housing. Basically, housing layout is designed mostly based on the assumptions about spatial behaviour rather than on practical evidence on patterns of dining, cooking, sleeping, studying, and watching television, of the inhabitants. However, the local living arrangement is not formed simply by its physical ‘container’; rather, it originates from socio-cultural values, representing the accumulation of norms, customary beliefs, and socialisation patterns (Aiello & Thompson 1980). Because patterns of behaviour develop and stabilise through time, so do the living arrangements and environmental properties that support those experiences (Altman & Werner 1985). There is thus a need for multi-storey housing to be able to accommodate local living arrangements.

However, cultural norms and values change over time due to changes in socio-economic conditions. Accordingly, “these built environments are constantly being modified to meet human needs and to reflect the prevailing attitudes, lifestyles, and customs. Thus, cultural values influence people’s perception about environments, which in turn affect environmental design” (Aiello & Thompson 1980, p. 108). The reasons for such changes are not only for functional adjustment but also for accommodating new conditions during the lifespan of a building.

2.3.3 Social interactions

Related to problems of social life, there is a growing concern in environment-behaviour studies about the level of social interaction in high-density settlement. In an overcrowded setting, relationships between residents are likely to become more alienated because they are surrounded by more strangers. As a result of overcrowding, occupants experience feelings of isolation and loneliness, lack of
social ties, and hostility to community (Jacobs 1961; Tonkiss 2005; Zhang, W & Lawson 2009). This lack of interaction between neighbours leads to situations of anonymity for the individual family (Beijing Review 1985; Rosenberg 1968). Although it is important to improve socialisation in multi-storey housing, there is a trade-off between social interaction and privacy. The conflict between them is a recurrent theme in many environment-behaviour debates. Esser and Greenbie (1978) claim that modern society tends to protect privacy more than community. Consequently, we have been witnessing the loss of social interaction in contemporary housing projects. The present thesis argues that social interaction in housing complexes must be encouraged to ensure sustainability outcomes. The lack of interactional and communal spaces and other related social facilities can negatively impact residents’ quality of life (Huang 2006; Kang 2006; Sirgy & Cornwell 2002; Sugiyama & Thompson 2007).

Among the possible reasons for such a lack of social interaction, limited access to sociable space appears to have the greatest negative impact on social interaction in multi-storey housing. Responding to the issue of constraint on private space, high-rise housing residents in Hong Kong and Singapore transformed outdoor areas in their residential blocks into vibrant social spaces (Forrest, Grange & Ngai-Ming 2002). It is believed that density thus leads to an increased sense of loneliness and a reduced sense of belonging (Skjaeveland & Garling 1997). In the same vain, Yuen and Yeh (2011, p. 132) point out that lack of social interaction is “strongly attributed to a lack of areas in a building where people can naturally interact”. Having neighbourhood environments with sociable spaces encourages residents to spend time and resources to create meaningful relationships with others in the community (Boyce 2006; Mee 2009).

There are two key trends in studying socialisation in multi-storey housing communities, focusing on: (i) how public spaces may encourage people to contact others (Katz 2006; Newman, O 1995); and (ii) the relationship between the level of social interaction and physical elements in public spaces (Gehl 1987, 2010; Whyte 1980). Despite these relevant studies, the issue of how to create public and semi-public spaces for multi-storey housing residents to engage in social activities is not well understood (Zhang, W & Lawson 2009). Design parameters, criteria,
and measures for public spaces related to social interaction are discussed in Section 2.7.

2.4 Behavioural issues in the Vietnamese context

Negative impacts of behavioural problems on multi-storey housing in Vietnam have been recorded (Dinh 2011; Geertman 2007; Procacci & Thao 2007). Under the pressure of housing shortages, developers and designers seek for technological solutions in order to provide shelter, but the designs are not always sensitive to the people’s attitudes, values, and behaviours. Inconvenient living arrangements and poor social interaction have been identified in recent-built projects, largely due to poor design (Dan & Shiozaki 2011; De Meulder & Shannon 2010; Dinh 2011; Hang 2010b; Huppatz, Daou & Dinh 2015; Le 2002; Procacci & Thao 2007). These housing complexes are, in essence, not sustainable, even though they might be cost-effective, built from locally available material, and use traditional building techniques.

Behavioural problems in Vietnam are exacerbated due to the fact that multi-storey housing is a relatively new housing form in the country. With unfamiliar user groups and unfamiliar building types, it is unquestionable that current multi-storey housing in Vietnam has created environment-behaviour problems. The introduction in recent years of multi-storey housing has had no reference to previous housing models in Vietnam, and no attempt at understanding the range of needs of the target groups.

The lack of attention to local living patterns challenges the sustainability of multi-storey housing in Vietnam. The cultural inexperience of people living in modern multi-storey housing, rather than in their former low-rise houses, has created concerns for this way of life. The residents have to adjust their living arrangements to ‘vertical’ settings; and the design of apartment units do not always respond to traditional activities (Oleg Golubchikov & Badyina 2012). Conventional multi-storey design, packed with repetitive housing units and floor plans, cannot resolve the tension between the old (traditional row house) and the new (modern apartment), in terms of living arrangements (Nguyen, D 2010). The multi-storey structure itself is not the problem, but rather the design intention to
carry local ways of life into the multi-storey structure (James 2010). It is important to identify behavioural problems associated with multi-storey housing in this context, to develop a design model responsive to the socio-cultural needs of Vietnamese residents.

This mismatch, between how people have traditionally lived and what is being provided for them, is one of the critical behavioural problems leading to the failure of multi-storey housing projects. In early days of vertical housing, the imported KTT model was alienating to the local way of life. After occupancy, patterns of modification to physical settings were recorded among these KTT houses. On the ground floor, apartments were extended to both sides (back and front). Residents personalised a part of the sidewalk to form spaces for commercial uses (Dan & Shiozaki 2011; Dinh 2011). On upper floors, many residents walled up their balconies and converted them into rooms for domestic purposes (Nguyen, D 2010). These modifications illustrate the significant impacts of local customs on the living arrangements in multi-storey housing in Vietnam. However, the continuing environment-behavioural misfit has led to the government’s decision on discontinuation of this housing type (Geertman 2007).

Despite lessons from the past failures of KTT, recently built multi-storey housing in Vietnam continues to face behavioural problems, negatively affecting the sustainability of this housing type. Although Vietnamese lifestyles, after Doi Moi, have been changed in association with the rise of global cities, they still have some unique characteristics. However, commercial apartments developed by the private sector have followed high-rise housing models from the Asia Pacific region without modification to fit these specific characteristics (Geertman 2007).

Specific analytical tools relevant to problems in the Vietnamese context are further discussed in the following, in Sections 2.5, 2.6, and 2.7.

Based on these behavioural problems, three main design components/scales are identified in the present research: (i) managing density, (ii) internal space organisation, and (iii) public and semi-public spaces in housing complexes. From that, the gap in understanding, of the relationship between the design of current multi-storey housing in Vietnam and its social uses, is addressed in the present
research through exploring a proposed theoretical framework that comprises the three following key themes:

(i) The implications of density for residential privacy;
(ii) Implications of internal space organisation for local living patterns; and
(iii) The key role of public space in social interactions.

From the perspective of environment-behaviour studies, socially sustainable problems in multi-storey housing can be understood through examining three identified themes. By obtaining knowledge of these themes, a design model can be effectively developed that responds to the social problems of multi-storey housing. Understanding of the relationship between physical design and social uses is a prerequisite for developing such a responsive design.

2.5 The implications of density for residential privacy

2.5.1 Introduction

Privacy is one of the most important aspects of quality of life, a basic component of socially sustainable housing. According to Turcotte and Geiser (2010), the key principle of sustainable housing is to maintain and, if possible, enhance its residents’ quality of life. To do that, sustainable housing must ensure the privacy for people who live in it (Brian & David 2013). Nevertheless, multi-storey housing has been criticised for decreasing the level of privacy. In developing cities, where the cost of land is extremely high, apartment unit sizes have been shrinking so to be affordable. The cramped living spaces, however, unfortunately have led to an overcrowded environment for city dwellers (Yeh & Yuen 2011). As a result, there are challenges for multi-storey housing design in providing a good living environment, as a suitable place for residential privacy (Shaftoe 2007). As a result, many studies have also shown the negative effects of crowding, a consequence of high-density living, on residential privacy (Jephcott, AP & Robinson 1971).

A growing criticism of high-density apartment living is regarding its negative impact on the level of privacy, resulting in severe problems for quality of life. The
central considerations are that crowding interrupts action cycles, disrupts communications, and arouses feelings of stress (Esser & Greenbie 1978). The lack of control over the situation often leads to a decrease in the level of privacy (Pederson 1997).

Conversely, Brian and David (2013) argue that, although density may decrease the level of privacy, people also need to accept less privacy in any modern living form. He suggests that society will thus need to accept a forgiveness factor, in order for changes toward high density, mixed land-use lifestyles to occur.

In brief, there is a need to develop design principles that involve mechanisms for controlling density to enhance the level of privacy in urban multi-storey housing in Vietnam. In order to do that, this section first explores the concept of privacy by reviewing its definition and related concepts. The following sections relate the concepts of density, crowding, and social isolation, which are closely related to density. Finally, related design parameters, criteria, and measurement of the above concepts, together with their relevance to the present study, will be discussed.

2.5.2 Density and crowding

2.5.2.1 Defining density

The term ‘density’ seems to be familiar, but it is actually more complex on closer inspection. Attempts have been made to clarify the definition, but confusion persists (Boyko & Cooper 2011; Cheng 2010; Rapoport 1975). The complexity is mainly derived from multifaceted definitions in various disciplines and under different contexts.

As highlighted by Cheng (2010), density can be understood with respect to two components, of physical density and perceived density. Physical density is defined as an absolute number measuring the proportion between the site and occupied buildings (e.g. building density, site coverage, and Floor Area Ratio, or FAR); whereas perceived density is about the interaction between the individual and the space (or spatial density), and between individuals in the space (or social density) (Yuen & Yeh 2011). While spatial density thus refers to the relationship between people and spatial elements, social density implicates the interaction between
people (Edward 2009). “For high spatial density, the primary problem is too little space. For high social density, the primary issue is too many people with whom one must interact” (Edward 2009, p. 12).

The debate on the relationship between the two components of density is inconclusive. Some consider that there is no direct relationship between building density and perceived density. The meaning of density needs to be thought of in terms of perception and experience (Bay 2010). Although a spatial characteristic is important to the perception of crowding; it is believed that the interaction between individuals in the environment counts even more (Baum & Weiss 1987). A statistical concept such as building density has not much to do with whether human activities are adequately concentrated (Yuen & Yeh 2011). As a result, the concept of perceived density could be more useful than physical density in crowding studies, because perceived density is relevant to human perception and experience. In this sense, it is not buildings but people and their activities that needs to be examined.

However, other studies indicate that there is a relationship between these two components of density. A substantial body of research indicates that physical density, involving space limitations, can in itself cause the subjective state of distress, or crowding (Altman & Gover 1975; Baum & Valins 1979; Yuen & Yeh 2011). The limitation of space results in the reduction of proximity, and forces individuals to undergo some unwanted social contact. Rapoport (1975) proposes a diagram hypothesising the relationship among physical density, perceived density, and affective density, based on the concept of rates of information. The impacts of physical density on perceived density are evaluated via a ‘matched’ mechanism, which is itself based on desired levels of crowding. In this process, “crowding or isolation (which we could call affective density) is the evaluation or judgement of that perceived density against certain standards, norms, and desired levels of interaction and information” (Rapoport 1975, p. 136).

2.5.2.2 Types of density

The following sections thus attempt to detangle the complex concept of density according to two perspectives: physical density and perceived density (see Table
An insight into these two distinct but interrelated concepts of density will serve as a basis for understanding the relationship between density and crowding.

### Table 2.1 Density: components, descriptions, rationales, and measurement

<table>
<thead>
<tr>
<th>Components</th>
<th>Descriptions/ rationales</th>
<th>Indicators/ measures</th>
<th>References</th>
</tr>
</thead>
<tbody>
<tr>
<td>Building density</td>
<td>Concentration of physical structures/ a given area</td>
<td>Plot ratio/FAR</td>
<td>(Edward 2009; Kim 2016; Rapoport 1975)</td>
</tr>
<tr>
<td>Physical density</td>
<td>Concentration of individuals/ an area</td>
<td>Regional density, Residential density, Dwelling density</td>
<td>(Edward 2009; Pafka 2013; Rapoport 1975)</td>
</tr>
<tr>
<td>Population density</td>
<td>Intra-household density, Household density, Occupancy density</td>
<td>(Baldassare 1979; Kim 2016; Rodgers 1982; Stokols 1972a; Yuen &amp; Yeh 2011)</td>
<td></td>
</tr>
<tr>
<td>External space density</td>
<td>Space between buildings, Neighbourhood density</td>
<td>(Baldassare 1979; Dave 2011; Kim 2016; Yuen &amp; Yeh 2011)</td>
<td></td>
</tr>
<tr>
<td>Spatial density</td>
<td>Spatial elements</td>
<td>Apartment unit size, Room size, Ceiling height, Room colour, Room brightness</td>
<td>(Baum &amp; Davis 1976; Desor 1972; Edward 2009; Schiffenbauer et al. 1977)</td>
</tr>
<tr>
<td>Perceived density</td>
<td>Intimacy regulation</td>
<td>Spacing, Juxtaposition</td>
<td>(Baum &amp; Weiss 1987; Edward 2009)</td>
</tr>
<tr>
<td>Social density</td>
<td>Group sizes</td>
<td>Floor density, Structure density, Project density</td>
<td>(Baum &amp; Davis 1980; Eoyang 1974; Newman, O 1972)</td>
</tr>
</tbody>
</table>

(i) **Physical density**

Physical density is defined by Edward (2009, p. 3) as “a numerical measure of the concentration of individuals or physical structures within a given geographical unit. It is an objective, quantitative and neutral spatial indicator”.

Physical density comprises two separate components: “the number of people in a given space; and the amount of space per person” (Saegert 1985, p. 15). The concentration of individuals within a given area is referred to as population density.
density. It is an objective, quantitative indicator, but it takes different meanings at different scales of geographical unit (Edward 2009). For instance, regional density is calculated by the ratio of a population to the land area of a region. Residential density is measured by the ratio of population to a residential area. Occupational density refers to “the ratio of the number of occupants to the floor area of an individual habitable unit” (Pomeroy 2011, p. 1). Increases in people density may be accomplished by increasing the number of people or by decreasing space (room size) (Baum & Weiss 1987).

Two components of population density are internal space and external space densities. “Internal space density is the density of the primary territory (primary living environment), where an individual spends a relatively significant proportion of their time” (Yeh & Yuen 2011, p. 11). It can be measured by the number of people per living space. “External space density is an expression of the secondary territory (secondary living environment), where facilities and services are shared among the people within certain area” (Yeh & Yuen 2011, p. 11). It is assumed that crowding in the primary environment is more undesirable than crowding in the secondary environment, because a large part of residents’ lives are spent inside their apartments (Zimring 1981). Empirical evidence also suggests that residents perceive more crowding when their home, rather than their neighbourhood, is congested (Aiello & Baum 2012).

The amount of space per person, or the concentration of physical structures within a given area, is called building density (Pomeroy 2011). The meaning of building density is further demonstrated by the variety of its measures, with multiple interpretations. Building density measures relevant to crowding can be divided into the following categories: (i) FAR (plot ratio) and site coverage; (ii) grouping and building height; and (iii) green open space. Edward (2009, p. 13) outlines the factors that are thought to have effects on perceived crowding, including “FAR, building height, space openness, space complexity, and the naturalness of the environment”. Plot ratio (FAR) refers to total gross floor area of a development to site area, whereas site coverage represents the ratio of the building footprint area to its site area (Rapoport 1975). In a housing development study, Marcus and Sarkissian (1988, p. 13) claims that “design attributes such as the overall size of
buildings, space between buildings, and visual access to open and green space, are acknowledged as contributing factors to the perception of density”. To reduce the negative impacts of high density on crowding, thorough planning and suitable density control are essential (Edward 2009).

With the same physical density, a high-rise housing development with more open spaces and public amenities might be perceived as less dense than the arrangement of multiple low-rise houses. If the size of apartment units grows according to the rise in number of stories, this may not necessarily lead to an increase in the density of that apartment project. In reality, however, most apartment projects in Asian cities go higher without an increase in dwelling area, due to the limited available land (Yeh 2000). In extreme case such as Hong Kong, the dwelling unit is even decreased to make the price affordable (Yeh 2000). In this respect, a rise in residential building height leads to a significant increase in the perception of density.

The impact of building density and people density on the phenomenon of crowding is not straightforward, and largely depends on how this density is measured. Some studies indicate that the unpleasant experience of crowding is more related to high people density and not necessarily associated with high building density (Edward 2009). Edward (2009, p. 14) argues that perceived crowding results from “a lack of space for individuals; thus it is more about high people density”. Other studies claim that building density has significant impacts on crowding. Edward (2009, p. 14) argues that, “in the case of larger dwelling size and smaller household size, higher plot ratio may lead to lower occupancy density and, therefore, more habitable area for individuals, in turn mitigating the crowding condition”. Zaxharias and Stamps (2004, p. 783), in their simulation experiments, find that physical factors such as “building height, number of buildings, spacing, and the extent of building coverage, have significant effects upon perceived crowding”. Similarly, Sivam and Karuppannan (2012) indicate that plot coverage, FAR, setbacks, mass, and height, are the design elements that influence the perception of spatial density. Their study concludes that, “apart from dwelling size, its shape, orientation, and grouping, the layout deserves careful consideration in determining densities” (Sivam & Karuppannan 2012, p. 5). Furthermore, high
building density allows more open space for the uses of people who need to withdraw from a crowded primary territory (Edward 2009). The next section further discusses perceived density, its design components, and their relationship to crowding.

(ii) Perceived density

Perceived density is defined by Rapoport (1975, p. 136) as “an individual’s perception and estimate of the number of people present in a given area, the space available and its organisation”. The spatial characteristic is central to the perception of density; but, in addition, the interaction between the individual and the environment counts even more.

Following this definition, perceived density is relevant to relationships between individuals and a space, on the one hand, and between individuals within a space on the other hand. To distinguish these two aspects of perceived density, the two concepts of ‘spatial density’ and ‘social density’ were introduced. “Spatial density is the perception of density with respect two to the relationship among spatial elements; whereas, social density is about the interaction between people” (Pomeroy 2011, p. 1). An increase in the number of people in a given area, without increasing the amount of space, creates an increase in social density. Conversely, a decrease in the amount of space while the group size remains unchanged is referred to as an increase in spatial density (Gifford et al. 2002).

Perceived density has many implications for the design of multi-storey housing to mitigate the negative effects of crowding. Zacharias and Stamps (2004, p. 13) claim that “perceived density is a function of building layout. According to them, building height, number of buildings, spacing, and the extent of building coverage”, significantly influence the perceived density. For spatial density, the measures are very much related to environment qualities. Edward (2009) points out some factors influencing spatial density, such as the degree of enclosure, intricacy of spaces, and activity levels.

Although not directly related, residential layout might have an impact on social density. Sivam and Karuppannan (2012) claim that what really matters for the perception of density is how the layout of a residential project is arranged.
Similarly, Chan (1999) asserts that social density is strongly influenced by design elements and layout pattern. He points out that “design responding to social density must involve the mechanisms for controlling interaction levels such as spacing, physical elements, territorial boundaries, hierarchy, the size and nature of the resident group involved, its homogeneity and rules for behaviour” (Chan 1999, p. 119).

Both physical and perceived densities are important for the purposes of the present research because they are both relevant to perceptions of crowding. Understanding the relationship between density and design, to manage the balance between the right size of the population and the built-up area, is challenging. However, it also could be an effective way to achieve good quality of life and social sustainability (Dave 2011). With proper planning, design, and management, “the proximity that arises from high social density can conversely facilitate social interaction and promote good neighbourhood relations” (Chan 1999, p. 16).

2.5.2.3 Managing density

Density is considered to be the main reason for the social condition of crowding in multi-storey housing. The experience of crowding is a result of limited space, because the ability to adjust individual proximity to others is reduced. According to Stokols (1972a), physical conditions involving space limitations can cause the subjective state of distress or crowding. Similarly, Kaya and Erkip (2001) argue that, in high-density settings where space is limited, people may feel restriction in movement or the invasion of privacy. In the same vein, Chan (1999) asserts that living in a high-density environment, usually with limited personal space and excessive unwanted interaction, has effects on the sense of both privacy and crowding.

Conversely, some other studies argue that density and crowding do not always occur together, and are not even necessarily related (Churchman 1999). Stokols (1972a, p. 275) argues that “density is viewed as a necessary antecedent, rather than a sufficient condition, for the experience of crowding”. High-density settings might create physical conditions that exacerbate psychological stress, but using physical indices of density as a measurement of experienced crowding may not be
sufficient (Baum & Valins 1979). Furthermore, the psychological experience can be mediated by other variables aside from reducing density. Baum and Valins (1979) point out that crowding is experienced only if density affects an individual’s ability to manage the type and frequency of social interaction. Sivam and Karuppannan (2012) argue that it is possible to achieve high-density multi-storey housing without crowding by offering spacious apartment units. Conversely, crowding might be experienced in a large house if there are too many people per room.

The present thesis argues that density increases socio-psychological processes including intrusion and social interference, and therefore influences boundary control. Intrusion generally refers to an individual being approached too closely by others, or to violate a territory without the owner's permission. Physical density increases the probability that social contact may interfere with boundary-control mechanisms. Social and spatial conditions of density can threaten the maintenance of personal control (Rodin, Solomon & Metcalf 1978). Thus, there is most likely to be a relationship between density and interpersonal and situational factors of crowding. Studies of urban density have tended to equate the two terms, using them synonymously (Altman 1978; Baum & Valins 1979). Although often related, crowding and density need to be distinguished, because they are different and are not always related (Sivam & Karuppannan 2012).

A review of the literature indicates that crowding is perceived as a subject state whereas density is considered as an objective condition (see Table 2.2). The most important differences between these terms are pointed out by Stokols (1972a): he indicates density as a ‘strictly physical meaning’, whereas crowding is a psychological concept with ‘experience and motivation base’. Similarly, Baum and Valins (1979), Chan (1999) and Churchman (1999) define density as an objective measure of the physical environment, and crowding as subjective interpretation (perception or state) of objective reality. However, they all support the point that, in some conditions, but not always, density can cause the subjective state of crowding (Chan 1999; Stokols 1972a; Yuen & Yeh 2011).
Table 2.2 Distinguishing the two terms: density and crowding

<table>
<thead>
<tr>
<th>Density is viewed as</th>
<th>Crowding is viewed as</th>
<th>Relationship between the two concepts</th>
<th>References</th>
</tr>
</thead>
<tbody>
<tr>
<td>a strictly physical meaning</td>
<td>a psychological concept with experienced and motivation base</td>
<td>Some of the physical conditions involving space limitations can cause the subjective state of distress, or crowding</td>
<td>(Stokols 1972a)</td>
</tr>
<tr>
<td>an objective condition</td>
<td>a subjective state</td>
<td>Crowding is experienced when density inhibits individual’s ability to regulate the nature and frequency of their social interactions</td>
<td>(Baum &amp; Valins 1979)</td>
</tr>
<tr>
<td>an objective measure of the physical environment</td>
<td>subjective interpretation of objective reality</td>
<td>privacy is one of the important variables intervening in the relationship between density and crowding</td>
<td>(Chan 1999)</td>
</tr>
<tr>
<td>an objective, qualitative, and neutral term</td>
<td>a perception that there are too many people</td>
<td>they are not necessarily related</td>
<td>(Churchman 1999)</td>
</tr>
<tr>
<td>a physical condition</td>
<td>psychological stress</td>
<td>Crowding is sometimes caused by high density</td>
<td>(Yuen &amp; Yeh 2011)</td>
</tr>
</tbody>
</table>

The crowding experience of lacking privacy in multi-storey housing can be regulated by managing the density. As density is an antecedent condition of crowding, psychological stress can be mitigated by regulating density (Brian & David 2013). Stokols (1972a) indicates that density affects behaviour only if it causes a psychological state of crowding. However, it is not easy to regulate privacy in a densely populated area by simply reducing the absolute number (Kaya & Erkip 2001). The main mechanism to maintain privacy for a large number of people in a high-density environment is ‘the power of design’ (Edward 2009, p. 291). Baum and Weiss (1987, p. 899) observe that “physical, social, and psychological parameters of the situation can influence the way people experience
density and determine crowding”. Regulating density for reversing its effects is very important, because it may indicate how to design environments to reduce any potential negative impact of a high-density environment (Schiffenbauer et al. 1977). To minimise the unpleasant experience of lacking privacy in multi-storey housing, the concept of density must therefore be carefully studied.

2.5.2.4 Density and the costs of crowding

The last component in understanding privacy is the cost of crowding, or the consequences of crowding outcomes. According to Altman’s model of crowding, the lack of privacy for an extended period of time can be recognised by its physical, physiological, psychological consequences. One of the most critical costs of crowding in high-density living is crime (Coleman 1985; Newman, O 1972).

2.5.5 Summary

So far, this Chapter has focused on definitions, debates, criteria and measurement, of privacy in multi-storey housing, and relevant concepts to residential privacy in multi-storey housing. The level of residential privacy can be studied through the constructs of desired privacy, achieved privacy, and optimum level of privacy. The relationship between privacy and housing design can be understood via privacy mechanisms and other related factors in the privacy regulation model proposed by Altman (1975).

Crowding and density are the two key concepts closely related to studies of residential privacy, especially in high-density environment. Crowding and social isolation are the two social conditions existing when there is a mismatch between the achieved privacy and the desired privacy. Studying these two concepts helps to identify the conditions that negatively influence the level of privacy. It is suggested that the way people experience crowding is affected by physical, social, and psychological parameters. The relationships of these parameters with crowding are hypothesised in Altman’s model, with the key components of antecedent factors, internal subjective responses, and overt coping behaviours.
Density is another concept strongly related to, and sometimes interchangeably used as a term for, crowding. In the present thesis, however, they are treated as two different concepts closely related to privacy. Density refers to the objective condition that exacerbates the subjective experience of crowding. In other words, crowding is the negative psychological effect that might be aroused because of the conditions of density, such as too many people or too little space. Density can be understood via two separate but interrelated components: physical density and perceived density. Physical density, in turn, is further divided into building density and people density. Similarly, perceived density is divided into spatial and social density, for better understanding. Spatial density is managed by the degree of enclosure, intricacy of spaces, and high activity levels; whereas social density can be controlled by residential layout. Furthermore, internal space density and external space density might have different impacts on perceptions of crowding.

To this end, density has important implications to issues of privacy in multi-storey housing. However, managing density is a complex process, largely dealt with by a process of trial and error to succeed. There is a need for testing and evaluating these design parameters in real contexts. The next section will review ongoing research on design approaches responding to local living arrangements.

2.6 Internal space organization for local living patterns

2.6.1 Introduction

In the midst of the great economic, social and physical changes taking place throughout Vietnam prior to and during the Doi Moi period of change, a wide range of apartment buildings for the middle classes appeared on the market, offering variations in area, finishing standards, and spatial solutions. However, the “cultural inexperience of people to live in vertical apartments rather than their detached houses has created a number of tensions and concerns” (Oleg Golubchikov & Badyina 2012, p. 42). In addition to the challenge of adjusting to vertical living, these new housing units have not been easily adaptable to customary activities crucial to Vietnamese culture, such as working from home or the worshipping of family ancestors (Choi et al. 2014).
In response to the above behavioural issues, in terms of living arrangements, an important aspect of multi-storey housing is occupants’ internal space organisation (Turner, BS 2006). It is considered that sensitivity to occupants’ patterns experience and behaviours may yield more appropriate solutions for organising living spaces, including in conventional unit types (Awan, Schneider & Till 2013). Surveys have been conducted on the transformation of housing environments in response to apartment habitation in Vietnamese urban areas (Choi et al. 2014; Geertman 2007; Shinozaki et al. 2006). There have also been studies focusing on outlining changes in residents’ behaviours in this modern, apartment living form (Dinh 2011; Geertman 2007; Procacci & Thao 2007). There is, however, to date limited research, based on analysis of the empirical evidence from actual buildings, on the relationship between contemporary apartment unit planning and the inhabitants’ satisfaction with these living arrangements. The literature review below indicates that it is important to understand how the ordering of space in building design originates in social life.

2.6.2 Spatial practice

In order to understand spatial practice, or perceived space, it is important to study residents’ activities in their everyday life. Dinh (2011) indicates that the perceived space of inner-city KTT can be studied by firsthand observation and interpretation of everyday life. However, it is important to note that perceived space is not a list of activities, but is rather a pattern of behaviours. Spatial practice is untangled by the components of what activities there are, how they are connected together and sequenced, which activities go together, and which are separated out (Hanson 2003, p. 13). These patterns of dining, talking, sleeping, studying, and watching television are reflected in housing design orienting residents in space and in sociocultural context (Altman & Werner 1985).

Spatial practice has been influenced by many socio-cultural aspects of the given context. In fact, individual’s behaviours are underpinned by socio-cultural forces that are constant, or change very slowly. These forces include religious beliefs, family structures, privacy, social organisation, ways of gaining a livelihood, and social relations between individuals (Rapoport 1969). More recently, Ornstein,
Villa and Ono (2011) indicate that everyday activities have been influenced by changes in the composition of families (or occupant profiles) and lifestyles in society. It is important to note that the forces influencing spatial practice indicated by Rapoport (1969) can be grouped into the categories proposed by Ornstein, Villa and Ono (2011). The two factors, of occupant profiles and lifestyles, will be discussed in the following sections.

2.6.2.1 Family profiles

Domestic activities in housing have been influenced by changes in the composition of families. These activities in multi-storey housing is subject to (i) household size, (ii) family type, and (iii) number of required bedrooms. According to Hirschman and Loi (1996), new profiles of domestic groups in Vietnam have had a great impact on spatial practice. The new occupant profiles include singles living alone, unmarried couples, and couples with no children, leading to processes of change in spatial behaviours. A large majority of Vietnamese households are still nuclear families (Barbiéri & Bélanger 2009). However, in recent decades there have been significant increases, particularly in large cities, in people living alone (singles, and the elderly) and couples without children or whose children have left home (Belanger 2000).

Socioeconomic realities, with the transformation of family composition directly affecting living arrangements, need to be considered in the design of contemporary dwellings. Conventional apartment units are not suitable to accommodate the living arrangements of these new types of households (Friedman 2012). Thus, new apartment unit types have been introduced, responding to the changes of family profile. These alternatives to conventional apartment have become available since the 1980s, such as studios for singles, duplex units, and three-bedroom-apartments for extended families (Do 1991). Changing household composition is one of most important aspects leading to changes in lifestyle, the latter which will be discussed in the next section.

2.6.2.2 Residents’ lifestyles

Residents’ lifestyles are believed to have a significant impact on spatial practice. Before the Doi Moi Policy, lifestyles of the Vietnamese people were associated
with the collective lifestyles of Moscow. People preferred collective activities in their everyday life, such as cooking, bathing, and washing clothes (Shinozaki et al. 2006). As a result, collective kitchens, collective bathrooms, and common laundries were provided at every level of a typical multi-storey housing in the mid 1960’s. The rapid urbanisation after Doi Moi has, however, led to changes in occupants’ patterns of behaviour. Lifestyles have changed, following the example of other countries in the Pacific Asian region (Geertman 2007). Such changes seem to required more seem to need more privacy, and therefore more space for the apartment unit. Modern city dwellers have focused more on quality of life, with more concern about household security and sufficient living space. Social relationships and the sense of neighbourhood are important factors in their perceptions of everyday life (Micheal 2014).

2.6.3 Internal space organisation

Although conceptual space is abstract, geometric, and objectively measured, the organisation of spaces reflects the social situations and cultural meanings of how people live and conceive the spaces. On the one hand, it is argued that the space produced by architects and planners serves powerful interests in a particular mode of production in modern spatial practice (Lefebvre & Nicholson-Smith 1991; Ng et al. 2010). The design of apartment units should have been ‘objective’ with ‘neutral’ plans; however, it has become ‘a means of production’ and ‘a means of control’ for the power of developers and state governments (Lefebvre & Nicholson-Smith 1991). On the other hand, conceived space, as the context where places, people, and things exist, is influenced by socio-cultural forces of that given place (Rapoport 1969). Every housing design serves the same basic needs of living; however, there are a variety of ways in which activities are arranged due to those socio-economic conditions (Hanson 2003).

2.6.3.1 Socio-economic conditions

A changing of socio-economic conditions demands a change in the design of internal spaces. Shinozaki et al. (2006) conducted research on the transformation of apartment layouts in Vietnam over time. In this study, a number of apartment units built in different periods of time were reviewed and analysed. The authors
point out that the spatial organisation of apartment units has shifted under the influence of socio-economic situations. They note changes in the layout, unit area, and access ways, over the time period studied (see Table 2.4). In the 1960’s, collective lifestyle was supported in apartment design with the ‘open water closet’, comprising a collective kitchen and bathroom (Shinozaki et al. 2006). From the late 1970’s onwards, the design of apartment units began to change to serve each independent family living in such units, with living space and sleeping spaces clearly divided. These changes were associated with the social condition that the civil war ended in 1975 and families required more privacy from collective life. From the 1990s, there has been a distinct tendency of apartment units to have wide and open living rooms, located at the centre of the house (Shinozaki et al. 2006). Furthermore, there has been a diversification of apartment types and sizes due to economic improvement after Doi Moi.

Table 2.3 The evolution of internal space in apartment units in Hanoi, from Shinozaki et al. (2006)

<table>
<thead>
<tr>
<th>Construction year</th>
<th>Middle of 1960’s</th>
<th>Middle of 1970’s</th>
<th>Middle of 1980’s</th>
<th>2000</th>
<th>2003</th>
</tr>
</thead>
<tbody>
<tr>
<td>Floor plan</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Apartment name</td>
<td>Kim Lien</td>
<td>Giang Vo</td>
<td>Nghia Tan</td>
<td>Linh Duy</td>
<td>Trung Hea</td>
</tr>
<tr>
<td>Area (m²)</td>
<td>31.12</td>
<td>52.24</td>
<td>72.66</td>
<td>70.97</td>
<td>196.96</td>
</tr>
<tr>
<td>Location</td>
<td>Urbanized area</td>
<td>Urbanized area</td>
<td>City fringe</td>
<td>City fringe</td>
<td>City fringe</td>
</tr>
<tr>
<td>Access way to units</td>
<td>Side corridor access</td>
<td>Side corridor access</td>
<td>Staircase access</td>
<td>Center corridor</td>
<td>Center core access</td>
</tr>
<tr>
<td>Stories</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>9</td>
<td>25</td>
</tr>
</tbody>
</table>

After the year 2000, an important trend of apartment design to be noted is the decreased floor space of units. This decrease is a response to the fall in the average size of families. According to Hirschman and Loi (1996), the average size of Vietnamese households has decreased from 4.8 persons in 2005 to 4.4 persons in 2015. Current designs of apartment units are smaller than those built in the 1990s, with some of them being only half the size. While apartment units have
decreased in size in general, the three-bedroom apartments have shrunk the most. However, extended families are still popular in urban areas, making up about half of current urban households (Hirschman & Loi 1996). Correspondingly, there still is a requirement for large apartment units, for adapting to the diversity and complexity of different life phases of those extended families (Thiem 2008).

In brief, new developments, in each period, have been made towards more appropriate spatial practices. However, the right changes must be based on practical evidence of occupants’ patterns of experience and behaviour. The next sections will discuss the rationale for understanding the changes of conceived space in multi-storey housing.

2.6.3.2 Relationship of functional spaces

In order to identify the appropriate structure of internal spaces in multi-storey housing, it is important to understand the functions of domestic spaces. The living arrangement in every dwelling is dedicated to social, private, and service uses. Ornstein, Villa and Ono (2011) investigated the development of residential high-rise buildings for middle income people in São Paulo, Brazil, analysing the layouts of selected apartment units through time. They identified the repetition of a typology based on the tripartition of spaces, and its consolidation, as a reference model for the production of apartment buildings (see Figure 2.3). According to this model, spaces in an apartment unit can be categorised into three functional groups, of social, intimate, and service areas. By tracing design responses to the occupants’ needs, their study demonstrates how the design of internal spaces in these structures maintains the conventional structure of mono-functional rooms, and the tripartite model, without reference to whether this model is appropriate to contemporary lifestyles.
The tripartition model of functional spaces is also found in the design of apartment housing in Vietnam. Studies on contemporary multi-storey housing indicate that domestic spaces can be generally grouped into three categories, of social, intimate, and service categories (Shinozaki et al. 2006; Thiem 2010). The social area, referring to living room, dining room, or common room (combination of the two), is directly connected to the hallway through the entrance door (social entrance). The intimate area, comprised of bedrooms and private closets, is usually located at the deepest place of the unit for reason of privacy. The service area, or the wet core of the unit, includes kitchens, laundry, common bathrooms and toilets. These spaces are usually grouped in a technically efficient way. In almost all apartment plans, the social area is located in the centre of the unit and residents need to pass social area to enter the intimate one (Thiem 2010).

2.6.3.3 The proportion of spaces

The perceptions of social/publicity and intimate/privacy area dramatically affect the spatial structure in housing design. Attitudes toward intimate/privacy are still
very much culturally shaped, and have a great impact on housing layouts (Rapoport 1969). Understanding ideas of privacy within a particular social group would, therefore, help to deliver a more culturally responsive housing design. In research on conceived space in apartment units in Vietnam, Shinozaki et al. (2006) analysed the evolution of functional spaces through time. Multiple case studies from the 1960s, such as on the Kim Lien KTT project, to modern high-rise housing, such as Trung Hoa-Nhan Chinh in 2003, were selected for comparison. Functional spaces in the apartments were grouped for the purpose of analysis, following the same categories used in the study of Ornstein, Villa and Ono (2011). The results indicate a distinct upward trend in the ratio of the intimate area size for more current apartments (see Figure 2.4). It can be inferred that urban residents have gradually preferred their privacy in multi-storey housing.

![Figure 2.4 The evolution of functional spaces in Vietnamese apartments (Shinozaki et al. 2006)](image)

2.6.4 Living arrangement

2.6.4.1 Locality in functional spaces

In traditional or self-built housing, where people design their own houses, the conceived space becomes the perceived space. The physical layout of the house represents the ‘private’ values of the users, or the lived space. The layout of a
vernacular home is believed to preserve cultural values, owing to the persistence through time and resistance to change of certain aspects of behaviour or way of life (Rapoport 1969). The core values of a specific culture have accumulated over time through the form of vernacular houses. These forms of housing have resulted from long-term growth and are part of popular culture; therefore, each is considered to be adapted to its specific location in terms of the social conditions (Nishimura & Phe 1991).

To understand the lived space in modern housing, it is important to link occupants’ activities carried out in the current layout to the spatial configuration of traditional houses. According to Gómez (2013), the performance of activities in the living arrangements of new housing, including how and where they take place, reflect the traditional attitudes and spatial patterns. Spatial patterns of use originally generated by the specific climate, social, and cultural conditions are presently reflected in new forms of housing. In research on a critical regionalist approach to housing design in Vietnam, Ly (2012) argues that it is essential, in order to understand the organisation of space, to examine and understand the daily activities of occupants in former housing types, which significantly contributes to the design of contemporary multi-storey housing.

The question is whether modern apartments can reflect locality within their spatial structure. Some studies compare the space organisation of Vietnamese apartments to that of other countries. Choi et al. (2014) conducted a comparative study on the spatial structures of apartment units in Asian countries including Korea, Vietnam, and Kazakhstan. By analysing and comparing the layouts of different apartment units, the distinguishing features of internal spaces have been identified. The results indicate that each country's apartments had different patterns of domestic spaces. Furthermore, these differences could be traced back to spatial characteristics found in traditional houses in each country. Geertman (2007) investigated the development of some apartment layouts in Hanoi since the 1960s. She claims that the layouts of apartments have changed through time in terms of space organisation, unit size, and the number of rooms. More importantly, the recent apartment layouts are observed to have some unique characteristics, a mixture of an imported typology and the local way of life. For instance, in Trung
Hoa-Nhan Chinh apartments, the living room functions as a lobby, also seen in traditional houses.

Architects are conditioned to label every room by function; however, the inhabitation is fundamentally cultural and territorial, not functional. Anh, HD and Ki-Hwan (2011), in research on domestic spaces in apartment housing, claim that the arrangement of the ‘dining room’ in the layout of modern apartments almost certainly comes from Vietnamese food culture. They indicate that the dining space is separated from the interior in order for the latter to remain unaffected by the odours, smoke and heat caused by cooking. This characteristic can also be found in traditional rural and urban houses, where kitchens were placed at segregated locations (Hoang 2006; Ly 2012; Thiem 2008). This aspect of the design practice sometimes makes it difficult to understand the lived space, because people, as always, instinctively adapt themselves to a built space as they settle into it.

It can be argued that the internal spaces within an apartment unit do reflect locality. However, what the specific characteristics of those functional spaces are remains unanswered. The purpose of the present study is to find living patterns within local settings, and to preserve the continuity of traditional values in modern housing design. This thesis aims to provide valuable data on differences in the ways in which individuals, and perhaps groups, perceive their environment in modern multi-storey housing. Heath (2009) asserts that, to develop a design that reflects spatial patterns accommodating particular lifestyles in the new design; which requires an understanding of the living habits originally generated by distinctive climates and cultural conditions. The role of the architect is “not to create a mode of life but to form spaces in which the models of habitat and the modes of life can manifest themselves” (Stanek 2011, p. 118).

2.6.4.2 Supportive environments

As previously discussed, living pattern is not only cultural specific but also subject to change in family composition and lifestyle. To ensure the congruence of home environments over time, there is a need for a system of settings supportive of the culture, values, preferences, and needs of given group: what are called supportive environments (Lynch 1984; Rapoport 1985). New housing
environments must respond to both customary activities and modern living arrangements. This concept plays a significant role in forming home environments that support different lifestyles, and communicate appropriate meanings when needed (Zube & Moore 2013). A typical example is the lack of space for home-based business in modern multi-storey housing (Davis, H 2012). In the context of Vietnam, working from home for extra income used to be popular in previous housing types, such as traditional shop houses, street houses, or row houses (Michael 2012). However, these economic activities have become impossible in modern apartment buildings, without supportive environments. Another example pointed out by Nguyen, D (2010) is the lack of certain functional spaces such as storage and worshipping areas in contemporary apartment design. The supportive environments concept is useful in the design of multi-storey housing because it takes into account the need for residents to adjust to vertical living, but also raises the question of what home environments can support the living arrangements of an individual or a particular group.

2.6.4.3 Affordances

Responding to the need for accommodating locality in functional spaces, the concept of ‘affordances’ has been employed (Maier, Fadel & Battisto 2009), referring to the physical properties of an environment (setting) that enable it to be used for certain activities (Gibson 1979). Different from the concept of behaviour setting, affordances do not in themselves cause people to use or not use spaces. However, when the requirements specified by cultural and social customs cannot be accommodated in the affordances of living spaces, the repercussions might be serious (Prak & Priemus 1985). This is supported by Clapham, Clark and Gibb (2012, p. 232) who argue that “the conflicts between the intended use of housing (by the architect, housing manager or property owner) and the actual use of housing (by individuals, households and specific population groups) can have several consequences”. Therefore, it is important to identify the cultural specifics involved for supportive environments, which have been discussed in the previous section.
Furthermore, cultural norms and values have changed over time due to changes in socio-economic conditions. Rapoport (1983) claims that housing forms are the negotiation between existing culture and alternative ones from elsewhere. Therefore, it is important to understand how the impact of changing values on traditional ones influences the organisation of the physical environment. By physically adjusting a setting, residents can alter its affordances (Maier, Fadel & Battisto 2009; Norman 1999). Where occupants are not able to change the affordances of a setting, for example (as where there are restrictions on such changes), this does not mean that their cultural values stay intact. Basically, the meaning may change with individual’s needs, and their cultural and individual background (Norman 2013). However, affordances do not automatically generate an outcome, but rather support or limit certain activities (Heft 1997). As a result, the role of the architects is to provide a physical setting that residents can easily appropriate for their own needs, and personal and cultural values, as well as that accommodates social change.

2.6.4.4 The appropriation of space

Lived space embraces both conceived and perceived space, because it is originally designed by architects but subsequently used by the occupants. Lived space exists in between these two spaces, “a space of pure subjectivity, of human experiences, of people’s sense-making, imagination, and feeling – that is, their local knowledge – of the organisational space as they encounter it” (Zhang, Z 2006, p. 221). When residents use the space, they add subjective values from their activities into it (Dinh 2011). As a result, there is always a conflict in the lived space between the ‘private’ values of the users and ‘public’ values of architects and authorities. Whenever an occupant has an unsatisfactory relation to the way of life, they actively modify the physical spaces to meet their social needs. Lived space thus has the power to readjust the balance of ‘popular’ perceived space and ‘official’ conceived space.

The modification made by occupants of their originally designed apartments, or the appropriation of space, is important for understanding the relationship between the design and living arrangement. As Lefebvre (2003) puts it, the appropriation
of space is characterised by the dynamics of a modification of a given model. (Stanek 2011, p. 118) claims that the appropriation of space is an essential way of understanding dwelling:

“For an individual, for a group, to inhabit is to appropriate something. Not in the sense of possessing it, but as making it an œuvre, making it one’s own, marking it, modelling it, shaping it … The interventions of the inhabitants should be understood as an attempt to bring “order” into space or to “re-appropriate” it; that is to say, to introduce the differentiation between private and public parts”.

In the context of multi-storey housing in Vietnam, the power of such an appropriation process is evidenced by users’ modifications made to the existing KTTs. As discussed in Section 2.6.2, there are studies specifically focusing on the modifications in this housing type (De Meulder & Shannon 2010; Dinh 2011; Huppatz, Daou & Dinh 2015; Procacci & Thao 2007). These studies point out the adjustments made to the original design at different scales, from site planning to the interior layout. At site planning scale, the ‘informal densification’ is observed by the construction of ‘informal structures’ between the KTT blocks (De Meulder & Shannon 2010; Procacci & Thao 2007). Residents realised that the ‘unnecessarily large’ spaces between the KTTs could be filled with small-scale buildings for everyday needs such as retail shops, convenience stores, and coffee houses similar to those in traditional living quarters. In this case, the lived space of residents is the key driver for these changes to the physical settings. On a smaller scale of internal space, modifications are recorded in the change of layouts towards increasing privacy and living spaces (Dinh 2011; Huppatz, Daou & Dinh 2015). It is common that balconies in those apartments are walled in as extra ‘rooms’, called a ‘tiger cage’ (Dinh 2011). These ‘informal’ extensions imply the power of the lived space through local adaptations and reactions to this imported built form.

Architects and planners have been familiar with physical traces (for physical changes) and spatial analysis (for spatial arrangement) as primary methods to examine and understand the complexities of living arrangements for housing
design (Zeisel 1984). However, it is also crucial for designers to observe, record and comprehend the patterns of life that reflect tradition and culture: the practices and customs of everyday life are useful for identifying living patterns important for the design of modern multi-storey housing. This is because residents ‘actively’ adapt to the provided settings, instead of passively living in them (Stanek 2011). To this end, the key role of the architects is in “furnishing the inhabitants with spaces that they can appropriate” (Stanek 2011, p. 118).

2.6.5 Summary

This section investigated the relationship of the design of multi-storey housing to the living arrangements of local residents. Reviewing the literature indicates that internal space arrangement is one of the most striking means by which we recognise the living arrangements in a specific context. This section also discussed relevant concepts, factors, and measures for identifying the relationship between the living arrangement of occupants and the internal space organisation, in contemporary multi-storey housing. There remains significant scope to understand how local living arrangements mutually affect the layout of internal spaces in existing current multi-storey housing in Vietnam. Through this understanding, socially sustainable housing can be pursued, because occupant’s spatial needs can be evidentially identified, and the design, in turn, can effectively respond to new lifestyle and demographic trends.

2.7 The key role of public spaces in social interactions

2.7.1 Introduction

There is a growing concern about the lack of social interaction in and around multi-residential buildings. It has been suggested that social contacts between residents are more likely to become estranged in such buildings, with many people living in high-density who experience feelings of isolation and loneliness, a lack of social ties, and who develop hostility to community (Jacobs 1961; Tonkiss 2005). Some studies have thus focused on how public open spaces may encourage contact between people in such developments (Holland et al. 2007; Newman, O 1995); while others have explored the relationship between activity levels and the
physical elements in public spaces (Gehl 1987, 2010; Mehta 2007; Zhang, W & Lawson 2009). Despite the differences in study approach, all such studies consider social interactions in multi-storey housing to primarily take place in public and semi-public spaces (Abdul Aziz & Ahmad 2011).

Public and semi-public spaces may play a significant role as meeting points for socialisation. In fact, the ability of the physical design characteristics to improve social interaction is indisputable. Madanipour (1996, p. 144) claims that “good public and semi-public spaces can largely contribute to the social activities of people”. Other authors (Brandon, Hirt & Cameron 2008; Huang 2006) similarly claim that the role of the physical environment in affording interactions cannot be underestimated, simply in bringing people closer together, in the streets and in shopping areas, as a way of increasing cohesion (Talen 1999). Enclosed outdoor spaces (Al-Homoud & Tassinary 2004) and outdoor semi-private spaces (Williams, J 2005), for example, support social interaction among neighbours in multi-storey housing (Abdul Aziz & Ahmad 2011).

In Vietnam, the status of social isolation in urban multi-storey housing is highlighted in the literature (Lan 2002). Public spaces for social interactions in apartment projects have been developed ineffectively. The design of such spaces is aligned with planning standards, but necessary facilities are inadequate and inequitably distributed (Hang 2010a; Nguyen, D 2010). In many cases, design solutions for residential public spaces have not provided a necessary close, secure and approachable feeling, especially for elders and children (Lang, NT 2007). To that end, it is important to review existing design approaches to public spaces that encourage social interactions in multi-storey housing projects, and relate these to the Vietnamese urban context. In spite of relevant efforts, the issue of how to create public spaces effective in engaging multi-storey housing residents in social activities is not well understood.

2.7.2 Understanding social activities

Despite the existence of social isolation in some projects, it is argued that multi-storey housing does not in itself stop casual contact in public spaces and around buildings. Ginsberg and Churchman (1985), in their study of social relations in
high-rise housing in Israel, found that people do have a tendency to meet with their neighbours in public areas in and around buildings, observing that they meet with their neighbours as they sit in public areas, such as in hallways, in the yard, and on the lawns on summer days, for communication. However, what types of social interaction and where they take place are culturally driven, and largely depend on variables such as life-cycle stage, social class, and lifestyle.

2.7.2.1 Behavioural map

Public spaces are considered to play an important role as a meeting point and a place for social contact (Madanipour 1996), and can significantly contribute to the quality and frequency of social activities of people. Gehl (1987) argues, for example, that social interaction depends on the presence of others in public spaces. Staying in a public space is thus a prerequisite for the possibility of physical contact. When people stay in outdoor spaces watching passing pedestrians, they increase the opportunity for social interaction (Gehl 1987). Whyte (1980) suggests factors of public spaces, such as seats, trees, water and the availability of spaces, that might encourage people to linger in public outdoor spaces. Furthermore, public spaces with activities tend to attract more activities (Gehl 1987; Jacobs 1961). The role of public spaces in enhancing social contacts is illustrated in the success of the KTT upgrading scheme in Ha Noi in the 1980s. Procacci and Thao (2007) analysed the collective residential quarters (KTTs), and claim that social interactions usually appeared in the public spaces.

To effectively design public spaces for social contacts, it is important to understand what interactions can happen, where they might take place, and how frequently they might occur in given areas. In other words, it is necessary to create a behavioural map for those public spaces. In the above-mentioned study, Procacci and Thao (2007) indicate that social contacts in the KTTs were found in the form of viewed relations (seeing and being seen), functional relations (e.g. between buyers and sellers in a shop), and neighbourhood relations (everyday actions including speaking, observing, and exchanging help). This behavioural map provides the basis for an upgrading scheme. For instance, from information recorded in a behavioural map, apartment units at ground floor were demolished.
and replaced by retail stores. As a result, the ground floors were successfully modified to match local lifestyles and enhance social contacts.

2.7.2.2 Categorising social activities

Social interaction in public spaces can be categorised based on the degree of contact intensity. According to Gehl (1987), activities in outdoor spaces can be divided into five groups, from low to high levels of social contact: (i) passive contacts (seeing and hearing contact); (ii) chance contacts; (iii) acquaintances; (iv) friends; and (v) close friends. From that, he suggests five means that could be used in design to promote social contacts: (i) no wall; (ii) short distance; (iii) low speed; (iv) single level; and (v) face-to-face orientation (Gehl 1987). However, this way of categorising social contacts does not reflect the relationship between people and space, and more importantly how to develop and prolong these interpersonal relationships.

Social interaction in public spaces can also be classified according to its purpose. (Gehl 1987) categorises social contacts in outdoor residential areas into three main categories: necessary activities, optional activities, and social activities. Necessary activities are those activities people have to do, such as walking through outdoor spaces of an apartment to get to the car park or public transport. “Optional activities are the activities people choose for clear or unclear purposes, such as taking a walk to get fresh air, and standing or sitting outdoor to enjoying life” (Zhang, W & Lawson 2009, p. 208). Social activities refer to both physical and passive contacts. Physical contact includes greetings and conversations; whereas passive contact might simply be seeing and hearing other people.

Another way to categorise social interaction in public space is based on the frequency and duration of contact. Mehta (2013) proposes three groups of social behaviours in public spaces, particularly in streets. These categories, ranging from short to long duration, are passive sociability, fleeting sociability, and enduring sociability. Passive sociability includes activities for the need of being in the presence of others without seeking any direct verbal contact. Fleeting sociability refers to brief and fleeting contacts that constitute easy interactions with others in a relaxed manner. Enduring sociability involves meaningful associations between
people, such as in intimate relationships (Mehta 2013). This way of classifying matches with the purpose of the present study, because it helps to identify the design features that can prolong users’ activities and thus help develop a social relationship.

2.7.3 Understanding public spaces

2.7.3.1 Defining public spaces

Public space is defined as the common ground on which people carry out the functional and ritual activities that create community, whether in the routine of daily life or in social events (Carr 1992). In this sense, public space, as comprehended in Western societies, is considered to be an arena of social interaction and political activity (Drummond 2000). However, the idea of public space in the context Vietnam offers different insights for the term, according to ‘local’ specificities of place. Basically, a residential building can be public or private property, but all land is legally the property of the Government representing all Vietnamese people (Vietnam 1992). The developers can only lease the land for specific uses approved by the authorities (Douglass & Huang 2007).

Thus, public spaces in Vietnam are sometimes not seen in the conventional Western sense of public arenas for social interaction and communal activity. This is certainly the case where, in Vietnam, a fee is required to access amenities in the so-called public spaces. In many multi-storey housing complexes, social infrastructure such as parks and swimming pools is provided but not accessible to everyone. In the Phu My Hung project, for example, only exclusive residents who pay for the management and maintenance costs have the right to use public spaces and amenities (Douglass & Huang 2007). This leasehold system of land use sometimes makes for confusion, affecting the design of public spaces in housing projects. Public spaces within a housing development project are, in this case, privately managed and subject to private rather than public rules of access and use. This allows owners and managers of these spaces to limit severely public use, through both by design and regulation.
2.7.3.2 Public spaces in housing complexes

The definition of public space is varied according to the scale of urban area; so too is its categorisation. On the urban scale, for instance, Chermayeff and Alexander (1963) divide the urban space (or realm) into six domains: urban public, urban-semi-public, group-public, group-private, family-private, and individual-private. According to Chermayeff and Alexander (1963), the distinction between public and private scales can be quite clear, or alternatively less well defined.

![Schematic illustrating sociable space hierarchy in multi-storey housing](image)

Figure 2.5 Schematic illustrating sociable space hierarchy in multi-storey housing

As the present study is restricted to the residential domain, only certain components of public spaces will be discussed in detail. In the case of multi-storey residence, Newman, O (1972) defines four basic categories of space: private, semi-private, semi-public, and public areas (see Figure 2.5). The residential spaces are categorised as a space hierarchy in which the levels of publicness are gradually increased, from apartment unit to public street. At one end of the scale is the private residence, the apartment unit, with private outdoor space such as a garden or a balcony.
2.7.4 Designing public spaces for social interactions

2.7.4.1 Elements of public spaces

In an attempt to categorise domestic public domains, (Newman, O 1972) proposed a model for space hierarchy in multi-storey housing (see Figure 2.5). The diagram in Figure 2.5 shows hierarchically organised spaces, with private, semi-private, semi-public, and public areas. The private domain includes the apartment unit and its private outdoor spaces such as a garden or a balcony. The semi-public space can be a group of dwelling units on the same floor. The outdoor space formed by a residential group has a semi-public character; while the urban street is a completely public space. The key application of this diagram in the present study is to identify the elements of social space, making clear in the design of multi-storey housing the identification of ownership of particular spaces (Newman, O 1972).

(i) Semi-private spaces

The semi-private space is based on private space, but it has public characteristics. According to Newman, O (1972), semi-private space is the space controlled privately but accessible by the public from within the buildings. In multi-storey housing, the small cluster of apartments at each floor is the first level beyond the apartment unit, where occupants can extend the realm of their homes and responsibilities (see Fig. 2.5). Such semi-private space as a hallway can serve a variety of private household functions, but predominately operates as a common area for group activities. The second level of semi-private space, or shared-private space, includes common entry and circulation paths within apartment buildings.

Corridors and lift lobbies are important spaces for social interactions in a multi-storey residential building. In research on social interaction in flat outdoor space, Abdul Aziz and Ahmad (2011) indicate that the corridor, being the closest space to homes, is the most active space for social activities. More than half of all social interactions (55.8%) were observed in the blocks, mostly in the corridors and the staircases. The physical characteristics of the central corridors have a significant impact on the performance of social contacts. Newman, O (1972) points out the
strong impacts of the length and shape of the central hallway on social activities. The clustered and/or divided corridor appears to have better control over social interactions than the corridors running the full length of the building (see Figure 2.6). In a different study, Abdul Aziz and Ahmad (2011) claim that social activities are observed more in the double-loaded corridor than in the single corridor.

![Diagram of apartment plans](image)

<table>
<thead>
<tr>
<th>Corridors run the full length of the building (double-loaded corridor)</th>
<th>Corridors limited to access to apartment unit doors only (cluster corridor)</th>
</tr>
</thead>
</table>

- The whole plan shares one entry lobby and a lift lobby.
- The plan is divided into distinct segments with their entries and lifts.

Figure 2.6 Types of apartment plan associated with forms of central corridor

In Vietnam, central corridors in apartment buildings are commonly used for a variety of social activities. Truong (2002) claims that neighbour relation is always important to the Vietnamese people, especially to those living in multi-storey housing. Therefore, apartment residents prioritise social interactions with people they know well, such as occupants living on the same level. Truong’s observations indicate that inhabitants make their social interactions with others in the common corridors, lift lobbies, and staircases, not far from their living rooms. Similarly, Hoa (2015) noticed several social activities taking place in the hallways, from having parties, and celebrating events, even to singing karaoke.

The questions here are to what extent an individual can control the social contacts in the corridor, and how these activities can affect the level of residential privacy. There is limited research on these topics in the context of Vietnam (Truong 2002). Na, Park and Cho (2013) propose the use of front rooms (connected to the
common corridors) for commercial purposes. Other rooms can be easily manipulated in function when needed. This approach would promote social interactions in the central hallways via business activities. However, the author does not mention how to resolve the contradiction between social interactions and privacy. It is obvious that not all occupants, especially the aged and children, would be happy with the noises and smells coming right outside their doors from such activities.

(ii) Semi-public spaces

The semi-public spaces in a residential group are publicly accessible but have a semi-public character due to their close connection to a limited number of residences. In a housing project, the clustering of buildings that define a project's grounds and its entry can be recognised as semi-public space (Newman, O 1972). The communal space outside the apartment buildings in the neighbourhood is somewhat more public than a semi-private one, but not completely public. Such space is public access, but here such space is perceived by residents and public actors as an extension of the apartment buildings. As Newman points out, semi-public space is a part of the living environment that residents are more likely to share responsibilities for looking after and for keeping intruders out of (Newman, O 1972). Semi-public spaces in a residential development could be commercial zones, community centres, roof gardens, and spaces between buildings.

Spaces between buildings are the areas around the residential block that serve as a suitable places for residential social life (Gehl 1987). Gehl emphasises the role of spaces between buildings in social contact. In modern apartment buildings, dwelling spaces are so limited that outdoor areas must act as an important extension of the home for social activities and relationship opportunities. He argues that physical designs must encourage optional activities, attract people, encourage sociability, and offer them residential safety. The design of spaces between buildings influences how residents perceive and use them for sociability.

In the Vietnamese context, however, spaces between buildings are hard to define and manage. The distinctive nature of public space in Vietnam leads to differences in its personalisation, a territorial behaviour mechanism in public spaces. In
Westernised countries, where people personalise their territories, they clarify individual or group territories. In Vietnam, the process of personalisation is entirely different. Although the land belongs to the state, inhabitants have a strong tendency to informally occupy these spaces for personal use. In some cases, people have even walled up the spaces between buildings for domestic or commercial uses, as illustrated with the KTTs (Dinh 2011). As a result, there is the need to understand personalisation behaviour in spaces between residential buildings in the context of Vietnam.

(iii) Public spaces

Public areas are defined as the places and facilities in public ownership for social interactions and public events. In in-fill projects, where residential buildings are directly connected to public streets, such spaces as plazas, sidewalks and parking lots might stake their claim on surrounding urban streets. These kinds of spaces have the characteristics of public spaces, because the number of users is large (Zhang, W & Lawson 2009). However, it is important to note that these space categories are varied depending on the contexts and perceptions of inhabitants. In new town developments, where the boundaries between a housing complex and urban surroundings are clear, such spaces as internal roads, sidewalks, paths, and parking lots are usually perceived by the residents as semi-public spaces (Ford 2000).

Although public spaces are extensively studied, research on outdoor spaces in multi-storey housing complexes where social interaction is taking place is limited. Basically, public spaces in high-rise housing are limited to the use of their residents and are private to them. Looking at the housing project scale, however, these spaces are accessible to all the residents and are perceived as public. Therefore, they are semi-public spaces, and not all social activities in urban public realms can be afforded in a residential complex. Nevertheless, residential outdoor spaces in multi-storey neighbourhoods could play an important role in establishing social interaction, because they are perceived by the residents as to be an extension and thus part of the living space of the home (Dillman, JJ & Dillman
In other words, they can become sociable spaces. The next sections will review key design approaches to sociable spaces in multi-storey housing projects.

In the literature review presented below, a supportive environment for social interaction in public spaces implicates four concerned components in the design process: (i) landscape elements, (ii) architecture elements, (iii) design principles, and (iv) affordances (see Table 2.6). Landscape elements include internal street network, pathway system, open space, greenery, play area, a place to sit, interesting objects, and trees. Among these, place to sit is believed to be the most important element that supports sociability (Carr 1992; Gehl 1987; Whyte 1980). Architecture elements for social interaction are comprised of street space fronting a business, articulated facades, spaces to gather, active edges of buildings, and the system of movable semi-fixed and fixed objects. Among those, street space fronting a business is the most important element for sociability. This refers to the part of the sidewalk that can be personalised and appropriated by the shop owners, functioning as extended open space for the coffee stores or restaurants lining the street. There are five key design principles to encourage a variety of social activities: (i) mixed uses, (ii) accessibility, (iii) visibility, (iv) open-endedness, and (v) looseness (Bell et al. 1996; Carr 1992; Huang 2006; Karen & Quentin 2013; Lang, J 1987; Lynch 1984; Mehta 2013; Porteous 2013; Rapoport 1990; Whyte 1980). Finally, all the design elements and principles must ensure affordances for long duration stays, businesses, and planned events.
<table>
<thead>
<tr>
<th>Rationales</th>
<th>References</th>
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<tbody>
<tr>
<td><strong>Landscape elements</strong></td>
<td></td>
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<tr>
<td>Internal street network</td>
<td>(Huang 2006; Jaskiewicz 2000; Rapoport 1990)</td>
</tr>
<tr>
<td>Pathway network (sidewalks, alleyways, pedestrian nodes)</td>
<td>(Huang 2006; Jaskiewicz 2000; Mehta 2013; Rapoport 1990)</td>
</tr>
<tr>
<td>Open space</td>
<td>(Carr 1992; Huang 2006; Lynch 1984; Marcus &amp; Sarkissian 1988)</td>
</tr>
<tr>
<td>Place to sit (benches, chairs, or ledges and steps built into the buildings and landscape)</td>
<td>(Carr 1992; Gehl 1987; Mehta 2013; Whyte 1980)</td>
</tr>
<tr>
<td>Interesting objects (statues and water features)</td>
<td>(Carr 1992; Huang 2006; Whyte 1980)</td>
</tr>
<tr>
<td>Shaded trees</td>
<td>(Carr 1992; Jaskiewicz 2000; Mehta 2013; Whyte 1980)</td>
</tr>
<tr>
<td><strong>Architecture elements</strong></td>
<td></td>
</tr>
<tr>
<td>Street space fronting a business (coffee shops/restaurants extending to the sidewalks)</td>
<td>(Mehta 2013)</td>
</tr>
<tr>
<td>Articulated facades (create semi-enclosed sheltered space)</td>
<td>(Jaskiewicz 2000; Mehta 2013)</td>
</tr>
<tr>
<td>Spaces to gather (available adjacent to businesses)</td>
<td>(Mehta 2013)</td>
</tr>
<tr>
<td>Active and animated edges of buildings</td>
<td>(Mehta 2013)</td>
</tr>
<tr>
<td>Overhangs/awnings/varied roof lines</td>
<td>(Jaskiewicz 2000; Mehta 2013)</td>
</tr>
<tr>
<td>Movable, semi-fixed, and fixed elements (food stalls, hawker trolleys, chairs, tables, retail goods and vehicles)</td>
<td>(Bell et al. 1996; Huang 2006; Karen &amp; Quentin 2013; Lang, J 1987; Mehta 2013; Porteous 2013; Rapoport 1990)</td>
</tr>
<tr>
<td><strong>Design principles</strong></td>
<td></td>
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<tr>
<td>Mixed uses</td>
<td>(Goody et al. 2010; Jacobs 1961; Katz 2006)</td>
</tr>
<tr>
<td>Accessibility</td>
<td>(Fleming, Baum &amp; Singer 1985; Huang 2006; Mehta 2013)</td>
</tr>
<tr>
<td>Visibility (the transparency of street frontage)</td>
<td>(Goody et al. 2010; Jacobs 1961; Mehta 2013)</td>
</tr>
<tr>
<td>Open-endedness (adaptability and flexibility)</td>
<td>(Garvin, Berens &amp; Leinberger 1997; Karen &amp; Quentin 2013; Oxman 1977; Rapoport 1968, 1990; Till &amp; Schneider 2005)</td>
</tr>
<tr>
<td>Looseness (loose spaces, loose forms or loose parts)</td>
<td>(Karen &amp; Quentin 2013, p. 1131)</td>
</tr>
<tr>
<td>Long duration stays (make lively street)</td>
<td>(Karen &amp; Quentin 2013, p. 1131)</td>
</tr>
<tr>
<td><strong>Affordances</strong></td>
<td></td>
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<tr>
<td>Businesses, especially food stores (coffeeshouses, bars, pubs, restaurants, convenience stores, fitness centres)</td>
<td>(Goody et al. 2010; Mehta 2013; Whyte 1980)</td>
</tr>
<tr>
<td>Planned events (festivals and special occasions)</td>
<td>(Mehta 2013)</td>
</tr>
<tr>
<td>Interesting activities (public performances)</td>
<td>(Whyte 1980)</td>
</tr>
</tbody>
</table>
In the context of Vietnam, although public streets and sidewalks have a long history of being used as sociable spaces (Minh 2015), there is limited research on the social life in public spaces of high-rise complexes. Design efforts to provide sociable qualities in streets and sidewalks have been made for new housing projects. However, the effectiveness of design practice on promoting street life within a housing development is still questionable. Douglass and Huang (2007) evaluated the quality and frequency of social contacts in Phu My Hung (PMH) urban complex in the southern suburb of HCMC. They claim that shops and restaurants located along the commercial streets are the liveliest parts of PMH during the day. However, the street life similar to that found outside of PMH is absent in everyday practice. All of these scenes, in designing streets and walkways, reveal the need for a design approach that can preserve the liveliness of the city through a variety of social uses of these spaces. The questions here are what features of street life in Vietnam can be preserved, and how they can be promoted by the design of multi-storey housing.

To this end, it is suggested that an effective way to better understand the relationship between design and social interaction would be to examine how public spaces afford social activities and fulfil everyday needs. This knowledge can be obtained by empirically studying interdependencies between the characteristics of public spaces (their uses, physical characteristics, and the management of the uses) and the behaviours (actions) of their users (Mehta 2013). To do that, information about characteristics of public spaces in a given site’s plans must be obtained. Furthermore, a behavioural map of planned and unplanned activities is also needed. According to Abdul Aziz, Ahmad and Nordin (2013), data collection includes: (i) the number of people engaged in social activities; (ii) the type of social activities (specific actions, interactions, any changes in activities); and (iii) the characteristics of the outdoor spaces (location, size, form, relationship to buildings, facilities). The research design for data collection for the present study will be discussed in Chapter 3.
2.7.4.2 Structuring sociable spaces

Structuring sociable spaces offers a design approach that can enhance social relationships. Sociable spaces can be grouped in a way that embeds a graduation in publicness from intimate, to semi-public, and familiar (Gehl 1987). In a multi-storey settlement, this hierarchy allows residents to know the people in the area better. Public spaces in this hierarchy become part of the residential habitat. Recurring informal meetings and encounters in a social grouping result in familiarity, which is likely to generate collective actions and expansion of personal contacts in everyday life, as forms of social support (Gehl 1987). Social interactions in daily routine are significant factors for enriching the vitality of social life in these structured public spaces.

(i) Clustering spaces for social groupings

In order to structure spaces for encouraging social interaction, it is essential to create subdivisions and groups. The underpinning principle is that the physical structure, both visually and functionally, supports the desired social structure of the residential area: visually, by arrangement of residences around a group of squares or streets; functionally, by the establishment of communal spaces at various levels and in various outdoor and indoor locations (Gehl 1987). A good structure of public spaces must reflect the hierarchy of social groupings and give suitable settings for social interaction. The social structure and its relevant spatial hierarchy within communal spaces at various levels offers occupants a greater feeling of belonging. This is because the spatial structure allows movement from one group of spaces towards larger ones, and from the semi-public to more public spaces. The hierarchy of public spaces associated with the social groupings, therefore, can improve interaction among individuals.

The spatial hierarchy has important implications for the design of public spaces for social contacts. For instance, public nodes in a Singaporean New Town is structured in a way that permits occupants’ movement from small public centres to larger ones (Field 1992). They create a hierarchy of public spheres from the activity centres of blocks, precincts, neighbourhoods, to the town (Bay, Tony & Wong 2008). This permits occupants’ movement from private to more public
spaces, strengthening the feeling of bigger communities outside their residential buildings. On a smaller scale, Leon Glicksman (2007) illustrates the application of the above approach in the Hui Long Guan Project in Beijing. In this case, social interactions in multi-storey housing are enriched by dividing a residential area into three groups or ‘clusters’. This scale of building blocks is observed to effectively enhance occupants’ social contacts.

(ii) Hierarchy of joints for structuring of spaces

The joints (or barriers) between domains are themselves physical elements that give the public spaces their hierarchical structure. The hierarchy of social spaces has been discussed earlier; and now the joints between those spaces are of no less importance. In housing study, each different joint has its own special form, either real or symbolic (Gehl 1987). The joints can be in physical (real) form, such as baffle, barrier, screen, transfer point, lock, portal, gate, and electronic interview system, serving to distinguish the territories. They also can be in symbolic form, such as welcome signs or boundary lines in defining areas. The hierarchy of joints is believed to be very effective in restricting behaviour within the defined space and therefore in improving social interaction. Conversely, one could argue that a solid boundary of a defined area, as in a gated community, might restrict the movement in public spaces and hinder outsiders to visit with others. It is important for the designer to choose or create an appropriate separating device or means that works in the manner of a joint. The scope of the uses of real and symbolic barriers to define spatial structure is varied. It can be used at different scales in the transition from the semi-public grounds of a project to public street; from indoors to outdoors; and from the communal corridors on each floor to the semi-public space of a building lobby.

(iii) Hierarchy of control for defensible space

On the same scale, the hierarchy of public domains encompasses the hierarchy of control, because they share boundary mechanisms. The perceived control is important to regulating social life in terms of residential security, increasing the capacity of residents to know who belongs in the spaces, and improving collective responsibility through shared group decision making (Gehl 1987). Furthermore,
the hierarchy of control, achieved by a clear definition of borders, enhances the residents’ sense of community. In fact, occupants have more ‘sense’ over their territory when the shared domain is clearly defined. The less the ability to have control over a domain, the higher possibility for crime and vandalism to occur.

Based on this principle, Newman, O (1972) introduces the theory of ‘defensible space’, which is enabled when residents are able to identify their own spaces, private, semi-public and public, and thus tend to look after and guard that space. The defensible space is achieved when residents can easily perceive and control all activity taking place within it. Defensible space uses a range of control mechanisms, including the hierarchy of real and symbolic barriers, to bring an environment under control of the residents. Newman, O (1972) proposes certain principles for the defensible space design as follows: (i) grouping as low a number of units as possible per common entry from the street; (ii) positioning units, windows, entries, corridors, pathways, and areas of activity in a way that inhabitants can have a continuous natural surveillance of the street and project grounds; and (iii) providing the capacity for surveillance of the street from building entries and lobbies.

2.8 Summary

In the context of rapid urbanisation, multi-storey housing in Vietnam has emerged as a response to housing shortage. Although this housing type has developed quickly in both quality and quantity, it raises social problems that need to be addressed. In that context, a gap in knowledge was identified, in the lack of understanding of the relationship between the design of current multi-storey housing and its social uses in the context of Vietnam. There have been many attempts to propose design models for multi-storey housing for the Vietnam context. However, the majority only respond to individual aspects of the complex issue of sustainability. This one-sided approach has resulted in an ineffective design practice for apartment housing, especially in its social responsiveness. The literature review presented in this chapter suggests three social sustainability issues related to quality of life: (i) basic needs, (ii) way of life, and (iii) social life in a neighbourhood setting.
The present study looks at above problems from an environment-behavioural perspective. Through studying the mutual relationship between people and the physical environment, these issues can be identified and addressed by means of environmental policy, planning, and design. Three behavioural issues emerged from reviewing the literature, associating with the above three social problems of multi-storey housing: (i) residential density, (ii) local living arrangement, and (iii) social interaction and communication. Based on these behavioural problems, three main design components/scales were identified: (i) managing density, (ii) internal space organisation, and (iii) public and semi-public spaces in housing complexes. To this end, the gap in understanding the relationship between the design of current multi-storey housing in Vietnam and its social uses can be addressed through exploring the three key themes: (i) the implications of density for residential privacy, (ii) implications of internal space organisation for local living arrangements, and (iii) the key role of public space in social relations.

These themes were further discussed to identify analytical tools relevant to problems in the Vietnamese context. For the first theme, crowding, social isolation, and density were discussed as relevant concepts to residential privacy. Density, the associated design component, was related to by the concepts of physical and perceived density. The second theme was identified to relate to the concepts of locality, supportive environment, and appropriation of space. For the third theme, social activities were identified via behavioural maps, and categorised based on degrees of contact intensity, purposes, movement, frequency, and duration of the interaction. The associated design component is public and semi-public spaces, which can be improved through providing physical elements and a space hierarchy.

Through offering knowledge of behavioural determinants in multi-storey housing, the present study makes a significant contribution to the field of socially sustainable housing. One intended outcome of the study, on a theoretical level, is to offer an understanding of the relationship between this housing type and its social uses in urban contexts of Vietnam. The second intended outcome of the study, on a practical level, is to offer design principles that respond to these behavioural needs. These principles function as the basis for developing a design
framework for multi-storey housing in the context of Vietnam. In short, this chapter provides a theoretical framework for understanding social problems in multi-storey housing. The next chapter proposes the research design to address the research questions.
Chapter 3. Research methodology

3.1 Introduction

The previous chapter discussed theories, concepts, and measures that relate to the understanding of the environment-behaviour relationship in urban multi-storey housing in Vietnam. This chapter provides a research design to investigate three themes identified in Chapter 2 (Section 2.4): (i) the implication of density for residential privacy; (ii) internal space organisation for local living patterns; and (iii) the key role of public spaces in social interactions (see Table 3.1). In addition, the chapter explains and justifies the methodology and the methods employed in the study.

Table 3.1 Research questions to be addressed in this study

<table>
<thead>
<tr>
<th>Key question</th>
<th>Sub-questions</th>
</tr>
</thead>
<tbody>
<tr>
<td>How does the design of existing recent urban multi-storey housing in Vietnam relate to residents’ patterns of behaviour?</td>
<td>What is the relationship between the design of the housing and the level of the privacy?</td>
</tr>
<tr>
<td></td>
<td>What is the relationship between the layout of the internal spaces and the living arrangement?</td>
</tr>
<tr>
<td></td>
<td>What is the relationship between the design of the public spaces and social interactions?</td>
</tr>
</tbody>
</table>

The chapter starts with the overall research design, explaining how the research design addresses the research objectives. Section 3.3 and Section 3.4 justify data collection and interpretation techniques employed in the study. This is followed by a discussion of how the research was conducted in the field.

3.2 Overall approach

This section provides general information about the methodology, research methods, case study strategy, data collection, and data interpretation techniques that were employed in this study (see Figure 3.1). It starts with the justification of methodology and qualitative approach, then presents an explanation for using case study method; it then presents a description of the data collection and interpretation techniques.
3.2.1 Methodology

As this thesis deals with issues related to the occupant’s perception of, and everyday activities and social life in multi-storey housing, it is framed within the interpretive paradigm, which considers that reality is multiple, relative, and dependent on subjective experience of that world (Berger & Luckmann 1991). This paradigm guides the data collection process, to fully understand the underlying motivations and meanings of behaviours and practices (Bryman 2015) in the multi-storey housing developments. Instead of discovering housing phenomena from the researcher’s viewpoint, interpretivist researchers try to understand participants’ construction of meanings and values within a given context (Hennink, Hutter & Bailey 2010).

3.2.2 Methods

For the present study, about understanding behavioural problems (social factors) in multi-storey housing in Vietnam (contextual factors) and their relationship to design (intervening factors), among the five common types of qualitative studies discussed by Hancock and Algozzine (2006), case study is the most relevant method. The case study was one of the most common approaches to qualitative
research, with the aim of understanding social, contextual, and intervening factors in an observed situation (Bryman 2015).

Case study is defined as a strategy for doing research which use multiple sources of empirical evidence to investigate contemporary phenomena within their real-life contexts (Robson 1997). By conducting case study research, an in-depth understanding of behavioural issues (contemporary phenomenon) in existing multi-storey housing (real life context) will be gained. What distinguishes a case study from other methods, according to (Hancock & Algozzine 2006), is the intensive analysis of a particular system as bounded within a space and time. Through a case study, the construction of meanings and values of local residents, which are time- and context-bound, can be perceived by the researcher.

**Case study strategy**

The focus on understanding behavioural issues in multi-storey housing is the main reason for using case study method. In particular, identifying and describing beliefs, values, and attitudes that structure the behaviour and interactions of middle-income residents were central to this research. A case study is considered to be optimal strategy for understanding what groups of people perceive and decide in relation to their interactions (Swanborn 2010).

Another reason to select a case study approach is that findings from fieldwork are generalisable to theoretical propositions, and make broader inferences and implications for other cases (Popay & Williams 1998). The purpose of this research is not only to highlight understanding of the environment-behaviour phenomenon in chosen housing complexes but also to make logical generalisation to a theoretical understanding of similar ‘class[es]’ of phenomena. Case study approach offers transferability so that the results can be taken to apply to similar housing projects in the urban contexts of Vietnam.

For both exploring and developing purposes, multiple case studies appear to be suitable (Groat & Wang 2002). Due to the limitations of time and difficulties in travelling between the cities, and that the main objective of this research is to understand the environment-behaviour relationship in multi-storey housing, relevant studies indicated that three projects (cases) would be considered
appropriate, sufficient and feasible (Huang 2006; Mehta 2013). The researcher sought typical case studies which were most relevant to the following six selection criteria (see Table 3.2).

Table 3.2 Case studies selection criteria

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Explanation</th>
<th>Relevant to research problems</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ranges of building types and</td>
<td>An individual or a group of residential buildings ranging from five to twenty</td>
<td>Building size and height might have implications for density and privacy</td>
</tr>
<tr>
<td>and apartment sizes</td>
<td>stories in height</td>
<td>Plan shape relates to the group size, and therefore, the perceived crowding</td>
</tr>
<tr>
<td></td>
<td>Buildings vary in plan shapes (slab-block, point-block, or module block)</td>
<td>The variety of apartment units strongly related to sustainable housing: the ability to choose (now) and the ability to adapt (in the future) to social needs</td>
</tr>
<tr>
<td></td>
<td>Apartments vary in size, ranging from one-bedroom unit to three-bedroom unit</td>
<td></td>
</tr>
<tr>
<td>Ranges of locations</td>
<td>Projects vary in distances to city centre</td>
<td>Project location affects residents’ living arrangements regarding their way of life and social needs</td>
</tr>
<tr>
<td></td>
<td>Cases located in different cities to maximise the variation of cases</td>
<td></td>
</tr>
<tr>
<td>Ranges of incomes and tenures</td>
<td>Projects are aiming for middle-income people but varying between lower and</td>
<td>Determinants of income and tenure might influence residents’ ways of life and their ability to appropriate physical settings for individual’s needs</td>
</tr>
<tr>
<td></td>
<td>upper groups; They can be private or public-private partnership financed</td>
<td></td>
</tr>
<tr>
<td></td>
<td>projects</td>
<td></td>
</tr>
<tr>
<td>Recent completion</td>
<td>Built after the Doi Moi</td>
<td>This research investigated social problems in current existing multi-storey housing in Vietnam</td>
</tr>
<tr>
<td>Provision of public spaces</td>
<td>Not infill blocks but housing complexes with outdoor spaces for social</td>
<td>Provision of public spaces could promote social relationships in neighbourhood settings</td>
</tr>
<tr>
<td></td>
<td>interaction</td>
<td></td>
</tr>
<tr>
<td>Accessibility</td>
<td>Good access to informants in those locations</td>
<td>To ensure the feasibility and insight of the research</td>
</tr>
</tbody>
</table>

The method employed for choosing case studies was the popular approach of selecting ‘success stories’ or ‘best practices’. These choices were determined by public media sources and suggestions from the key informants. The procedure for
case selection started with consultation with officials who had been responsible for approving the projects. The discussion was based on the above six criteria, to identify initial candidates for the case studies. From that selection, people who were involved in the housing delivery process (residents, policy people, and developers) were asked to confirm potentially good cases.

It is important to select a case that varies or even contrasts with other cases on some relevant independent factors. “While it may be useful to select cases which are typical or representative of other cases, a case is unlikely to be a strong representation of others. Case study research is not sampling research. Researchers do not study a case primarily to understand other cases but to understand that specific case” (Stake 1995). If multiple cases were drawn from the same context, nothing could be said about the role of that context, because it did not vary with respect to other contexts. The argument in the present thesis is not of a statistical nature, but relies upon explanatory, descriptive, and exploratory logic. Three case studies were selected to test the applicability and adaptability of the theoretical framework to varying parameters of multiple contexts.

Vicoland and Nest Home projects in Da Nang City, and Thai An project in Ho Chi Minh City, were selected. Although there were differences, the two cities share some crucial similarities in terms of socio-economic conditions. Furthermore, they have characteristics that can be mutually beneficial in understanding the contexts. Lessons can be learnt from the common experiences and/or unique characteristics of each of the case studies. For example, the study of multi-storey housing development in Da Nang could considerably benefit from a comparison with the first-hand experiences of Ho Chi Minh City, the most developed urban area in Vietnam.

3.3 Data collection

Data for the case study were collected from four main sources: project documents (drawings, project evaluation reports, archival photos and documents), in-depth interviews, direct observations, and participant observations (Yin 2013). These sources of information provide a rich description of, comprise a chain of evidence for, and facilitate research triangulation over the ‘facts’ of a case (Gillham 2000;
Both qualitative and quantitative data were collected. This combination reduces the limitations of each type of data and balances each with the strengths of the other.

### 3.3.1 Interviews/discussions

This study started with a qualitative interview approach, to gain insights into the situations of social problems and the environment-behaviour relationships in selected case studies. The role of the interviewer was to discover and portrait comprising multiple views of each case. As what we cannot observe can be observed by others, interviews help the researcher to obtain descriptions and interpretations from their respondents (Fink 2000). Interviewers seek to aggregate perceptions or knowledge over multiple respondents, as the main way to obtain multiple perspectives on reality (Stake 1995).

#### 3.3.1.1 Sampling

The method of sampling for the interview was ‘purposive sampling’ (Abrahamson 1983; Robson 1997). In case studies, purposive sampling is a common approach in which elements of the population selected for the sample are chosen based on the judgement of the researcher (Robson 1997). Nomination from key informants is often used as an instrument assisting the selection of respondents appropriate to the research problems. This is a valuable source of information to reduce bias in the representation of purposive sampling (Mickelsen 1995). These informants were contacted before conducting the fieldwork; but the researcher’s judgement was important in avoiding reliance on them.

Information was collected from different respondent groups, to obtain different perspectives on social issues in multi-storey housing. This variation of sampling was applied to help the researcher to intentionally seek and select participants who had relevant experience in the research topic areas (Creswell 2013). Based on the particular areas of inquiries of this research, the key informants were selected from three key groups:

(i) Residents: These informants are the users, whose behaviours are a central concern in this study;
(ii) Relevant stakeholders: These are developers, architects, and property managers, who are involved in the housing delivery process; and

(iii) Built-environment professionals: These are experts in the field of urban multi-storey housing. This group of people includes urban planners, researchers, and local authorities, who could provide insights into environment-behaviour relationships in modern housing projects.

To locate the key informants, snowball sampling was employed. After each interview, a respondent was asked to nominate people who have experience in the research topic area for an interview. Following that chain of contact, the researcher invited potential participants to arrange the next interviews. Regarding sample size, the required number of respondents in each case ranges from four to ten (Clark & Creswell 2011). In the present study, the sample size and its distribution are shown in Table 3.3. As users’ behaviours are a central concern in this study, the majority of the respondents are from the ‘residents’ group.

Table 3.3 Key informants in three case studies

<table>
<thead>
<tr>
<th>Informant group</th>
<th>Vicoland</th>
<th>Nest Home</th>
<th>Thai An</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Residents</td>
<td>9</td>
<td>12</td>
<td>18</td>
<td>39</td>
</tr>
<tr>
<td>2. Stakeholders</td>
<td>2</td>
<td>3</td>
<td>5</td>
<td>10</td>
</tr>
<tr>
<td>3. Professionals</td>
<td>2</td>
<td>2</td>
<td>6</td>
<td>10</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>13</strong></td>
<td><strong>17</strong></td>
<td><strong>29</strong></td>
<td><strong>59</strong></td>
</tr>
</tbody>
</table>

3.3.1.2 Interview questions

A set of questions, prepared in advance, was developed from the research questions (see Table 3.4). These interview questions (see Appendix A) were divided into five sections. The first group of interview questions gathered general information about (1) the respondents, and (2) the housing complexes. The second group is related to thematic areas of inquiry, comprising (3) the implication of density for residential privacy, (4) internal space organisation for local living arrangements, and (5) the key role of public spaces in social interaction. After the ‘ice-breaker’ questions, respondents were required to answer a series of issue-oriented enquiries relevant to behavioural problems in multi-storey housing.
Table 3.4 A set of interview questions

<table>
<thead>
<tr>
<th>The set of interview questions</th>
<th>Residents</th>
<th>Relevant stakeholders</th>
<th>Professions</th>
</tr>
</thead>
<tbody>
<tr>
<td>General information of the respondents</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>General information about the housing complexes</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>The implication of density for residential privacy</td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Internal space organisation for local living arrangement</td>
<td>✓</td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>The key role of public spaces in social interaction</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
</tbody>
</table>

Among the three common interview types discussed by Robson (1997), semi-structured interviews were used in the present study, because of the ability to expand the present questions in response to issues raised in the respondent’s reply (Bryman 2015). Semi-structured interviews were essentially the list of questions mentioned above; but the order and content could be modified depending on adaptation by the interviewers according to what appeared most appropriate at any point in the interview. Extra questions could also arise from on-site observations (Robson 1997). The purpose of flexibility in the questionnaire was to untangle possibly hidden factors such as behaviours, attitudes, perceptions, and social relationships in multi-storey housing. These factors are difficult to quantify, and extensive discussion was required to bring about their meanings.

3.3.1.3 Interview administration

Each potential respondent was first contacted, by an invitation letter and/or a phone call, with a brief description of the research. When a respondent agreed to participate in the interview, another contact was made to arrange the time and venue. In the meeting, the interview started with an ‘ice-breaker’ process, including a brief introduction about the researcher and a description and explanation of the purpose of the research. Information was gathered using a series of questions from the interview protocol (see Appendix A). Although the interview protocol was used as guidance for the interview process, respondents
were encouraged to discuss relevant issues. As mentioned above, the sequence of questions was shifted in response to the logical flow of occupants’ responses. The length of an interview varied from 25 to 60 minutes, largely depending on respondent’s experience in the topic areas.

3.3.2 Survey

Survey was used as a supportive or supplementary method to collect data that complemented data obtained by qualitative interview. The statistical approach was used for investigating the relationship between physical and perceived crowding in multi-storey housing projects. This was an appropriate approach because of the quantitative nature of density indices and the ability to quantify subjective feeling of crowding and privacy (Aiello & Baum 2012; Chan 1999). Inferential statistics with non-parametric tests were used for comparing two samples, to enhance the thematic analysis. Furthermore, descriptive statistics were used to indicate the frequency of relevant variables such as visiting neighbours or use of outdoor spaces.

3.3.2.1 Sample size

Required sample size can be identified based on population size and the degree of diversity in the population. Dillman, DA, Smyth and Christian (2014) propose a table that approximately calculates the sample size for a 95% confidence interval (common in social sciences) (see Table 3.5). In this table, a ‘50/50 split’ indicates that the population is relatively varied; while an ‘80/20 split’ means it is homogeneous, and most people have a certain characteristic.

Both the literature and empirical data from the present study indicate that the target groups in the study, the middle-income people, are quite homogeneous (Ha 1999; Shira 2014). As a result, this study adopted the 80/20 split to describe the characteristics of the population. Furthermore, the aim of the survey was to investigate the perceptions of residents regarding social issues, rather than to obtain more representative information. Thus, a sampling error of ± 10% (with an 80/20 split) was considered to be suitable for the present research (Ahsan 2016). During the field investigation, discussion with Building Managers revealed the approximate population of each project. From this information, the required
sample size was identified (see Table 3.6). The actual sample sizes obtained in the survey are larger than the required values.

Table 3.5 Sample sizes needed for various population sizes and characteristics at three margins of error (Dillman, DA, Smyth & Christian 2014, p. 80)

<table>
<thead>
<tr>
<th>Population group</th>
<th>Population size</th>
<th>Characteristic of population</th>
<th>Sample size needed</th>
<th>Actual sample size obtained</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vicoland</td>
<td>498</td>
<td>80/20 split</td>
<td>53-56</td>
<td>74</td>
</tr>
<tr>
<td>Nest Home</td>
<td>1,259</td>
<td>80/20 split</td>
<td>58-60</td>
<td>73</td>
</tr>
<tr>
<td>Thai An</td>
<td>3,749</td>
<td>80/20 split</td>
<td>60-61</td>
<td>83</td>
</tr>
</tbody>
</table>

Total=231

3.3.2.2 Selecting participants

Except for the ground level, mostly used for commercial purposes, attempts were made to distribute the samples across every floor. For selecting respondents on each floor, a simple randomising procedure was conducted. Door-knock meetings with the occupants were undertaken, and then the survey was immediately
conducted after the ‘ice-breaker’ process. The owners (or occupants) of the apartments were the participants of the study. However, in some special circumstances, the assistance of the developers and property managers was required for delivering and collecting the questionnaire. As a result, the response rate for the survey was quite high, with 77% (231/300).

3.3.2.3 Interview questions

The survey was based on a questionnaire technique to gather relevant information on the physical environment and user behaviours. The questionnaire included questions in relation to: (i) household profile; (ii) personal background; (iii) apartment information; and (iv) perceptions related to research themes. To respond to the questionnaire, participants ticked the relevant box(es) or selected a number on a Likert scale with options from 1 to 5. The content of the questionnaire included the following sections: A. Respondent’s profiles; B. Household’s profile; C. Housing tenure; D. Physical characteristics of the apartment; E. Residential privacy and perceived crowding (see Appendix C).

3.3.2.4 Field procedures

Introducing the questionnaire to participants: The meeting with a participant usually started with an introduction about the aim of the research and the ethical procedure. When the respondents were clear about the requirements, the questionnaire was handed to them. In some circumstances, informants raised questions to clarify the content of the questionnaire. All documents and the questionnaire were in Vietnamese for ease of the research.

Meeting participants: Although the questionnaire was designed for respondents to complete by themselves (Bleikie 2000), the present study used door-knock meetings, which allowed the researcher to explain the questions to the respondents. Meeting participants in this way helped to increase the quality of the survey and control the response rate. Furthermore, this technique allowed the researcher to make a brief interview/discussion about relevant topics in the survey.
3.3.3 Observation

Observation in this study was used as the primary data collection method for certain topics related to resident’s behaviour. It was used to support or supplement the information obtained by other data collection means. Information on people, activities, behaviours, and the spaces occupied by these, was mostly collected by observation. Furthermore, observation was also used to corroborate the information from the interviews (Robson 1997). For example, the data on how occupants coped with a crowded environment were derived from a series of interviews and supplemented by observation on territorial behaviour.

3.3.3.1 Sampling

At the scale of apartment units, it appeared that residents living on different floors might have different experiences of privacy, living arrangements, and social interaction. As a result, selecting samples on every floor helped to reduce errors when generalising about a larger group of the whole building (Zeisel 1984). Samples were chosen, following a randomisation procedure, across all floors of the buildings. However, there were differences in the distribution of the units between the ground floor and the upper floors. Because of the design, fewer dwellings were located on the street level than on above levels. Consequently, the sampling process had to be matched with that distribution characteristic of the population. In this case, samples were chosen following a matching procedure that allowed fewer samples for the ground floor.

At the scale of outdoor spaces, the researcher observed residents’ activities and behaviours in those places over various periods of time during the entire day. As the study group was too multifaceted for purposes of categorisation, the observer had to take a sample of people, places and events using a specific procedure to reduce errors. From preliminary observations, it was found that observations were likely to obtain various results across different periods of the day, and different days of the week. Therefore, the sampling process used a matching procedure based on the activity patterns found in the preliminary observations, in particular the suitable periods of time. The number of periods and days for observation were also influenced by the limitations of resources and time-constraint.
3.3.3.2 What to observe?

The basic objectives in Section 3.3.3 were to describe the setting, the people, and the events, and to get an ‘insider’s’ view. Among nine possible dimensions of observation mentioned by (Robson 1997), the present study focused on six, which related to environment-behaviour interaction (see Table 3.7). Those observations provided descriptive information relevant to the study. Meanwhile, the observations of physical traces (see below) provided inferred information about the environment-behaviour relationship, as discussed next.

Table 3.7 Observation schedule

<table>
<thead>
<tr>
<th>Dimensions of observation</th>
<th>Descriptions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Space</td>
<td>Layout of the setting, rooms, central corridors, lift lobbies, entrance lobbies, and outdoor spaces</td>
</tr>
<tr>
<td>Actors</td>
<td>Residents in and around apartment units, walk-bys in central corridor, and outdoor space users</td>
</tr>
<tr>
<td>Activities</td>
<td>Everyday activities and social life</td>
</tr>
<tr>
<td>Physical objects</td>
<td>Architecture, landscape, and ornament objects</td>
</tr>
<tr>
<td>Behaviours</td>
<td>Territorial behaviours, passive and active behaviours on public spaces</td>
</tr>
<tr>
<td>Events</td>
<td>Lunar festival, new year festival, block parties, weddings, and sport events</td>
</tr>
</tbody>
</table>

Observing physical traces

“Observing physical traces means systematically looking at physical surroundings to find reflections of previous activity that was not produced in order to be measured by researchers” (Zeisel 1984). Architectural studies have tended to employ physical trace observation to gain unobtrusive insight into the meaning or use of environments; and then quantitative methods can be applied to measure the frequency of traces and related attitudes (Brown, Perkins & Brown 2003; Saegert, Winkel & Swartz 2002). In the present study, physical traces refers to the changes occupants made to their apartments. The following sections discuss the categories of observing physical traces serving different purposes of the research inquiries.
Adaptation for use: This type of observation is used in this study to understand occupants’ behaviours in the appropriation process of social spaces. These were in the forms of desperation, connections, and displays of self.

Personalisation: People use physical environments to express their uniqueness and individuality by a certain style of furniture and a particular way of arrangement in their living spaces (Zeisel 1984). Observing such specific uses indicated how occupants were different from their neighbours regarding personalities, ways of life, and living arrangements.

3.3.3.3 Field procedures

Two different approaches to observation were employed in this study: participant observation and structured observation. Participant observation, with its roots in anthropology, is essentially a qualitative method (Robson 1997), playing a natural role in the context being studied (Groat & Wang 2002). For instance, to observe people’s activities inside their apartment units, the researcher took part in occupants’ everyday life. The respondents knew they were being and agreed to be followed and observed. In larger studied areas (outdoor spaces) or for a longer observation time, the researcher could discreetly follow people with or without their knowing (Gehl & Svarre 2013).

Structured observation is predominantly a quantitative approach (Robson 1997). In the present study, it was mostly used in studying social life in residential outdoor spaces. The researcher set up a schedule for counting activities, people, places in public spaces, following the principle that most if not all such phenomena can be measured quantitatively for comparative purposes (Gehl & Svarre 2013). This information was recorded as behavioural mapping for outdoor spaces.

3.3.4 Project documents

The project documents collected in each case study comprise the project feasibility study, concept drawing, architecture drawings, project evaluation reports, marketing materials, and as-built drawings. Among these, drawings were the primary sources of data for understanding the physical setting. They were also
used collaboratively with field notes to record occupants’ activities and behaviours in both the apartment units and outdoor spaces.

3.4 Data interpretation

Because of the nature of the research problem, the primary approach in data collection and analysis in the present study is qualitative, with an interpretative approach. Quantitative data were also collected and analysed within each theme, mostly for supporting/triangulating findings from the qualitative data. Furthermore, certain of the qualitative information were coded and transformed into quantitative data to make use of relevant quantitative analysis tools.

3.4.1 Qualitative data

The process of coding was one of the most important steps of the data analysis process, using a procedure adopted from Braun and Clarke (2006) (see Table 3.8). In the initial phase of coding, data were categorised based on the feature of the data that appears most meaningful for the analysis (Boyatzis 1998). There were two types of initial coding: ‘theory-driven’ and ‘data-driven’. Theory-driven coding was based on existing codes developed from the literature review (also known as a priori code or a deductive code) (Miles, Huberman & Saldana 2013). Data-driven coding was used when a pattern emerged but did not fit in any priori code (also known as an inductive code).

Both intra-case (within-case) and inter-case (cross-case) analyses were conducted in this study. The intra-case analysis was used to (i) provide insights into the situations of current multi-storey housing, and to (ii) untangle the environment-behaviour relationship in this housing type. Inter-case analysis was used to compare how residents in different cases used and appropriated the settings. Inter-case analysis also used to understand how density, internal spaces, and public spaces in different cases influenced occupants’ behaviour. The inter-case analysis finally, functioned as an analytical tool to synthesise findings from individual case studies (Yin 2009).
Table 3.8 Coding and developing category system, adapted from Braun and Clarke (2006)

<table>
<thead>
<tr>
<th>Phase</th>
<th>Description of the process</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Generating initial codes</td>
<td>Coding interesting features of the data in a systematic fashion across the entire data set, collating data relevant to each code.</td>
</tr>
<tr>
<td>2 Searching for themes (first order codes)</td>
<td>Collating codes into potential themes, gathering all data relevant to each potential theme.</td>
</tr>
<tr>
<td>3 Reviewing themes (second order codes)</td>
<td>Checking if the themes work for the coded extracts (level 1) and the entire data set (level 2), generating a thematic ‘map’ of the analysis.</td>
</tr>
<tr>
<td>4 Defining and naming themes</td>
<td>Ongoing analysis to refine the specifics of each theme, and the overall story the analysis tells, generating clear definitions and names for each theme.</td>
</tr>
</tbody>
</table>

3.4.2 Quantitative data

In each theme, data was collected in qualitative form (respondent’s age, incomes, the number of family members, the number of bedrooms, and unit area) or in a form amenable to qualitative analysis (gender, place of origin, the frequency of neighbour contact, desired/achieved level of privacy, and perceived crowding). Quantitative data were used to supplement and enhance the qualitative findings. The descriptive tables or graphic charts presenting the statistical data were useful in comparing and contrasting the responses for multiple-answer questions.

On the other hand, quantitative tests could be used to identify correlations between factors and to inform the thematic analysis. For example, the relationship between internal space density and perceived crowding, indicated in interviews, was triangulated by a positive correlation in the Spearman tests. The computer program IBM SPSS Statistics 23 was utilised for these tests. The results from such tests prompted more questions, because the variables had a significant relationship. The researcher then went back to the qualitative data to understand why the correlation was so strong. Such quantitative data can thus be embedded in the thematic analysis to enrich and enhance the arguments presented.
It is important to emphasise the qualitative orientation of the present research. Quantitative data and tests were primarily employed for strengthening qualitative findings, and were not intended to draw out primary conclusions. In addition to the statistical tests for correlations between variables within a case study, a number of other tests were also conducted for cross-case analysis. The use and purpose of these tests are discussed in detail in the relevant sections of the findings chapters (Chapter 5, Chapter 6, and Chapter 7).

3.5 The conduct of study

The conduct of study describes the fieldwork investigation associated with three identified themes: (1) the implication of density for residential privacy; (2) the implications of internal space organisation for local living patterns; and (3) the key role of public spaces in social interactions. For each theme, the questions of what, where, and how the data were collected during the fieldwork are now discussed in detail.

3.5.1 Density, crowding and privacy (Theme 1)

To explore the issues of density, crowding and privacy, a range of data collection techniques were conducted, comprising in-depth interviews, surveys, and observations (see Table 3.9)

Table 3.9 Data collection for density, crowding and privacy

<table>
<thead>
<tr>
<th>Data collection criteria</th>
<th>Interview</th>
<th>Observation</th>
<th>Survey</th>
<th>Documents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Occupants’ orientations towards privacy</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Crowding and privacy mechanisms</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>Occupant’s tolerance of crowding</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Density and crowding</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
</tbody>
</table>

3.5.1.1 Conducting interviews

Interview questions on density and privacy were developed from the research themes and sub-themes, and divided into four sections, as follows.
Occupants’ orientations towards privacy:
Occupants were first asked whether they had any problems with privacy, and then what type of privacy problems they were dealing with. Respondents were required to indicate the design elements (such as the location of apartment unit, layout, positions of doors and windows, or acoustic insulation) that might influence the level of achieved privacy.

Residential crowding and privacy mechanisms:
Selected residents were invited to in-depth interviews regarding their perceptions of crowding. The factors that might relate to the feeling of crowdedness, such as personal control over social interaction, the willing to contact, and the instances of interaction in the central hallway, were discussed. Residents were also asked to identify the situations and design elements that might arouse, exacerbate, and affect their perceived crowding. In case the environment was overcrowded, what would they do to maintain their privacy was also discussed.

For further understanding the implication of privacy mechanisms for maintaining privacy, architects involved in the design process were invited for interviews. The main question asked was whether they used privacy mechanisms in the design process. Selected architects were also asked to evaluate the effectiveness of those mechanisms in their design of multi-storey housing.

Occupants’ tolerance of crowding:
Respondents were asked about their personal information, such as age, gender, place of origin (local or immigrant), and their experience in coping with a crowded environment. Interpersonal characteristics, such as the relationship of people sharing the unit and neighbour relations, were discussed. Respondents’ opinions about the availability of space and their perceived control were also discussed.

Density and crowding:
Residents were questioned about their attitude towards both physical and perceived density. Regarding physical density, they were asked to discuss their perceptions of population density. The question was whether internal space
density or external space density had a greater impact on the level of achieved privacy. Regarding perceived density, questions were mostly about social density. The discussion was about residents’ perceptions of group size related to privacy.

To further explore the relationship between privacy and density, especially building density, built-environment professionals (including architects, urban planners, developers, and researchers) were invited for discussion. Fourteen professionals who are experts in the field of multi-storey housing were interviewed. Among these informants, three were architects involved in the design processes of the three case studies. Six of them worked at local authorities, including Da Nang Urban Planning Institute, the Da Nang Department of Construction, and HCMC Department of Planning and Architecture. Four of them were professors at a University in HCMC (see Table 3.10). The last informant is one of the developers of the Thai An project. The respondents were asked firstly to talk about their perceptions of density, and then to discuss its relationship to residential crowding in multi-storey housing. Regarding social and spatial density, the implications of group size and apartment unit area in managing density (or the intensity of social interaction) were discussed.

Table 3.10 List of interviews with professionals in Da Nang and HCMC

<table>
<thead>
<tr>
<th>Level of services</th>
<th>Interviewee No</th>
<th>Occupation</th>
<th>Professional background</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Local authority</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Engineer</td>
<td>PhD in Engineering</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Architect</td>
<td>Architect</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Architect</td>
<td>PhD in Architecture</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Engineer</td>
<td>Master of Engineering</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>Engineer</td>
<td>Civil Engineer</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>Architect</td>
<td>PhD in Architecture</td>
<td></td>
</tr>
<tr>
<td><strong>Developer</strong></td>
<td>5</td>
<td>Engineer</td>
<td>Civil Engineer</td>
</tr>
<tr>
<td>7</td>
<td>Architect</td>
<td>PhD in Architecture</td>
<td></td>
</tr>
<tr>
<td><strong>Researcher</strong></td>
<td>8</td>
<td>Social researcher</td>
<td>PhD in Architecture</td>
</tr>
<tr>
<td>9</td>
<td>Architect</td>
<td>PhD in Architecture</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Architect</td>
<td>Master of Architecture</td>
<td></td>
</tr>
<tr>
<td><strong>Architect</strong></td>
<td>2</td>
<td>Architect</td>
<td>Master of Architecture</td>
</tr>
<tr>
<td>6</td>
<td>Architect</td>
<td>Architect</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Architect</td>
<td>Architect</td>
<td></td>
</tr>
</tbody>
</table>
3.5.1.2 Conducting surveys

The quantitative data from surveys were used as a complement to enhance the qualitative findings. All respondents among the three case studies were invited to participate in a survey investigating the issues of density and privacy in and around their apartments. They were asked to respond to a range of questions developed from the theme and related determinants. These questionnaires are categorised into four main groups of questions, as follows.

**Occupants’ orientations towards privacy:**
As both achieved and desired levels of privacy are subjective to residents’ feelings, they can be rated and explored by statistical tests. Respondents were first asked to rate their (satisfaction) level of achieved privacy, following a 5-point Likert scale ranging from 1 (completely acceptable) to 5 (unacceptable). They then were asked to rate the attitudes towards desired privacy, from ‘little’ to ‘much’.

**Residential crowding and privacy mechanisms:**
Respondents were asked to discuss their perceptions of crowding in and around their apartments. They were also required to rate their level of perceived crowding on a 5-point Likert scale ranging from 1 (isolated) to 5 (overcrowded).

**Occupants’ tolerance of crowding:**
Respondents were requested to provide information on their personal characteristics: (i) place of origin, (ii) previous living environment, and (iii) neighbour relation. Firstly, the ‘place of origin’ was coded either as 1 (local resident) or 2 (immigrant). Secondly, the ‘previous living environment’ refers to respondents’ former housing forms. This determinant is strongly related to occupants’ experiences in coping with a crowding environment. The previous housing form could be one or more of the following types: (1) shared room, (2) apartment, (3) row house, (4) detached house, or (5) country house. ‘Shared room’ refers to the status of not having a separate room and sharing that space with someone else. ‘Apartment’ relates to either pre-reform collective housing (KTT) or contemporary multi-storey housing. ‘Row house’ is sometimes called ‘tube house’, ‘street house’, or ‘popular house’, according to its shape, location, or
popularity (To 2008). Thirdly, the ‘neighbour relation’ is related to group cohesion, measured by the frequency of friendly contact of respondents with neighbours. Respondents were asked to rate the frequency of contact on a Likert scale, ranging from 1 (very frequently) to 5 (very rarely).

Density and perceived crowding:
A questionnaire survey was conducted to ascertain the relationship between people’s perception of crowding and internal/external space density (see Table 3.11). For internal space density, respondents were asked to provide information on their household profiles: (i) the number of family members, (ii) the flat size, and (iii) the number of bedrooms in an apartment unit. For external space density, they were asked about the feeling of crowdedness in their neighbourhoods. The perceived crowding was rated on a 5-point Likert scale, ranging from 1 (least crowded) to 5 (most crowded). Perceived density was calculated based on the data on the household profile.

Table 3.11 Measuring internal space density and external space density.

<table>
<thead>
<tr>
<th>Indicators</th>
<th>Measures</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Internal space density</strong></td>
<td>Intra-household density  Persons/ room</td>
</tr>
<tr>
<td></td>
<td>Household density                 Persons/unit</td>
</tr>
<tr>
<td></td>
<td>Occupancy density                 Persons/unit area</td>
</tr>
<tr>
<td><strong>External space density</strong></td>
<td>Space between buildings Resident’s perception rated on 5-Likert scale</td>
</tr>
<tr>
<td></td>
<td>Neighbourhood density             Resident’s perception rated on 5-point Likert scale</td>
</tr>
</tbody>
</table>

3.5.1.3 Conducting observations
To understand the privacy mechanisms, observations on social interactions in semi-public spaces, such as central hallways, lift lobbies, and lounges, were conducted. Both behavioural and environmental mechanisms were observed. However, special attention was paid to the means of design, such as opening/closing the entrance door, putting furniture in the central hallway, and adding architectural elements to mark the territory and to guide the territorial behaviours. It was also important to record any physical modification made by users due to privacy problems.
3.5.2 Internal space organisation and living arrangement (Theme 2)

To understand the relationship between internal spaces and living arrangement, it is essential to disentangle the interdependency of three research issues: (i) the use of space; (ii) the organisation of space; and (iii) the appropriation of space. The related data for each of the research issues were collected by combining different collection techniques (see Table 3.12). The conduct of this part of the study is further explained as follows.

Table 3.12 Data collection for understanding space-activity interactions

<table>
<thead>
<tr>
<th>Collection</th>
<th>Data Type</th>
<th>Data source</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>The use of space</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Observation</td>
<td>Photos and sketches</td>
<td>Apartment units where the researcher was allowed to conduct participant observation; Related spaces around apartment unit such as central corridor, lobby, and outdoor spaces; Occupants’ activities in their daily life</td>
</tr>
<tr>
<td></td>
<td>Observation notes</td>
<td></td>
</tr>
<tr>
<td>In-depth interview</td>
<td>Interview transcript</td>
<td>Occupants in their daily routine</td>
</tr>
<tr>
<td><strong>The organisation of space</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Project documents</td>
<td>Drawings</td>
<td>Relevant stakeholders in housing delivery process; Site visit</td>
</tr>
<tr>
<td></td>
<td>Project reports</td>
<td></td>
</tr>
<tr>
<td>Archival and docs</td>
<td>Photos and sketches</td>
<td>Stakeholders involved in housing delivery processes such as architects, developers, and property managers; Architects, urban planners, researchers who are expert in apartment design</td>
</tr>
<tr>
<td></td>
<td>Observation notes</td>
<td></td>
</tr>
<tr>
<td>In-depth interview</td>
<td>Interview transcript</td>
<td></td>
</tr>
<tr>
<td><strong>The appropriation of space</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Observation</td>
<td>Photos and sketches</td>
<td>Modified apartment units are identified with information from informants, property managers, and occupants’ survey; Physical changes spotted during interview</td>
</tr>
<tr>
<td></td>
<td>Observation notes</td>
<td></td>
</tr>
<tr>
<td>In-depth interview</td>
<td>Interview transcript</td>
<td>Occupants who make the modifications</td>
</tr>
</tbody>
</table>
3.5.2.1 Collecting project documents

Project documents are important for understanding the conceived spaces created by built-environment professionals. Project documents refer to architectural sketches and drawings, project evaluation reports, archival photos and documents, and observation notes (if available). This information is useful to understand the forces that influence/drive the design process. The data were collected by contacting relevant stakeholders in the housing delivery process. The apartment layouts were important because they can be used as annotated diagrams, supporting other data collection methods.

3.5.2.2 Conducting observation

For the research on the relationship between physical space and its social uses, observation is commonly used as the primary data collection method (Dinh 2011; Ly 2012; Zeisel 1984). To understand the use of internal spaces, activities taking place in and around apartment units (in everyday routines) were observed. The respondents were contacted before the observation to obtain their permission to participate in their daily lives. Among the four observers’ positions proposed by Zeisel (1984), the present research design adopted the marginal-participant vantage point for the observer. This is a comfortable and familiar position for the researcher to have an overview of everyday activities occurring in public spaces. Before conducting the observation, the apartment unit layout, obtained from related parties, was printed out for the observation notes. Data on the use of spaces were collected throughout the day from early morning to midnight. Information about what and where activities took place was carefully recorded on both the printed floor plan and the observation sheet, adapted from Ellegård (2006) and Management et al. (1973) (see Table 3.13).

The observation sheet of occupants’ activities, a part of the space-use diary, includes four columns: (i) categories, (ii) everyday activities, (iii) associated room label, and (iv) notes. The everyday activities of the occupants were divided into four general categories: (1) Paid work/education, (2) Personal and family care, (3) Household work, and (4) Reflection/recreation (Ellegård 2006; Management et al. 1973; Robinson & Godbey 2010). The space-use diary was the basis for
providing step-by-step accounts to inform understanding of the living arrangements (Michelson 1977).

Occupants’ activities and behaviours were systematically recorded in the above-mentioned observation sheet. Everyday activities taking place inside the apartment were marked in the ‘Activities’ column. If the activities were taking place within the intended function room, they were marked in the next column, ‘Associated room label’. Activities that were not in the list or took place outside the indented rooms were recorded in the ‘Notes’ column of the observation sheet. Observing behaviour in the given physical settings generated data about the people and their relationships, patterns of behaviour, and various uses of their places (Zeisel 1984).

Table 3.13 Observation sheet of occupants’ activities in an apartment unit

<table>
<thead>
<tr>
<th>Categories</th>
<th>Activities in the apartment</th>
<th>Associated room label</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Paid work/education</strong></td>
<td>Home businesses</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Working at home</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Studying</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Personal and family care</strong></td>
<td>Sleeping</td>
<td>Bedrooms</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Eating</td>
<td>Dining room</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Personal hygiene</td>
<td>Restroom</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Taking care of children</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Worshipping</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Household work</strong></td>
<td>Preparing food and cooking</td>
<td>Kitchen</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Doing the dishes</td>
<td>Kitchen</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Washing and drying clothes</td>
<td>Laundry</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Ironing</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Dumping rubbish</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Cleaning, tidying up</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Gardening</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Reflection/recreation</strong></td>
<td>Relaxing</td>
<td>Balcony</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Family gathering</td>
<td>Living room</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Watching television</td>
<td>Living room</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Children playing</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Guest welcoming</td>
<td>Living room</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Doing exercises</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Finally, physical modifications made by users were carefully documented to understand the appropriation of space. Apartment units having physical changes were identified through occupant survey and consulting the informants and property managers. The physical traces were observed in a wide range of practices as a result of occupant’s modifying, reshaping, adapting, adjusting, or altering space on various scales (Stanek 2011). These could be in the form of altering furniture arrangement or replacing material, or slightly adjusting the structure of spaces (separations or connections by using movable partitions), up to major modifications such as the demolition of walls or changing the layout. Physical changes were recorded in an annotated diagram based on the drawings obtained from the project documentation stage. Major modifications made to apartment layout were sketched in a separate sheet.

3.5.2.3 Conducting interviews

Interviews were important to obtain insights into the relationships between the internal space arrangements and living arrangements. For the ‘residents’ group, participants were asked to answer two groups of questions: (i) the use of space; and (ii) the appropriation of space (see Appendix A). For the ‘relevant stakeholders’ group, respondents were required to respond to a group of questions related to the organisation of internal space. The architects were asked to discuss the driving forces influencing design decisions regarding the number of the bedrooms, the unit size, and the apartment layout (see Appendix B). For the ‘built-environment professionals’ group, experts in apartment design were first questioned about the influence of social change to the design of apartment layout, and then about the appropriateness of the tripartition model of internal space in modern housing.

3.5.3 Public space and social interaction (Theme 3)

The main purpose for investigating this research theme is to understand the environment-behaviour relationships in outdoor spaces in the case studies. To do this, the study needs to answer the following sub-questions: (i) what is done (act); (ii) where it happened (scene); (iii) who did it (agent); (iv) how they did it; and (v) why they did it (purpose) (Mehta 2013). From these, people’s needs of the public
spaces were identified through understanding why people did (or did not) what they were observed doing. For these inquiries, observation was the primary data collection method (Gehl & Svarre 2013). The interview, however, was also important to provide insights into people’s feelings, attitudes and perceptions about social interaction in public spaces. To this end, the present study recorded information on the physical settings, the users and their behaviours (see Table 3.14).

Table 3.14 Data recorded for public spaces in terms of the physical settings, the users and their behaviours

<table>
<thead>
<tr>
<th>Components</th>
<th>Observation elements</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Users</strong></td>
<td></td>
</tr>
<tr>
<td>Demographics</td>
<td>Number of users</td>
</tr>
<tr>
<td>Genders</td>
<td>Male and female</td>
</tr>
<tr>
<td>Age range</td>
<td>Children, teenager, adult, and elderly</td>
</tr>
<tr>
<td><strong>Context of setting</strong></td>
<td></td>
</tr>
<tr>
<td>Space type</td>
<td>What type of spaces and what movement those spaces provide access for</td>
</tr>
<tr>
<td>Visibility</td>
<td>What visibility by whom and from where</td>
</tr>
<tr>
<td>Control</td>
<td>Who controls access to those public spaces</td>
</tr>
<tr>
<td><strong>Behaviours</strong></td>
<td></td>
</tr>
<tr>
<td>Activities</td>
<td>What uses in public spaces</td>
</tr>
<tr>
<td>Location</td>
<td>What kind of activities happened in each space type</td>
</tr>
</tbody>
</table>

3.5.3.1 Documenting open spaces

Before the systematic observation started, a thorough survey of the public spaces in the three case studies was conducted. Major spatial types were identified based on their environmental characteristics, and then recorded in the map that went together with the behaviour sheet (see Appendix E). These identified spaces were then documented into a research log with four main categories: (i) seating space, (ii) scenic space, (iii) circulation space, and (iv) activity/recreational space (Huang 2006). Each major category consists of various spatial components and design elements, as shown in Table 3.15. Findings on spatial components/elements are noted in the table as well as being marked on the map. It is important to note that there was considerable overlap among those categories. For instance, sidewalk
was a design element of the circulation space category, but it also belonged to the seating space category. Many users who were the customers of a pavement ‘cafe’ sat on the movable chairs located on the sidewalk. This overlapping will be further discussed and categorised in Chapter 7.

Table 3.15 Inventory of the outdoor spaces

<table>
<thead>
<tr>
<th>Spatial categories</th>
<th>Spatial components</th>
<th>Design elements</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Seating space</td>
<td>Movable settings</td>
<td>Semi-fixed seating, movable chairs</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Fixed settings</td>
<td>Fixed benches, steps built into buildings, ledges</td>
<td></td>
</tr>
<tr>
<td>Scenic space</td>
<td>Landscape elements</td>
<td>Trees, shrubs, and flowers</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Visual significance</td>
<td>Water features and sculpture features</td>
<td></td>
</tr>
<tr>
<td>Circulation space</td>
<td>Internal street system</td>
<td>Primary and secondary streets</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Footpath system</td>
<td>Sidewalks and alleyways</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Pedestrian node (recessed areas on pedestrian routes)</td>
<td></td>
</tr>
<tr>
<td>Recreational space</td>
<td>Green open areas</td>
<td>Lawn, central courtyard, roof garden, and sky-deck</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Recreational facilities</td>
<td>Playgrounds, open ground floor for children play</td>
<td></td>
</tr>
</tbody>
</table>

3.5.3.2 Conducting observation

Behaviours observed in this study were categorised as social and non-social activities (see Table 3.16). Social activities are defined as observable behavioural interaction among residents (Sullivan, Kuo & Depooter 2004). These comprised gestural or verbal greetings, such as talking, nodding, waving, talking, and friendly physical contact. Non-social activities refers to behaviours that were not involved in a group activity (Sullivan, Kuo & Depooter 2004). Non-social activities were further divided into two categories: domestic activity and retreat activity. The domestic activity category includes routine household activities related to functioning of the family and taking care of exterior space. The retreat activity category comprises outdoor activities fulfilling personal needs to be alone outside (Abdul Aziz, Ahmad & Nordin 2013). However, public social life is always culturally diverse and contextually dependent, and cannot be generically
grouped into neat and clean categories (Mehta 2013). As a result, the observed activities will be further analysed and grouped in the finding chapters (Chapter 7) based on the contexts of the case studies.

Table 3.16 Coding observed behaviours in public spaces

<table>
<thead>
<tr>
<th>Behaviour categories</th>
<th>Sub-categories</th>
<th>Descriptions</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Social activities</td>
<td>Group activities</td>
<td>Sitting in groups having a conversation</td>
<td>Sitting in groups having a conversation</td>
</tr>
<tr>
<td></td>
<td>including interaction</td>
<td>Playing in groups</td>
<td>Playing in groups</td>
</tr>
<tr>
<td></td>
<td>among the residents</td>
<td>Brief gestural or verbal greetings</td>
<td>Brief gestural or verbal greetings</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Friendly physical contact</td>
<td>Friendly physical contact</td>
</tr>
<tr>
<td>Domestic activities</td>
<td>Routine household activities related to functioning the family and taking care of exterior space</td>
<td>Looking after children</td>
<td>Looking after children</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Putting out rubbish</td>
<td>Putting out rubbish</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Gardening</td>
<td>Gardening</td>
</tr>
<tr>
<td>Non-social activities</td>
<td>Outdoor activities</td>
<td>Sitting</td>
<td>Sitting</td>
</tr>
<tr>
<td></td>
<td>fulfilling personal needs to be alone outside</td>
<td>Relaxing</td>
<td>Relaxing</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Playing alone</td>
<td>Playing alone</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Watching the surrounding</td>
<td>Watching the surrounding</td>
</tr>
</tbody>
</table>

Systematic behavioural observations, termed by Abdul Aziz, Ahmad and Nordin (2013), were used to capture people’s behaviours in the public spaces. Behavioural observations in the present study comprised the following techniques: (i) structured walk-bys, (ii) unstructured observations, and (iii) photography. Structured walk-by observations served two purposes: (i) recording people’s locations and the demographics; and (ii) identifying the activities they engage in. Unstructured observations were conducted to record people’s activities and behaviour patterns using field notes. Photography was used to document the interactions (or failure of interactions) between people and their physical environment (Gehl & Svarre 2013). In-depth interviews were also conducted to investigate people’s feelings, attitudes and perceptions about public spaces in a multi-storey housing development. The interview protocol in this study is discussed in Section 3.5.3.3.

For structured walk-by observation, the researcher walked slowly pass the complete length of a route map designed to cover a unit of study or a project.
segment. The techniques for recording the information were learnt and developed from the studies of Sullivan, Kuo and Depooter (2004), Huang (2006), Gehl and Svarre (2013), and Mehta (2013). Observations were documented using behaviour sheets with maps (see Appendix D). Each sheet consists of a table of inputted information on individuals and their activities, and a detailed map of the study area. In particular, the total number of people encountered, their locations, and the activities they were engaged in were carefully recorded on the behavioural sheet. People passing by the premises without stopping were not recorded as using the space. An individual at a particular place was represented as a dot at the corresponding location on the map. Similarly, people engaged in group activities were represented by a circle. Behaviours were first noted and described in detail where necessary, and then recorded into the following general categories: (i) resting/thinking, (ii) eating, (iii) doing chores, (iv) entertaining, (v) socialising, and (vi) playing (Sullivan, Kuo & Depooter 2004). These activities will be further analysed and categorised in Chapter 7.

The observation procedures were conducted differently across the case studies, due to the sizes and the nature of the study areas. In the Vicoland project, the data could be primarily collected from a discreet vantage point located in the open spaces. Due to the small size of the site, the city streets bordering the block and the only alleyway could be easily observed from that point. In Nest Home, however, the study area had to divided into two smaller unit of studies, or two project segments (for details see Table 3.17). Consequently, the ‘observation’ of the whole study area was divided into two ‘observation segments’, associated with the two mentioned project segments. The main purpose for this division was to enable the researcher to practically cover the large observation areas. The study area in Thai An was also divided into two project segments. Accordingly, each observation of activities of the public spaces was divided into two observation segments.

Table 3.17 indicates the quantity and duration of each observation and observation segments in the three given case studies. The length of one set of observations (for each case study) was three days, including two weekdays and one weekend. In each day, five observation segments were conducted, in five periods of times
ranging from 7 a.m. to 9 p.m. The average duration for each observation segment was about fifteen minutes. In short, fifteen observation segments were conducted in Vicoland; whereas, thirty observation segments were conducted in both Nest Home and Thai An, during the fieldwork. The detailed schedule was identified based on the most suitable time periods during the day as suggested by the preliminary observations.

Table 3.17 The schedule for timed-observations in case studies

<table>
<thead>
<tr>
<th>Case study (project segment)</th>
<th>Total number of observation segments</th>
<th>The length of the observation (days)</th>
<th>Number of observation segment each day</th>
<th>Duration for each observation segment (minutes)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vicoland Open space at the ground floor and city streets</td>
<td>15</td>
<td>3</td>
<td>5</td>
<td>15</td>
</tr>
<tr>
<td>Nest Home City streets bordering the neighbourhood</td>
<td>30</td>
<td>3</td>
<td>5</td>
<td>15</td>
</tr>
<tr>
<td>Sky-deck and central courtyard</td>
<td>5</td>
<td>15</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Thai An Public spaces in Thai An 1-2</td>
<td>30</td>
<td>3</td>
<td>5</td>
<td>15</td>
</tr>
<tr>
<td>Public spaces in Thai An 3-4</td>
<td>5</td>
<td>15</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

As a participant observer, the researcher frequently used the commercial and outdoor spaces to conduct unstructured observations. This type of observation was used alternatively with the methods above to cover the remaining areas outside the designed route map. In the Nest Home project, this technique was used to observe some parts of the central courtyard that were not visible from the sky-deck above. In the Thai An project, this method was used extensively to observe the green open spaces, the rooftop gardens in both Thai An 1-2 and Thai An 3-4, and the space under development bordered by Thai An 3-4 blocks and river bank. It was also used to observe such outdoor spaces used for business and retail activities as coffee shops, restaurants and retail shops. Photographs were taken to record these activities and the physical settings. These photos were further analysed for the proxemics, the width of the sidewalk, the approximate area of the public spaces, the fixed and semi-fixed elements, the set-ups for movable furniture/objects.
3.5.3.3 Conducting interviews

In-depth interviews were conducted as a supplement to the observation method, to investigate people’s feelings, attitudes and perceptions about public spaces in the multi-storey housing projects. To fully understand why people did what they were observed doing, it is important to determine their needs in public spaces. Respondents were asked to answer a set of questions about their perceived safety, their perceived space quality, and their perceived range of goods and services. The informants were also questioned about their reasons for using (or not using) the given public spaces, their favourite businesses, what they valued most on the space, and their future visions for those spaces.

3.6 Summary

This chapter has outlined the research design, described the research methods, and explained the reasons for choosing these. The methodology was characterised as an interpretive perspective with a qualitative approach. For the nature of the research inquiry, case study was identified as the most efficient method for better understanding the three research themes: (i) the implication of density for residential privacy; (ii) the implications of internal space organisation for local living patterns; and (iii) the key role of public spaces in social interactions.

Cases were chosen based on six criteria: (i) the ranges of building types and apartment sizes, (ii) ranges of locations, (iii) ranges of incomes and tenures, (iv) recent completion, (v) provision of public spaces, and (vi) accessibility. Three case studies were selected, Vicoland and Nest Home in Da Nang City, and Thai An in Ho Chi Minh City.

The fieldwork was conducted to collect qualitative data from in-depth interviews and observations, with the supplement of quantitative data from surveys. For the qualitative interviews, 59 respondents were involved, with 39 from a ‘residents’ group, and 20 from both ‘stakeholders’ and ‘built-environment professionals’ groups. Among the 39 residents selected, nine were from Vicoland, 12 from Nest Home, and 18 from Thai An. Regarding the surveys, there were 231 respondents with 74 from Vicoland, 73 from Nest Home, and 83 from Thai An. Observations were conducted over 75 short time segments, at various scales from internal
spaces within apartment units (primary territory) to central corridors and lift lobbies within residential buildings (secondary territory), and to outdoor spaces within housing projects (public territory). The next chapters use the first-hand data from fieldwork for interpretation of and informing the research findings.
Chapter 4. Overview of case studies

4.1 Introduction

The present research was conducted through three case studies, in Vicoland, Nest Home, and Thai An projects. The first two cases were in Da Nang City, Central Vietnam, and the third one in Ho Chi Minh City (see Figure 4.1). Da Nang is the Vietnam’s fastest growing city, with a population of 992,800 people, and Ho Chi Minh City is the largest metropolitan city in the south, with 7.8 million people (General Statistics Office 2014). The reasons for choosing these two cities are that they share similarities in socio-economic conditions, and mutual characteristics that can be of mutual benefit in understanding the two contexts. Lessons can be learned from both the common experiences and unique features of each case study. Multi-storey housing developments in Da Nang could considerably benefit from the first-hand experiences of Ho Chi Minh City, the most developed urban area in Vietnam.

Figure 4.1 Locations of selected case studies
This chapter includes two main parts. The first part presents an overview of the case studies, with discussion of household profiles, housing prototypes, and surrounding urban contexts. The second part outlines the contexts of the study in terms of privacy in popular housing, orientation towards apartment living, and public life on the streets. In brief, this chapter acts as a stepping stone, providing related information for the contexts of the case studies and supporting further interpretation in the next three chapters, associated with the three themes: (i) the implication of density for residential privacy; (ii) the implications of internal space organisation for local living arrangements; and (iii) the key role of public spaces in social interaction.

4.2 Case study overview

The following sections introduce key facts about (i) surrounding urban contexts, (ii) site characteristics, (iii) housing types, and (iv) household profiles, for each case study. At the end of this chapter, these facts are then summarised and compared across the cases in regard to those four issues.

4.2.1 Case study 1: Vicoland project

4.2.1.1 Site characteristics and surrounding urban contexts

The project is located at a place that used to be a quiet area, relatively close to the Centre Business District (see Figure 4.2). After the Doi Moi policy, this area has undergone tremendous change. At the time of conducting this fieldwork, the surrounding areas were dominated by row houses and shops (see Figure 4.6). The apartment were in walking distance to childcare centres, open markets, food and retail stores.
Figure 4.2 Location map - Vicoland project, Da Nang City

The project was surrounded by a fine-grained urban fabric of row-houses (see Figure 4.3). These houses line public streets, with the facades ranging from three- to six-meters wide (see Figure 4.4). Each house was usually allocated in a long (from 25 to 100 metres) and narrow (from three to six metres) site, with the height varying from one to five stories. The ground floors were observed to be used as retail shops, coffee shops, restaurants, or even motorbike repair stores (see Figure 4.5). Observations also indicated that open markets, food and retail stores, and childcare centres were in walking distance (see Figure 4.6).

Figure 4.3 Surrounding urban context - Vicoland project
4.2.1.2 Description of housing project

Vicoland is a multi-storey housing development built to be occupied by government employees in Da Nang City. It is a public-private partnership financed project, totalling 159 units, built at a density of 3.5 units per a hundred-square meters. Local government provided the land, whereas the developer was responsible for the construction and delivery process. As compensation, 25% of apartment units were strictly allocated for government officials at affordable
prices. The site is located at a corner bordered by Le Thanh Nghi Street on the west and Tieu La on the north (see Figure 4.7). The project is composed of an L-shape, seven-story apartment block and an open green space separating the building from surrounding public streets. There are two main entrances leading to the lift lobbies at the two sides of the building. The outdoor space is publicly accessed, but the building is limited to the use of residents. The accessibility to the building is managed by doormen.

Figure 4.7 Site planning - Vicoland project

The floor plan is a standard L-shape, double-loaded corridor apartment building. A typical (upper) floor accommodates 23 apartment units, lining along a central corridor. There were seven apartment units at the ground floor, four of them directly connected to the city streets (see Figure 4.8). The project offered three apartment types, but they are all two-bedroom units.
4.2.1.3 Resident profile

According to the survey, the majority of the respondents (91%) were government employees of young ages. The average age was 35.5, with only 17% of over 40-years old. Regarding family profile, most of the people who responded to the survey (83%) had at least one child. Among these, nearly a half (46%) had only one child, and one third (34%) had two children. For housing tenure, the majority of the respondents (71%) owned the apartment units they lived in. More than a half of the studied population (60%) paid for the units upfront (single payment scheme), a minority (11%) using an instalment plan, and a third (29%) renting the places to live and work in.

4.2.2 Case study 2: Nest Home

4.2.2.1 Site characteristics and surrounding urban contexts

The site used to be an ‘informal low-income housing area’ of fishermen from Tho Quang fishing port. Recently, it has been cleared out and preserved for new housing development. The place is encircled by Son Tra Mountain on the north (2 kilometres), Pham Van Dong beach on the east (1 kilometre), Da Nang Bay on the west (0.25 kilometres), and Da Nang Industrial Zone on the south (0.7 kilometres) (see Figure 4.9). Located on the East bank of Han River, the site is immediately connected to the CBD through Han bridge (2.5 kilometres). This 9,840-square-meter-site is bordered by Tran Khac Chan and Ngo Quyen streets, connecting to Tho Quang fishing port and the city centre, respectively. An open market (Man
Thai) and school (Ton That Tung) are at walking distance from this housing
development. Buses are also available at the doorstep routing to Que Son, Quang
Nam provinces.

Figure 4.9 Nest Home project: site location

4.2.2.2 Description of housing project

Nest Home in Da Nang City is a public-private partnership-financed housing
project, totalling 421 units, built at a density of 4.3 units to 100 square meters.
The project was constructed with medium site coverage (51.43 %) and a medium
FAR value (3.05). Local government was responsible for providing the land
(9,840 square meters), managing site clearance, and supporting resettlement. The
private developer, Phu My, put their money into the construction and management
processes. As compensation, 25% of the housing stock in the development was
strictly reserved for government employees at a price determined by the local
administration. The remaining units were sold at the market rate, aiming for
middle-income people.

The project’s site plan consists of four blocks of nine-story apartments
surrounding a central courtyard (see Figure 4.10 and Figure 4.11). This courtyard
is comprised of a garden at ground level and a sky deck on the second floor.
Apartment units at the sky-deck level directly open onto this space. Although the
courtyard is open, accessibility is limited by security guards. The sky-deck is the heart of the project, surrounded by its own buildings, and sealed off from adjacent streets. The setting was aimed at enhancing community life among Nest Home residents. Most of the apartment buildings (except for Block IV) are comprised of multiple point-block towers jointed together. Each point-block has only six apartment units per floor with a shared lift. At the ground level, apartment units open directly onto the city streets.

Figure 4.10 Master plan - Nest Home project
A typical floor plan of a module consists of six apartment units along a short corridor (see Figure 4.12). The lift core is surrounded by a fire-exit stair located at the centre of this hallway. With only six dwellings sharing an entry, most respondents perceived the corridor as an extension of their private spaces. As one interviewee put it, the whole six-family unit was perceived as a traditional residential quarter. Except for the units at the street and sky-deck levels having two separate entrances, apartments on upper floors were two-bedroom-units with similar sizes and layouts.
As a public-private partnership project, this housing development was targeted at three different groups: (1) people in designated priority groups, (2) individuals in need for housing, and (3) middle-income people working in Da Nang (see Table 4.1). Group 1 refers to individuals in priority groups who do not yet have a permanent place in which to live and who cannot afford to purchase housing at the market rate. This priority group is defined as the people who are honoured citizens, the poor, vulnerable countrymen, low-income urbanites, factory workers, army officers, government workers, and resettlers (Housing Law 2014). Most of the apartment units are for people in Group 2, the middle-income people who work in Da Nang City and can afford to house at the market rate with a bank loan. Group 3 opens to anyone living and working in Da Nang who can make a single payment for the house.

Table 4.1 Defining target groups and apartment selling plan

<table>
<thead>
<tr>
<th>Group</th>
<th>Defining group</th>
<th>Payment</th>
<th>Selling plan</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Priority groups</td>
<td>- have no housing, and - cannot afford to house at the market rate</td>
<td>instalment plan with special interest rate</td>
<td>25%</td>
</tr>
<tr>
<td>2 People in need for housing</td>
<td>- work long term in Da Nang - can afford to house at the market rate with a bank loan</td>
<td>instalment plan without special interest rate</td>
<td>50%</td>
</tr>
<tr>
<td>3 Open</td>
<td>- live and work in Da Nang - can afford to house at market rate without a bank loan</td>
<td>single payment</td>
<td>25%</td>
</tr>
</tbody>
</table>

Despite the variety of the target groups, there are limited options for the choice of dwelling type. The project was advertised with six different categories, but they were quite similar in size and layout. They all were two-bedroom units, with the areas ranging from 53 to 61 square meters (see Figure 4.13). As the compensation arrangement between local government and the developer, people in Group 1 can buy their apartments at an affordable price; and Group 2 have a more flexible payment method than those in Group 3.
Figure 4.13 Advertisement for six apartment types (from A to F).
4.2.2.3 Resident profile

For housing tenure, contrary to expectation, the majority (61%) of the respondents reported that they made a single payment for their apartments. Only 6.5% of those surveyed were in Group 1. Individuals who rented apartments to live and work in consisted of 27.5% of the respondents. In terms of end users, 40% of the studied population were the original owners, while 39% were the second buyers. According to the policy, the designated priority people have to live in their apartments for at least five years before being able to resell it. In this transition period, the buyer is issued a ‘giay phep su dung’, a certification confirming the rights to use that apartment. In this instance, the original user could unofficially put the ‘giay phep su dung’ on sale before the expiration day. The secondary user bought this document and lived under original user’s name until the property could be officially transferred.

For profession, most of the respondents (82%) were white-collar, working for the public or private sectors. Regarding the place of origin, a majority (73%) of the studied population were local residents, and a considerable proportion (27%) of the residents came from other cities for doing business in Da Nang City. In discussing this issue, one interviewee said she had been living in Ha Noi but her work required spending a considerable amount of time in Da Nang. She was tired of commuting between the two cities. For that reason, a decision was made to buy an apartment in Nest Home.

This unexpected finding on end users and housing tenures demonstrates the pressing need for middle-income housing. The fact that many end users were not original owners indicates that people in the priority group sold their apartments at the market price. Furthermore, that a high percentage (61%) of respondents could pay for their dwellings with a single payment implies that the studied population were able to afford larger/better units. In other words, a diversity of apartment type and size could practically provide more options to meet the preferences of the end users. Furthermore, a considerable proportion (18%) of the respondents having home-based businesses might influence the design in terms of accessibility and functional spaces.
In regards to family profile, the majority of the participants were young professionals at an average age of 36, similar to those in Vicoland (35.5). A large proportion (40%) of the participants had only one child. The number of households without children in Nest Home (31%) was much higher than in Vicoland (17%). This leads to an average age of children in Nest Home (four-year-old) being much younger than those living in Vicoland (six-year-old).

4.2.3 Case study 3: Thai An

4.2.3.1 Site characteristics and surrounding urban contexts

Figure 4.14 Aerial view – Thai An project

Unlike the first two case studies adjacent to the City centre, Thai An project is located in District 12, on the northwest outskirts of Ho Chi Minh City, nine kilometres from the CBD (see Figure 4.14). The project is located in a place that used to be an industrial area. The site is adjacent to the Tan Binh industrial zone, just a kilometre from the south.
Figure 4.15 Site plan, indicating three construction phases. The grey area is Phase 3, scheduled to be built in 2017.

The site is bordered by Nguyen Van Qua Street on the west, Truong Chinh Avenue on the south, and Tham Luong Canal on the east. The north boundary is next to existing warehouses and industrial buildings. Those surrounding streets are lined with strips of row-houses, forming a fine-grained urban fabric (see Figure 4.16). This location is well connected to the city centre and other suburbs by public transportation. Buses are available at main streets nearby, such as Route 62 on Nguyen Van Qua street and Route 104 on Truong Chinh avenue. The site is also next to a future train station in a Metro network connecting to Tan Son Nhat airport. The apartments are in walking distance to Bao Ngoc Tu open market and Coop Mart shopping mall.

Figure 4.16 Row-houses lining streets, and public life on the sidewalks
4.2.3.2 Description of housing project

Thai An apartments in Ho Chi Minh City were part of a privately developed housing project, totalling 1,143 units, built at a density of six units per hundred square meters. It contains a mix of row houses and multi-storey housing, densely grouped in an area of 19,150 square meters. The project was planned to be completed in three phases. In Phase 1, the two blocks TA1 and TA2 were built for upper-middle-income people (see Figure 4.17). In Phase 2, the two blocks TA3 and TA4 were built for lower-middle-income people. Row houses were also built in this phase, aiming at affluent people. Phase 3 is comprised of two apartment blocks and a pier of row houses, scheduled to be built in 2017.

Figure 4.17 Two phases: TA 1-2 (Phase 1, left) and TA 3-4 (Phase 2, right)

The project is sealed off from adjacent city streets by a long and narrow access road leading to the residential area (see Figure 4.18). A strip of row houses lines this drive-in with a similar grain to the existing urban fabric. This setting provides a reasonable setback for the apartment buildings, whereas it doesn’t break up the existing urban patterns. The project's site plan includes three groups of residential buildings associated with three construction phases. These are connected by the internal street system and pedestrian routes. The project was completed at a relatively low site coverage (28.35 %) and a high FAR value (4.82).
Public spaces are subdivided into a hierarchy of accessibility and publicity. In each phase of the project, the buildings are grouped to form a common open space, and limited this from public access (see Figure 4.19). These outdoor spaces between buildings are connected by the internal street system running throughout the site (see Figure 4.20). These streets with sidewalks are lined with stores and shops. The building entries are provided immediately off the sidewalk, and the parking areas are underground. Public buildings such as the childcare centre and community hub are located between the blocks (see Figure 4.19).

Figure 4.18 Access roads with a strip of row houses

Figure 4.19 Open space (left) and childcare centre (right) between TA1 and TA2
The Thai An project contains three distinct housing types: short-corridor-apartments (TA1 and TA2), long-corridor-apartments (TA3 and TA4); and shop-houses (row-houses). In TA1, a typical floor consists of eight dwelling units surrounding a central lift core (see Figure 4.21). Block TA2 is comprised of two modules, TA2A and TA2B. Each long-corridor apartment (TA3/TA4) is comprised of two identical modules (TA3A and TA3B / TA4A and TA4B). A typical floor plan of each module is comprised of 12 to 14 apartment units lining both sides of the central corridor (see Figure 4.21). The lift lobby is located at the centre of the long corridor.
In comparison with the other two cases, the Thai An project has more options for apartment types. There are varieties of unit sizes ranging from one-bedroom apartment (36 square meters) to three-bedroom apartment (168 square meters). The options for unit types in Thai An are also more diverse than for the other two projects. Affluent people who prefer privacy might choose spacious units in short-corridor apartments (TA1 and TA2). Conversely, a young family without children could be suitable for small and affordable units in TA3 and TA4. An interesting design feature in TA1 and TA2 is the duplex units on the street level. These were designed following a traditional shop-house configuration, with narrow shop fronts directly accessed from the sidewalk. People who want to do home-based business can choose these duplexes. The owners live on the upper floor and leave the ground floor for commercial activities (see Figure 4.22).
4.2.3.3 Resident profile

As per the survey, most the respondents (74%) were middle-income people. They were mostly white collars workers, working in offices and factories nearby. Of those surveyed, 63% bought their apartments by single payment, and 27% by instalment plan. Among those who responded to the survey, 63% were the original owners, and 35% repurchased from the previous owners. A minority (7%) of the participants rented these places to live and work in. During the field investigation, it was found that respondents were of a young age, with an average of 38 years old. The most popular family profile was parents with one child (41%), followed by family without children (31%), and family with two children (25%).

4.3 Outlining the contexts of the study

4.3.1 Privacy and living arrangements in popular housing

All case studies were surrounded by a fine-grained urban fabric of row-houses. Row houses, known as street-houses, shop-houses, tube-houses, or popular housing, were named after the shape, location, site geometry, function, and the popularity of the houses, respectively. These houses line the streets, with their facades ranging from three to six-meter wide, and the height varying from one to
five stories. In urban areas, this housing type is the most common living form. Observations indicate that privacy in these houses is both vertically and horizontally maintained (see Figure 4.23). In particular, the ground floor is usually intended for commercial activities, managed either by the landlords or by the shop owners. The upper levels, separated from the ground floor, are only used for private/domestic activities. Horizontally, the privacy is gradually increased from the streets and sidewalks to the parts of the pavement under the balcony, to the shop front, and to the back of the house. These settings help urban residents to balance their public and private lives.

![Figure 4.23 A street section showing the maintenance of privacy in the shop house](image)

This type of housing is relatively effective in response to local living patterns by making use of the shop-fronts for extra income. However, this housing has very high site coverage but a low coefficient in using the land. If row houses increase in quantity, they will reduce the land for public open spaces and hinder the development of urban infrastructure. Guided by the National Housing Development Scheme by MoC (2011), it is required to gradually restrict development of street houses, increase the number of new apartments, and improve the urban landscape for residential areas. By 2030, apartments will be the popular choice for many groups of residents, especially middle-income people (MoC 2011). The above-mentioned settings in row houses, which can accommodate local living patterns while preserving privacy, can be applied to the design of multi-storey housing. Furthermore, many activities of everyday life
taking place on the street level appear to be an inseparable part of domestic life. As such, sidewalks become extended parts of the houses.

4.3.2 Public life on the streets

It appears that the city streets surrounding the case study developments have the same patterns of setting and behaviours. The urban street system follows a traditional hierarchy, from “pho”, “ngo”, to “ngach” (see Figure 4.24). “Pho” refers to the main city street with strips of sidewalks (ranging from one and a half to three meters wide), usually lined with shops about every three to five meters. “Ngo” is generally a lane with narrow sidewalks, and secondary to “pho”, varying from three and a half to seven meters wide. It is considered as the access road to the neighbourhood. “Ngach” can be described as a narrow alleyway without sidewalk (extending from half a meter to three meters wide), but still carrying motorcycle traffic and running within a neighbourhood (see Figure 4.25). It goes deeper into the residential area, reaches the individual houses, and acts as a stage for public life. These were frequently busy places with significant foot traffic, providing a wide range of commercial, social, and cultural activities. Parking was a distinct behavioural pattern, regulated by the state but subject to a set of local rules. In a “pho”, cars were not allowed to stop, but motorbikes could be parked on the sidewalks and were managed by the shop owners. However, these parking activities are strictly regulated by the police. In a “ngo”, vehicles can be parked more freely than in “pho” but are still subject to the rules. Cars can temporally be parked on a “ngo”, but motorbikes must be on the sidewalks. In a “ngach”, parking is more subject to local rules than the other types of street. The property owners have a tacit right (but not a legal right) to park their motorbikes in front of their houses. This unwritten rule is reinforced locally rather than officially.
Although the hierarchy appears to be unique, there are similarities between the street system in this study and those in Bangkok described by Kim and Kasama (2006). The street and pedestrian network of Ban Panthom consists of the hierarchy of thanon (main street), soi (side street) and trok (pedestrian street or lane). It is considered that the difference might be that the trok in Thailand is usually attached to religious events, but the ngach in Vietnam is mostly for everyday activities. Furthermore, the trok is free from vehicles due to the exclusion of cars, but the ngach carries motorcycle traffic. However, the use of cars as personal transportation means is sharply increasing in Vietnam, and the ngach might be made vehicle free in the near future.
shop-houses, with approximately four-meter building frontage (see Figure 4.26). Sidewalks are social places for people of all ages, especially children, and genders. Various retail shops were observed on street level, from electronic stores, jewellery shops, fashion showrooms, to food stores. Commercial activities inside the shops were seen to spill onto the sidewalks. Storefronts, the public parts of street houses, were usually not fixed in design, and were easily manipulated for commercial purposes. The settings allowed a wide range of uses without changing the physical characteristics or altering the functions of the spaces. Street vendors were observed on the sidewalks of phos and ngos, but these activities were not supported by police and local authorities. In ngachs, however, the commercial activities were much more diverse and informal, with street vendors and shift-shoppers. Street vendors selling a range of breakfasts, prepared meals, coffee, fruits and vegetables occupy most of the width of the alley (ngach). Without a predetermined pattern, vendors continuously negotiate with the house owners for their territories. The appropriation of space reaches an advanced level when one part of the ngach can accommodate multiple businesses at the same time. Furthermore, the sites are used by different merchants during the day. For example, a breakfast stall selling coffee in the morning is replaced by another hawker trolley offering cooked food in the afternoon.

![Figure 4.26 Retail shops lining an ngo (left) and shift-shops in ngach (right)](image)

The city street system mentioned above functions as a cultural setting, enhancing and characterising the experience of public life.
4.4 Summary

This chapter has provided an overview of the three selected case studies. The determinants of urban contexts, site characteristics, housing types, and resident profiles, are discussed in relation to the research problems (see Table 4.2, Table 4.3, Table 4.4, and Table 4.5). It appears that the given sites are in residential areas with a fine-grained urban fabric. Row houses line public streets, with the shops at the street level directly opening onto the sidewalks. There are two main types of the apartment buildings relevant to (population) group size, short-corridor and long-corridor apartments. Resident profiles were also discussed and compared among case studies.

Table 4.2 Urban contexts surrounding three case studies

<table>
<thead>
<tr>
<th>Distance to the city centre (km)</th>
<th>Vicoland</th>
<th>Nest Home</th>
<th>Thai An</th>
</tr>
</thead>
<tbody>
<tr>
<td>Distance to the nearest industrial zone (km)</td>
<td>1</td>
<td>2.5</td>
<td>9</td>
</tr>
<tr>
<td>Distance to social/commercial services</td>
<td>Open market, Retail stores, Childcare centres in walking distance</td>
<td>Open market, Retail stores, Childcare centres in walking distance</td>
<td>Open market in walking distance; Retail stores and childcare centre provided in the complex</td>
</tr>
<tr>
<td>Social activities on public spaces</td>
<td>Sidewalk cafés, Retail shopping, Street vending</td>
<td>Sidewalk cafés, Retail shopping</td>
<td>Sidewalk cafés, Retail shopping, Street vending</td>
</tr>
</tbody>
</table>
Table 4.3 Site properties of the case studies

<table>
<thead>
<tr>
<th></th>
<th>Vicoland</th>
<th>Nest Home</th>
<th>Thai An</th>
</tr>
</thead>
<tbody>
<tr>
<td>Site area (m²)</td>
<td>4,495</td>
<td>9,840</td>
<td>19,150</td>
</tr>
<tr>
<td>FAR and Site coverage (%)</td>
<td>2.55</td>
<td>3.05</td>
<td>4.82</td>
</tr>
<tr>
<td>Connection to public streets</td>
<td>Directly connected to city streets</td>
<td>Directly connected to city streets</td>
<td>Connected to city streets via access road and gate(s)</td>
</tr>
<tr>
<td>Accessibility to outdoor spaces</td>
<td>Publicly accessed</td>
<td>Publicly accessed</td>
<td>Barrier gate with gatemen</td>
</tr>
<tr>
<td>Provided services</td>
<td>Shops and parking area on the ground level</td>
<td>No shop allowed</td>
<td>Shops on street level and parking in the basement</td>
</tr>
</tbody>
</table>

Table 4.4 Housing types in three case studies

<table>
<thead>
<tr>
<th></th>
<th>Vicoland</th>
<th>Nest Home</th>
<th>Thai An</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Building types</td>
<td>Seven stories</td>
<td>Nine stories</td>
<td>17 stories</td>
</tr>
<tr>
<td>Corridor types</td>
<td>L-shape floorplan</td>
<td>Module blocks</td>
<td>Module blocks</td>
</tr>
<tr>
<td>Number of units</td>
<td>23 units per floor</td>
<td>6 units per floor</td>
<td>TA1-2: 8 units/floor</td>
</tr>
<tr>
<td></td>
<td>Total 159 units</td>
<td>Total 421 units</td>
<td>TA3: 14 units/floor</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>TA4: 12 units/floor</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Total 1,143 units</td>
</tr>
<tr>
<td>Entrance types</td>
<td>2 entrances/block with doorman</td>
<td>2 entrances/block without doorman</td>
<td>2 entrances/block with doorman</td>
</tr>
<tr>
<td>Apartment types</td>
<td>Three unit types</td>
<td>Six unit types</td>
<td>Duplexes on ground</td>
</tr>
<tr>
<td></td>
<td>All two-bedroom units</td>
<td>All two-bedroom units</td>
<td>One-, two-, and three-bedroom units</td>
</tr>
</tbody>
</table>
The chapter also outlined the contexts of the study regarding the maintenance of privacy in popular housing, respondents’ orientations towards apartment living, and public life on the streets. In brief, this chapter has provided relevant information about the urban contexts in which the case studies are situated, to support further interpretation in the next three chapters associated with the three themes: (i) the implication of density for residential privacy, (ii) the implications of internal space organisation for local living arrangement, and (iii) the key role of public spaces in social interaction.
Chapter 5. Residential privacy

5.1 Introduction

In Chapter 2, environment-behaviour problems related to multi-storey housing were outlined, indicating the linkages to the high-density setting. Theoretically, privacy is the central concept that binds together other behavioural issues of multi-storey housing such as residential crowding, social stress, social isolation, and social withdrawal. Empirical research also confirms that privacy is the key variable in studying occupants’ responses to a high-density environment (Chan 1999). Privacy is a significant factor in indicating the quality of the living environment, and that a lack of privacy often leads to anti-social behaviour (Pedersen 1997). The importance of improving the level of privacy in multi-storey housing resulted in the formulation of the first derived research question:

What is the relationship between the design of multi-storey housing and the level of privacy?

The purpose of this chapter is to identify privacy problems, their causes, and design elements that support the control of social interactions in the buildings. To understand this relationship, however, requires revealing the components of privacy. One of the most important concepts for understanding the level of privacy is residential crowding. In a model of crowding, Altman (1975) explains that crowding exists when privacy mechanisms are not functioning effectively, resulting in an excess of undesired social contact. He assumes that personal space and territorial behaviour are the key mechanisms for managing social interactions, and therefore privacy.

This chapter examines in detail the relationships between the concepts of density, privacy, crowding, personal space, and territorial behaviour, to develop a complete understanding of determinants and mechanisms that affect the level of privacy in multi-storey housing, among the three Vietnam case studies. As discussed in Chapter 3, interviews with 39 respondents, including nine from Vicoland, 12 from Nest Home, and 19 from Thai An, were conducted to gain insight into various aspects of privacy such as the variation in cultural background.
and interpersonal boundaries. This method was enhanced by a survey of 231 residents to assess the inhabitants’ feelings, opinions, and preferences regarding residential privacy. This quantitative data was used for simple non-parametric tests (Spearman, Kruskal-Wallis, and Mann-Whitney U) to triangulate the relationship between design determinants and the level of privacy. Surveys and interviews were further supported by the observation of privacy status, indicated by the close/open state and modifications of front doors to achieve the expected privacy.

5.2. Occupants’ orientations towards privacy

This section explores the situation of residential privacy in the three case studies. Interviewees were asked to identify whether they had any problems with privacy, what type of privacy issues they were dealing with, and how they related to the design. It is important to note that the respondents’ orientation towards privacy is different from their satisfaction with the privacy. For instance, an interviewee in the Vicoland Project reported acoustical problems, but he was still generally satisfied with the achieved privacy.

5.2.1 General assessment

It appears that respondents in the three case studies were concerned with family privacy, but had no problem about individual privacy. Issues related to interaction behaviour between and among family members were not particularly prominent in the interview data. A common view amongst interviewees was that the privacy issue only arose if social contacts involved non-family people.

The results of this study indicate that the number of respondents who had problems with privacy (12 of 39) was less than a half of those who did not (27 of 39). Nest Home had the highest percentage of respondents having privacy problems at 50%, whereas Thai An had the lowest proportion at 11% (see Table 5.1). Only two interviewees in Thai An reported problems with residential privacy. It is interesting to note that, in Nest Home, the number of informants having issues with privacy was the same as the number of those who did not (6 of 12). The issues with privacy identified from interviews are reported in Table 5.2.
Table 5.1 Respondents’ orientations towards privacy

<table>
<thead>
<tr>
<th>Case study</th>
<th>Number of respondents having problems with privacy</th>
<th>Number of respondents not having any problem with privacy</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vicoland</td>
<td>3 (38%)</td>
<td>5 (62%)</td>
<td>8 (100%)</td>
</tr>
<tr>
<td>Nest Home</td>
<td>6 (50%)</td>
<td>6 (50%)</td>
<td>12 (100%)</td>
</tr>
<tr>
<td>Thai An</td>
<td>2 (11%)</td>
<td>17 (89%)</td>
<td>19 (100%)</td>
</tr>
<tr>
<td></td>
<td>11</td>
<td>28</td>
<td>39</td>
</tr>
</tbody>
</table>

Table 5.2 Participant responses to privacy problems

<table>
<thead>
<tr>
<th>Case study</th>
<th>Informant</th>
<th>Participant responses to privacy problems</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vicoland</td>
<td>1</td>
<td>The bedroom located next to the corridor is exposed to the noise from this central hallway. I altered the unit layout to move that bedroom away from the corridor.</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>I feel crowded so I barely talk to my neighbours. Many of them are renters and I know nothing about them.</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>Many occupants living at the same floor with me are renters. I know their faces but never made a conversation.</td>
</tr>
<tr>
<td></td>
<td>9</td>
<td>My apartment is in the ground floor so there are many passers-by. Sometimes we got intruders pretending to be door-step salesman or surveyors.</td>
</tr>
<tr>
<td>Nest Home</td>
<td>1</td>
<td>The window of small bedroom is directly opposite to the window of adjacent apartment unit.</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>One of my bedrooms has a window directly facing the window of the apartment next door.</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>I prefer privacy but my apartment unit is located at the sky-deck level. It is always noisy so I have to close the entrance door all the time. Kids not only from the complex but also from outside neighbourhoods play at the sky deck. They make the space noisy and unsecure. People make loud conversations from the sky-deck to the upper floors and vice versa. Some residents even throw stuff from the above floors to the sky-deck. People liberally left their stuff at the sky-deck such as trash, cigarette ash, and food wraps.</td>
</tr>
</tbody>
</table>
I barely open the door due to the loud music from neighbours. But it always feel stuffy when closing the door. The window of small bedroom is placed directly opposite to the window of my neighbour unit.

The windows from the adjacent unit and the units above look over the window of my bedroom. Some windows open directly to the public street.

The window of small bedroom directly opens to the street.

Entrance doors are opposite each other

It is crowded. I close the entrance door when getting home.

The above privacy problems can be grouped into three categories: (1) visual, (2) auditory, and (3) social (see Table 5.3). ‘Visual privacy’ is the ability to conduct everyday activities without being observed by those outside the dwelling unit (Al-Kodmany 1999). ‘Auditory privacy’ is the ability of individuals (or groups) to control what to hear and what is being heard. ‘Social privacy’ or ‘territorial privacy’ refers to the ability to control unexpected interactions between individuals or groups.

Table 5.3 The number of participants per categories with illustrative quotes

<table>
<thead>
<tr>
<th>Categories of privacy problems</th>
<th>The number of participant responses with illustrative quotes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Visual privacy</td>
<td>Problems of privacy because the window/door is directly opposed to neighbour’s window/door (6)</td>
</tr>
<tr>
<td></td>
<td>Visually exposed to passers-by on common spaces such as central hallway, public street, and sky-deck level (4)</td>
</tr>
<tr>
<td>Auditory privacy</td>
<td>Problems of privacy due to the noise from public spaces as central hallway, public street, and sky-deck level (6)</td>
</tr>
<tr>
<td></td>
<td>Problems of privacy due to the noise from apartment(s) next-door (1)</td>
</tr>
<tr>
<td>Social privacy</td>
<td>Problems of privacy due to the crowded feeling created by passers-by and unfamiliar neighbours encountered on the central hallways (3)</td>
</tr>
<tr>
<td></td>
<td>Problems of privacy due to intruders and unexpected guests (4)</td>
</tr>
</tbody>
</table>

Visual privacy had the highest number of reports (9), while auditory privacy and social privacy had the same frequency (7). Among those experiencing privacy
issues, respondents in Vicoland appear to have more problems with acoustical privacy and unwanted social interaction; whereas informants in Nest Home experienced more issues with visual privacy.

Table 5.4 Types and numbers of privacy problems reported by the informants

<table>
<thead>
<tr>
<th>Case study</th>
<th>Visual privacy</th>
<th>Auditory privacy</th>
<th>Social privacy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vicoland</td>
<td>2</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>Nest Home</td>
<td>6</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Thai An</td>
<td>1</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>9</td>
<td>7</td>
<td>7</td>
</tr>
</tbody>
</table>

In privacy studies, social interaction has always been the central topic, whereas visual and acoustical problems is less mentioned. Contrary to expectations, the present findings indicate that respondents’ privacy was most troubled by visual exposure. A possible explanation for this might be that the perception of privacy is subject to culture. This finding is in agreement with the studies of Altman (1977), Altman and Chemers (1984), and more recently Yuen and Yeh (2011). According to these authors, desired privacy is culturally defined. People in Asian countries have a tendency of having a lower level of desired privacy and a higher level of tolerance to residential crowding. The next section discusses the findings on the social and spatial factors influencing the achieved privacy.

5.2.2 Visual and auditory privacy

This section analyses the specific architectural features in relation to privacy. The following categories have emerged from the fieldwork findings: (i) positioning doors and windows, (ii) wall opening and insulation, (iii) apartment layout, and (iv) location of dwelling units. The collected data for analysis include the interview content, direct observations from the field, and the architectural drawings provided by related parties.

**Positioning doors and windows**

Interviews with residents indicate that privacy was affected by the positions of the windows. Interviewing data suggest four critical situations that can cause
problems of visual privacy in the Nest Home project (see Figure 5.1). In situations (A) and (B), the bedroom windows in two apartment units are facing each other. In the situations (C) and (D), the opposite windows are from the kitchens. One participant in Nest Home commented he owned a two-bedroom apartment but his family only used one of them for sleeping. The other bedroom has a window that faces directly to the window of another apartment (situation A). The two windows are so close that he decided not use it as a bedroom but as storage for old clothes and extra furniture. Another interviewee mentioned that he had two windows that are overlooked by the windows of the apartment next door (situation B and C). Because of the privacy issue, he decided to use one of the bedrooms as a working space.

![Figure 5.1 Achieved privacy is affected by the positions of windows](image)

Similar to the location of windows, some doors in the apartment units are directly facing each other, also affecting the privacy of the inhabitants. This situation is illustrated in Thai An 3-4 apartments, south wing (see Figure 5.2). The effects of the door location on privacy were confirmed by a group of respondents living in Thai An 4. Just before the interview, all entrance doors towards the end the central corridor were closed. When the informant was contacted, the respondent asked to conduct the interview outside her apartment, in the hallway. When the conversation started, three of her next-door neighbours came out and participated in the focus interview. Those interviewees expressed their desire to open the doors and make contact with one another, but they all worried about visual privacy. One of these women claimed that the door location made the view into her neighbour's apartment unavoidable. Conversely, it allows a view to the kitchen and the living
room of her apartment to the neighbour. This situation has had an impact on her everyday activities, particularly in the way she dressed at home. Talking about the same issue, another male interviewee on different level said that he noted the privacy problem but still left the door open. According to him, opening doors and windows was important to allow natural ventilation and lighting. He shared the feeling of sacrificing privacy for health benefits.

Contrary to the above examples, the locations of doors in type-E-units in Nest Home could enhance visual privacy. The visual blind spots at the entrance and kitchen door could protect everyday activities from being observed by outsiders (see Figure 5.3). Interviews with residents living in these units expressed satisfaction with privacy. However, the architects involved in the design process indicated that the window positions were overlooking. They designed the blocks individually and failed to notice the windows from other blocks when composing them in the master plan.
Figure 5.3 The internal spaces are organised to block the line of sight

5.2.3 Social/territorial privacy

As indicated in Section 5.2.1, participants’ responses to social privacy were all related to unwanted social contacts with neighbours. As a result, this section will investigate the frequency of neighbour contacts in relation to the level of achieved privacy. Respondents were first asked to rate their level of achieved privacy on a Likert scale ranging from ‘unacceptable’ to ‘completely acceptable’. They then were asked to rate their frequency of contacting neighbour, from ‘very rarely’ to ‘very frequently’.

The findings indicate that the majority of respondents (67%) have active social interactions with neighbours. These interactions occur in spite of the differences in their desired levels of privacy. Of the respondents, 33% said they contacted their neighbours from ‘frequently’ to ‘very frequently’ (see Table 5.5). It is evident from the interviews that women with children who spent most of their time at home had intensive contacts with people next door. One respondent in the Thai An project reported that she had active social ties with her neighbours who had kids of similar ages. They studied at the same kindergarten and played with each other after school time. Among the interviewees, 35% reported that they occasionally had selective contacts with some known neighbours. One woman in the Nest Home, who worked for a telecommunication company, said that she preferred to control her neighbourly relations by choosing when and to whom to allow access. Only a minority of respondents (5%) reported that they very rarely interacted with people in the immediate surroundings. Of these, interviews indicate that they mostly did not have difficulties in establishing close ties with neighbours but were not interested in contacts with them. In the Vicoland project, one informant working in the music industry narrated a story that he only contacted with people who could understand and appreciate his lifestyle. He spent most of his time at work and returned to his apartment for retreat. This lack of neighbourly relations was a matter of choice.
These findings appear to contradict some previous studies (Jephcott, P 1971; Yuen & Yeh 2011), that assumed that occupants in urban multi-storey housing suffer from anonymity and loneliness. According to these studies, urban middle-income people are usually characterised by a ‘non-localised’ lifestyle, with no interest in contact with neighbours. In the present study, only a small percentage of respondents chose this way of life. The rest were far from being isolated from their surroundings. They interacted with neighbours, although the majority had opportunities for social relations at work. This finding is likely to be related to Ginsberg and Churchman (1985) study, which showed that lifestyle and life cycle stage are two important variables contributing to the neighbour relationship among city dwellers. Another explanation for this finding is that the population in the case studies was remarkably homogeneous regarding similar life-cycle stage. In fact, most of the respondents were young (average age 36.36; SD=8.81), employed in academic/clerical work (89.2%), and had one or two children (M=1.2, SD=.852).

In this circumstance, the differences in localised and non-localised lifestyles did not create much impact on neighbour relations in the multi-storey housing for these middle-income people. The next paragraph discusses the patterns of neighbour relations found in the selected case studies.

Despite active neighbour relations, respondents did not have difficulties maintaining privacy. Although there was no ‘completely acceptable’ response, the majority of the respondents expressed very acceptable (40%) and moderately acceptable (47.5%) attitudes towards their privacy (see Table 5.6). Among the case studies, Thai An had the highest level of achieved privacy, with 52.6% ‘very
acceptable’ and 47.4% ‘moderately acceptable’ responses; whereas, of the respondents, 11.1% in Vicoland and 16.7% in Nest Home indicated an unacceptable level of privacy. It is interesting to note that respondents in Thai An also had the highest frequency of contact with neighbours. No one in Thai An reported the level of ‘very rarely’ in meeting neighbours; whereas this number was 11.1% and 8.3% in Vicoland and Nest Home, respectively (see Table 5.5).

Data from survey also indicate that there is a reasonably strong positive correlation between the frequency of neighbour interaction and the level of achieved privacy, rs = .598, p < .001.

Table 5.6 The level of achieved privacy among interviewees

<table>
<thead>
<tr>
<th>The level of achieved privacy</th>
<th>Case studies</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Vicoland</td>
<td>Nest Home</td>
</tr>
<tr>
<td>Completely acceptable</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Very acceptable</td>
<td>22.2%</td>
<td>33.3%</td>
</tr>
<tr>
<td>Moderately acceptable</td>
<td>66.7%</td>
<td>33.3%</td>
</tr>
<tr>
<td>Slightly acceptable</td>
<td>16.7%</td>
<td>-</td>
</tr>
<tr>
<td>Not at all acceptable</td>
<td>11.1%</td>
<td>16.7%</td>
</tr>
</tbody>
</table>

The finding that residents maintained well both social ties with neighbours and their privacy appears to be different from findings in earlier studies of Western contexts. A common assumption has been that people living in multi-storey housing have difficulties in keeping their privacy due to population density. The notion of inherent conflict between privacy and social interaction is a recurrent theme in housing literature (Esser & Greenbie 2011). A possible explanation for this might be that Western society prioritises privacy over social life. As a result, multi-storey housing residents have witnessed a decrease in neighbour relations in this housing typology. The situation might, however, be different in Asian countries where people culturally value both privacy and neighbour relations as being basic needs. Most of the residents are sociable and expect to have a warm and friendly relationship with neighbours. Clearly, privacy and community need not to be in conflict in the context of Vietnam.

Another explanation for these results may be that respondents maintain privacy by selective contact with their neighbours. The homogenous family profile naturally
creates a group of inhabitants within the building sharing the same interests and values. The findings help us to understand that maintaining privacy does not mean a ‘shutting-out act’ or having no contact with others. Anonymity might be one way of obtaining privacy in a crowded multi-family building, choosing whom and when to allow or prevent access could also be appropriate behaviour. This privacy mechanism will be discussed in detail in the following sections.

5.3 Density and crowding

So far, the previous sections have focused on exploring respondents’ desired levels of privacy and their achieved privacy. It is indicated that the level of achieved privacy is related to people’s subjective interpretation of their privacy, their behavioural adaptation, and relevant environment factors. This section further explores the factors that affect respondents’ privacy and evoke the feeling of crowdedness.

Before proceeding to examine the impacts of density on crowding, it is necessary to explore the meaning of density among the stakeholders in the case studies. Findings highlight a common view amongst respondents, that density is understood as an objective and quantitative indicator. The architects and the local authorities mentioned density as the measures of plot ratio and site coverage. According to them, these indicators are important to prevent over-building and to preserve land for open green spaces. They must follow the National Technical Regulation on Construction and Planning in design and management processes of multi-storey housing (QCVN: 01/2008/BXD). It requires a maximum site coverage of 40% for a development having a site area over 10,000 square meters. The plot ratio is not allowed to exceed 5.0 for multi-storey housing development in urban areas. Another interviewee, when asked about other measures, said the minimum floor area for an apartment is also related to density, particularly the plot ratio. He indicated this number is 50 square meters, which is regulated in the Circulars on Ranking Apartment Buildings (TT 14/ 2008/ TT-BXD). They believed that density, as a physical condition, can create a subjective state of distress, or perceived crowding.
The above finding indicates that density is perceived as building density by various groups of built-environment professionals. As such, the concepts of population density, and spatial and social density, have been left out of the design agenda. There is thus a need to further develop and implement this concept in the design, to cope with residential crowding in multi-storey housing. The following sections attempt to untangle the relationship between density and crowding, according to the two perspectives of physical density and perceived density. An understanding of these two distinct concepts of density will serve as a basis for resolving the problems of residential crowding.

5.3.1 Physical density

This section presents the findings on the relationship between physical density and residential crowding. Firstly, occupants’ orientations towards crowding are discussed. The following sub-sections are about how building density and population density relate to perceived crowding. The last part, Section 5.3.1.4, compares the effects of internal density and external density on residential crowding.

5.3.1.1 Occupants’ orientations towards crowding

For investigating perceived crowding, respondents were invited to a survey discussing their perception of residential crowding in and around their apartments. The respondents were asked to rate their level of perceived crowding on a five-point Likert scale ranging from 1 (least crowded) to 5 (most crowded). Table 5.7 summarises residents’ responses to selected questions.

It is evident from the data that the majority of the respondents (83.9%) were satisfied with the level of crowding. Furthermore, there was a statistically significant variation in the perceived crowding by respondents across the three case studies (Kruskal-Wallis test H=19.631, df=2, p<.001), with a mean rank of 142.18 for Vicoland, 112.01 for Thai An, and 94.15 for Nest Home.
Table 5.7 Respondents’ perceived crowding and building density in case studies

<table>
<thead>
<tr>
<th>Cases</th>
<th>Vicoland</th>
<th>Nest home</th>
<th>Thai an</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>Perceived crowding (%)</td>
<td>Quiet</td>
<td>-</td>
<td>15.1</td>
<td>6.0</td>
</tr>
<tr>
<td></td>
<td>Uncrowded</td>
<td>25.7</td>
<td>45.2</td>
<td>40.5</td>
</tr>
<tr>
<td>Satisfaction with crowding</td>
<td>25.7</td>
<td>60.3</td>
<td>46.5</td>
<td>44.1</td>
</tr>
<tr>
<td>Neither crowded or uncrowded</td>
<td>48.6</td>
<td>28.8</td>
<td>41.7</td>
<td>39.8</td>
</tr>
<tr>
<td></td>
<td>Crowded</td>
<td>20.3</td>
<td>9.6</td>
<td>8.3</td>
</tr>
<tr>
<td></td>
<td>Overcrowded</td>
<td>5.4</td>
<td>1.4</td>
<td>3.6</td>
</tr>
<tr>
<td>Dissatisfaction with crowding</td>
<td>25.7</td>
<td>11</td>
<td>11.9</td>
<td>16.1</td>
</tr>
<tr>
<td>Building density</td>
<td>Site coverage (%)</td>
<td>36.7</td>
<td>51.43</td>
<td>28.35</td>
</tr>
<tr>
<td></td>
<td>FAR</td>
<td>2.55</td>
<td>3.05</td>
<td>4.82</td>
</tr>
</tbody>
</table>

5.3.1.2 Building density and crowding

Fieldwork results indicate that the dissatisfaction with residential crowding does not rise in direct proportion to building density. It is evident from Table 5.7 that occupants in Nest Home, with the highest site coverage (51.43%), reported the extremely low level of dissatisfaction with crowding (11%). Residents in Vicoland, with the average value of site coverage (36.7%), experienced the highest degree of crowding (25.7%). As shown in the Table below, the FAR values gradually increase from 2.55 in Vicoland to 3.05 in Nest Home and 4.82 in Thai An; whereas the dissatisfaction levels decrease from 25.7% to 11% and 11.9%, respectively. It is interesting to note that the combination of high FAR (4.82) with low site coverage (28.35%) in Thai An results in the optimised level of crowding satisfaction (88.2%).

These research findings are in agreement with the results in Yeh (2000), which show that perceived crowding cannot be handled by simply reducing building density. According to this, an individual measurement such as FAR or site coverage was not sufficient to manage the perceived density. In another empirical research, Edward (2009) concludes that density expressed in terms of building density has little effect on residential crowding. The unexpectedly high level of crowding satisfaction in the Thai An project may partly be explained by the idea in Zhu (2011) of combining high/medium FAR with low site coverage for optimising the effects of density. In Vietnam, the combination of these indicators
could thus be one of the most suitable choices for a new multi-storey housing project. However, this finding cannot be extrapolated to all developments, because the optimised FAR is usually defined on a case-by-case basis. Under certain circumstances, increasing FAR beyond the reasonable limits will increase pressure on land, create overcrowding and congestion, and result in deficiency of facilities and utilities.

5.3.1.3 Population density and crowding

The results of this study did not detect any conclusive evidence for the relationship between population density and crowding. Interviews were conducted with the apartment property managers in the three case studies. They were asked about the total population of the corresponding housing complexes, and how to keep it up to date. Whenever a new apartment was sold or transferred, an updated list of registered residents was recorded. The population had also been monitored by appointed team members checking on a regular basis. At the time of conducting interviews, the population was roughly 498 people in Vicoland, 1,259 in the Nest Home, and 3,749 in the Thai An. From that, the residential density was calculated as 0.11, 0.13, and 0.19, respectively. Meanwhile, the dissatisfaction level with crowding was 25.7% in Vicoland, 11% in Nest Home, and 11.9% in Thai An. It appears that the relationship between people density and residential crowding is not straightforward.

The combination of the above findings provides some support for the studies conducted by Edward (2009) and Yuen and Yeh (2011), which argue for the usefulness of residential density in the analysis of perceived crowding. One of the issues that emerges from the present findings is that residential density might not be an effective indicator for managing residential crowding in the multi-storey housing for middle-income residents. In Section 5.3.1.4, the effects of population density on crowding are further explored through the measures of internal space density and external space density.

5.3.1.4 Internal density and external density on crowding

It appears that the effect of density on crowding is mainly through personal space density rather than external space density. A common view amongst respondents
living in high internal space density was that they experienced a greater frequency of unwanted social interactions on their floor. One individual stated that, because a large number of people shared the living space, he encounters them more frequently. As a result, he felt he was losing control regarding social interactions in his living environment. In terms of external density, none of the interviewees reported the feeling of crowdedness in their neighbourhoods. All of them expressed interest in using the external spaces provided, except for one interviewee in the Nest Home whose apartment was located on the sky-deck level.

These findings support the ideas of Stokols (1972b) and Baldassare (1979), who suggest that crowding experiences have greater intensity and duration in primary environments than in secondary ones. Their studies suggest that most of the respondents generally did not feel crowded at street level, where their encounters with others are relatively transitory and anonymous. Nevertheless, some of them felt crowded at their floor levels due to the restraints on behavioural freedom and the violation of privacy imposed by the proximity of others. They felt a lack of personal control over the environment, and were unable to escape from the inconvenience of involuntary social encounters. In a more recent study, Yuen and Yeh (2011) offer another possible explanation for the present study’s findings based on the theory of personal control. They claim that the primary settings are always associated with a diversity of needs and a high level of personal control. The ‘proximity-related interferences’ negatively impact on a person’s personal space. When high density involves the close presence of unfamiliar residents, the environment is not only restricting but also unpredictable. Furthermore, in crowded personal spaces, occupants cannot escape from crowding by retreating to their homes.

A questionnaire survey and interviews were conducted in order to ascertain the relationship between people’s perception of crowding with internal space and external space density. Regarding internal density, respondents were asked to provide the number of their family members and the flat sizes. They were asked about the feeling of crowdedness in their neighbourhoods. The perceived crowding was rated on a 5-point Likert scale ranging from 1 (least crowded) to 5.
(most crowded). For an in-depth understanding of internal density, the interviewees were asked to discuss their experience of crowding in and around their apartments.

The findings indicate a positive correlation between internal density and perceived crowding. Spearman’s correlation was run to assess the relationship between occupant density and crowding using the samples from the case studies. It is evidenced in Table 5.8 that there was a relatively strong positive correlation between occupancy density and perceived crowding, rs=.511, p<.005. Similar tests were conducted to investigate the correlations between other density measures with crowding. The results are summarised in Table 5.9.

According to this table, each of the density measures has a positive correlation with perceived crowding. The correlation coefficient gradually decreases from occupancy density (rs=.511, p<.005) to intra-household density (rs=.373, p<.005), and to household density (rs=.293, p<.005). It appears that, when internal space density goes up, dissatisfaction (sense of crowding) also goes up.

Table 5.8 Relationship between internal space density measures and perceived crowding within home

<table>
<thead>
<tr>
<th>Correlations</th>
<th>Occupancy density</th>
<th>Perceived crowding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spearman's rho</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Occupancy density</td>
<td>Correlation Coefficient</td>
<td>1.000</td>
</tr>
<tr>
<td>Sig. (2-tailed)</td>
<td>.000</td>
<td>.000</td>
</tr>
<tr>
<td>N</td>
<td>231</td>
<td>231</td>
</tr>
<tr>
<td>Perceived crowding</td>
<td>Correlation Coefficient</td>
<td>.511**</td>
</tr>
<tr>
<td>Sig. (2-tailed)</td>
<td>.000</td>
<td>.000</td>
</tr>
<tr>
<td>N</td>
<td>231</td>
<td>231</td>
</tr>
</tbody>
</table>

**. Correlation is significant at the 0.01 level (2-tailed).
Table 5.9 Correlation between occupant density and perceived crowding

<table>
<thead>
<tr>
<th>Spearman's $\text{Internal space density}$ rho</th>
<th>Correlation Coefficient</th>
<th>Sig. (2-tailed)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Occupancy density</td>
<td>.511**</td>
<td>.000</td>
</tr>
<tr>
<td>Intra-household density</td>
<td>.373**</td>
<td>.000</td>
</tr>
<tr>
<td>Household density</td>
<td>.293**</td>
<td>.000</td>
</tr>
</tbody>
</table>

**. Correlation is significant at the 0.01 level (2-tailed).

5.3.2 Perceived density

Despite the general belief that people respond more aggressively to spatial density than to social density, the present study highlights the role of social density in managing privacy. In Section 5.2.1, research findings indicate that individual privacy was not the concern in this study. Because spatial density is only about individual privacy, this type of density did not contribute much to the level of (family) privacy. Consequently, this section only discusses the findings on the relationship between social density and perceived crowding in selected case studies. As discussed in Chapter 2, group size is the most prominent design intervention influencing social density.

The group sizes of residential settings in the case studies can be divided into two distinct groups: (1) small and (2) large. The small group size indicates a residential setting with no more than ten apartment units per floor (five units each half of a corridor, divided by a lift core at the middle) (Aiello & Baum 1979). The large group size refers to a setting with more than ten units per floor. In this study, the small group includes Nest Home and Thai An 1-2, and the large group includes Vicoland and Thai An 3-4 (see Table 5.10).
During the field investigation, group size was found to have a strong relationship with perceived privacy. For eliminating ‘sensory modalities’, which might affect the residents’ perception of crowding, this study further compares the relationship between the given residential settings and perceived crowding in the same geographical locations. Firstly, the pair Vicoland and Nest Home are both located in Da Nang City. Their residents were homogeneous and had similar rules for behaviour. However, these two complexes were radically different in group sizes. Vicoland was a corridor-apartment with a relatively large group size of 25 units connected to a long corridor; whereas Nest Home was a suite apartment with a small group size number of six units around a shared area. Similarly, the pair Thai An 1-2 and Thai An 3-4 are the two independent settings in HCMC (despite being from the same project), with a significant difference in their group sizes. A floor plan in Thai An 1-2 has six units around two short corridors; whereas 25 to 28 units were arranged along a central hallway in Thai An 3-4.

For understanding the effects of group sizes, in-depth interviews were conducted with selected occupants. Respondents were asked about their perceived crowding in associated corridor design. In all large group residential settings, the informants frequently reported unwanted interaction. They could not be able to predict or determine the nature and frequency of social contact. Talking about this issue, an informant (interviewee 3) in Vicoland said that he could not determine when and with whom he would interact. Therefore, the encounters with neighbours in the
central hallway became unexpected and uncomfortable. He did not even know how to behave in that given interaction. From these reasons, the respondent perceived the common corridor to be very cramped. To escape these inconveniences, he simply ignored the unintentional annoyances or locked himself up in his apartment. Conversely, another respondent (interviewee 1) in Nest Home expressed her comfortable interaction with familiar neighbours in the shared hallway. She commented that three dwelling units at one end of the corridor created a close group of neighbours. This group is so small that she perceived the common corridor as a part of her apartment, where social interaction can be regulated and protected from intruders or passers-by.

Surveys were also conducted with selected residents to triangulate the above findings from interviews. The respondents were asked to rate their level of perceived crowding on a five-point Likert scale ranging from 1 (least crowded) to 5 (most crowded). The fieldwork results suggest that long-corridor-residents perceived more crowding than did occupants of the short-corridor apartment. A Spearman's correlation was run to assess the relationship between ‘group size’ and respondents’ perception of crowding. The test indicates a relatively strong positive correlation between group size and perceived crowding, \( r_s = .410, p < .005 \).

Furthermore, Nest Home and Thai An 3-4 have the similar spatial density (18 and 19 square metres per person, respectively), but their residents had different responses to crowding (Chi-Square test \( \chi^2 = 11.311, df = 4, p = 0.04 \)). It is evident from Table 5.11 that respondents in the Nest Home (small group) reported a much higher level of satisfaction with crowding (60%) than did respondents in Thai An 3-4 (large group) (14%). In testing the pair settings in the same geographical areas, correlations were found between Nest Home and Vicoland \( r_s = .373, p < .005 \), and between Thai An 1-2 and Thai An 3-4 \( r_s = .551, p < .005 \).
Table 5.11 Group size settings and perceived crowding.

<table>
<thead>
<tr>
<th>Location</th>
<th>Da Nang City</th>
<th>Ho Chi Minh City</th>
</tr>
</thead>
<tbody>
<tr>
<td>Residential setting</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Vicoland</td>
<td>Nest Home</td>
</tr>
<tr>
<td>Floor plan layout</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Architectural variation</td>
<td>Long-corridor</td>
<td>Short-corridor</td>
</tr>
<tr>
<td></td>
<td>Double-loaded corridor: apartment-units are organised at both sides of the central corridor</td>
<td>Two modules are joined together to form a housing block.</td>
</tr>
<tr>
<td>Group size</td>
<td>Large</td>
<td>Small</td>
</tr>
<tr>
<td></td>
<td>23 apartment units per floor</td>
<td>6 apartment units per floor</td>
</tr>
<tr>
<td>Satisfaction with crowding</td>
<td>26 %</td>
<td>60 %</td>
</tr>
</tbody>
</table>
This result can be explained by the previous research of Calhoun (1962); Valins and Baum (1973) and Aiello and Baum (2012), who emphasise the role of a central corridor in regulating social interaction. According to these studies, large group size might lead to decreasing familiarity with neighbours. Despite the fact that long-corridor-residents came in contact with neighbours more frequently, they would feel it difficult to make friends on their floors. It is hard to get to know all the neighbours and, therefore, challenging to become friendly with others. This situation, in turn, arouses unpredictable and uncomfortable interactions.

All of the claims from the interviews appear to fall into the following conditions categorised by Saegert (1973): (1) inappropriate or unwanted interaction in the corridor; (2) uncomfortable interaction with others not known; and (3) a general loss of control over interaction in this hallway space. These conditions indicate that the design variable of group size was influential in determining response to crowding.

The findings also reveal that architectural settings can mediate the effects of social density by facilitating the ability of social groupings in the hallway. An in-depth interview with the architects involved in the design and the observation of social density measures indicate that varying group size was an influential design variable in determining occupants’ responses to crowding. In discussing this issue, one interviewee commented that their solution to overcoming the problems of crowding was to eliminate the long corridor, a common feature of high-rise buildings. These architects reserved the same number of floors and units per floor, but broke up the central hallway into smaller sections. The observation of social density in both Nest Home and Vicoland 1-2 indicates that they are similar in various measures. Taking a closer look at the social density measurement, Nest Home and Vicoland have the same indication of people per floor (23), similar units per floor (six and eight) and units per block (106 and 116), and an approximate number of units per project (421 and 348). This pair of residential settings indicates the highest level of satisfaction with crowding, with 60% in Nest Home and 83% in Thai An 1-2.
The above findings are in agreement with the Aiello and Baum (2012) research on residential design and crowding. They claim that the design method of splitting the hallway into manageable sections required more elevators but was probably worth the cost. Floor plan designs with relatively small clusters of residents around a communal corridor resulted in less frequent and more predictable use of the central hallway. By affecting the degree to which groups form, individuals could have better opportunities to control their social experience. The finding on social density measures in the present research is also consistent with the values found in the above-mentioned study. The number of units per floor in Nest Home and Thai An 1-2 are six and eight, respectively. These are comparable to the Aiello and Baum (2012) findings, which state that five families per each half of a corridor (divided by a lift core at the middle) would be large enough for residents to know their neighbours and to create a sense of community on the floor. If the group size is greater than this number, it is hard for occupants to know all the faces and to become friendly with others.

These findings implicate that residential crowding is not a simple consequence of social density or number of people in a given setting. Residential crowding also appears to be largely dependent on ‘situation mediation’ of density. Empirical evidence from case studies suggests that breaking up a long corridor into smaller sections could be a positive approach to regulating social interaction in shared space. With a manageable group size, particularly less than five units per half of a corridor with a lift core in the middle, occupants could effectively manage arising crowding. In this case, the corridor could be perceived as a semi-private space and facilitate small group formation. This will strengthen an individual’s ability to regulate social experience on their floor. The issue of the semi-private corridor will be further discussed in Section 5.2.2.

5.4 Factors influencing perceived crowding

To better understand the relationship between the design of multi-storey housing and crowding, this section identifies other factors affecting residents’ perception of crowdedness. As mentioned in Chapter 2, the following factors are assumed to influence an individual’s tolerance of crowding: (i) desired privacy, (ii)
geographical region, and (iii) personal background (Altman 1975; Yuen & Yeh 2011). For investigating factors of crowding, a range of research methods were used to collect the related data from case studies. To gain insight into the variations in perceptions of crowding, in-depth interviews were conducted. Any theme that emerged outside the mentioned factors was documented for further analysis. Residents were also invited to a survey to confirm the above assumptions and triangulate findings from interviews. Firstly, respondents were asked to rate their attitudes towards desired privacy. Secondly, case studies were selected in different cities, thus making it possible to investigate the influences of geographical regions on perceived crowding. Thirdly, participants were requested to provide information on their personal characteristics, including place of origin and previous living environment. The measurements for the place of origin and previous living environment were discussed in Chapter 3, Section 3.5.1.2.

5.4.1 Desired privacy and crowding

It was found from the fieldwork that there was a strong relationship between desired privacy and crowding. A Spearman's correlation was run to assess the relationship between the two desired variables. The result indicates a strong positive correlation between desired privacy and perceived crowding, $r_s=0.590$, $p<.005$. A Kruskal-Wallis test was run to see whether there are any differences in the way in which the desired privacy in three case studies were rated. The test result indicates that the difference between the three results was statistically significant ($H = 6.501, df=2, p=0.039$).

The test result on the relationship between desired privacy and crowding further supports the Altman (1975) model of crowding. According to him, crowding exists when privacy mechanisms function ineffectively, resulting in an excess of undesired social contact. In other words, the feeling of crowdedness is aroused when achieved privacy is less than desired privacy. This finding is also consistent with ideas in the studies of Baum and Weiss (1987), Chan (1999), and more recently Esser and Greenbie (2011). The differences between the way in which the desired privacy was rated in the three case studies suggest that the residents’ tolerance to crowding depends on situational characteristics of each case.
5.4.2 Geographical regions and crowding

During field investigation, it was found that residents’ attitudes towards desired privacy are different between the two case studies in Da Nang and the case in HCMC (Chi-square test $X^2 = 6.580, df=2, p<0.05$). As shown in Table 5.12, the percentage of respondents residing in the Vicoland and Nest Home desiring ‘little’ privacy (24.5%) is double the proportion of respondents in Thai An in this respect (10.7%). The percentage of informants in Da Nang desiring ‘much’ privacy (22.4%) is less than the proportion of those living in HCMC having the same level of desired privacy (28.6%).

Table 5.12 The frequency of responses to desired levels of privacy in two different geographical regions

<table>
<thead>
<tr>
<th>Desired level of privacy</th>
<th>Geographical regions</th>
<th></th>
<th></th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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<td>HCMC</td>
<td>Thai An</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Vicoland &amp; Nest Home</td>
<td>Toddy</td>
<td></td>
<td></td>
</tr>
<tr>
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<td>10.7%</td>
<td>19.5%</td>
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<tr>
<td>Moderate</td>
<td>53.1%</td>
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</table>

This finding is in agreement with a recent study by Nejadriahi and Dincyurek (2015), which showed the relationship between desired privacy and geographical regions, sub-cultures and socio-economic conditions. An implication of this finding is that middle-income residents in Ho Chi Minh City appear to require more privacy than those living in Central Vietnam. In fact, the bigger city offers more privacy for its inhabitants by providing anonymity and choice. People in a big city such as HCMC can choose multiple identities to make social interactions in different communities. For instance, they can socialise with their friends and colleagues elsewhere by day, but might prefer to be anonymous at home. The apartment unit is the refuge for retreat from a long day at work; therefore, it requires a higher level of privacy.

In Da Nang, a relatively young city, people’s perception of privacy is likely to have been influenced by traditional behaviours. People still prefer to keep their
social interactions at the neighbourhood level. However, the city is growing fast, and migration has been the dominant factor in the city’s population growth. The implication for design is that residents’ level of desired privacy in Da Nang could increase in future due to social changes. The experience of residential privacy in HCMC can be a valuable reference for the future design of multi-storey housing in Central Vietnam.

5.4.3 Personal background and crowding

As discussed, it is important to investigate whether individual background might influence the orientation towards privacy. This research compares the preferences for privacy among groups of respondents who had different personal backgrounds. The following sections will look at key factors of personal background that might affect the desired level of privacy. These are (i) place of origin, and (ii) previous housing form.

The results of this study indicate that respondents formerly living in a traditional shop house showed relatively less crowding tolerance compared to those previously living in an apartment or shared room. A Spearman’s test indicates a strong negative correlation between previous housing form (shared room, apartment, row house, and detached house) and perceived crowding, $r_s=-.431$, $p<.005$. Another finding is that the level of crowding satisfaction is varied between two groups of respondents: immigrants, and local residents. There was a strong positive correlation between place of origin and perceived crowding, $r_s=.443$, $p<.005$. The positive rating, in this case, is the aggregate of both uncrowded and acceptable rating toward perceived crowding.

An implication of this finding is the possibility that occupants’ tolerance to crowding depends on their personal background. It can be assumed from the results that residents formerly living in apartments and shared rooms, who have previous experience in high-density living, had a higher level of tolerance to crowding than those from traditional shop houses. The high level of general satisfaction with crowding may be explained by the fact that most of the residents are used to living in a much denser environment. Interviews with respondents indicate that most them generally felt less crowded in current apartments than in
their former dwellings. Thus, prior experience of crowding appears to influence reactivity to density in other settings.

This finding is in agreement with the studies of Langer and Saegert (1977) and Severy (1979), demonstrating that, by formerly experiencing the effects of crowding and the situations involved, negative effects of crowding can be diminished. The finding might be inferred that immigrants and people previously living in less crowded environments might find it difficult to adapt to new living conditions. Conversely, people who have previously lived in a denser environment such as shared rooms or pre-reform apartments might develop special ways to manage space and social contacts.

5.5 Privacy mechanism

Because the focus of the study is about the relationship between users’ behaviours and physical setting, this section only discusses the applications of environment mechanisms in managing privacy. The priority of group privacy found in Section 5.2.1 suggests that territory behaviour (mechanism) overrides the importance of personal space.

5.5.1 Territorial behaviours

The purpose of this section is to investigate how the respondents coped with social interactions and maintained their privacy by using territorial behaviour. Several observations, on social interactions and boundary-regulation mechanisms in semi-public spaces such as central hallways, lift lobbies, and lounges, were conducted. As mentioned before, these parts of the buildings are defined as secondary territories. The reason for emphasising these secondary territories is because of their ambiguity of ownership and control. An individual or group could have some regulatory power over these places, but not to the same degree as over the primary territories. Due to the ambiguity of these spaces, there are potentially more miscommunications and more social conflicts associated with them than in other parts of the buildings.
5.2.2 Buffer zones between the territories

Interviews with informants in Nest Home project indicate that the central hallway was perceived as a semi-private space. Most of the respondents reported that the corridor was mostly used by the residents on the floor, and sometimes by people from upper/lower floors. As a woman said, she perceived the common corridor as a part of her apartment, surrounded by familiar people. She shared a story about her decision to be a ‘housewife’ when her baby was born. Given that situation, she spent most of her time in and around her apartment. Fortunately, the woman next door also had a baby so they shared a variety of everyday activities, mostly in the hallway. The use of two living rooms and the shared corridor were constantly enfolded into each other, creating a temporary domain for interacting, exchanging help, or sharing a good meal (see Figure 5.4). The two entrance doors were kept open onto the common corridor until evening (see Figure 5.5). When her husband came home from work, she might close the external layer (steel-grille) of the front doors for family privacy, but left the internal layer (solid-timber) open for ventilation and communication.

Figure 5.4 The articulation of socialisation spaces at the ends of the corridor
Another interviewee, when asked about his orientation towards the central hallway, said he perceived the corridor as a part of his ‘home’. As a result, he cleaned it up regularly and even put his flowerpots on the walkway to his apartment to mark the territory (see Figure 5.6). He commented that the architectural design sufficiently provided natural lighting for better surveillance of shared areas. It was observed in the fieldwork that all the stairs were well lit and occupants using them were visible to the view of people on the sky-deck area.

The design of the secondary territory in this case study allows occupants to maintain their privacy by using territorial behaviour. A possible explanation for
this may be that the corridor in the building is short enough to form small clusters of residents, to function as a semi-private space. The front doors opening to the hallway act as a physical barrier to create a temporary boundary. This boundary, in turn, forms a temporary territory in the corridor. This transient area is perceived to be more ‘home’ than is the rest of the corridor, an ‘interaction territory’ to use Altman’s (1975) term. The design provides the possibility for the occupants to facilitate social groupings that gain more control over the given residential settings. The flowerpots are placed in the hallway by occupants as symbolic markers preventing territorial encroachment. The above responses provide residents with some sort of control, ownership, and regulatory power over these secondary territories, to make them more ‘primary’. The design aspects providing natural light to the hallways and permeable quality to the staircases are consistent with the analysis of ‘defensible space’ by Newman, O (1972). A clear secondary territory makes clear rules of use and ownership, and permits better control over shared areas. In this case, the corridor, or the secondary territory, acts as a buffer zone, so that the residents could maintain their privacy in the apartment, or the primary territory.

Differently, in the Vicoland project, the central corridor was perceived by respondents as a semi-public area. Most of the respondents reported that their children always play at the hallway as a public area (see Figure 5.7). One interviewee said that he even organised a party for sixty guests in the corridor for his wedding. The communal corridor is also used as a place for social gathering and gardening activities (see Figure 5.8). Another respondent said he left his coffee table and some chairs in the hallway for neighbours, for drinking tea or playing chess. It is observed that individuals felt they had less privacy and found it harder to control the environment as compared to people in Nest Home. Statistical data confirms this observation, with the highest level of satisfaction with crowding in Nest Home (60.3%) and the lowest level in Vicoland (25.7%) among the case studies, (Kruskal-Wallis test $H=19.631$, $df=2$, $p<.001$).
Figure 5.7 Corridor perceived as semi-public space in Vicoland apartment

During the field investigation, a considerable concern with privacy was reported by residents who live on the ground and sky-deck levels of the Nest Home project (see Figure 5.9). Some interviewees needed a certain level of privacy and
preferred not be bothered by their neighbours or passers-by. However, the achieved privacy was much less than the level that they desired. One respondent living on the sky-deck level reported that, after a long day at work, he just wanted to go home and unwind. However, his preference for privacy was always disturbed by his neighbours, especially kids playing just outside his front door. Another respondent on the ground floor narrated a story that underscored the window placement facing the outer street. She explained that the passers-by on pavements outside ‘conveniently’ overlooked into her bedroom through the window. The feeling of being under the direct view of outsiders made her nervous and psychologically uncomfortable.

Figure 5.9 Apartments opening to the sky-deck level, Nest Home project

It appears that the lack of suitable semi-private spaces between the primary territory (individual units) and the public territories (public street and sky-deck area) could have made individuals’ privacy less manageable. The sky-deck area in the Nest Home project should have been a semi-public space with some level of resident control. In reality, this place acts as a public territory due to the open
access to anyone outside the residential area. Furthermore, the large number of people using this space, together with the lack of ability for social groupings, made the regulation of social interaction increasingly difficult. It is argued that the larger the domain is, the less controllable it is. Similarly, occupants in the apartments with windows facing directly onto the street would feel less privacy because of the lack of semi-private buffers that help to regulate intrusions. This failure of boundary-control mechanisms indicates an important implication for the design. There should be a secondary territory somewhere between primary and public ones, to maintain residential privacy. This secondary territory ought to have the quality of semi-private space, which could facilitate small group formation and strengthen individuals’ ability to regulate their social experience.

It appears that privacy problems are strongly related to territorial behaviours. In particular, the notion of private (primary territory), semi-private and semi-public space (secondary territories) space plays a central role here. The corridor, in the Vicoland case, neither provided semi-private space quality nor facilitated social groupings. As a result, this secondary territory did not support individual control, and the selective screening mechanism is more likely to fail. Furthermore, these places were not easily personalised or under the supervision of residents. Such areas were less regulated, and passers-by could not be easily watched by occupants. In Newman’s (1972) term, they are non-defensible territories.

From the field observations, it was evident that occupants actively used territorial behaviours to re-establish regulatory control in the hallways. Objects such as coffee tables and chairs on the second floor (see Figure 5.10), and planting pots on the fourth floor (see Figure 5.11) were purposely placed in the common corridor to mark the territory. These symbolic markers could make the rules of use and ownership clearer, and therefore minimise the territorial encroachment and maintain privacy.

Converting such secondary territory as shared corridor into semi-private space by design techniques could be a solution for regulating social interaction. For a long access corridor, it could be important to differentiate hallway space in the design,
providing ability for social groupings. The sense of semi-private space quality can also be delivered by using objects or symbolic territorial markers.

Figure 5.10 Coffee table and chairs provided for the second-floor-occupants.

Figure 5.11 Planting pots purposely placed at the fourth-floor-corridor
5.2.3 Boundary control: the use of front doors

During field investigation, it was evident that there is a pattern of modifying apartment front doors for boundary control in all the case studies. Observation indicates that an extra layer of steel door grille was added to the entrance door (see Figure 5.12 and Figure 5.13). One resident expressed that the reason for this adjustment was to increase the family privacy and security. He explained that a large number of passers-by, with many ‘strangers’, in the central hallway made him very uncomfortable. The threat to the regulation of social experience led to his decision on the architectural intervention to the door. The extra grille layer of the entrance door allowed him to make social contact but prevent territorial encroachment. Another interviewee explained that the grille layer of his entrance door allowed for cross-ventilation and supervision of his kids playing in the hallway. The door grille also allowed him to see, hear, and sense his neighbours.

![Figure 5.12 Adding door grille (swing) to the front doors at Nest Home project](image)

While the previous section emphasised the hierarchy of territories, these findings are about another boundary-control mechanism, protecting family privacy. According to Chermayeff and Alexander (1963), the front doors, or the joints, are
themselves physical elements to give the building plan its hierarchical structure of territories. The joint, permanent or temporary, must be provided to protect the privacy of primary territory in a residential setting. In the case studies, the door appeared not to provide adequate control to maintain privacy for personal space. The respondents who modified the front doors required barriers against the sounds and sights of visitors in the hallway. The entrance doors act as the thresholds between the primary and secondary territories, with the purpose of protecting residents from the threat of territorial encroachment. The encroachment, in this study, could be categorised in the form of violation (unwarranted entry into primary territory), invasion (bypassing boundaries and interrupting someone in his personal space), or even something less direct such as looking/stalking. The extra layer of door grille could either allow social interaction or provide the ability to prevent territorial encroachment.

Figure 5.13 Adding doors (folding) to the front doors in Thai An project
5.6 Summary

In this chapter, the relationship between multi-storey housing design and the level of privacy is understood by untangling that complex issue into the following correlations:

(i) between design elements (door, window, and corridor) and visual/auditory/social privacy; and
(ii) between design components (density, territorial hierarchy, and boundary control) and perceived crowding.

Fieldwork findings highlight the problems of visual, auditory, and social privacy caused by strangers/passers-by/neighbours using the central corridor. The first two issues were mostly related to the locations of front doors and windows; whereas social privacy was relevant to unwanted interaction taking place in the central corridor. Surprisingly, there was no privacy problem aroused by contacts between family members. Respondents appeared to prioritise their family privacy from the outside world over individual privacy within the family from each other.

The relationship between density and residential crowding was studied by unravelling that correlation through two components of density: physical density and perceived density. An important finding is that residential crowding cannot be handled by simply reducing the building density. A combination of high FAR and low site coverage could perhaps be an option for optimised level of crowding. Regarding population density, it was evidenced that internal space density had stronger effect on the perception of crowding than external space density had.

The indirect relationship between physical density and crowded feeling indicates that crowding could be more relevant to perceived density. Fieldwork findings show that social density had a strong impact on perceived crowding via the setting of group size. In particular, the composition of long/short corridor and large/small clusters of residents on a floor suggested different experiences of crowding. It is suggested that a maximum of ten apartments/households per corridor would be sufficient for maintaining privacy.
It was found that the tolerance of crowding varied depending on residents’ previous experiences of high-density living. Such determinants as place of origin (local/immigrant) and former living environment (shared room/apartment/shop house/detached house) influenced the experience of crowding. It was also evidenced that the tolerance of crowding varies in different geographic regions. Fieldwork findings suggest that middle-income occupants in HCMC required more privacy than those living in Da Nang City.

The territorial hierarchy and boundary-control mechanisms are crucial in providing the ability to have control over social contact and visual privacy. The central corridor, a secondary territory, was found to be perceived as either semi-private or semi-public space. Differentiating the design of a long central corridor could make it more or less a semi-private space. This, in turn, raises the possibility of increasing individuals’ privacy, made it more manageable and satisfying. It was also found that the lack of buffer zones between public spaces (public streets and sky-deck) and private spaces (apartments) in Nest Home reduced the level of privacy.

Findings reveal that boundary control was strongly related to the regulation of privacy. The joints between domains, or the front doors in this case, played an important role in controlling the boundaries. To enhance the control capability, respondents were found to be adding extra layers to their entrance doors. The operation of a multiple-layer door could help dynamically manage social contacts and protect occupants from the threat of territorial encroachment. These findings have important implications for developing design solutions that enhance the level of privacy and therefore improve the quality of life.
Chapter 6. Internal space organisation and living arrangements

6.1 Introduction

The previous chapter presented findings related to density and residential privacy. This chapter explores occupants’ activity patterns and the spatial uses inside the apartments. To develop socially sustainable multi-storey housing, it is important to make internal spaces respond to local living patterns. However, there is limited research on this matter, especially on the space-activity interactions inside the flat. The imperative of understanding the environment-behaviour relationship leads to the formulation of the second derived question:

**What is the relationship between the layout of internal space and the living arrangement?**

To understand the complexity of the relationship, not only occupants’ activities but also the ways they perceive, interact, and make a change to the (physical) environments must be investigated in a holistic manner. From that aim, this chapter is organised into the following three main sections: (1) the activity patterns and the uses of spaces; (2) social/spatial adaptation and the physical modifications; and (3) the internal space organisation for local living arrangements. The first two sections (Section 6.2 and Section 6.3) discuss a range of (social/spatial) adaptation and (physical) modification strategies found in the case studies. Section 6.4 provides synthesised discussions of those findings, and forms a consolidated framework for internal spaces.

6.2 The space-activity interactions

This section is about the patterns of activities found in case studies, and how the initial design of the built form supports the social needs of residents. Focusing on activities is the most efficient way to understand the relationship between the locality of living arrangement and the layout of internal space (Seo 2006). This study maps occupants’ activities in association with the spaces where they happened, rather than the room labels. It first deductively explores the occupants’ activities in associated functional spaces provided by the architects. The activities were initially examined according to four groups: (1) paid work and education, (2)
personal and family care, (3) household work, and (4) reflection and recreation (Ellegård 2006). During the field investigation, it was found that some activities were observed to be well suited to the intended spaces provided by original design. In particular, personal care and household work were generally well fitted to the provided rooms, except for gardening. Some others, however, were found to be suited only with the interventions of flexible uses, social/spatial adaptation, or physical modifications.

Five groups of domestic activities emerged in association with the supportive capability of relevant spaces. The first group was well suited to the intended spaces, and therefore will not be discussed in the sections that follow. The second group could be easily adapted to spaces that were available. They comprise children playing and family gathering. The third group is important activities, but the associated spaces for them were not provided (missing). They include studying, working at home, doing home-based business, and worshipping. For those activities to be arranged in the home, spatial adaptation was needed. The fourth group of activities required physical transformation to fit, because the provided spaces were inadequate or unsuited for the desired uses. These activities were related to family profiles, stages of life, and residents’ lifestyles. The fifth group of activities was found to be socially adapted to the new living conditions. Instead of appropriating the spaces, occupants decided to change their living habits to adapt to the given physical settings. The followings sections discuss the inductive categories of space-activity interactions in the apartments among the case studies.

6.2.1 Activities well suited to the given spaces

6.2.1.1 Cooking

Although well suited in the kitchen, the activity of cooking was preferred to be visually separated from the living room. A tenant from the Nest Home explained that cooking and preparing food are usually considered informal in the Vietnamese culture. Therefore, activities such as preparing food, cooking, and cleaning pots and pans should not be exposed to outsiders. In all cases, observations show that the view of the kitchen from the living room was obscured
either by the original layout (see Figure 6.1) or by the partitions installed by the users (see Figure 6.2). Interviews with architects who were involved in the design of Nest Home project confirmed their efforts to arrange the kitchen to visually conceal it from the living room. They also pointed out that the kitchen was prioritised in receiving the daylight and ventilation due to the heat and odour created when cooking.

Figure 6.1 The kitchen is visually separated from the living room by the layout

Figure 6.2 The view to the kitchen from living area is obscured by partitions

This visual relationship found in modern apartments was probably derived from the spatial characteristics of traditional houses. In the past, the kitchen was in an
outhouse next to the main building (see Figure 6.3). At the time, activity cooking was considered too secular to be visible from such formal activities as welcoming visitors or worshipping (Tran, Q 2001). Furthermore, the odour, smoke and heat caused by cooking required the kitchen to have direct access to the natural environment. This placement and planning method was adapted to the contemporary design of multi-storey housing, leaving the top priority being for the kitchen to connect to the natural environment. It can also be said that the spatial requirement relevant to the kitchen in contemporary apartments is inherited from the space structure of traditional houses.

Figure 6.3 Master plan of a vernacular house, adopted from Na (2011).

### 6.2.1.2 Having meal

During the field investigation, it was found that having meals was an important activity in domestic life, and the dining area had a central role in organising internal spaces. A common view amongst interviewees was that dinner time is significant for family members caring for each other and parents teaching children moral lessons. As one respondent said, having meal was important in connecting people and provide a sense of family. In terms of spatial organisation, observations indicate that the dining area was usually combined with the kitchen to form the dining-kitchen space. No physical separation such as kitchen bar or
kitchen island was set up between the two functional spaces (see Figure 6.4). Furthermore, it is interesting to note that the dining area was directly accessed from the central corridor via the entrance door; whereas the living area was ‘pushed’ to the ‘back’ of the apartment (see Figure 6.5). In family events, the dining room was integrated with the living room to form a larger area for having a home-cooked meal.

Figure 6.4 The spatial integration of kitchen-dining and dining-living in apartments in Nest Home (above) and Thai An (below)

Although the morphologies of the three apartments in Figure 6.4 were different, the same topological relation of central corridor-dining_kitchen_living-balcony was evident (see Figure 6.5 and Section 6.3.1). The kitchen in this descriptive syntax is superscript because this space is offset from the main linear spatial sequence.
This finding corroborates the ideas of Lister, Pohl and Fountoulakis (2011), who point to the importance of meals in the Vietnamese culture, not just as a time to eat but also as an opportunity for family members to interact socially. The finding also supports Ly’s (2012) observations regarding the significance of the dining room for bringing family members together and providing them with a sense of family. Regarding the combination of the dining area with the kitchen, this feature is likely to have been inherited from the spatial structure of a traditional house. Occupants rarely have breakfast at home, so the kitchen island/bar is not needed in everyday routine (see Figure 6.6). The dining-kitchen area is used extensively after hours, functioning as a place for family activities (Ly 2012). As such, the spatial arrangement of kitchen-dining-living in a modern apartment could probably be adapted and developed from the spatial framework of the traditional shop house.

Concerning the direct access to the dining area from the public hallway, this finding is rather unexpected. In the traditional shop house, the living room/the shop is directly connected to the entrance (To 2008) (see Figure 6.6). A possible explanation for this shifting of spatial sequence might be that people have changed their habits of receiving guests when living in multi-storey housing.
Occupants in modern apartments appeared to welcome their visitors elsewhere, outside their apartments (this social adaptation to vertical living will be further discussed in Section 6.2.5). The change in receiving guests is attributed to the devaluation of the original function of the living room. The finding of the living room being pushed back is an illustration of social adaptation to the new living form. The living space, in this case, should be considered as the extension of the dining area where family members were gathering.

6.2.2 Activities required dynamic and flexible uses of spaces

6.2.2.1 Family gathering

During the field investigation, it was found that family gathering was one of the most important activities in everyday living of the occupants. Most of the interviewees reported that all members of their family gathered for dinner and watched television after working hours. One participant commented that such a gathering time was culturally important to a household for fostering the spiritual level of the family. The activities could be having meals, chatting, playing cards, watching films, and playing games. His married children were encouraged to return to home to have dinner. The evening meal was not only for helping the young couples who did not have enough time to be cooking for themselves, but also for maintaining close contact. To accommodate family gatherings, there was a common trend of combining living room and dining room for a larger sociable area. This combined space was named by the residents as the ‘common’ room. Talking about this issue, one interviewee said her family utilised the living area for family activities. When the children gathered, usually at weekends, they rearranged the furniture to create a long room with enough space for the extended family (see Figure 6.7). The rearrangement of the furniture is recorded in Figure 6.8.
This finding further supports the results of a study by Ly (2012), which pointed out the importance of family gatherings in family life. These activities are significant in connecting and encouraging family members to gather, and in
providing the sense of family (Ly 2012). While Ly’s findings were limited to the confines of previous housing types, including pre-reform and post-reform houses, the present study expands these in the current context of multi-storey housing. It is argued that the lack of space in apartment housing could lead to a lack of home-life. However, this finding indicates that family gathering is still a crucial part of life in Vietnamese apartment housing. However, in a morphological perspective, a gradual change in the use of internal spaces for family gatherings has been recorded through the development of housing forms. In pre-reform houses, the sociable space for the family was mostly the dining room. In post-reform houses, however, it was dynamically switched between the dining room and the living room. If visitors were in the house, family gatherings were conducted in the dining area. If there were no visitors, residents would occupy the living room for family gathering, chatting, or watching television. The role of receiving guests for the living room in post-reform houses appeared to be downgraded (Ly 2012). In apartment housing, due to the limitation of unit area, this dynamic use of space continues to exist by the integration of the living room and dining room into a ‘common’ room.

6.2.2.2 Children playing

Observations and interview responses suggest that children played both inside and outside their apartments (see Figure 6.9). For the indoors, they either played quietly in the corner of the living room or watched television. The use of internal space was dynamic due to the limitation of apartment area. After the children went to bed, their parents tidied up their playing corner and used it for other activities such as working at home. In responding to the question of children playing, one informant in Vicoland reported that his children preferred to play in the public space downstairs, but it was not always possible to go out. Furthermore, he felt safer when the kids play indoors or in the hallway where the adults could easily be looking out for them. Observations also confirmed that children were seen playing in groups in the central corridors or the lift lobbies.

Children playing reflects the dynamic of living arrangement through the flexible uses of internal spaces. This way of using space appears to be effective because
different members of a family had discrete daily routines. This spatial use is termed as time-space dynamics (Nuala 2003). Observations in a Nest Home apartment showed that the children, when back from school, created their own domains in the living room for playing. The mother was in the kitchen preparing dinner when the father was watching television. The Vietnamese children were taught to follow some required behaviours of being indoors. As an influence of Confucian philosophy, they were expected to behave themselves in a way that pleased their parents. For that reason, children would prefer the greater ‘freedom’ of playing in the corridor while not being far from their parents.

![Children playing indoor and 'outdoor'](image)

**Figure 6.9** Children playing indoor (left) and ‘outdoor’, on the hallway (right)

### 6.2.2.3 Gardening

Surprisingly, the activity gardening was found to be very common in respondents’ dwellings, for 46% of the interviewees. Observations show that plants were grown in the pots located in either balconies, windowsills, or inside the units (see Figure 6.10). With the limited size of the balcony, some trellises were mounted into the existing structure for the plants to climb (see Figure 6.11). Apartments on the ground floor in Vicoland facing the alleyway had a strip of gourds and melons along the façade (see Figure 6.12). Among those gardening, this activity was observed more frequently in the apartments with three bedrooms (58%) and the households with elderly (25%). A common view amongst interviewees was that the activity of gardening was a good way to relax, to keep busy, and to enhance
the micro climate. Some respondents considered gardening as a necessity; others viewed it as a chore. Those respondents who did not have a garden also wanted a ‘piece of green’ in their dwellings. However, they could not grow plants on the balconies due to strong winds, direct sunlight from the west, or too limited space.

Figure 6.10 Flower pots allocated on a balcony (left) and on a windowsill (right)

Figure 6.11 Different types of trellis fixed onto the structures of balconies

Figure 6.12 A small garden running along the alleyway, Vicoland project
These findings may help to understand the need for being close to nature for occupants who lived above ground. Green area has always been an important part of housing culture. Courtyards with small gardens have existed from vernacular housing, to traditional shop house, and popular housing (Na & Park 2011). It can be said that the need for an internal green space is inherited from the previous living forms and adapted into multi-storey housing. In this modern housing type, the balcony is the only functional space in the apartment fully open to natural sunlight, and thus appeared to be the suitable place for gardening. This finding also indicates the influence of household composition on the activities of gardening. In fact, families with children have to spend extra time for overwork and childcare, leaving less time for gardening. Maintaining the garden requires some effort; but it brings about many benefits such as cooling the internal spaces and enhancing the connection with the natural environment.

6.2.2.4 Working and studying at home

During the field investigation, it was found that working at home is a common activity. A common perception amongst interviewees was that the home is considered as a workplace. Respondents indicated that working at home could be the continuation of unfinished tasks from work or extra income-generating activities. One interviewee in Nest Home said he had to do extra work to support his six-member family. His wife stayed home to take care of the children, and his formal income was not enough to run the family. Regarding the work-at-home arrangement, he found that his work did not require much space: it was just a small desk with a computer located in the living room (see Figure 6.13). After having dinner, he started to work and concurrently supervised his daughters studying next to him. Another interviewee in Vicoland - an English teacher - when asked about working at home, said she had an extra job translating books and documents. After finishing the household chores, she started her work in the corner of her bedroom (see Figure 6.14). It is important to note that some work terminals were dynamically integrated into larger spaces as temporary domains, while some others were carried out in an enclosed area or a room exclusively (see Figure 6.15).
Figure 6.13 Work terminal located at a corner of the living room

Figure 6.14 Work terminal located at the corner of a bedroom

Figure 6.15 Working space as an enclosed area (left) or a room exclusively (right)

A possible explanation for this might be that the Vietnamese people have had a long tradition of working and living in the same building. In traditional shop houses, the business space was located in the front room connected to the street for selling goods or doing services (Ly 2012). The business and the living spaces were intertwined, overlapping and practically indistinguishable. This living
pattern has been integrated with different aspects of family life passing from generation to generation. This living habit might still exist for contemporary middle-income people. Furthermore, innovations in technology increase the possibilities of working from home. These jobs can be easily carried out in a small work terminal at home, as the ‘flexiplace’ option (Nuala 2003). It is important to note that the majority of respondents were working at home as a supplement to their ‘formal’ incomes, not for a sole living income. Occupations involving data entry and retrieval, and typing, are natural for working at home. Skilled information analysis jobs such as software coder and researcher are also suitable for working from home (Graham 1993).

6.2.3 Activities requiring spatial adaptation (spaces not provided/missing)

6.2.3.1 Home-based businesses

There was a considered proportion of survey respondents (21%) had home-based enterprises (HBEs), businesses on the premises as the main source of their incomes. As shown in Table 6.1, the frequency of existing HBEs in all three cases is 21%, gradually increasing from 16% in Vicoland to 22% in Nest Home and 24% in Thai An. Interviews with selected residents indicate a variety of home-based economic activities, comprising two groups, of retail/commercial and manufacturing. As shown in Table 6.2, the most common types of HBE in the case studies were retailing/convenient stores (20%), selling food and drink (13%), teaching at home (10%), and dressmaking (8%).

Table 6.1 Survey results of home-based enterprises in case studies (HBEs)

<table>
<thead>
<tr>
<th></th>
<th>Number of respondents having HBEs</th>
<th>Sample size</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vicoland</td>
<td>12</td>
<td>74</td>
<td>16%</td>
</tr>
<tr>
<td>Nest Home</td>
<td>16</td>
<td>73</td>
<td>22%</td>
</tr>
<tr>
<td>Thai An</td>
<td>20</td>
<td>83</td>
<td>24%</td>
</tr>
<tr>
<td>Total</td>
<td>48</td>
<td>231</td>
<td>21%</td>
</tr>
</tbody>
</table>
Table 6.2 Home-based economic activities found in case studies

<table>
<thead>
<tr>
<th>Types of HBE</th>
<th>Vicoland (n=9)</th>
<th>Nest Home (n=12)</th>
<th>Thai An (n=18)</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Retail/commercial</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Convenience store</td>
<td>7</td>
<td>2</td>
<td>2</td>
<td>20%</td>
</tr>
<tr>
<td>Sale of groceries</td>
<td>2</td>
<td>5</td>
<td></td>
<td>5%</td>
</tr>
<tr>
<td>Sale of food and drinks</td>
<td>5</td>
<td></td>
<td>1</td>
<td>13%</td>
</tr>
<tr>
<td>Hiring equipment and cars</td>
<td>1</td>
<td></td>
<td></td>
<td>3%</td>
</tr>
<tr>
<td>Beauty salon</td>
<td>1</td>
<td></td>
<td></td>
<td>3%</td>
</tr>
<tr>
<td>Offices (working/represent)</td>
<td></td>
<td>2</td>
<td></td>
<td>5%</td>
</tr>
<tr>
<td>Teaching at home</td>
<td>1</td>
<td></td>
<td>3</td>
<td>10%</td>
</tr>
<tr>
<td><strong>Manufacturing</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tailor (made/measure/repair)</td>
<td>2</td>
<td>1</td>
<td></td>
<td>8%</td>
</tr>
<tr>
<td>Media (composing)</td>
<td>2</td>
<td></td>
<td></td>
<td>5%</td>
</tr>
<tr>
<td>Repairs cars/motorcycles</td>
<td>2</td>
<td></td>
<td></td>
<td>5%</td>
</tr>
</tbody>
</table>

This finding has an important implication for urban housing design, that the informal sector, of which home-based businesses are the major part, is important in developing countries. It is generally believed that home-based work, in the twenty-first century, is associated only with blue-collar rather than wealthier, white-collar neighbourhoods (Davis, H 2012). However, with more than a fifth of the respondents having income-generation through informal-sector activities at home, this finding proves otherwise.

Fieldwork data informed two key categories of using internal space for HBEs: (i) blending the space for working with that for living; and (ii) reserving specific space to allow HBE activities. It is important to note that the form of reserving space was only available in the duplex apartments in Thai An project. The blending space for working with that for living was the dominant form in the case studies.

Observations indicate five types of arranging HBE spaces found during the case studies (see Table 6.3). Among these, three arrangements (types 1, 2, and 3) belong to the blending working/living space category. The other two arrangements (types 4 and 5) belong to the reserving the space category. It is interesting to note
that the latter category only took place in the duplex apartments, in the Thai An project.

Table 6.3 Classifying HBEs as per their use of space, adapted from Seshachalam and Rao (1987)

<table>
<thead>
<tr>
<th>Type</th>
<th>Descriptions</th>
<th>Blending</th>
<th>Reserving</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>shop-front on the street with a dwelling unit in the back</td>
<td>✔️</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>a rented resident with own shop</td>
<td>✔️</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>own resident with an encroaching business space</td>
<td>✔️</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>the ground floor as a business space with the first floor as residential unit</td>
<td></td>
<td>✔️</td>
</tr>
<tr>
<td>5</td>
<td>own resident with a rented business space</td>
<td></td>
<td>✔️</td>
</tr>
</tbody>
</table>

Regarding the blended use of space, one woman in Vicoland narrated a story that her family was devoted to tailoring and dressmaking for generations. The home-based business is the primary source of income supporting her family and her son studying abroad. Most of her customers are residents living in the same buildings or at neighbourhoods nearby. She used the living space for receiving customers and sewing work, and a part of the dining area for storing materials (see Figure 6.16). Another interviewee in the Nest Home project, when asked about his home business, said he set up a hiring car company using his apartment as a workplace. The common room (combining living and dining space) was arranged to function as an office, opening to the sky deck for receiving visitors. He explained that the customers, mostly residing in the area, felt comfortable with his service because of its reliability, convenience, and accessibility. In the Thai An project, one respondent working in construction industry revealed that his apartment contained living quarters as well as his firm’s office. To accommodate five employees, the living-dining room was divided into multiple workstations by movable partitions (see Figure 6.17). For the reservation of space for HBE’s activities, home-based economic activities (owned or rented) in street-level-duplexes in Thai An were observed on the first floor activities (see Figure 6.18). The second floor was used for domestic activities (see Figure 6.19).
Figure 6.16 Home business: dressmaking (left) and selling of groceries (right).

Figure 6.17 Home-based business: a construction design company

Figure 6.18 Setting for a coffee shop in a duplex unit, Thai An project
Figure 6.19 Reserving the ground floor for coffee shops (left) and using the second floor for domestic activities (right)

The blending working space with living space was found to be common in multi-storey housing because it derived from housing culture and traditional ways of life. The traditional shop house epitomised the spatial characteristics of blending working and living spaces in a HBE that require little skills and resources. In multi-storey housing, home-based economic activities requiring little resources, such as tailoring, retailing, or selling groceries are suitable for a blending arrangement. Families are living and working in the same space, and the relationship between the shop, and everyday life is flexible. If the HBEs require modest/high resources, such as coffee shops or designed offices, the preserving arrangement was used. The apartment unit was treated like a piece of infrastructure in the production process. In this case, doing home-based business calls for an extensive use of space for making, storing, and selling products.

6.2.3.2 Worshipping spaces

Worshipping emerged from the fieldwork as one of the most important activities in domestic life. Observations indicate that those activities exist in a variety of forms and take place in different locations. They include worshipping ancestors, Buddha, gods, deities, or the three legends (of Fortune, Wealth, and Longevity). Among these, the most common type of belief was devoting to the ancestors, with 87%. Respondents reported that they believe that ancestors’ spirits continue to
live in the family and follow their daily routines. The activity of praying expressed their appreciation to the ancestors for protecting the family. The locations of ancestral shrines and altars were observed to be varied, but were usually in the living room or in the dining area. It could sometimes be a large table, or less commonly the whole room for worshipping purpose (see Figure 6.20). A common view amongst respondents was that, in the worship space, the location of the ancestral altar had to be fixed. The second most frequent (59%) worshipping activity was praying to the Earth God (or the God of Land).

Respondents believed that the Earth God is the governor of the space, protecting family members from the dead. For that reason, the shrines usually sit on the floor and face the entrance to guard the buried souls (see Figure 6.21). For the worshipping procedure, the male householder is responsible for praying to their ancestors or gods. They burn the incense twice a day, usually in the early morning and late night, to thank the ancestors/gods for blessing their life.

Figure 6.20 Ancestral altar (left) and ancestral shrines (right)

Figure 6.21 Shrines for Earth God and Wealth Legend in different locations
The above findings emphasise the need for worshipping spaces in modern multi-storey housing. When space is set aside for a specific function such as the altar, in the high-density setting such as apartment unit, worshipping activities apparently play a significant role in domestic life. This social need was deeply rooted in a traditional cultural view (Nuala 2003). In Vietnamese tradition, people believe that a worship corner is a place where family members connect with their ancestors’ spirits (or god) to wish for protection for the family (Ly 2012). As worshipping activity had a spiritual meaning in the occupants’ everyday life, the associated space dominated the central location in the traditional house (see Figure 6.22). This convention from the past has been passed through generations, absorbed and adapted to the modern housing forms. In other words, the occupants’ folk model drives the spatial thinking and informs elements that make a domestic space a home. With the limitation of space in modern apartments, the shrines were usually fixed on the upper part of the wall, near the ceilings. Only a few residents living in bigger units could use a room exclusively for worshipping, as in a traditional home.

![Figure 6.22 Worshipping space is in the central location of the traditional house, adapted from Na (2011)](image)

There were divergent and conflicting discourses about worshipping activities and their associated settings in apartment housing. Interviews with architects involved in the design of case studies indicate that they were aware of the need for worshipping space. Those places, however, could not be allocated because of the
limitation of space and the conflict with fire and life-safety codes. However, in contradiction to this, all selected apartments were observed to have ‘honourable places’ located in the prominent locations of the units. One participant commented that the honourable place in his apartment was for worshipping the ancestors. The ancestral shrine was seen mounted on the wall facing the door. He believed that these spaces must be placed in front of the entrance door. Another interviewee, when asked about ancestral worshipping, showed the altar located in the living room (see Figure 6.23). He asserted “it does not need to be facing the door”, and “a prominent location in the house is good enough”. Some interviewees did not devote to any particular deities, but still had honourable places in their apartments “to ease their conscience”.

Fieldwork data indicates two conflicting trends towards the sense of order and spatial arrangement, between traditionally minded and less traditional respondents. One informant reported that the influence of folk traditions on his spatial thinking was so strong. He had felt uncomfortable living in his apartment until the worshipping space was arranged in a certain way; whilst a young respondent mentioned that he set up an honourable place just for easing his conscience. However, he was concerned that blindly following folk traditions brought irrational restriction on the layout.

![Figure 6.23 Different ways of setting up the worship spaces](image)

The divergent and conflicting discourses about worshipping activities and their associated spatial settings illustrate ‘the production of social spaces’. These different viewpoints, between the authorities and occupants on worshipping activities, recalls the metaphor of top-down and bottom-up experiences by
Certeau, Giard and Mayol (1988), and different ways of resolving those. Despite the user’s need, worshipping space was the most neglected functional space in the design of contemporary multi-storey housing. The necessity of worship space was not appreciated by the authorities because burning the incense and paper offerings after praying posed a risk to fire safety (top-down). Architects are well aware of the issues, but they ignore these to avoid conflicting with the related regulatory parties. However, occupants added worshipping spaces to their apartments regardless of the warnings or even prohibitions from local authorities (bottom-up). Another reason for the diversity of spatial behaviours was the difference in the personal experiences of the worshipping space. The personal folk knowledge has been absorbed and adapted differently among individuals, leading to the variety of spatial behaviours in modern housing. Regardless of this variety, the forming of worshipping spaces in apartment housing is currently inevitable, Thus, the designers should consider it in the light of its positive contribution to maintaining local ways of life.

6.2.4 Activities requiring physical transformation

(spaces inadequate or unsuited for desired uses)

In order to accommodate social needs, residents were found to be actively appropriating the given spaces. The physical changes found in the case studies covered a wide range of practices, including modifying, reshaping, adapting, adjusting, and altering spaces at various scales. The fieldwork data indicates that those changes generally occurred within two clearly defined levels: (1) changing spatial sequence, and (2) transforming the spaces. The following sections first describe the physical modifications, and then identify the underpinning reasons for the changes.

6.2.4.1 Changing spatial sequence

It was found that there was a pattern of change in the Vicoland project related to the organisation of the front bedroom and the dining area. Almost two-thirds of the participants in this case study reported that they had to change the spatial structures to fit their living arrangement. As one interviewee said, her family only
had three members, including a small daughter. The apartment size was currently acceptable, but she was frustrated by the layout (see Figure 6.24). Firstly, the ‘front’ bedroom in the original plan was noisy and lacked visual privacy. It was directly connected to the long central hallway full of people and activities during the day. Furthermore, the window opening to the void (see Figure 6.24) for natural lighting and ventilation was visible from the hallway. Secondly, the bedroom was unnecessarily big for her daughter. She needed only one full-sized-bedroom, and as much as space possible in the dining-living area for family activities. Thirdly, the communal area was pushed to the back of the apartment, connecting to the central corridor through an access corridor.

This layout isolated the domestic life and reduced the sense of place. The unfortunate position of the bedroom forced her to change the spatial sequence. The ‘front’ bedroom was reshaped, and the toilet door was adjusted in its orientation, facing away from the public view (see Figure 6.25). By offsetting the partition away from the entrance door, the bedroom was reduced to a half of its original size, leaving space for the new dining area. For natural lighting and supervising the child, that brick partition was replaced by a full-height glass partition with sliding door. By making those changes, she now had a smaller bedroom for her daughter that could be supervised from the kitchen and dining area. In some circumstances, she could also receive guests in the dining area without invading her family privacy. The new spatial order, she commented, could address her needs for privacy, social interaction, working at home, and taking care of the children, without sacrificing internal ventilation and lighting.
Another interviewee, when asked about the spatial sequence of the house, said that the original layout was not appropriate to the living arrangement of his family. Different from other respondents, he frequently had visitors stopping by his home. The kitchen, according to him, was the first thing visitors saw when entering the dining-living area. From his perception, the cooking area is quite informal, and therefore should not be seen by the outsiders. Furthermore, the bedroom door was positioned in the middle of the wall so that the sofa had to be
placed on the opposite side. This situation led to a lack of privacy for family members when someone dropped by (see Figure 6.26). It was also too inconvenient for the guests to use the restroom as they had to go through the kitchen area. For the front bedroom, the size was suitable for his two daughters, but the position was inappropriate. As such, he decided to change the spatial order of the layout. The kitchen was moved to the back of the apartment and visually separated from the living-dining area by a stepped decorative partition (see Figure 6.27). The toilet was reshaped, leaving more space for the common area. For the front bedroom, he commented that the demolition of the walls was technically complicated, and therefore very expensive to do. By making those changes, the respondent could improve both the level of family privacy and the social life.

Regarding the spatial problem-solving, respondents’ decisions were made mostly by practical approaches based on their understanding of the space. Interviews indicated that the occupants’ design ideas were developed from what made sense in the space, the practicality of the solutions, and comparison with what the neighbours did. For the construction, the respondents usually did all the alterations with the help of local masons. Interior designers had little interest in this kind of work because they had little direct impact on the design process, one participant commented. In terms of the authorisation for the changes, a respondent said that he only contacted the authorities if there was no precedent for what he intended to do. If other residents had been given permission to make changes, he could make the same alteration without the need for formal approval.
The findings suggest that, in such a high-density environment as an apartment, the configuration of the plan is a critical factor for a tenant’s living arrangement. The layout of internal spaces in Vicoland imposed restrictions on how occupants lived. In particular, it indicated a contradiction in the spatial requirements, between social interaction (receiving guests and visiting neighbours) and family privacy (cooking, having meals, and family gathering). Occupants decided that they were going to live ‘actively’ by making those changes rather than adapting themselves.
to the given spaces. The interventions of the inhabitants found in the three case studies are understood as an attempt to bring ‘order’ into space or to ‘re-appropriate’ it to their living patterns and lifestyles. As such, patterns of changes and adjustments are empirical evidence for understanding the relationship between occupants’ living arrangements and the layout of internal spaces.

The above two examples represent the pattern of change in spatial sequence related to the location of dining, living, and kitchen in the Vicoland project. These changes form a space structure with a spatial sequence similar to those found in the other case studies [corridor-dining-kitchen-living]. In particular, the dining area, directly linked to the common hallway, was combined with the kitchen, and tentatively extended to the living area. The kitchen was visually separated but not segregated from the living space. The difficulty in changing spatial sequence in the second example, due to the inflexible partitions, has a critical implication for designing internal spaces. It reminds one of Boudon’s argument that “the capacity to accommodate, facilitate, and even encourage these changes is a fundamental feature of the design” (Stanek 2011, p. 90). In addition, these findings further support the idea of Rapoport (1969), Boudon and Onn (1972), and Lefebvre and Nicholson-Smith (1991), about the tension between the constraints on and the appropriation of space through inhabitation (Lefebvre & Nicholson-Smith 1991).

Occupants’ knowledge of space is likely to be influenced by Bourdieu (1977) concept of habitus. The way spatial design thinking is formed is based on “a set of practical taxonomies, divisions and hierarchies which are embodied in the everyday lifeworld of experience and action” (Kim 1996, p. 2). Because the habitus is embedded in popular housing types, it becomes a form of knowledge, a set of structured beliefs about reality in terms of how people actually live and how people should live.

6.2.4.2 Transforming the spaces

Another important finding is that there was a pattern of combining two bedrooms into one. In the Thai An project, one informant reported that his family only used one of the two provided bedrooms. He expressed that his son would not need a separate room until starting school. What he really needed was a bigger bedroom
where his son could safely play. The original layout also did not provide a proper storage room/cupboard or large enough wardrobes for keeping family stuff. As such, one of the bedrooms was used for storing clothes and miscellaneous items. Another problem was that the doors of the bedrooms were both open onto the common area, leaving no space for placing furniture in the living area (see Figure 6.28). There was a need to physically modify the space for a better living arrangement. To this end, the wall between two bedrooms was demolished, joining the two sleeping areas. One of the doors was filled up, giving space for the sofa. The other door was offset, leaving space for a large wardrobe. The redundant toilet was converted into a storage room for keeping miscellaneous items. Consequently, the modifications extended the bedroom, created a proper living area, and offered a storage room (see Figure 6.29). In the Nest Home case study, similar types of modification were evident. A variety of perspectives were expressed about the spatial redundancy in those apartments with two-bedrooms and two separate toilets. However, not many alternative options were available for people who only needed one bedroom. Therefore, they had to make physical modifications to the space to meet their specific needs. In the Vicoland project, it is interesting to note that there was no record of combining bedrooms. Interviews with residents revealed that the separated locations of the two bedrooms made this combination technically difficult and expensive.

Figure 6.28 The original layout (left) and the layout after modifications (right)
This finding emphasises the influence of family profile on the layout of internal space. The majority (42%) of households in the case studies were nuclear families with only one child, ranging from 46% in Vicoland, to 40% in Nest Home, and 41% in Thai An. For that reason, the modifications related to the bedrooms were expected. In the West, it may be seen as a basic requirement for children to have their own rooms. In Vietnamese culture, however, children sleep in their parents’ room when they are small (Thiem 2008). Families in this profile required only one bedroom, and therefore had a tendency to combine two given bedrooms to form a larger one. However, this behaviour might become less common in the future because of the rapid transformation of the life-styles of residents. Furthermore, the emerging family profiles, such as singles living alone, unmarried couples, and couples with no children, also have made changes in spatial behaviours. For these reasons, the bedrooms should be placed side by side, leaving the opportunity for occupants to easily merge/divide the spaces for their immediate needs.

Another interesting finding was the trend of connecting two adjacent apartments into a larger unit. The following data were collected from an apartment formed by joining two units on the ground floor, in the Nest Home project. The respondent was a member of a nuclear family with two children, and belonged to the upper-middle income group. She narrated that, with the given economic conditions and the demand for space, her family intended to buy a vacant land not far from the central district to build a house. The course of action, from looking for an available site (not far from the city with affordable price), to developing the
design (appropriate and again affordable for her families) and managing the construction process (building permits, selecting materials, and dealing with contractors) could take years to finish. However, for personal reasons she was in immediate need to house her family. At the time, she was aware of the Nest Home project and found out the promotion of prices when buying two units at once. This package also offered a free upgrade to the highest quality options for interior finishing. With these values, the cost of two apartments was cheaper than building up a house from the ground up, in the same neighbourhood, and through a lengthy process. Furthermore, these apartments were on the ground floor and directly opened to the public streets, just like traditional street houses did. The most important decision she had to make concerning the choice was whether or not the wall in between was permitted to be knocked out. Fortunately, this wall was a partition without inherent features and could easily be removed (see Figure 6.30 and Figure 6.31). This change was also allowed by the authorities. By purchasing these apartments, she was able to move in conveniently without sacrificing her needs and also avoiding the painful process of building a street house. As such, the modification was a cost-effective process, and she was pleased with the new living arrangement.

Figure 6.30 The original layout of two apartments (left), and the new layout after knocking out the wall (right)
The above finding indicates that, with increasingly varied life-styles and family profiles, the need for diversity of apartment structures might outgrow the capacity of building. This finding also highlights that, if larger units were unavailable for larger families, two smaller units allocated by side could enable the option of joining them. To this end, the layout of internal space should be arranged in a way that can be adapted when needed. For instance, the unit should be regular in plan without awkward angles or inherent features. The locations of columns and structure elements should not hinder the choices of appropriation spaces. Furthermore, the transformation process could also be convenient, or less confusing, for the occupants, if there was a range of contractor’s options to go along with. The level of bureaucracy attracted to the approval process of modifications should be minimised. The physical alterations were unavoidable when multi-storey housing was not responsive to individual resident needs. However, these problems can be avoided if the architect is more sensible to the variety of family profiles and needs in the design of internal spaces.

6.2.5 Activities socially adapted to the physical settings

**Receiving guest**

The most interesting finding on the living arrangement was that the activity of receiving guests was taking place outdoors, mostly at coffee shops downstairs. The majority (74%) of interviewees reported that they frequently met their visitors elsewhere, outside their apartments. Of the respondents, 89% from Vicoland, 67% from Nest Home, and 72% of Thai An reported receiving their guests at cafes on
the street level. A respondent in Thai An indicated that his visitors could not
directly access the apartment without making a prior contact. A coffee shop was
nominated by the occupant as a meeting venue, usually in the perimeter of the
complex. Another interviewee, in Vicoland, asserted that she preferred to meet her
friends at a favourite coffee shop nearby. She explained that the reason was to
keep the privacy of her apartment. Another respondent in Thai An expressed his
habit of welcoming guests at the coffee shops provided on the ground floor (see
Figure 6.32). Only relatives and close friends were welcomed in the living room,
in some ritual events. Conversely, families living on the street/sky-deck level, or
running home-based businesses, still received guests in the living rooms (see
Figure 6.33).

Figure 6.32 Receiving guests at coffee shops in Vicoland (left) and in Thai An
(right)

Figure 6.33 Receiving guest in the apartments on the street level (left) and with
home-based business (right)
Concerning the pattern of receiving guests extending to the coffee shop, this finding is rather unexpected. The result may be explained by the fact that the activity of welcoming guests has been developed over time as a response to the changes in lived society. In a vernacular house, the living room provides a formal area for greeting visitors as well as for family members’ gathering. In contemporary shop houses, guests or customers are welcomed in the living room that is directly connected to the store. Family activities are held in the dining-kitchen area. The space for guest welcoming is separated (but not segregated) from the space for family activities. This is the spatial adaptation to the economic activities of the shop front. In current multi-storey housing, except for apartments combining home-based businesses with living activities, residents have a tendency of keeping visitors outside the perimeter. As discussed in the previous chapter, the need for privacy was strongly related to the living preferences of middle-income people. Furthermore, eating out or having coffee is relatively cheap in comparison with the incomes of the given groups (Thanh 2011). This change in living pattern is attributed to the devaluation of the living room regarding the role of guest receiving. The living room has become more private, for family members to act and interact. Social activities, including receiving visitors, have become more flexible, taking place in various locations and becoming gradually detached from family activities. In this case, the coffee shop acts as a ‘living room’, an extended domestic life to public spaces. In brief, the combination of space limitation, the priority of family privacy, and the preference of social interaction, were the major factors in creating the social adaptation to a highly externalised lifestyle.

6.3 Internal space organisation for local living arrangement

This section consolidates previous discussions on the uses of space, social/spatial adaptation, and physical modification strategies. The identified patterns of activities in the case studies were mapped in relation to the associated spaces (see Figure 6.34). This chart indicates how domestic activities were grouped to form a spatial framework, and how the internal space design supports each of the spatial behaviours.
Figure 6.34 Mapping activity patterns in associated spaces: apartment housing in Vietnam

From the diagram, three key points emerge: (1) the common room (the combination of the dining room and living room) has become the core space; (2) various kinds of functions are accommodated in a room; (3) and domestic activities are extended to outdoor spaces. Firstly, the dining and living spaces appeared to combine into one main space, the common room. This combined space allows many through movements, but still accommodates many family private and social activities. The common room had a central role in arranging other internal spaces. Secondly, a functionally specified room, or a partitioned space, in a modern apartment tends to accommodate multiple functions. It is not that space was loosely programmed, but was because of the dynamic uses of high-density interior spaces. Thirdly, density in the home makes the ‘locale’ more important to everyday life. Occupants will not confine their daily activities to the internal spaces but also expand them to the streets. The extension of domestic
activities to outdoor spaces becomes natural. Inner space density and the preferences in social interaction of the Vietnamese people are the primary factors in creating a highly externalised lifestyle in multi-storey housing.

6.3.1 The spatial sequence

This section identifies the patterns of spatial sequence found in the case studies, and discusses their design implications. The spatial sequence was identified by the adjacency connection of functional spaces. It is important to clarify that the functional spaces here are not the rooms originally labelled by the architects in the initial design. They are understood as the behavioural settings in multi-storey housing where occupants’ behaviours and domestic activities take place. For consistency of analysis, these functional spaces are coded as follows: (L): Living space, (K): Kitchen, (D): Dining space, (Cm): Common space, (B): Bedroom, (W): Worshipping space, (C): Corridor, (Bc): Balcony, and (U): Utility.

Despite the varieties in plan design, some patterns of spatial sequence emerged amongst the case studies. All apartments in Nest Home and Thai An contained the ‘domestic code I’, referring to the [C-D-K-L-W-Bc] relationship of internal spaces (Corridor-Dining-Kitchen-Living-Worshipping-Balcony). In this descriptive syntax, a dash represents a relationship between two spaces. The superscripts indicate spaces that offset from the main linear spatial sequence. In the first spatial link C-D, the central corridor is directly connected to the dining space. This prominent location of the dining area indicates that family activity is the key concern in domestic life. This spatial order further develops the work of Ly (2012), which identified the spatial sequence in Vietnamese traditional houses. In previous housing forms, the living room was attached to the entrance. This sequence indicates that receiving visitors, in the past, was more important than the family gathering. With the living space being ‘pushed’ away from the entrance, the role of receiving guests inside the modern apartment appears to be devalued. This spatial relationship points out the change in the propriety of domestic activities.

The D-K-L link embeds three separate spatial sequences that need to be discussed. Firstly, the D-K relationship shows the trend of combining the kitchen and dining areas for family activities. Secondly, the D-L indicates that family activities were
extending from the dining to the living area, forming the Common space (Cm). These two spaces were placed side by side without partition, so that the furniture could be easily rearranged for different purposes ranging from guest receiving to having meals, and family gathering. Thirdly, the K-L relationship refers to the visually separated but not segregated relationship between the kitchen and the living area. The next spatial sequence D-L-W brings up the ritual integration into vertical living. The worship space was located at a prominent place, either in the living space or the dining area. It could be a large table, an altar, or an ancestral shrine fixed on the wall in the dining-living area. Finally, the L-Bc relationship relates to the wish of the occupant to live close to nature. Instead of attaching to the bedroom, the Bc adjacency with living area increases the accessibility to this space.

The ‘domestic code II’ refers to the [Cm-U-B] relationship of internal spaces (Common-Utility-Bedroom), which was found in all apartments. In this spatial sequence, the common area is directly connected to the bedroom(s) and utility space. This spatial order can be different from that in other countries where the bedroom(s) and utility space are connected to the living/dining area through circulation spaces (interior corridor/hall).

While all social activities of occupants in everyday life happened within the spaces in the ‘domestic code I’, all private activities took place in the ‘domestic code II’. It is interesting to note that the two domestic codes share the central role of common space (or dining/living space) in organising functional spaces.

The above domestic codes represent the hidden rules in spatial organisation emerging from occupants’ behaviours and activities. Although the built forms of the apartments were different, the space sequence was similar. These domestic codes could have a significant implication for the design of internal spaces. If a layout clashed these spatial codes, it would result in altering, adjusting, or physically modifying the spaces. This is evident in the Vicoland case study, where the apartment layout violated the ‘domestic code I’. The location of the front bedroom, directly connected to the central corridor, breaks the C-D-K link in the spatial code. As such, the respondents subconsciously reshaped this room, leaving
the space for the dining area. In fact, they shifted the original layout to match the ‘domestic code I’.

6.3.2 The model for spatial integration

Based on the core relationship of common space (Dining-Living) with others, a model for spatial integration with five directions is proposed (see Figure 6.35). This model epitomises the spatial characteristics and the typology of the internal spaces informed by the case studies. The integrated directions comprise (1) ritual integration, (2) privacy sense integration, (3) family connection, (4) external relationship, and (5) natural connection. In current apartments, the privacy sense and family connection are strengthened; whereas, the traditional relationships with nature and ancestors’ spirits in traditional houses are retained and appropriated in the new living conditions. Moving to vertical housing, people brought with them the traditional activities and local methods of spatial organisation to appropriate the given space. Furthermore, the external relationship with guests was consolidated and migrated to more public domains for the access of both family and non-family members. Besides preserving old values, people also accepted the new housing culture and socially adapting to the new patterns of built form.

Figure 6.35 A model for spatial integration in the Vietnamese apartment housing
6.4 Summary

In this chapter, the research results revealed the patterns of occupants’ activities in relation to the spatial behaviours, ranging from dynamic and flexible uses, to spatial adaptation, and physical modifications. It was found that activities related to personal care and household work were well suited in the given spaces. Some other activities such as family gathering, children playing, gardening, and working at home needed a dynamic and flexible use of provided spaces to be accommodated. Amongst these, family gathering was one of the most important actives taking place in a combination of living and dining areas. This combined space was directly connected to the central corridor and had a central role in organising other functional spaces. It was also found that some activities such as worshipping and doing home-based business were important to domestic life but the spaces for them were not provided (missing). As a result, occupants actively adapted the existing space to accommodate these social needs.

The most concerning space-activity interactions in the apartments was the physical transformation. The fieldwork data indicates that these changes generally occurred within two clearly defined levels: changing spatial sequence and transforming the spaces. The most common alterations in space order were evident in Vicoland, where occupants tried to reshape the front bedroom, moving the dining area closer to the front door. This was related to the specific needs in living arrangement of a certain household profile and the spatial sequence. Regarding physical transformation, there was a pattern of combination of two bedrooms or two apartments into larger ones. These changes were not only due to the demand for space but also the requirements of family life cycle and occupants’ lifestyle. It is interesting to note that occupants sometimes decided to adapt their activities to the new living environment instead of appropriating the given spaces. There was a radical change in the space for guest receiving. Residents preferred to welcome their visitors at a coffee shop downstairs outside their apartments.

The space-activity interactions were consolidated, and two models of internal spaces emerged: the spatial sequence and spatial integration. The spatial sequence model includes two domestic codes. ‘Domestic code I’ refers to the social
relationship [C-D-K-L-W-Bc] of internal spaces (Corridor-Dining-Kitchen-Living-Worshipping-Balcony); the ‘domestic code II’ refers to private relationship [Cm-U-B] of internal spaces (Common-Utility-Bedroom). Based on the core relationship of common space (Dining-Living) with others, a model for spatial integration with five directions is proposed. The integrated directions comprise ritual integration, privacy sense integration, family connection, external relationship, and natural connection. By appreciating the spatial sequences and spatial integration, the layout of internal spaces created by professions might come closer to the social needs of users, avoiding physical modifications to the given spaces. In other words, by employing these spatial sequences and integration, the design of multi-storey housing might socially respond to the living arrangements of the residents.
Chapter 7. Social interactions in public spaces

7.1 Introduction

This study deals with the development of social interaction among middle-class people in multi-storey housing in Vietnam by examining the impact of both the characteristics of the residents and the public spaces on social interaction. The findings were first reported and then interpreted for possible implications and/or explanations. As discussed in Chapter 2, it is argued that social relationship is not only possible in multi-storey housing, but also supported by public spaces in and around the buildings. However, there is limited research on this matter, which led to the formulation of the third derived question:

What is the relationship between the design of public spaces and social interaction?

This chapter deals with three issues: (1) behavioural patterns in the public areas; (2) social life in public spaces; and (3) physical settings for the affordances of social relationships. The behavioural map presented in this chapter, Section 7.2, provides information about people’s location and the frequency of social contact. Section 7.3 is about social life in public spaces, focusing on where the social interaction took place. It offers data for investigating what type of space could attract more people and how to encourage local residents to socially interact. What were the underpinning reasons that drew people out of their apartments to stay in outdoor spaces long enough to meet each other? To design public spaces in multi-storey housing that accommodate and encourage social relationships, it is important to understand what kind of social relationship happens there. The final section, Section 7.4, on physical settings for the affordances of social relationships, analyses physical attributes of particular spaces that support social relationships.
7.2 Behavioural maps of the public areas

This section provides a snapshot of people’s location and the frequency of social contact in the case study public spaces. Firstly, it provides an idea of the distribution of public spaces in all three case studies. Such information, about the types of spaces, their layouts and areas, was documented on a map (see Appendix D) before starting the observations. Behaviours observed in each case were recorded in a set including a map and a behaviour sheet. Each behaviour sheet consists of a table for inputting information about individuals and their activities, whereas the map provides the layout of public spaces in which the behaviours occurred.

7.2.1 The distribution and contents of public spaces

The spatial elements recorded from the survey of public spaces were grouped into four main categories: (1) seating space, (2) scenic space, (3) circulation space, and (4) activity space. Each major category consisted of various spatial elements and design elements, which are indicated in Table 7.1. It is important to note that there was a considerable overlap among the categories. For instance, sidewalk is an element of the circulation space category but it encompasses the category of seating space. Observations showed that many coffee shops and restaurants used sidewalks as a part of their businesses. Customers were commonly seen to seat on movable chairs around the tables put outside those shops. This overlapping will be further analysed and discussed in Section 7.4.1.2.

As can be seen from Table 7.1, Thai An had the widest range of spatial elements among case studies, with 17 elements, including five from seating space, three from scenic space, five from circulation space, and four from activity space. In Thai An, the prominent component was the internal street system with sidewalks running along. In Vicoland, the central courtyard was the key feature, which was largely occupied by an outdoor café. There were three types of seating space recorded in the study overall, including: (i) incidental integral surfaces on which people could sit, such as ledges, planters, steps, bollards and so on; (ii) fixed/semi-fixed benches provided by the developer, and (iii) movable tables and
chairs provided by private stores. While movable facilities were found across the three cases, fixed/semi-fixed benches were only available in Nest Home and Thai An. Regarding scenic space, both landscape elements and visual significance were found in all case studies. In Vicoland, the rock-garden functioned as visually significant in the outdoor cafe. In Nest Home, trees, shrubs, flowers and sculpture were provided at the central courtyard and on the sky-deck. In Thai An, those landscape elements were provided on the sidewalks, along internal streets.

Table 7.1 The inventory of public spaces in three case studies

<table>
<thead>
<tr>
<th>Spatial categories</th>
<th>Spatial components</th>
<th>Spatial elements</th>
<th>Vicoland</th>
<th>Nest Home</th>
<th>Thai An</th>
</tr>
</thead>
<tbody>
<tr>
<td>Seating space</td>
<td>Movable settings</td>
<td>Semi-fixed seating</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Movable chairs</td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Fixed settings</td>
<td>Fixed benches</td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Steps in buildings</td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Ledges</td>
<td></td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>2</td>
<td>2</td>
<td>5</td>
</tr>
<tr>
<td>Scenic space</td>
<td>Landscape elements</td>
<td>Trees, shrubs, flowers, and lawn</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td></td>
<td>Visual significance</td>
<td>Water features</td>
<td></td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Sculpture features</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>2</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Circulation space</td>
<td>Internal street system</td>
<td>Access road</td>
<td></td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Internal streets</td>
<td>✓</td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td></td>
<td>Footpath system</td>
<td>Sidewalks</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Alleyways</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Pedestrian route</td>
<td></td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Pedestrian node</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>2</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>Activity space</td>
<td>Green open areas</td>
<td>Central courtyard</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Sky-deck</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Roof garden</td>
<td></td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td></td>
<td>Recreational spaces</td>
<td>Playgrounds</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Open ground floor</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td>2</td>
<td>4</td>
</tr>
</tbody>
</table>

For circulation space, the internal street of the Vicoland project was directly connected to the city streets. As a result, the internal street functioned as a city
street, where people made a shortcut through the area. The alleyway at the back of the building was for the use of people living on the ground floor. In Nest Home, there was no internal street, but the sky-deck functioned as the footpath system, connecting all building blocks. In Thai An, the internal streets were separated from the public streets outside by an access road. These streets carried vehicle traffic, but the speed and volume were controlled by a barrier gate. These internal streets were lined with private establishments such as shops and restaurants. The sidewalks were linked to the system of pedestrian routes and notes. A pedestrian node was the recessed area on a pedestrian route where people could gather to socialise, but it did not block foot traffic flow. The largest pedestrian node was located in front of the kindergarten, between the two blocks Thai An 1 and Thai An 2 (see Figure 7.1).

![Figure 7.1 A pedestrian node in Thai An project](image)

Regarding activity space, four spatial elements in Thai An, two in Nest Home, and only one in Vicoland, were recorded. There were two big central gardens located in each of Thai An 1-2 and Thai An 3-4 (see Figure 7.2). The open ground floors in Thai An 3-4 were used for children’s play and for planned events (see Figure 7.3). These buildings also had roof gardens for relaxing, doing exercise and
recreation. In Nest Home, the central courtyard was the green open space component, surrounded by eight residential blocks.

Among the given spatial elements, sidewalk and pedestrian node were observed to be most significant for supporting social activities. Observations revealed that these two elements accommodated most of the observed population (88%) in public spaces. People were recorded most frequently on the sidewalks (74%) and in the pedestrian node (14%). Looking at each case individually, in the Thai An project, the sidewalks were used extensively not only for standing, walking, jogging, and running but also for business activities spilling onto the walkways.
Such stores as retail shops, coffeehouses, and restaurants put movable chairs on the sidewalks to extend their territories. The pedestrian nodes between Thai An 1 and Thai An 2 were extensively used from 4.30 PM to 6 PM on the weekdays. In particular, 83 people were observed making social interactions within this spatial element on Thursday from 4.30PM to 4.45PM. Some children asked to stay with their friends and the parents were observed to walk and sit around while supervising their children. In Vicoland, there was no pedestrian node, but the sidewalk accommodated most of the social activities. The sidewalk section, as the extension part of the coffee shop, was recorded to attract 91% of the people using public spaces.

This finding, to some extent, agrees with that observed in an earlier study in Taiwan conducted by Huang (2006). In that research, residents were also observed to be most crowded in the pedestrian route and node. However, these social interactions mostly reported in green open space and play area. In the context reported in Huang’s study, the public spaces having the highest rates of social interaction were not the most crowded places. In the cases in the present study, however, spaces crowded with more people did have the higher rate of social interaction.

7.2.2 Who participates in social activities in public areas

The results of observations on the number of people using public spaces in the three case studies are shown in Table 7.2. Thai An had the largest number of public space users (1,732 persons – 59% of the total observed across all 3 cases), followed by Vicoland (857 persons – 29%), and Nest Home (370 persons – 12%). The total people observed was 2,959, including 1,679 males and 1,280 females, representing 57% and 43% of the whole observed population, respectively. In Vicoland and Thai An, men were more active than women in using public space, with 68% (587 persons) and 64% (929 persons) of the total observed residents, respectively. Conversely, in Nest Home, women users of public spaces were dominant, with 56% (207 persons), mostly mothers with their infants or toddlers. Regarding the age distribution, 189 people were elderly, 1,866 were adult, 176 were teenager, and 689 were children. Among those ranges of ages, adult was the
most active group, with 63%, following by children with 25%, and then teenager and elderly, equally contributing 6% each. Elderly people were less active during the day but particularly active in early morning, doing exercises or practising Tai-Chi. Teenagers appeared to be the least active group in using outdoor spaces in and around their neighbourhoods.

Table 7.2 The observed demographics of public space users in 3 case studies

<table>
<thead>
<tr>
<th></th>
<th>Male</th>
<th>Female</th>
<th>Elderly</th>
<th>Adult</th>
<th>Teenager</th>
<th>Children</th>
<th>People</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vicoland</td>
<td>587</td>
<td>270</td>
<td>24</td>
<td>607</td>
<td>77</td>
<td>149</td>
<td>857</td>
</tr>
<tr>
<td>Nest Home</td>
<td>163</td>
<td>207</td>
<td>39</td>
<td>168</td>
<td>30</td>
<td>133</td>
<td>370</td>
</tr>
<tr>
<td>Thai An</td>
<td>929</td>
<td>803</td>
<td>126</td>
<td>1,091</td>
<td>69</td>
<td>407</td>
<td>1,732</td>
</tr>
<tr>
<td>All cases</td>
<td>1,679</td>
<td>1,280</td>
<td>189</td>
<td>1,866</td>
<td>176</td>
<td>689</td>
<td>2,959</td>
</tr>
</tbody>
</table>

The finding indicating public spaces in Nest Home were the least active among the case studies was unexpected. Nest Home had bigger population than Vicoland (1,259 to 498), larger area of public space (4,778 to 2,845 square meters), and wider range of spatial components (mentioned in the previous section) to support social interaction. This result is thus in agreement with the idea of Abu-Ghazzezeh (1999), stating that the layout of space, not the amount of it, decides the use of the area. A possible explanation for this might be that the design of public spaces in Nest Home made them separate from the main circulation. Thus, a resident could enter and exit the complex without passing through those mentioned public spaces. This kind of movement entering and exiting the building, namely process activity, was necessary but people tended to spend a minimum of time on it (Zhang, W & Lawson 2009). If a public space is designed to obligatorily involve the process activity, a resident has to walk through it and initiates other social activities such as meeting and greeting. Another possible explanation for the finding is that the sky-deck in Nest Home was elevated above the street level. Although the sky-deck is public access, it was separated from the public street, where people were passing through during the day. Besides this, the fact that no
business was allowed on the sky-deck made people have had no reason to use this space.

Regarding the number of residents found in public spaces by age range, the finding further supports the suggestion by Clack and Uzzell (2002), showing that teenagers tend to be socially active away from their parents by hanging out with their friends in places far from home. Furthermore, the absence of elderly people might be associated with the fact that the majority of the population in the selected case studies were young couples with one or two children (as mentioned in Chapter 4).

Walk-by observation indicated that most of the observed residents (61%) were engaged in some kind of social activity (see Table 7.3). Vicoland had the highest rate of social interaction, with 83% (710 out of 857), followed by Nest Home with 78% (287 out of 370), and Vicoland with 64% (1,102 out of 1,732). Social activities included talking, eating and drinking, shopping, and playing games. Social activities observed mostly involved children (36%) and female adults (21%). Only 39% of the observed residents were engaged in non-social activities. Non-social activities included walking, seating alone, standing, jogging, reading, eating and drinking alone, working on a laptop, and bicycling. Among these non-social activities, more than a half involved children (37%) and the elderly (21%).

Table 7.3 Number of social and non-social activities observed in three cases

<table>
<thead>
<tr>
<th></th>
<th>Non-social activities</th>
<th>Social activities</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Vicoland</strong></td>
<td>147 (17%)</td>
<td>710 (83%)</td>
<td>857</td>
</tr>
<tr>
<td><strong>Nest Home</strong></td>
<td>83 (22%)</td>
<td>287 (78%)</td>
<td>370</td>
</tr>
<tr>
<td><strong>Thai An</strong></td>
<td>630 (36%)</td>
<td>1,102 (64%)</td>
<td>1,732</td>
</tr>
<tr>
<td><strong>All cases</strong></td>
<td>810 (39%)</td>
<td>2,099 (61%)</td>
<td>2,959</td>
</tr>
</tbody>
</table>

It is interesting to note that the selected case studies had the highest rate (61%) of social interaction compared to similar studies in other countries. For instance, the rate was 42% in research in Malaysia by Abdul Aziz, Ahmad and Nordin (2013),
18% in a similar study in Taiwan by Huang (2006), and only 8% in a study in Brisbane by Zhang, W and Lawson (2009). The reasons for this result are not known, but could be related to the preference for social interaction of the Vietnamese people in public spaces, especially the streets (Annette 2015).

Among the observed spatial categories, the settings across the three case studies where social activities occurred were, in descending order: seating space, circulation space, activity spaces, scenic space, and vague space (see Table 7.4). Vague space refers to the public spaces that did not belong to any of the four types mentioned in Section 7.2.1. These were located around the border area or ambiguously connected to public sidewalks. This space did not have a clear function, so people might use it for other purposes than for social interaction (see Figure 7.4). Most of the activities (45%) were observed in seating spaces among the case studies. It is important to clarify that these activities in seating spaces were mostly observed for movable seats (95%) rather than fixed benches (only 5% with 54 persons). This was followed by circulation space (43%), the concourse for pedestrians. These spaces were observed to be most crowded in two periods within the day, from 8 AM to 9.30 AM and from 4.30 PM to around 6 PM. Activity space came third for the observed residents, with 7%. These spaces were mostly occupied by children and the parents or guardians taking care of them. Residents in activity spaces were most crowded from 4.30 PM to around 6 PM during the week. Contrary to expectation, scenic space was one of the most inactive places for social activity, with only 4% of users. Observation indicated that green open spaces in the three case studies were underused on both weekdays and weekends. Vague space was the least active space, with only 1% and only occurring in Vicoland.

From Table 7.4, it is interesting to note that fixed benches were not a great stimulation for facilitating social interaction. This result appears to differ from some published studies (Carr 1992; Gehl 1987; Lynch 1984; Whyte 1980) that have claimed that fixed/semi-fixed seating is one of the most crucial spaces for social contacts. These studies also note that the social uses of public seating depend on social orientation of the setting. The influence of social distance and
orientation of public seating on social interaction is further discussed in Section 7.4.4. The contrastive finding in the present study may be explained by the fact that these fixed benches were provided within the outdoor spaces of multi-storey housing neighbourhoods, not in the public realms outside the complex. People tended to use movable chairs rather than the fixed/semi-fixed benches, because such seating offers more control over social distance and orientation (Quentin 2007).

Table 7.4 Number of observed residents on different types of public spaces

<table>
<thead>
<tr>
<th></th>
<th>Seating space</th>
<th>Scenic space</th>
<th>Circulation space</th>
<th>Recreation space</th>
<th>Vague space</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vicoland</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vicoland</td>
<td>570 (67%)</td>
<td>23 (3%)</td>
<td>153 (18%)</td>
<td>94 (10%)</td>
<td>17 (2%)</td>
<td>857</td>
</tr>
<tr>
<td>Nest Home</td>
<td>104 (29%)</td>
<td>32 (7%)</td>
<td>198 (54%)</td>
<td>36 (10%)</td>
<td>0</td>
<td>370</td>
</tr>
<tr>
<td>Thai An</td>
<td>660 (38%)</td>
<td>51 (3%)</td>
<td>937 (5%)</td>
<td>84 (5%)</td>
<td>0</td>
<td>1,732</td>
</tr>
<tr>
<td>All cases</td>
<td>1,334 (45%)</td>
<td>106 (4%)</td>
<td>1,288 (43%)</td>
<td>214 (7%)</td>
<td>17 (1%)</td>
<td>2,959</td>
</tr>
</tbody>
</table>

Figure 7.4 A vague space in public area, Thai An project
7.3 Social life in public spaces

The issue of public spaces in multi-storey housing community is not about what type of space could attract more people, but how to encourage local residents to socially interact and leave their apartments to stay in outdoor spaces long enough to meet each other (Zhang, W & Lawson 2009). In order to design public spaces that accommodate and encourage social relationships, it is important to understand what kind of social relationship happens there. From this understanding, the design of public spaces must not only accommodate the widest range of social behaviours but also facilitate the physical conditions to transform passive into fleeting relationships, and/or prolong fleeting to enduring relationships (Gehl 1987).

7.3.1 Types of social behaviour in the public areas

Observations across the three case studies indicated a wide range of activities taking place in public spaces. These were categorised into a typology of three key types, of passive, fleeting, and enduring sociability (see Table 7.5).

Table 7.5 Passive, fleeting, and enduring sociability in three case studies

<table>
<thead>
<tr>
<th>Passive sociability</th>
<th>Fleeting sociability</th>
<th>Enduring sociability</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Walking alone</td>
<td>- Greeting others</td>
<td>- Morning coffee (friends/neighbours/family)</td>
</tr>
<tr>
<td>- Seating alone</td>
<td>- Retail shopping</td>
<td></td>
</tr>
<tr>
<td>- Standing</td>
<td>- Vending (on the sidewalks)</td>
<td>- Receiving guests</td>
</tr>
<tr>
<td>- Running alone</td>
<td>- Taking care of children</td>
<td>- Gathering outside for group</td>
</tr>
<tr>
<td>- Jogging alone</td>
<td>- Mother feeding infants</td>
<td>- Eating out (group/family)</td>
</tr>
<tr>
<td>- Smoking alone</td>
<td>- Playing board games</td>
<td>- Going for a walk/seating</td>
</tr>
<tr>
<td>- Reading</td>
<td>- Engaging in planned events</td>
<td>- Eating out (group/family)</td>
</tr>
<tr>
<td>- Talking on mobile</td>
<td></td>
<td>- Going for a walk/seating</td>
</tr>
<tr>
<td>- Eating/drinking alone</td>
<td>- Children playing</td>
<td>- Doing exercises, jogging, practising tai-chi in groups</td>
</tr>
<tr>
<td>- Working on laptop</td>
<td>- Leaving for work and</td>
<td></td>
</tr>
<tr>
<td>- Parking</td>
<td>- returning home</td>
<td></td>
</tr>
</tbody>
</table>
Across the cases, enduring sociability was the most common trend of social activity observed in the public spaces, with 40%. It was followed by fleeting sociability (31%) and passive sociability (29%) (see Table 7.6). Looking at each case individually, the variability in the range of activities was in descending order from Thai An to Nest Home and Vicoland. It is interesting to note that enduring sociability dominated in Vicoland and Thai An but fleeting sociability was more common in Nest Home.

Table 7.6 The frequency of social activities in the three categories.

<table>
<thead>
<tr>
<th></th>
<th>Passive sociability</th>
<th>Fleeting sociability</th>
<th>Enduring sociability</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vicoland</td>
<td>147 (17%)</td>
<td>238 (33%)</td>
<td>427 (50%)</td>
<td>857</td>
</tr>
<tr>
<td>Nest Home</td>
<td>83 (22%)</td>
<td>150 (41%)</td>
<td>137 (37%)</td>
<td>370</td>
</tr>
<tr>
<td>Thai An</td>
<td>630 (36%)</td>
<td>479 (28%)</td>
<td>623 (36%)</td>
<td>1,732</td>
</tr>
<tr>
<td>All cases</td>
<td>860 (29%)</td>
<td>912 (31%)</td>
<td>1,187 (40%)</td>
<td>2,959</td>
</tr>
</tbody>
</table>

The following sections will discuss the observed social activities in fleeting and enduring categories, to better understand the range of social uses and outcomes that people seek in public spaces.

7.3.2 Fleeting sociability

7.3.2.1 Commercial activities

Observation indicated that all case studies had a wide range of small businesses, and their types, locations, and tenures varied a great deal between the cases. A small business in the present study was a private establishment, mostly owned and operated by the locals, and limited in size (less than ten employees). It is clear from Table 7.7 that the businesses were varied, ranging from (i) retail, (ii) eating and drinking, (iii) services, and (iv) offices. Among the case studies, the number and range of businesses were, in descending order, Thai An with 33 businesses, Nest Home with seven businesses, and Vicoland with only three businesses. It is
interesting to note that there were no retail and food businesses in Nest Home, due
to a restriction by the Building Manager. In Vicoland, the fake flower shop
occupied the majority part of the ground floor. The shop-frontage was formed by
some large glass panels for window shopping. The remaining area of the ground
floor was rented by the game centre and a coffee shop.

Retail activities were observed in all case studies, but they were of different types
and forms. In Vicoland, retail activities were recorded in the stores in the ground
floor. There were multiple shops, including a game centre, a stationary shop, and a
fake flower shop. Interviews with the building management team indicated that
these establishments belonged to the project developer, although they were
marked as public spaces. These activities were also found in the small-scale
businesses in the city streets around this housing project, ranging from
convenience stores, DVD and music store, grocery, dry food, pharmacies,
restaurant, to sidewalk cafes. In Nest Home, retail activities were not allowed in
and around public areas. However, there were other commercial activities
observed, such as a car rental office on the sky-deck level, a hair/beauty salon, and
representative offices on the ground floor. In contrast, at Thai An, private
establishments open onto internal streets were allowed and encouraged by the
developer and Building Manager. The ground floors of the residential blocks were
fully occupied by shops and stores. These commercial establishments, with four to
five-meter-wide frontage, were distributed along the internal streets and opening
onto the sidewalks. These internal streets acted as a kind of commercial street for
the neighbourhood. During the day and night, these were the liveliest parts of the
residential area, where residents gathered for business and social activities. These
fleeting activities were observed as people socialising when entering and existing
in a building, a store, or a shop.

In Vietnam, retail activity on public streets has always been an important part of
everyday life (Annette 2015). Street frontage is a value commodity for the
proprietor, as it offers an opportunity to spill out commercial activities onto
sidewalks (Drummond 2000). Customers shopping along the pavements have
opportunities to interact with pedestrians, which thus forms another fleeting
activity. As a result, pavements become the hosts for fleeting sociability between
the customers and the passers-by. The importance of the pedestrian-scale stores in facilitating the environment for social activity also evidenced in the Nest Home project. The lack of social life in the public spaces project might thus not only be a result of the design but also the provision of functional services. Neighbours appeared to have little social interaction on the sky-deck without any shop or service. In Thai An, except for the eating and drinking businesses, retail shops were not allowed to put their products out on the sidewalks. As a result, customers had to go into the stores for shopping; and this, therefore, significantly reduced the changes of meeting and greeting other people on the pavements.

Table 7.7 The distribution and type of small businesses opening to public

<table>
<thead>
<tr>
<th>Business</th>
<th>Vicoland</th>
<th>Nest Home</th>
<th>Thai An</th>
</tr>
</thead>
<tbody>
<tr>
<td>Retail</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fake-flower shop</td>
<td>1</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>Retail activities</td>
<td></td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Dry food store</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pharmacy</td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Convenience store</td>
<td></td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>Grocery store</td>
<td></td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>Dry food store</td>
<td></td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>Pharmacy</td>
<td></td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Eating &amp; drinking</td>
<td></td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Coffee shop</td>
<td>1</td>
<td>0</td>
<td>5</td>
</tr>
<tr>
<td>No food business</td>
<td></td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>was allowed</td>
<td></td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Restaurant</td>
<td></td>
<td>0</td>
<td>6</td>
</tr>
<tr>
<td>Canteen</td>
<td></td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Services</td>
<td></td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Game centre</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Hair/beauty salon</td>
<td></td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Car rental</td>
<td></td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Swimming pool</td>
<td></td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Kindergarten</td>
<td></td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Hair/beauty salon</td>
<td></td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Gymnasium</td>
<td></td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Motorbike/car</td>
<td></td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>repairing</td>
<td></td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Offices</td>
<td>0</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>Representative</td>
<td></td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>office</td>
<td></td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>Showroom</td>
<td></td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>Office</td>
<td></td>
<td>0</td>
<td>5</td>
</tr>
<tr>
<td>Total</td>
<td>3</td>
<td>7</td>
<td>33</td>
</tr>
</tbody>
</table>
7.3.2.2 Playing

Playing in public space was observed as fleeting sociability, where player(s) and audiences engage in individual or group activities. The most common play activities among three case studies were board games, mostly occurring on the sidewalk cafes. Two players, usually male adults and elders, were sitting on movable chairs facing each other over a plastic table provided by the shops. Audiences stood around them and softly chatted about the moves, but were not allowed to intervene. After each game, the winner could stay for the next one either with the same player or with a new challenger. Children playing was commonly found on sidewalks and internal streets, and fleeting sociability was observed among the parents/guardians looking after them. Only in Thai An project were ‘actual’ playgrounds for children provided with playing facilities. However, these spaces were arranged on the open ground floor of residential blocks so that they were very structured and small for imaginative play. An interview with the building manager of Thai An 1-2 also revealed that some new playing facilities for children would soon be installed in the existing green open spaces. Child play was an important behaviour that could trigger other fleeting activities on public spaces. It is important to note that the highest quantity of fleeting sociability in Thai An was observed on the pedestrian node in front of the kindergarten just prior to and after school time. Before entering and after leaving the school, both children and parents were observed lingering and making contact with others. Interviews with informants indicated that many children attending the school were not living in the neighbourhood. On informant explained that she felt it safer for the children to study ‘here’ than other schools ‘out there’. Another interviewee said her children always asked to stay at the pedestrian node in front of the school to play with her friends before going home. The school finished at half-past four, but she usually stayed with her daughter until six and then went home to cook dinner.

This finding matches the result in an earlier study (Mehta 2013) stating that play is a key for fleeting sociability. Two players engaging in the game can transfer their relationship from stranger to ‘familiar stranger’. If this activity can be recurrent, the participants have more opportunities to know each other. In this
case, the fleeting sociability can thus transform into more enduring sociability. Not only the act of playing itself, but watching play also triggers fleeting sociability. Audiences circling in close proximity making conversation were already engaging in fleeting sociability. One of them could become the player, and therefore prolong their duration of stay.

7.3.2.3 Planned events

Weekend markets were observed during the fieldwork in Thai An as special occasions providing numerous opportunities for fleeting sociability. This was a community event for residents, happening on every Saturday and Sunday on the ground floor of Thai An 3 (see Figure 7.5). An interview with the Building Manager revealed that the market was first proposed and funded by the developer. It was then periodically organised by the Building Management Team with the participation of inhabitants. Any resident could be eligible for the event by just contacting the authority for a slot on the next occasion. The purpose of this event was for enhancing social coherence among the residents. It also aimed at encouraging family businesses and exchanging goods for extra income (as in the traditional community). Observations indicated that people actively participating in the event expected interaction with others. They were excitedly greeting, asking for the cost, negotiating the price, and getting to know each other. Some parents even walked with their children and talked with the familiar vendors for the whole morning.

Figure 7.5 Weekend Market in Thai An project
Another planned event observed in Thai An was the Moon Festival, with many interesting and unusual activities. Children gathered and played with each other under their parents’ supervision on the open ground floor of Thai An 4 building. From 7.45 pm to 8pm on the day, there were 547 residents observed, mostly children, gathering for the event. Students who had outstanding academic results were honoured and given prizes at the celebration (see Figure 7.6). After that, a traditional ‘lion dance’ started at the stage to draw people’s attention, and then led the flock of participants along the internal streets (see Figure 7.7). The streets became the stage for cultural activities, carrying the flow of people promenading. Residents were observed to talk to people next to them while watching the lion dance. An interviewee indicated that this occasional event helped not only him but also his son to know other families, to build up the sense of community.

Figure 7.6 Rewarding kids having good academic results

Figure 7.7 The lion dance lead people going along the internal streets
7.3.2.4 Parking on internal streets

Although each resident was officially provided with at least one indoor parking space, it was common for them to park on public spaces unofficially. In Vicoland, people who dropped by for coffee or using other services parked their motorbikes on the internal street alongside the shops. In the Nest Home project, no public spaces were accessible by vehicles. However, residents living in apartments opening onto the public sidewalks unofficially parked their motorbikes on the pavements and cars on the city streets. In Thai An, a plethora of motorbikes and cars were recorded parking along the internal streets while the drivers were drinking coffee, having meals, or shopping.

In Vicoland and Thai An, parking activities followed the behavioural patterns of the ‘ngach’ (see Section 4.3.2), although internal streets do not belong any of the above categories. Vehicles were freely to temporarily park, but the wish to park was competitive and subject to the tacit right of the shop owners. Customers stopping by for coffee, food, or shopping were observed to park just in front of the shops. Because of the easy of traffic, both cars and motorbikes could be parked on the internal streets, leaving the sidewalks for other activities. Customers were well aware of not being allowed to park there on the street, but it appeared that they felt it their tacit right to park in front of the shops for using their services. The situation was different in the Nest Home project, because it had no internal street. The project was bordered by four ‘phos’ (see Section 4.3.2), and unofficial parking activities were observed on the sidewalks of these streets. As discussed earlier, these activities followed the behavioural pattern of a pho. Some residents living in the apartments opening to the sidewalk were observed to park their cars on the public street, in front of their properties. Some other vendors on the sidewalks managed with their customers’ motorbikes on the pavements.

7.3.3 Enduring sociability

There was a wide range of social activities observed as enduring sociability in public spaces among the three case studies (see Table 7.8). Among the 1,187 people engaged in enduring sociability, the number of activities was, in
descending order, having coffee/breakfast on sidewalks (61%), mums with
toddlers gathering (19%), being out for a meal (9%), gathering on fixed benches
or scenic spaces (7%), and doing group exercises (4%). It is important to note that
the majority of enduring sociability, such as morning coffee and having meals,
was observed in public spaces around food businesses. Looking at each case
individually, Thai An had the widest range of social activities, ranging from
having coffee (53% of the total observed activities at this site), to mum-gathering
(15%), having meals together (16%), gathering on fixed benches/scenic spaces
(9%), and doing group exercises (7%). The activities of having meals outdoors
and doing group exercise were only found in the Thai An project. Family, friends
and couples were observed to be spending time having meals in restaurants,
sitting around tables on the sidewalks. Residents, especially elderly people, were
found doing exercises, jogging, and practising tai-chi in groups in the early
morning. As an interviewee said, they knew each other quite well and participated
in these activities on an everyday basis not only for the health benefits but also for
socialising. There were only three enduring activities found in Vicoland,
dominated by having coffee with 93%, followed by mum-gathering with 4%, and
gathering on fixed benches/scenic spaces with 3%. by contrast, in Nest Home,
enduring sociability was comprised of mum-gathering (77%) and coming around
fixed-benches/scenic spaces (23%). The next sections will discuss two of the most
common activities in detail.

Table 7.8 Number of persons and percentages of observed population involved in
enduring sociability

<table>
<thead>
<tr>
<th>Enduring sociability</th>
<th>Having coffee</th>
<th>Mums gathering</th>
<th>Having meal together</th>
<th>Doing group exercises</th>
<th>Gathering on fixed benches</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vicoland</td>
<td>399 (93%)</td>
<td>19 (4%)</td>
<td>0</td>
<td>0</td>
<td>9 (3%)</td>
<td>427</td>
</tr>
<tr>
<td>Nest Home</td>
<td>0</td>
<td>105 (77%)</td>
<td>0</td>
<td>0</td>
<td>32 (23%)</td>
<td>137</td>
</tr>
<tr>
<td>Thai An</td>
<td>33 (53%)</td>
<td>97 (15%)</td>
<td>99 (16%)</td>
<td>43 (7%)</td>
<td>53 (9%)</td>
<td>623</td>
</tr>
<tr>
<td>All cases</td>
<td>730 (61%)</td>
<td>221 (19%)</td>
<td>99 (9%)</td>
<td>43 (4%)</td>
<td>94 (7%)</td>
<td>1,187</td>
</tr>
</tbody>
</table>
7.3.3.1 Having coffee

Having coffee with a group of friends, neighbours or family members, especially in the morning, was observed to be one of the most standing behaviour patterns of local residents as enduring sociability. Fieldwork data indicates that 58% (248 persons) of total observed residents in Vicoland were engaged in some kind of activity in the outdoor space of the coffee shop. Similarly, 53% (331 persons) of the studied population in Thai An were observed to gather around tables with others on the sidewalk cafes. People using the outdoor cafe were observed staying for more than fifteen minutes, having breakfast, drinking coffee, reading a newspaper, and talking about their everyday lives and work. Interviews with male informants, both in the Vicoland and the Thai An projects, also confirmed that they usually started the day with morning coffee at the coffee shops downstairs before leaving for work.

A possible explanation for the extensive use of the coffee shops on the pavements might be derived from the ‘coffee culture’ in the Vietnamese urban areas. People were found in either high-end coffee shops or sidewalk cafes with movable tables and chairs put out on the pavement. Cafes, indoor establishments, or more casual street-side stalls are gathering places for people of all ages and genders. In Vietnam, eating breakfast and drinking coffee on the sidewalk are commonly associated with relaxation. People preferably combine eating and drinking with
socialising. These observations confirm the findings of Mehta (2013), that the combination of food and social activity supported by outdoor seating made people stay longer on the street.

Similar settings were observed in both the Viceland and the Thai An projects, where the shop owners used the sidewalk as an extension of their shops. These shops were usually on a small scale, located on the ground floor of the apartment blocks. The sidewalk was commonly used as a part of the cafe, as an outdoor space for the shop. The shop owners provided commodities, chairs and tables out on the pavements, and motorcycles parked on the street, next to the curb. They organised the chairs so that passers-by could move easily through the sitting areas. Motorcycles were parked on the street or right on the pavements where the shops were. After business hours, the owner put the tables and chairs back into the shop. Section 7.4.2.1 will discuss in detail how sidewalk cafes were set up in relation to other activities on the pavements.

7.3.3.2 Eating out

Eating out at a restaurant in the precinct was another common activity, but only found in the Thai An project. It was the second most active enduring sociability, with 16% of the behaviours recorded during the fieldwork (99 out of 623 persons). There were six restaurants observed on site, mostly on a small scale. The activities were found to be spilt/extended from the internal space onto the pavement outside the shops. People were found seated on movable chairs around a table placed on the sidewalk. The parts of the pavement in front of the shops functioned as the extended territories of the restaurants, where customers exposed themselves to the passers-by. During the day and night, these were the liveliest parts of the neighbourhood.

These findings further support the idea in previous studies claiming that eating and drinking establishments such as cafes and restaurants make public spaces attractive to people (Hass-Klau et al. 1999; Loukaitou-Sideris 1993; Montgomery 1997; Rapoport 1990; Whyte 1980). Building spaces at street level are adapted for various retail activities without modifications. The variety of eating and drinking activities draws in ‘optional’ activities, as in the study of Gehl (1987).
7.4 Physical settings for social interaction

This section identifies the most useful design features that support social interaction by the analysis of particular spaces in case studies and their physical attributes. It describes the spaces in detail and elaborates the conditions for the affordances of passive, fleeting and enduring sociability.

7.4.1 Internal street as vital place for social activities

In Section 7.3, findings indicated that internal streets were exceptionally well used in the Thai An project but underused in Vicoland. This section further analyses the settings of the sidewalks in both cases, to identify which physical characteristics supported social contacts and which did not. The discussions are about the use of spaces, their scales, and the organisation of outdoor furniture in relation to social activities. Although internal streets were provided in both Vicoland and Thai An, there was no sidewalk found in Vicoland. Sidewalks in Thai An, however, were the places for social life. As discussed in Section 7.2, the parts of sidewalk spaces in front of and adjacent to eating and drinking businesses appeared to be the busiest places, with significant foot traffic. This section will look specifically into the sidewalk café to analyse the given settings and identify useful features supporting social contacts.

7.4.1.1 Zones of activities on the sidewalk

Observations showed that the distribution of social activities on the sidewalks in front of the coffee shops was different between Thai An 1-2 and Thai An 3-4. In Thai An 1-2, social activities were observed in four spatial zones (see Figure 7.9 and Figure 7.10). The first zone (active zone) was two-meter-wide, running along the edge of the buildings. This zone is mostly used for people entering and existing, ordering food and drink, waiting for their orders, and choosing the place to sit. The second zone (passer-by zone) was 1.2-meters wide, particularly allocated for people walking by. The third zone (seating zone) was two-meters wide, accommodating a wide range of activities including sitting, eating and drinking, reading, working on a laptop, and playing games with others. This zone was furnished with both semi-fixed benches and movable chairs provided by the
shop owners (see Figure 7.11). The fourth zone (pedestrian zone) was two-meters wide, essentially designated for pedestrian movement, and separated from the third zone by a bordered green strip (see Figure 7.12). People were observed running, jogging, ambling, walking with children, or stopping for conversation in the midst of pedestrian flow. This zone was big enough for placing fixed benches and other objects such as light poles, trash cans, and fire hydrants. Next to the pedestrian zone, vehicles were observed parking on the streets along the curb side. It is interesting to note that all fixed benches in front of the coffee shops (provided by the developer) were replaced by movable tables and chairs (provided by the shop owners).

![Figure 7.9 Sidewalk plan in front of a coffee shop, showing the zones of activities](image1)

![Figure 7.10 Section cross the sidewalk showing zones of activities, Thai An 1-2](image2)
In Thai An 3-4, activities on the sections of the sidewalk in front of coffee shops were also distributed into four zones but the organisation was different from that in Thai An 1-2 (see Figure 7.13 and Figure 7.14). There was no active zone on the sidewalk. The space for ordering food and drink was inside the shops. The first zone, running along the edges of the buildings, was for customers’ seating (see Figure 7.15). This zone was the extension of the coffee shops. The second zone, similar to Thai An 1-2, was for people passing by. The third zone, lined with fixed benches, was the place for people gathering and seating. However,
these seating spaces were observed to be vacant during the fieldwork. The fourth zone was for pedestrian movement.

Figure 7.13 Sidewalk plan in front of a coffee shop, Thai An 3-4

Figure 7.14 Section across the sidewalk showing zones of activities, Thai An 3-4

Given the similar pavement width, the differences in the design of the buildings lead to the difference in social interaction on the sidewalks in Thai An 1-2 and Thai An 3-4. In particular, the articulated facades in Thai An 1-2 create a semi-enclosed shelter, as favourable conditions for accommodating the food stand and associated activities. This is the place for people gathering, window-shopping their meal, ordering food/drink, and waiting for their orders. This space was also particularly inviting because those fleeting activities were visible from the street front. In Thai An 3-4, this transitional zone between inside and outside was for seating space. This setting, to some extent, thus blocks accessibility to the internal
space of the shop. The lack of semi-enclosed space formed by articulated facades made the shop-owners use movable tarpaulin covers to create such shelters for their customers (see Figure 7.15). In this case, the internal space was not well lit by natural light, a crucial condition for comfortable social contact.

Figure 7.15 Seating space outside the shop, extended to the sidewalk, Thai An 3-4

Regarding the passers-by zone, the setting in Thai An 1-2 allowed circulation in a 1.2-meter-wide. This narrow space increased the intimacy between people, and also the opportunity for social interaction. In Thai An 3-4, however, this zone was wider (2.4 meters) and, therefore, it was perceived to be less active. Furthermore, the outdoor seating is next to the indoor space, so both customers and waiters had no reason to use the passers-by zone. Another possible explanation for the difference in the intensity of social contacts is the factor of space depth. The sidewalk in Thai An 3-4 goes deeper into the site, so the integration/accessibility is reduced (see Figure 7.16. In this instance, people using the sidewalk were
mostly the residents of the complex.

Figure 7.16 The depth of sidewalk space in Thai An 1-2 and Thai An 3-4

7.4.1.2 Adaptability and flexibility of the sidewalk

One of the qualities of sidewalks in Thai An that supported social activities was the ability to accommodate a wide variety of activities without changing the physical characteristics of the space. The sidewalks were observed to accommodate a diversity of uses and adaptability to different uses. There was a large number and a great variety of retail activities occurring, including coffee shop, restaurant, convenience store, office, chemist, and hair salon, along the internal streets. The uses of sidewalks were also varied during the day. For instance, from early morning to 11am, the food stall was set up in the first zone selling breakfast. From 11am to about 3pm, it was replaced by another stall managed by a different owner selling lunch orders. After 3pm, the food stall was folded up, leaving the continuous space from inside to outside for a night coffee arrangement.

This finding is strongly related to the open ended space in the study of Quentin and Karen (2007), concerning the qualities of adaptability and flexibility of public spaces. The capability to accommodate a wide range of residents’ needs during the day encourages social contacts among residents. In other words, adaptability has an important role in developing social interaction in public spaces. In this
instance, the sidewalk must be wide enough (e.g. ten-meters wide corridor in Thai An) to accommodate diverse activities and rich street furniture. In the sidewalk café, the pavements are flexibly and extensively used, with the shop owners constantly unstacking movable tables and chairs for customers to sit on and then stacking them up again to make room on the sidewalk (see Figure 7.17).

Figure 7.17 The arrangement of moveable tables and chairs during the day

7.4.2 Small businesses for occupants’ convenience

7.4.2.1 The settings of coffee shops and restaurants

There were similarities and differences in the arrangements of coffee shops in Vicoland and Thai An, regarding proxemics and orientation. In both cases, a group of two people were observed either sitting facing each other across the table or sitting side by side facing the street. A group of family members or friends with more than three people had the tendency of seating around the table. Regarding proximity, it was noticed that the distance between two sets of table and chairs in Vicoland (from 0.5 to 0.6 meter) was much less than that in Thai An (from 1 to
1.2 meters) (see Figure 7.18).

Figure 7.18 A short distance between two set of tables in outdoor café, Vicoland

In Vicoland, the outdoor space of the coffee shop was in front of the store, with an area of around 60 square meters, accommodating 24 movable tables and 96 chairs (see Figure 7.19). The café can be publicly accessed, serving both residents of the complex and local people in the neighbourhood. This outdoor space was elevated from the street level, and disconnected the café from the public sidewalk. In Thai An, the outdoor furniture, including movable tables, chairs, and umbrellas, was arranged within a two-meters wide strip of the sidewalk (see Section 7.4.1.1). The coffee shop at the street corner privatised the sidewalk outside, using this as the extended space, accommodating 13 tables and 52 chairs (see Figure 7.20).
In Vicoland café, the social distance between two people was similar to that in sidewalk cafés along the public streets around. The outdoor café was publicly accessed, so it functioned as a part of the public realm, and shared the spatial patterns and scales with the surroundings. In Vietnam, it is normal for people in a pavement café to sit back to back or side by side within the distance of less than a half of a meter. This proximity is categorised as ‘intimate’ in the study of Hall (1966). Within this closeness, strangers might feel ‘too close for comfort’ in some
other cultures. This café setting is an outstanding illustration of cultural variation in terms of social distance.

Differently, coffee shops in Thai An were directly extended to the sidewalks of internal streets, but separated from the public streets outside by an access road and a barrier gate. As a result, the physical settings of outdoor café were more ‘formal’ than those ‘traditional’ cafés outside the perimeter. The minimum distance between two customers in different tables were from 1 to 1.2 meters, which are considered as ‘personal distance’ by Hall (1966). This distance is normally acceptable to separate individuals in most common settings (Lawson 2007). Regarding the use of space, coffee shops in Thai An were more flexible than those in Vicoland, because of the ability to extend the space to the sidewalks.

### 7.4.2.2 The setting of retail shops

Beside eating and drinking businesses, retail shops appeared to be places for social activities in Thai An project. Observations suggested that the sidewalk sections in front of the retail shops along the internal streets in the Thai An project were places for people shopping, meeting and engaging in conversations. Many activities were observed on the sidewalks, such as reading signs displayed by the stores, window shopping, and entering and exiting the shops. Inside the stores, people did their everyday shopping, and the retail activities also promoted other social activities. The shopkeepers chatted with each other and engaged their regular customers in gossip. People expressed their preference for making social interaction during the shopping activity in the retail shops. One interviewee in the Thai An project expressed his satisfaction with the way in which shops were organised. The diversity of small-scale shops run by families reminded him of the settings in traditional shop houses. He enjoyed the community life, that he could chat with the shop owners, say hello to his neighbours, or meet new tenants while shopping. Conversely, the retail shop in Vicoland was underused, with only nine visitors observed during the period of the fieldwork.

Observations suggested that all businesses opening onto public spaces were in the form of pedestrian-scale storefronts. No large business or chain store was found among the case studies. The ground-level spaces in Thai An and Vicoland were
sub-divided to contain many different activities. The architecture of those shops was generally uniform, with approximately four- to six-meter frontage, according to the building structure (see Figure 7.21). The scale (4 to 6-meters wide) and location (on ground floor) of the retail shops are similar to those in traditional shop houses (row houses) lining the public streets (see Chapter 4). Like for the sidewalk café, retail shop owners used ‘semi-fixed elements’ such as movable tables and chairs to set up outdoor spaces for their patrons. Interviews with informants also indicated that the small-scale shop was the most favourable form of business for their everyday needs.

Figure 7.21 Settings for retail shops at the ground floor in Thai An 3-4

The preference for shopping in pedestrian-scale shops might have its root in traditional shopping habits. It is safe to say that having crowded, noisy places full of energy and people milling around is a cultural need for Vietnamese people (Cooke 2014). These findings further support the idea of Jacobs (1961), which show the importance of small-scale shops along the street to urban community life. The small-scale shop in the Thai An project is an excellent case for illustrating the essential role of commercial spaces in encouraging social interaction. The situation was different in the Nest Home project, where all retail and food businesses were strictly prohibited by the Building Manager.
7.4.3 Open ground floor for social events

These open sections of the ground floors in the Thai An 3 and Thai An 4 buildings were both located at the north-wing of the blocks, towards the riverside (see Figure 7.22). Each area for occasional events was around 470 square meters, completely open plan, with a six by six-meter column grid. These two open ground floors were connected by an in-between central courtyard with landscape elements, visual feature, and fixed benches. These spaces could also be directly accessed from the pathways within a long and narrow lawn running along the river. These places for the events were at the far-north end of the site, so that the activities would not affect the auditory privacy of the neighbourhood. Planned events were usually held on the open ground floor, but social activities spilled into the central courtyard and the lawn. Various social activities were observed in these areas.

Figure 7.22 Open ground floors for planned events, Thai An 3-4

A set-up in the weekend market include a mat for the seller and his/her stuff, representing the temporary territory. There were no tables and chairs found in the place, and the sellers were observed to sit directly on the mats. All the retail goods were displayed in cardboard boxes, plastic crates and buckets, and clothing racks within the given territory (see Figure 7.23).
As pointed out in Chapter 2, one of the problems of current multi-storey housing in Vietnam is the lack of sociable places, but this is not the case in the Thai An project. Putting people closer together, getting them out into the common place and mingling in community events close to their homes appear to be intuitively obvious methods for gaining resident cohesion. The mechanism for this is not new, but still appears to be effective for the given context. These research results are in contrast to some previous findings claiming that the likelihood of meeting large numbers of strangers would increase unwillingness to trust people and, thus, may hinder social interaction.

7.4.4 Seating spaces

It was found that the location related to pedestrian flow and orientation of the fixed/semi-fixed benches might influence the social interaction in these seating spaces. In Thai An 1-2, there were three main ways the benches were arranged: (1) individually along a footpath, (2) in pair lining a walkway, and (3) in pair facing each other (see Figure 7.24). Among these, the first two arrangements were found being used mostly for passive sociability. Residents were found seating alone, watching, and relaxing (see Figure 7.26). The settings in the pedestrian zone were observed as having fleeting sociability, when people sitting on the benches greeted and chatted with others passing by. Conversely, the arrangement
of benches facing each other were observed to be the most active setting for fleeting and enduring sociability. Residents were observed gathering in a group, seating on and standing around the benches (see Figure 7.25). It is important to note that these benches were placed in front of the entrance of Thai An 2 building, where many people were going in and out during the day.

Figure 7.24 Different types of arrangements for benches, Thai An 1-2

Figure 7.25 A pair of semi-fixed benches facing each other, Thai An 1-2

Figure 7.26 A pair of semi-fixed benches lining along the sidewalk, Thai An 1-2
Another place where the location of the seating spaces related to foot traffic flow was the pedestrian node before the kindergarten (see Figure 7.27). Around 4pm weekdays, these benches were full of people waiting for their children (see Figure 7.28). On weekends, these seating spaces were places for people gathering and having group chats.

![Figure 7.27 Benches were places in the pedestrian node, in front of the kindergarten](image1)

![Figure 7.28 Benches placed along the frontage of the kindergarten, Thai An 1-2](image2)

These findings on the orientation of the benches are relevant to sociopetal and sociofugal spaces. These concepts have been widely used in planning and site furnishing (Main & Hannah 2010). The arrangement (3), where benches are facing each other, is an example of sociopetal seating (inward facing). This configuration orients residents toward one another (face to face), and therefore
increases the opportunity for social interaction. The arrangements (1) and (2) along internal streets orient people away from one another, and discourage face to face contact. These configurations promote individual privacy in public spaces. The benches in front of the kindergarten had socialfugal setting, but they were still places for social interaction due to the influence of the high volume of pedestrian flow.

It was evident from the observations that people using benches tended to sit in the shaded spaces. Social activities around benches were observed taking place under tree covers and shading devices such as canopies, awnings, overhangs, umbrellas, fixed and retractable canopies provided by stores. However, not all seating spaces were equipped with such amenities. Many fixed benches provided by the developer in Thai An 3-4 did not have shading devices. Observations indicated that they were abandoned by the residents (see Figure 7.29).

This finding confirms the association between physical conditions and the use of public spaces in previous studies (Carr 1992; Hass-Klau et al. 1999; Marcus & Sarkissian 1988). These authors claimed that comforts including temperature, sunlight and shade, and wind are important in supporting social activities in public open spaces. Whyte (1980) asserts that sunlight is a major attraction in the use of
public open spaces. However, it is equally important to provide shade and shelter, because people’s preferences change with seasons and weather. In the hot and humid conditions in Vietnam, people seek for shading areas to sit under.

### 7.4.5 Buffer zones for the balance between privacy and sociability

During fieldwork study, it was found that the clarity of territorial hierarchy for public spaces was in an ascending order from Thai An, Nest Home, to Vicoland. This finding was evidenced by the territorial signs. In Thai An, the neighbourhood was physically separate from the city street system by an access road. At the connection point with city street, there was a welcome sign at one end of the access road. There was a barrier gate at the end of the road, controlling the circulation before going deeper into the neighbourhood. The way in was a buffer zone distinguishing the outside from the inside of the complex. The public spaces within the complex were for, but not limited to, the uses of local residents. An interviewee, when asked about his perception of the public space, said he thought of the outdoor spaces as a part of his apartment, an outdoor living room.

In Nest Home, there was no ‘gate’ or physical boundary to distinguish the site from surrounding area. However, the arrangement of eight building blocks surrounding a central courtyard created a boundary for the neighbourhood. The entrances to the precinct were provided with territorial signs such as welcome board, flower boxes, and name plates, to announce the existence and extent of the territorial claim. The sky-deck connecting the blocks was elevated from ground level and could not be access from the city streets. However, there was no buffer zone for the apartments on the ground floor directly opening onto the public sidewalks.

In Vicoland, the outdoor spaces were directly connected to the city streets. There were no clear territorial signs to claim and indicate the boundary, except that the curbs of the public pavements were made higher to limit the trespassing motorbikes. Talking about this issue, an interviewee living on a ground floor apartment (opening onto the alleyway) said she had a concern about residential security. She mentioned some unpleasant experiences of thieves and con artists breaking into her apartment or taking vegetables she planted in front. As a result,
her door and window were kept locked behind a steel gate, and she refused to have contact with strangers.

The public spaces in Thai An actually behaved as secondary territories. These open spaces were publicly accessed, but local residents exerted some control over the space. They were also physically and visually separated from the ‘actual’ public territories, the city streets. The outdoor spaces acted as buffer zones between the outside world and the housing communities, and thus had the quality of defensible space. To this point, such quality of public space as in the Thai An project was essential for residents to establish social interaction and recognition. They were publicly accessible but not totally public, defensible, and could be controlled by the residents to some extent. In that environment, residential outdoor spaces are usually perceived as extensions of living space and part of the home (Dillman and Dillman 1987). The residential open spaces in Nest Home were publicly accessed and visually separated from public streets, but residents had little or no control over the spaces. Business activities, the appropriation the space, and the personalisation of facades were not allowed by the management board. As a result, these spaces were lacking the quality of secondary territory, and therefore could not strongly support sociability.

7.5 Summary

This chapter reported and discussed the findings on the relationship between social interaction and public spaces in the three case studies. The first part of the chapter provided a snapshot of occupants’ activities in outdoor spaces through a behaviour map for each case. The second part of this chapter investigated the activity-space interaction, and identified what social activities were most frequent and where they took place. These relationships are synthesised and described in the following diagram (see Figure 7.30).
Figure 7.30 The environment-behaviour relationship on public spaces

The diagram (see Figure 7.30) shows the relationship between social interaction and given public spaces, observed from the fieldwork. Social activities listed on the outer ring are divided into two groups by the vertical axis: (1) fleeting sociability on the left, and (2) enduring sociability on the right. In the middle of the diagram, four circles represent the four types of spatial categories. The larger ring in the centre refers to ‘circulation space’. The three smaller circles attached to ‘circulation space’ denote ‘activity space’, ‘scenic space’, and ‘seating space’. 
They are all connected by a dash-ring representing ‘internal street system’ and ‘footpath system’. Each dark rectangle on the double ring refers to a spatial component or design element such as sidewalk café, restaurant, retail shop, pedestrian node, and open ground floor. Each continuous line indicates a relationship between an activity and the space in which it took place. As can be seen from the diagram, ‘circulation space’ has the central role in accommodating social activities. It also connects all other spatial categories, creating a system of public space for social interaction.

The last part of this chapter identified the most useful design features that support social interaction in public spaces. It described in detail the spaces of coffee shops, restaurants, sidewalks where the café and restaurant extended to, retail store, open ground floor for playing and social events, and seating space. The physical attributes that encourage/discourage sociability were elaborated and recorded for the development of a future design framework.
Chapter 8. Conclusions

8.1 Introduction

This chapter consolidates and further discusses the key findings from previous chapters and their contributions to the field of environmental design. It also mentions the limitations of the research and recommendations for future studies. The first section synthesises the results in relation to the research, and then discusses the relationship among them. In the section that follows, the implications of the studies regarding theory, methodology, and practice are discussed. The last section indicates the limitations of the study, and suggests recommendations for future research.

8.2 Relationships and conclusions

The following sections discuss in turn each of the three main research questions, at three spatial scales, the findings related to each of them, and the key concepts that arise from those findings. The environment-behaviour relationships are presented in three scales, ranging from apartment scale (internal spaces and domestic activities) to building scale (semi-private space/density and residential privacy), and settlement scale (public spaces and social interactions). These findings are then consolidated in the subsequent section, and further discussed across this range of scales in a holistic manner.

8.2.1 The relationship between the layout of internal spaces and the living arrangement

The relationship between the layout of internal spaces and the living arrangement is explored by investigating space-activity interactions. The dynamic and flexible uses of space, the social/spatial adaptation, and the physical modifications, were all taken into account in understanding this relationship. Through that understanding, a model for spatial integration and two domestic codes were extracted as the backbone for understanding the environment-behaviour relationship at the apartment scale.
Based on the core relationship of Common space (Dining-Living) to other spaces, a model for spatial integration was developed related to ritual integration, privacy sense integration, family connection, external relationship, and natural connection. This study argues that the emerged domestic codes are the ‘rules’ of spatial sequences, functioning as the DNA to guide the environmental fit. ‘Domestic code I’ refers to the relationship between social activities and internal spaces [C-D-K-L-W-Bc] (Corridor-Dining-Kitchen-Living-Worshipping-Balcony). The ‘domestic code II’ refers to the relationship between private activities and internal spaces [Cm-U-B] (Common-Utility-Bedroom).

By appreciating the above spatial integration and domestic codes, the layout of internal spaces created by professions might come closer to social needs of users, avoiding physical modifications to the given spaces. By doing that, the design of multi-storey housing might socially suit better the living arrangements of the residents.

8.2.2 The relationship between the design of multi-storey housing and the level of privacy

The level of privacy relates to apartment building design through the relationship with density, territory planning, and boundary control.

Density design and privacy

Both physical and perceived density appeared to have an impact on the level of privacy in multi-storey housing. Physical density includes building density and population density; whereas perceived density is comprised of spatial density and social density. Building density (FAR and site coverage) was not likely to have much impact on residential privacy. For population density, internal space density had a greater impact on occupants’ perception of privacy than external space density had. Therefore, outdoor space has a major role in facilitating the place for retreat from domestic density.

Despite the general belief that people respond more aggressively to spatial density than to social density, this study proves otherwise. By pointing out that family privacy was perceived to be more important than individual privacy, the research
highlights the role of social density in managing privacy. Group size was found to be the most important indicator of social density that influences the perceived privacy. Consequently, the length of the central hallway becomes a critical design interventions affecting the level of privacy.

**Territory planning and privacy**

Territory planning has an important role in maintaining privacy in multi-storey housing. As discussed earlier, the access corridor had the key role in maintaining the level of privacy. This space regulated privacy from the external, between the family and outsiders. Another important element influencing the relationship between territory planning and privacy was the buffer space. It was evidenced that the lack of buffer zone between primary and secondary/public territories reduced the level of privacy. In the Nest Home project, the missing transitional spaces between apartments and the sky-deck/public streets created problems for residential privacy. Similarly, in the Thai An project, the bedroom connected to the central corridor without a buffer space, arousing privacy issues due to the noise and activities from the circulation space.

**Boundary control and privacy**

It was found that the design elements for boundary control were strongly related to the regulation of privacy. Physical elements such as walls, windows, and doors created territories and joints. The joint between domains has an important role in controlling/managing their boundaries. The research results confirm that the positions of doors and windows had strong impacts on the level of privacy. Furthermore, the control level over the joints was proved to be crucial for regulating social contact. This is evidenced by the fact that residents added extra layers to the entrance doors to increase the level of control.

**8.2.3 The relationship between the design of public spaces and social interaction**

The relationship between the design of public spaces and social interaction is understood through analysing the interactions of landscape and architecture elements with social activities. For landscape elements, the pathway network,
including sidewalks, alleyways, and pedestrian nodes, were the most active areas, with various social activities. It is important to note that the pathway network should associate with the circulation system (public/internal streets) to keep those pathway spaces peopled. The sky-deck in Nest Home was disconnected from both public streets and internal circulation, resulting in an empty public space devoid of life. Similarly, the alleyway and sidewalk in Vicoland were underused because they were detached from the main circulation networks. The variety of social activities was influenced by the width of the sidewalk. Thai An provided ten-meter-wide sidewalks accommodating four zones of activities: (1) activities extended from the shops, (2) passers-by, (3) seating, and (4) pedestrians. Playing areas, open spaces, and greenery were also active places for social interaction. However, social activities taking place in these areas were found to be less varied than those in the pathway networks. Contrary to the literature on Western contexts, seating space (fixed/semi-fixed) was not very effective in accommodating social interaction.

For architecture elements, sidewalk cafes and restaurants opening to the pathway network were found to be most efficient for social interactions. The activities included passive (seating, reading, eating and drinking alone, smoking, working on a laptop), fleeting (greeting others, talking with people, playing board games), and enduring sociability (receiving guests, friend/neighbour gathering, and family going out for a meal). It is important to note that these social activities not only took place inside the shops but also spilt out onto the sidewalks. Correspondingly, the internal spaces of the shops were opened seamlessly to the pavements. In this spatial organisation, movable chairs on the sidewalks become a favourable setting for social interaction. Open ground floors connected with green spaces were used for planned activities such as Sunday market and Moon Festival. These spaces were open-ended, allowing a wide range of social activities to be arranged.

8.2.4 The relationship between the themes

It is now important to draw out the relationships between the themes in relation to the main research question. The following diagram (see Figure 8.1) demonstrates the relationships between the space-activity issues across a range of scales. In the
convex map, each of the circles indicates a particular activity and the space associated with it. A continuous line refers to a direct connection between two spaces, and a dashed line signposts a visually separated relationship. The left side of the map shows the design scales/research themes in relation to the convex map. The right-side reveals types of activities and spatial/territorial hierarchy associated with the map. The legend is: (U) Utility; (K) Kitchen; (D) Dining space; (L) Living space; (Cm) Common space; (B) Bedroom; (Bc) Balcony; (W) Worshipping space; (C) Corridor; (El) Entrance lobby; (Cf) Coffee shop downstairs; (Is) Internal street; (Os) Outdoor space; (Gt) Gate; (Ar) Access road; and (Ps) Public street.

Figure 8.1 The convex map showing space-activity relationships in multi-storey housing across a range of scales.
According to the map, the environment-behaviour relationships in multi-storey housing were studied at three different scales. Theme 1 (chapter 5) is associated with the ‘building scale’, since it focuses on the impacts of density and building design on the level of privacy. Theme 2 (chapter 6) is relevant to the ‘apartment scale’, because internal spaces and domestic activities are the main focuses. Theme 3 (Chapter 7) refers to the ‘settlement scale’, as it is about the roles of public spaces in relation to social interactions.

The design concerns among the scales are related and overlapping, although they seem separated. Firstly, some domestic activities, supposed to be at the ‘apartment scale’, were found at ‘building scale’ (children playing) and ‘settlement scale’ (receiving guests). Secondly, the clearer the territorial hierarchy at the settlement scale, the higher the level of privacy at the building scale. The depth-increasing in the shallowest part of the complex housing (settlement scale) will affect residential privacy (building scale). In the Thai An project, for example, the formalistic depth-increasing is made by adding the access road (Ar) between the public street (Ps) and the gate (Gt). As a result, the cafeteria (Cf) became more private for the guest-welcoming purpose of the residents.

The above discussions are key to the conclusions. They should be incorporated in the future design framework of socially sustainable multi-storey housing in Vietnam.

8.3 Research implications

8.3.1 Theoretical contributions

(i) Offering a new way to interpret socially sustainable multi-storey housing via the lens of environmental studies.

Although several studies have attempted to develop the understanding of socially sustainable multi-storey housing, most of them have focused on the relationship between people. Such concepts as social cohesion and integrity, social equity and equality, well-being and self-independence were the frequent topics in the field, which seemingly overlooked the relationship of the ‘human factor’ with the built form (Chiu 2012; Oleg Golubchikov & Badyina 2012; Priemus 2005; Thorkild
However, for design concerns, social sustainability means addressing the relationship between society and built environment in a neighbourhood setting (Sivam & Karuppannan 2012). As a result, there has been a lack of an appropriate framework for built-environment professionals to interpret the term social sustainability in the design process. To address this gap, the present study developed a framework for understanding social sustainability through the ‘activity-space’ interaction in apartment housing, at different scales, from internal spaces to outdoor public domains.

(ii) Contributing to the body of knowledge of multi-storey housing in Vietnam by providing understanding of current situations of living in apartment buildings and the activity-space relationship.

Previous research has highlighted the importance of environment-behaviour studies in housing design; however, most of these were conducted in developed countries where the socio-economic conditions were vastly different from the contexts of developing countries. Findings from the present research indicate cultural biases in favour of negative orientations towards high-rise housing and density in Western countries. The present study provides a convincing illustration that those environment settings are positively perceived by the users in the context of Vietnam. The findings confirm that middle-income residents preferred to live in apartment housing over other types of urban housing, due to its affordability, accessibility, convenient service, modern lifestyle, security, and also more surprisingly, its adaptability to social needs.

The understanding of the activity-space relationship in the case studies points out that modern apartments in Vietnam respond to behavioural issues differently to those in developed countries. Firstly, individual privacy was the most critical concern in the Western context, whereas occupants from the case studies in the present study prioritised family privacy. Consequently, the environmental design focused on the relationship between apartments and the central corridors rather than that among internal spaces. Secondly, the apartments did support local living arrangement through the organisation of their layout. The ability to support spatial adaptation and physical modifications of the original design points towards a
unique rule of spatial sequence and integration associated with this context.
Thirdly, outdoor green spaces and public seating are not always the prominent places for social interactions. In the context of Vietnam, the sidewalk cafe appears to be the most important public space for social activities. It is considered as the extended living room for receiving guests, as well as a place for social meetings. The activity system and behaviour setting in this study provide a foundation for environmental analysis and design in responding to users’ needs.

8.3.2 Methodological contributions

(i) Developing a method of spatial analysis related to users’ behaviours for application to domestic spaces.

A considerable amount of recent environmental design research points to the significant role of space syntax (Hillier & Hanson 1984) in exploring the relationship between spatial organisation and its social structure. Despite this major achievement, this method has exposed a limitation in analysing domestic spaces in modern apartments, due to the assumption that each enclosed space can be considered as fundamental cellular (Kim 1996). In a high-density setting such as multi-storey housing, the given space is very compact. As a result, a room must allow many through movements and accommodate a variety of social activities. The dynamic and flexible uses of spaces make it difficult to define the room as a single cell or several cells. Similarly, the open/unpartitioned area, such as dining-kitchen or dining-living, also causes the same problem to space syntax analysis. There is a need for a method of analysing the current production of space that breaks the ‘programmatic segmentation’ model in apartment housing. The present study offers the combination of ‘domestic code’ and ‘integration model’ as an illustration of how an activity system can be analysed based on social needs and their associated spaces. It is also an extension of current methods for analysing activity systems, including time budgets, censusing, and origination and destination studies (Lang, J 1987).
(ii) Informing methodological guidelines for built-environment professionals.

The findings on the flexible use, adaptation, and modification of spaces indicate that it is important for architects to observe, record and comprehend the patterns of activities taking place in multi-storey housing. Due to the lack of design guidance for these activity systems, there is a need to develop methodological guidelines informing planners and designers to observe what people do, and letting them or helping them to do this. From such guidelines, built-environment professionals can be “more open to different ways of reading built form, particularly those with more considerations for everyday life reality of the local residents” (Dinh 2011, p. 137). The space appropriation must be perceived in terms of its positive contribution to the extent that it brings characteristics to the environment to meet residents’ needs. For instance, worshipping and doing home-based businesses were found in multi-storey housing to be important parts of everyday life. The re-allocation of these traditional activities in modern housing was informed by the appropriation of spaces. As a result, the intended spaces for these activities must be dynamically/flexibly integrated into the initial design layout.

**8.3.3 Practical contributions**

For providing an effective design for socially sustainable multi-storey housing, it is important to understand the mode of housing delivery in the given context. In some countries, mortgage financing provisions have a significant impact on what kinds of housing are built for what types of households in what locations. In the housing delivery system studied in the present research, design has a limited role in the process. As indicated by the findings, the Vietnamese middle-income people could buy their housing outright without a loan. Thus the cost, in this instance, was not a critical factor in the housing delivery process. Focus can therefore move to how we design the houses well, to suit how people live, and how they work at home. In other words, the design could play a significant role in how the adaptations of the housing are delivered. In the housing studied here, it made a strong impact on what users do and could do after they acquired the housing. The ultimate aim of understanding the mode of housing delivery is to
find a way that knowledge can influence the formal sector and design practice. What we need to produce are the opportunities for residents to undertake all the kinds of behaviours observed in their everyday life.

(i) Implications for architects and designers

The knowledge obtained from this study supports designers in providing opportunities for the owners to modify or use their houses in a flexible way. The role of the architect is to furnish the occupants with spaces that they can appropriate. The designer cannot create a mode of life, but can form spaces in which the patterns of activities and the ways of life can manifest themselves. Although the findings are not a prescription of how the design should be, they outline some of the issues that designers need to be aware of. For instance, the fieldwork pointed out the lack of spaces for worshipping and home-based businesses in the design. It also illustrated the social and spatial adaptations, as well as the physical modifications made to initial layouts. In future design guidelines, one of the key dimensions should be about accommodating the informal sectors, self-built, and adaptation. The design guidelines/process for this kind of housing should recognise self-regulation, adaptation, and flexibility. The present research can inform the provision of adaptability in design for future housing: how architects can ‘let go of’ housing after they design it.

To this end, the adaptability of the built form and, therefore, how it is constructed should be taken into account in the design process to allow flexibility. For instance, the way that the service areas are organised inside the apartment might be crucial for maximizing the re-configurability. Another way to improve the flexibility in residential buildings is by allowing more resilient adaptation in planning so the structure’s frame does not prevent changing the structure. As a result, the role of occupants in appropriating the living environment can be incorporated into the design process.

The findings about what kinds of spaces were adapted and the extent to which they were changed have implications for apartment design. From Diagram 8.1, it can be seen that some parts of the apartment such as bedrooms, utility, and kitchen are fundamental and inflexible; other parts such as living room, dining
room, and worshipping space are central but more flexible. Spaces for receiving guests in an apartment, where people meet their visitors, to some extent, does not exist anymore. Residents tend to greet their friends in the coffee shops in common areas at the ground level.

The above findings are about a typological understanding of how Vietnamese apartments work from a behavioural perspective. From this knowledge, the designer might think about the general typology of multi-storey housing with a better social performance in the Vietnamese urban context. This is a guide to design decisions because it derives from empirical observation of environment-behaviour relations.

Another central implication to the design of shared spaces in multi-storey residential buildings is the scale of clustering, or group size. The design method of splitting the hallway into manageable sections, as observed in Nest Home and Thai An, improves the level of privacy. Floor plan designs with relatively small clusters of residents around a communal corridor results in less frequent and more predictable use of the central hallway. The number of units per floor in Nest Home and Thai An 1-2 are six and eight, respectively. These are comparable to the Aiello and Baum (2012) findings, which state that five families per each half of a corridor (divided by a lift core at the middle) would be large enough for residents to know their neighbours and to create a sense of community on the floor. If the group size is greater than this number, it is harder for occupants to control the level of social interactions. This finding offers an appropriate length of the corridor, or the number of the units per floor, which optimises the level of residential privacy in Vietnam.

One important aspect of the apartment typology is the join, or the control point between spaces. Designers should think carefully about these joints because they are crucial and they might need adaptation. In the work of Chermayeff and Alexander (1963), the design of door and threshold are very important in controlling social interactions and preserving privacy. This study confirms that their findings are also applicable for medium density multi-storey housing in Vietnam. The joins can control the privacy and social relations in different scales. In Figure 8.1, each dash line represents one of the joins between (i) the inside the apartment with the common corridor (apartment entrance), (ii) the apartment
building with outdoor open space (building entrance), and (iii) the housing project with its surrounding urban context (gate).

Findings on the nature of public spaces within multi-storey housing projects offer implications for the design of those common areas. The open spaces in the present study are physically separated from fully public territories because of the barriers. They act as buffer zones between the outside world and the housing communities. These spaces are publicly accessed, but local residents exert some control over the areas. Instead of one big area, open spaces in multi-storey housing are better grouped into a series of smaller areas to encourage the appropriation of space. Open outdoor space in multi-storey housing is not merely a place for recreation; it is a part of the domestic space extending to the public. The internal space density, together with the preference for social interaction, has created an externalised lifestyle that takes people to the streets. The activity of receiving guests taking place in the sidewalk cafes is an excellent illustration of this way of life. As such, the places for food/drink businesses must be provided on the street level, and the pavements should be able to afford the activities extended from those shops. Furthermore, the extension of domestic activity to internal streets requires an appropriate level of residential security. Either the territory mechanisms or defensible space should be applied to meet the needs of the residents.

(ii) Implications for developers

For developers, the findings point out the need for a wider range of apartment types, unit sizes, and interior finishing. The majority of the respondents could buy their housing outright, indicating that they could afford larger units, better equipment, and more enduring materials. Furthermore, the trend of merging two bedrooms and combining two apartments indicates the influences of the household profile, family stage, and occupants’ lifestyle over the demand for space. Developers should take into account these factors to provide more options to the target groups regarding the number of bedrooms, apartment sizes, and fixtures. While the designers are responsible for ‘home-making’, the partitioning and the level of interior finishing can be left to the occupants. This idea was successfully integrated in the Nest Home project, where a range of options for
materials and fixtures was provided by the contractors. Although some tenants chose to set up the internal spaces by themselves, most of them went along with the given options. To avoid confusion in making design decisions for tenants, it may be more convenient for them to go along with developer’s options for internal layout and materials.

(iii) Implications for policy makers

This study provides a useful lesson about spontaneity, self-regulation, adaptability, and flexibility in formal housing provision, both for practice and policy. It forges the link between design and policy by informing of the strengths and weaknesses in existing housing outcomes. Currently, housing policy is a top-down process in which the government only concerns itself about the provision of housing stock, the minimum area per person, and the construction quality. The present study shows that the availability of housing choices and the affordances of domestic activities should also be taken into account, based on empirical evidence. It is suggested that policies need to focus on shaping more responsive design for the crucial aspects of the building typology discussed above, and at the same time also ensuring that developers do not constrain flexibility in other aspects of the apartments.

8.4 Research limitations and recommendations for further studies

As social, cultural, and economic contexts have changed over time, both housing morphologies and their usage patterns have altered accordingly. Socio-cultural shifts in society lead to changes in people’s lifestyle, and this requires changes in domestic activities. Subsequently, the built forms have to adjust to match the room activities. As such, it is not possible for designers to provide an everlasting apartment plan that can accommodate ever-changing social needs. However, findings from the present study suggest that a design that is more responsive to change can be achieved by integrating the understanding of domestic activities and their spatial properties in the design process.

The outcomes of the present study can, to some extent, contribute towards addressing one of the long-running EBS debates over the accuracy of prediction
of behavioural change. The main reason for this problem might be due to the limitation of understanding the environment-behaviour relationship of a social group and the changes in patterns of territorial behaviour of that group over time (Lang 1987). This present study uses case studies that systematically explore housing design across a whole range of scales, and examines where changes can be made to the housing, and the performance issues of those aspects that cannot change. In comparison to traditional qualitative EBS, the present research provides richer, more substantial data sets with additional quantitative analyses. As a result, the study offers a new type of objective evidence to improve the accuracy in studying behavioural change. By applying the same methodology, space-activity relations can be studied in other housing forms, for different income levels.

In the context of Vietnam, it is suggested that further research on mapping the process of how activities change and relocate over time should be conducted to make the study of behaviour change more accurate. From reviewing the literature, six key Vietnamese housing typologies are identified, and the process of activity relocation is proposed in Figure 8.2. This diagram provides a preliminary suggestion; further research will require first-hand data for each of the typologies in order to trace the route of activities in transition. In this diagram, the spatial structures of six housing typologies are represented by the six vertical axes, ranging from vernacular housing on the left to contemporary apartments on the right. Each circle represents a functional space and the activities occurring in that space are listed next to them. The lines between circles indicates the transformations of the spaces and their associated activities. The dashed boxes refer to a group of related activities, usually enclosed within a partitioned space. The size of the circle is proportional to the number of activities each group accommodates.
Although the present study was conducted in the Vietnamese context, the design implications may be applied to other contexts elsewhere in the world. It is possible that many of its findings would be similar to those found in other contexts, confirming their validity. For instance, the design implication of focusing on domestic activities in apartment design instead of room function is in agreement with Seo’s (2006) findings in the Korean context. However, some other findings point towards new knowledge and raise questions for further studies. These emerging results may need validation to determine whether they can be generalised, replicated, or are transferable to similar situations.
This study tried to limit the inherent weakness of case study method by diversifying the cases selected in two different cities, and focusing on different types of residential buildings. However, this is only a practical justification to the study. The researcher was acutely aware of the variety of multi-storey housing projects for middle-income people associated with different socio-economic conditions in other areas. Further research should extend the range of housing types into more diverse geographical locations to explore the influences of social and economic circumstances on the environment-behaviour relationship.

Another obstacle that might create a limitation of the study was the restriction of time and resources. The selected cases located in two different cities required considerable effort to go back and forth between them. To observe social interaction in planned events (such as Moon Festival), the researcher had to go back and reside in the field at those specific times. Besides this, the study of behaviours in public spaces required observation of large sized areas, with much information to be documented. As a pragmatic solution, those sites were divided into smaller segments, and therefore required more time to complete. There is a need for a more inclusive extension of this research, with a larger team over a longer period.

In light of what was learnt, some future questions could be explored about the roles of different actors in housing processes. Environment-behaviour research does not only mean looking at the behaviour of the residents but also at the behaviour of a range of actors. Each of these had a particular role in driving the appropriation of spaces. Those studies should ground their work so a design framework for socially sustainable multi-storey housing can be developed in a holistic manner. The process of design is not simply the act of creating drawings for housing products, because people are constantly appropriating and adapting spaces. It is a process of creating a (multi-storey) living form, responding to the physical environment, local cultural experiences, and individuals’ expectations, which thus guide the process of housing delivery.
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APPENDICES

Appendix A – Interview questions for households

Date ………………………………......Time commenced:…………………………

General information
Project name: ………………………………………………………………………
The unit number and level: ………………………………………………………
The apartment type and size: ……………………………………………………
How many members are currently in your household? ………………………
How many children do you have? ……………………………………………
How long have you lived in this property? ………………………………………

1. General discussion about multi-storey housing
- Why did you choose to live in multi-storey housing? (prompt: housing cost, location, life-styles, accessibility to social/commercial services, security)
- What are your concerns about vertical living? (prompt: unwanted neighbours, waiting time for elevator, safety, and neighbourhood facilities)

2. Density, perceived crowding, and privacy
   (a) Occupant’s orientation towards privacy
- What do you think of the level of privacy in this housing project?
- What types of privacy problems are you dealing with? (prompt: individual and/or family privacy; visual, auditory, and/or social privacy)
- In your opinion, which are the design elements that influence the level of your achieved privacy? (prompt: location of unit, apartment layout, positions of doors and windows, and acoustic insulation)
   (b) Residential crowding and privacy mechanisms
- How often do you interact with your neighbours/passers-by in common spaces around your apartments such as the access corridor?
- How can you regulate the social interaction? (prompt: willing to interact, selective control, ignore, or close the door)
- In your opinion, what are the design elements that might arouse, exacerbate, and affect your perceived crowding?
   (c) Occupant’s tolerance of crowding
- What was/were your previous housing form(s)? (prompt: apartment, street house, detached house, and/or country house)
- In your opinion, which living environment is more crowded: your current apartment or your former housing type(s)?

(d) Density and crowding
- How do you feel about density in this apartment?
- Where do you feel more crowded: in internal space or in external space?
- In your opinion, are there too many households on the floor?

3. Internal space organisation and living arrangement

(a) The use of internal space
- Why do/don’t you do these activities? (prompt: personal/family needs, household chores, working at home, home-based business, etc.)
- Why do/don’t you use the provided spaces for those activities?
- What are the reasons you chose this particular space for that activity?

(b) The appropriation of space
- In your opinion, did the organisation of internal spaces fit with your living arrangement? and why?
- What are the adaptation/modifications you made in your apartment?
- What were the reasons for these adaptation/physical modifications?
- How did you make these changes to internal spaces? (prompt: in terms of design idea, official approval, and construction process)
- How could you evaluate the effectiveness of these modifications towards your living needs?

4. Social interaction in public spaces

(a) The use of public space
- How often do you use public spaces?
- Why do/don’t you use the given public spaces?

(b) Identify the needs of residents in public spaces
- What do you use public spaces for?
- Please describe your preferences for businesses and the associated spaces.
- What do you value most in public spaces, and what are your future visions for them?
(c) The senses of safety and belonging
- How do you feel about the security in public spaces?
- How do you feel about the relationship of the apartment with the wider urban context?

5. Housing delivery process
- What is your housing tenure? (prompt: tenant, owner, the original buyer, or the second buyer)
- How did you pay for the apartment? (prompt: outright payment, mortgage loan, or instalment plan for prioritised group)
- Are you willing to pay for improvements? (prompt: apartment size, number of rooms, finishing materials, and fixture/equipment?)

6. Suggestion
- Based on your living experience in this apartment housing, what do you suggest to improve the design of this project? (prompt: in terms of residential privacy, living arrangement, and social interaction)
Interview questions for households (Vietnamese version)

Ngày …………………………………Thời gian bắt đầu: ………………………

Thông tin chung
Tên dự án: ……………………………………………………………………
Số căn hộ và vị trí tầng: ……………………………………………………..
Kiểu và kích cỡ căn hộ: ………………………………………………………
Có bao nhiêu thành viên trong hộ gia đình? …………………………….
Anh/chị có bao nhiêu người con? …………………………………………..
Anh/chị ở căn hộ này đã được bao lâu rồi? ………………………………

1. Bàn luận chung về nhà ở cao tầng
- Vì sao anh/chị lại lựa chọn ở nhà nhiều tầng? (gọi ý: giá nhà, vị trí, phong cách sống, tiếp cận dịch vụ xã hội và thương mại, và an ninh)
- Anh/chị quan tâm điều gì khi ở nhà nhiều tầng? (gọi ý: hang xóm không mong muốn, chở dời thang máy, an toàn, và các phương tiện dùng chung)

2. Mật độ, đông đúc và riêng tư
(a) Quan điểm cư dân về tính riêng tư
- Loại vấn đề riêng tư nào bạn đang phải chịu đựng? (gọi ý: cá nhân/ gia đình; thị giác, thính giác, và xã hội)
- Theo ý kiến anh/chị, các yếu tố thiết kế nào ảnh hưởng đến mức độ riêng tư? (gọi ý: vị trí căn hộ, bộ trí, vị trí cửa di, cửa sổ, và cách âm)
(b) Đồng dục và cơ chế giữ tiếng tư
- Bạn có thường tiếp xúc với hàng xóm/ người qua lại trên hành lang chung không?
- Làm thế nào để bạn điều tiết mức độ tiếp xúc xã hội (gọi ý: sẵn sàng tiếp xúc, tiếp xúc có lựa chọn, làm lơ, hoặc đồng dục)
- Theo ý kiến anh/chị, các yếu tố thiết kế nào làm trầm trọng và ảnh hưởng đến cảm giác đồng dục?
(c) Khả năng chịu đựng đồng dục
- Đang nhà ở trước đây của bạn là gì? (gọi ý: nhà chung cư, nhà phố, nhà liên kế, nhà biệt thự, và/hoặc nhà thôn quê)
- Theo ý kiến anh/chị, môi trường sống nào đông đúc hơn: căn hộ hiện tại hay các dạng nhà ở trước đây?

(d) Mặt độ và sự đông đúc
- Bạn cảm nhận mặt độ trong công trình này ra sao?
- Theo ý kiến anh/chị, ở đâu cảm thấy đông đúc hơn: trong nhà hay ngoài nhà?
- Theo ý kiến anh/chị, có nhiều họ trên cùng một tầng quá không?

3. Tố chức không gian nội thất và lời sống

(a) Sử dụng không gian nội thất
- Vì sao anh/chị làm/không làm những hoạt động này? (gọi ý: nhu cầu cá nhân và gia đình, việc nhà, làm việc tại nhà)
- Vì sao anh/chị không dùng không gian có sẵn cho các hoạt động này?
- Lý do anh/chị chọn không gian này cho hoạt động đó?

(b) Sự phù hợp không gian
- Theo ý kiến/chị, sự bố trí không gian trong căn hộ hiện tại có phù hợp với sự tổ chức cuộc sống không của mình không? vì sao?
- Những thay đổi/điều chỉnh nào anh/chị đã thực hiện trong căn hộ?
- Lý do của những thay đổi/điều chỉnh đó là gì?
- Làm thế nào để anh/chị thực hiện thay đổi đó (gọi ý: ý tưởng thiết kế, phê duyệt chính thức, và xây dựng)
- Các thay đổi đó có mang lại hiệu quả cho các nhu cầu sống?

4. Tiếp xúc xã hội trong không gian công cộng

(a) Sử dụng không gian công cộng
- Anh/chị có thường xuyên sử dụng không gian công cộng?
- Vì sao anh/chị dùng/không dùng không gian công cộng được cung cấp?

(b) Xác định chủ cầu cần được trong không gian công cộng
- Anh/chị sử dụng không gian công cộng để làm gì?
- Hãy mô tả sự ưu tiên của dịch vụ và không gian?
- Anh/chị đánh giá điều gì cao nhất trong không gian công cộng?

(c) Sự anh toàn và cảm giác nơi chọn
- Anh/chị cảm thấy như thế nào về sự anh toàn trong chung cư này?
- Anh/chị cảm thấy như thế nào về mối liên hệ giữa căn hộ và đô thị?
5. Quá trình phân phối nhà ở

- Tình trạng sở hữu của anh/chị đối với căn hộ (gọi ý: thuê, sở hữu, người mua gốc, người mua lại)

- Anh/chị trả tiền căn hộ ra sao? (gọi ý: trả một lần, thuê ngân hàng, trả góp theo nhóm ưu tiên)

- Anh/chị có sẵn loằng nâng cấp căn hộ? (gọi ý: về kích cỡ, số phòng ngủ, vật liệu hoàn thiện, và trang thiết bị)

6. Đề xuất

- Căn cứ trên kinh nghiệm sống trong khu căn hộ này, anh/chị có đề xuất gì để cải thiện thiết kế? (gọi ý: riêng tư, bố trí cuộc sống, và giao tiếp xã hội)
Appendix B – Interview questions for professionals

Date …………………………………………. Time commenced: …………………………….

General information
Organisation: ……………………………………………………………………….

Your current position: ………………………………………………………………

What was your role in this housing project? ……………………………………….

1. General discussion about multi-storey housing
   - What are their challenges and opportunities of multi-storey housing in Vietnam?
   - What are current policies guiding the development of multi-storey housing?
   - What are the available tools that assist the design of multi-storey housing in Vietnam? (prompt: design guidelines/design frameworks/evaluation tools/precedents)

2. Density, privacy mechanisms, and perceived crowding
   - What are the implications of density in multi-storey housing design?
   - What is the relationship between density, crowding, and privacy?
   - How were the privacy mechanisms implemented in the design process?
   - Which of these privacy mechanisms were effective in controlling the level of social contact?

3. Internal space organisation and living arrangement
   (a) Living arrangement
       - In your opinion, what are the key differences between living arrangements in multi-storey housing and in former housing types?
       - Which living patterns should be preserved in multi-storey housing and which should not?
       - In your opinion, will multi-storey housing residents change their living habits to adapt to the provided physical environment?
   (b) Organisation of internal spaces
       - What are the underpinning reasons for the number of bedrooms, unit size, and the apartment layout in the project?
- What are the implications of the tripartition model of internal space in designing multi-storey housing in the context of Vietnam?
- How to organise apartment layout to accommodate local living arrangement?
- How to design the apartment layout that can be adapted to the needs of residents over time?
- How can flexibility and adaptability be incorporated in apartment layout?

4. Social interaction in public spaces
- What is the role of public spaces in the development of social interaction?
- How to make these public spaces attractive to the residents to come and use them for social interaction?
- What types of public spaces best encourage social interaction?
- How to best plan the public spaces of multi-storey housing to connect the project to the wider urban context?
- How to enhance/strengthen the residents’ sense of place and belonging?

5. Housing delivery process
- What are the problems of the multi-storey housing delivery process?
- What were the forces that influenced the design decision-making of multi-storey housing projects?
- How does social change influence the design of apartment layout?
- What is the influence of the cost factor in the design of multi-storey housing for middle-income people?

6. Suggestion
- Where would the proposed design framework (based on the present research outcomes) sit in the current design and planning regulations?
Appendix C – Household profile questionnaire

This questionnaire aims to collect information on household profile and the issue of residential privacy. Please kindly response following questions either by ticking the appropriate box(es) or writing down the answer on the blank space next to the question.

<table>
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<tr>
<th>Respondent’s profile</th>
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<tbody>
<tr>
<td>1. What is your gender</td>
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<tr>
<td>□ Female</td>
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<tr>
<td>2. What is your age?</td>
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<tr>
<td>3. What is your occupation?</td>
</tr>
<tr>
<td>4. What is your income?</td>
</tr>
<tr>
<td>5. Where do you work?</td>
</tr>
<tr>
<td>□ At home</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Household’s profile</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. How many members are in your household?</td>
</tr>
<tr>
<td>2. How many children do you have?</td>
</tr>
<tr>
<td>3. How old are your children?</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Housing tenure</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. What is your housing tenure?</td>
</tr>
<tr>
<td>□ Owner</td>
</tr>
<tr>
<td>2. Which group(s) of buyers are you in?</td>
</tr>
<tr>
<td>□ Original buyer</td>
</tr>
<tr>
<td>□ Second buyer</td>
</tr>
<tr>
<td>3. How do you pay for the house?</td>
</tr>
<tr>
<td>□ Mortgage</td>
</tr>
<tr>
<td>□ Outright</td>
</tr>
</tbody>
</table>

| 4. How long have you lived in this apartment? |

<table>
<thead>
<tr>
<th>Physical features of the apartment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Apartment area (square meter)</td>
</tr>
<tr>
<td>2. Number of bedrooms</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Residential privacy and perceived crowding</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. What is your place of origin</td>
</tr>
<tr>
<td>□ Immigrant</td>
</tr>
<tr>
<td>2. What are your former housing types?</td>
</tr>
<tr>
<td>□ Apartment</td>
</tr>
<tr>
<td>□ Street house</td>
</tr>
<tr>
<td>□ Detached house</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>---</td>
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<tr>
<td>3. How frequently do you interact with your neighbours?</td>
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<tr>
<td>4. How much do you desire privacy?</td>
</tr>
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<tr>
<td>5. How do you feel about the achieved level of privacy in your housing project?</td>
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<tr>
<td>6. How do you feel about the level of crowding in your housing project?</td>
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</tbody>
</table>

If there is anything you would like to tell us more about the above issues, please use the space provided below. We assure that your identity will remain confidential.

.................................................................
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.................................................................

Thank you for completing this questionnaire.
Appendix D – Letter of approval for ethics application

RMIT UNIVERSITY Design and Social Context College Human Ethics Advisory Network (CHEAN) Sub-committee of the RMIT Human Research Ethics Committee (HREC)

Notice of Approval

Date: 14 June 2013
Project number: CHEAN A-2000859-04-13
Project title: Towards developing a model of sustainable multi-story housing for municipalities in Vietnam
Risk classification: Low Risk
Investigator: Mr Hung Nguyen and A/Prof. Esther Charlesworth
Approved: From: 14 June 2013 To: 14 June 2016

I am pleased to advise that your application has been granted ethics approval by the Design and Social Context College Human Ethics Advisory Network as a sub-committee of the RMIT Human Research Ethics Committee (HREC).

Terms of approval:
1. Responsibilities of investigator
   It is the responsibility of the above investigator/s to ensure that all other investigators and staff on a project are aware of the terms of approval and to ensure that the project is conducted as approved by the CHEAN. Approval is only valid whilst the investigator/s holds a position at RMIT University.
2. Amendments
   Approval must be sought from the CHEAN to amend any aspect of a project including approved documents. To apply for an amendment please use the ‘Request for Amendment Form’ that is available on the RMIT website. Amendments must not be implemented without first gaining approval from CHEAN.
3. Adverse events
   You should notify HREC immediately of any serious or unexpected adverse effects on participants or unforeseen events affecting the ethical acceptability of the project.
4. Participant Information and Consent Form (PICF)
   The PICF and any other material used to recruit and inform participants of the project must include the RMIT university logo. The PICF must contain a complaints clause including the project number.
5. Annual reports
   Continued approval of this project is dependent on the submission of an annual report. This form can be located online on the human research ethics web page on the RMIT website.
6. Final report
   A final report must be provided at the conclusion of the project. CHEAN must be notified if the project is discontinued before the expected date of completion.
7. Monitoring
   Projects may be subject to an audit or any other form of monitoring by HREC at any time.
8. Retention and storage of data
   The investigator is responsible for the storage and retention of original data pertaining to a project for a minimum period of five years.

In any future correspondence please quote the project number and project title.

On behalf of the DSC College Human Ethics Advisory Network I wish you well in your research.

Daniel Martini
Ethics Coordinator (Acting)
College of Design & Social Context
RMIT University
Ph: (03) 9925 3283
carrie.martini@rmit.edu.au
Appendix E – The distribution of public spaces

Vicoland project
Appendix E – The distribution of public spaces

Nest Home project
Appendix E – The distribution of public spaces

Thai An project – four sections of observation
Appendix E – The distribution of public spaces

Thai An project: Section A
Appendix E – The distribution of public spaces

Thai An project: Section B
Appendix E – The distribution of public spaces

Thai An project: Section C
Appendix E – The distribution of public spaces

Thai An project: Section D