A study of the self-built housing in Hanoi city, Vietnam after the economic reform in 1986

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ABSTRACT

This research project explores the self-built housing in Hanoi city in Vietnam after the economic reform in 1986. Existing studies suggests that end users' needs played significant roles in producing more affordable and sustainable housing, particularly in developing countries. However, although the importance of connection between family needs and housing design has been recognised in academic research, housing projects in Vietnam developed as mass production were generally based on housing policies, urban planning regulations and market system relating to "*supply*" and "*demand*". On the other hand, due to the historical, political and economic reasons, more than 80% of contemporary housing production in Vietnam was considered as self-built houses, according to the data published by UN Habitant in 2014. The main aim of this study, therefore, is to provide an in-depth analysis of self-built urban housing in Hanoi city that were designed and constructed with close involvement of the house owners after 1986. The intention of the study is to investigate how individuals make decisions and work innovatively to design and construct their own houses within the context of a contemporary globalised city in Vietnam.

Specifically, the study aimed to understand how people build and use their house to meet their individual needs within three different urban areas in the context of the Hanoi city. There three areas are newly developed urban area, work-unit area and urban village areas. Eighteen cases of self-built housing in three different urban areas were investigated, together with face-to-face interviews with households were carried out in order to find out peoples' individual choices regarding their living conditions. This research project explored the built environment of Hanoi cities including historical development of the urban areas, housing policies and self-built housing design before and after the economic reform in 1986. The study highlighted the role of households in decision-making process and analysed how households made decisions regarding their daily needs, ritual activities, living styles and beliefs.

The outcome of this research support for the argument that socio-cultural values are crucial factors in housing process. In the context of different kinds of urban typologies in Hanoi city, individuals made decisions on the design and build of their own houses not only based on building traditions but also incorporated new materials and contemporary techniques and facilities. Traditional principles regarding hierarchical relationships of spaces, such as 'clean' and 'dirty', 'safe' and dangerous' spaces, have been followed. Orientations of the houses have been

decided by their locations in relation to the streets. On the other hand, new design concepts such as 'private' and 'communal' spaces also had impact on the housing design. The case studies in all three urban areas in Hanoi have demonstrated similar characteristics in terms of the spatial arrangements despite of the differences on sizes and number of rooms.

Finally, the study argues that governmental support and planning guidance are crucial to provide infrastructure to the local communities and also play significant roles in enhancing the quality of living conditions in all three urban areas in Hanoi city.

Key word: Hanoi, self-built housing, urban area, culture, globalization, built environment and economic reform.

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GLOSSARY OF DEFINITIONS

Ancestral altar is a special table that hold images of ancestors for worshiping.

The Vietnamese economic reform or ***Đổi mới*** is the name given to the economic reform initiated in 1986 with the goal of creating a socialist-oriented market economy

Constructor is an individual or organisation with full capability for construction and practice activities, entering a contractual relationship with respect to construction activities.

Culture is a catchall term to describe general customs and beliefs of particular group of people, and it exposes to economic, political and social phenomena.

Feng Shui or ***Phong Thuỷ*** is practical principles in traditional society to gain harmony between human life and natural forces.

House means a construction work used for the residential purpose and to save daily life needs of a household or individual

House owner means an organisation, a household or an individual that require a lawful house through construction, purchase, lease-purchase, receipt as donation, inheritance, receipt as capital contribution, exchange of houses.

Investor is an individual or organisations that assigned to manage and utilise capital for investment in construction of works

New urban area or ***Khu đô thị mới*** (**KDTM**) is an urban area, which is newly built with complete technical and social infrastructure and housing since 2002.

Traditional quarter or ***Khu phố cổ*** is an historical urban area, which was formed during feudal period, in the city centre.

French quarter or ***Khu phố Pháp*** is urban area, which was planned during the colonial period, in the city centre.

Living quarter or ***Khu Tập Thể*** (**KTT)** is an urban area, which was planned during central economic command period (1954-1986).

Finished house *or **Nhà hoàn thiện*** means a house that has been completely built and ready to put in use.

Unfinished house *or Nhà xây thô* means a house of which the framework and structure has been finished.

Self-built house is defined as a house is invested by users in their owned land in planning areas; the building is applied industrial materials and modern construction techniques, and owner invests and manages the processes of design and construction to meet their own requirements

Urban village or **Village in the city** is a term to describe village, which naturally become urban area due to urbanisation process.

Work-unit area is urban area, which was developed by state institutions for its employees.

Red River or *Sông Hồng* is the name of river, which flowes from Yunnan in Southwest China through Northern Vietnam to the Gulf of Tonkin.

Red River Delta is the low-area formed by the Red River in Northern Vietnam.

CHAPTER 1 INTRODUCTION TO THE STUDY

There are two parts in this introductory chapter including the argument of the study and the structure of thesis. The first part indicates the relevant issues, which reveal why this topic is significant for studying. It began by reviewing the process of globalization and its influence on regional identity and housing architecture. Then, the next issue reveals the important of socio-cultural factors and its relation on housing designs. The final argument focuses on the significant of self-built housing studies. The first part finishes with an explanation of the research questions, research aims and objectives and choice of study area. The second part shows the structure of the thesis including the general approach framework, the principles and clarification of how the study is structured.

1.1 The research gaps and arguments

1.1.1 Globalization and modernisation processes and their influences on architecture

Architecture is facing a remarkable change due to globalisation and modernisation processes. Since the first industrial revolution happened in Britain in the nineteenth century, various types of modern transportation systems and telecommunications devices have been invented. New designs allow people to link with others in different parts of the world within a call or a flight. Moreover, economic activities are not only limited in the boundary of one country, but it also shapes the form of global economy. Thus, exchange of culture could be seen in different scales. For example, the global corporations expand their productions and market to other countries. Franchise shops, such as McDonalds, KFC and Burger King set up shop on every street corner. Besides, within modernisation process, new materials and building techniques and new styles have been applied in building. Particularly, glass and steel buildings are presenting for cutting-edge architecture while gate communities, shopping malls and high-rise constructions have become the symbol of modernity, wealthy and power of each nation (King, 2004; Guggenheim and Söderström, 2010).

Although advantages of globalisation and modernisation are undeniable to create diversity and to improve living conditions, there are growing concerns about their negative impacts on housing architecture. In recent years, architectural theory and practice in developed countries influence on developing countries through art, film, books and education system. In addition, international architectural firms that appear around the world have shaped the characteristics of "*global cities*" (Ren, 2011). Consequently, housing relating to the western or international models are believed as better than domestic ones without consideration of socio-cultural context. In various developing countries, the urban housing models, and international form and function, are simply copied and pasted without regional identity and local aspects. Numerous housing projects are in the risk of losing the local characteristics, and they start to look like any other housing in the other parts of the world.

Turning into the globalisation process in Vietnam, the influence of external culture on Vietnamese architecture is not new phenomenon. Despite that, before the 1980s, the Vietnamese architecture had slowly transformed. However, after nearly 30 years since the economic reform in Vietnam in 1986, the processes of globalisation and modernisation have rapidly increased. As a result, the Vietnamese architecture has experienced remarkable changes. In this regard, new housing proposals are likely focused on advanced technologies, form and function from the international styles without consideration of socio-cultural aspects and living styles of house owners. Various housing schemes appear in the sense that

they might well be built anywhere in the world for people of whatever socio-cultural group. This phenomenon appears not only in Vietnam, but it also happens in various places around the world. The key issues are what are socio-cultural needs in contemporary societies and whether local socio-cultural factors could be applied in the housing process.

1.1.2 Housing development and research gaps
A house not only expresses the physical and economic factors, but it also reveals the social and cultural environment. Accordingly, socio-cultural values could be understood as the system of shared meaning of a particular society (Rapoport, 1969). The system relates with multi-dimensional factors such as geographical location, economic viability, human development, social relationship, local values and aspirations. Thus, the house is a mirror, which reflects the perception and ideology of society.

Although socio-cultural values are necessary to create sustainable projects, these values are often being underestimated. According to UN-Habitat (2012), there are four primary pillars of sustainability including economic, environmental, social and cultural elements; nevertheless, a concept of sustainable architecture is widely related with economic policy (e.g: delivery system relating supply and demand or financial resources) and green architectural perspective (such as resource saving, green house or energy reduction). Meanwhile, connections between socio-cultural aspects and architecture have been oversimplified as architectural elements, such as form, decoration or structure, in vernacular architecture. Thus, developers and designers tend to assume human needs rather than to consider how socio-cultural values and family's needs work in contemporary context. In this regard, there is a growing debate about poor understanding of socio-cultural factors in contemporary housing projects. For example, Al-Thahab et al (2016) argue that modern housing has eliminated a sense of privacy, which is important in Iraq culture. Similarly, Rahim et al (2017) indicate that socio-cultural aspects in Malaysia including community ties, social interaction, privacy and hospitality are weakening due to modern housing design. Chua (1997) showed that when buying a ready house designed by designers, households tend to adjust parts of building to meet their requirements, which is determined by socio-cultural background of users. Based on those examples, copying of modern housing forms from one culture to another is not practicable. The modern housing has failed to satisfy the cultural values of users, and it has created new multi-housing problems. For this reason, UN-Habitat (2012) highlighted that sustainable housing is not just about economic and green perspectives, the concept of sustainable housing should cover socio-cultural aspects; a house cannot be considered as sustainable design if they create negative influence on social life.

United Cities and Local Governments (UCLF, 2015) stated that social and cultural factors must be at the heart of sustainable development. Dwelling is an important aspect of human life. Everybody needs privacy, security, stability, comfort and religion; however, the ways people respond to those factors are depended on social and cultural background. If the design fails to provide one of those elements, it can significantly impact on the way people determine and use the house. Thus, besides economic and environmental factors, the housing design must be suited to socio-cultural needs. Meanwhile, Lefaivre and Tzonis (2012) highlight the importance of socio-cultural identity in modern world. The world is frequently believed as getting flat where there is no distinction between one place and other. The ideal of flat world is not referred to geography or planning; it emphasises on the characteristics of society under the process of globalization. Within flat world, the socio-cultural aspects should play vital role to make sense of place: "*with global flattening, the only things that got levelled were the unique peaks and valleys of ecological diversity, ways of life, and cultural treasures, along with nature, ideas, and identities*" (Lefaivre and Tzonis, 2012, p2).
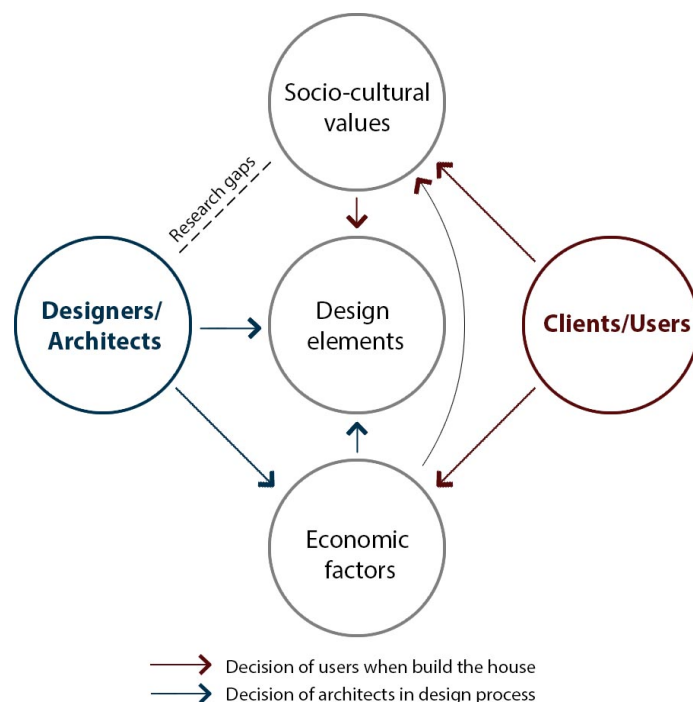
Figure 1: Gaps in design process (Drawing by the author, adopted from Lawrence, 1987)

In Vietnam, there are several gaps between housing design and family needs. Since the economic reform in 1986, the modern living styles and new ideologies have significantly impacted on the housing design. The residential planning is aimed to meet fast growing demand; therefore, modern architecture applying new architectural styles, materials and technologies, become the most popular trend.

However, those planning have not taken into account on socio-cultural needs. Specifically, the gaps can be seen in decisions-making process between two main groups: one is group of designer and producers, and another is group of users (Figure 1). Planners and architects often design housing regarding general architectural standards, such as size, number of rooms or number of housing, to meet market demands. Therefore, the decisions of building are influenced by economic purposes of developers and political perception of modernity. By comparison, user's groups looking a house regarding particular needs, which is influenced not only by economic factors, but also come from socio-cultural backgrounds. The gaps might come mainly from following reasons:

Firstly, various studies analyse contemporary housing designs under the political and economic approaches (World Bank, 2011, 2015 and UN-Habitat, 2014). This approach generally focused on housing policies, urban regulations and market system relating to "*supply*" and "*demand*". Thus, the studies are based on the statistical data of economy, finance, policies and general household structure to provide suggestions for housing schemes. However, those studies have ignored the significant of housing design and the role of household in design process to meet the socio-cultural needs.

Secondly, modern housing delivery system has been industrialised. Since the last century, the housing demand in urban area significantly increased owning to urbanisation process. In order to deal with housing shortage, the governments tend to use mass housing to control formality and living conditions. Principally, the housing projects are driven by political and economic factors to provide mass housing production, which using new materials, factory components and construction with standardised unit (Turner, 1972). As a result, mass housing designs are strictly controlled by quantitative methods such as sizes and the floor area. In this regard, people do not have voice on the decision-making process, which ensure the building programmes are developed in socio-cultural dimension. Users have very little or no control at all in any stages of design, management or construction

Finally, according to Lawrence (1987), there are seven approaches to study inter-relationship between housing architecture and regional factors including aesthetic interpretation, typological approach, evolutionary, diffusionism, physical explanation, social explanation and socio-cultural values. In the context of Vietnam, although the connection between regional factors and housing characteristics had been studied from various approaches (Table 1), much of those studies focused on form, aesthetic and transformation of physical characteristics; and there is a limited number of researches that investigates the connection between socio-cultural needs and contemporary housing.

Particularly, the vernacular housing has commonly been highlighted for regional identity, but the framework cannot apply to present due to new concerning realities. The view is blocked in cultural factors regarding the age-old, history, religion and tradition without considering current living styles and new demands. Thus, those studies remained at the level of explanations, and there are no clear answers about the influence of socio-cultural values on contemporary housing architecture.

Approaches to studying housing in Vietnam

Physical ←···→ Socio-cultural values

Timeline	Aesthetic Interpretation	Typological approach	Evolutionary	Diffusionism	Physical explanation	Social explanation	Socio-cultural values
After the economic reform	Herbelin (2013)	(Na & Park, 2013)	(Kien, 2008a)		(Nguyen, 2016) (Dao, 2010) (Nguyen & Dobbelsteen, 2016) (Ly, 2012)	*Contribution of this study*	*Contribution of this study*
1986							
Subsidized period		(Van Anh & Fausto, 2013)	(Murakami et al, 2004)		(Schwenkel, 2014) (Dinh, 2011)	(Gough & Tran, 2009) (Tran & Dalolm, 2005)	
1954							
French colonialism		(Phan, 2013)	(Tran, 2013)		(Bao, 2013) (Nguyen et al, 2011)		
1887							
Feudal periods	(Le, 2006)	(Truong, 2014) (Na & Park, 2011) (Kien, 2008b)	(Tran, 2016)	(Nguyen, 2014) (Trung, 2014) (Le & Pugnaloni, 2013)	(Trinh, 2007) (Nguyen, 2013) (Ly et al, 2010) (Hayashi, 2010)		(Doan, 2003) (Nguyen, 2004)
Ancient time					(Tung & Hirohide, 2013)		(Waterson, 1997) (Zamolyi, 2009)

✚ Previous studies   ▨ Contribution of this study

Table 1: Approaches of housing study and previous studies in Vietnamese context (Eddited by author, adopted from Lawrence, 1987)

Meanwhile, several studies highlighted impacts of privatisation policy on inequality and opportunities for different social classes to access and use collective apartments in living quarters, which was built during the central economic planning period (1954-1986) (Gough and Tran, 2009; Tran and Dalholm, 2005). Particularly, Gough and Tran (2009) discuss the housing problems in Hanoi in the transition period (1986 to the 2000s). Within the provision of privatisation and market-driven housing, there is increasing inequality between different social groups. Those have high social status in the old hierarchy, such as formal senior officials; have good opportunities to improve their housing situations. On the other hand, less well-off residents (low ranking workers and people working in private sector) are losing out under the new housing policy. Majority of them are unable to improve their houses owing to little or no support. Meanwhile, young people are particularly disadvantaged as they facing full market-based economy with no support from state. Also, Tran and Dalholm (2005) focus on consequences of

privatisation on housing conditions of those tenants and owners in the collective apartment since the economic reform in 1986. The study highlights four main points. Firstly, privatisation contributes to strengthening existing inequality between different social groups. Senior officials and war veterans get better financial supports from the state. Secondly, the privatisation of collective apartment gives opportunities only for particular groups of residents, rather than a choice for all residents. Within the market system and housing shortage, owners could sell apartment with the modest prices and have chance to move to better apartment after renovated projects. On the other hand, poorer residents worry that they have to more out because they could not pay for the price of new apartment after renovation. Thirdly, the goal of privatisation in Hanoi is to increase investment of participants on housing to improve the quality of the housing stock; nevertheless, this goal is only partly fulfilled. The public areas such as staircases and communication areas are neglected because of unclear ownership status, and the lack of regulations and rules about the rights and duties of owners towards the public spaces. Finally, privatisation provided an opportunity for specific groups such as senior officials and war veterans to become owners. The remaining tenants are clearly in a less favourable position, and they have to pay a higher rent compared to the time before privatisation. They also have no clear legal protection for housing security.

In general, although connection between socio-cultural aspects and Vietnamese housing architecture has been well studied in the literature, majority of previous studies focus on vernacular architecture and impacts of privatisation on those who live in collective housing. Thus, design of contemporary self-built housing, was not mentioned in those studies. Given that self-built housing is representing for about 80 percentage of housing production in current Vietnamese cities (UN-Habitat, 2014 and World Bank. 2015), this would appear to be a surprising imbalance.

In order to fill the gap, this study analyses relationship between characteristics of self-built housing and the socio-cultural values and family needs. The outcome of this study, therefore, will help to provide the special view and lessons for architects and designers. It also suggested that participation of households in design and construction process is significant to create sustainable housing programme. When households participate in the decision-making process of design and construction, they are able to weight the merits of different architectural aspects regarding their priority and needs. Meanwhile, governmental support and planning guidance are crucial to provide infrastructure and to enhance the quality of living conditions (Please see section 2.6.1 for details of research hypothesis).

1.1.3 Why study self-built housing, why not study mass housing
Self-built dwelling is not new phenomenon in architecture. For thousands of years,

households tended to build their houses for themselves. The designs were tested in various living conditions to shape the socio-cultural characteristics, and the building techniques were handed down and passed by generations. That traditional type of self-built housing is well known as vernacular architecture, "*built to meet needs*" (Oliver, 2006) or "*architecture without architects*" (Rudofshy, 1987). In the age of globalisation and modernisation, various new factors have influenced on housing designs such as new materials, facilities and domestic needs. Giving new conditions, there is a high demand for urban housing. Nevertheless, in various countries, majority of population could not afford housing at market price while government have failed to provide housing. As a result, there is a rapid growth of self-built construction. One of two outcomes is possible here. One is that poor population develop squatter settlements and slums in the cities. Another outcome is that self-built housing was legalised, and it has become key housing policy. By that, household could participate to build the house by themselves while government provide supporting resources such as land, infrastructure and services. The concept of contemporary self-built housing; therefore, is focused on feasible solutions to the housings needs of urban population (Turner, 1976). By applying traditional knowledge and experiences, households could able to create their own home to meet their own requirements within the control of governance. Therefore, the study of self-built housing is an interesting topic to because it was designed to match with socio-cultural values and family needs of users.

Perhaps, Turner (1976) was recognised as one of the first people to conceptualise the model of self-built housing. When John Turner were involved with the squatters, which was in the first stage of incremental development, he found that far from being a problem, such model of housing was a solution (Bromley, 2003). Turner also critiqued mass housing projects. He argued that the fundamental issues are who control over decision-making. Within the mass housing projects, the centrally administrated bureaucratic systems were inefficient, particularly when comparing it with self-built housing, which was locally controlled approach. In addition, he also commented that mass housing projects were influenced by functionalism of the modern movement rather than actual family needs.

The ideal of turner quickly gained attention in the academia, and it was supported by various theories (Hollnsteiner, 1976; Rapoport, 1969; Lawrence, 1985). For example, Hollnsteiner (1976) highlight an importance of people's participation to formulate shelters and community through four following reasons. Firstly, if households participated on housing programme, the program results are more successful because it will conform more closely to their aspirations and accustomed lifestyles. Secondly, by participation in design and planning process, households could show another perspective on the matter under study to architects, planner and local administrators. A third benefit of household's participation derives from the very process itself. It builds up the self-enabling

character and cooperative spirit of the community. Finally, by participating on housing process, household could express their views and share their ideals. Similarly, Lawrence (1985) shows that when households participate in design processes, they have to balance different factors to meet their own requirements, aspiration and lifestyles. Consequently, learning from self-built architecture implies the phenomena that shape architecture in particular ways. Meanwhile, according to Rapoport (1983), the most efficient way to deal with modern architecture is to learn lessons and principles from what people made. It means that knowing the people well is importance to identify their needs rather than copy form of building and structure from another place. The design of modern housing; therefore, should be learnt from natural way people design their houses. Architects and engineering often use biology to create efficient designs, and the same can be done with self-built housing. Architects should learn the ideas that work in self-built housing to improve the modern designs regarding physical factors and its relevant socio-cultural elements, which is influenced by history, geography, climate and technology.

Although self-built housing is important building to explore socio-cultural needs in every society, self-built constructions are frequently neglected in history of architectural study. One of reasons might be the definition of housing architecture in term of physical matters; thus, housing can be classified in different types regarding function, typology, height, structure, materials and technology. In this regard, a meaning of house has been understood as an ended product rather than a process. Awan, Schneider and Till (2011 p 26) argue that "*mainstream architectural practice is not engaged enough with political and social context, there is no clear consensus as how to create alternatives was formed*", especially for the freedom of users to participant on housing process to meet their own needs. Practically, areas of contemporary self-built constructions are often referred to informal and unregulated settlements. For example, housing in favelas in Brazil and urban village in China are the self-built architecture; however, those areas are considered as unsustainable living areas rather than an alternative ideal that they are place for sustainable practice, particularly when looking at how the self-built houses respond to local conditions and household needs (Dovey & King, 2012; Lingling, 2013). This means that researchers and planners should avoid issues of self-built housing area as matters of poor infrastructure, services, lack of public spaces and uncontrolled regulations. It is important to understand the taste of self-built housing architecture in order to search for other ways of doing architecture.

In Vietnam, more than 80% percentage of contemporary housing production in Vietnamese urban since economic reform in 1986 is considered as self-built housing (UN-Habitat, 2014; World Bank, 2015). However, the existing research hasn't differentiated the self-built houses from the mass-produced houses;

therefore, there is the lacking of the real understanding of how the individuals made decisions and worked innovatively for house building under the influences and restrictions of the modernization and tradition in the emerging metropolitans.

To summary, the fundamental difference between self-built housing and mass housing, which was built by developers, is the participants of households in design and construction processes. Thus, while self-built housing is constructed regarding needs of users, mass houses are designed for large-scale projects, and the concept is based on policy-maker and individual ideology of planners, architects and developers. Therefore, self-built housing is not only provided physical architectural elements, but it also expressed feeling, meaning and conceptual environment for particular social group. Thus, the study of self-built housing will reveal deeper understanding of the socio-cultural perception and its influence on contemporary housing designs.

Also, it is important to note that this study did not attempt to compare self-built housing and mass housing, which was built by developers. The focus on this study is to investigate how household's needs contributed to the architecture of contemporary self-built housing. It supports alternative ways to achieve sustainable housing architecture by encourage participation of households in housing process within the supporting framework by the state. On the other hand, within mass housing process, households have little or no choice to participate on housing process. Thus, a comparison of self-built housing and mass housing is not applied in study. However, further studies could be useful to compare advantage and disadvantage of different types of housing and the role of households in housing process.

1.1.4 Research questions
Based on the above arguments, the main questions are tested as follows:

1. *How did city development and Vietnamese housing policies influence housing characteristics and communities in Hanoi city before and after the economic reform in 1986?*
2. *How did different urban neighbourhoods in Hanoi city affect the development of self-built housing in Hanoi city?*
3. *How did the households make decisions and take action to design and construct their own houses in Hanoi city since the economic reform in 1986?*

Those questions are important because they help to demonstrate the framework for socio-cultural practice and sense of place in contemporary self-built housing.

1.1.5 Aims and objectives of research
The aims of this research are:

1. *To identify the characteristics of housing and regional identity before and after the economic reform in 1986 in Hanoi city.*
2. *To investigate how individuals make decisions and work innovatively to design and construct their own houses within the context of a contemporary globalised city in Vietnam.*
3. *To investigate household needs and the socio-cultural context that had influence on self-built housing design in Vietnam.*
4. *To explore the meaning of home and sense of places in Vietnamese culture and their influences on contemporary self-built housing design.*

To achieve the aims and answer the research questions, the research objectives are:

1. *To identify the housing policies, built environment and main characteristics of Vietnamese housing before and after the economic reform in 1980s in the context of Hanoi city.*
2. *To understand how people build and use their houses to meet their individual needs within three different urban areas in the context of the Hanoi city. There three areas are newly developed urban area, work-unit area and urban village areas.*
3. *To analyse the relationship between the contemporary self-built houses and the built environment of urban neighbourhoods in Hanoi city.*
4. *To investigate how design and construction of contemporary housing not only changed physical environment but also had impacts on the socio-cultural factors. When households participated in design and housing process, this study analyses how the new living styles affected their decisions and how traditions have influenced on characteristics of housing design.*

1.1.6 Choice of Hanoi city as study area

This study has been carried out in a context of Hanoi, the capital city of Vietnam. Hanoi city has been chosen as appropriate context for this study due to following reasons.

Firstly, Hanoi city is believed as the earliest city in Vietnam. Therefore, the city has rich history and cultural background. Also, Vietnam open to capital market system since 1986; and globalisation and modernisation processes are significantly influenced on Vietnamese cultural background and housing characteristics in Hanoi. Thus, the city is an ideal case to understand inter-connection between housing architecture and Vietnamese culture in the age of globalisation and modernisation.

Secondly, according to Ministry of Construction (2009), Hanoi city is an economic centre in the north of Vietnam, and during the period between 2010 and 2025, the

population of Hanoi city is expected to grow at an annual rate of 7% per year, so urban population will increase from 30% to 50% result in needs of new housing production. This meant that Hanoi city will became one of the most attractive cities for investment in residential projects. Therefore, the regional identity of urban housing will be a great issue in Hanoi city in the next several decades, and there is a need for research about housing to provide sustainable living environment in the city. That allows the exploration of self-built housing in the urban context.

Finally, the researcher spent most of his life in Hanoi city since he was born. Thus, he had spent years familiarised himself with the context and background of Hanoi city.

1.2 The structure of thesis

1.2.1 Outline of research process
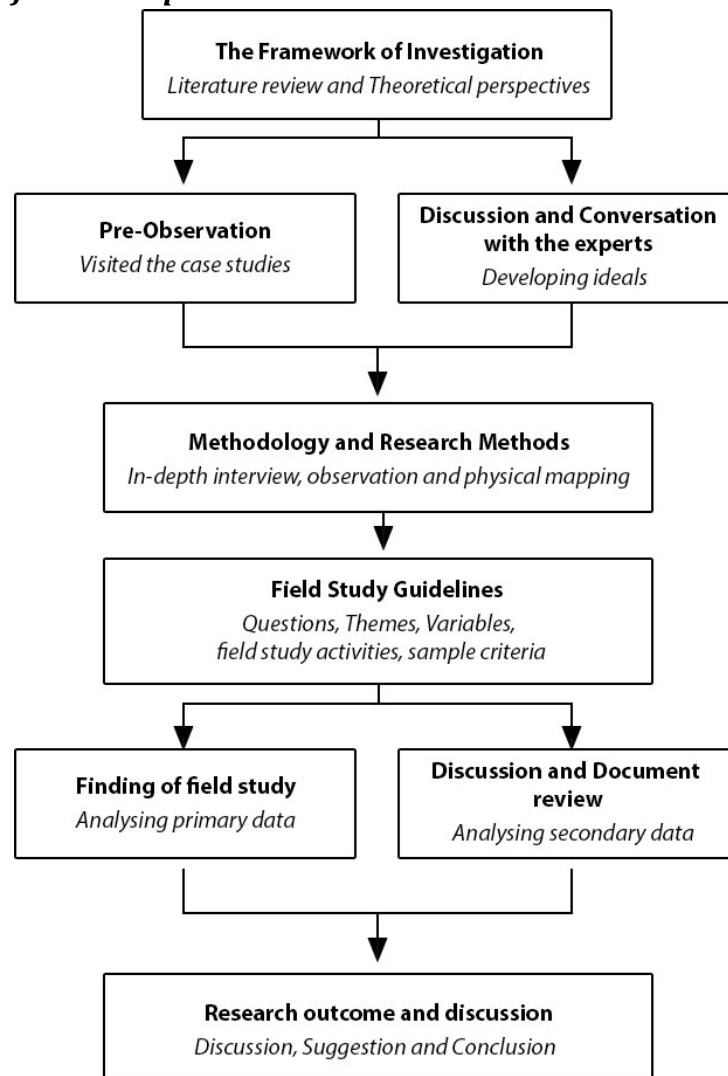
Figure 2: Process of study guidelines

To analyse the characteristics of urban houses in Hanoi city, a range of date types is necessary to address for examination. Date collection and analysis require five stages (Figure 2). The detail of research method will be point out in chapter three.

Stage one aims to build the overview background and research framework. The urban environment, cultural characteristics and its relationship with housing help to provide support information for further investigation. Generally, literature review, definitions and theoretical background studies will be undertaken to support the relevant discussion, together with the initial question form.

Stage two using discussion and observation data to analyse different types of urban houses and how they were built. In addition, a search will be carried out to gather information on globalization and modernisation phenomenon and socio-cultural issues within self-built housing. This will allow a critical review to be produced and also help set information to inform later stages of the research.

Stage three involves methodology and technique's method. Besides the understanding of regional identity of Vietnamese urban housing and the cultural and social context, the techniques to collect data are also important. There is no wrong and right method; however, methodology and method might affect to outcome of research. Therefore, stage three is significant to point out particular technique's methods for studying.

Stage four involves field-study. During this stage, research methods were applied to collect data.

Stage five involves analysis process. The outcome including characteristics of urban house in Vietnam based on Vietnamese culture will be revealed. Besides that, discussion and document review will help to provide supported data for this studying

Stage six testing hypotheses leading to discussion and conclusion.

1.2.2 An organisation of the thesis
This study is composed of eight chapters, which are organised from general ideal to specific results and findings, as follow:

Chapter 1: "**INTRODUCTION TO THE STUDY**" is an introductory chapter. This chapter has two parts. The first part is an initial picture of general relevant issues in Vietnam, and why it is important to explore the cultural influence on housing design in Vietnam. The second part presents the structure of thesis.

Chapter 2: "**THEORETICAL PERSPECTIVES**" highlights the relevant perspectives of nature of housing on five main sections. The first section focuses the relevant principles of self-built housing and the role of households and users in housing

process. The second section discusses the notion of culture and its influence on housing design in the light of the built environment. The third section relates to the urban environment. The fourth section focuses on home environment and family needs. The fifth section reviews concept of housing transformation and changes owing to globalisation and modernisation process to meet new requirement of living spaces. This chapter ends with the framework of the investigation.

Chapter 3: "**METHODOLOGY AND RESEARCH METHODS**" describes the research plan for how this study was approached. This chapter opens with a brief review of research framework, including the research paradigms, research strategies and research approach. The review focuses on constructivism. This is followed by a choice of qualitative strategy, and ethnography approach. The second part details the research methods to collect data. This chapter ends with the methods and techniques for analysis process.

Chapter 4: "**URBAN DEVELOPMENT AND HOUSING ARCHITECTURE IN HANOI CITY**" illustrates the context of study. It starts with the story of Vietnamese society and early housing form. Then, detailed urban environment and housing characteristics within different cultural influences are reviewed to provide meaning of house from the Vietnamese point of view.

Chapter 5: "**DEVELOPMENT OF SELF-BUILT HOUSING IN HANOI CITY SINCE THE ECONOMIC REFORM IN 1986 IN VIETNAM**" focuses on detailed characteristics of urban neighbourhood in Hanoi city and development of self-built housing. This chapter highlights urban environment and sense of neighbourhood in Hanoi city since the economic reform in 1986. It covers the following issues: the reason for self-built housing is popular in Vietnam since the economic reform, the role of state and households in housing development and overview characteristics of contemporary urban settlements in Hanoi city. This chapter ends with overview characteristics of collected self-built housing in Hanoi city.

Chapter 6: "**HOUSING DESIGN AS A REFLECTION OF FAMILY NEEDS**" discusses the findings in order to answer how the processes of housing design articulate specific aspects of socio-cultural needs and living styles. Each part of this chapter explains how people make decision to design their own house and connection between family needs and characteristic of housing design. Hence, this chapter ends with a preliminary conclusion to the main issues concerning the creation of family needs in urban housing in Vietnam.

Chapter 7: "**DISCUSSION AND CONCLUSION**" provides a reflection of the thesis, where the research questions and objectives were meet. This is not only simply a review of previous chapters, but also a discussion of the interrelated parts of variables, particularly the analytical part. Thus, this chapter processes towards a comprehensive and coherent understanding of the relationship between house and

culture that can be drawn from this research. It also provides implications of findings and proposed further investigation, which end this chapter.

CHAPTER 2 THEORETICAL PERSPECTIVES ON SOCIO-CULTURAL VALUES AND THEIR INFLUENCE ON SELF-BUILT HOUSING DESIGN

Globalisation process changes our living styles, family needs and perception of the world; thus, housing designs are changing to adopt with new living preference. The shifts in housing architecture could be seen in new ways of thinking. For example, Le Corbusier (1986, p95) considers a house as a machine for living in. Following his work, the ideal of new housing architecture should focus on function and standards. So, the concept of machine has been used to support mass housing. Standardisation of building elements has become an approach to achieve cheap and quick housing production. However, within this approach, household's living styles and cultural aspects are oversimplified. Therefore, this chapter carried out a review of theories and concepts about urban housing in the literature, and search for an approach to investigate the connection between socio-cultural needs and housing design.

In general, this chapter discussed the exiting studies on the subject of the definition of self-built housing, cultural influence on housing design and built environment. It also discussed the connection between regulations and planning of settlements and housing, people's needs in different levels and how a house reflects perception and identity of households. The existing study demonstrates the interconnection between socio-cultural needs on design of self-built housing architecture. It supports that self-built housing design is not simply the result of physical factors, but is a consequence of a whole range of socio-cultural factors seen in different scales of built environment including urban environment and home environment. In urban level, housing ideology would contribute to buildings through housing policies, regulations and planning of neighbourhoods. Meanwhile, in housing level, domestic spaces and sense of place are influenced by living styles, traditional norms and rituals. In addition, this chapter highlighted that the socio-cultural factors are not fixed elements relating old age, history and traditions in particular period. Socio-cultural factors should be considered as a process of learning through daily practice and built environment to express belief and custom of particular group of people. Thus, in the age of globalisation, economic and political changes lead to more diverse living styles. The physical aspects of housing design are changing accordingly to the changes in socio-cultural values and new living conditions. The outcome of this chapter helps to form the framework to study contemporary self-built housing in the context of Hanoi city.

This chapter has seven parts. The first part shows concept of self-built housing using in this study. The second part highlights the relation between culture and dwellings. The third part describes the relationship between urban environment and housing architecture. The fourth part highlights the connection between home environment and domestic spaces. The fifth part helps to clarify socio-cultural

factors and its influenced on contemporary housing architecture. The sixth part shows research hypothesis and theoretical framework for research investigation. This chapter ends with chapter summary.

2.1 What is self-built housing

Besides professional designs, self-built construction covers majority of buildings around the world. Self-built houses are including courtyard house or traditional shop-house in the ancient quarter; street house in busy street; detached houses or semi-detached houses in residential areas; and various other types. Many of them have been the subjects of individual architectural studies (Oliver, 1986; Rudofshy, 1987; Rapoport, 1969). Therefore, self-built houses could not simply describe regarding function, form or structure. Self-built houses are particular construction that is built and controlled by house owners to provide the flexibility living environment and support needs for their family. Despite that, the meaning of self-built housing is still broad and general. Thus, this part aims to clarify the definition of self-built housing for this studying.

First of all, self-built housing is building that is built by individual or household to meet their needs. In the work of Turner (1976), the word "*house*" could be used as a noun or as a verb. A noun describes a house as an ended product or an economic commodity, which is influenced by the mechanisms of the market. Within this definition, a house has been standardised by institutions and constructed by developers for commercial purposes and to generate profit. On the other hand, the verb describes housing process or activities of housing, which are relevant to personal life. Thus, the principal element of self-built housing is that households are freedom to make decisions to meet his or her own requirements and circumstances. Meanwhile, Yadav (1987) and Tipple (2000) implies a house as process involving the interaction between an organism and its environment. The human being is like the organism evolves their houses to adapt to the environment. Thus, a meaning of self-built housing should not be defined in any single explanation relating materials or physical forms, but it is a process respond to the environment of people holding different attitudes and ideology.

Secondly, self-built housing is completely differenced with mass housing in term of who will make decision in design, construction and manage processes (Turner, 1976). Particularly, there are two opposite models of housing production's process. As can be seen in figure 3, the right model is based upon a hierarchical top–down command and control paradigm. Within this model, political and economic factors considerably influence on housing design to meet the basic requirements, and solve the housing shortage (Turner, 1976). In this regard, designers tend to assume and predict housing needs in order to create sense of place; however, there is not clear the role of users in the process of design. Consequently, spaces are frequently marked on the drawing with label identity such as master bedroom, kitchen or living room. In most cases, this model does not sufficiently to reflect the real problems because the model underestimates the inter-connection between the real built environment and household needs. By contrast, the left model is bottom-up paradigm through self-governing and local system (Turner, 1976). Within this

system, the accessibility of basic resources, such as land, materials and finance, is controlled through laws to support local autonomy. The users could directly control the process of housing design and construction. The definition of self-built housing; therefore, focuses on the role of users on stages of planning, construction and management.
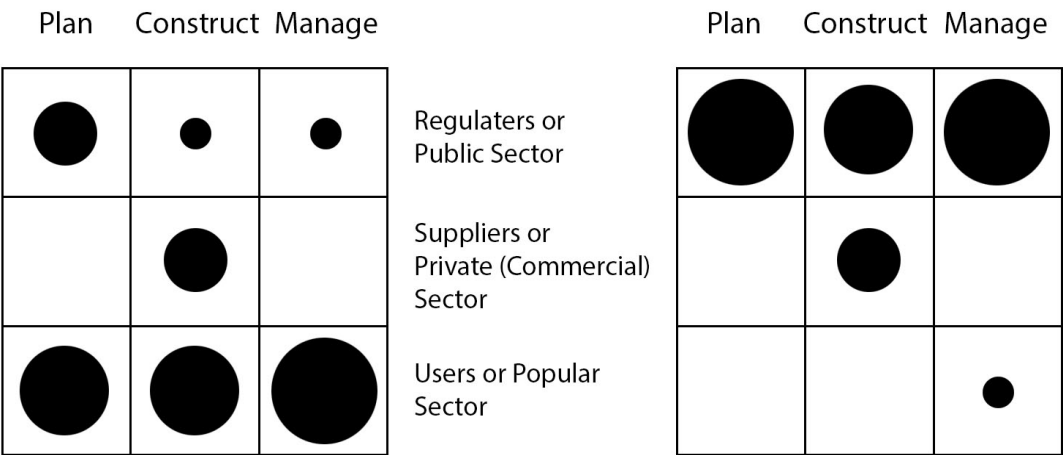
Figure 3: Organisation of two patterns (Turner, 1976, p 27). (Left) local self-governing or autonomous housing systems, (Right) Centrally administrated or heteronomous housing systems.

Thirdly, self-built housing is a production of low and middle-income groups. Regarding housing process, individual housing, which is completely designed by professionals and architects, is very popular in urban areas, particularly for high-income classes in the society. Large amount of money is always invested into the building, such as luxury villa, to meet particular requirements or interests of owners. Thus, housing built by the rich classes are omitted in this study. In comparison, self-built house is built to meet the family needs by low and middle-income groups, and the involvement of house owns is significant during the processes of design and management. Professional advices in self-built housing is limited in some technical parts of projects while house is mainly formed with none expensive materials (Turner, 1972).

Fourthly, there are two main methods to construct the house by self-organised activities including self-build and self-help; thus, it is important to highlight the differences between self-built housing and self-help housing. Both concepts highlight the connection between users and building activities. However, self-help housing is built as a part of rehabilitation program around the slum and poor areas. Therefore, self-help housing also includes renovations, alterations and adaptations of existing building, such as industrial spaces or existing structure that have not been occupied for lengthy periods. Meanwhile, the purpose of self-help activities is

to reduce the cost of housing projects and to improve user's satisfaction and living conditions. Within this model, training activities of construction skills are keys to upgrade informal area. By contrast, self-built house is constructed and managed by owners in their own land using their finance to meet their needs. The role of owners directly involves in design, management and construction process.

Fifthly, self-built housing is also different with squatter housing in term of built environment. When moving to city, migrants tend to occupy vacant land to build their shelters result in development of slums. Thus, slum is considered as informal area, and most of buildings in slum are illegal. Meanwhile, squatter housing is belonging to temporary settlements or unplanned areas where has no infrastructure and essential services, such as clean water, electricity and waste collection. On the other hand, self-built housing has been legalised as affordable housing strategies. Thus, self-built housing is located in permanent settlements or planning areas that ensure basic services and infrastructure.

Last but not least, the self-built housing is also different with vernacular housing. Vernacular house uses available natural resource, and the techniques are based on knowledge of craftsmen. In other words, vernacular housing could be defined as traditional type of self-built housing in pre-industried society. Therefore, within vernacular context, self-builder tended to fill all the roles that responded for project and ownership rights to the product. By contrast, self-built housing always uses modern materials and techniques; thus, house owners might need to hire some special contractors to carry out specific jobs. Also, house owner could decide how much of the work he will do himself, and how much can be done by professional participants. The developers and designers could involve in several parts of and construction while owner still obtains the ideal, site and capital for the house. In this respect, the household and housing developers are cooperated to finish the housing production; the role of household is primary while the role of developers is secondary.

Briefly, in this study, the definition of self-built housing is defined as a house is invested by users in their owned land in planning areas; the building applies industrial materials and modern construction techniques, and owner invests and manages the processes of design and construction to meet their own requirements (Figure 4).

Figure 4: Housing classified system and general self-built characteristics

2.2 What does culture do in dwelling design?

2.2.1 Culture definition

In the literature, the definition and concept of culture is too broad. According to Kroeber and Kluckhohn (1952), there are more than 160 definitions and meaning about culture, and those definitions are developing in different field. Therefore, the concept of cultural values is dynamic; each meaning supports for particular aspect of identities. In architectural field, the term "*culture*" is widely used without its explanation or definition, and the framework of culture has been frequently borrowed from the exploration studies and historical research. Therefore, the concept of culture is normally rooted in the literal meaning of something that has age-old, customary and unchanging. This lead to an important question of what is conception of culture for this study.

Recently, in the academic research, culture is often defined as value system of one society. For example, Rapoport (1980, 1998) implies the generalised definition of culture as:

> "*A set of values and beliefs which embody ideals, and are transmitted to members of the group through enculturation*"

Meanwhile, Tylor (2016, p 10) wrote that

> "*CULTURE or Civilisation, taken in its wide ethnographic sense, is that complex whole which includes knowledge, belief, art, morals, law, custom, and any other capabilities and habits acquired by man as a member of society*"

UNESCO (2002, p 18) emphasize on definition of culture as

> "*The set of distinctive spiritual, material, intellectual and emotional features of society or a social group, and that it encompasses, in addition to art and literature; lifestyle, ways of life together, value systems, traditions and beliefs*"

Alternatively, Spencer-Oatey (2000, p4) defined culture as:

> "*A fuzzy set of attitudes, beliefs, behavioural norms, and basic assumptions and values that are shared by a group of people, and that influence each member's behaviour and his/her interpretations of the meaning of other people's behaviour*"

Within the above descriptions, culture is a complex concept of selected, valuable and cultivated artefacts of a society. Culture determines how people perceive themselves, their lives and their environment, about what is good, right and desirable (Hofstede, 1994). Culture provides a framework within which economic development occurs and sets the conditions for the success of such activity. For the

purpose of this study, the concept of culture is defined as perception, value and beliefs, which formed the worldview of society; culture is transmitted across generations through practices and built environment.

2.2.2 Influence of culture on housing design

In the context of housing study, perhaps Rapoport was one of the first pioneers to study relation between culture and dwellings (Rapoport, 1969, 1980, 1998, 2005). According to Rapoport (1980) the characteristics of culture could be grouped in three major categories: first is life typical of a group; second is a system of symbols, meanings and cognitive schemata transmitted through symbolic codes, and finally, culture is considered as a set of adaptive strategies for survival, related to ecology and resources. Culture started as adaptive strategies of groups in special ecological setting. Then, those strategies have been developed to create living environment including symbols, ideal and living styles. Consequently, the first and second categories strongly indicate the important of cultural environment studies reflecting the complex setting of human behaviour. The belief and psychology reveal special way of looking and shaping the world. The ideal creates rules to reflect living styles and the choices of living environment. Therefore, every decision of each individual is based on particular ordered regularity that draws attention to *wants* rather than *needs*, and *wants* will determine the choice of housing design.

An example of cultural influence on housing design could be found in the book "*House form and culture*" (Rapoport, 1969). Amos Rapoport investigated the vernacular housing and how the settlement related to other cultural factors. The findings strongly maintain that form of housing is based on cultural values reflecting though the desires of society. Although climate, materials and technology are important elements in architecture, they are still only modifying factors. Each society or group has its own perception based on the forms of economic situations, beliefs, values and social organizations to create its own living environment. The built environment impacts on size, appearance, form and structure of building. Therefore, similar geography and climatic conditions may lead to building types with many common architectural elements; however, socio-cultural demands are more important in determining the building forms.

In the meanwhile, various scholars focused on relationship between different aspects of dwelling and culture through psychological perspective (Bourdieu, 1977; Canter, 1974, Hillier and Hanson, 1984 and Lawrence, 1982, 2000). Particularly, Bourdieu (1977) focused on theoretical structure of *habitus* that gave meaning for human actions. The word *habitus* is to describe a complex network, which we are socialised at an early age. The *habitus* is a set of practical taxonomies, divisions and hierarchies that are embodied in everyday result in experience and actions. The *habitus* is including both a social condition for practice and a form of its

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reproduction. Social practice is formed as a "*game*", structured within the *habitus*' rules that are rarely written but often learnt through social practice:

> "*The children learn their vision of the world is read with body, in and through the movements and displacements which make the space within which they are enacted as much as they are made by it*" (Bourdieu, 1977, p 90)

In other words, housing architecture is a product of history, which will produce more history. The experience of home is based in childhood when the *habitus* of the first place establishes a spatial and cultural order. All action performed in home are immediately qualified as symbolic and function. The experience of home creates ideology about future expectations regarding inside-outside, safety-danger and private-public. Thus, house is a dialectical relationship between people and things regarding customs and rules that are learnt in the same way as knowledge is gained from books.
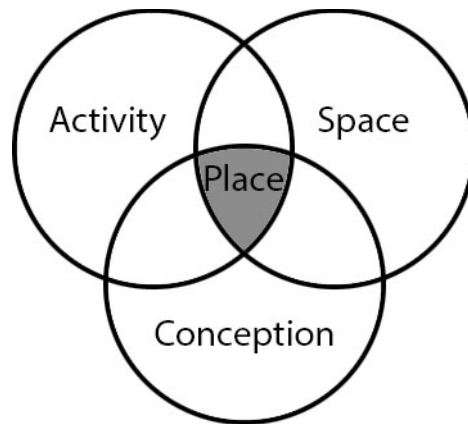
Figure 5: Place model (Canter, 1974, p158)

Besides, Canter (1974) revealed the influence of culture on dwelling through concept of place model, which shows the meaningful for place through three elements: activities, physical attributes and conceptions (Figure 5). Accordingly, being human means to live in a world that is full of meaning; thus, concept of place and dwellings is area in which human presence in space and create a meaningful connection with it. The interaction between human and those three elements are extremely important to identify the nature of the cognitive system. For example, when analysing domestic products and its relation with places in Japanese houses, every pieces of furniture are identified with particular role and space. Dining table and tea table reflect similar spatial identities; thus, they may in the same room. By contrast, chest of drawers and sofa are opposite patterns, and they are never located in the similar room. Therefore, every furniture, activities or spatial arrangement have special meaning and concept to reflect human behaviours settings and socio-cultural background.

Meanwhile, Hillier and Hanson (1984) highlight a connection between spatial structure and the socio-cultural behaviour. Particularly, order of spaces is based on a complex of social values including safety, security and privacy rather than random choice. Different societies lead to different principles of spatial forms such as connection between privacy and public spaces or between social rank and gender and spatial layout.

From above viewpoints, culture plays significant role to shape characteristics of housing architecture. Housing is an expression of culture, whether through purposeful design or everyday use. Therefore, although there are various options for housing form, the actual housing choice of a society in particular place and time is limited by socio-cultural norms.

2.2.3 Connection between culture and built environment
As described in previous sections, the concept of culture and how does culture influence on housing design are still too broad and abstract. Specifically, the term culture could not just about the living styles, belief and perception, but also values of larger system such as political ideology, regulation and planning. Thus, it is necessary to explain a connection between culture and housing through studies of built environment.

According to Lawrence and Low (1990), each society has characterized by its own culture. No matter how the culture is simple or complex, everyone is born in a culture that influenced on the living styles and behaviours. Thus, the built environment could be understood as an abstract concept to describe the relation between production of human building activities and culture. The concept refers to any physical alteration of natural environment, from cities to buildings, which are created by human. Within the built environment, building forms are defined by building functions, landmarks, plan, and decorated styles to demonstrate meaning and values of society.

Rapoport (1977) considers the built environment as a "*system of setting*" to express the emotional, personal and symbolic meaning. Design of dwellings provides the different approaches to respond to the local cultural values. The design does not base on the ideals or interested things of the designers; it refers to the setting for special group, and it required knowledge about socio-cultural background including local conditions and lifestyles characteristics. Consequently, buildings are not only reflected the physical expression, but they are also "*non-verbal style of communication*" reflecting how people choose and modify the setting to meet their requirements. For example, when people choose housing, they choose not only the design of building, but also the site, surrounding landscape, street and sense of neighbourhood such as noise pollution, quality of schools, crime and safety, traffic

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and so on. Based on those preferences, households would decide where and what to be built and how to build it.

Meanwhile, to clarify an interconnection between the built environment and culture, Rapoport (2000b) used dismantling method (Figure 6). Within this approach, the meaning of culture had been developed in order to respond two issues: excessive abstractness and excessive generality. The formal one reflected that the culture is the blueprint of social variables including kinship structures, social networks, roles, statuses and social institutions. Meanwhile, the latter one considers culture as an expression of social variables through worldviews, values, images, lifestyles, activity systems and standard and rules.
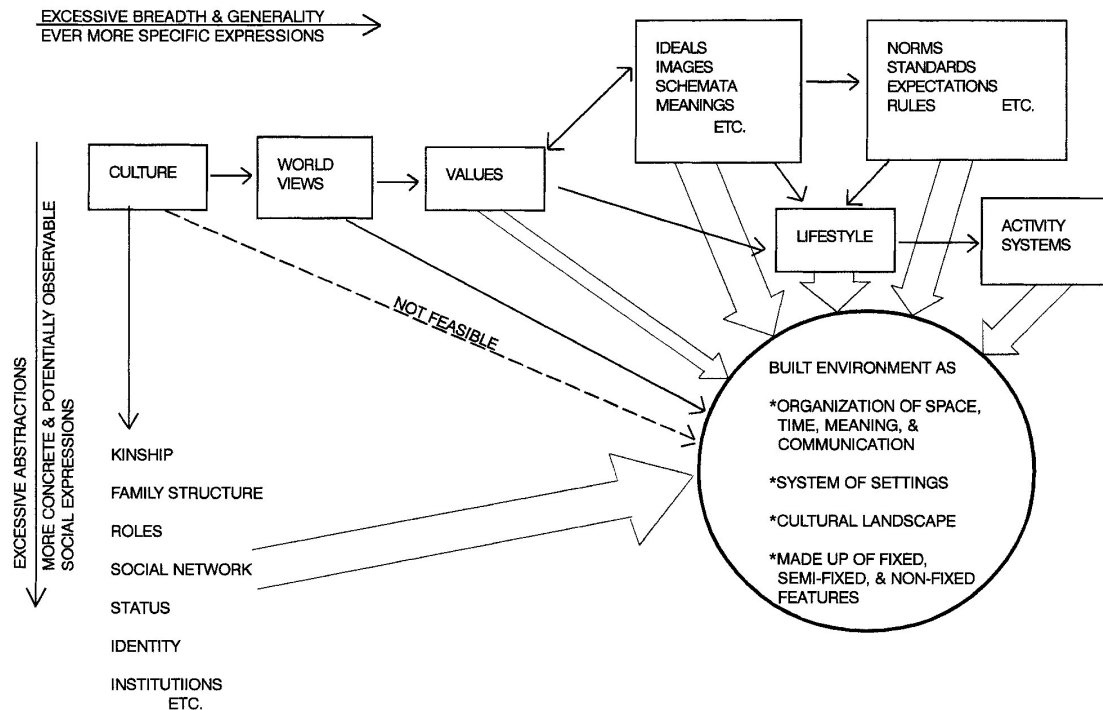
Figure 6: Dismantling of culture and its expressions to the built environment (Rapoport, 2000b, p 149)

Based on theoretical model of Rapoport (2000b), this study analysed the self-built housing through influence of two main themes: the urban environment and housing environment. The first theme is an analysis of urban environment including housing ideology and planning of urban settlements. This theme helps to explain why self-built housing is popular in Vietnam, supporting policies, regulation and characteristics of self-built areas. The second theme is an analysis of home environment. This theme focuses on influence of socio-cultural values on spatial layout, design and use of domestic spaces. It helps to explain individual needs and desire of household about living spaces. The influences of urban and

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home environments on housing design will be explained further in the following parts.

2.3 Urban environment: Rules, standard, images and ideology of environmental quality

2.3.1 Ideology of environmental quality

The built environment exists in terms of our actions and meanings to give purposes and direction to society (Parker and Richards, 1994). Architectural space could be defined as concretisation of this existential space. Space is perceived only as place. The environment is categorised and named it though stories and tales, making it history and experience. Though the cultural artefact of a name, unidentified space is marked and delimited place. For example, the concept of forest is a cultural artefact. The deep forest rarely penetrated, were once potentially threatening, full of dangerous spirits and wild creatures (Parker and Richards, 1994, p4). Names and stores were associated with the forest though the fairy tales. Thus, the forest had meaning as place of danger, and it was conceptually opposed to the security and order of town and city.

The meaning that are giving to places and spatial order are not fixed but must be invoked in the context of practice and usage. Human actively give their physical environments meaning, and then people act upon those meanings. Amos Rapoport (1977) advocated that an application of sets of rules reflects different meanings of environmental quality. Design could hence be seen as an attempt to give form of expression and ideal images to make actual good environment. An involvement of ideology and concept in built environment directly make place though the application of sets of rules based on definitions of environmental quality. Moreover, a preference of ideal environment is also different among different groups and cultural background (Rapoport, 1977, p50-54). In order to satisfy different groups, institutions generally play critical role to balance difference requirements and shape social, economic and political ideology (Franklin, 2006). The institutions and social organisations could be represented as family, laws and system of government, planners and professional designers. They create the rules and control resources. They provide continuity and certainty, and form the boundaries of activity. In architecture and planning, the system of rules appears in form of planning, policies or types of buildings in association with the size and composition of resident group. The role of the institutions; therefore, reflect on what it does to drives human action.

For example, before industrialised society, dwellings were generally built by the households. The lack of institution framework normally results in self-organised development, and it might lead to development of slums and health issues. In Western countries, the public health concerns caused central government to create

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a series of Acts during the nineteenth century (Franklin, 2006). The ideology model; therefore, was formed in order to provide housing and other facilities.

Particularly, Western urban in the twentieth century was based on three main ideologies developing by Ebenezer Howard, Frank Lloyd Wright and Le Corbusier (Fishman, 1977). Each ideology contributed specifying aspect of ideal city. Urban settlements principally based on a concept of Garden city, which reflected the harmony between urban characteristics and rural landscapes (Miller, 1995; Ward, 1992 and Howard at el, 1966; Fishman, 1977). The garden city movement had been institutionalised, and inspired designs of numerous new planned settlements such as Letchworth Garden City and Hampstead Garden Suburb. In comparison, the ideal of Wright about Broadacre city focused on decentralisation and self-reliance communities; thus, in the Broadacre city, there is no distinction between urban and rural area. The urban structure and planning appeared to be natural parts of the landscape. On the other hand, the modern city was impacted by the concepts of contemporary city and radiant city. The ideas of Le Corbusier in those concepts emphasised on modernist city through centralization planning and development of tower blocks with open space between them. From those three concepts, it is clear that different ideologies might be resulted in different characteristics of housing designs reflecting though indications such as density of population, built up area, subdivision planning, types of dwellings and building regulations.

According to King (2004, 143-149), different ideologies are resulting in different characteristics of dwellings in the same region. Giving examples in New Delhi and Old Delhi, where have various similar features such as location, geography and climate; nevertheless, two cities have numerous differences in term of spatial structure and form of buildings owning to different socio-cultural background and political ideology about way of live and every day activities. The old Delhi is a production of the Indian, and city plan is based on assumptions of pre-industrial society. Thus, the city is identified with narrow land, courtyard houses and less high-rise building. By contrast, New Delhi has been built as the capital of British Raj from the industrial society that had different language, economic system, religion, values and worldviews. So, New Delhi is identified with wide street, parks, gardens as well as language of imperial geometry in planning and architecture.

From the above examples, it is reasonable to suggest that the ideology of environmental quality plays important role in housing planning and designing schemes. Social institutions provide the mean of housing, how, where and when the house should be built, and relevant provisions of infrastructure and supporting services. In the context of self-built housing in Hanoi city, the ideology also plays important role. Through historical development, the built environment in Hanoi city has been influenced by different external culture including Chinese influence, French influence, Soviet influence and influence of global culture since the economic reform in 1986 (Logan, 2000). Each influence had formed meaning of

living spaces, housing types, set of regulations and housing standard. Thus, in order to understand influenced factors on self-built housing design in Hanoi city, it is necessary to explore the social and historical context, political ideology, housing policy and urban settlement. The next part will explain further a connection between planning, regulation and characteristics of housing.

2.3.2 A connection between regulation and planning of settlements and housing

According to Rapoport (1977, 2000b), the analysis of built environment should examine concerning three different levels including the micro-scale, medium-scale and macro-scale (Figure 7). The first scale is housing environment such as function, spatial organisation and other detailed aspects of designs. The second refers to relationship between dwellings and settlement or neighbourhood unit while the third is broadest context such as housing strategies, urbanisation and the relation between urban-rural areas. In this regard, interconnection between those scales and design of dwelling had been highlighted in various studies (Rapoport, 1997, 2000b; Moudon, 1997; Chapman, 1996; Siksna, 1998; Towers, 2005 and Patricios, 2002).
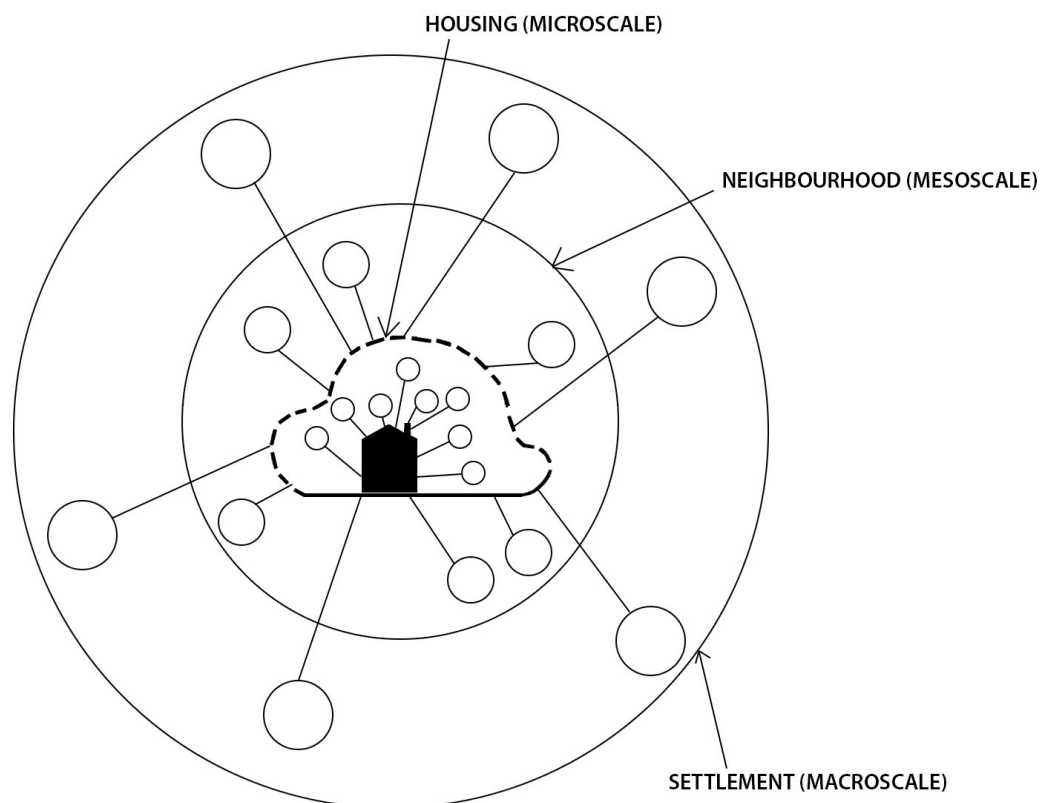
Figure 7: Relation between housing design and built environment (Rapoport, 2000b, p 147)

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Particularly, Moudon (1997) pointed out the link between urban settlements and buildings though three principles. The first principle is the physical elements including street network, plots and buildings. The second is map of different level of resolution while the third is urban form with its transformation in different historical events. Three principles reflect both characteristics of cities and socio-structural patterns that contribute to detailed design including scale, form and functional needs. For example, the Britain school of urban morphology focus on Fringe belt concept (Whitehand, 2001). Therefore, housing in each planning area has various distinct characteristics. For example, city centre has high-density housing, and housing been originally designed as pedestrian access. By comparison, modern housing in suburb have larger green spaces and they are designed for occupants using car and modern transportation (Figure 8).
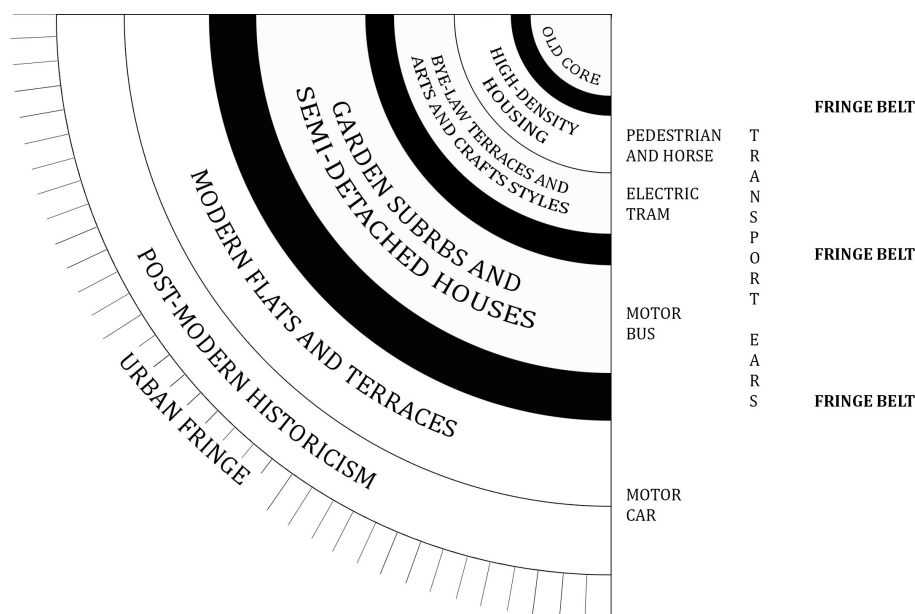
Figure 8: Fringe belt concept (Chapman, 1992, p 42)

Similarly, the planning of towns and cities could impact on detailed characteristics dwellings. Before the nineteenth century, towns and cities were originally established for trading, processing, manufacturing, and their locations were depended on the natural environment and geography. Overtime, the towns and cities had been growing and expanding with particular administration, political and religious controls. Accordingly, the urban structure is shaped and controlled though three levels: block, plot pattern and building (Chapman, 1996). The basic urban unit is block shaped by network of street. The next level is the building plot while the smallest level is building design. An example of interaction between those three levels could be found in the work of Siksna (1998). Siksna analyses different patterns of cities in Australia and America (Figure 9). The study shows that different planned structures result in different character of building typology and form of building. Small plots might suit with small number of buildings. By contrast,

big plot may engage with large number of building, and there is a need a system of alleys to provide equal access to buildings. Based on surrounding landscape, each building has its own design strategies responding to the plot and circulation system.
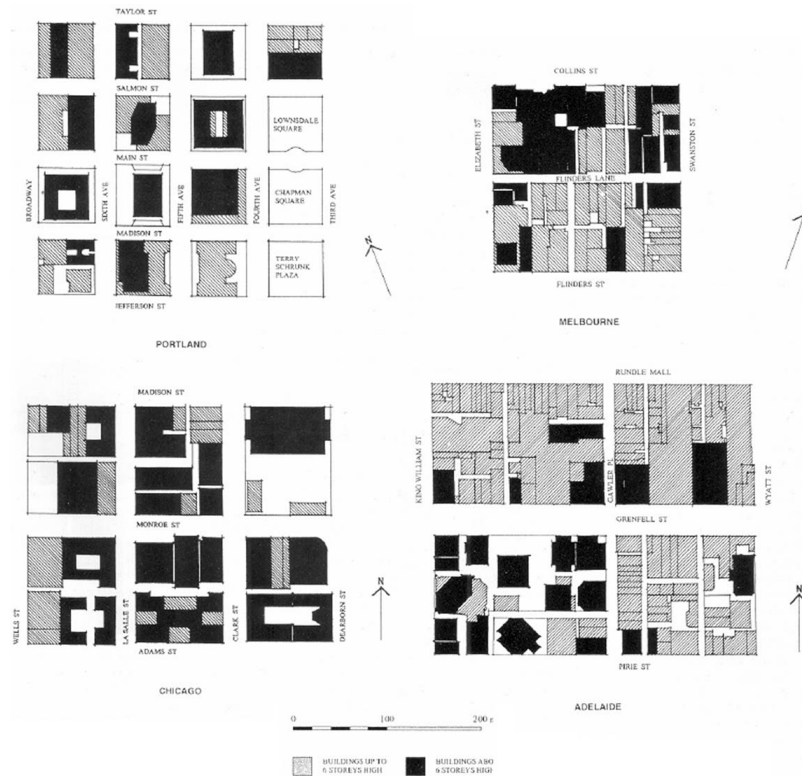
Figure 9: Different size of blocks, plots and circulation system result in the different typologies and form of buildings (Siksna, 1998, p 31-32)

Planning is also influenced on form of urban buildings and built environment of living spaces. According to Towers (2005), number of the population in one space has significantly affected the quality of urban houses and services. High levels of occupation could cause public facilities and urban management while low level of residential may affect to communal service that becomes unsustainable. In other side, high-density population has some benefits in term of economy, environment and social network. Specifically, high-density area is easier access to public service; the cost of providing infrastructure services could be reduced, or urban area provides wide range of choice for social interaction. Based on images of quality environment, Towers (2005) showed that there are three basic forms of housing: pavilion, street and patio (Figure 10). Although the amount of floor space was same, each form covered different ground area; the height and sizes were depending on the appearance of forms. The pavilion form presented for high-rise housing; street form responded for low apartment while later took form of urban

block in Western countries. Those basic concepts had great influence for design of urban dwellings such as detached and semi-detached houses, terraced houses and flats to indicate amount of space, garden area and privacy.
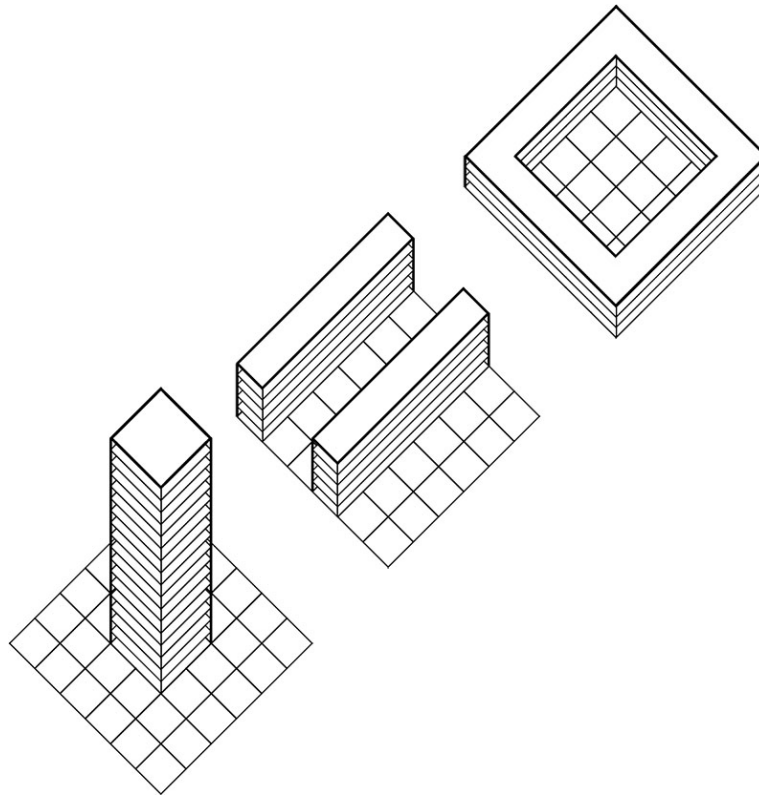
Figure 10: Relation between population density and typologies of buildings (Towers, 2005, p 51)

Meanwhile, Patricios (2002) highlighted the urban environmental quality though the neighbourhood unit. Though the concept of neighbourhood unit, housing was planned in four levels: enclave, block, super block and neighbourhood. Each enclave had contained limited number of houses; block and super block were aimed to arrange number of public spaces and pathway between several enclaves. The biggest level was neighbourhood that was bounded by natural feature or major roads. Each level of neighbourhood also had a fixed population size and number of housing to maintain the quality of life, such as capacity of school and public services.

From the above explanations, it is clear that housing is part of larger setting system; therefore, to analyse the housing itself, it is necessary to understand broader systems. In the context of this study, it is important to find out relationship between building and urban environment in Hanoi city. The details of housing concept, relevant policies, regulations and planning of urban settlements in Hanoi city will help to demonstrate the characteristics of self-built housing since the economic reform in 1986.

2.4 Home environment: perception, meaning and identity

2.4.1 Housing needs

In academia, there is a large volume of studying of connection between housing needs and housing designs (Maslow, 1943; Lawrence, 1987; Tipple, 2000). Maslow (1943) identified a hierarchy of needs, which contain five categories of needs common to all people. Those needs are following the order from lowest to highest rank: physiological needs, safety, belonging and love, esteem and self-actualisation. This mean that each level must be satisfied within the individual before moving to next level. Based on theory of human needs developed by Maslow (1943), Lawrence (1987) highlighted the connection of dwelling with household needs through psychological perspectives. Within his analysis, there are different hierarchy of family needs regarding to both conscious and unconscious human motivation and personality (Table 2). The needs are following order: (1) primary level, such as shelter and basic amenities, (2) secondary level, such as security, comfort, socialization and (3) tertiary level, such as self-expression.

Primary level	Physiological needs *Homeostasis, food consumtion, sexual behaviours*
Secondary level	Safety needs *Security, stability, dependency, protection, freedom from fear, anxiety and chaos, need for structure, order, law, limtis*
	Belongingness and love needs *Stable affectionate regulations with people and places, including homes and neighbourhoods*
	Esteem needs *First, for strength achievement adequacy, mastery and and competence; for confidence, independence and freedom* *Secondly, for reputation, prestige, status fame and glory, dominance, recognition, attention, improtance, dignity and appreciation*
Tertiary level	Need for self-actualization *Individual differences are significant at this level*
	Cognitive capacities *The desires to know and to understand are the preconditions for the basic need satisfactions*
	Aesthetic needs *Need for order, symmetry, closure, system and structure*

Table 2: Hierarchy of human needs (Lawrence, 1987, p 159-160)

According to Lawrence (1987), although the basic level of human need was similarity in many cultures, the secondary and tertiary levels are based on perception of house owners, and they are significant to create home environment and regional identity. For example, Roderick Lawrence (1987) analysed domestic spaces in housing in England and Australia. The organisation of domestic spaces

could be explained by structure of functional attributed and symbolic meanings revealed oppositions such as clean-dirty, day-night and public-private (Figure 11). While housing in both countries apply similar principles for domestic spaces, the use and the meaning of living spaces are different. For example, the author highlighted that:

> *"Australian respondents with young children frequently suggested that the minding of children is closely related to other household chores, which are done in the kitchen. In the English study, however, very few respondents mentioned that there was a need to supervise children in the kitchen… It was common in both Australian samples to entertain kin and friends around the kitchen table. This practice was not evident in England in fact; the English respondents said that it was usual for friends to be entertained in the living room". (Lawrence, 1987, p 108)*

The organization of domestic space in England   The organization of domestic space in Australia
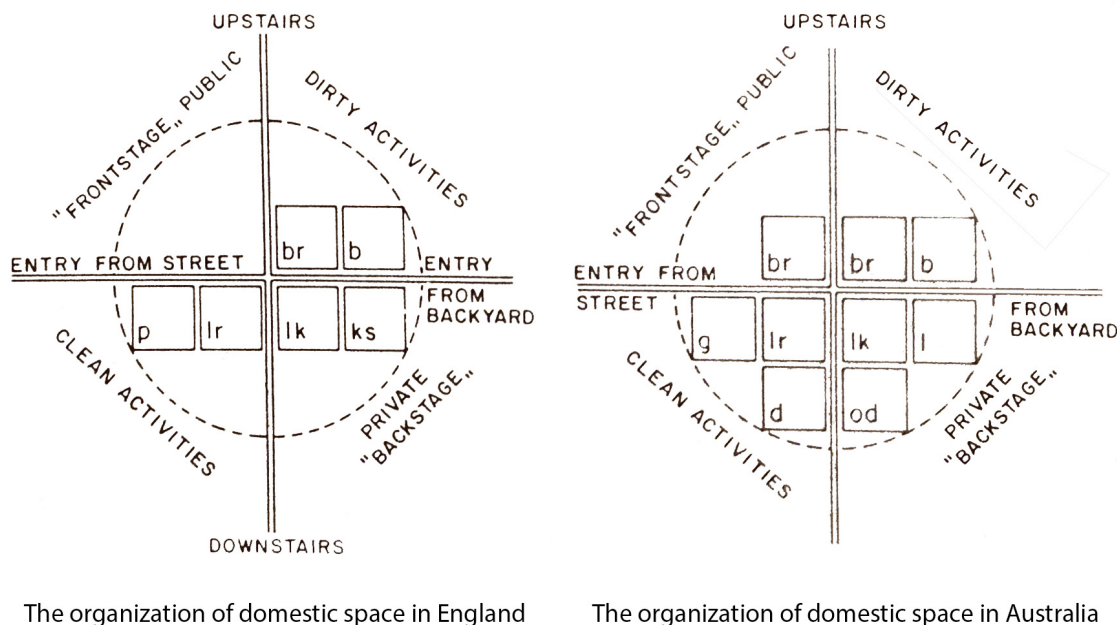
Figure 11: The organisation of domestic space in Australia and England (Lawrence, 1987, p 107)

Beside the hierarchy of needs, Tipple (2000) revealed the influence of family structure on home environment though different phrases of life. Specifically, the house is needed to transform it-self when the demands of space increased due to natural increase in household size (Figure 12). For examples, a basic house is designed for the young couple with fixed quantity of room (Q1). When number of family member naturally grows up, the need of new space results in the transformation of housing. Thus, new rooms are added (Q2). The process of transformation continues when the family had second and third child, and the

house transformed itself again to have maximum number of living space (Q3). After several years, when the children growing up and moving out, the need for spaces is reduced, and some parts of house would be used for rent or other purposes.
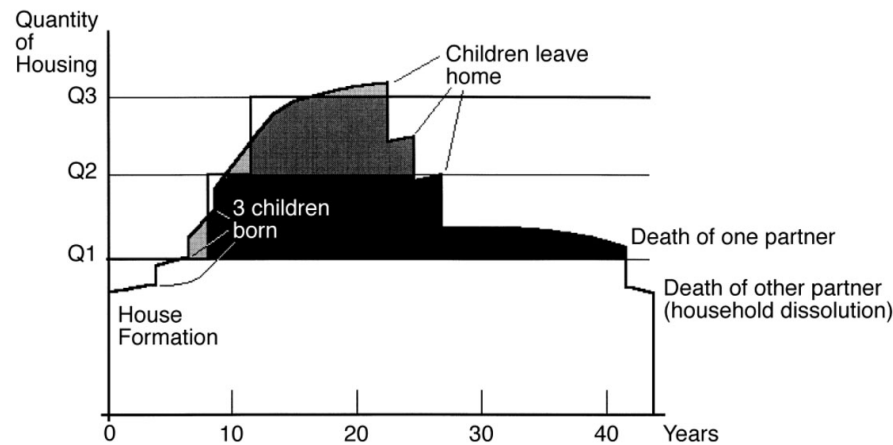
Figure 12: household consumption overtime (Tipple, 2000, p 115)

Briefly, based on those explanations, family needs provide preferences of housing design. Different requirements and use of living spaces provide different strategies of design process. Meanwhile, the building could be designed in different phases. When people have better income, the house could be upgraded or modified to meet new requirement. In the context of this study, it is necessary to find out primary needs of household and how does it impact on design of self-built housing in Hanoi city. In addition, within self-built activities, household would modify and change the design overtime; therefore, it is necessary to investigate how the building could be transformed and what is motivation for household to modify the house.

2.4.2 A house as reflection of perception and identity of households
In recent years, it has become increasingly common for social scientists and designer to address relationship between the home and housing environment (Tuan, 1979; Parker and Richards, 1994; Oliver, 1987; Blundell, 2016; Cooper, 1974). Human are not only species that can build. Many animals live in their own construction rather than simply in nature. Termites, wasps and bees built sophisticated structure. Some birds create their nest based on their experience. Consequently, Tuan (1979) hypothesized that a difference between human and other animals is based on the awareness of people. When household make their shelters, the household is aware of what they do than the animals as they make their home. At the start, the household needs to know where to build, with what materials and in what form. Therefore, completed building impact behaviour of the household. Living spaces could refine human feeling and perception about the building.

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Similarly, Parker and Richards (1994) reveal that besides protective functions, a house is a place reflecting cosmology and perception of occupants. Consequently, various proverbs strongly indicate meaning of home through feeling and behaviours. For examples, two popular English proverbs are "*Every man's home is his castle*" and "*Home is where the heart is*" that reminded a relation between human behaviours and the living environment. The relation indicated that the meaning of buildings is more important than physical structure on a piece of land; it is a place that provides the symbolic meaning for any person. Each person has different way to interact with other family members, neighbourhoods and friends to express self-expression, the personal relationship and power of individuals. Thus, home is not only the place for sleeping, cooking, eating or other daily activities; it is a particular family setting for social meaning and formation of personal identity.

Meanwhile, according to Oliver (1987), dwelling is not only shelter, but it also is a symbolism of socio-culture and has behaviour meaning to reflect the habit, individual expression and philosophy of owners. The concept of dwelling; therefore, could be understood as special place reflecting psychological behaviours. For example, he stated that:

> *The dwelling is more than the materials from which it is made, the labour that has gone into its construction, or the time and money that may have been expended on it: dwelling is the theatre of our lives, where the major dramas of birth and death, of procreation and recreation are played out, and in which the succession of scenes of daily living are enacted, and re-enacted in the processes of dwelling* (Oliver, 1987, p15)

According to Blundell (2016), buildings are not only show a physical structure or aesthetic message; it expresses experience and ideology of owner though daily rituals. Practically, buildings could be designed and organized in different ways to indicate different purposes and meanings. For example, the different designs give different meaning that affects the way of eating, sitting and sleeping. In addition, buildings are not only show the relationship between architecture and human, but they also indicate the worldwide and cosmos. In pre-modern societies, the practical task and experience are mainly based on cosmological dimension though ceremony and religious activities. Thus, housing architecture is a mirror, which reflects our world, knowledge and how we understand it. Ritual had shape architectural characteristics through experience and meaning of spaces that remain unconscious. For example, ideology relating cleaning and dirty might define and delimit meaning and use of domestic spaces:

> *Shoes are not dirty in themselves, but it is dirty to place them on the dining table; food is not dirty itself, but it is dirty to leave cooking*

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utensils in the bedroom, or food bespattered on clothing; similarly, bathroom equipment in the drawing rooms; clothing lying on chairs; out-door things in in-doors; upstairs things downstairs. (Blundell, 2016, p 9-10)

According to Lefebvre (1974), to concentrate on the form and other architectural elements of buildings, it is essential to understand the meaning behind the ideal and activities around it. In the work of Lefebvre (1974), the connection between meaning and architectural aspects of design has been highlighted though concept of a spatial triad including conceived space (representations of space), perceived space (spatial practice) and lived spaces (representational space). The representational space is described as the space of inhabitants and users. The space makes symbolic use of its objects. Representation of space is the conceptualised space that created by planner and architects. Spatial practice is space where daily activities occurred. The ideas of Lefebvre have been reflected in the work of Dovey (2008) and Markus (1993). Both authors indicated that architecture form and urban design act as mediators of social practice while the built environment is endowed as capacity to control, manipulate and authorise. Particularly, Dovey (2008, p1-2) stated that:

"Architecture and urban design frames space, both literally and discursively. In the literal sense of everyday life takes place within the clusters of rooms, buildings, streets and cities we inhabit. Action is structured and shaped by streets, walls, doors and windows; it is framed by the decisions of designers. As a form of discourse, building form constructs and frames meanings. Places tell us stories; we read them as spatial text.... The built environment reflects the identities, differences and struggles of gender, class, race, culture and age. It shows the interests of people in empowerment and freedom, the interests of the state in social order, and the private corporate interests in stimulating consumption".

From the above text, the built environment could be understood as filters to classify people and their roles in society. From historical buildings to modern designs, from urban planning to housing, all of those structures reflect the meaning, social practice and ideologies. For example, the modern shopping malls represent as a temple of the power of global capitalism, where passers are attracted into consuming not on the essential needs but in search of a lifestyle or realisation of their dreams (Markus, 1993).

From those explanations, beside the physical matters, it is important to find out the meaning and ideology about a house, and perception of household about living spaces. In the context of Hanoi city, due to its rich cultural background and

historical development, a meaning of house could only understand by analysis of traditional rules, rituals and perception of the Vietnamese, which are continually changing overtime. By that, the study could fully demonstrate the influence on socio-cultural needs on characteristics of housing.

2.5 Culture transition's process and transformation of housing design

2.5.1 Culture transition's process

According to Rapoport (1983), due to the fast development and modernisation in developing countries, the living environment, should been considered as an active factor reflecting socio-cultural variables. The transition of living environment provides new needs and demand; as a result, socio-cultural values have changed itself to adopt with new condition. The author considered the transition process as the "*creative synthesis*"; the synthesis is based on the combination of new, peripheral and core elements (Figure 13). Core cultural elements that characterized the group and slowly changed while the peripheral elements that quickly changed over time. The peripheral elements are less important rather than core elements in traditional environment. Besides that, contemporary environmental setting also provides new elements such as the application of new technologies, materials and modern devices. Generally, over time, some aspects of culture may disappear while other aspects persist, that reveal the practical experiments of people and the built environment.
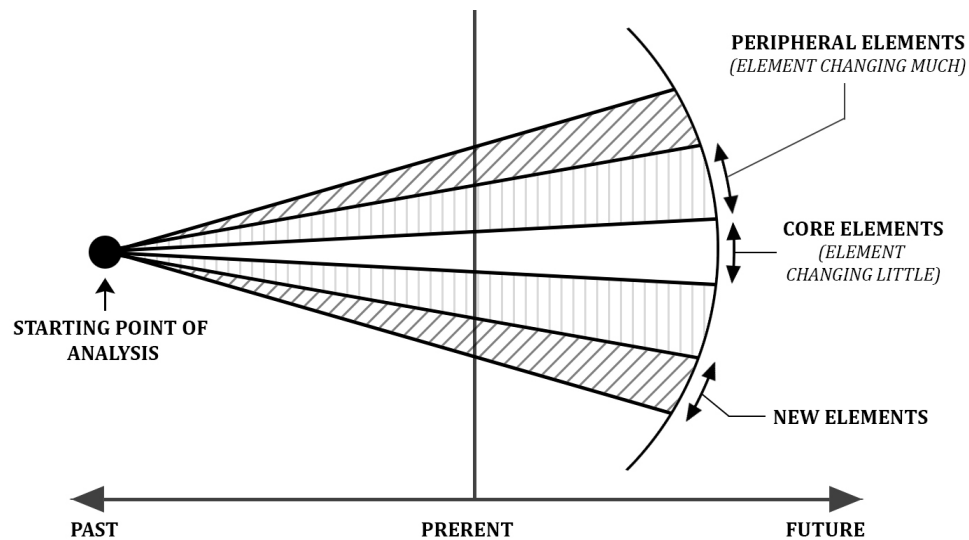
Figure 13: The socio-cultural values as a process (Adopted from of Rapoport, 1983, p 261)

Oliver (1986) highlighted that culture is process of learning. Culture should be distinguished from nature of human, which represent unique universal level. Human nature is inherited by genes that determine the physical identities. Consequently, Oliver (1986) focused on a concept of "*handing down*" to understand

the culture and dwelling design. The concept is actual process of transmission from one generation to the next by oral and other communicated methods. Thus, there are not such things a cultural building. There are only buildings that embody cultural factors.

From the above description, it is clearly that the values of culture are not a hermetic. The following sections will explain further the influence of cultural changes on architecture.

2.5.2 Globalisation and hybrid architecture
The earliest capitalist system began with globalisation of commercial or mercantile capital in the thirteenth century (Abu-Lughod, 1989). Since the sixteenth century, European merchants and traders based in world cities exploited resource and raw materials. Later, during the age of imperialism, financial capital is generally controlled by industrialised nation-states and their dominant imperial metropolis such as London, Paris and New York (Soya, 2000). Based on the capital system, investment from industrialised nations has spread to other parts of the world and shaped organised new international division of labour and structure of the First, Second and Third Worlds. In this ordered configuration of international relations, newly industrialised countries quickly appeared. The new countries have been associated with international capitalist world economy, and they have own distinctive spatial division of labour to create new world order.

In the early phase of globalisation, the process of housing production has changed. For example, in the UK before the First World War, the supplies of housing mostly created by private builders. In 1918, the country faced a housing shortage and building costs were inflated. In addition, the materials and labours were scarcity while the hygiene level was decreased. As a result, social attitude moves towards to mass housing to solve those issues (Elliott, 2014). In the twentieth, the changes in housing process lead to the increasing questioning of fixed national cultures and the understanding that cultures are not hermetic.

The study about housing transformation due to change of socio-cultural values has gained attentions from researchers and professionals from over the world. In this respect, numerous strategies and methods have been used to investigate the problems (Abel,2000; Agusintadewi, 2014; Al-Sanafi, 2001 and Nanta, 2009). Specifically, according to Abel (2000), in the age of globalisation, hybrid architecture became a phenomenon. Multinational corporations and architectural firms are increasingly extended their market into new areas. In meeting these new demands, their products and policies are changing themselves to suit culture of local consumers and other social factors. Therefore, the process of globalisation has triggered socio-cultural, economic and political changes lead to a more diverse and unpredictable result than that envisaged in the usual scenarios. For instance, Abel

(2000, p 190-197) showed impact of "*imported culture*" on Singapore architecture. During colonial period, Singapore had been exposed to layers of imported culture, which had been localised overtime, and adopted to regional conditions. Therefore, a new set of culture was created within the influence on Western and non-Western culture. Singapore was not a Chinese city or Western city, but it was developed with dualistic pattern with European half and native half. Also, many leading architects received their professional education abroad, and were exposed early on to an international architectural culture. Thus, contemporary Singapore architecture is a hybrid mix of imported and local elements.

Similarly, Agusintadewi (2014) shows the transformation of low-cost housing in Bali due to new elements in built environment. The urban household who live in those houses tend to modify and change their houses to meet their own satisfactions. Despite various changes to meet new living styles, numerous socio-cultural aspects are still important to create sense of place in Bali houses. Particularly, the study shows that among various socio-cultural factors, religious and perception of Bali people are the key elements contributing to the meaning and designs of domestic living spaces. Besides, new elements are introduced through new living styles. For example, the household structure is moving from extended family to nuclear family while application of modern devices in house is becoming a common phenomenon.

Meanwhile, Nata (2009) reveals the transformation of vernacular rural Thai house due to social changes. Using mix method including semiotic and ethnography studies, the study shows changing of place experience in historic houses and contemporary houses. Particularly, based on study of murals paintings of traditional houses; the multi-level platforms represented various symbolic meaning. On the other hand, in recent society, a single level platform is considered more practical. Also, the form of contemporary buildings has become more and more enclosed with permanent walls and roofs for protection and security (Figure 14).

Historic version of H03

Historic version of H04

Contemporary version of H03

Contemporary version of H04
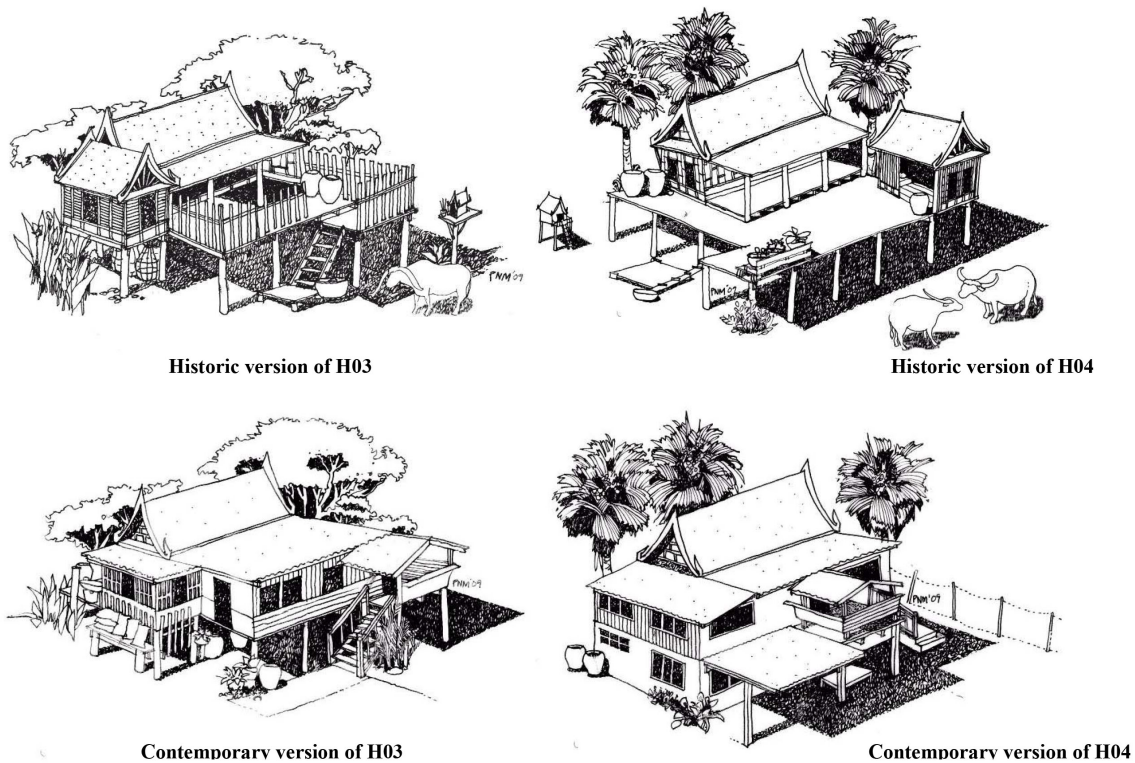
Figure 14: Comparison characteristics of traditional and contemporary houses (Nata, 2009, p 199)

All above examples show that transformation of architecture is unavoidable. They also suggest that housing characteristics are based on old and new socio-cultural values. When the family needs are changing, the design of housing is also changing to meet new requirements of living spaces. In the context of this study, it is important to explore housing as expression of socio-cultural values. In this regard, since the economic reform in 1986, is spatial layout of Vietnamese housing different from housing in other countries? In addition, why some aspects of self-built housing are changing overtime while some aspects are not changing?

2.5.3 Modernisation and transformation of architecture

Architecture always provides two perspectives; one is the technical task while another is socio-cultural identity. The modern architecture was developed technologies were improving. For example, the industrial evolutions have considerably shaped the technological innovations, and influenced into designs of domestic products (Abel, 2000). Iron stoves began to replace the fireplace. Gas and electric stove became popular. Water supply, plumbing and sanitation had been standardised to improve hygiene. Thus, it is clear that the application of new regulation, materials, methods of construction and domestic products provided new form of architecture. Therefore, the modernism is not presented in particular

times; it always transformed itself overtime. As King (2004, p 65) highlighted the process of change as:

> *"No-one living in the Stone Age would know he was living in the Stone Age. He would believe he was living in the modern age. Today we believe we are living in the modern age. Time will tell".*

Besides that, tradition was represented though living styles, which is changing overtime to suitable with new environment. For example, the introduction of electricity has resulted in the transformation of domestic spaces and the way individual living in the house. In addition, mass media such as newspapers, magazines, television and the Internet allow people from other part of the world could interact with each other. Thus, people's beliefs, values, worldviews, life styles and other symbolic meanings of life are also changing. The culture changes also impact to political ideology; therefore, new building regulations and new form of housing appeared to adopt with new conditions. So, traditional architecture is not only values in particular historical context. The concept of tradition should produce new elements rather than copy the old form or structure. In other meaning, the traditional architecture does not have to appear in any particular buildings; the values of culture and tradition are reflecting in process of learning.

According to Tzonis, Lefaivre & Stagno (2001), there were two main architectural challenges in the age of globalisation. The first was the identity of the traditional architecture within an impact of post-colonialism while the second was a threat of the globalization. Both challenges related with culture and its transition on designs. In the book: "*Tropical architecture: Critical Regionalism in the Age of Globalization*" (Tzonis, Lefaivre & Stagno, 2001), several professionals and architects had revealed their ideals about the transition of socio-cultural concept.

Lewis Mumford was introduced as a professional writer of regionalism who had great influenced on new way of thinking about regional architecture. Within his perspective, the regional architecture was understood a process of continuous changing process rather than expression of monopoly architectural type. The value of historical architecture was always important, and it had something to study. However, it was hard to support needs of new generations. Therefore, traditional architecture should be innovated to integrate with modern life. In other meaning, tradition was not timeless, but it should redefine itself overtime and adapted from new realities.

> *People often talk about the regional characters as if they were the same thing as the aboriginal characters: the regional is identified with the rough, the primitive, and the purely local. That is a serious mistake… The forms that people used in other civilizations or in other periods of our country's history were intimately part of the whole structure of their life… Regionalism is not a matter of using the most*

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available local material, or of copying some simple form of construction that our ancestors used, for want of anything better, a century ago. (Tzonis, Lefaivre & Stagno, 2001, p.24-25)

Besides that, Mumford rejected the idea of using traditional landscape while the application of new techniques in new designs was accessible. The modern designs needed to deal with new realities and actual conditions of life such as economic and social issues. Therefore, the role of designers was to create an environmental space that people feel at home rather than picturesqueness. Moreover, sustainability and ecology were referred to "bio-technic", which highlighted the role of technics to create balance between man and nature. Thus, the concern of advanced technology could help to improve living and working environment. For example, the natural ventilation was suitable in the most circumstances, but the using of air condition could apply in particular situations.

Da Silva who was introduced as a famous practical architect, and she had similar ideal with Mumford about modern architecture. She considered that architecture was similar with other creative life such literature, music, painting and education, and local architecture needed to be examined to accept present technology.

> *As an architect I believe in and so cannot subscribe to copying the architecture of an era that is long past. As an architect I believe in building to suit our living needs in a living way, utilizing the most suitable modern and progressive means at our disposal, and on adopting these sound and fundamental principles of building in the past.* (Tzonis, Lefaivre & Stagno, 2001, p.31)

For her expression, Da Silva rejected to use traditional building materials, methods and ornament while the sustainable materials, ventilation and shading techniques can be applied in new designs. Moreover, the features of social life were unique, and they should be considered during design process to express regional identity rather than reproducing some Western architectural elements. In addition, the ideal of tradition in the past was completely varied from the concept of traditional in present due to new concerning issues. Thus, the tradition should be understood as a heritage evolving continually to express the regional identities rather than copying old form, structure and materials, and the architects had to decide which principles were still appropriate and valid for new realities.

Based on those arguments, it is reasonable to suggest that culture is not a monolithic force in particular period; it is a catchall term to describe general customs and beliefs of particular group of people, and it exposes to economic, political and social phenomenon.

In context of Hanoi city as well as other Vietnamese cities, since the economic reform in 1986, various new factors has significantly influenced on living styles and beliefs of local inhabitant; thus, the design of self-built housing reflect how did people adopt new ideal, concept and living styles and which traditional socio-cultural rules are still valid in contemporary society.

2.6 Research hypothesis and theoretical framework

2.6.1 Research hypothesis

As mentioned in the introduction chapter, the research gaps are identified in following aspects:

Firstly, there is little existing study exploring the significant of housing design by house owners or the roles of households played in the design process. However, as literature review demonstrated that existing studies have explored the socio and political situations of self-built housing in Vietnam. For example, Gough and Tran, 2009; Tran and Dalholm, 2005 argued that privatisation policies could also lead to increasing socio-spatial disparities and inequality in collective apartments, such as some groups get better supports from state than other groups. This study focuses on different aspect of self-built housing. It investigates design aspect of self-built housing regarding traditional norms, ritual activities at home and living styles of households.

Secondly, industrialised mass housing designs are strictly controlled by standard design principles. Users generally had very little or no control in stages of design, management or construction. However, self-built housing allowed users or owners to be fully involved in the design and construction processes. Therefore, it may reveal different aspects that are different from mass housing design and construction process.

Thirdly, the housing architecture in Vietnam has been well studies in the existing literature; nevertheless, majorities of those studies focus on characteristics of housing in a particular period. In addition, discussions about Vietnamese housing architecture commonly emphasised on vernacular architecture rather than contemporary housing. This study aimed to explore how people practice self-built housing as a main primarily form for contemporary residential buildings. I would like to demonstrate that traditions embedded in the housing design and construction are not fixed but should be considered as a process of learning, changing and adaptation in different living conditions and built environment.

Therefore, the hypotheses of this study are as follow:

Firstly, this study hypothetically suggested that participation of households in design and construction processes is significant to create sustainable housing programme. When households participate in design and construction processes, households are able to made decision about their dream houses regarding their socio-cultural background, family needs and expectations, and to explore the sustainable ways to achieve their goals.

Secondly, in order to achieve sustainable development, urban planning authorities need to support for self-built activities and maintain the living standards of neighbourhoods; otherwise, self-built housing area may quickly become modern slum. Since the economic reform in 1986, Vietnamese housing policies have changed to support private self-built housing. Different housing models have been applied to promote participations of households in design and construction processes. In this regard, the state agencies and developers have responsibilities to develop and improve infrastructure and services while households are able to made decisions to design and construct their own houses based on their financial capacities, needs of daily life and needs for ritual activities.

Thirdly, design and construction of contemporary housing is not just a matter of building up physical environment, but also has impacts on the socio-cultural factors. When households participate in design and housing process, new living styles will affect their decisions, but various traditional elements can still heavily influence on characteristics of housing design. In the context of different kinds of urban typologies in Hanoi city, individuals made some similar decisions on design and construct their own houses based on their socio-cultural values and needs. For example, traditional principles regarding hierarchical relationship of spaces, such as 'cleaning' and 'dirty' spaces, 'safe' and 'dangerous' space have been followed. Also, new design concept such as 'individual private' and 'communal' spaces may have impact to the housing design.

2.6.2 Conceptual framework
Given the review of different perspectives in the literature, this section proposes a conceptual framework to guide the study of contemporary self-built housing in Hanoi city. Using the ideal of Rapoport about relationship between socio-cultural factors and housing in different layers of built environment as a starting point, it is possible to construct a framework to expand characteristics of contemporary self-built housing and its connection with households needs in the context of Hanoi city. Particularly, the framework of this study focused on two main themes: urban environment and home environment (Table 3).

The urban environment emphasised on influence of Vietnamese housing policies, urban development process and planning of neighbourhoods on development of self-built housing. The housing policies and planning of neighbourhoods are important because they help to determine the role of households, state and developers in housing process. It helps to answer how, where and when the building could be built, and what kinds of regulations and supporting programmes before and after the economic reforms in 1986.

Main themes	Sub-themes	Research issues	Examples of key studies
Urban environment	Housing policies and roles of organisations, institutions and developers in planning process	Ideology and concept about the house Housing development strategies and housing policies	Rapoport (1969, 1977, 1980, 1998, 2002a,b, 2005); King (2004)
	Neighbourhood's environment	Concept of neighbourhood Characteristics of neighbourhoods Local building regulations in urban neighbourhoods	Rapoport (1977, 2002c) Moudon (1996); Chapman, (1996); Towers, (2005) and Patricios (2002)
Home environment	Reasons for building a house	Building the house in order to saving construction cost Building the house in order to generate income The special requirements	Turner, (1972, 1976)
	Methods to design and to build a house	Household design the house based on their experience Household design the house based on architect's suggestions Architect's design based on household requirements	Lawrence (1985, 1987); Turner (1972, 1976)
	Housing and family needs	Living styles Comfort environment Organisation of space	Rapoport (1967) Lawrence (1982, 1987, 2000)
	Changing and expectations	Demolition/rebuilt the house Physical extension	Tipple (2000)
	Ritual activities and ceremonies	Ritual activities during construction process Daily ritual activities Occasional ceremonies and festival	Tuan (1979); Oliver (1987); Parker and Richards (1994); Blundell (2016) and Cooper (1974)
	Daily activities	Cooking and eating Sleeping arrangement Social activities	Lawrence (2000); Rapoport (1969)

Table 3: Conceptual framework of investigation

Meanwhile, the home environment highlights the choices of households in design and construction processes, and influence of socio-cultural factors on characteristics of self-built housing. As matter of fact, each individual and households have different requirements regarding their living styles and beliefs. Thus, how households create their houses to meet their own requirements in the Vietnamese context is needed to investigate. In the meanwhile, since there is a change in living style of family needs since the economic reform, households and individuals could build and modify the building in different ways (Tipple, 2000). What motivation and how did Vietnamese households build and change their designs to meet modern living conditions. Also, how ritual activities and living styles influenced on housing design, and what make a house became home in contemporary Vietnamese society is need to be explained.

2.7 Summary

This study investigates the characteristics of contemporary self-built housing under the influence of socio-cultural values in the built environment of Hanoi city. For that reasons, the relevant arguments and theoretical perspectives from many relevant subjects had been reviewed to provide background, knowledge and guidance for the investigation.

As presented in this chapter, the theoretical perspectives are divided into six sections. The first section contains the concept and definition of self-built housing and the role of households in design process to meet their living requirements. The second section shows series of theoretical interpretations that reveal the influence of culture on dwellings. The third section highlights the influence of urban environment on housing architecture through political ideology, rules and standards while the fourth section focuses on housing needs and perception of households on design of domestic spaces. The fifth section highlights the changes and adaptations of architecture to meet socio-cultural needs. This part also highlighted that socio-cultural aspects are not hermetic. Socio-cultural aspects are process of learning through daily activities and built environment to express belief and customs of particular society. Within the process of cultural transitions, architecture is continuously changing to adopt with new conditions. The last section reveals the research hypothesis and research framework.

Though the literature review, this chapter discussed the research gaps of existing studies on self-built housing, particular, the lack of the studies of self-built housing in Vietnam, which consisted of around 80 percept of the total housing supplier (UN-Habitat, 2014 and World Bank, 2015). The research gaps have been discussed, and this then led to the hypothesis and suggestive way to answer research questions. The outcome of this chapter helps to form the framework of contemporary self-built housing in the context of Hanoi city.

The review of previous studies and housing theory ultimately provides an understanding of connections between socio-cultural needs and assessment of living spaces and dwellings, and it also helps to construct the conceptual framework of the study. Particularly, this chapter shows that design of housing is based on matrix of socio-cultural factors seen in different scales of built environment rather than random choices. The urban environment, such as housing policy, urban development strategies and planning of neighbourhoods, influenced on form and typology of buildings and role of stakeholders in housing process. In the meanwhile, home environment (family needs and rituals) impacted on detailed aspects of domestic spaces and organisation of domestic spaces. Therefore, both urban and home environment are needed to investigate to find out how socio-cultural needs are expressed in contemporary self-built housing.

CHAPTER 3 METHODOLOGIES AND RESEARCH METHODS

In this stage of study, the importance of the originality of the ideal is significant. Within the introduction chapter, most previous studies focused on characteristics of appearance and physical characteristics of dwellings. Therefore, there are limited studies on an exploration of socio-cultural issues. Particularly, the built cultural environment and an interaction between socio-cultural needs and urban self-built dwellings are oversimplified in previous studies. Moreover, In Western countries, numerous scholars conclude that the role of household is significant in housing process (Lawrence, 1985; Rapport, 1979; Turner, 1976). In this regard, the role, opinions of household and characteristics of self-built housing are needed to investigate the influence of socio-cultural factors on housing design. Thus, the fieldwork of this study was designed to select contemporary self-built housing cases in Hanoi urban areas. Then, analysis and interpretation will be carried out to answer the research questions. As described in the chapter two, the framework of investigation focused on two main themes: (1) the built cultural environment in Hanoi city, and (2) the natural interaction between households and self-built houses to meet their socio-cultural needs in home environment. In order to present the connection between these themes, research issues and the methodology, the process of inquiry, strategies, approach and techniques used to collect data, and strategies for the analysis and interpretation of evidence will needed to be clarified.

Accordingly, the methodology means "*a way of thinking about and studying social reality*"; thus, methodology referred to the order to make the research process (Strauss and Corbin, 1998). It is including the wide range of research methods to collect data and analysing data. The method can be determined regarding the strength and usefulness of the method for the research topic. In order to present the connection between research themes, research issues and methodology, the process of inquiry, strategies, approach and techniques used to collect data, and strategies for the analysis and interpretation of evidence will needed to be clarified. Therefore, this chapter have two main parts. The first part shows the research framework of this study including research inquiry, research strategy and research approach. The second part shows detailed methods for collecting and analysed processes.

3.1 Research framework

It is necessary to point out the research framework that applied in this study. Research could be conducted though a number of frameworks that describe the sets of assumptions and way to achieve results. Particularly, Groat and Wang (2013) referred the research framework as the system of inquiry to frame one study in a special structured way. Figure 15 represents the broad theoretical perspective namely "*schools of thought*" that influence on various disciplines in research. There are four major components that structured the study in particular direction. The highest level is systems of inquiry, which reveals the critical theory and phenomenology. The following level is school of thought that focuses on the framework of study and the use of specific model for analysing. The lower levels indicate the methodology and more particular levels of techniques to collect data and examine the study. The term strategies referred to the management and planning while the tactics indicates detailed deployment of specific techniques. This conceptual paradigm helps researchers to shift from one stage to another slowly by understanding the important of each position, rather than suddenly jump to another. In other words, research framework is significant in order to answer research questions because it provides the structure from broadest level that influence on the choice of methodology, strategies and tactics.
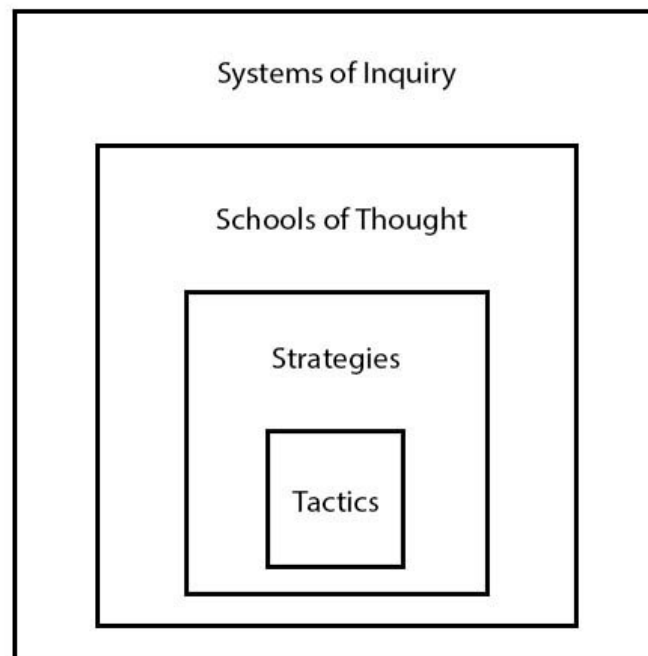
Figure 15: The system of inquiry and schools of thought (Groat and Wang, 2013, p 10)

The following parts will explain the framework of this research from broad level to small level: research paradigms, research strategies, and research approach and research methods to collect and to analyse data.

3.1.1 Research paradigms

In academic research, there are two major research philosophies namely positivism and constructivism that have been widely accepted (Groat and Wang, 2013). Both philosophies have opposite characteristics in the explanation and describing the phenomena (Table 4). The positivism seeks the explanation for human actions based on the experimental model and scientific views. Within positivism view, there is only one reality and it could be assumed and measured. Thus, this paradigm uses the statistical and mathematic tools to generalise and predict causes and effects. Opposite with positivism, the constructivism seeks the answers though context of everyday lives that identified by both participants and researcher (Groat and Wang, 2013). Within this paradigm, the reality is multiple and relative. The knowledge acquired is socially constructed rather than objectively determined; thus, the goal of constructivism is to understand and interpret meanings.

Basic beliefs	Positivism/ Post positivism	Constructivism
Ontology What is the nature of reality?	One reality; knowable within probability	Multiple, socially constructed realities
Epistemology What is the relationship of the researcher to that being researched?	Objectivity is important; research manipulates and observes in dispassionate, objective manner	Interactive link between researcher and participants; values are made explicit; created findings

Table 4: research paradigms (Based on Groat and Wang, 2013, p 66-79)

Why using constructivism in this study

Within the purposes for studying, this study applied constructivism paradigm by the following reasons:

Firstly, the study is involved with a complex system of built environment and an interaction between household and housing designs. So, daily activities, rituals and human behaviour no longer are objectives. Every architectural element in self-built housing in Hanoi city is designed regarding living styles and experience of house owners. Therefore, the dynamic process of housing design could not be completed without the involvement of participant's experience. In this regard, the constructivism helps to understand the natural interaction between housing design and participant's experience.

Secondly, this paradigm helps the study took place in the real contextual setting. The setting was involved multi influenced factors such as political ideology,

household choices, ritual, living styles and influence historical development of Hanoi city on housing design. Therefore, the study is not just simply answer series of question form but it involves a complex system. The system is needed to explore in order to answer the research questions.

3.1.2 Research strategies

Besides the research paradigms, it is important to point out the research strategies for this study. Although the research paradigm does not specifically suggest which methods have to apply for studying; however, the theoretical framework is useful to determine which strategy and methods will be applied. In the scientific methodology, the most popular research divisions are qualitative and quantitative research (Lucas, 2016 and Groat and Wang, 2013) (Table 5).

Method	Quantitative research	Qualitative research
Observation	Preliminary work	Fundamental factor to investigate the phenomenon
Textual analysis Interviews	Statistical content analysis "Questionable survey research": mainly fixed-choice questions to random samples	Understanding participants' categories "Open-ended" question to small samples
Transcripts	Use infrequently to check the accuracy of interview record	Used to understand how participants organize their talk and body movements
Methodology	Deductive process: cause and effect	Inductive process

Table 5: Comparison between qualitative research and quantitative research (Base on Silverman, 2013 and Groat and Wang, 2013)

The qualitative research is the understanding of qualities that can be defined in different ways:

Qualitative research is a research strategy that produced the findings with the uses words to reveal lived experience, behaviours, emotion and feeling rather than number or statistical data (Silverman 2013; Strauss and Corbin, 1998). This strategy is a power tool that focus on observation and interview in the real world to answer the research questions. In this way, the theory provides both the framework for critical understanding of the issues and analysing problems. Groat and Wang (2013, p 218) defined the qualitative research as "*the multi-method in focus, involving an interpretive, naturalistic approach to its subject matter*". In this definition, the qualitative research involves the natural setting to make sense of meaning.

According to Braun and Clarke (2013), the main fundamental characteristic of qualitative is about meaning, not numbers. It is useful setting to focus on knowledge within the real context rather than testing the hypothesis. The methods to collect data for qualitative research that is naturalistic in the senses can be

interview, group discussions, diaries, conversations and debate. Thus, the analysing of qualitative data provides the stories rather than telling about the data.

By contrast**, *the quantitative research*** is the method of collecting ideas from local people to investigate the issue; this method involved large number of participants, and it is useful when research needs accurate statistical data based on surveys or questionnaires. Within this strategy, the object of study is depended on the view of researchers. Furthermore, this approach involved the deductive process to seek cause-effect explanations to describe phenomenon.

Generally, both qualitative research and quantitative research have its advantages and disadvantages. In this study, the research focuses on the cultural changes and stories of the house owners and their feeling about their home in the age of globalisation. So qualitative research is much fitter to apply into this study.

Why using qualitative strategy in this study

This study applied the naturalistic qualitative strategy to interpret the ways participants making their houses due to following reasons:

Firstly, the qualitative strategy is useful to deal with complex setting of meaning. This study analysed the influence of socio-cultural factors to the characteristics of self-built housing in urban conditions of Hanoi city; thus, there is also a range of subjects relating to character of self-build housing such as folk, everyday life knowledge and political ideology. Each of them influences on housing design in different way. For example, without using qualitative strategy, it is difficult to investigate the influence of Feng Shui principles in spatial organisation of domestic spaces and ritual activities in design and construction process (See chapter 6). Both Feng Shui principles and ritual activities are necessary to demonstrate characteristics of self-built housing in Hanoi context.

Secondly, by approaching the qualitative research, this study can achieve much more meaning than the previous exploratory studies. The study potentially involved on the dynamics of cross-culture phenomenon and housing process. So, the investigation is not only simple as the answers of questionnaire form about housing, but it also needs to indicate the opinions and feeling of the occupants and stakeholders. Specifically, in this study, households are invited to describe their needs, preferences of living spaces and how those factors contribute to the architectural form of self-built housing. Therefore, the finding of this research is not simply to describe physical elements of self-built housing, but also how reveal meaning and sense of domestic spaces.

Thirdly, based on the theoretical perspective analysis, the self-built housing design is concerning the natural knowledge of household and socio-cultural factors rather than an involvement of architects and designers. In this regard, the interpreting of

the social interaction that took place in and with self-built housing design played significant role in this research. Therefore, the qualitative strategy is much suitable with this study to investigate the role and contribution of households in design and construction processes.

Within qualitative approach, the architectural research methods include observation, case studies and interviewing (Groat and Wang, 2013). Each method is used depending on its strength to investigate the problems. As described in chapter 1, there are four main research objectives in this study. The connection between research objectives and research methods could be seen in the table 6. The choice of methods depends on the available of data source and research objectives.

Research objectives	Data source	Methods
To identify the housing policies, built environment and main characteristics of Vietnamese housing before and after the economic reform in 1980s in the context of Hanoi city.	Archival record of housing policies in Hanoi city and Vietnam	Systematic literature reviews and observation
To understand how people build and use their houses to meet their individual needs within three different urban areas in the context of the Hanoi city. There three areas are newly developed urban area, work-unit area and urban village areas.	Households living in urban areas in Hanoi city, archival record of urban neighbourhood in Hanoi city	Literature review, case studies, observation and` interviews
To analyse the relationship between the contemporary self-built houses and the built environment of urban neighbourhoods in Hanoi city.	Record of urban planning in Hanoi city, households living in urban areas in Hanoi city	Observation, interviews and mapping
To investigate how design and construction of contemporary housing not only changed physical environment but also had impacts on the socio-cultural factors. When households participated in design and housing process, this study analyses how the new living styles affected their decisions and how traditions have influenced on characteristics of housing design	Households living in urban areas in Hanoi city	Case studies and interviews

Table 6: Connection between research objectives, data source and research methods

The objective 1 involved with historical context and historical development of Hanoi city before and after the economic reform. Thus, the data source mainly

based on archival record and relevant documents about housing policies and built environment in Hanoi city. In this regard, a systematic literature reviews is useful to highlight the housing characteristics in Hanoi in different period. During the fieldwork, the observation techniques had been applied to check and record addition information such as housing types and housing plans.

The objective 2 involved with socio-cultural context of different types of urban neighbourhoods in Hanoi city since the economic reform in 1986. Thus, a context and general characteristics of neighbourhood are required. In this regard, the literature study is useful to review the historical background and development of different models of urban neighbourhoods in Hanoi city. In the fieldwork, observation, case studies and interviews with households are applied to record details about differences of urban neighbourhoods in Hanoi city, and living styles and family needs of households.

In order to achieve the objective 3, it requires records and information about plans of urban neighbourhoods in Hanoi city. Thus, the maps and planning of different neighbourhood had been collected. Also, interview with households living in those neighbourhoods provide additional information about the studied neighbourhood.

The objective 4 involved with case studies of contemporary self-built housing. Thus, case studies are needed for detailed analysis. Also, investigation of the case studies and the participation of households in design and construction processes are recorded through interview methods.

For details, the following parts explain the methods of collecting data and analysis processes.

3.2 Data collecting

3.2.1 Archival record
An analysis of secondary data is significant in this research due to two following reasons:

Firstly, before studying in the fieldwork, it is necessary to build the framework and background for further investigation. In this regard, during the first and second years of research, various housing studies and analytical approaches were reviewed (See theoretical perspective chapter). Meanwhile, study of housing in Hanoi city as well as housing in other regions in Vietnam had been collected. Those studies were grouped in different historical periods to provide background for further analysis of contemporary self-built housing (See chapter 4 for details).

Secondly, due to short time in field study and cost for travelling, collecting all data in the fieldwork sometime is impossible. Moreover, it is important to find out what already existing to avoid the tendency among other previous studies. Without

preparing, some parts of research may impossible to analyse due to lacking of evidence from fieldwork; and the researchers may take more times and efforts to collect data.

In to get data about the housing and the influence of socio-cultural on self-built housing design, the secondary data were collected from various relevant resources. They are including historical, ethnographic, descriptive, journalistic and architectural documents. Principally, the secondary data was collected from two published sources. First, the relevant books, journals and articles selected in the university library. Those data provide the basic information and better understanding of Vietnamese socio-cultural values, context of Hanoi city and the user's requirement for investigating. Second, other relevant sources, such as company reports, research studies and official maps, are useful to support for the research. Those reports and maps are collected during the fieldwork in Hanoi city.

In this study, the secondary data mainly focused on general built environment in Hanoi city and overview of housing characteristics before and after the economic reform in 1986. The aim of secondary data is to provide background of Hanoi city and influence of urban conditions on housing designs.

3.2.2 Housing case studies

Besides secondary data, case studies were selected to demonstrate the characteristics of self-built housing and the living styles of Vietnamese. The most significant aspect in case studies is type of research questions. Research questions that focused on who, what and where are investigated through archival analysis, documents and surveys. On the other hand, the case study is commonly applied in qualitative strategies with the purpose of deeper and more detailed investigation. The case studies are normally used to answer how and why questions. Therefore, within this study, the case studies are important to show the interconnection between household's ideology and housing design.

3.2.2.1 Criteria to select samples

Clear criteria to select sample should be determining for this research purpose. Within this research, the case studies were selected following criteria. Firstly, the building should be self-built housing. It means that a house was built by owner, individual or family, who are still living in that house. It aims to avoid the case that was built by public and state developers. Secondly, the houses have to locate in urban areas around Hanoi city to fix with the research purposes.

3.2.2.2 Contacting households

This is the hardest step in this study. Even with introduction of university of Huddersfield, numerous households still refused to be part of this study. Therefore, a good relationship between research and interviewees is important to gather

information needed. Generally, the collecting data process in fieldwork can be classified into two main approaches:

The first approach is to contact with the leader of the community or gatekeeper where the research areas were located. In Vietnam, the smallest community unit is a neighbourhood unit (In Vietnamese: "*Tổ Dân Phố*") and leader of this area is called "*Tổ Trưởng*"[1]. *Tổ Trưởng* presented as a part of local authority to indicate needs of that community to higher administration levels; *Tổ Trưởng* also supervises all activities including building, trading and arranging between every member in that area. Therefore, a letter of introduction from the university was used to show my identity and explain the purpose of the study. By asking *Tổ Trưởng*, I could have an agreement or letter to allow me to carry out the study in the neighbourhood unit and other members in that community.

Despite having preparation, during the fieldwork study in 2016, this approach faced numbers of difficulty. Firstly, most households did not stay at home during visited time; thus, it is difficult to contact with households to arrange meeting. Secondly, majority of family refuse to interview and to participant due to sense of privacy and safety. Households are not comfortable to share their private life and detailed design of their houses to the unknown and un-relationship person. Thirdly, various households thought that their houses have nothing special to share, and household tended to recommend researcher to visit good-looking houses, which are fully designed by architects.

During the fieldwork study in 2017, second approach, which used the network of researcher to contact with households, was applied. Friends and relatives were invited to be parts of the project using social network. When they agreed to participant in this research projects, researcher made plan and visited their houses. Interestingly, after interviewing with local residents, they tended to introduce their neighbours, relatives and friends living in Hanoi city for studying.

3.2.2.3 Interview with households

Within each case studied, besides recording the physical characteristics, the household will be invited to get an interview. According to Braun and Clarke (2013), interview is the most familiar tool to collect data in the qualitative

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[1] In Vietnam, the administrative system is based on top-down system. At the top is the central government following by provinces, district level and the lowest level is ward or "*Phường*" (In Vietnamese). Each level is administrated by an elected person (People's Committee). Meanwhile, within *Phường*, there are several quasi-official levels including "*cụm dân cư* "and "*tổ dân phố*". *Tổ dân phố* is the lowest level that consisted of about four hundred and fifty households, and it has an elected leader (*Tổ Trưởng*) to represent local needs to administrative levels. For details, please see Leaf (1999, 199-302)

research. In the interview, researchers and participants have a professional conversation about their experience and perspectives to capture the concepts. There are different styles of interview. For example, according to Opdenakker (2006), there are two main ways to interview (Table 7). The first one is visual interview using mail, chat boxes and phone. The second one is face-to-face interview.

Techniques	Strengths	Weaknesses
Visual interview (Mail, Chat boxes and phone interviews)	Participants can answer at the any convenience time of respondent. Can cover large samples Easy to contact with interviewees in different location. No loss of raw data for online and email interview	Much depend on the accessibility of participants to computer and mobile device. Mail interview cannot use when participant require a certain level of writing and reading. Less control over the interview while participant can bias about their responses. Poor response rate due to lack of social cues
Personal interviews (Face to face interview and focus groups)	Interviewer makes sure respondents understand questions. Thus, it provides detailed data about experiences and perspectives of participants. Can obtain supplementary information about respondent that is important in attitudinal surveys. Ability to collect observational data about respondent's dwelling.	The interviewer may effect to answers of respondents. Due to large amount of data, it is time consuming to organise, conduct and transcribe.

Table 7: Strengths and Weaknesses of interview types (Based on Lucas, 2016; Braun and Clarke, 2013 and Opdenakker, 2006)

In this research, the face-to-face interview is more suitable because it provides the conservation that the participants can respond the questions by using their own words and feeling. During interviewing, the researcher can easy to explain the question, and it is more convenient rather than by using mail or chat boxes interview. Face-to-face interview also provide the social interaction between researcher and participants; thus, it helps the participant feeling more comfortable when talking rather than using telephone interview. Moreover, face-to-face interview is involved with the story-telling techniques to investigate the issues. The interviewees were encouraged to describe what happing in the real-life context.

Besides that, there are two main types structure of interview namely structured interview and unstructured interview. According to Braun and Clarke (2013), unstructured interview is most powerful way to investigate the experience and issues, which is litter known. Before interviewing, a list of themes will be prepared rather than list of specific questions. Thus, sometime, researcher can raise new questions based on the responds of participants. By contrast, questionnaire-based interview is based on specific variables while data require precise answers and

large number of participants. Thus, this type of interview is particularly useful for numeric information. For investigating socio-cultural factors and its influence on housing design, in-depth interview that applied unstructured interview type was applied in this research. Before collecting studies, a framework was prepared (section 2.6). During interview, researchers ask household questions relating topics in the framework (Please see in-depth interview guidelines in the appendix A).

3.2.2.4 How to conduct interview?

*Opening the interview***:** in Vietnamese culture**,** greeting participant and thanked them for agreeing to take part of interview is important. Then the searcher introduced the key elements of this research; that help to give the personal motive and interest in this study. After that, some demographic questions will be used to make sure the participant are ready for interview; it also gives time for researcher to check the audio-recording equipment before going to the main questions.

*Getting people to talk***:** during interviewing, researcher can use some techniques to let people to open up and talk at length:

- *Research may provide some short response to get more detail rather than rush on the next question. For examples: "can you give more example?"; "what do you mean?" or "can you tell me more about that?"*
- *Using silence technique by simply remains silent when participants have finished their speaking; they will start speaking again or provide more data on the topic before (Braun and Clarke, 2013).*
- *Another key successful of interview is showing the interests on participant's responds. Using body language and non-evaluative sound such as 'm-m' to show that researcher is active listening to participants and want them to continue. Besides that, research has to avoid using some evaluative comments like "I know what you mean".*
- *Avoiding 'doing expert'*

*Closing the interview***:** when finishing the questions, research has to check if the participants want to add any interesting things. Finally, thank the participants and give them an opportunity to ask the questions about the research.

The interview was conducted in the Vietnamese language. Before collecting data, the interview scripts were prepared and revised in English using the framework in the theoretical perspectives section, and then it was translated in to Vietnamese. The scripts have several parts including demographic information, socio-cultural values and living lifestyle, religions and ritual activities and preference in housing design. The duration of interviews depends on how much information each family want to share.

3.2.2.5 Physical mapping and observations

Besides interview techniques, physical mapping and observations are necessary to check the interview responds. Interviewing with households might show the participant's perspective about the dwellings; however, not everything could be gained from interview data, such as plans, design and the arrangement of living spaces. Thus, the physical drawings and observation data provide a detail and realistic image on how building and living spaces are being used in the real context. In this study, three techniques were used to record physical map and observation information.
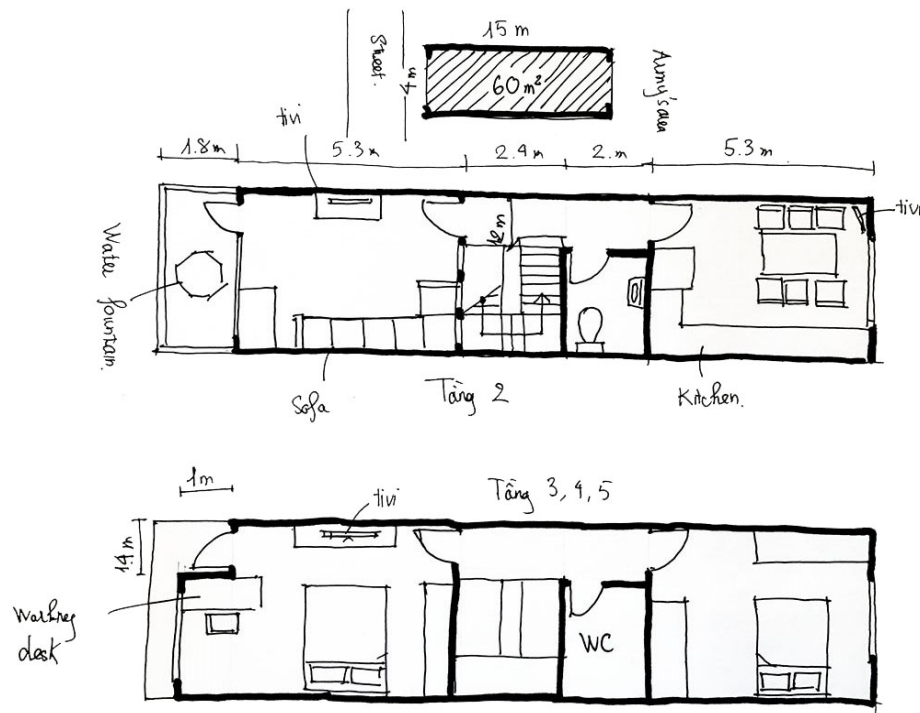
Figure 16: Example of sketches of one case study in fieldwork

Firstly, the sketches of the house's plans and mapping of studying areas are used for recording physical aspects. The drawings are useful for analyse spatial organization, the influence of socio-cultural on the plans and the arrangement of interiors. The sketches have to follow several principles such as using similar scale, labels of living rooms and arrangement of interior.

Secondly, notions are helpful to save observation information of researcher in the special events or daily activities in the case study areas and housing. The information in the field notes is fresh and it is easier to recall specific elements of the context in the analysed process. Besides observation data, the notions also recorded further explanations of household during the tour around the house. All notions were saved in the notebook of researcher.

Thirdly, a camera was used to record images of building designs, daily family activities, ceremony, ritual activities and other relevant information. During the fieldwork, the photographic records were saved in research's hard disk and USB.

3.2.2.6 How many case studies are enough?

In qualitative strategy, the number of samples is always small for practical reason. Someone might argue that the number of samples is needed to be big enough to be representative of total population. However, in research, the key issue about number of samples is to access enough data to enable to answer the research questions. Accordingly, the qualitative research focused on social process and meaning of experience, which needs to be understood and explained rather than attempting to understand. Therefore, the decision about the right number of samples depend on what it is that researcher need to analyse and in which number of samples will enable researcher to do that. In other works, the number of samples is considered as enough when number of samples reaches a point that help to build general picture of what is going on and can generate an appropriate explanation for it. The point is reached when the data from new samples do not provide new information about the studying issues.
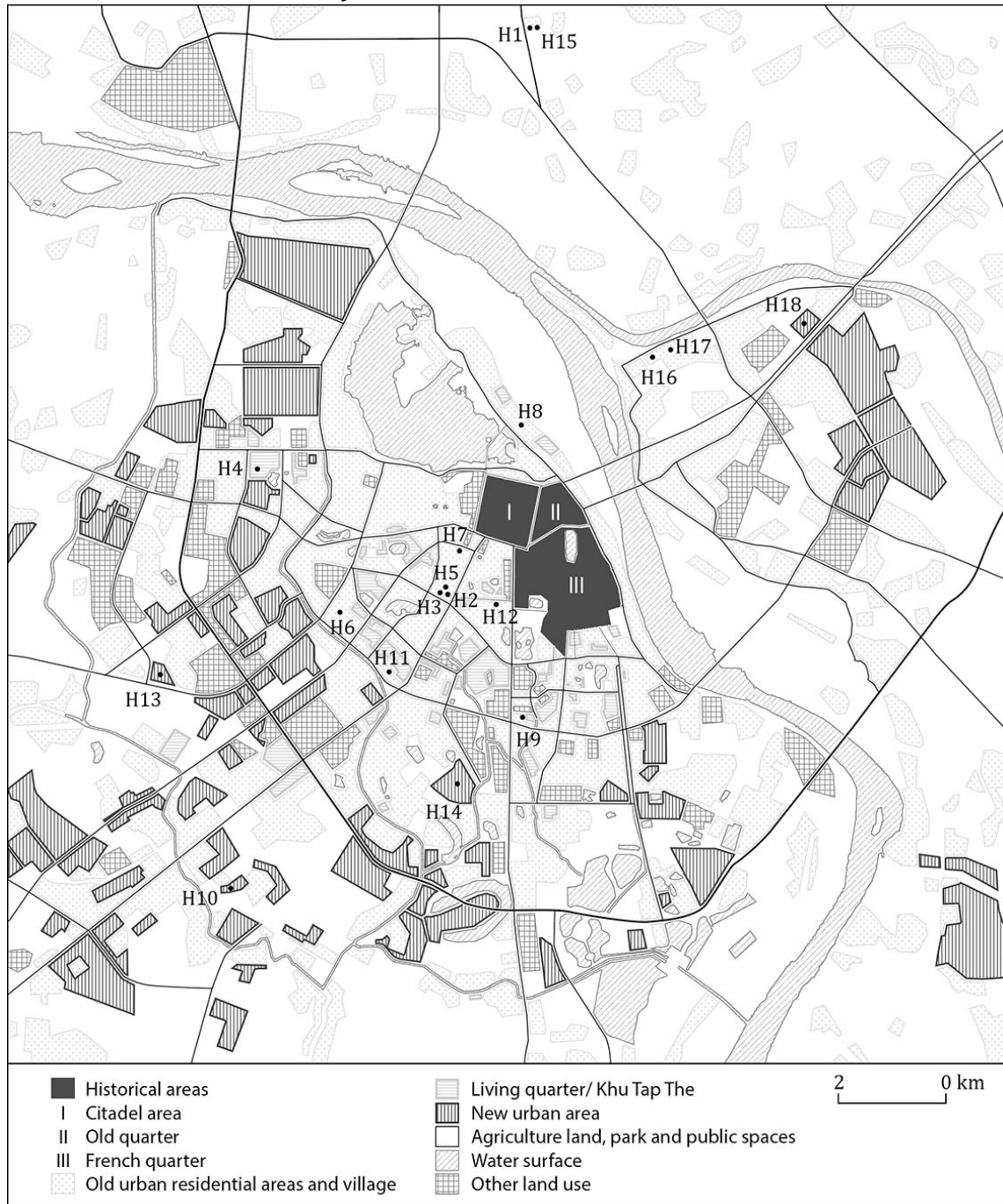
Figure 17: Location of case studies

In this study, during the fieldwork, 18 case studies of self-built housing were collected in two periods in 2016 and 2017. The case studies were choosing based on network of researcher and recommendation of gatekeepers (See section 3.2.2.2 for details). No case study was selected due to its special location and built environment. When analysing, based on responds of households about their

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houses, the neighbourhood types of case studies were classified to three main types: work-unit area, urban village and new urban area (See details in chapter 5, section 5.2).

In 2016, 5 pilot case studies were collected to test the research method and to generate possible findings and outcome of study. Researcher interviewed five participants and examined the housing design to identity potential problems and test quality of data, techniques and methods. Based on the pilot studies, some mistakes had been clarified:

Firstly, neighbourhood characteristics should be clearly clarified in the studies. In Hanoi city, self-built housing is built in different urban structures with different environment. Each environment might influence on housing designs in different ways. For example, the finding in three cases showed that housing plot and housing form is much depending on planning, regulations and neighbourhood's buildings. Thus, a study of neighbourhood's characteristics is important in this study.

Secondly, based on discussion with several Vietnamese architects and households, besides contemporary housing, political ideology plays critical role to shape housing characteristics. Therefore, besides the contemporary built environment, the study needs to explore the historical built environment, such as historical housing development, housing policy and development strategies in different period to make comparisons and housing transformation process. The comparison is useful to highlight how culture was changing and how does the building changing to adopt with new conditions.

Thirdly, the physical mapping and observation data should be included detailed of furniture and common activities in each room. The finding in three case studies revealed that the location and characteristics of furniture might base on individual perception, living styles and religion factors. For example, the direction of beds is much depending on location of ancestral altar and direction of building. Thus, in the plan, detail information about arrangement of furniture and how the household using the spaces should be highlighted and noted for analysed purposes.

Based on those mistakes, the framework of this study had been changed in order to cover all research issues and to answer the research questions. In 2017, during the fieldwork, researcher interviewed with households and collected 13 case studies of self-built housing. Although 18 cases might not enough to provide answer for all housing issues, those cases help to draw a broad context and help to answer the research questions about self-built housing in Hanoi city, Vietnam. The details of case studies could be found in appendix F.

To summary, this part describes how case studies have been collected. The process of data collection is illustrated in figure 18.
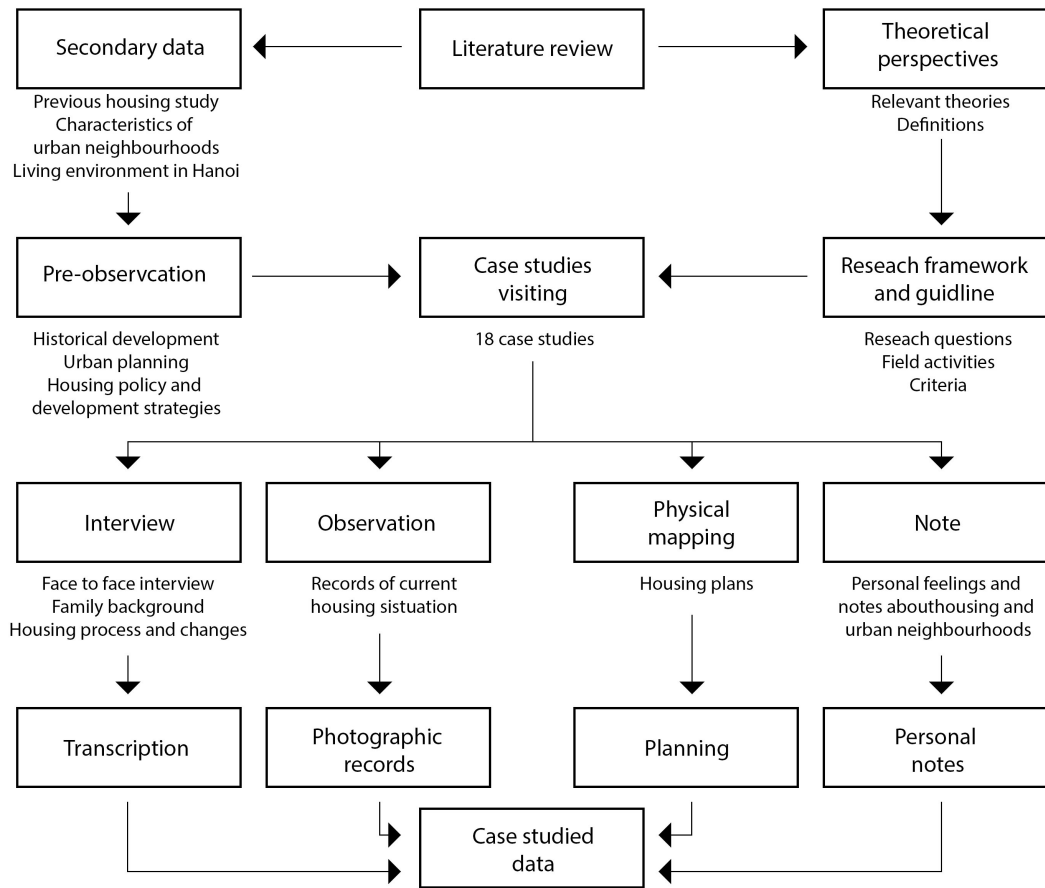
Figure 18: Collecting data process

3.3 Analysis and interpretation

3.3.1 Post field study

After collecting case studied data, it is time to check the quality of the data. The interview notes were reviewed to make certain that they made sense and to cover all areas of study. If interview data seem not to make sense with observation data, clarification was needed from the interviewees as soon as possible by telephone or revisiting the interviewees by person. This process helps to guarantee that the data obtained would be useful and reliable.

Besides checking data, transcription is another important stage before analysed process. There are two aims of producing transcription. Firstly, it helps to the create representation of experience and behaviour of participant into form of words. Although some words and ideas could not be translated directly due to different languages, the ideal and experience of household should be present on paper as accurately as possible. In this study, the researcher communicates with interviewees by Vietnamese. Therefore, translated versions of interviewee's respond in English are necessary before analysing, and chosen the right words for

explanation are significant. Secondly, it helps research to familiar with the data. By reading data, research would understand distinct characteristics of each case for further analysis process.

Meanwhile, the secondary data is significant because it provides the overview background, general living conditions and neighbourhood's characteristics in urban areas. In this research, the study of built environment in Hanoi city highlighted three main aspects of each period: development strategies, characteristics of residential settlement and housing design. The built environment of city provided an understanding of external influences on housing, such as political, economic and social reasons. Therefore, during the fieldwork, the collection of maps and description of urban neighbourhoods have been collected from relevant sources.

3.3.2 Organised data

Before analysing, it is important to organised data to clarify the useful of data in specific themes. The data collected from fieldwork including interviews, observations, documents, drawing and note is raw data. The data was organised to different files depending on type of data including image, drawing and note. Each type of data was put in specific folder and marked with label.

The transcription of interviews was organised using NVivo, a widely used software for qualitative data analysis. The texts were coded into different nodes (or themes) regarding the research framework (Figure 19). A final template of coding is saved in NVivo for convenience of working in the data. During the analysis process, the research check the different responds of households and find the main ideals coming form transcriptions, and how did those ideals match with observation data and notations. Interestingly, the households would respond for the same issue in different ways; thus, the finding chapters represent different ideas from household's answers rather than showing which type of answers is the most popular. For example, when analysing the location of ancestral altar in Vietnamese house, all household recognised that the ancestral should be located in the clean areas and far away from dirty spaces including kitchen and toilet. However, while interview, while majority of households selected the room in the highest floor as place for ancestral altar, several other households put ancestral altar in the living room or even in bedroom. All explanations for different locations of ancestral altar; therefore, are presenting in the finding chapters to show different choices and needs of households.
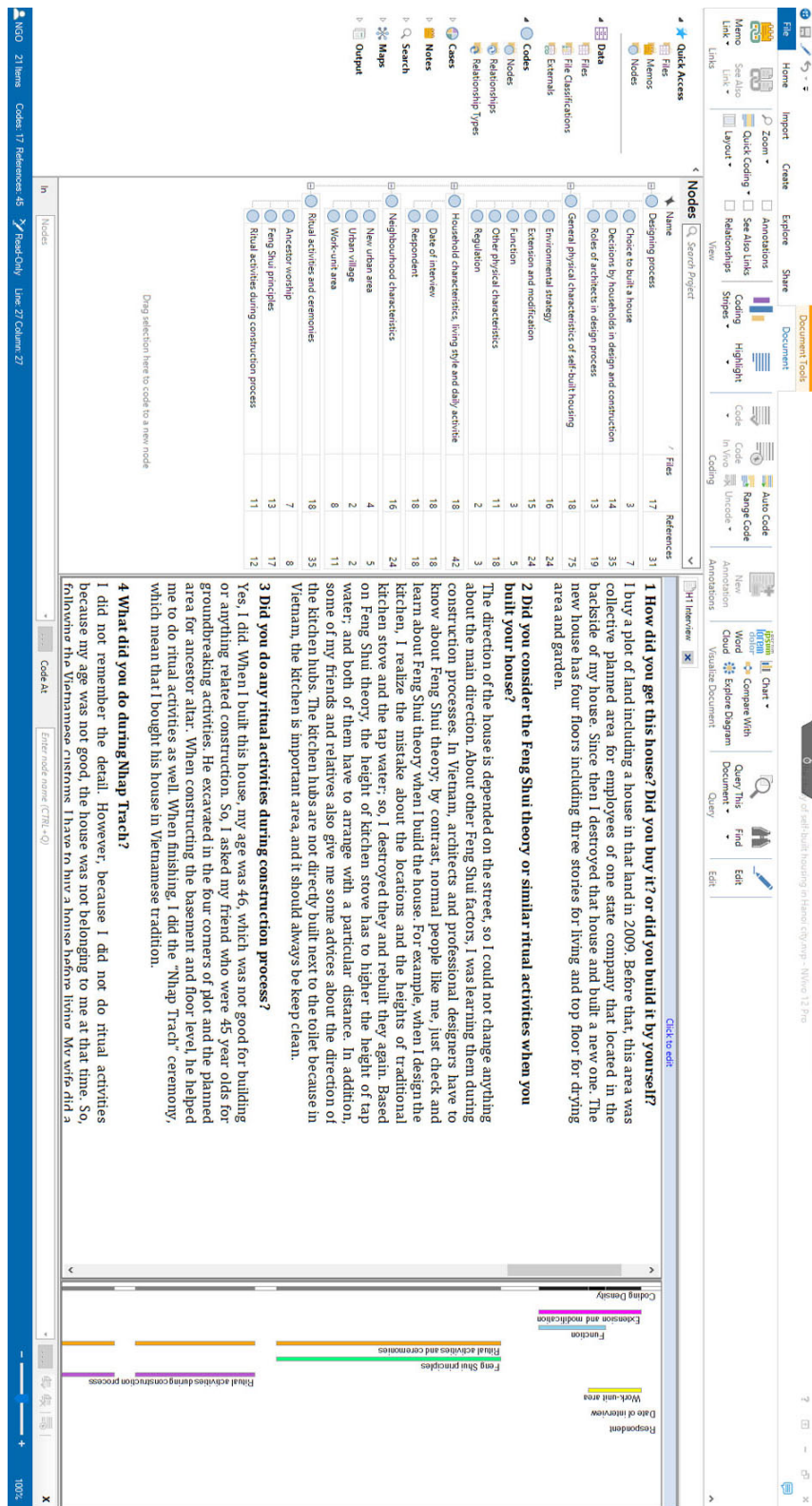
Figure 19: Coding of interview's transcripts using Nvivo software

After organising, data were connected to different themes and sub-themes that focused on specific issues. Data is divided into three main themes, and each of the main themes is further categorised into sub-themes and specific issues.

Specially, the first finding chapter (chapter 4) started with a general review of development of Hanoi city and urban housing before and after the economic reform. In this stage, note, images and settlement's plan from observation data were used to show and influence of power and political ideology on urban development, neighbourhood's characteristics and housing designs in different historical periods. The data was grouped into several sub-themes including housing in ancient time, urban structure of Hanoi city and traditional tube housing in feudal period (before 1880s), urban development and urban housing in colonial period (1880s-1954), urban development of Hanoi city and collective housing in central economic command period (1954-1986), and changes in housing policy and review of urban housing since the economic reforms in 1986.

The next finding chapter (chapter 5) focused on models of self-built housing in different urban neighbourhoods in Hanoi city. Drawing, maps and plans colleting from the fieldwork were used to analyse urban structures of Hanoi city and design of self-built housing. The data was grouped into three main sub-themes including model of self-built housing in Hanoi city, characteristics of urban neighbourhoods in Hanoi city since the economic reform and main characteristics of collected case studies of contemporary self-built housing.

The last finding chapter (chapter 6) focused on analysis of housing designs regarding family needs. This chapter focused on experience of households in design and construction processes and sense of place through the analysis of case studies. Thus, transcription, note, images and drawing were used to illustrate the interconnection between participant's experiences and self-built housing designs.

3.3.3 Analysis process
After organised data, the next stage is to analyse data and to formulate explanations in order to answer the research questions. Different researchers have different ways to structure their activities to explain procedure process. Thus, this part explains the analytic process using in this study.

In analytic process, the Lofland (1971) describes the research process having two main phases namely data collection and analysis. Those two phases run concurrently with temporal overlapping with another rather than appeared separately. The collecting data will mainly concern in the initial stages of research while analysis will occupy in the later stages. Although Lofland (1971) describe only two main phases; nevertheless, in practice, the analytic process might involve various different phases.
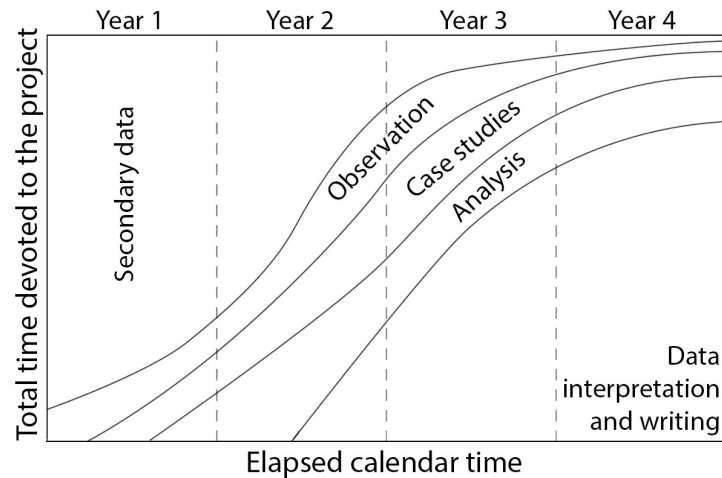
Figure 20: Research activities and timeline (Adopted from Lofland, 1971)

In this study, there are five main activities of research analysis including collecting secondary data, observation, case studies, analysis and data interpretation (Figure 20). During the first year of studying, researcher focused on a connection between housing characteristics and socio-cultural values and family needs from different sources was reviewed and reported. Besides literature review, the observation in the fieldwork helped to explain further the investigate issues. In the end of 2016, pilot case studies were applied to test the research methods and predict main findings. During the second year, researcher analysed detailed housing characteristics and how household design the house to meet their needs. During the third and fourth years of studying, researcher focused on the interpretation of data to give explanations for the phenomenon and to answer research questions.

3.4 Summary

This chapter has explained the methodological framework and research strategies and techniques for how study was approached. The study focused on natural interaction between built environments, household's experience and housing design. Therefore, this study was structured within qualitative strategies. Specifically, archival records and observation data were used to analyse the urban environment in Hanoi city before and after the economic reform. In addition, 18 case studies from fieldwork were examined based on interview, observation and mapping data. For the analytical process, the data from fieldwork was organised to two main themes: urban environment and home environment. The analysis of the data and results of the data analysis are presented in the next chapters.

CHAPTER 4 URBAN DEVELOPMENT AND HOUSING ARCHITECTURE IN HANOI CITY

This chapter illustrate the layers of built environment and the context of urban housing in Hanoi city. Accordingly, the built environment of Hanoi city has been based on four main cultural influences including Chinese rule and feudal Vietnamese dynasties, French colonial rule, Soviet influence and the current "*Đổi mới*" period since 1986 (Logan, 2000). All of these influences have been very different; however, the main characteristic in all those periods is that they produced social and cultural ideology for each period. Urban planning and housing architecture in each period; therefore, have various distinct characteristics to reflect its social-cultural values.

Generally, this chapter provides deeper understanding of context of self-built housing in Hanoi city. It helps to explain why self-built housing became popular types of housing in Vietnam. In addition, this chapter shows influence of socio-cultural values on housing designs. The housing architecture in Vietnam has been well recorded in the literature; nevertheless, majorities of those studies focus on characteristics of housing in particular period rather than a process of adaptation and evolution of housing architecture. Thus, discussion about socio-cultural aspects of Vietnamese architecture commonly emphasised on architectural elements in vernacular housing. This chapter shows that socio-cultural aspects are not fixed elements in one particular period. As socio-cultural values and norms vary owing to new built environment, the configuration of house form changes accordingly. Thus, socio-cultural aspects should be considered as a process of learning, changing and adaptation in different living conditions and built environment.

There are six main sections in this chapter. The first section gives an overview of Vietnamese society and early housing form in mountainous and rural areas. The second section explains urban development and traditional urban houses in Hanoi city during feudal period. The third section explains an influence of French rules on plans of Hanoi city and its urban housing during the colonial period (1883-1954). The fourth section describes the influence of Soviet Union on the planning concept and design of collective apartment during the central economic planning period (1954-1986). The last part highlights main changes in the Vietnamese society since the economic reform in 1986 and overview characteristics of contemporary housing. The chapter ends with the summary.

This chapter uses data from various sources including books, historical documents and other official publication. In addition, the observation data in the fieldwork had been used to illustrate the evolution of housing characteristics.

4.1 The Vietnamese society and early housing form

4.1.1 The origin of Vietnamese: a historical review

According to the Vietnamese legendary story, as revealed in *Lĩnh Nam Chích Quái* book, the ancient state of Vietnam, i.e. *Văn Lang,* was ruled by *Hùng* kings (Taylor, 1983). *Hùng* kings claimed descent from *Lạc Long Quân* or *Lac* Dragon Lord, a hero coming from sea. *Long Quân* defeated all evil demons and civilized the people, teaching them to cultivate rice and to wear clothes. *Lạc Long Quân* returned to his home in the sea. After that, *Lạc Long Quân* met *Âu Cơ* - a mountainous fairy. They get married and *Âu Cơ* gave birth to a sac of one hundred eggs from which one hundred children were born. When the children grew up, Âu Cơ and fifty children went to mountainous areas while *Lạc Long Quân* and other fifty children went to coastal areas. The first son – the first *Hùng* King followed *Âu Cơ* and established the *Văn Lang* nation. Although the legendary story did not describe how Vietnamese people appeared; it shows how maritime-cultural base with political accretion from continental influences shaped the origin of Vietnamese.

It is believed that Vietnam is one of the earliest civilisations in the world (Kiernan, 2017, Dao, 1950 and Taylor, 1983). Accordingly, during the Chinese state of Chu, in Southern China and Northern Vietnam, there were hundreds of indigenous Yueh tribes or "*Bách Việt*" in Vietnamese (Dao, 1950). All tribes shared similar characteristics, such as having tattoo and living in stilt houses. Each tribe created its own territory. Overtime, some tribes merged with others to create larger tribes. Later, there were five main tribes namely *Đông Việt* (Dongau), *Mân Việt* (Minyue), *Nam Việt* (Nanyue), *Âu Việt* (Ouyue) and *Lạc Việt* (Luoyue). A group of tribes namely *Lạc Việt* lived around the Red River delta and created *Văn Lang* state. The state ruled by *Hùng* Kings during the Hồng Bàng period. The state ended in the 3rd century BCE when *An Dương Vương*, a descendant of the *Âu Việt* tribe lived in the mountainous areas conquered *Lạc Việt*. As the two tribes merged, a new state was formed under the name *Âu Lạc* (Van, 1989).

Meanwhile, in the ancient time, Vietnam became a meeting point of two cultural influences (Long, 2011; Kiernan, 2017, Dao, 1950 and Taylor, 1983). The country is located between two great civilisations in China and India. Thus, the marine trade links, diffusion and migration from advanced civilisations influenced on characteristics of Vietnamese people. During the ancient time, the Chinese influenced the northern part of Vietnam owing to the fleeing Yueh people migrated south from China. Meanwhile, the Indian affected the early states of Vietnam in the South, such as Champa and Khmer empires. Thus, the early ancestors of Vietnamese in the South belong to the Austroasiatic group. As two groups met and merged, but most Austroasiatic residents adopted the name Yueh or *Việt* in Vietnamese for their own name.

Regarding the archaeological evidence, hunting and gathering communities appeared in Vietnam since 14,000 BCE (Kiernan, 2017). Numerous cultures, such as *Hoà Bình, Bắc Son, Phùng Nguyên* and *Đông Sơn²* have been found in Vietnam. The chieftain of communities was called as *Hùng* Kings. The name *Hùng* was borrowed from Mon-Khmer peoples and the language of other Austroasiatic inhabitants, who lived in the mountains of Southeast Asia and Southern China. *Hùng* kings were believed to associate with the *Đông Sơn* culture (Taylor, 1983). From the mountainous area namely *Mê Linh*, *Hùng* kings extended their influence eastward to the coastal areas and maintained contact with Chinese people in the north.

4.1.2 Housing in mountainous area: Nhà sàn

Due to natural dangers, the early form of dwellings in Vietnam was built over numerous piles. Such form of building is normally referred to pile house or "*Nhà sàn*" in Vietnamese. Accordingly, this type of housing is not only popular in mountainous areas in Vietnam, but also in other neighbourhood countries (Waterson, 1997). Particularly, vernacular buildings during the Bronze Age in Yunnan and Indonesia, and the housing in the *Đông Sơn* period in Vietnam shared various similar aspects regarding form and structure (Figure 21,22 and 23).
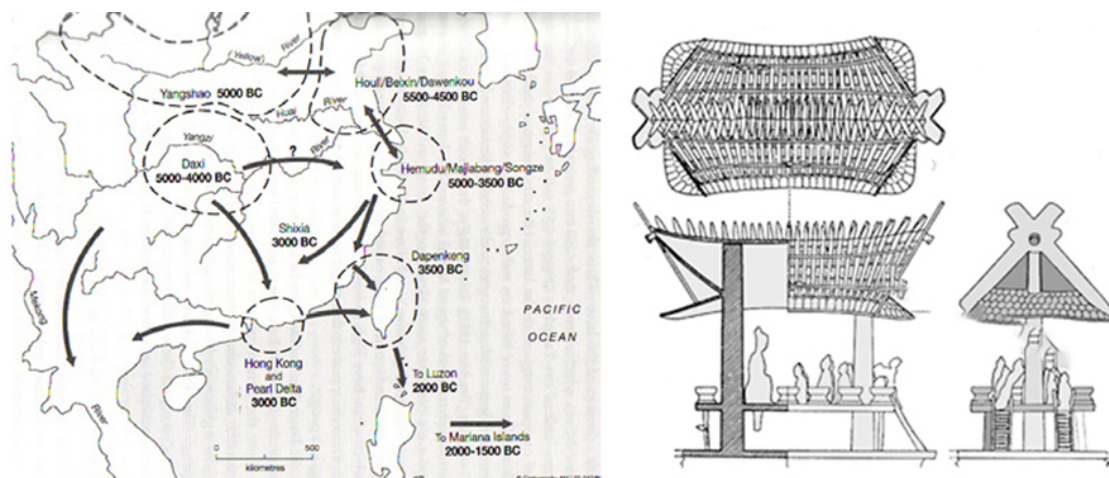
Figure 21: Chinese expansion and traditional house drawing in Yunnan (Zamolyi, 2009, p 57- 59)

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² The name of culture was based on the place where relevant historical relics were found
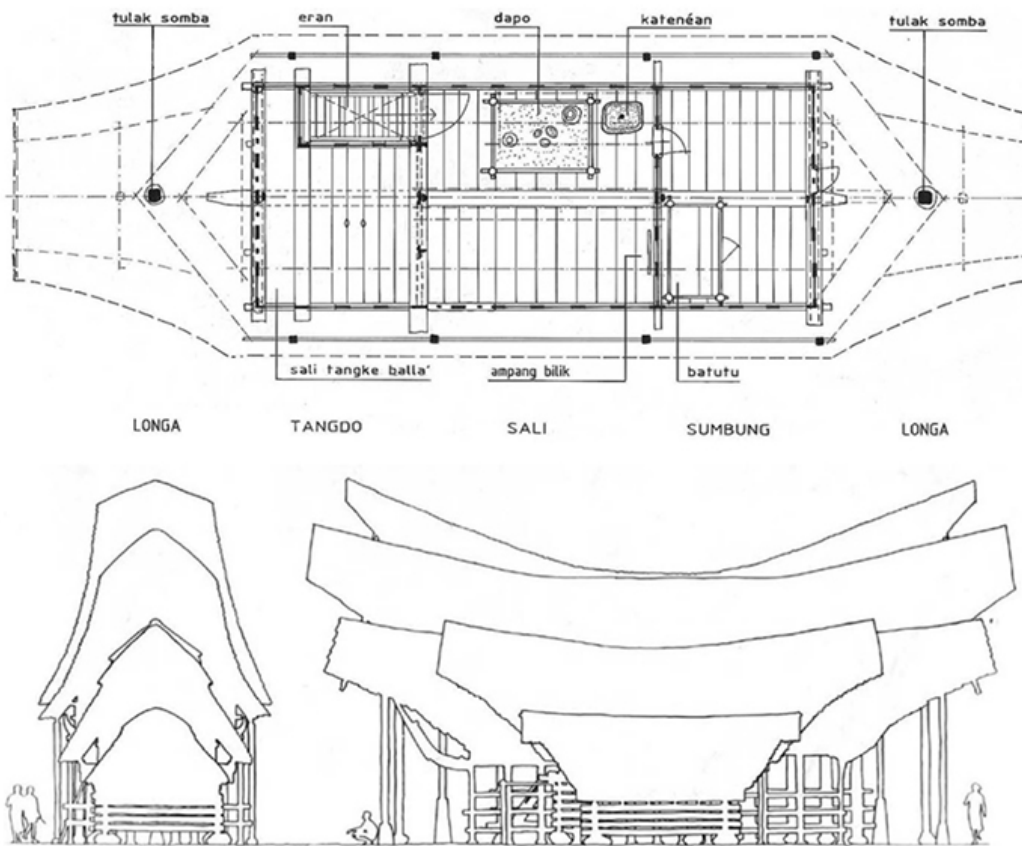
Figure 22: Tongkonan house in Indonesia (Eunike & Lilianny, 2005, p 2670-2671)
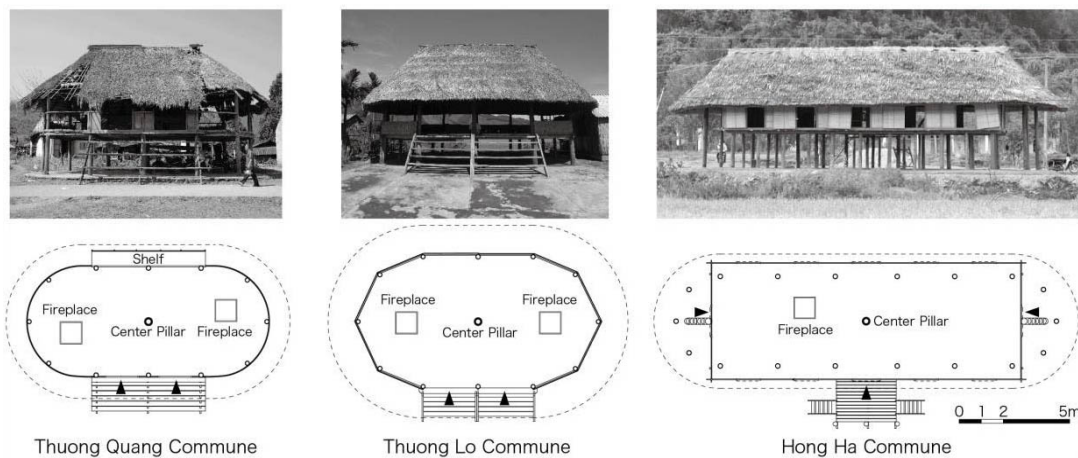
Figure 23: Community houses in Central Vietnam (Kobayashi, H. & Nguyen, 2013, p 3)

According to Waterson (1997), the early form of dwellings in the South East Asia not only provided the shelter for habitant; but it was also a social and symbolic product. During the *Đông Sơn* culture, which appeared in Northern Vietnam

between 600BC and 400BC, the images of *Nhà Sàn* occurred in various historic bronze drums (Figure 24). The main living spaces consisted of three main levels showing different uses. The ground floor was used for animal, cattle and poultry; upper floor was used for human to prevent wild animals while attic space contained valuables things like chests and drums.
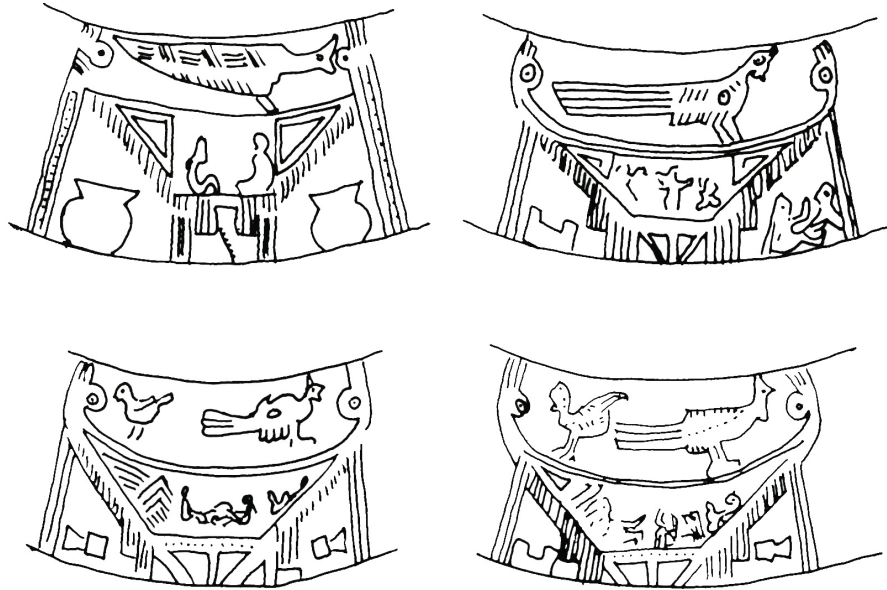
Figure 24: Housing images on Đông Sơn drums in North Vietnam (Waterson, 1997)

Today, various ethnic groups are still living in *Nhà Sàn (*Nguyen, 1994*).* Particularly, *Mường* people who are one of the fifty-four ethnic groups living in *Hoa Binh*, has the same social origin and ethnography characters with the majority of current Vietnamese people. *Mường* people mainly live in mountainous areas in the South East Asia. The *Mường's* houses demonstrate the harmony between natural elements and philosophy of *Mường* people in various architectural aspects (Pham, 2005):

Firstly, the location of a house would be subject to the social status of the house owner. Particularly, the lower social class people usually build their shelters near the side of mountain, while the higher-class people could build their houses in more convenient areas such as near rice fields or in the centre of village.

Secondly, the spatial organisation is believed to reflect the living styles and perception of *Mường* people. The main living area covers a system with many piles to prevent wild animal and insects. The ground is an open space for storing agriculture products, while a number of fruit trees and bamboo trees surround the building to highlight the physical boundary. The houses always turn their backside on the mountain, while in front of the houses; there are yards for drying agricultural product. *Mường* people believe in the god of soil, who would bring

happiness and prosperity to their family. For this reason, a good position next to the entrance gate has the altar of god of soil. In addition, instead of digging well for water, *Mường* people collect rainwater and water from streams; thus, in the rear of the houses, there are tanks for containing water.
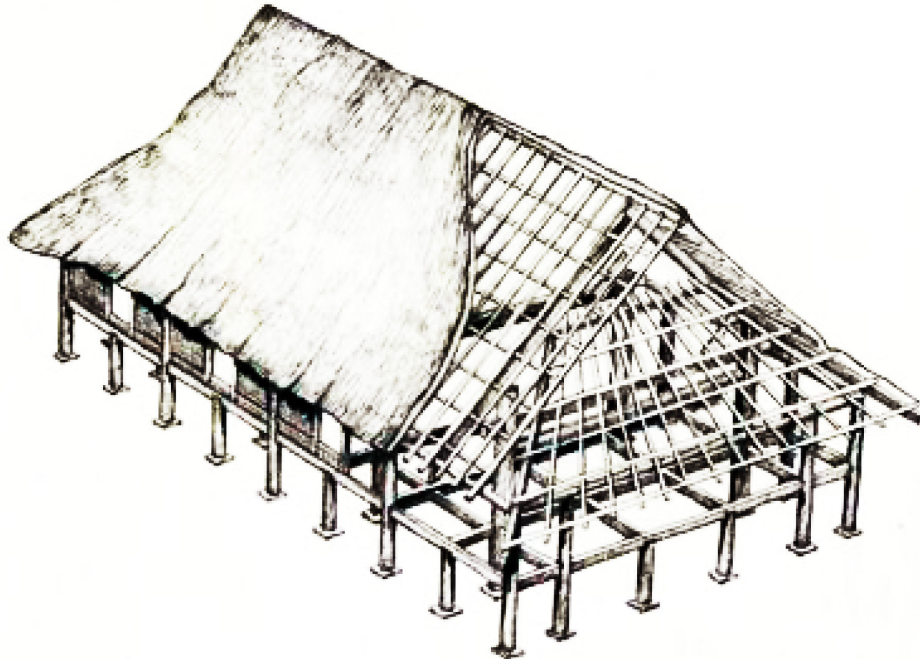
Figure 25: Structure of *Mường* house (Pham, 2005, p 15)

Thirdly, ritual activities are an integral part of many living aspects in South East Asia (Waterson, 1997 and Dumarcay and Smithies, 1987). The perception of home is based on religions and ceremony. The early tribes had to deal with extreme natural environment and living conditions to survive. Thus, fear from such events have significantly influenced on human behaviours, and dwellings are considered as ceremonial sites to save the house from natural forces. Therefore, a house only becomes home when it has ritual protections. Particularly, the house must have a shrine of gods or ancestral altar to protect people and construction. In addition, regarding to the legendary story of *Mường* people namely "*Đẻ đất đẻ nước*", in the ancient time, a tortoise god taught people how to build the house. According to Pham (2005, p10), the god of tortoise advised that:

> *"Take the house's shape like tortoise shells. Four of my legs would be for main columns. Both sides of my chest would be two roofs. The spine makes beams. The rips make rafters. The head makes an entrance steps to the door."*

Following the advice, houses of *Mường* people was generally built on stilts. The width is about five to six meters while the length is subject to the number of family members. A house has different cells for different functions.

Kobayashi & Nguyen (2013) highlight that measurements based on human body play a critical role in the design and construction process of vernacular houses in minority groups. The human-body-based units are considered as a temporary ruler to measure wooden components of buildings. Body-based units are only calculated from healthy body, which is believed to provide luck for the construction.

4.1.3 Traditional rural housing in the Red River delta

From 5,000 to 2,000 BCE, rice-farming village communities emerged in the Red River delta (Kiernan, 2017). When moving to the Red River delta, indigenous tribes started to build the house on the ground. As a result, the traditional rural housing in the Red River delta have some distinct characteristics (Ngo, 1998; Chu, 2003 and Vu, 2015; Nguyen, 1994). Specifically, the fundamental structural element of the traditional rural house is based on "*gian*" modules. Each *gian* consists of three dimensions of space; thus, a *gian* is considered as a room. Normally, the vernacular architecture has several *gian*; the number of *gian* is an odd number, which is believed to afford balance and symmetry. In addition, the number of *gian* reflected the social class of house owners (Chu, 2001). For example, during the feudal period, the peasant dwellings had one *gian* with poor materials; common people could build three-*gian* with more solid materials. Five-*gian* and seven-*gian* and good materials were for the mandarin class. Nine-*gian* buildings were only used for royal family.

Besides, the decoration and details of *gian* reveal the spatial hierarchy and use of living space. Particularly, the central *gian* is always the most important room; it represents the unity and continuity of family (Nguyen, 1994). The interior of central *gian* has to follow a particular design, which applies the symmetrical arrangement. The front is the main entryway while the rear is usually a table to hold the ancestral images and incense bows. The middle consists of a set of furniture with table in the centre and two long chairs in two sides. This is also the space for family activities such as worship, gathering in festivals, family meals and entertainment with guests.

Another important characteristic of rural housing is the division of living spaces. Basically, there are two-separated functional areas in the traditional rural houses including the main living areas and the supporting spaces (Hoang, 1996 and Nguyen et al., 1997). The living spaces include ancestral altar, beds and guest welcoming area. On the other hand, the supporting spaces include kitchen, toilet and storage. The supported spaces are always planned in separated construction.

The division of main living spaces and supported space aims to reduce negative effects such as smoke and smell to main living areas.

1 Ancestor altar   6 Yard
2 Living area   7 Toilet
3 Bed   8 Well/ Water tank
4 Veranda   9 Garden/ Pond
5 Kitchen
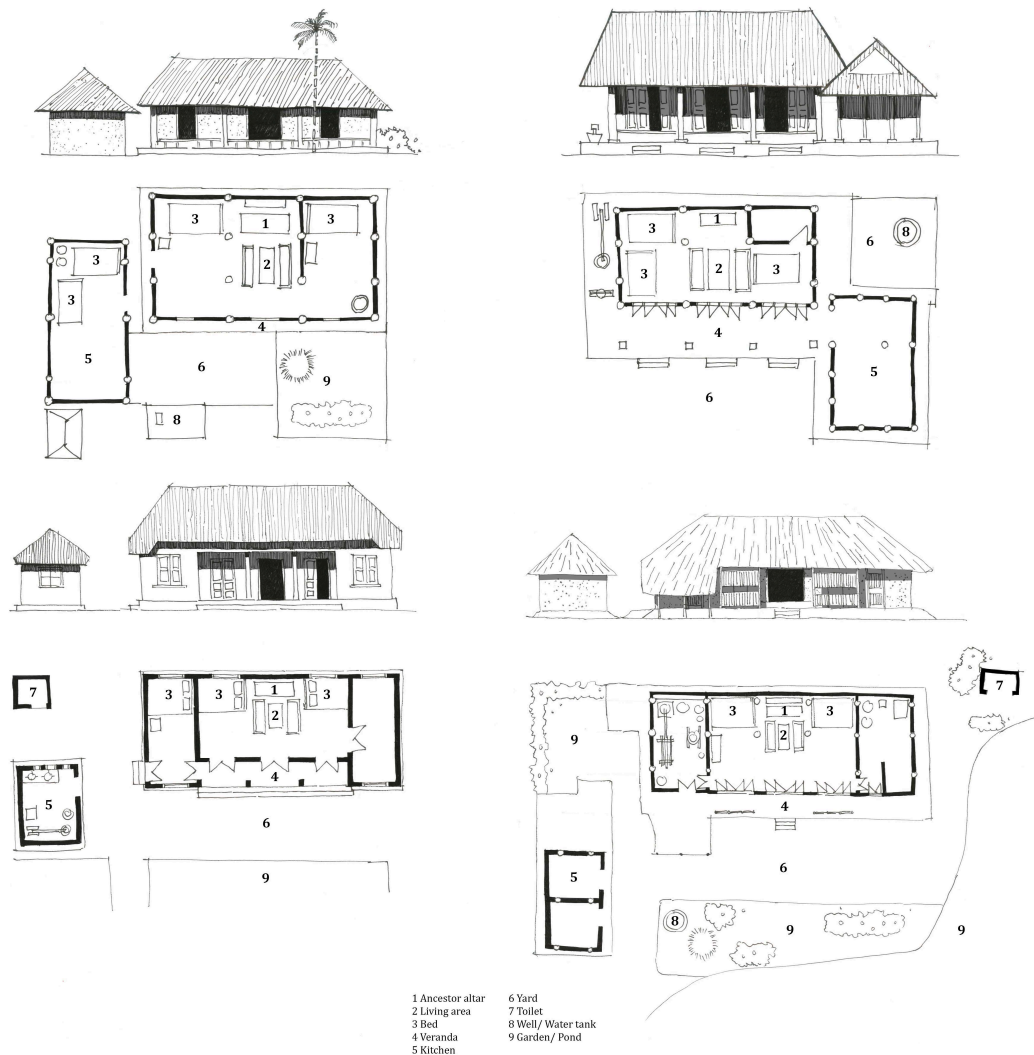
Figure 26: Example of traditional rural houses in Vietnam. (Clockwise from the top left) (1) Adopted from Hoang (1996, p53), (2) Adopted from Hoang (1996, p54), (3) Adopted from Hoang (1996, p55), (4) Adopted from Nguyen et al. (1997, p 19).

In term of materials, timber and stones are the main materials for all types of traditional constructions in Vietnam, such as palace, temples, pagodas, community constructions and housing. Basement is not popular in traditional rural housing. Normally, a building is situated directly on compacted earth, which is levelled or raised on a layer of stone (Phuong, Janis & Nur, 2010). The walls are made of adobe brick, fired brick or event tamped earth. Loading-bearing walls that support the roof structure are common in Vietnamese houses; however, those walls do not support to the weight of the roof. Therefore, the timber framework is considered as

the skeleton of a house. The purchasing of good timber for pillars and beams are significant.

Regarding the building size, the dimensions of vernacular houses are based on the "*thước tầm*", which is a bamboo ruler (Trinh, 2007; Ngo, 1998). Based on requirements of house owner about the size of living spaces, the main builder use the "*thước tầm*", to estimate the size of timber frame and detailed techniques based on traditional scales (Figure 27). Each dimension of building could be recorded in the "*thước tầm*" (Nguyen, 1994). When repairing the house, traditional builders only need to obtain the information on numbers and scales in the ruler.
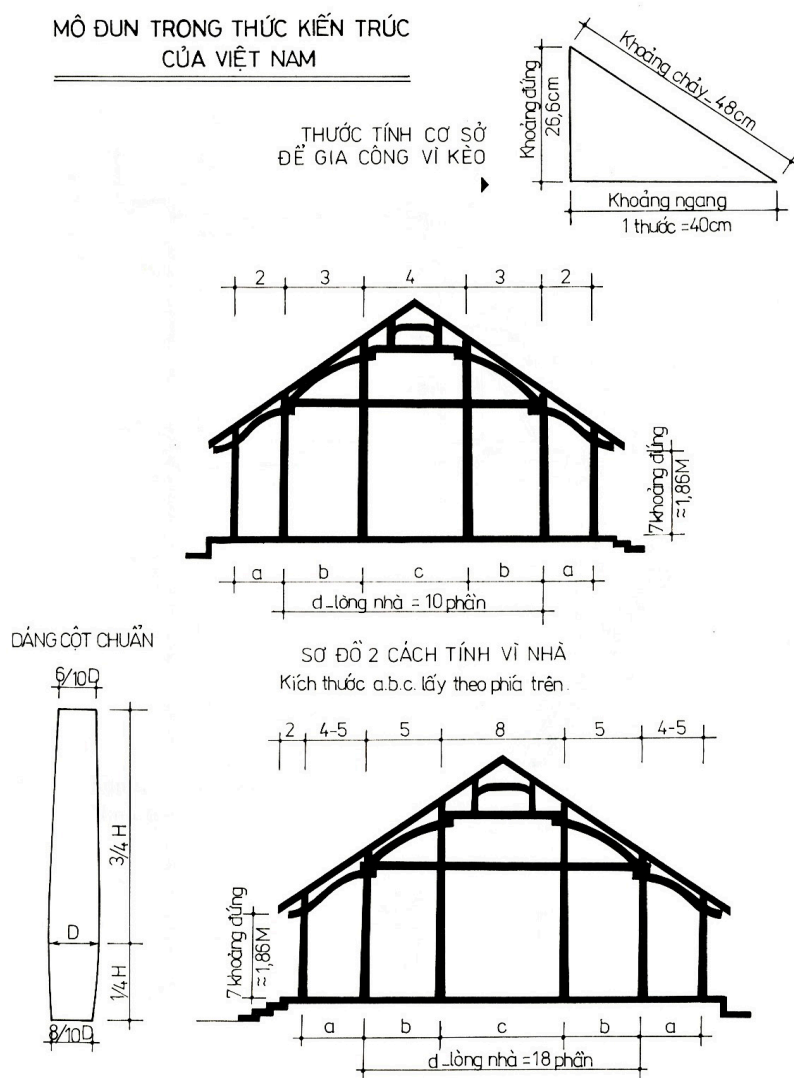
Figure 27: Primary scales in Vietnamese vernacular rural house (Vu, 2015, p 138)

In general, this part explains the origins of Vietnamese society and characteristics of vernacular housing in mountainous and rural areas. The design of vernacular

housing is heavily based on the local norms, beliefs, available of materials and building techniques and living styles of households. The next parts will explain the changes and transformation of housing in different built environment in Hanoi city.

4.2 Development of Hanoi city and traditional town house during feudal period

4.2.1 The establishment of Thăng Long – an ancient city of Hanoi (1010-1883)

From archaeology perspective, the existing historic constructions show that Hanoi area is an important strategic location during the ancient time. When the Vietnamese people arrived Hanoi city remains unclear; however, according to Vietnamese historian, Truong Huu Quynh (1997), it is believed that Vietnamese emerged in the lowlands of the Red River delta during the last millennium B.C. During the ancient time, the chieftain, who called himself as *Hùng* Kings (*Vua Hùng* in Vietnamese) established *Văn Lang* kingdom. The kingdom ruled Northern Vietnam and parts of today Southern China. In the third century B.C, *Thục Phán An Dương Vương* defeated *Hùng* Kings and formed the *Âu Lạc* nation. The capital city was built in *Cổ Loa* locating nearly 15 km in the North of Hanoi city centre.

During 196 BCE, *Âu Lạc* was conquered by Nanyue kingdom. Since then, Chinese empires exerted their influence on the Vietnamese culture such as belief, religions and even planning and construction techniques. During the ancient time, the centre of Hanoi city was a traditional village namely "*Long Đỗ*" (Van, 1989). The village was situated between the *Tô Lịch* River - part of the Red River, and the *Nùng* Mountain. During the Chinese domination, the site, on which Hanoi city was established, was known as "*Tống Bình*" district. The district covered areas in the South bank of the Red River. During the eighth to ninth century, a citadel namely "*Đại La*" was built to be the regional administration centre. Moreover, the ground of Hanoi city was below the water level during wet season; thus, a network of dykes was constructed to project the residential areas. All inhabitants contributed to the maintenance of the dyke. The dyke formed outer wall of the city.

Until 938 AD, the Chinese rules were removed and replaced by a series of Vietnamese Royal Dynasties. During the mid-tenth century, the political center of *Đại Việt* state was moved from *Cổ Loa* to *Hoa Lư* under the government of the *Đinh* family, then by the *Lê*. Lately, *Thăng Long*[3] was became the capital city of *Lý* dynasty in 1010 A.D during the era of King *Lý Thái Tổ* when he moved the royal city from *Hoa Lư* to the ancient part of Hanoi city (Van, 1989).

There are various hypotheses about the initial selection of Hanoi city to be the capital city. Firstly, the Vietnamese society needs administrative and military

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[3] An ancient name of Hanoi city during the Ly dynasty from 1010 to 1225.

constructions. Secondly, the existing Chinese fortress provides building technology and citadel for protection. Finally, the site of Hanoi city is in the centre of Red River delta. Therefore, the political and military considerations obviously played a critical role to determine the capital city location. Besides, it is believed that the site of Hanoi city was considerably impacted by geomancy, which was used to gain better fate and avoid mysterious forces (Logan, 2000). Owing to influence of Chinese culture, there were three main religions, namely Buddhism[4], Confucianism[5] and Taoism[6] jointly formed the Vietnamese worldview, philosophy and perception (Nguyen, 2005; Nguyen, 2013; Ngo, 1998; Logan, 2000). The perception ran through the system of society, from individual to family, from family to the community, from community to the state. People had to follow particular rules and should not disturb the lives of other people. The aims of those rules were to get to afterlife and to be reborn in proper place. Thus, people accepted differences and inequality. The core of this concept was the belief that the king was Son of God or "*Thiên Tử*" in Vietnamese (Phan, 2005, p 197-200). As a result, the royal citadel acted as the centre for multiple sectors including economic, social, cultural and political sectors.

Meanwhile, according to the Vietnamese belief, the supreme forces control everything under the Heaven; thus, geomancy is significant since it controls the forces and directly influences the Fate. The most popular philosophy dictating the choice of planning and design in order to protect life from evil spirits is Feng Shui (Yu & Yang, 2016 and Lu & Ruzica, 2004). In the traditional society, Feng Shui masters were highly respected for the reason that they could predict times for important meetings and actions (Ngo, 1998). Those masters could help to identify the appropriate places to build a house or tomb to protect people from evil spirits. Within the Feng Shui, a good location generally should have hills or forest to shield the main entrance, and two sides with hills or mountain represent white tiger and blue dragon. Moreover, river must flow around the site. Based on that ideology, the site selection of Hanoi city, which was chosen by King *Lý Thái Tổ*, was appropriate.

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[4] Buddhism had influenced in Vietnam replaced the existing beliefs in about 300 BC by Indian sailors and traders (Nguyen, 2008). Lately, new teaching of Buddhism was introduced into Vietnam under the influence of the Chinese dynasties from the first century to the tenth century. No matter it came from India or by the way of China, Buddhism spread rapidly and became national religion during the Ly (1010-1225) and Tran Dynasty (1225-1400) (Ngo, 1998)

[5] Confucianism was introduced to Vietnamese culture during the influence of Chinese dynasties from the first century to the tenth century (Tran 1997). Confucianism reached a peak during the fifteenth century when it became a national religion and ideology.

[6] The Chinese introduced Daoism to Vietnam during their influences from the second century to the tenth century (Tran, 1997).

The following text[7] had been written in "*Chiếu dời đô*"[8] that describes the decisive role of geomancy and the establishment of *Thăng Long*:

> "*Furthermore, Đại La citadel that is the ancient citadel of Lord Cao Biền is situated in the space between Heaven and Earth, in the location where the dragon is coiled and tiger crouching. The capital is laid out on North-South East-West axes and is favourably situated with regard to the mountains and river. The site is large and flat, the fields high and well enough exposed. The population is protected against high water and floods. Everything there flourishes and prospers. It is a most beautiful site where men and riches from the four cardinal points converge*".

According to the description, Hanoi city was located in the region between Heaven and Earth. In closer details, the vital energy or "*Khi*" in Vietnamese, flows into the site and the site is protected by the mountains and slow flowing water lying around it. Regarding geography, the ancient book "*An Nam Cửu Long Kinh*"[9] has described the location of *Thăng Long* as following text[10]:

> "*…Three rivers draw the vein behind, two fish-shaped hills stand in front, Mount Tản Viên defends the northwest, Mount Tam Đảo secures the northeast, thousands of peaks turn into white tigers, tens of thousands of flows coil up like pure dragons*".

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[7] Translated version in Logan (2000, p 34)
[8] *Chiếu dời đô* (English: Edict on the transfer of the Capital) is the edict written by *Lý Thái Tổ in 1010 to transfer the capital city from Hoa Lư to Đại La.*
[9] *An Nam Cửu Long Kinh is a book that recorded good locations for building constructions and tombs regarding Feng Shui principles*
[10] Translated version in Whitmore (2013, p3)
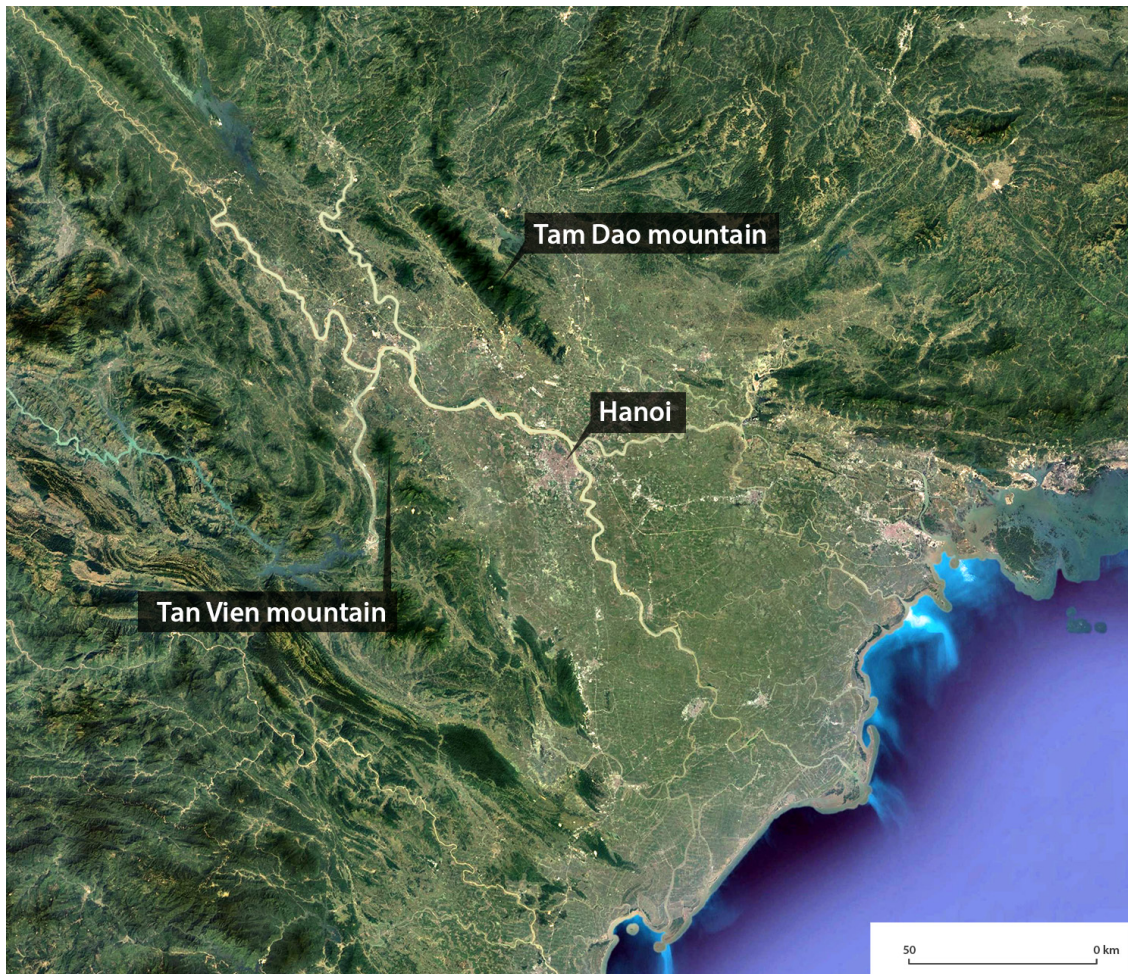
Figure 28: Typography of Red River delta and the location of Hanoi city (Edited by the author, based on satellite image in 2018)

4.2.2 The traditional urban structure of Hanoi city
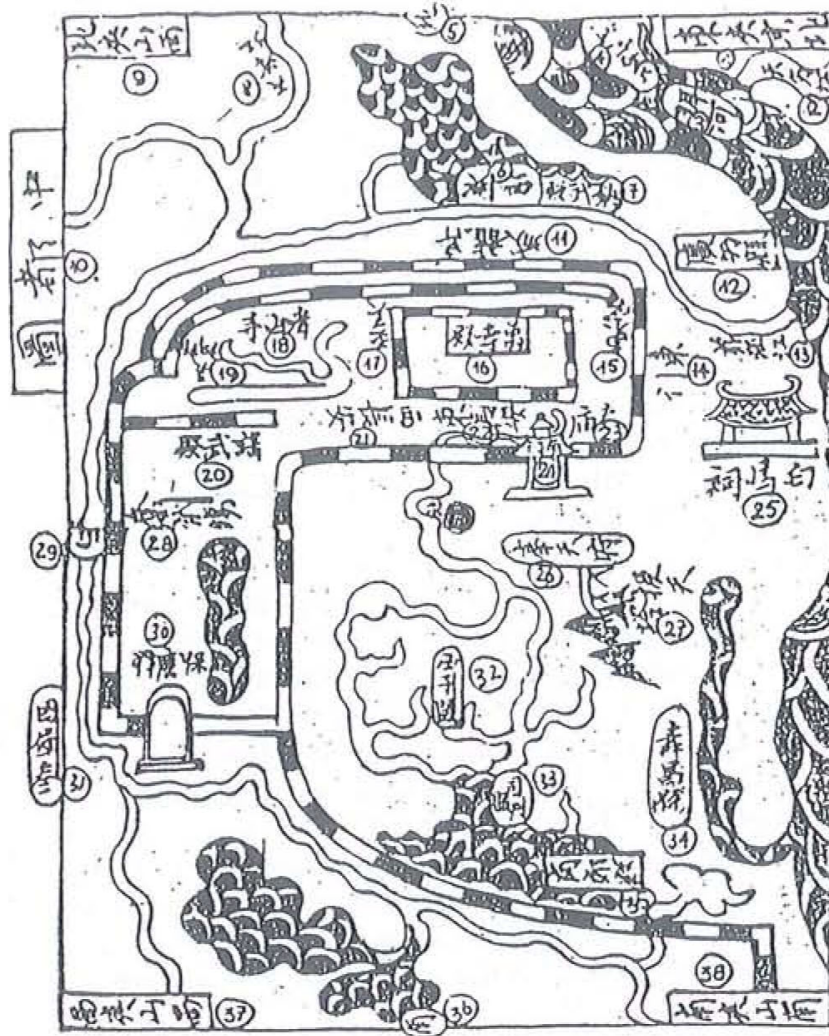
Figure 29: Map of Thang Long in 1470[11] (Collected from Hoang and Yukio, 1992, p 18). The map describes location of Hanoi, which is surrounded by rivers in all sides. The royal citadel has rectangle shape in the center. Surrounding royal citadel are other landmarks including outer walls, lakes, pagodas and palaces.

According to Keyes as cited in Logan (2000), there are three main types of ancient cities in South East Asia. The first type is scared or temple cities where agrarian population resort to religions to ensure the prosperity of city. The second type is trading cities. Although the second type had religion too, the cities are mostly

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[11] This map is in an ancient Vietnamese geography book namely "*Hồng đức bản đồ*" issued in 1490 to describe boundary of nation. The drawings in those books were based on observation without physical calculation. The text in the map is traditional Vietnamese language.

developed due to regional trade. The last one is the citadel or garrison cities. The citadel cities focused on military, political and administrative roles.

Figure 30: Morphological structure of historical trading town during the early nineteenth century. (Map took by the author in the Old Quarter Cultural Exchange Centre in Hanoi city in 2016). The map shows a context of historical quarter during the early nineteenth century.

In case of the Hanoi city, after the establishment of its royal citadel in 1010 (Figure 29), the trading town soon appeared to serve the courts and the royal city (Logan, 2000). During the fifteenth century, the Hanoi city was one of the most important trading towns in the region. At that time, a relationship was based on kinship, while status gained from a traditional ethnicity and a web of friends including local and people in the countryside. Each group of people established control over particular street with its own religious buildings. Therefore, from the fifteenth century to the nineteenth century, the Hanoi city was developed as a composite city that had all characteristics of a garrison town with religious population and trading and craft (Figure 30).

Particularly, during the sixteenth century, an ancient trading area of Hanoi had various names such as *Kẻ Chợ* – marketplace or "*the area of 36 Commercial streets*", known as the Old Quarter. Those names highlighted an importance of this area for trading activities. According to Dinh and Groves (2006), there are two theories that explain the development of trading quarter in Hanoi. The first theory highlights that during the fifteenth century, various craftsmen from rural areas worked for the royal courts; they opened shops next to the citadel for workshops and their own business. In another theory, when the royal citadel was established in 1010, the Old Quarter was situated in a marketplace of surrounding villages. Craftsmen built stalls for market days. Over the time, due to the benefits of the marketplace, the stalls were replaced by permanent shop-houses. In common, those theories point out that due to the production demand for the royal city, Hanoi quickly became a popular trading area (Figure 31).
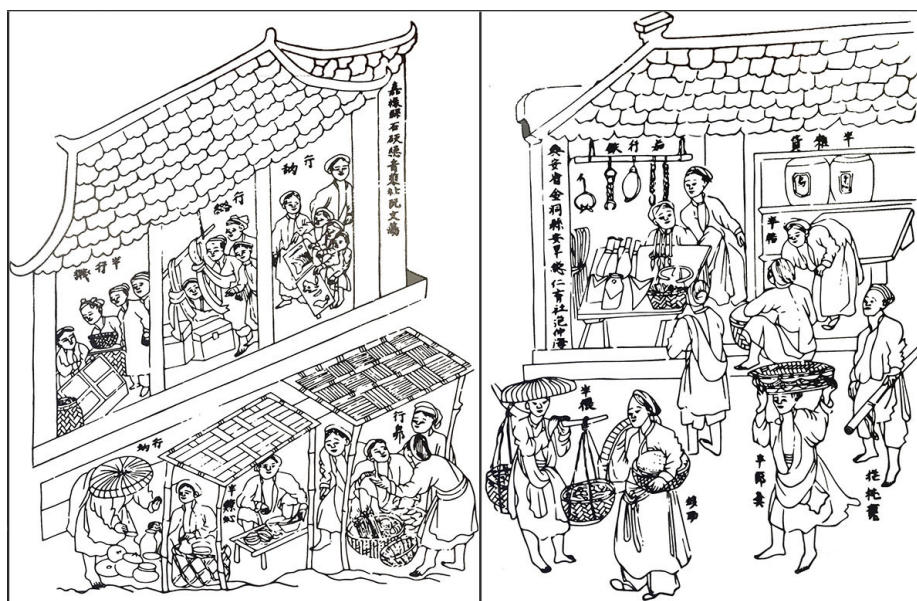
Figure 31: Two images describing the housing and trading activities in Hanoi city during feudal periods. (Images took and edited by the author in the Old Quarter

Cultural Exchange Centre in Hanoi city in 2016. The context of images was from the eighteenth century to the nineteenth century).

Meanwhile, according to several scholars, the structure of the traditional quarter is based on the pattern of traditional village (Logan, 2000; Waibel, 2004; Geertman, 2007 and Kien, 2008). There are two main proofs showing the relationship between urban structures of historical towns and those of traditional villages.

Firstly, during the feudal period, village was a self-reliant unit rather than an administrative unit (Ngo, 1998). Each village had its own communal house, pagoda and temple. In term of physical structure, each village was surrounded by gate and rows of bamboo to control accessibility and to protect village from external aggression. Normally, villagers had little contact with others outside that village. The craftsmen who lived in traditional villages only came to marketplace to sell their products; after few days, they returned to their villages. Meanwhile, the historical structure of Hanoi urban counted on the unit of "*Phường*". Each "*Phường*" shared common characteristics with those of Vietnamese villages including communal house, temple and pagoda, which hosted the typical socio-cultural activities that could be seen in the traditional villages (Logan, 2000). The communal house was the meeting place of the people engaged in the same handicraft. Temple was the place to worship god, while pagoda was the place for Buddhism. *Phường* was controlled by guild. Each guild inhabited in a single street to protect its guild members; the individual street was limited for those who came from similar region or village only. Wooden gates, which were locked at night, provided the access to the community in the daytime. Moreover, each *Phường* had its own headman, police and administration system.

Secondly, the relationship of traditional quarter and village also could be seen in the specialization production (Logan, 2000 and Sylvie, 2012). In the old quarter, each street sold only one type of commodities; ancient streets' names were determined by main commodity that was sold there. The name often combined by two words; the first word is "*Hàng*" which means good while the second word is name of main commodity. For example, some street's names are Sugar street (*Hàng Đường*); Chicken street (*Hàng Gà)*; Jeweller street (*Hàng Bạc*), and Comb street (*Hàng Lược*). In comparison, there were various traditional craft villages producing only one type of production around Hanoi. Various ancient craft villages are still existing in present such as *Đồng ky* village, specialised in wood production, *Phú Lâm* village, specialised in paper, *Bát Tràng*, specialised in ceramic production, *Vạn Phúc* village, specialised in weaving, or *Phụng Xá* village, specialised in silk.

4.2.3 Traditional urban houses in Vietnam
According to Kien (2008) and Tran (2013), one of the noteworthy characteristics of traditional houses in Hanoi is the typology (Figure 32). Traditional urban houses,

which were built during the early nineteenth century, has one to two floors, which are quite narrow while the length could be up to 100 meters long. Hence, traditional house in Hanoi is referred as "*tube house*" or "*Nhà Ống*" in Vietnamese. There are two main explanations about the typological form of the traditional urban house.

Firstly, following Vietnamese culture, children would move out of their parents' houses after marriage. Only the oldest son and his family could stay; this is to take care of family worshipping and his parents in their old ages. Traditionally, other sons have to build their houses next to the house of their parents. By doing so, the sons could visit their parents, and sometimes share responsibilities with others in common family commitments. Parents often allocate parts of their land to their sons in the case they have more than one son; so, the younger sons could have their own houses. In Hanoi, this land division was popular in the Old Quarter during the feudal period (Geertman, 2007 and Waibel, 2004). Over generations, such process has affected the traditional urban housing in Hanoi.
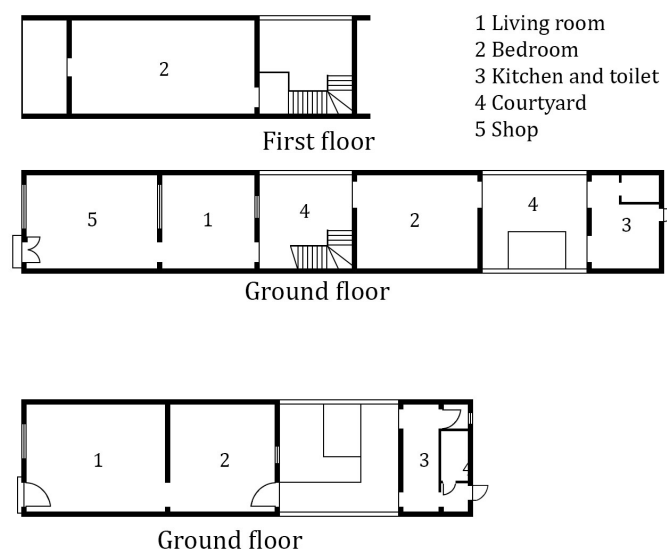
Figure 32: Typology of two traditional houses, which was building during the early nineteenth century in Hanoi city (Adopted from Nguyen, 2007, p 76). (Top) a two-storey building, (below) a one-storey building. Both buildings had two entrances: front door to main street and back door to small alley for waste colleting

In particular, the original plot was divided into smaller and smaller plots. Furthermore, conventionally, extended family living under the same roof was a symbol of great happiness. Thus, there was a need of expansion to create more living spaces for younger generations. Consequently, the traditional housing in the historical quarter became extremely long and thin. Particularly, Geertman (2007) hypothesised that the development of traditional urban houses during feudal periods in Hanoi might follow four stages (Figure 33). In the first stage, original

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villages were surrounded with natural landscapes including lakes, rivers and rice fields. People settled around these lakes, and roads were built to connect villages. In the second stage, the inhabitants divided their houses, and extended the backside further against their houses. Courtyards were then created for light and circulation. In the third stage, when families expanded, they continue to live on the family land, which added up to higher density. In the final stage, when guild and trading activities appeared, people started to trade and produce goods instead of farming. This resulted in the loss of natural landscape, meanwhile emerging buildings covered all over the area.

Another hypothesis about the depth of building derives from economic purposes. Situated on the maritime routes from China to other Eastern countries and later to Western countries, the Southeast Asian civilization has engaged into commercial trading activities and has been influenced by foreign lifestyles (Han and Beise, 2016). New urban features such as harbours, markets, commodity workshops and settlements emerged. For commercial purposes, a part of the individual building was utilized to open a shop and storage. The space in the frontage was valuable for family business. Moreover, in the feudal period, taxation was imposed according to the width of building; thus, the inhabitants purportedly cut down the width to save money on tax payment (Dinh and Groves, 2006). As a result, the length of building regularly increased while the width became narrower and narrower.

a 1st catalyst for is the water system of the lakes

 ▶ *fertile land for rise fields*

People settle around the lakes

 ▶ *A road network is build to connect the villages*

Markets arise along the roads

 ▶ *Trade emerges between the villages*

Emergence of the village- and later shop houses along roads

 ▶ *Small facades*

b 2nd catalyst: centralization to preserve paddy fields

 ▶ *small facades extention in the interior, patio's (san) are created for light and circulation: emergence of tube houses*

c 3rd catalyst for centralized densification is culture
Land brings 'luck' families do not move they are spiritual related to it. When families expand they live more dense, when a couple marries, the wife moves to the husbands family.

 ▶ *Emergence of extreme dense agglomerations*

d 4th catalyst for centralized densification is to an urban lifestyle: trade and guilds instead of farming

 ▶ *dumping of the lakes losing the natural reservoirs, causing pollution bad air, bas water and sewerage etc.*

Figure 33: Housing transformation in Hanoi: traditional village's house to tube-house form (Geertman, 2007, p 128)

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For illustration, the following parts show two examples of traditional houses: one is in 87 *Mã Mây* Street (Figure 34) and the other in 47 *Hàng Bạc* Street (Figure 36).
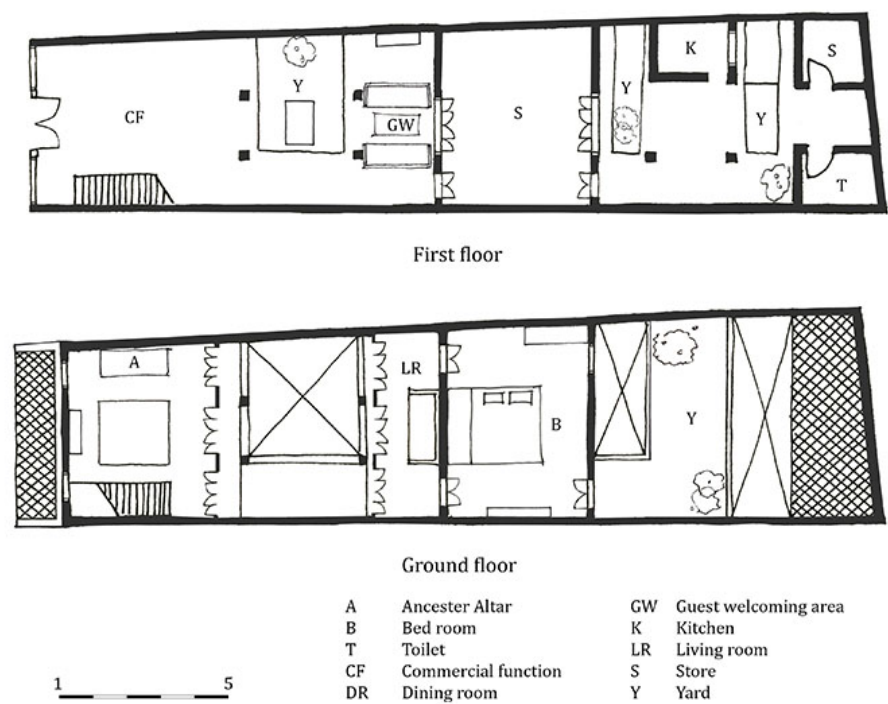
Figure 34: plans of house no 87 Mã Mây in old quarter (Drawing by author during fieldwork study in 2016)

House no. 87 in Mã Mây Street: The house has been renovated by Hanoi City Council to preserve the old house in good conditions for tourism rather than living purpose. The current spatial organization is the same with the original plan. This two storeys building was built in 1890s. In the ground floor, the front space was used for commercial activities, such as shop and storage. Other spaces in the rear and in the upper floor were for family living spaces. Also, the house has two courtyards, which separate the shop with the guest-welcoming area, separate the dining room with the kitchen and toilets. There is one stair in the front corner connecting the main entrance with the worshipping room in the upper floor. The worship room connects with the living room and bedroom through the courtyard. In the end of second floor, there is a top terrace for garden. In term of the typology, this building has a rectangle shape; the width of the front and the rear are nearly 5 meters and 6 meters, respectively; the length is approximated 28 meters.

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Figure 35: Living spaces in the house 87 *Mã Mây* st (Images by author during fieldwork study in 2016) (Clockwise from the top left) (1) Ancestral altar, (2) Traditional bed in bedroom, (3) Traditional chair in living room, (4) Guest welcoming area, (5) Inner courtyard, (6) Kitchen, (7) Internal gateway.

House no. 47 in Hàng Bạc Street: Briefly, the original house has two stories. In the ground, the front space was used as a shop with a waiting area for guests. Inside, the house has two courtyards; one connects the main hall with the ancestor altar room, while another courtyard connects the dining room with the supporting areas, i.e. kitchen, toilet and bathroom. In the upper floor, there are two different areas separately connecting with the ground floor by two stairs. Near the main entrance is the first bedroom; the remaining area has three connected spaces, i.e. bedroom, top terrace and living room. This building is in rectangular with the length of 25 meters and the width of 5.1 meters. The materials are mainly brick, timber and tiles.
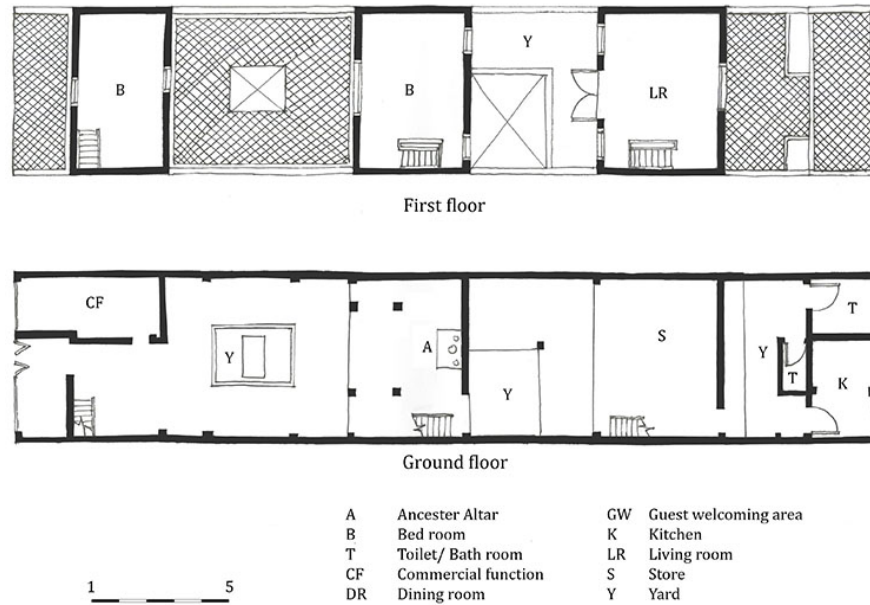
Figure 36: Plan of house no 47 in *Hàng Bạc* Street, Old quarter, Hanoi (Adopted from Kien, 2008a[12])

Generally, from both examples, they demonstrate some common principles of spatial layout in traditional town houses:

Hierarchy of Front versus Back*:* the example case studies of traditional urban house and contemporary self-built housing show that the classification of front and back suggested the position of specific rooms in the houses. The traditional tube houses have two distinct functions: commercial and living spaces. Owing to commercial purposes, a part of the individual building was utilized to open a shop and storage. Consequently, the frontages of buildings were reserved for commercial function while the living spaces are located behind.

Hierarchy of Top versus Down*:* given the condition of increasing population density and market place, traditional urban houses generally have two floors. The ground floor is for daily and commercial activities while spaces in the upstairs are private spaces.

Hierarchy of Enclosed space versus Open spaces: The layout of traditional urban dwelling is following order: shop - courtyard-living - space – courtyard- space. Within that order, courtyards and corridors were meant to join the internal spaces

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[12] Due to no clear conservation planning during the early 1990s, most of houses in traditional quarter has been collapsed or modified by household. Therefore, Kien (2008a) studied original housing plans of building no 47 in Hang Bac in old quarter of Hanoi city based on responds of residents and map of current building.

together. To explain about that special spatial layout, the form of traditional town houses does not only reflect protective structure, but it also implies the ideology and perception of the Vietnamese culture. Open spaces, such as courtyards, are indispensable parts in the traditional urban housing layout. Following the Feng Shui theory, the traditional building layout should be an enclosed form, allowing the building itself filled with life energy. "*Life energy*" means essential elements to strengthen the quality of residence. The ideology of Feng Shui principles, therefore, aims to create a harmonious environment to bring life energy into the buildings (Ngo, 1998). However, in reality, it is usually difficult to obtain an ideal site in the towns and cities. In order to achieve a desirable living environment, the form of a courtyard house has been selected as an ideal model. On the one hand, courtyard is an open space in dwelling. On the other hand, it is also perceived as a structured vision of the universe and ideal place of life elements. Although the size and shape of courtyard might vary according to location and size of plot, courtyard, enclosure and wall are inarguably the heart and soul of dwelling units. At least one space is an important element in any Vietnamese house; even the space is merged between indoor and outdoor. The traditional Vietnamese houses always surround their gardens. Around courtyards are main living spaces or walls to create sense of privacy, security, to restrict noise and dust, to offer light and air. Therefore, a courtyard is also a place for cultural activities.

Based on those descriptions and examples of traditional town houses in Hanoi city, the form and order of main living spaces could be illustrated in figure 37. In the ground floor, the front space is for commercial function; living space is always located in the centre while the rear is place of supporting spaces including toilet and kitchen. The room in upper floors are the bedroom and ancestral altar. Meanwhile, there are several internal courtyards to separate different functional areas.

Traditional house
(During 19th century)

Street │ Building │ Courtyard │ Building │ Courtyard │ Building
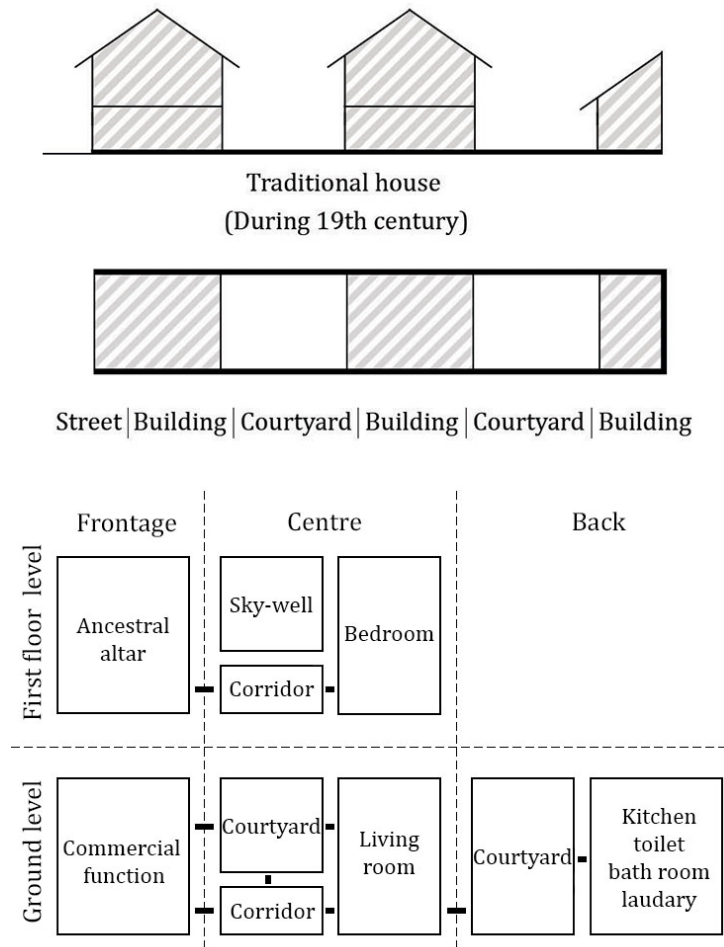
Figure 37: Form and spatial organisation layout of traditional town house in Hanoi during the nineteenth century (Drawing by authors according to analysis of traditional house in various sources including Kien (2008a, 2008b), Phe and Nishmura (1991) and Phan (2013))

In essence, this part explains the socio-cultural context in Hanoi city and characteristics of traditional tube houses in Hanoi city during the feudal period. When Hanoi was selected as capital city of Vietnam in 1010, different craft guilds started to emerge. Each group spontaneously inhabited in one street. The planning of streets and guild's areas was based on kinship, local relationships and natural landscape rather than formal planning by institutions. In this regard, households were free to make decisions about housing design and division of living spaces regarding their experience and family needs. Therefore, the traditional tube house was a transformed model of traditional rural housing to meet living conditions of marketplace in Hanoi city. The main characteristic of traditional town houses was its form, which is long and narrow, and there was large number of courtyards to

separate different living areas. Also, the traditional tube house was designed as mixed function between living spaces and commercial areas.

4.3 French influence on urban development and housing in Hanoi during the colonial period (1883-1954)

4.3.1 The influence on French culture on urban development

During the colonial period (1883-1954), French architecture had influenced in Vietnam and Hanoi through four main ways:

Firstly, the European people came to Vietnam for their commercial and missionary activities. During *Trịnh-Nguyễn* civil war (1627-1775), international trade flourished prosperously in both the North and the South (Kiernan, 2017). Hanoi and other towns quickly emerged to become market towns for not only the indigenous people, but also for foreigners, such as Chinese, Japanese, English, French, Dutchman and Portuguese. Along with trading activities, foreigner priests introduced Catholic into Vietnam. Therefore, some religious buildings such as churches and cathedrals emerged across the country. Although these buildings use local materials, their design follows Western principles. But, Vietnamese people have learnt and applied these building techniques in other construction.

Secondly, French supported *Nguyễn* family, by that, *Nguyễn Ánh* conquered the whole country and established the *Nguyễn* dynasty. In 1802, the capital city was established in the Hue city, and the *Nguyễn* rebuilt the Hanoi royal citadel into smaller fort (Figure 38). The form of citadel is based on the military work of Vauban - a well-known French military engineer (Logan, 2000).

Figure 38: Hanoi urban structure in the late nineteenth century (Edited by the author, adopted from the historical map in 1873 printed in Phan (2013) and satellite image of Hanoi city in 2018)

Thirdly, considering Vietnam as a strategic location, in 1858, French navy launched a colonial war in Vietnam to create potential market and supplies for France. After conquering Cochinchina (Southern Vietnam), French realised the benefits the Tonkin (Northern Vietnam today) for commercial purposes since it had the waterway to Yunnan province of China (Kiernan, 2017). Meanwhile, Hanoi was enclosed by three rivers *Tô Lịch* River, *Kim Ngưu* River and the Red River; such

geographical location granted the citadel a strategic position[13]. Therefore, the French occupied Hanoi Citadel in 1873 and again in 1882. In 17 October 1887, French merged five regions including Cambodia, Laos, Cochichina, Annam and Tonkin into a Union (Dinh et al., 2000). The last three regions became the contemporary boundary of Vietnam.

After occupying, French authorities introduced the French *mission civilisatrice*, which implied the French effort in Indochina. In the first strand, this program aimed to disseminate the influence of French education and culture. In the second strand, it promoted economic activities and improved the administrative organisation in Indochina (Logan, 2000; Njoh, 2016). In fact, Indochina did not bring many economic profits to the French. The regional economy of Indochina heavily relied on agricultural production; and to develop an agricultural economy was not an easy task. On the other hand, there was little room to increase tax rates. Especially, at that time, due to the French industrial revolution, since the French government insisted to maintain Indochina as one of its exclusive market for French goods, encouraging the development of handicrafts, as source of trading and tax was less feasible. Thus, in Vietnam in general and in Hanoi in particular, the French government created a monopoly of trade on tobacco, alcohol and opium, which generated huge profit margin for France. In order to promote trading activities, a French administration established quotas of consumption for each Vietnamese village. The villagers have to purchase and consume set amounts of those monopolised goods. Correspondingly, the infrastructure system including roads and north-south railway emerged. Later, some selective cities and towns became the administrative centres and summer holiday places for Western people in Indochina.

Finally, French opened the Indochina College of Fine arts to train local architects since the late 1920s (Labbe et al., 2013). The architectural lessons principally followed French and other Western styles. As a result, architectural design had been increasingly internationalised, particularly in public architecture.

Due to the above reasons, even Hanoi was colonial city for nearly half century; French culture has significantly influenced urban pattern and local architecture in Hanoi city.

4.3.2 Urban development and residential planning during the colonial period
Since 1887, Hanoi was chosen to be the capital city of Indochina, and it became a laboratory of colonial France for other colonies in Indochina. In Hanoi, urban planning and improving infrastructure drew a great attention from the French Republic, since those matters could illustrate the practices of *mission civilisatrice*

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[13] Please see section 4.2.1 for details location and geography of Hanoi city

and the influence of French culture (Njoh, 2016). Urban planning in Indochina could mark the presence of France on their colonial territories. Various new constructions were built to improve hygiene and infrastructure in Hanoi such as the *Long Biên* Bridge, a railway and train station, an electronic tramway system, the construction of channel and pumping station. Moreover, the French military established an authoritarian regime to suppress indigenous revolts. The army expressed their power through not only military buildings, but also spatial planning (Cooper, 2000). Specifically, a number of pre-colonial constructions were demolished and replaced by new projects such as administrative and military buildings. This was to demonstrate the strength of French army and to establish a new order in Hanoi. For example, the walls of the citadel were destroyed to make way for the new grid of road. At the same time, the French also replaced the palace with a new headquarter of the French army (Figure 39).

Figure 39: The French redesign of the citadel area (Logan, 2000, p71)

In term of residential planning, Hebrard, an architect known as the father of Hanoi planning during the colonial period (1883-1954), recognised the significance of native settlements and its relation with the French quarter through daily social interaction. For example, he stressed that:

We should not forget that the European need the natives in order to survive... Domestic servants live in their master's houses, but every day go to the market for their shopping, or to a native village to see their families and friends. Around every European settlement one or more native agglomerations always form; there correspond, in fact, to the groups of shopkeeper and worker in our modern cities, who are, in truth, separated from the bourgeois neighbourhoods without a definite line being drawn on a map. (Hebrard in Logan, 2000, p104)

| Citadel area | Old commercial street area | Urban development during colonial period |

Figure 40: A transformation of Hanoi urban structure during colonial period (Adopted historical maps printed in Phan (2013) and work of Mamoru (2009) and satellite image of Hanoi city in 2018)

Accordingly, Hebrard applied the concept of dual city, in which the native settlement should co-exist with the Western settlement. In this regard, the traditional quarter was kept to support new planning. In particular, its

infrastructure was redeveloped under the strict French regulations, i.e. expanded streets together with the wastewater and drainage system (Phan, 2013).

Particularly, figure 40 illustrates the transformation of Hanoi city urban structure during the colonial period. From 1875 to 1888, the French embassy and guard buildings were situated in the southeast of Hanoi city. Since 1888, this area was developed as a new French quarter (Phan, 2017). In order to build a colonial city, an urban planning practice, namely "*Town planning and architecture service*" was introduced in the 1920s (Geertman, 2007, p 143). There are two master plans, one proposed by Hebrard in 1924 and the other by Cerutt in 1942. However, given the changing political circumstance and the termination of French colonial system in the mid twentieth century, only the former plan was actually executed, while the latter plan was not fully implemented. Generally, in the French quarter, the street would have 20-30 metres width and the French-style housing blocks were on its two sides.

In term of housing provision, the French focused on the development of villas for European people in the new French quarter. Housing for the Vietnamese lower classes are overlooked in any general planning; thus, the majority of Vietnamese inhabitants continually constructed their houses on their own initiative in villages and the Old Quarter (Geertman, 2007).

Only one exception is a *Bùi Thị Xuân* quarter, which is located in the south of the French quarter. During the colonial period (1883-1954), The *Bùi Thị Xuân quarter* was developed for the Vietnamese elite class, those worked for the French government (Phan, 2017; Labbe et al., 2013). Originally, this was a rural area with paddy fields and a number of swamps and ponds in the municipal territory of Hanoi. At that time, since this area had been included in the French planning to improve living environment, it had increasingly attracted rural migrants come to find a job in the city. Most of buildings were simple constructions using light materials such as timber and thatched. As a result, there had been unhygienic conditions and in short of fire prevention. In 1902, new indigenous quarter was formulated by the French administration (Figure 41).

> *"Group in the same place the Annamites displaced by the opening of new road… to allow workers, servants and divers employees of the Europeans to build their houses near their place of work. [and] limit as much as possible the exaggerated expansion of the road network … as well as the temptation of land speculation which, if not attended to, would lead to the collapse of the municipality's finance"*

> *(Translated version in* Labbe et al., 2013*, p 257)*
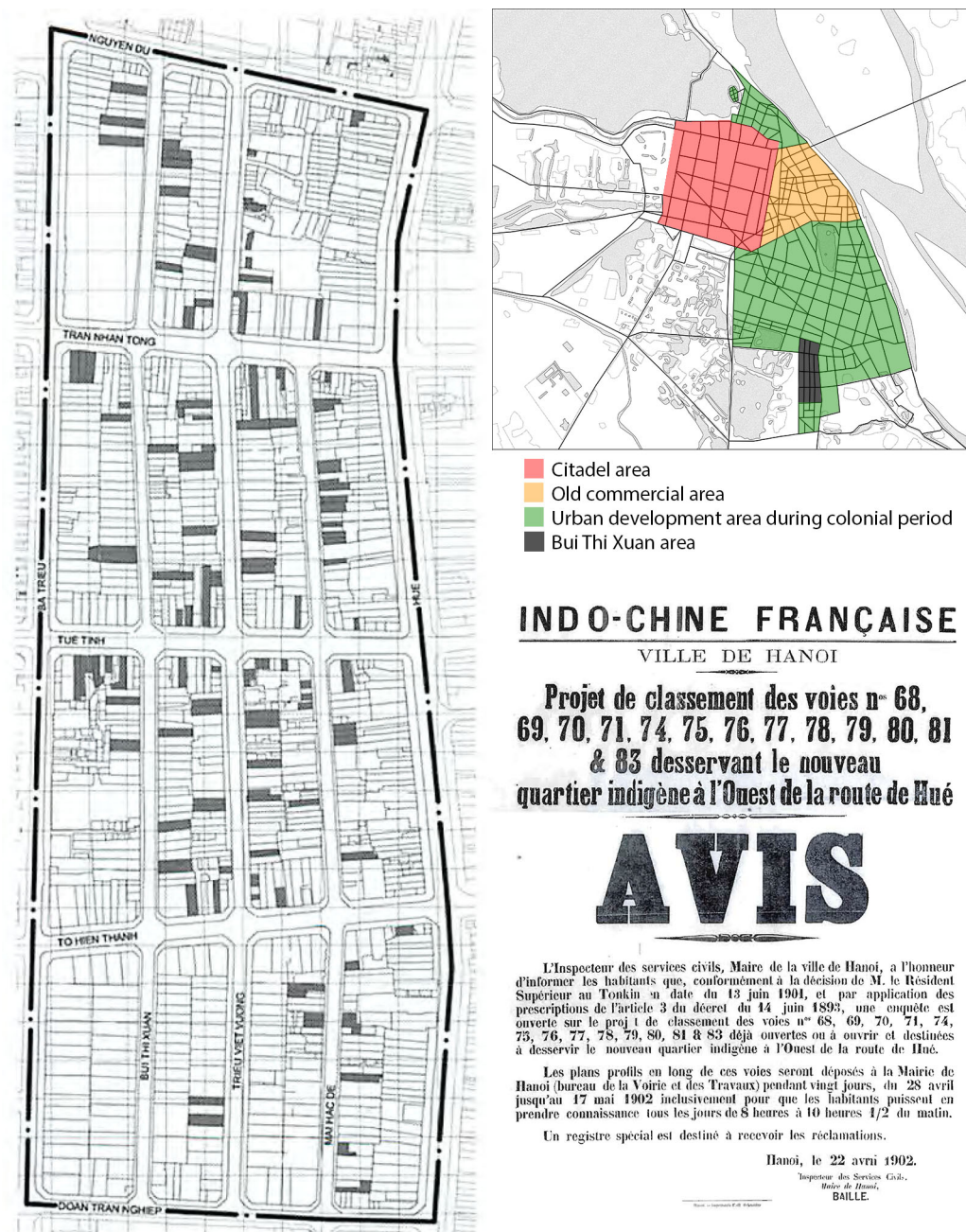
Figure 41: A plan of the *Bùi Thị Xuân quarter.* Left - the original plan of urban area known as the *Bùi Thị Xuân quarter* (Boisvert, 2006, p 124). (Right top) location of the *Bùi Thị Xuân quarter*, (Right below) Notification of the quarter (Dao, 2010, p 214).

According to Nguyen (1995), the street layouts in *Bùi Thị Xuân* quarter was based on pre-existing rural landscape of rice field, ponds, and villages. It had a rectangular grip street system. The municipality divided these blocks into small plots; and the French allocated plots to indigenous households through a leasehold system. Each parcel was four to six meters wide.

4.3.3 A transformation of the urban tube house under the influence of Western culture during the colonial period

Apart from planning, aspects of traditional architecture had been transformed during the colonial period (Tran, 2013). Accordingly, there were growing attention on construction technology and the French design principles. Local households started to apply French regulations. The town houses had two to three floors using solid materials such as steel and concrete. Main building had larger rooms than those in traditional tube houses. The façade designs derived from the interest of house-owners. Such new architectural trends represented wealth, comfort and intimacy.

In addition, French introduced new educational system (Labbe et al., 2013). From 1926 to 1940, a number of Vietnamese graduated from the Indochina College of Fine arts. College students were trained and engaged with Western theories, techniques and styles. Young architects were soon exposed to an international architecture. Their mind-sets contributed to shape new regional identity and to create distinctive urban houses in Hanoi. Their designs more or less borrowed several elements from those of French villas (Figure 42). Housing façade applied French motifs while the main living space had large volumes with separated functions, such as entry hall, dining room, maid room and pantry.

While borrowing some aesthetic elements from the French architectural principles, the colonial town houses in Hanoi had several distinctive features. In closer details, the building form remained the same as with traditional housing, e.g. with inner courtyards, corridor and gardens to separate kitchen, bathroom and toilet from living spaces (Figure 43). Meanwhile, the colonial townhouses in Hanoi followed the principle of exposing as much as possible with regard to its external surface to facilitate the airflow within a house. Hence, the colonial townhouses in Hanoi could be a blend of the Western-style and the Vietnamese tropical-style architecture.

Figure 42: Examples of French style in old houses in historical streets in Hanoi
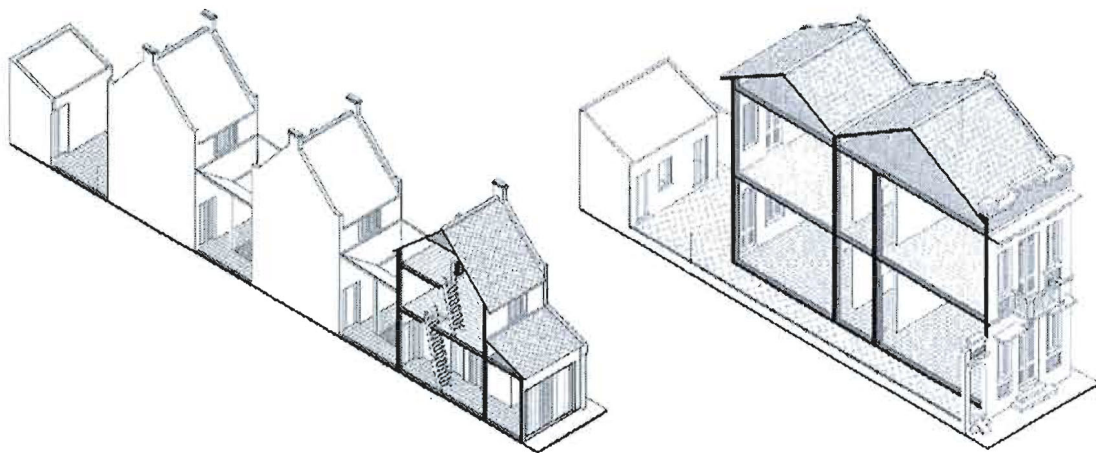
Figure 43: Typologies of traditional house in old quarter (Left) and town house in the *Bùi Thị Xuân* quarter (right) (Dao, 2010, p 351)

To summary, this part explains the social conditions its link with urban development and colonial town houses in Hanoi city during the colonial period (1883-1954). When Hanoi was selected as a capital city of Indochina, French planning system and building regulations were introduced and applied in different levels. Urban neighbourhoods were planned by the institution rather than spontaneous development. The street and housing plots were designed regarding French principles. In the meanwhile, new materials and living styles, which were introduced by French, resulted in transformation of living spaces. The living room had large volume while the French motifs became popular in building facades. Interestingly, although various aspects had been changed to meet new building regulations and living styles, several traditional principles, such as ventilation

system and use of courtyard to separate different living functions, in traditional tube house were kept.

4.4 The influence of the Soviet Union and urban development under the centrally planned command (1954-1986)

4.4.1 The influence of the Soviet Union on Hanoi city

During the early twentieth century, the economic and culture of Vietnam had been increasingly internationalised. International social patterns, rooted in the successful renovation plans in China and Japan, influenced the social-political life in Vietnam (Kiernan, 2017). Based on those renovation plans, some scholars such as *Hoàng Hoa Thám, Phan Bội Châu* and *Phan Châu Trinh* proposed different movements to gain independence. Accordingly, some movements including *Đông Du, Duy Tân* and *Đông Kinh Nghĩa Thục,* were organized to train and educate indigenous people. Subsequently, the social concept of "loyalty to kings" transformed into patriotism to the modern nation state of Vietnam. At the end, their attempts of gaining independence for Vietnam failed; however, the anti-colonialist movements had gathered pace.

During the period of working and living in Paris from 1917 to 1923, *Hồ Chí Minh* joined the French Socialist Party in 1919. Since then, he became an active member in a number of anti-colonist organisations and parties. Later, he laid the foundation of the modern Vietnamese communist party. The party was responsible for training its members, and coordinating its activities with other Asian communists and anti-colonialists following the policies of Soviet Union.

In the World War II, Japan attempted to overthrow French control in the Indochina. During the war, both French and Japanese introduced various regulations to exploit raw materials to support the war regardless of the living conditions of indigenous people. As a result, it is believed that four hundred thousand to two million people starved to death during the Great famine in 1945 (Huff, 2018). Subsequently, the Vietnam communist party quickly gained reputation and became the leading force to reclaim freedom. In August 1945, the Democratic Republic of Vietnam took the power and declared Hanoi as the capital city. When the World War II ended, the French army returned and reclaimed their control over Indochina and triggered the first Indochina war or the War of Resistance (1945-1954).

The War of Resistance (1945-1954) radically affected the urban structure of Hanoi city (Turley, 1975). Between 19 December 1946 and 17 February 1947, all essential services and industrial facilities were destroyed. Urban residents had to leave the city. Even after the fighting, they were reluctant to return given the shortage of basic services. Only until 1949-50, people began to migrate and return

to the city; nevertheless, the substantially damaged production facilities could no longer supply a comparable amount of goods and services to the level before 1945

After the Vietnamese government won the decisive victory again French forces at the battle of *Điện Biên Phủ* in 1954, the Geneva Agreement was held to discuss about the future of Vietnam. Although Vietnam officially defeated the French in Indochina, the country was temporarily divided into two parts. The Northern part was under the control of the Democratic Republic of Vietnam, while the South of Vietnam was ruled by the anti-communist regime owing to the support of the United States of America. The second Indochina war or the Vietnam War (1954-1975) started when the Northern regime insisted to reunite the two parts of Vietnam. The Vietnam War ended after the full-scale offensive by the North in the South of Vietnam in 1975 (Kiernan, 2017).

During the Vietnam War, most urban residents had to relocate to rural areas under the government order to avoid bomb raids. The only construction activity in Hanoi was to repair damages from bomb raids. The reconstruction of urban housing in Hanoi was described as "*do it yourself*". Residents simply called their friends, relatives and neighbours to repair the damaged space.

Meanwhile, the design principles and implementation practices from Soviet Union influenced the urban development strategies firstly in the North of Vietnam from 1954 and later to the whole country after 1975 (Logan, 1995b). The Soviet architects and planners involved in around 300 urban projects in Vietnam, covering both housing and industrial construction. In addition, a number of Vietnamese students were sent to Soviet Union for training and study. Those architecture graduates from Soviet Union returned to Vietnam, and introduced the architectural material to fulfil the needs of a socialist state.

Similarly, Vietnam followed the model of Soviet Union with regard to urban development due to their political commonality. Both Vietnam and Soviet Union suffered the loss from wars, such as human losses and physical destruction (Logan, 1995b). Particularly, from 1965 to 1972, the American air force launched numerous bombing campaigns. Those campaigns included Operation Rolling Thunder and Linebacker I and II, which involved a large-scale bombing in Vietnam. Consequently, Vietnamese cities and towns witnessed a massive devastation. According to Turley (2008, p. 123) during the Vietnam War, the American air force and its allies dropped about eight million tons of bombs. This figure was more than triple than the total dropped by all aircrafts in World War II. In Hanoi, about seventeen thousand houses had been totally destroyed leaving nearly ten thousand homeless people (Turley, 1975).

In the post-war period (1975-1986), Hanoi city gradually recovered and represented a socialist city. During the Vietnam War, President Ho Chi Minh declared in public media that:

"The war may be happened in 5 years, 10 years, 20 years or even longer. Hanoi, Haiphong and other cities and infrastructure may be destroyed to the foundations, but Vietnamese people are not afraid. Nothing is more precious than independence and liberty. When we achieve final victory, we will build them back even more spacious, larger and more beautiful". (Ho, 1966)

As another influence from the Soviet Union ideology, urban development in Vietnam was governed through five-year plans; each plan would aim for particular targets. During 1955-59, the Vietnamese government focused on economic rehabilitation, transformation and development of Hanoi city. Since 1960s, the long-term planning of Hanoi was proposed. The first master plan was established in 1961 with a timeframe to 1980. The plan pursued to develop housing, leading industries and public services. At the same time, Soviet Union experts in association with Vietnamese architects introduced another development plan of Hanoi city in 1965 (Logan, 1995b). The purpose of this plan was to redevelop the traditional quarter and to promote new urban areas in the west of the *Hồ Tây* Lake and the southwest of city. Moreover, the city boundary would expand to include two rural districts, i.e. *Gia Lâm* and *Đông Anh,* in the north of riverbank. Particularly, *Xuân Hoà* was selected as new city centre due to its geology. However, the plan to build a new city centre did not work due to lack of capital and interruption by the war. From the early 1960s to the late 1970s, the master plan of Hanoi was adjusted to deal with the destroyed parts of the city in the war and flooding from Red River due to broken dyke. According to the adjusted master plan, several new towns would emerge in the outskirt of Hanoi (Nguyen, 1995).

In 1973, some experts from Soviet Union including Sokolov, the head of Soviet urban planning, helped to work out a new master plan (Logan, 1995b). In the new master plan, a new city centre would be located in the south and southwest of the *Hồ Tây* Lake with green spaces, high-rise public buildings and pedestrian overpasses. The master plan seemingly reflected political ideology rather than practical use. In addition, in this period, the Vietnamese economy stagnated due to the wars and then trade sanction from capitalist countries. In addition, the aids from Soviet Union declined after the war. Thus, the state budget was short to execute those plans. In practice, there was no major investment for infrastructure such as bridges and roadway to connect Hanoi with other areas locating in the north of riverbank. Therefore, from the 1980s to the early 1990s, Hanoi city only expanded toward areas in the south and west directions (Figure 44).
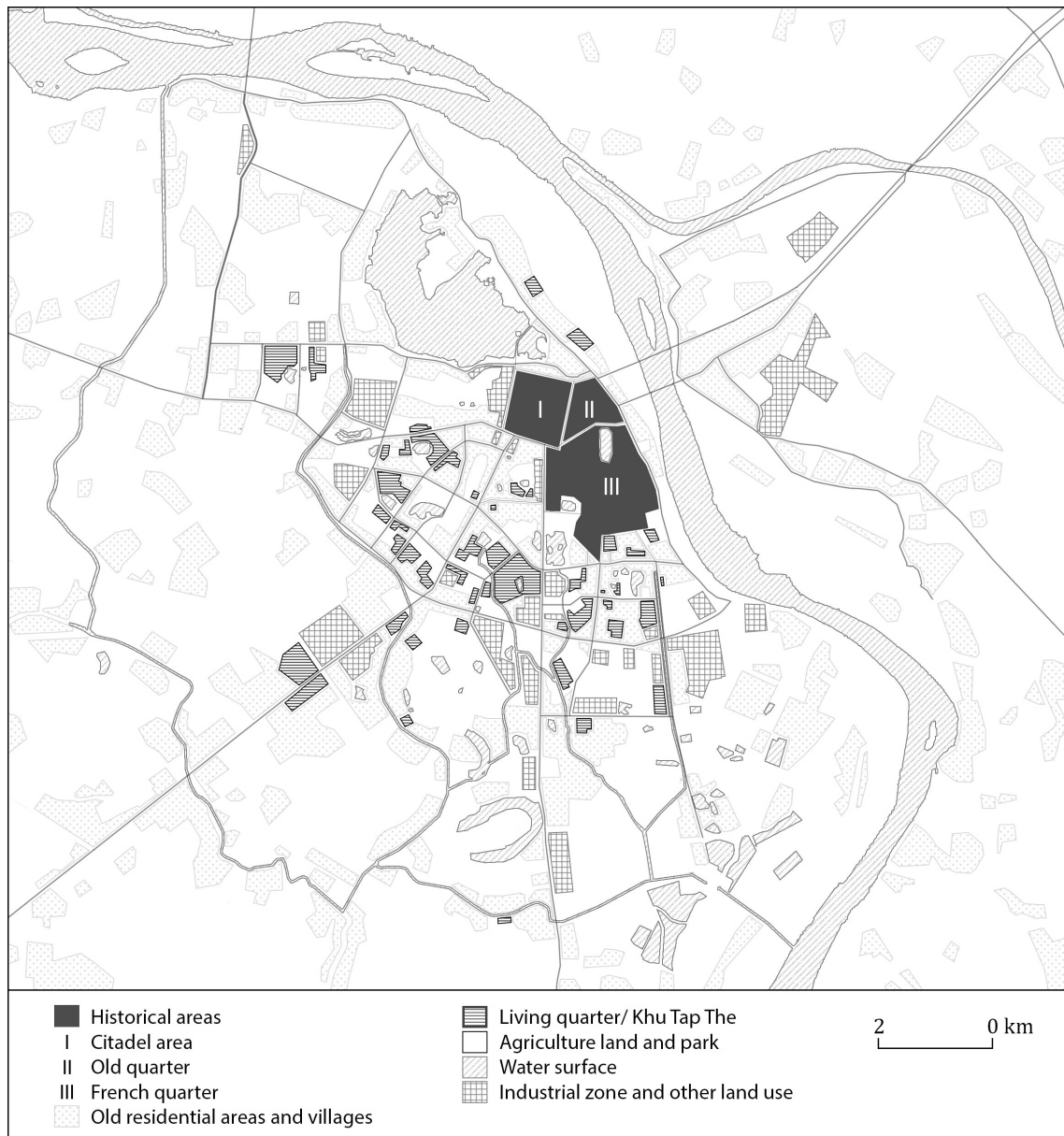
Figure 44: Urban structure of Hanoi during the late 1980s (Drawing by author, based on Nguyen and Kammeier, 2002)

4.4.2 Urban structure after the war and application of Soviet residential model: the living quarter

In term of construction, the Hanoi plans focused on three types of constructions (Logan, 1995b, 2000; Nguyen and Kammeier, 2002). The first type was symbolic building reflecting order and influence of the Soviet Union. Basically, new administrative and statues were built around the historic areas including the *Hồ Chí Minh* mausoleum, the Soviet-built state assembly building, the Vietnamese-Soviet friendship cultural palace and the Hanoi People's Committee Building.

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The second type was industrial constructions in chemical, engineering, building materials and light industries. The industrial zones were along the main road or ring road taking into consideration of accessibility, land availability and pollution prevention. Each industrial zone was specialized in a distinctive industry.

The third type was new urban housing projects. One of the most important priorities of the socialist ideology for urban planning was the provision of good quality housing for citizens. After gaining power in 1954, the Vietnamese government adopted a socialist system of public ownership within a planned economy. Housing, therefore, was not considered as a consumer good but as a kind of welfare. There were two outstanding policies in response to residential needs (Geertman, 2007). The first policy was to requisition and redistribute private housing, which already existed in the city. In particular, those empty houses in the Old Quarter and those housing in French quarters, which were originally designed for single families, had been repaired, divided and distributed to new families. This policy was unpopular, and it did not meet increasing demand of housing in Hanoi city. Therefore, the second policy aimed at generating housing in large scale in newly built collective quarters in the outskirt of the city. Each new urban settlement was in close proximity with one manufacturing zone to provide shelters for workers and local officials. The financial resources from state budget, foreign aid and other sources were disbursed under the state control through the top-down system.

Based on the Soviet ideology, which focuses on collectivism, no private house was allowed, even in theory. Private constructions had been restricted for special buildings due to numerous building's licence and papers. Majority of household had to rent a room from the state. This concept was implemented in the Hanoi city as well as other Vietnamese cities.

Practically, in Vietnam, during the central economic command period (1954-1986), the urban settlements were influenced by the Soviet principles. The settlements area has various names: the living quarter or "*Khu Tập Thể*" (KTT). The design of the living quarters aimed to meet the housing demand of shelters for local employees; thus, state had its own special agencies that built housing according to five-year socio-economic plans.

In Hanoi, a model of residential planning of neighbourhoods was inspired by model of C. Perry (Ngo, 1998; Logan, 2000). Within that model, schools and public services were considered as primary factors to determine principles for living areas (Figure 45). Specifically, in Vietnam, there were three main principles for planning of living quarter (Logan, 2000). Firstly, the residential areas had to provide necessary shops and services for everyday in the centre. Secondly, the residential areas had the facilities for education and culture activities nearby.

Lastly, the traffic network should be clearly graded. Based on those principles, the living quarters in Hanoi were principally designed with school, market and kindergarten (Table 8). Although several living quarters did not have all services and facilities, they had the services nearby.
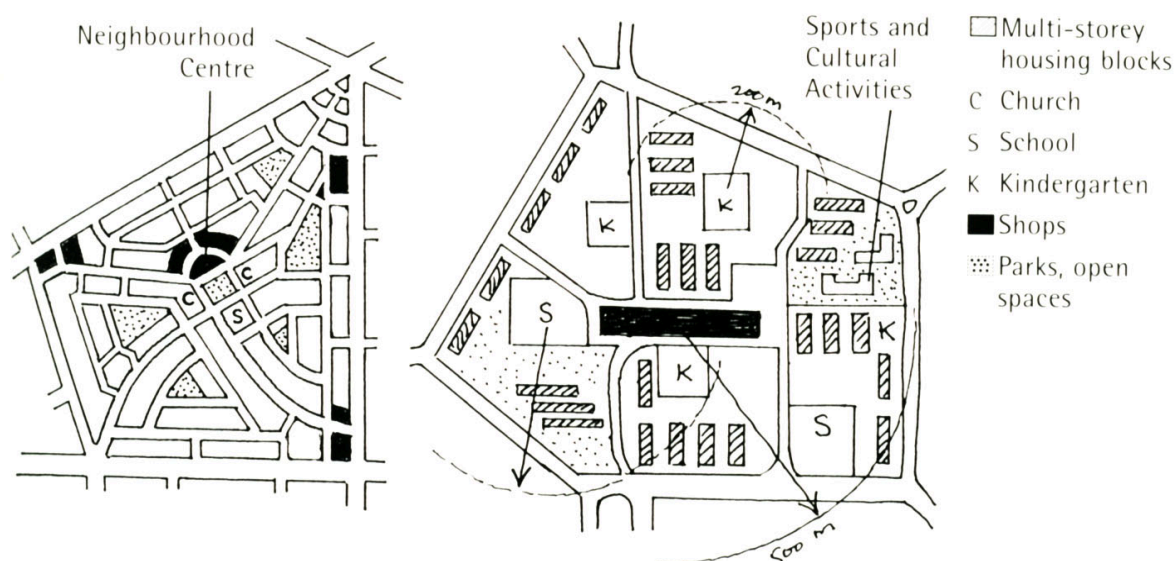
Figure 45: The principle's design of Neighbourhood unit of Ferry.C (Left) and its modification in Soviet Union (Right) (Logan, 2000, p 207)

Living quarter name	Construction year	Area (ha)	Services
Kim Lien	1961	40	2 school, kindergarten, 2 nursery, health centre, engineered residence, public committee, market, post office
Nguyen Cong Tru	1960	6	Market, kindergarten
Mai Huong	1960	7.5	-
Trung Tu	1791	16.5	3 school, kindergarten, 2 nursery, health centre, engineered residence, public committee, ground
Giang Vo	1973	30	Hotel, school, kindergarten, embassy
Thanh Cong	1973	36	Hotel, school, kindergarten, public committee, market, post office, police station
Vinh Ho	1973	14	School, market
Khuong Thuong	1974	7.5	Kindergarten
Quynh Loi	1974	13.5	Kindergarten, public committee, police station, post office
Bach Khoa	1975	16	School, shop, office, ground
Nghia Do	1981	41	School, kindergarten, market
Thanh Xuan Bac	1981	56	School, kindergarten, market

Table 8: Characteristics of several KTT in the Hanoi city (Narumi, Bui and Oka, 2005, p79)

4.4.3 A design of collective apartment under the Soviet influence during the central economic planning period (1954-1986)

In the living quarters, the apartment design conformed to Soviet principles with the aim to provide shelters for local workers and officials. The apartments in KTT were distributed to state employees as a social benefit, compensating for low income

rather than an economic good. Accordingly, low-rise apartment buildings were popular since this solution could save costs and land use to fulfil increasing housing demand. The provision of housing would satisfy four main criteria, namely to be built quickly, sustainably, well and cost-efficiently. The plan aimed to provide mass housing by using the industrial method on large scale (Ngo, 1998, p 800). Thus, concrete slabs were the main construction materials for apartments building.

The apartment design was subject to technical, economic and social conditions. During the period 1960-1965, low-rise housing was constructed across the city to solve the housing shortage problems (Ngo, 1998). The design was based on model of vernacular houses[14] during feudal periods. Each building had several "*gian*"; each "*gian*" was twenty to twenty-four square meters for a household of five to six people. Six to seven households shared one *gian* for common supporting spaces, which was about 10 square meters. Dang in Logan (1995b) highlighted that about 5000 flats were built around the ancient quarter and in new estates at *An Dương, Phúc Xá, Mai Hồng* and *Đại La*. Despite that, the newly built housing could not meet the high housing demand at that period. Dang estimated that housing production only satisfied one-sixth of the demand.

From the mid-1960s, new medium-rise housing became models for new living quarters. The early complete housing areas were in small scale with three-to-four-storey buildings. The apartment typology had a simplified shape sufficient to some basic living functions (Phuong, 2011). There was no attention paid to the visual appearance of a building. Each apartment block had four or five storeys with a number of flats. According to the standard principle, the shelter area must satisfy the rule of 4.2 square metres per person (Ngo, 1998). There was no parking area in the plans; thus, the stairs had slope pathway in the middle for bicycles moving. In each floor level, every two or even more families had to share a common public space and sanitary facilities such as kitchen, toilet, and bathroom.

Particularly*, Khu Tập Thể* (KTT) *Nguyễn Công Trứ* and *Kim Liên* are two examples for the first model of living quarters (Ngo, 1998). KTT *Nguyễn Công Trứ* was built between 1958 and 1960. The plan and apartment design could illustrate new socialist ideology and symbol of independence. The area was constructed with assistance from the Chinese government. KTT *Nguyễn Công Trứ* was originally located in the South of French quarter. Today, this area is a part of the city centre. Its plan has 16 blocks with four floors in parallel with the street. The communal broads are used to announce new information. KTT *Kim Liên* is located in the Southwest of today Hanoi city centre, and it covers 40 hectares of agricultural land

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[14] Please see section 4.2.3 for details of traditional houses

in *Kim Liên* village. The quarter provides accommodation for about 16,916 inhabitants. It consists of four-storey apartment buildings, schools, canteens and other public services. Later, new areas became more complicated with kindergartens, schools, community buildings and shops to provide accommodation for 7,500 to 10,000 citizens per unit. In both KTT *Nguyễn Công Trứ* and *Kim Liên*, each block consists of staircase in the middle and it has four to five flats in each side of the staircase. Each flat has a living room about 10 to 24 square meters. Several families had to share the same kitchen, toilet and bathroom.
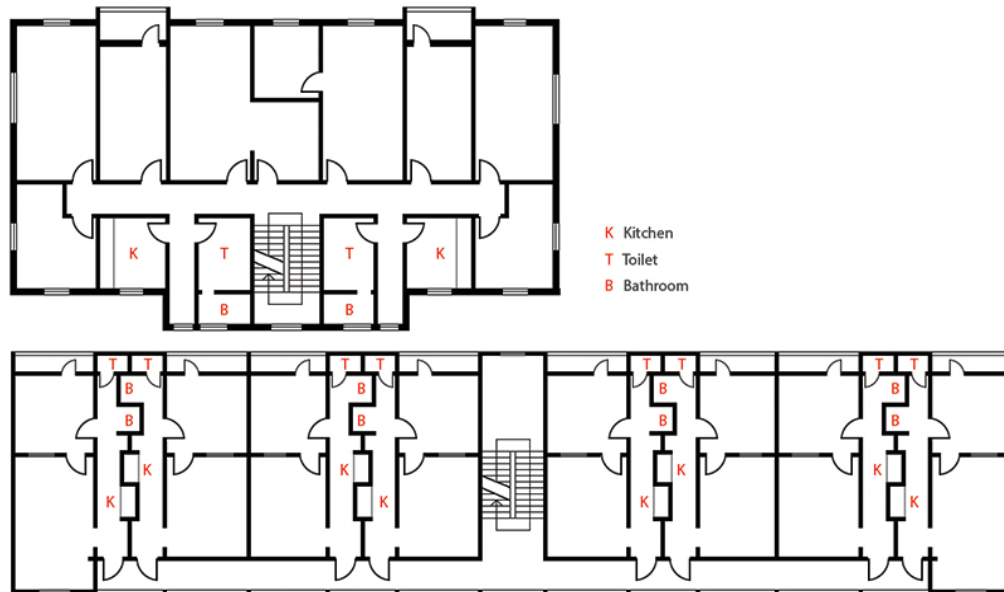
Figure 46: The plans of the collective apartment. (Top) apartment plan during the 1960s with sharing amenity area and (Below) building during the 1970s with private amenity area (Tran & Dalolm, 2005)

Since the 1970s to 1986, the design of building blocks and apartments had several major changes (Ngo, 1998). Firstly, the sharing facilities in each floor were eliminated. Each flat has a small hall and private balconies. Secondly, each apartment had private amenity area including kitchen, toilet and bathroom. Thirdly, each flat had three rooms: the size of living room was twenty-one square meters while size of bedroom was twelve square meters. Lastly, the ground floors of buildings were used for public space and communal activities such as meeting room, communal room, leisure facilities, garage for motorbikes and bicycles and mailbox.

Generally, during this period, particularly from 1945 to 1975, Vietnam suffered two wars; due to the bombing, most of important cities and towns were heavily destroyed (Basil, 2005; Logan, 1995b). In addition, Vietnamese economy under the state command mainly served the wars. Hence, self-built housing was abandoned in the North of Vietnam while the state fully controlled housing production. The only

housing style in this period was the collective apartment, which based on housing model of Soviet Union. Thus, the design of collective apartments was not likely to be a result of the transformation of agricultural buildings or historical housing in Vietnam; rather, it mainly derived from the economic-political ideologies.

4.5 Changes in the built environment in Hanoi city since the economic reform in 1986

4.5.1 Changes in the housing policy since the economic reform in 1986
An economic reform was introduced in 1986 with the goal of creating a socialist-oriented market economy. After the war ended in 1975, Vietnam faced an economic crisis due to war devastation, economic mismanagement, trade embargo and political isolation. The inflation rate reached to three-digit, and Vietnam was considered as one of the poorest countries in the world at that time (Tram, 2013). From the 6th National Congress of the Communist Party of Vietnam in 1986, the Vietnamese government introduced an economic reform known as "*Đổi mới*", which shifted from centralized planning to a decentralize transitional economy (Harrington, 1994). As a result, a foreign investment law was enacted and the private corporations were legitimized.

Apart from changes in the economic system, there have been changes in housing policies as well. Before the economic reform, a housing model was based on welfare system. Collective apartments were directly distributed to state officials according to their work units. The state had special housing agencies to build collective apartments in compliance with periodic five-year social economic plans. Despite its meaningful objectives, the welfare system suffered from various drawbacks (Ngo, 1998; Koh, 2006, Logan, 2000 and Yeung, 2007).

Firstly, the idea and planning of the collective housing theoretically aimed to provide good living areas; however, housing was poorly constructed in practice (Ngo, 1998; Koh, 2006). Admittedly, housing was considered as a social service; however, house-users had little voice in the housing design. Typically, the collective apartment targeted low-wage households. In addition to a restricted state budget for housing, the rent payment was not sufficient to cover the cost of housing maintenance. As a result, a number of buildings became quickly downgraded after several years (Ngo, 1998). In addition, many housing areas did not have green spaces and necessary facilities and infrastructure (Yeung, 2007).

Secondly, according to Turner (1980), under the central supplied housing system, housing problems are mainly physical standards and financial issues. When the meaning of housing is misunderstood, the building methods are limited in producing and maintaining physical elements while keeping the cost down by the use of industrial materials. On the other hand, house users may have different

practical needs and priorities in using their houses. Especially, after 1975, people returned to city and expected a better quality of housing. Nevertheless, the central supplied housing system in general did not satisfy the requirements of house users (Koh, 2006). Particularly, the family size increased while the size of allotted flat did not. Several family generations had to live a small apartment. Besides, in those flats built in 1960s, most families had to share kitchens and toilets with other households. The increasing demand on bigger living spaces and on privacy resulted in the encroachment on common public spaces with illegal structure (Koh, 2006; Ngo, 1998 and Dinh, 2011).

Thirdly, the state was in short of funding for housing. During wartime, the state allocated main parts of its resources to national defence. Consequently, during the early 1980s, it was estimated that only 30% of government officials could stay in collective housing while the rest had to live in extreme conditions in existing housing stock. Specifically, Logan (2000, p 223) highlighted that:

> "The *Vietnamese Architects' Association estimated in 1991 that over 100,000 people were living in temporary shelters. The narrow tube houses, originally designed for a single extended family, now held four or five families; French villas accommodated up to 120 people each… the apartment blocks also now accommodate far more residents than was originally intended*".

In order to solve those issues, the institutional responses went to the route identified with increasing degree of pragmatism (Nguyen and Kammeier, 2002). Thus, since the economic reform, housing sector has been transformed from the welfare system, in which state monopoly controlled the supply and resource, to the market-oriented system. Within the new system, both private and state sectors were encouraged to produce housing. In March 1991, the state issued the Ordinance on Residential Housing recognized the right of private ownership and private participants in housing sector. A key provision stated that:

> "*The State encourages and make conditions favourable for every organisation and individual to maintain and develop the residential housing stock. Any organisation or individual can conduct businesses in residential housing through building, renovating houses for sale or for rent, and other housing business activities as stipulated by law*"[15]

Within the new system, the provision of welfare social housing was completely removed in 1992. Since then, individual and organisations has become main contributors to produce housing while the state control planning and regulation.

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[15] Translated version in Koh, 2006, p 220

Apart from changes in the housing provisions, since the economic reforms, a number of new laws have been introduced including the Land Law. The new law provides the legal framework for the ownership, lease, use and management of urban housing (Nguyen and Kammeier, 2002; Tran and Yip, 2015; Gillespie, 1995). During the period from 1954 to 1986, land management was controlled through the socialist legislation. Accordingly, no private rights in land were legally approved. After the reform in 1986, land is recognized as a property of people, and it is subject to the exclusive administration by the state. However, the Law of Land is introduced to separate the right of land use from the land ownership. Particularly, table 9 shows housing ownership in Hanoi city during the period from 1989 to 2005. The rate of private housing ownership has increased dramatically from 47.3% in 1989 to 95.5%. Notably, housing constructions are majorly funded by their residents (Table 10).

Year	Location	Privately owned	Rented from government (%)	Others
1989	Urban districts	47.3	48.1	2.4
1999	Urban districts	76.3	18.3	0.5
	Rural district	63.1	29.7	0.6
	Hanoi total	92.0	4.8	0.2
2005	Urban district	91.5	3.8	1.5
	Rural district	91.3	4.4	0.8
	Hanoi total	95.5	1.7	0.4

Table 9: Housing ownership in Hanoi (Tran and Yip, 2015, p 315)

Source of funding	1995	1997	1999	2000
Central government	3.9	4.8	3.3	10.4
Local government	96.1	95.2	96.7	89.6
Central budget	-	3.9	-	2
Local budget	-	-	2.5	4.2
Other capitals	2.1	-	2.6	-
Self-built by residents	65.7	73.7	79	74.8
Big capital	1.7	2.3	-	-
Capital for building house for sale and mobilized joint-venture	26.6	15.3	12.5	8.6
Total	100	100	100	100

Table 10: Differentiation of local construction of new residential areas in Hanoi during 1995-2000 (JBIC, 1999, p92)

4.5.2 Influence of private sectors and market forces on urban planning and housing development since the economic reform in 1986

Opening the country to the global economic system after 1986 introduced elements of market economy and reduced the direct controls of state. Hanoi city is one of the two largest cities in Vietnam, and it contributes substantially to the economic sectors. Therefore, since the economic reform, planning policies aim to promote as modern international city and economic centre. In this regard, Hanoi and Ho Chi Minh City (HCMC) are only two cities has status of special cities[16].

The political and economic changes have led to considerable spatial transformation in Vietnamese cities. Both marketization and decentralization have boosted the foreign and private development in the national economy. Hanoi, the capital city of Vietnam has experienced rapid growth regarding physical, economic and socio-cultural development (World Bank, 2011; Nguyen and Kammeier, 2002; Van Horen, 2005). Before the reform, the government concentrated on controlling urban growth using Soviet principles, and the local governments-controlled resources. The strategies promoted the goals including the redistribution of population away from large cities, control of migration to city and encouraging the development of small town. Nevertheless, the Soviet plans were considered as abstract and unsuited to the actual conditions of the city in the late 1980s. In this regard, since the economic reform, the government attitude towards revision and development of urban and regional plans, and private developers are encouraged to invest on urban projects.

Particularly, table 11 shows that during the first decade since the economic reform, the sources of urban development came directly from foreign investment from major economies of East and South-East Asia. The five largest investment sources (Singapore, Taiwan, Hong Kong, South Korean and Japan) accounted for more than half of all registered foreign investment. Meanwhile, 90% of those foreign investments concentrated in Hanoi and HCMC (Smith and Scarpaci, 2000).

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[16] Officially, the current Vietnam urban classification system had six classes of urban centers, which is determined by different levels of economy, physical development, population and population density, non-agricultural labor, infrastructure and urban architecture and landscape (The Prime Minister, 2009). The highest class is the special cities while the lowest class was small townships. Hanoi and Ho Chi Minh are special cities due to their unique economic and political contributions. For details of Vietnamese urban classification system, please see World Bank (2011, p 10-14).

Source	1988-96	%	1996	%
Singapore	4322.3	16.0	2763.6	32.5
Taiwan	3917.3	14.5	783.2	9.2
Hong Kong	3116.8	11.6	1258.4	14.8
Japan	2400.1	8.9	591.2	7.0
South Korea	2261.3	8.4	826.2	9.7
Virgin Islands	1486.3	5.5	383.1	4.5
Australia	1074.3	4.0	48.1	0.6
France	979.2	3.6	101.7	1.2
United States	849.0	3.1	92.8	1.1
Malaysia	773.8	2.9	88.5	1.0
Thailand	760.9	2.8	255.1	3.0
Panama	655.4	2.5	637.0	7.5
Other	4367.6	16.2	688.4	7.9
Total	29 974.3	100	8497.3	100

Table 11: Sources of foreign investment during 1988-1996 (Leaf, 1999, p 307)

Although private sectors could participate in urban projects, Hanoi city faced various challenges during transitional period (1986-2000). Firstly, financial crisis in Asian in 1997 resulted that most of foreign investors withdrawn their plans from Vietnam; since then, urban development generally replied on state-owned enterprises (Geertman, 2003). Nevertheless, there was lack of funding and investments for urban development, particularly for basic services such as water supply, sewerage and waste disposal (Yeung, 2007). Secondly, it is worth noting that fewer restrictions on the movement of good, capital and labour had caused rapid urbanisation process. During the late 1980s, Hanoi city was one of the most highly concentrated cities in the world. Thirdly, along with high density of population and lack of funding, state management was weak. All of those reasons resulted that urban conditions in Hanoi regions were very poor during transition period from 1986 to the early 2000s. Particularly during the early 1990s, water supply replied on underground water; as a result, various urban areas were without water during summer months. Meanwhile, wastewater was discharged without treatment into rivers, leading to hygienic problems.

In term of housing, various scholars also emphasised on illegal housing in urban areas in Hanoi (Smith and Scarpaci, 2000; Koh, 2006; Tran and Ngai, 2017). During the late 1980s, housing conditions in Hanoi were both poor and insufficient with only 4 square meters per capita (Koh, 2006, p 222). In this regard, households often

extended or build construction without building licences[17]. Therefore, much of building activities during the late 1980s and in the early 1990s are illegal.

In 2008, a new master plan was introduced. Within new plan, the city boundary expanded to nearly 3.344 square kilometres (Leducq, and Scarwell, 2018). A master plan bordered with the *Thái Nguyên* and *Vĩnh Phúc* provinces to the north, *Bắc Giang, Băc Ninh and Hưng Yên* provinces to the east, *Ha Nam* province to the south, and *Phú Thọ* and *Hoà Bình* provinces to the west. According to the plan, there are five main satellite's towns in *Sơn Tây, Hoà Lạc, Xuân Mai, Phú Xuyên* and *Sóc Sơn*. The city core lied in the South of red river bank. Although the border of Hanoi city is very large; however, the actual urban built-up areas was around 303,62 km2 while the rest were agricultural land and traditional villages. The metropolis was divided into 12 urban districts inside them; the boundary of districts and wards were based on number and density of population (Figure 47).

The new master plan of the city centre also focused on an expansion of city centre to other bank of red river in the North and areas in the South and West of city core. Urban areas are grouped in specific zone; each zone has its own detailed plan and spatial development such as road network. For example, the old areas are controlled to redevelop decay building's area step by step though regulations and extensive planning while new urban areas are planned and developed by private developers in the outskirt of city, between existing urban settlements and peri-urban villages (Figure 48).

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[17] For details, please see section 4.5.3.1
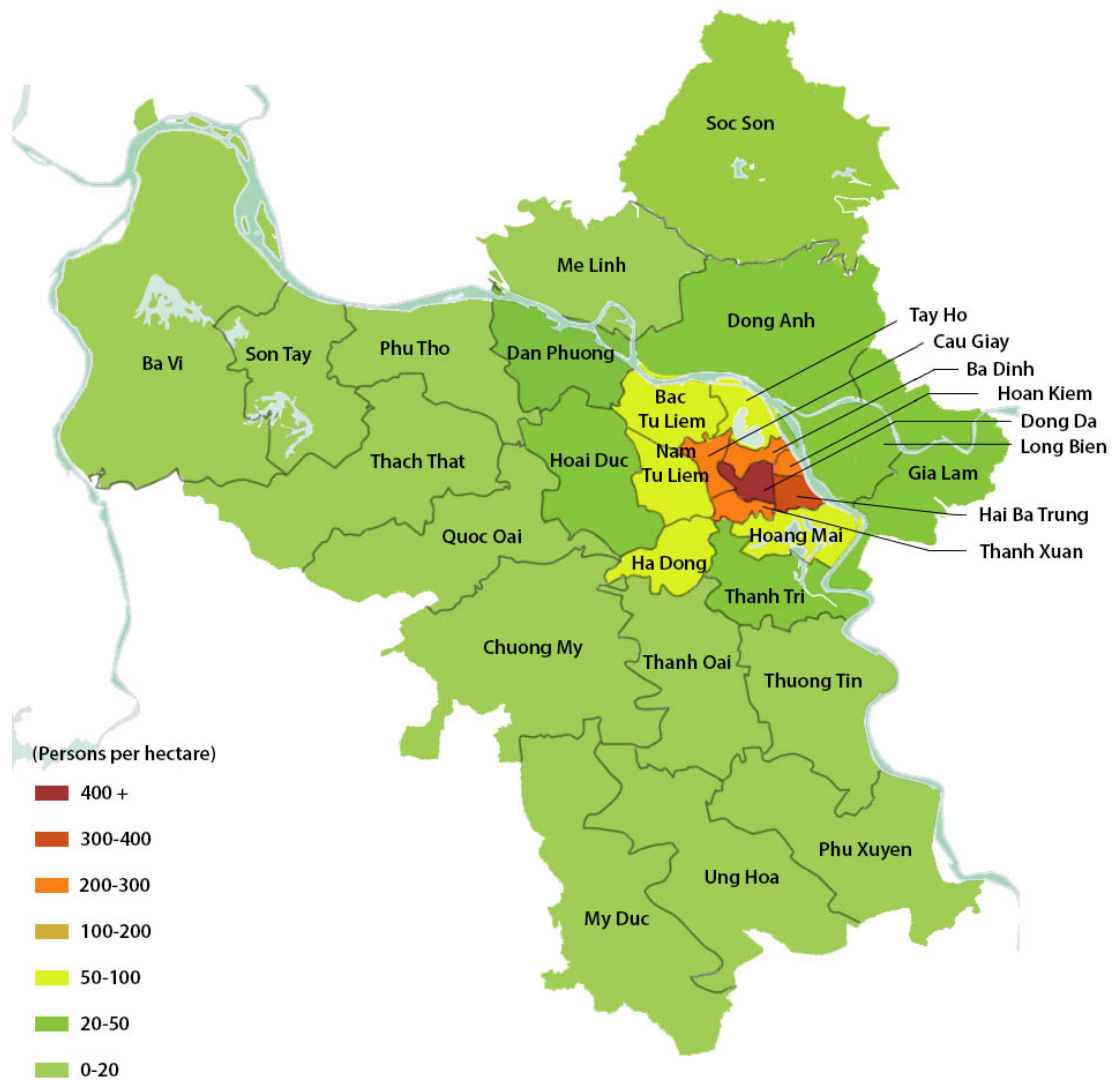
Figure 47: Population density in Hanoi city (Drawing by author, based on information in Leducq and Scarwell, 2018, p 72)

Legend:
- Historical areas
- I Citadel area
- II Old quarter
- III French quarter
- Old urban residential areas and village
- Living quarter/ Khu Tap The
- New urban area
- Agriculture land, park and public spaces
- Water surface
- Other land use

2   0 km

Figure 48: Planning of city centre (Drawing by author, based on satellite image in 2018)

4.5.3 Overview housing characteristics since the economic reform in 1986 in Hanoi city

This part reviews development of housing in Hanoi since the economic reform in 1986 in the literature. Accordingly, the architectural studies of contemporary housing could be grouped into two main topics focusing on influence of economic

changes on housing design in historical quarters and appearance of modern housing types built by private developers. For details, this part had two sub-sections. The first sub-section shows ideal of modern housing due to economic changes and transformation of housing in Hanoi regions. The second sub-section highlights development of modern communities and housing built by private developers in Vietnam.

4.5.3.1 An influence of new economic system and living styles on housing in existing urban areas

Owing to changes in economic policies, there is an emergence of new middle classes in Vietnam. During the central economic planning (1954-1986), the state applied the socialist ideology. Thus, the private economy and capitalism were totally eliminated. In addition, the main occupation was relevant to farming, fishing, local crafting and trading activities. On the other hand, after the economic reform in 1986, private ownership gained popularity in most of economic sectors and industries. The involvement of private sector in economy has influenced the old socio-economic structure. Specifically, according to the Vietnamese general statistics office (Table 12), in 1986, agriculture, forestry and fishing contributed around 38% of national GDP. However, this number decreased considerably to nearly 19% in 2009. On the other hand, services and industrial sector saw an increasing trend. For example, contribution of service to GDP rose from 33% in 1986 to 43% in 2015. Industrial sector contributed 29% to Vietnamese GDP in 1986, while in 2009 it contributed around 37%. In addition, around 90% of employed population are moving to cities or industrial zones to work for non-state companies (GSO, 2018). Due to better salaries, many workers would be able to set up their own business. This led to the emergence of new middle-class including entrepreneurs who had knowledge and experience in their fields through education and practical training. New business class has leaned toward Western and global culture.

Sector value-add as percentage of GDP	1986	1990	1995	2000	2005	2009
Agriculture	38.06	38.74	27.18	24.53	19.30	19.17
Industry	28.88	I22.67	28.76	36.73	38.13	37.39
Services	33.06	38.59	44.06	38.74	42.57	43.44
Total	100	100	100	100	100	100

Table 12: Changing economic structure of Vietnam (Based on GSO, 2018)

With the new economic and social conditions, the new living style of new class has influenced the built environment in both direct and indirect ways (Geertman, 2007; Waibel, 2006 and Herbelin, 2013).

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Firstly, during the rationing period, under the state control, the principle of equal property was restrained and restricted. Thus, the inequality between the rich and the poor was not significant. On the other hand, since the economic reform, the economy is based on market system. That results in a transition of Vietnamese culture and its urban lifestyle. For example, Geertman, (2007) shows that the government attitude is in support of private wealth reflecting through a well-known slogan, i.e. "*Dân giàu nước mạnh*" (In English: *rich people make a powerful country*". Thus, the Vietnamese citizens are becoming the consumer society and old personal value's system is becoming disappeared. The modern society focuses strongly on development of individualism. Therefore, entrepreneurs and new middle classes have invested in their houses to make them distinctive. The idea of modern design or "*Nhà ở hiện đại*", which applied permanent materials and architectural styles, became popular trend to reflect wealthy and personal identity of the house owners

Secondly, the use of housing has changed significantly since the economic reform. Under the central economic planning (1954-1986), housing was ranked fourth in priority, after food, industry and infrastructure. The fund for housing construction was estimated around 3% to 4% of the total state investment (Koh, 2006, p 214). Basically, a house during the central economic command period meant a shelter for protection. On the contrary, the new market economy since 1986 provided new expectation about housing. A house could be used for multiple family purposes such as living spaces, financial security, workshops and commercial activities.

Thirdly, the contemporary housing has decorative elements borrowing from the French architecture or other Western countries owing to influence of global culture. For the reason, modern styles are deemed to demonstrate power and wealthy of new middle-class (Herbelin, 2013). Meanwhile, a preference for international architecture is in large-scale public projects. The Vietnamese government has commissioned international architectural firms to design a number of high-profile public projects such as Vietnam National Convention Centre, the National Assembly building, Keangnam Hanoi Tower, Lotte Centre and Hanoi museum. Those buildings have transformed the image of Hanoi from a socialist city into a global metropolis. As a result, the Vietnamese contemporary architecture is considerably influenced by cutting-edge international styles.

Fourthly, the house often combined with new spaces for modern needs. According to Geertman (2007), since the economic reform in 1986, people can easily access information from Internet and public media; therefore, an ideal of house has changed owing to new information and new living styles. The Vietnamese start to explore new culture, and to travel around the world come up with new experience. When coming back to Vietnam, they introduce new living styles to their home. Therefore, a range of new architectural styles appeared. In a typical Vietnamese street, none of an individual building design is similar with each other.

Finally, a popular Vietnamese proverb indicates that house is one of three important events in the life of a ma, namely *"Building a house, getting married, and buying a buffalo"*. Thus, renting houses is quite unpopular in Vietnamese culture while home ownership is regarded as the most important asset. Moreover, during the transitional period, people in general do not trust the banks and other public institutions (Geertman (2007); thus, they invest directly in real estate. A house has an implicit meaning, which is an important financial resource. A number of houses turned into small workshops, offices, shops or family-run restaurants. During the Asian economic crisis in the 1990s, the income from these above commercial activities became more significant for daily expenses. Typically, those houses locating in the main streets are golden land for business and investment.

Due to those changes in economic sectors and living styles, since the economic reform, historical town and French quarter have experienced remarkable transformations (Dinh and Groves, 2006; Waibel, 2004; Nguyen and Kammeier, 2002; Surborg, 2006; Parenteau et al., 1995). Those areas become new commercial business districts. When the inhabitants have saving, they start to renovate, rebuilt and upgrade the old buildings. The housing transformation in historical quarters could be summarised in two main phases:

The first phase was an increase of unregulated and illegal buildings during the 1990s. Within economic market system, a restaurants and public consumption had formed along main streets. A profit from business let families living in historical quarters to improve their living conditions by reconstruction. Despite that, the reconstruction of residential buildings had seriously endangered characters of historical quarters. During transitional period (1986-2000), there was a lack of planning, guideline and building regulations to protect the historical quarters. As a result, open spaces and courtyards were converted into indoor living spaces. Meanwhile, during the wartime (1954-1975), there was lack of maintains resulted in old and decay buildings. Also, the building certificate often took a long period of time. Therefore, households generally replace old parts of buildings with new structure using permanent materials such as concrete, steel and glazing. In many cases, households were able to demolish historical building and rebuild the new buildings to four or six storeys (Waibel, 2004).

Figure 49: Newly-built housing in the historical trading quarter

The second phase happened when the local authority, international experts and organisation recognised the potential of the historical quarter in the early 1990s. A draft plans to rescue an historical area was issued in 1993 (Logan, 1995a). The plans included preserving historical buildings, drawing construction guidelines and reducing density of population. Despite having good plans, the implementation of plans delayed for several reasons (Waibel, 2004). Firstly, due to self-organised structure during transitional period, fragmented plots represented a large obstacle to implement large-scale planning. Secondly, city administration lacked the financial resources for resettlements and redevelopment plans. Thirdly, inhabitants did not want to move to new resettled projects. Finally, there was a lack of institutions and suitably qualified staff in the field of architecture and town planning to implement redeveloped projects. Consequently, although various studies have highlighted development strategies for historical urban areas, in common, the reserved plans only principally focus on renovation projects of traditional buildings including pagoda, temples, historic communal buildings and important historical houses.

Apart from historical areas, the transformation of housing in other urban areas of Hanoi city also gains attention by various scholars (Kien, 2008b; Koh, 2006; Gough and Tran, 2009; Tran and Dalholm, 2005; Dinh, 2011). According to Kien, 2008b, most old houses are replaced by new constructions using permanent materials including concrete and brick. The house is built based on traditional tube house form, which are long and narrow. Nevertheless, the number of storeys is between from two to five. Ground floors consist of store and shops while the upper floors are private family spaces.

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Physical transformation of housing is not only happened in the existing historical urban areas, but also appeared in the living quarters during the 1990s (Gough and Tran, 2009; Tran and Dalholm, 2005; Geertman, 2007 and Dinh, 2011; Koh, 2006). In common, due to inefficient spaces and family growth, households use different tricks to extend their living spaces (Figure 50). Households living in the ground floor often extended part of their apartments to public yards or alleys. In the meanwhile, households living in the upper levels built suspended balconies namely the tiger cages or "*Chuồng cọp*" in Vietnamese, without supported structure below.

Figure 50: Extensions in the collective apartments in KTT

4.5.3.2 Housing built by developers

Due to the market system, various new types of housing and communities have been introduced since the economic reform in 1986 by private developers, particularly by foreigner developers (Tran, 2014; McGee, 2009; Nguyen and Kammeier, 2002; Logan, 1995a; Yeung, 2007; Waible 2006). As describe in the previous part, during socialist command economy period (1954-1986), the urban landscape was identified with collective apartment, industrial factories and

buildings reflecting socialist architectural styles. In this sense, all buildings had to follow uniform and form of building was designed regarding on horizontal dimension. On the other hand, since the economic reform in 1986, foreigners and organisations from economic market system are invited to setup the urban plans and development strategies (Haidep, 2007; UN-Habitat, 2014). Practically, information and indicators on other similar cities are using to compare and serve as a tool to monitor specific concerns and long-term issues. The government attitude moves forward from low-rise housing to high-rise buildings, which are indicator and symbol for success in other developing countries in the Asian regions such as Hong Kong and Singapore (Geetman, 2007, p 273-290). In this regard, urban fabric is formed in vertical dimension and the number of high-rise apartments rises quickly.

KDTM's name	Slogan
Ciputra	Ciputra Hanoi: International city
Ecopark	Thành phố xanh tươi, cuộc đời trọn vẹn
	(Green city, life is full)
Vinhomes riverside	Biệt thự ven sông phong cách sang trọng
	(Luxury riverside villa)
	Xứ sở thanh bình
	(Peaceful land)
Timecity	Phong cách sống resort trong lòng đô thị
	(Lifestyle as resort in the heart of the city)
	Thành phố của thời đại mới
	(City of the New Age)
The royal city	Thành phố hoàng gia đẳng cấp sống thời thượng
	(The royal city lives up to its name)
	Thành phố Châu Âu thu nhỏ
	(The miniature European city)
Vinhomes gardenia Cau Diem	Đẳng cấp vượt trội
	(Superiority)
Hanoi Garden city	Biệt thự đẳng cấp - Mái ấm hoàn thảo
	(Luxury Villa – Perfect Home)
Park city	Ý tưởng độc đáo về những ngôi nhà trong công viên
	(Unique idea about the houses in the park)

Table 13: The names and slogans of the new urban areas containing finishing houses (Author collection from housing advertising leaflets)

In term of urban housing, housing projects are designed by private developers. In order to maximise profits, the design of buildings is based on Western styles or international styles to reflect wealthy living styles, and to promote property sales. For instance, names of various new residential areas in Hanoi city are in English to attract customers. The slogans and images for advertising are normally related with modern life styles, orderly neighbourhoods and comfort (Table 13). Meanwhile, those new urban area often have international schools and shopping malls to attract buyers.

For details, since the economic reform in 1986, industrial zones have been planned in the rural areas (World Bank, 2011). Thus, sites of old industrial areas become golden place for commercial estate. Those sites generally have been redeveloped to become modern and high style residential neighbourhoods. For example, Royal City and Time City are two of the first complex residential areas building in old industrial zones (Figure 51). The plans of both Royal City and Time City aim to create international living environment that is attractive for high-income groups. Therefore, both areas are designed with underground shopping malls, supporting commercial services, international schools and high-rise apartments.

Figure 51: Royal City (Left) and Time city (Right) before and after developing.

Beside high-rise and complex buildings, a new form of communities with international styles has been introduced in Vietnamese cities. For example, Ciputra Hanoi International City locating in the West of Hanoi city was invested by a joint-venture company making from Indonesian property developers Ciputra Group and Urban Development and Infrastructure Construction Company. The project covers

an area of nearly 405ha with high-rise apartment blocks, villas, offices, health centre, sport centre and park (Figure 52). The planning and housing design applied western architecture styles, and the project is surrounded by high walls and gates. According to Waible (2006), this neighbourhood type has become gate communities in Vietnam. Although walls and gates are not new for controlling though historical development of architecture, the current gate community is believed to create segregation between different social groups rather than for protection. Therefore, in Vietnam, the conceptual design and implementation of new residential projects can be interpreted as symbol for the political wish to be part of globalising modern community (Leaf, 2015). The planning of new neighbourhoods often inspired from international planning, driving under market forces (Labbe and Boudreau, 2011). Although the planning authorities intend to provide a mix-social structure in new urban areas, the purpose failed due to the market system. Practically, the developers target wealthiest residents result in that the built environment in those areas is frequently borrowed from Western and high-living styles. The most popular housing types are villa and luxury high-rise apartments.

Figure 52: The plan of new urban area - Ciputra in Hanoi (From brochure of the Ciputra project)

Generally, this part explains the social and economic changes since the economic reform in 1986 and the characteristic of contemporary housing in the urban areas of Hanoi city. Owing to poor housing conditions during the 1980s, new housing policies and development strategies have been introduced to allow private sectors, including public developers, individual and households, to participate in housing projects. In this regard, households could able to design and build the house by themselves in their own plots to meet their own requirements of living spaces.

Therefore, the design of contemporary housing is significantly influenced by new socio-economic situations. In all urban areas, households always attempt to rebuilt and upgrade their houses through different methods. In the meanwhile, new types of community and neighbourhood start to emerge.

4.6 Summary

The built environment of Hanoi city has been based on four main cultural influences including Chinese rule and feudal Vietnamese dynasties, French colonial rule, Soviet influence and the current "*Đổi mới*" period since 1986 (Logan, 2000). All of these influences have been very different; however, they made substantial impacts on the urban fabrics and the forms of residential buildings in the city. This chapter discussed the form and hierarchical spatial layout of housing in different periods. Meanwhile, this chapter helps to explain why self-built housing became popular in Vietnam.

This chapter discussed different urban fabric in respective historical urban development processes. In addition, it also highlights the housing policies and general characteristics of urban housing in Hanoi city before and after the economic reform in 1986. There is five parts in this chapter as follows:

The first part of this chapter illustrated the Vietnamese society and early housing forms. Particularly, during the ancient time, the Vietnamese society emerged in the mountainous areas and most of people lived in pile houses. From 5,000 to 2,000 BCE, the tribes moved to the Red River delta and created village communes. Houses in the traditional rural village were simple given the respective social ideology and available materials. In addition, rather than building a house over the piles, rural housing is built in the ground.

The second part highlighted the development of Hanoi as economic, political and socio-cultural centre during the Vietnamese feudal period and its connection with design of traditional tube house. During ancient time, Hanoi was central development of region. Until in 1010, the king citadel was established in Hanoi, and city became the capital city in Vietnam for many centuries. The establishment of the citadel is believed to be based on Feng Shui principles to create harmony place between man and nature. Besides citadel, the traditional quarter was naturally developed owing to location as marketplace and trading activities rather than formal planning by institutions. When moving to the city, people who shared similar craft skills live in one street and setup their own community. Within the traditional quarter, the traditional houses rooted from the living style of rural communities and under the influence of conditions in marketplace; as a result, the urban town houses were formed in the shape of tube, which is long and narrow. Also, there was a mixed function in the traditional tube house: living spaces and commercial areas.

The third part highlighted the French influences during colonial period (1858 to 1954). During the colonial period (1858-1954), Hanoi was selected as the capital of Indochina. In this regard, the planning system aimed to create duplication of Paris in Indochina, and the residential areas were planned by the local institutions rather than spontaneous developments. Also, there were various changes in building

materials and living styles of local inhabitants. As a result, the colonial town houses applied French motifs in their decoration while large living room became popular. Although there are various changes in housing design, the form of buildings and ventilation system was borrowed from the Vietnamese traditional tube-house.

The fourth part explored the Soviet influence (1954-1986). During the central economic command period (1954-1986), Vietnam applied Soviet ideology in its urban planning and housing model. Particularly, the collective apartments were built by state agencies under the influence of Soviet architectural principles. Meanwhile, the self-built activities by people were banned. Thus, the mass design of collective apartments was not likely to be a result of the transformation of agricultural buildings or historical housing; rather, it mainly derived from the economic-political ideologies.

The last part investigated changes in urban planning system and general characteristics of contemporary housing since the economic reform in 1986 in Vietnam. During the late 1980s, there were various issues with the collective housing system, which was based on the central economic planning. In this regard, after the economic reform in 1986, new housing policies and laws have been introduced to encourage households and private developers to involve in housing projects. The role of state is limited in preparing general planning of city and regions and regulations, and it no longer deliveries the urban housing projects. The changes in housing policies and planning system create dynamic housing environment. For the households, owing to poor housing conditions and housing shortage and socio-economic changes, households start to redevelop their houses; even though many of building activities are considered as illegal construction. Besides, new types of housing, such as high-rise apartment and villas in gate communities, have been introduced by private developers.

In essence, this chapter contributes to the deeper understanding of urban housing through reviewing the built environment of Hanoi city. The urban environment of Hanoi city is influenced by different cultures. Each culture creates particular ideology and framework for urban settlements and housing characteristics; thus, the studies in this chapter demonstrate that traditions embedded in the housing design and construction are not fixed but should be considered as a process of learning, changing and adaptation in different living conditions and built environment.

Meanwhile, the outcome of this chapter also highlighted the popularity of self-built housing is owing to various problems of housing policies during the central economic planning. Thus, since the economic reform in 1986, new policies and laws have been introduced to encourage households to participate in housing process.

Although this chapter explains the urban environment in Vietnam before and after the economic reform in 1986, this chapter does not explain urban settlements in Hanoi city and detailed characteristics of contemporary self-built housing. For that reason, the next chapter will provide detailed information about urban neighbourhoods and characteristics of case studies of self-built housing in Hanoi city since the economic reform in 1986.

CHAPTER 5 DEVELOPMENT OF SELF-BUILT HOUSING IN HANOI SINCE THE ECONOMIC REFORM IN 1986 IN VIETNAM

This chapter explains the urban settlements and characteristics of contemporary self-built housing in Hanoi city. Particularly, when designing a house, household do not only have to deal with internal spaces but also with external influences such as urban living conditions regarding neighbourhood and city scales. It means that house must be viewed as part of a larger system. For example, various relevant factors such as street, landscapes and infrastructure and services might significantly influence on characteristics of housing design (Rapoport, 1977; Towers, 2005 and Siksna, 1998). Thus, when building houses, households do not only plan the living spaces, but household also create physical boundary in responses to surrounding living environment. This chapter shows detailed connection between planning of urban settlements and self-built housing in Hanoi city since the economic reform in 1986.

This chapter has two purposes. Firstly, this chapter explores three different types of urban settlements in Hanoi city namely work-unit area, new urban area and urban village. Although the morphology and background of those neighbourhoods are different, they share several similarities regarding the role of developers to create planning and to provide infrastructure and services to each housing plot. In addition, in those settlements, households are free to make decision in design and construction process. Secondly, this chapter shows characteristics of case studies in Hanoi city. Each case study has various distinct characteristics regarding detailed designs, form and spatial organisation despite having similar housing plot's typology, which is long and narrow. The differences are mainly based on different background of neighbourhoods and household's choices. The finding of this chapter argues that the state and public developers are crucial to improve living conditions of self-built housing area. Without supporting regarding planning, infrastructure and services, areas of self-built housing could quickly turned into unhealthy living areas.

This chapter is organised into three sections. The chapter starts with development of self-built housing in Vietnam since the economic reform in 1986. The second section introduces overview characteristics of three urban neighbourhoods and its housing in Hanoi city. The last section highlights general characteristics of collected cases of self-built housing.

For the purpose of analysis, observation data including map and images was used to illustrate the built environment. The details of location of observation area could be seen in appendix D.

5.1 Development of self-built housing in Hanoi and Vietnam

In order to control housing standard and quality of construction, since the economic reform in 1986, new housing provision has been established. The housing provision generally could be classified into four main housing models (Nguyen & Kammeier, 2002, p 382-383).

The first model is State and People partnership (in Vietnamese: *Nhà nước và nhân dân cùng làm*). This model has been used to solve the problem of housing shortage since the economic reform. Within this model, house owners provide financial funding and labours while the state contributes land, essential infrastructure, services and materials. According to Koh (2006, p 219), the residents have responsibility for building and improving their houses. All new constructions have to follow the state plan in housing. In the old apartment buildings, the model is in the form of repainting and building toilets and amenities in older flats.

The second model is self-built housing by government agencies and state-owned institutions. This one addressed the problem of housing shortage through the form of working-unit housing from the late 1980s to the middle 1990s. Owing to the financial supports from the government, state-owned enterprises created their own fund for housing production. State enterprises had to build and allocate the houses to their employees.

The third model is self-built housing on subdivided land. This model is similar with the "*site and services*" models in other developing countries (Hoang, 2002). The concept is based on the idea of Turner (1976) regarding the housing solutions for low-income groups. Construction companies have responsibility to develop the land with basic services, infrastructure and facilities. Then, sub-divided plots are sold to households to build their own homes. This model was applied from early 1980s to the mid-1990s to solve issues of housing shortage. Nevertheless, due to uncontrolled housing standard, poor infrastructure and inefficient land use, this model was soon removed and being replaced by the new housing model in the form of comprehensive projects.

The final model is housing in comprehensive housing projects, which have been applied since 1996. The model aims to increase government control over urban development through large-scale housing projects. All projects are organised under the planning system. The housing projects must have social and technical plans and integrated provision with infrastructure and facilities. All plans have to be approved by local authorities. In practice, developers have responsibilities to developed areas, and they could sell the housing. The owners could finish or built the house by themselves.

As a result of new housing provision, number of self-built housing construction has quickly increased in Vietnamese cities. Some scholars highlighted that self-built

houses sprouted like mushrooms after the rain (Ngo, 1998, Geertman, 2003). Particularly, table 14 shows area of housing construction in Vietnam from 2005 to 2016. Most of land area for housing is self-built area.

	2005	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Apartment	1,592	2,359	2,058	3,409	4,559	4,219	1,844	3,361	2,326	2,324	2,982
Privately self-built house	31,778	48,776	55,853	64,801	81,326	80,147	79,469	83,260	87,517	91,098	99,506
Total	33,370	51,135	57,911	68,210	85,885	84,366	81,313	86,621	89,842	93,422	102,488

Table 14: Area of housing constructions in Vietnamese cities from 2005 to 2016 (GSO, 2018) (Unit: Thous.m2)

5.2 Urban neighborhoods and typology of self-built housing in Hanoi

This part highlights the urban residential structure and sense of neighborhoods having self-built housing in Hanoi city. Based on responds of households, urban neighborhoods having self-built housing could be classified into three types namely work-unit area, new urban area and urban village. Housing design in those urban areas are mixed between different housing models. The following section will explain details characteristics of each neighborhood type and its housing (Please see appendix D for location of examples of urban neighborhood in Hanoi city).

5.2.1 Work-unit areas

Due to changes in housing policies and living styles, the socialist housing area has experienced rapid transformation since the economic reform (Bui at el, 2005; Oka at el, 2007). During central economic planning period (1954-1986), numerous areas around city were planned as the collective quarters; however, due to lack of capital and resources for housing construction and bureaucratic system, various housing projects were delayed or cancelled. In order to solve the housing issues, during the late 1980s, new model of self-built housing developed by government agencies and state-owned institutions, was applied. Basically, state directly distributed the land to state institutions such as universities, state enterprises, armies and research centres. The institutions have full rights to manage and to approve renovated plans without needing local authorities' approval. Most institutions renovated the original plans by adding self-built housing plots in their areas. The institutions had responsibility to develop essential infrastructure and facilities. After that, they could sell the housing plots. Most housing plots were directly sold to employees of the institutions. The buyers had responsibility to build or to upgrade the house using their own finance and resources. For example, one interviewee revealed that:

> In the old day, this district had very few state companies. Then, the
> companies locating from inner city moved out to this outskirt district.

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Each company had parcel of land for its own employees. My wife was employee in the National Academic of Politics. Thus, she was distributed this plot for living from her company [...] Before that, this area was just an agricultural land for banana trees.

<div align="right">

N. K. Anh, interview in 04-09-2017

</div>

For details, the following part shows three examples of work-unit area and their living environment.

Figure 53: self-built housing area in a work-unit area (Edited by author, adapted from information from Hanoi Department of Natural Resources and Environment)

Firstly, figure 53 is an example of self-built housing area developing by state institutions locating in the South of *Thành Công* living quarter. Before the economic reform, there were several state institutions situated around this area. This area also contained the collective apartments. During 1990s, this area was renovated. The self-built housing was added between institution's buildings and the collective apartments. Networks of small alleys were created around the neighbourhood; each alley has three to four meters wide. Along the alleys, plot of self-built housing had similar size. During the 1990s, each household in this area was able to build one-storey construction. The layout of living space was similar with spatial organisation of traditional house in the historical quarter. A frontage was a living

room while kitchen and toilet were in the rear. Since 1988, when the Land use rights were issued, households bought the housing plot from their institutions. Most households were able to replace old house with new multi-storey building using concrete structure (Figure 54).

Figure 54: Housing in work-unit area. (Right) A row of self-built housing, (Left) An old one-storey house was built during the early 1990s.

Secondly, although state institutions had responsibility to create new plans, various areas have poor planning. Particularly, figure 55 shows another area, which locates in the South of the National Economic University. During central economic command period, this area was used as living areas for the employees of the university and institutions nearby. The apartments and public buildings were built in the East of block while the West area was planned as football fields. Currently, the existing collective apartments and public buildings in the East are evidence of past planning. All collective apartments have similar form and orientation. Besides, since 1986 to the early 1990s, original plan had been renovated. The area of football fields had been replaced by rows of self-built housing. Due to lack of funding and poor regulation during transitional period during the 1990s, the state institutions attempted to maximise number of housing plots along alleys and main streets. The plots were directly sold to the state employees. Thus, the West part of this residential block seems unregulated.
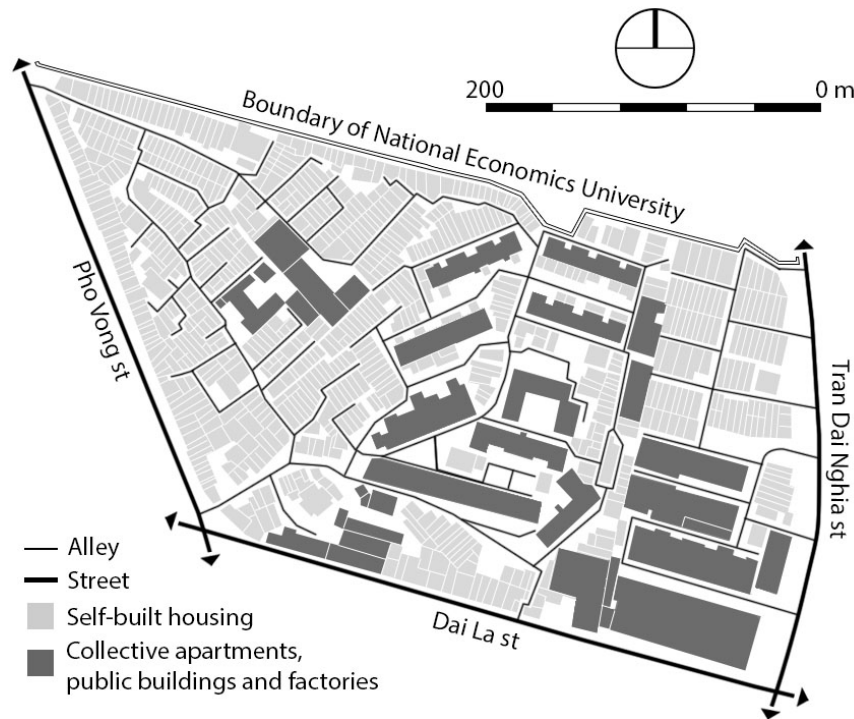
Figure 55: Apartment buildings and self-built housing around the work-unit area (Edited by author, adapted from information from Hanoi Department of Natural Resources and Environment)

Finally, during central planned economy from 1954 to 1986, state institutions and collectives often used existing buildings and part of settlements in traditional villages as living space for their employees. Particularly, figure 56 shows a traditional village settlement, which had been developed by the state institution. After 1954, the state took the empty houses and distributed the houses for employees in the state company, which located nearby. The physical structure of area was still based on original alleys and network in the old village. In addition, several public buildings were built including a public canteen and one collective apartment building. Also, the main alley was expanded to provide access to the state company. Surrounding the main alley, there are several smaller alleys. Accordingly, many households had two housing plots, one big plot for family living space and one small plot of 4 square meters, for kitchen and toilet.

In the old day, this area was belonged to one landlord name Van Tin. He did a food product to export. The south of this area is a market place and trading area [...] In 1982, my wife worked at a Waterway transport company. The company headquarter was planned in this area; thus, old housing and remain empty housing plots in this area were distributed by the company to the employees. Consequently, my wife got a small house plot [...] At this time, this area did not have plan, administrations just divided the plot with simple construction to their

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workers and employees, and then household organized to rebuild or upgrade the houses by themselves.

N.T.Truong, interview in 25-08-2016
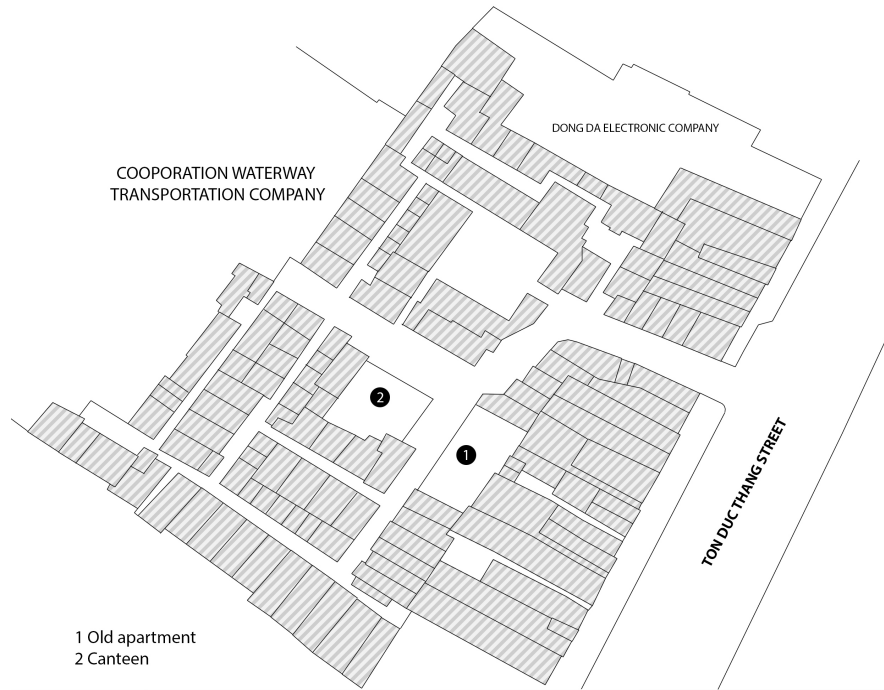
Figure 56: Plan of one work-unit area based on layout of an original village. (Clockwise from the top) (1) Planning of neighbourhood (Edited by author, based on information from local neighbourhood's leader) (2) (3) (4) alleys of neighbourhood (5) Old apartment.

In the three above examples, although the planning and an involvement of institutions and collectives in planning stages are different, all those areas shared several similar characteristics. Firstly, all three examples were planned as residential neighbourhoods to provide accommodation for employees of nearby work-units during the central economic command period. Secondly, there was not clear road system in planning. All three examples are surround by city road;

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however, the internal circulations are based on a complex of numerous small alleys. Given living conditions in the late 1980s, those residential areas were planned for motorbikes and bicycle rather than the use of modern transportation such as car and bus. Therefore, the alleys were popular in work-unit areas. Thirdly, in all three examples, there were no commercial services and green spaces such as park and garden in original plans. The common public spaces were schools, markets and other social and public buildings nearby.

Generally, this type of neighbourhood is another version of living quarter, which was popular during the central economic command (1954-1986) (Please see section 4.4 for details of the living quarter). The difference between work-unit and the living quarter is the housing types. In the living quarter, the collective apartment was constructed by the state agencies and apartment was distributed to the employees through welfare system housing. By comparison, in work-unit, the main building construction is self-built housing. In work-unit area, employees bought the housing plot with cheap price as part of their salary and contribution to state companies. Then, households could build or upgrade the house by themselves according to their needs.
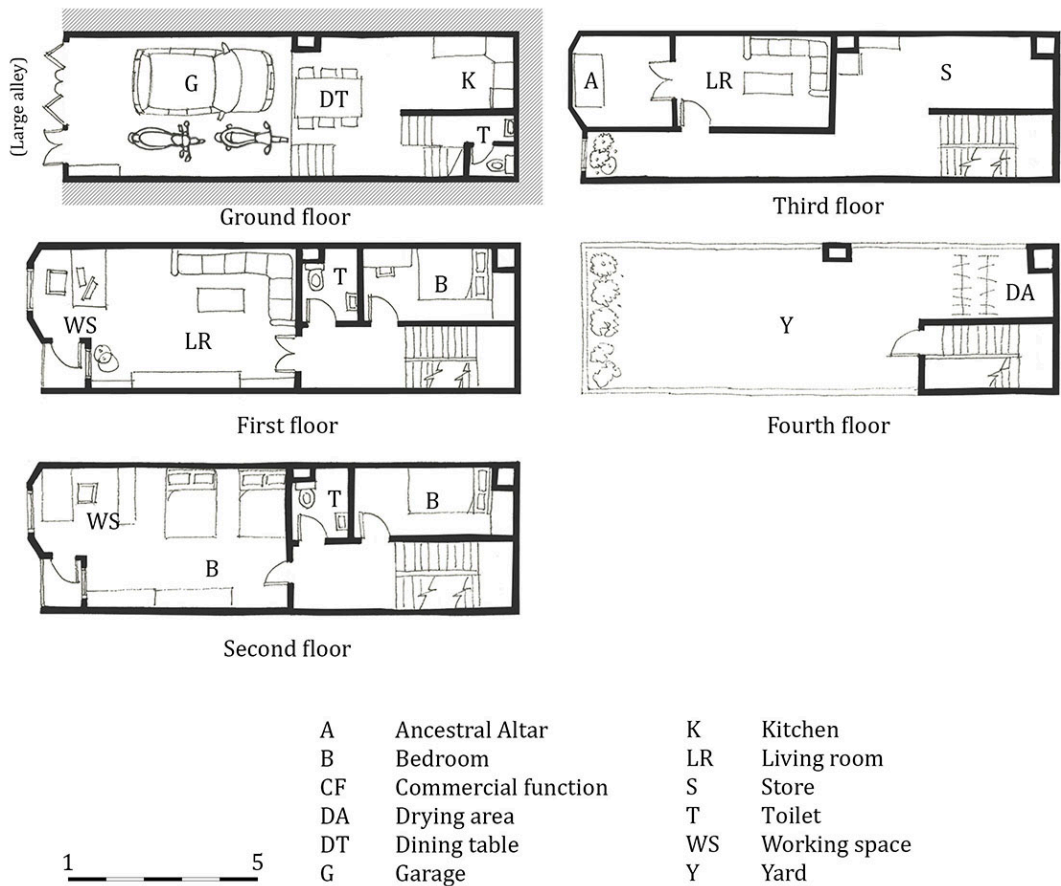
Figure 57: A example of a housing locating in work-unit area

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In term of regulation and standards, the housing plots did not follow any standard form. The size of housing plot is varying different depending on planning of each institution or collective. The common typology of housing plot has a shape of tube, which is long and narrow, to maximise number of housing plots. For example, figure 57 shows housing plan of one building in the work-area. The building has five storeys, covering an area of 48.4 square meters. The house has tube shape. The width of the building is 4 meters while the length is 12.1 meters.

5.2.2 New urban areas

During the 1990s, individual housing constructions dominated the urban landscape. The increasing of individual construction results in uncontrolled urban planning. Therefore, since 1996, the new housing strategy has been proposed to increase government control over urban development through large housing projects. Several decrees and decisions have been issued to guide urban development in this direction. Particularly, private developers are encouraging to invest in housing sectors. The developers are granting land lease schemes, tax breaks and increasing level of autonomy in running their projects. The housing projects mainly locate in formal larger green field, along major primary road networks or ring roads. As a result, number of new urban area was quickly rose from 49 in 2003 to 131 in 2009 (Tran, 2016, 343-361).

Idea of new urban areas or "*Khu đô thị mới*" is to create good living environment through fully planning of infrastructure, architecture and facilities. Specifically, the new urban areas are principally required to provide necessary public facilities such as schools, hospitals, health care centre, markets, sports grounds and communal buildings (Moc, 2008). Planning should follow general city plan and have detailed 1/500 plans. Due to those requirements, model of new urban areas is generally associated with residential models that often seen in other developed cities, such as Singapore, Hong Kong and other global cities. Particularly, Geertman (2007) highlighted six main advantages of new urban area when comparing new urban area and the model of the living quarter:

Firstly, the new urban projects are generally planned in large scale. Before the economic reform, the living quarters were planned in small area, which was around twenty hectares. By comparison, according to Gerrtman (2007), since the economic reform in 1986, numerous new urban areas have been planned in vast areas.

Secondly, new housing projects have increased in complexity. As described in the chapter four, the socialist housing planning such as *KTT Kim Liên, Trung Tự* and *KTT Thành Công* were built to provide shelter for state employees; thus, those areas did not have commercial services. By comparison, the new housing projects are offering various packages of commercial services. In addition, new urban areas have different types of housing, such as from villa, low-rise apartments to high-rise

apartments. On the other hand, the living quarters were only designed for collective apartment.

Thirdly, the current housing projects in new urban areas aim to promote high-rise apartments. Since the 2000s, high-rise apartment has become the first priority by the authorities. In new urban areas, sixty percentages of all housing should be high-rise housing, which has nine levels and above, while the rest could be landed house (Hanoi People' committee, 2001). The aims are to decrease construction density and to increase large open spaces.

Fourth, new projects have large open spaces including green spaces, spacious road and water surfaces.

Fifth, besides green spaces, the roads in new urban areas are very wide. The streets in new urban area are designed for modern types of transportation such as car and bus. In comparison, streets in the living quarters were only designed for small vehicles such as bicycle and motorbike.

Finally, new urban areas do not have any industries integrated in their projects. Since 1986, the economic reform has boosted non-state economic sector for urban and housing development; therefore, the foreign and private investment has played a significant role to drive urban structure. Due to new free economic market, a linkage between industrial and residential has been broken. The expanded commercial activities result that the spatial pattern has transformed from central planning influences to market mechanisms. Under the market forces, the current decisions for new residential locations are based on private checks of land availability and cost rather than the working places. Specifically, housing and land prices in city centre rapidly increase due to its convenience for business and public services. In addition, urban fringe has become attractive locations for new housing projects due to low cost of compensation and redevelopment. Consequently, it is not surprised that nearly 86 percentages of new projects have been built around the outskirt, 3 to 8 km away from the city centre (Nguyen & Kammeier, 2002, p 384).

In term of housing, there are different types of housing construction in new urban area. Process of housing construction in new urban area could be drafted as (a) preparing housing plot, (b) build the basic framework, (c) decoration and finishing. Housing in new urban area; therefore, could be classified into three types: finished houses (a+b+c), un-finished house (a+b) and serviced plot for self-built housing (a). The new urban area could be filled with one or all types of housing depending on type of projects. When buying the houses or housing plots, the owners might build or finish the houses by themselves.

For details of built environment in new urban areas, the following parts explain housing characteristics in selected new urban areas in Hanoi having self-built housing.

For instance, *Trung Văn* is new urban area locating in the South-West of Hanoi, away 7 km from the city centre. It covers an area of 15,6 ha. The area has apartment, villas, detached houses, market, kindergarten and two schools (Figure 58). The housing types are introduced into customer as un-finished house or "*Xây Thô*" in Vietnamese. The term of unfinished housing means that building has basic framework and amenities services. When buying unfinished-houses, customers could make decisions regarding plan, architectural styles, decoration and finished materials to finish their own houses depending on their interests. For example, one interviewee revealed that:

> *In this area, the house was built with basic structure and framework, as we called as "Xây Thô". Thus, every house in this developed area had the same form regarding height, number of floors, size of building as well as number of rooms. The only different features are the detailed decoration, function and interior design.*

> *N.T.Hoang, interview in 05-09-2017*

Figure 58: *Trung Văn* – a new urban area in the South of Hanoi. (Clockwise from top left) (1) Plan of *Trung Văn* area and its housing (Edited by author, based on poster of planning in *Trung Văn*), (2) High-rise apartment, (3) and (4) Unfinished houses.

Beside unfinished house, housing plot, which has been prepared for housing construction is another popular type of housing in new urban area owing to following reasons (Geertman, 2007). Firstly, in the 1990s, numerous new urban areas were invested by foreign direct investment as part of Hanoi New Town Plan. Most new urban areas were planned with high-rise buildings. However, due to the financial crisis in 1997, foreign investors withdrew from those projects. Since then, the local developers have become very active developers in the property market. They soon realise the advantage of self-built housing. As a result, developers replaced high-rise housing with sub-divided housing plot for sale. Secondly, during the transitional period, citizens did not trust banks, and they found another way to invest money. The housing plots in new urban areas are attractive due to new facilities and infrastructure. Therefore, self-built housing plot became very favourable sites to invest. Thirdly, in the 1990s, high-rise apartments are not considered profitable due to lack of expertise. In addition, high-rise housing is a new type of housing; thus, Vietnamese citizens had no ideal to make a living in high-rise housing. Thus, they tend to refuse to live on high-rise buildings. Finally, due to influence of rural lifestyle, the Vietnamese like to live the landed house rather than high-rise housing. Before 1954, Vietnamese people always live in one

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or two storey housing. Public and commercial housing did not exist at that time. During central economic command period, Vietnamese people lived in low-rise state apartment or one or two storeys buildings. Therefore, an ideal of good house should be attached with the land to secure land values and for sense of privacy. In addition, on normal house, household could modify or rebuilt the house when they have new requirements. On the other hand, one high-rise housing building, there are limited things household could change. Thus, people tend to avoid living in high-rise apartment.

In new urban area, self-built housing area is based on model of site and services (Hoang, 2002). It means that developers have to complete the technical infrastructure and essential facilities including water and electricity supply, water drainage and garbage collection. Only after that, plots of land could be leased to individual citizens for long term; by that, customers could buy and build the houses depending on their interests. For example, the following text describes the responsibility of customers and investors in one new urban project in Hanoi city:

> *"Customers can carry out the construction by themselves but strictly following the constructed landmark, façade architecture, basis height and the height of each floor. All formality relating land use right, construction permit, contract for water and power supply are under the responsibilities of project investor without any charges to customers. Moreover, the investor can help customers in supplying the detail design and constructing. Customers can be both organisation as individuals. Price for transferring the land use right applying with the villas with design of detached house or semi-detached house with the area from 150-200 m2 is 2 million to 2.4 million VN Dong per square meter. Responsibility of investor as well as customer and payment procedure and determined as with low-rise building"* [18]

Meanwhile, sizes of housing plot are controlled by regulations. For example, according to Ministry of Construction (2008), if the house locates in the large streets, the size of housing plot should not less than forty-five square meters; meanwhile, the width and length of plot must larger than five meters. If the house locates in the small streets, the size of housing plot should not less than thirty-six square meters; in addition, the width and length of plot must larger than four meters.

An example of new urban area filling with self-built housing is *Định Công* (Figure 59). This project is run by HUD (Housing and Urban Development corporation)

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[18] Text in brochure collected by Geertman (2007, p 277)

covering an area of thirty-five ha in the South of city centre. The residential project was one of the first new urban areas in Hanoi. This project included high-rise apartments, serviced self-built housing plot and other necessary facilities. In term of planning, most land use in this project was planned for self-built housing plots. The satellite images in 2000 show the development of basic infrastructure by developers. In 2002, some households started to build their own houses. In 2009, all housing had been constructed.
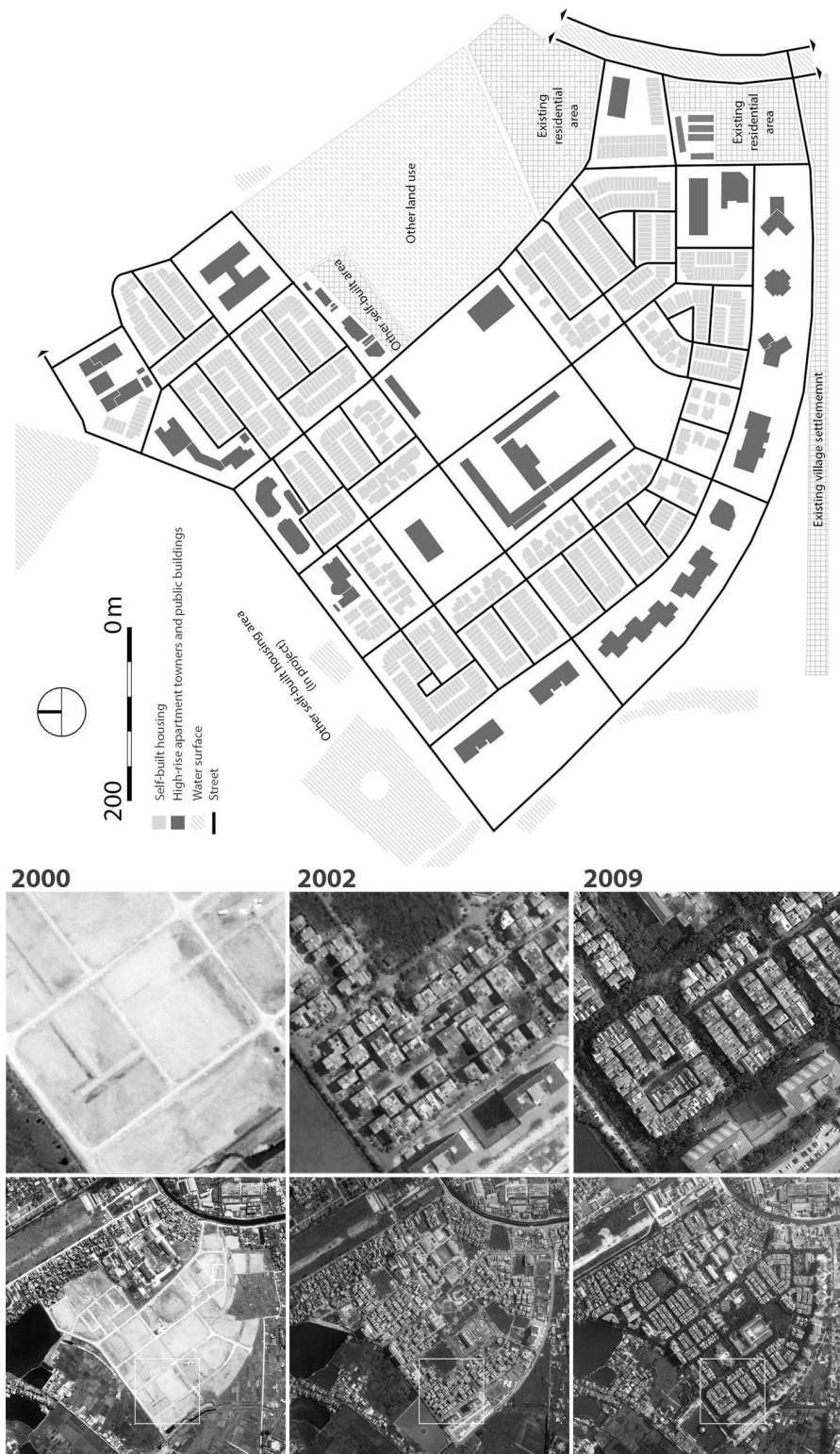
Figure 59: Housing Layout in *Định Công* (Edited by author, based on information from Hanoi Department of Natural Resources and Environment and satellite images)

Figure 60: Self-built housing plots in new urban area (Housing plots are highlighted by lines of bricks in new urban area in the outskirt of the Hanoi city. The size of plot is from 40 to 60 square metres; each plot has four meters wide and ten or fifteenth meters long).

Generally, in new urban area, the typology of self-built housing shared some common characteristics. The housing typology is long and narrow. The length of plot could be 15 to 20 meter while the width of plot is around 4 to 6 meters. Meanwhile, depending on urban planning of new urban areas, some housing areas might have setback area to control built up area. For example, figure 61, 62 and 63 show 3 examples of building in the new urban areas. In the figure 61, building have setback in the front and rear of building. In the figure 62, building have setback in the front of building while in the figure 63, the building has no setback.
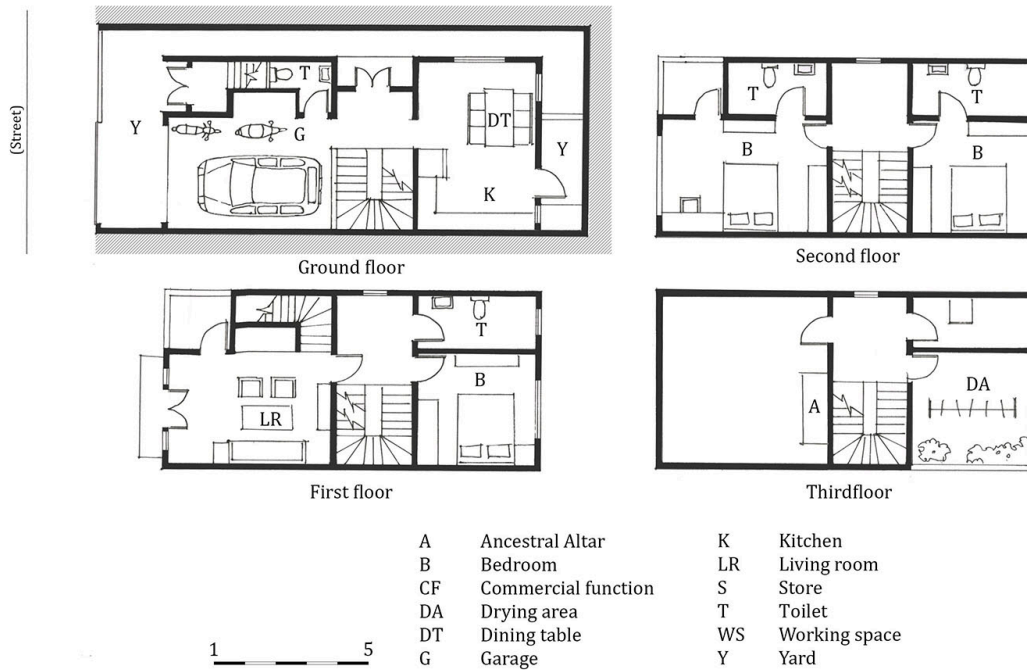
Figure 61: Self-built housing built on basic framework built by developers with setback areas
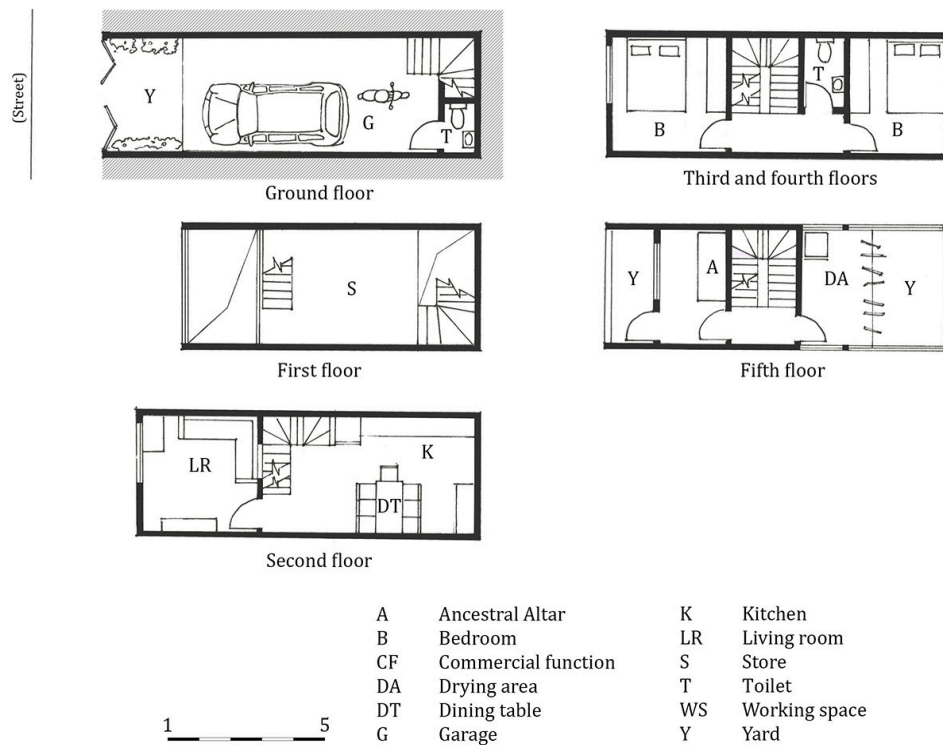
Figure 62: A house having setback in the front, which has been turned into small yard

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A	Ancestral Altar	K	Kitchen
B	Bedroom	LR	Living room
CF	Commercial function	S	Store
DA	Drying area	T	Toilet
DT	Dining table	WS	Working space
G	Garage	Y	Yard
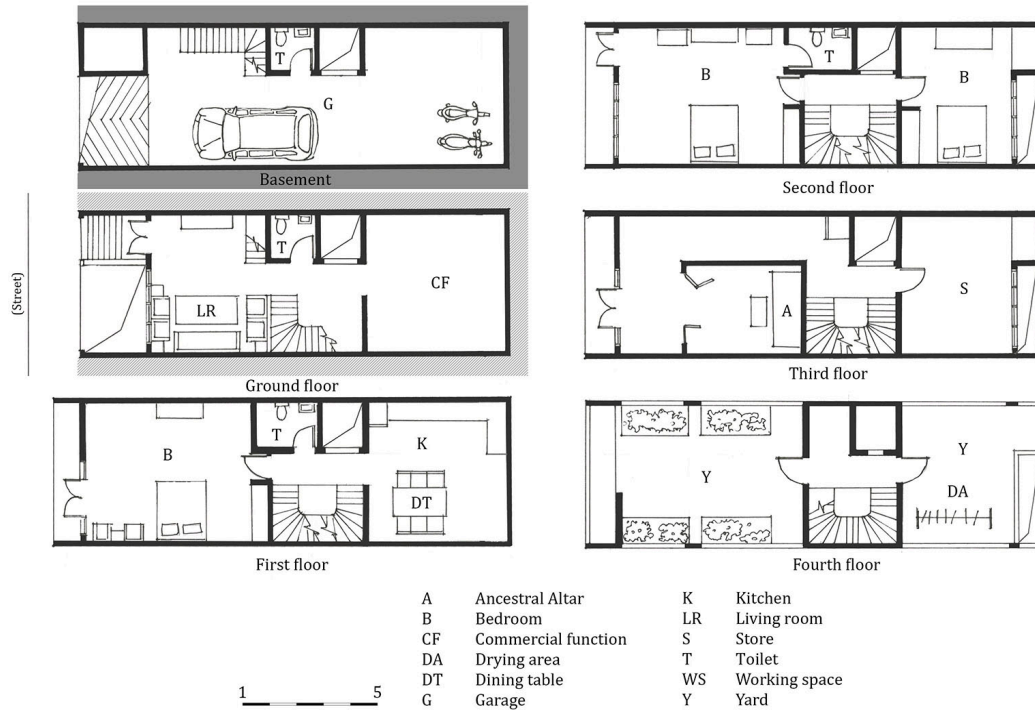
Figure 63: A house with no setback area in new urban area in the outskirt of city

5.2.3 Urban villages

Besides work-unit and new urban area, urban village is another popular residential area in Hanoi as well as other Vietnamese city. This section reviews historical development of urban villages. It ended with overview characteristics of self-built housing in urban villages in Hanoi.

In academia, the concept of "*urban village*" in Asian countries differs from urban planning in the context of Western countries. Specifically, in the Western literature, the term urban village is based on concept of garden city that emphasis on living conditions of urban area having characteristics of rural village (Howard et al., 1965). Thus, the Western conceptions of urban villages have been widely perceived as planned areas that promote social interaction and community (Taylor, 1973; Aldous and Urban Villages Group, 1992). The principles of urban villages emphasise on a sense of belonging to the place, walking paths, friendly neighbourhood environment, and deep community involvement in design and management processes. Consequently, in Western countries, the urban villages in peri-urban area are place of hobby farm, supporting industries, and leisure place, which being taken over by urbanites as second home. By contrast, the term of urban village in Asian countries emphases on transitional neighbourhood from rural village to urban structure. In the process of urban expansion, villages locating in the peri-area of metropolis have been merged into urban structure. Consequently, urban villages could be understood as "*villages in the city*" to describe the urban transitional phenomenon.

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Village is the basic social and self-sufficient unit in Vietnam for centuries (Labble, 2011). Originally, each village was built surrounding dominated clan or particular surname lineage. Each village has its own rules and customs. The Vietnamese proverb "*The customs of the village have precedence over the laws of the king*" (In Vietnamese: "*Phép vua thua lệ làng*"), shows that a village was considered as independent area without the control of state or political regularities. Another proverb "*each village strikes its own drum and worships its own deities*" (In Vietnamese: "*trống làng nào làng ấy đánh, thánh làng nào làng ấy thờ*"), emphases that the Vietnamese village was a unique complex system that only support its community. Villagers had little connection with other people outside their community. In term of physical pattern, village's settlement was formed depending on surrounding natural landscape, agricultural land and fishing activities (Ngo, 1998). Villages normally situated in the high ground areas that helped to protect villages from flooding. One village could have several clusters. All clusters located around the communal houses, temples, pagodas and wells. The village gates and rows of bamboo were created outside the villages to control accessibility and to protect village from external aggressions. In terms of belief systems, there is a combination of several religious practices including Buddhism, Taoism and indigenous folk religions. The religion practices are necessary activities for each villager. In festival days, villagers always go to their temples, pagodas and communal house for worship. Every year, villagers have to donate money or time for self-help activities to maintain those public buildings.

Hanoi was marked as cultural, social, political and economic centre since 1010, under the regime of King *Lý Thái Tổ* (Logan, 2000). The original urban structure was based on Confusion and Taoism principles. The urban structure was formed with two separated areas: the citadel and the historical trading quarters. One is place for royal family while other is place for commoners. The location and shape of the citadel was based on Feng Shui principles. The citadel was planned with square shape with four entrances in four directions. Outside the citadel and the trading quarter, villagers dominated the rural landscape. Most of current urban village's blocks in Hanoi city are based on those historical natural villages.

During the colonial period (1858-1954), Hanoi city experienced the first city expansion. The French quarter was planned in the South of the historical areas. Within this process, several villages were demolished to pave the way for new urban blocks. The evidence of original villages still could be recognised based on existing historical buildings such as temples and pagodas.

From 1954 to 1986, Hanoi urban area experienced the second expansion. Although several rural villages were integrated into urban area, the spatial layout and structure of those villages were unchanged due to wartime and state control. Particularly, during the war, people have to move to rural area to avoid boom raids.

During the war (1954-1975), most necessary infrastructure, facilities and services were damaged. As a result, in post-war period (1975-1986), the general plans heavily focused on redevelopment of city centre, housing and necessary industry. Meanwhile, during 1954-1986, Vietnam followed the model of central command economy. The state applied *Hộ Khẩu* system to control migration from rural to urban areas, and as an instrument for public security and economic management of state (World Bank Group, 2016). Every citizen had to register their citizenship and to provide details of their household such as the address of permanent resident. The movement from one place to the other required the permission of relevant authorities. By doing so, the state could control the migration rate from rural to urban areas. Without a valid *Hộ Khẩu*, an individual could not gain access to public services such as housing, education and medical care. Consequently, the population growth rate and the rate of urbanisation in Hanoi remained low during this period.

In the late 1980s, Vietnam implemented the economic reform from central command economy to socialist oriented market (Harrington, 1994). Within the political and economic transition, Hanoi has become a dream place for migrants to work and live in city. The *Hộ Khẩu* system, which has been using to control the rural to urban migration, has lost its function (Nguyen et al, 2012). Rural migrants could register as temporary residents in urban areas. In addition, foreign investment and private enterprises increased significantly; new jobs that do not require *Hộ Khẩu* in industrial and services sectors emerged. Consequently, the economic reform turned a new page of rapid rural-urban transition. Particularly, in 1954, the urban population accounted for only 12% of the total population (UN-Habitat, 2014). After three decades of central economic planning which restricted urbanisation, the proportion of the population living in cities reached 20% in 1985. On the contrary, after thirty years since the reforms, nearly 34% of the total population were living in urban area, and that number is predicted to reach 55% by 2050. Typically, rural-urban migrants contributed approximately 40% of the Hanoi urban population (VGSO, 2011).

The rapid urbanisation process has affected every aspect in rural villages. Vietnamese cities not only have increasing rate of urban population growth, but also facilitate urbanisation by absorbing massive number of rural villages. For example, the urban land increased from 2,200 square kilometres in 2000 to 2,900 square kilometres in 2010 (World Bank, 2015, p 117-125). To accommodate investment and development, the Vietnamese government relies on urban development to convert sub-urban rural for urban use (Bertaud, 2012). Specifically, since 1988, the Law on Land has been introduced (Vietnamese National Assembly, 1988). Land is the property of people, and is subject to exclusive administration by the state. In this regard, the Law separates the right to use land from the ownership of land. The state could lease the right to use the land to individual, household and organisations for a fix period. Villagers have

permanent agricultural land use rights and long lease residential land for their dwellings. The state can get back the land, which has lease anytime, but must compensate land users for the construction or loss of revenue from crops. Meanwhile, following the compensation land price frame, the compensation price of residential land is much more expensive than the compensation price of agricultural land. In the urbanisation process, the government tend to requisition farmland rather than to requisition settlements of rural villages to avoid costly and time-consuming programs and relocation of villagers. As a result, the settlement components of villages remain while their surrounding environment has dramatically changed. The new urban areas and infrastructure spatially surrounding original villages now make up the urban villages.

Figure 64 shows an example of transformation of village in *Vĩnh Hưng* area in *Hoàng Mai* districts. This village is located in the outskirt of city. In 2001, housing in the village is built by timber and brick. As urban area expanded overtime, in 2005, some traditional house had been replaced by new permanent houses, which used concrete structure. In 2016, the density of construction in village became very high. Most of housing was built with permanent structure and materials including concrete and bricks.

Meanwhile, the circulations inside the urban villages are still based on traditional alley system. Most alleys are too narrow to be used by cars and public transports. For example, figure 65 showed the urban block, which is a combination of several parts of traditional villages namely *Xã Đàn, Mỹ Đức, Trung Tự* and *Trung Phụng* in the city centre. In the past, there were several small lakes and rice fields that separated villages. Over the process of development, urban projects have filled the lakes and rice fields. As a result of densification, the density of building in the urban village is very high. Except surrounding roads around the villages were improved and newly built, the narrow alleys still dominated the internal circulation.
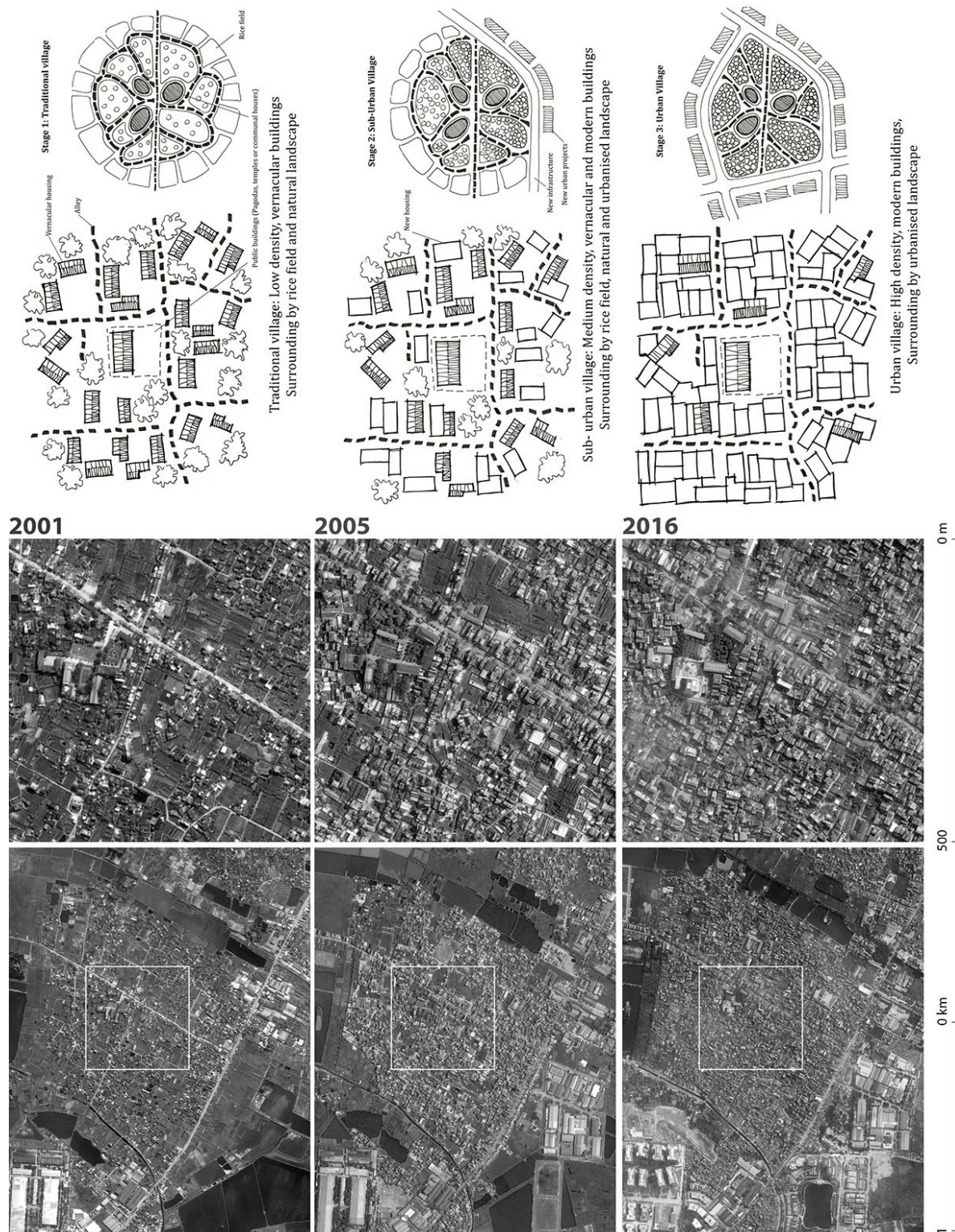
Figure 64: Changing of urban landscape in village owing to process of urbanisation in the outskirt of Hanoi city. (Left) Satellite images in Vinh Hung area in Hoang Mai urban district in 2001, 2005 and 2016 (From top to bottom); (Right) author's drawings.

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Figure 65: High building density in one urban village block in the city centre (Edited by the author, adapted from information from Hanoi Department of Natural Resources and Environment)
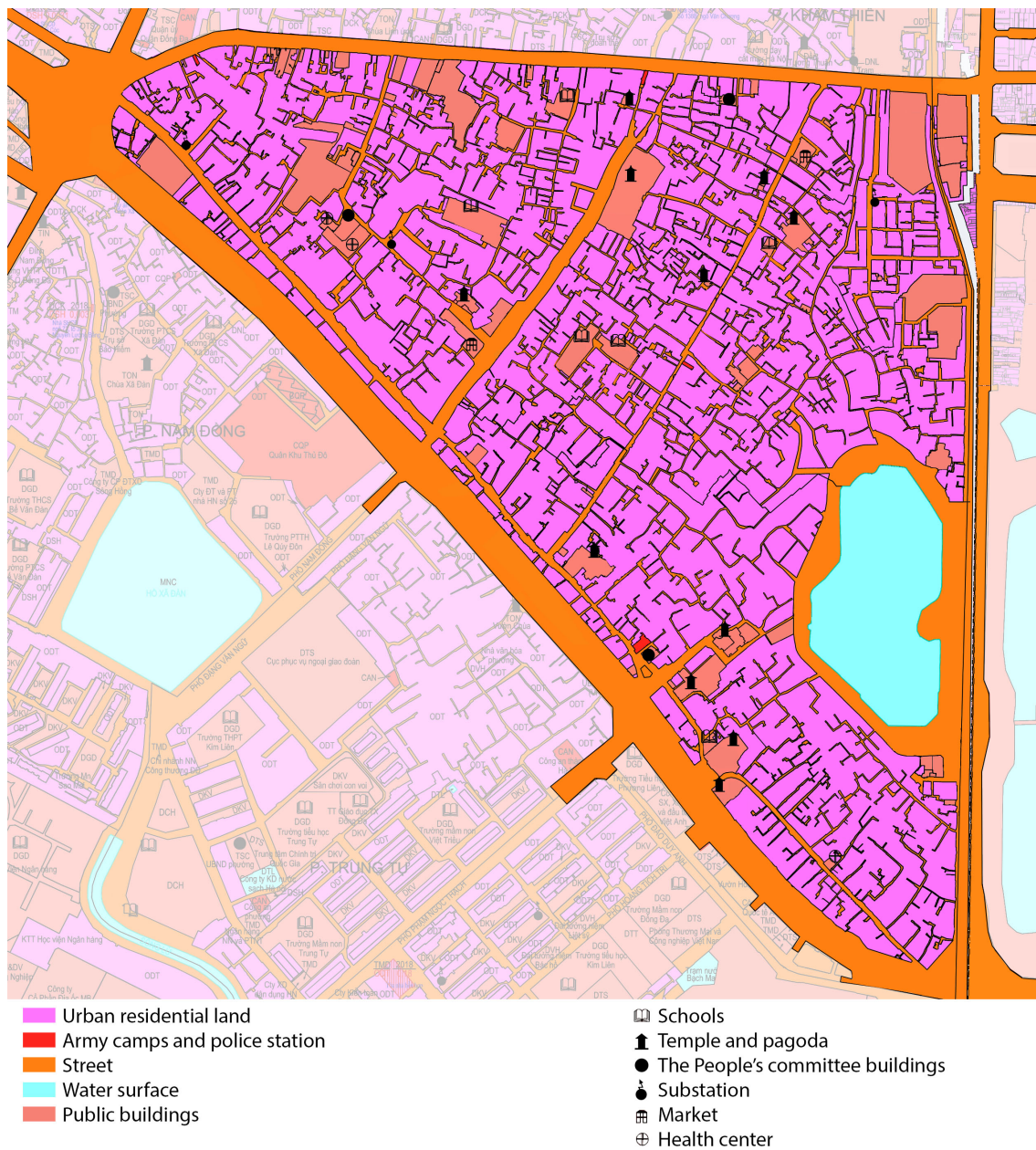
Figure 66: Land use of block of urban villages in *Dong Da* district (Edited by the author, adapted from information from Hanoi Department of Natural Resources and Environment)

Figure 67: Historical buildings highlight the evidence of villages in the above block of urban village.

Figure 68: Narrow and dark alleys in urban village in Hanoi

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Besides housing, since the village has urban status, there have been several development projects aiming to improve living conditions in urban villages in Hanoi. The settlements of villages are considered as existing residential area; thus, the governing authorities are upgraded from the level of rural district to the level of urban district, which now provide additional social welfare services such as schools, health and activity centres for villagers. The local administrative levels also have responsibility for providing, managing and upgrading infrastructure. Nevertheless, as the finance of government is weak, it is difficult to upgrade the whole area. The common projects are to develop necessary infrastructure and to widen roads around the villages. Consequently, local inhabitants are also contributors to develop living environment. Network of small alleys is the typical characteristic of the traditional villages. Due to lack of funding to run upgrading alleys inside villages, the model of "*state and people partnership*" (*Nhà nước và nhân dân cùng làm*) has been applied to improve the infrastructure. Basically, households contribute money and land while the state prepares technical plans, hire and supervise the constructors. This model focuses on necessary amenities such as water and sewage system, electricity around the alleys. Meanwhile, a traditional mud and brick alleys have been upgraded to concrete alleys.

The transformation process from rural village to urban structure also effect housing in the village. In the traditional villages, the house was simple [19](Figure 69). Each family had a courtyard. Inside the courtyard, a simple house was built. Larger and richer families would have more building and yards. Most traditional rural house was single storey built by timber and brick. Since the village became urban area, the farmer starts to redevelop their houses. The transformation of buildings in urban villages could be classified into three main stages: Firstly, villagers who lost their agricultural land due to land requisition need saving to support their urban life. Meanwhile, the city expands around the villages, the land values increased quickly. Thus, villager starts to divide their land into smaller plots and sold them to new middle classes. In addition, following the popular proverb: "*getting marry gently wife, build a house, buy a buffalo*". Building a house is one of three important things in the life; thus, villager often distributes the housing plot for their children. By that, their children could build their own houses. Consequently, gardens and yards were divided into smaller housing plots for selling and for children heritage. Secondly, when there is not many remain lands, the villagers always redevelop their houses as big as possible. Any remain open spaces were transformed into enclosed spaces and become part of the house. Finally, when villagers have good income and new requirements about living spaces, they often rebuilt or redevelop the house by adding new storeys. As a

[19] Please see section 4.1.3 for details of rural housing in villages in regions of Hanoi city

result, the form of dwellings is likely a tube form, which is narrow, long and high (Figure 70).

1 Ancestor altar
2 Living area
3 Bed
4 Veranda
5 Kitchen
6 Yard
7 Toilet
8 Well/ Water tank
9 Garden/ Pond

Main building

Supporting building
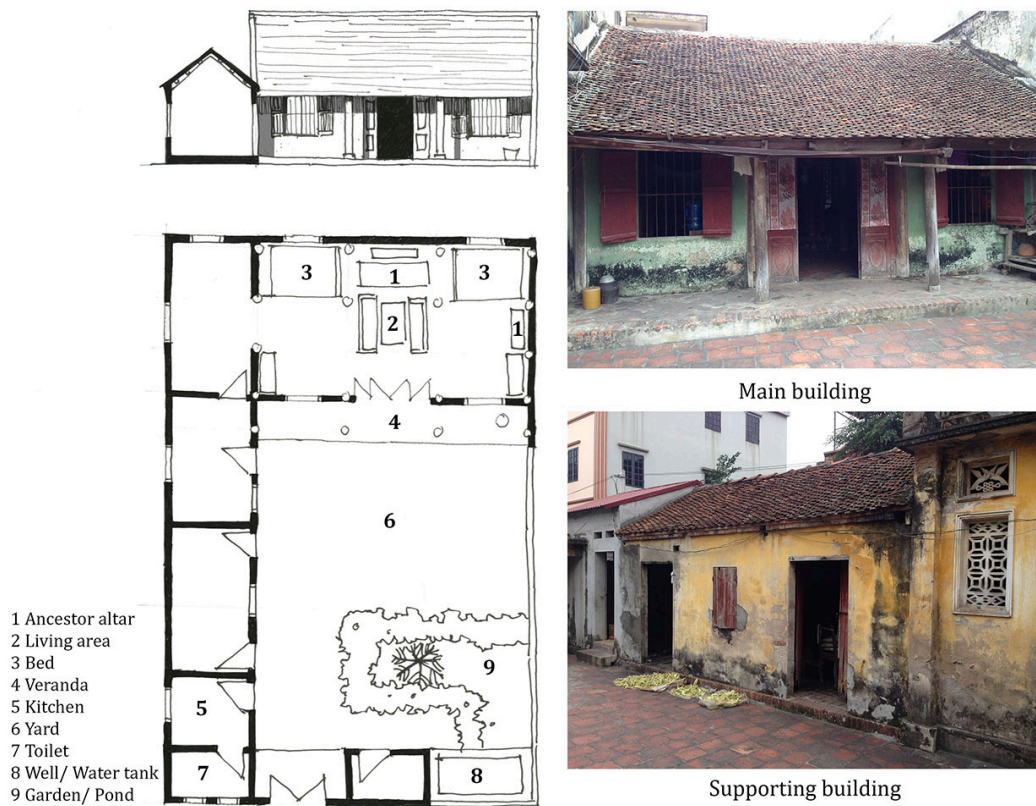
Figure 69: Example of one existing traditional house in a village locating in outskirt of Hanoi (Drawing and images by author in 2016)

A	Ancestral Altar	K	Kitchen
B	Bedroom	LR	Living room
CF	Commercial function	S	Store
DA	Drying area	T	Toilet
DT	Dining table	WS	Working space
G	Garage	Y	Yard
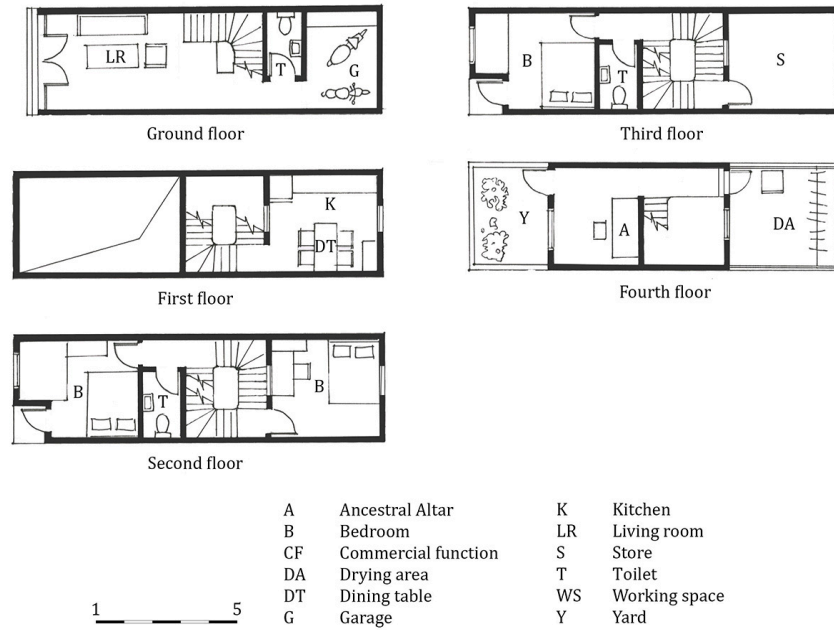
Figure 70: Example of typical housing plan in urban village block

The changes in livelihood also impact on the transformation of living spaces. Basically, the traditional houses were designed to support for agricultural activities. On the other hand, the contemporary house could be used for multi-purposes. Depending on location of buildings, parts of dwellings could be used to generate income. After losing the agricultural land, finding a new job is a challenge for villagers due to poor training and skills. Villagers start to join the informal jobs in the cities such as street vendor. Meanwhile, if their houses located in main alley or streets, villagers generally set up shops on the ground floor of their own houses (Figure 71). There are various types of shop including grocery shops, café, small restaurants, hair salons or clothing shops. Overall, these shops provide basic products, necessities and food targeting low-income groups. Their prices are cheaper than those in well-established stores or supermarket. Shops and restaurants normally run by house owners. Most of restaurants in urban villages are big enough for several chairs and small tables. When new urban areas emerge surrounding an existing urban village, those restaurants and shops would be upgraded. As a result, more expensive shops and restaurants could be found along the main busy streets. Furthermore, most urban villages maintain at least one street market, where local residents could find fresh vegetable, meat, poultry and fish on a daily basic. The street market often took place in primary alleys. In this sense, the ground floor near the market could turn into market stalls.

SHOPS IN THE MAIN STREETS   MARKET STALLS IN THE ALLEYS

Figure 71: Ground floors are using for commercial purposes

5.3 Overview characteristics of self-built housing in Hanoi city, Vietnam

The previous section highlights characteristics of three types of urban neighbourhoods in Hanoi city and general typology of self-built housing in each area. For further details, this section reviews general physical characteristics of collected case studies of self-built housing in those neighbourhoods. The data presenting in this part mainly came from observation and case studies.

All case studies are collected in one of three types of neighbourhoods. The location of building is based on responds of households and observation of neighbourhood (Figure 72). The researcher did not choose case studies because of its location. Through social network of researcher, households were invited to the research program. In this regard, nine case studies are located in work-unit area. Five cases are located in urban village and only four cases are located in new urban area
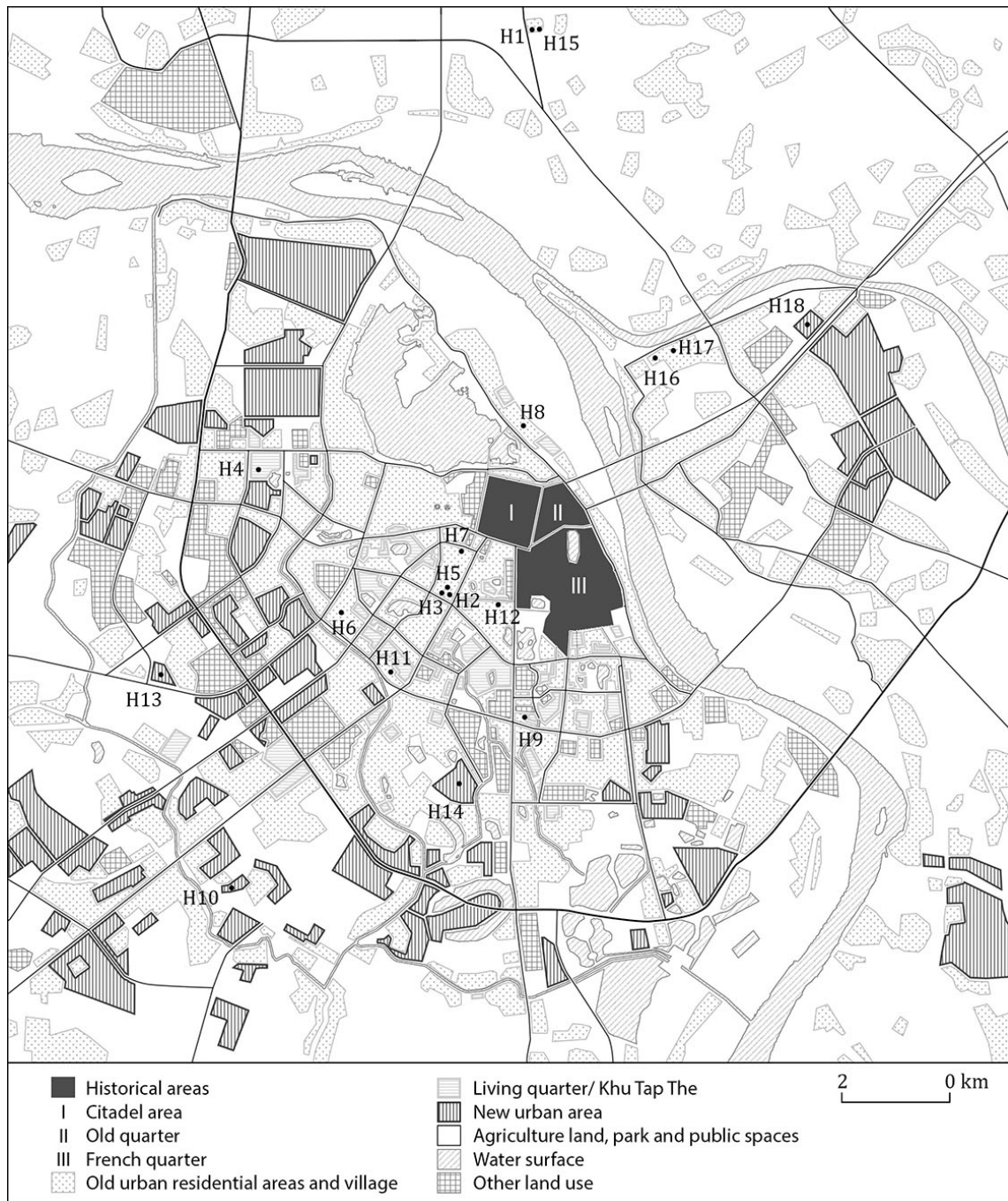
Figure 72: Location of case studies in Hanoi city

5.3.1 General characteristics of case studies
Case study H1 (Visited in 03/09/2016)
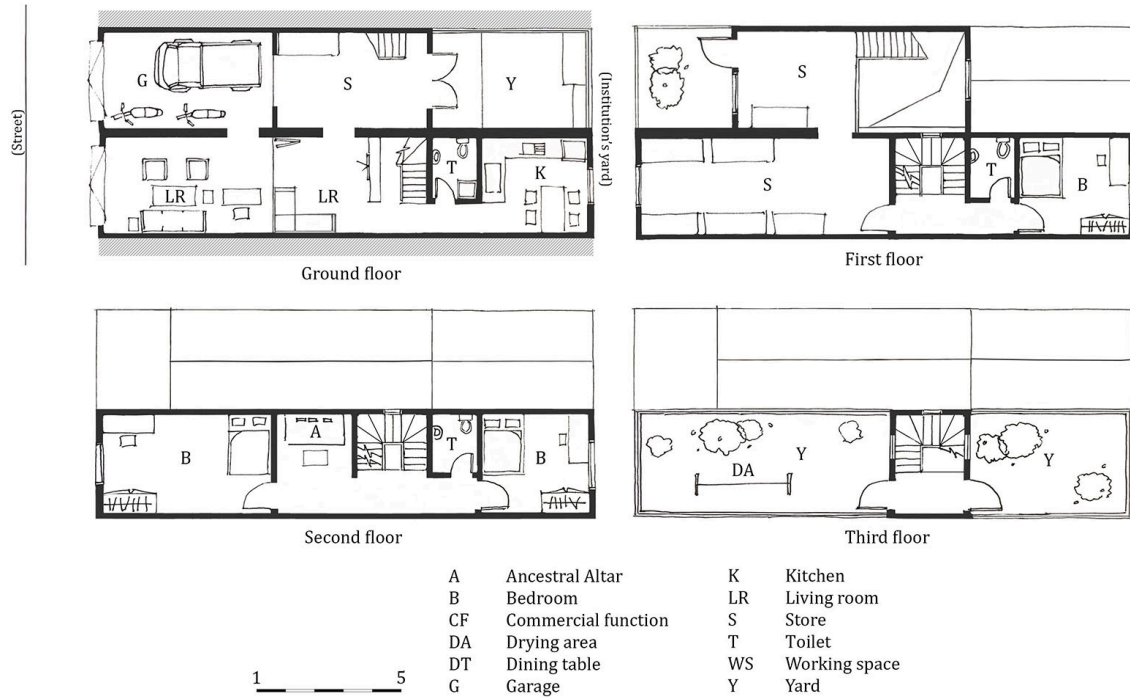
Figure 73: Housing plan of case H1

Figure 74: Domestic spaces of case H1

Case study H1 is located in work-unit area in the outskirt of Hanoi in *Đông Anh* district. It is a four-storey building, which was built by concrete frame. The house is attached to neighbour's houses in right and left sides. The rear of building is site of an old collective company. Plot covers an area of 127.3 square meters. The housing

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plot has rectangle shape, which is long and narrow. The width of building is 7.4 meters while the depth is 17.2 meters.

On the ground floor, there are two entrances. One is for the vehicles including motorbikes and car while another one is for living room. Also, the middle wall is very thick. This suggests that there are two different structures in the house. Based on responds of house owner, the original house was too small when the children grow up. Thus, the house owner bought one neighbour's house and merged new construction with the old house in 2010. The old house was four-storey building while the neighbour's house was two-storey building. In order to connect two buildings, several parts of the middle wall were demolished to create walkways during the renovation.

A spatial organisation of case H1 follows particular order. The ground floor is using as social and service spaces including garage, living rooms, small garden, store, kitchen and toilet. Upper floors are mainly using for private rooms. Meanwhile, the family run a fabric company; thus, several parts of building are functioned as stores in the ground and in the first floor. The top terraces consist of gardens and clothes drying area.

Case study H2 (Visited in 25/08/2016)

Case study H2 is situated in work-unit area locating in the *Đống Đa* district. A house covers an area of 60.6 square meters. The house is a six-storey building using concrete frame. A housing plot has two separated parts. One has shape of square while another has L shape. The front of building is a communal alley. The rear of large plot is a local electronic company. Other sides of plots are adjacent to neighbour's houses.

The typological shape of case H2 is not very popular in Hanoi city as well as Vietnam. To explain about this, the house was built in different phrases. The original house was two-storey building in the square plot. Overtime, due to family growth, household extended the house to create extra living room. By merging with two neighbour's houses, the house became very large and has unique shape.

The spatial organisation of this case is different with case H1. There is no garage in the house. Consequently, part of living room is using as parking area for motorbikes. The room in square plot is using as elder bedroom. The first floor is place of family business. On the second floor, there is a master bedroom and kitchen. The upper floor consists of bedrooms and stores. The top terraces have an indoor space for store and gardens.

Figure 75: Domestic spaces of case H2

Ground floor

(Institution's yard)

(alley)

LR

T

A

G

(Neighbour's yard)

B

T

(alley)

First floor

CF

Third floor

T

B

DT

T

K

Fourth floor

T

B

WS

Fifth floor

T

S

DA

Y

Sixth floor

Y

S

DA

A	Ancestral Altar	K	Kitchen
B	Bedroom	LR	Living room
CF	Commercial function	S	Store
DA	Drying area	T	Toilet
DT	Dining table	WS	Working space
G	Garage	Y	Yard

1 _____ 5
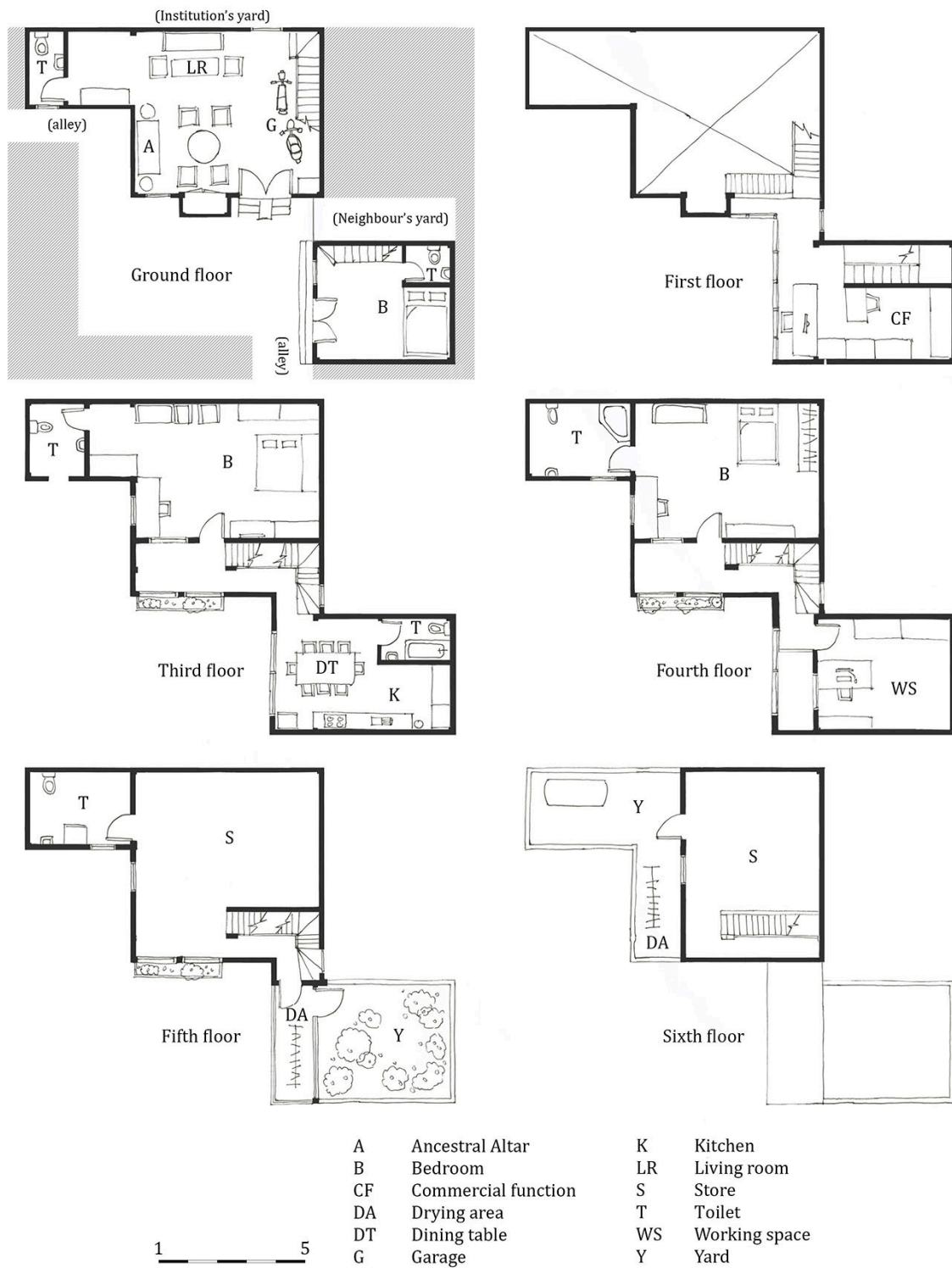
Figure 76: Housing plan of case H2

Case study H3 (Visited in 01/09/2016)
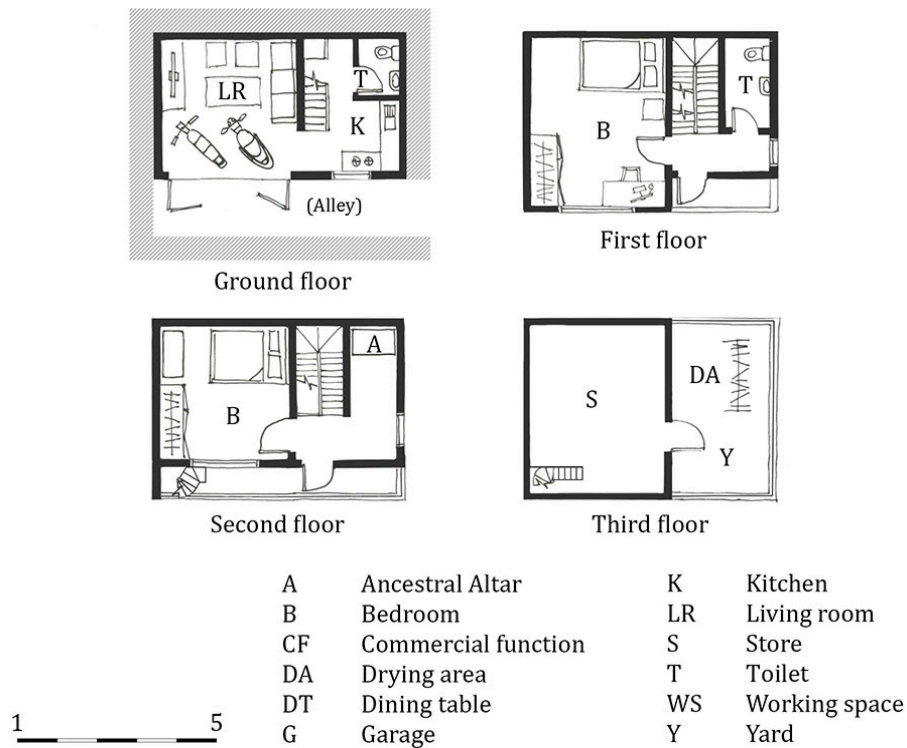
Figure 77: Housing plan of case H3
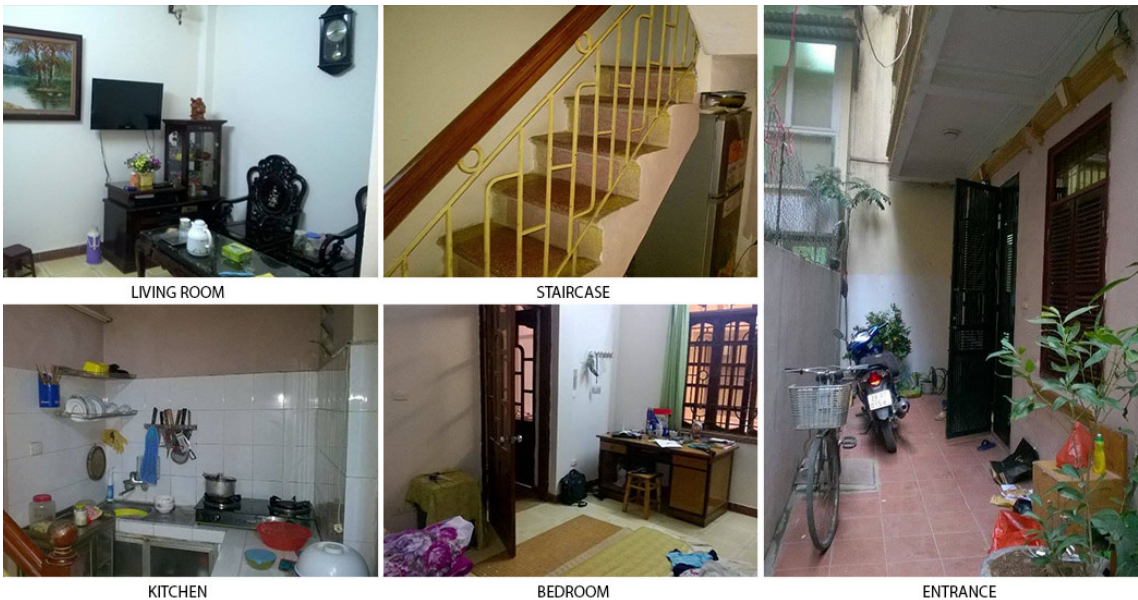
Figure 78: Domestic space of case H3

Case H3 is located in work-unit in *Đống Đa* district. The house has four storeys covering an area of 22,5 square meters. Housing plot has rectangle shape with 3.7

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meters wide and 6.3 meters long. Reinforced concrete is the main structure of building. A front of building is communal alley while two sides and a rear of building are adjacent to neighbour's houses.

Owning to small housing plot, the main family living space is a place of mix-function. Particularly, there is no dining room as well as garage. On the ground floor, there is a living room, kitchen and small toilet. Therefore, the living room is using as social space, guest welcoming area and dining area. Meanwhile, household put motorbikes in living room in the night. The first and second floors follow the same pattern with the staircase in the centre, and each right and left side has one room. In this respect, the first floor has toilet and master bedroom while the second floor has one bedroom and ancestral altar's room. The building also has one store and small yard in the fourth floor.

Case study H4 (Visited in 04/09/2017)
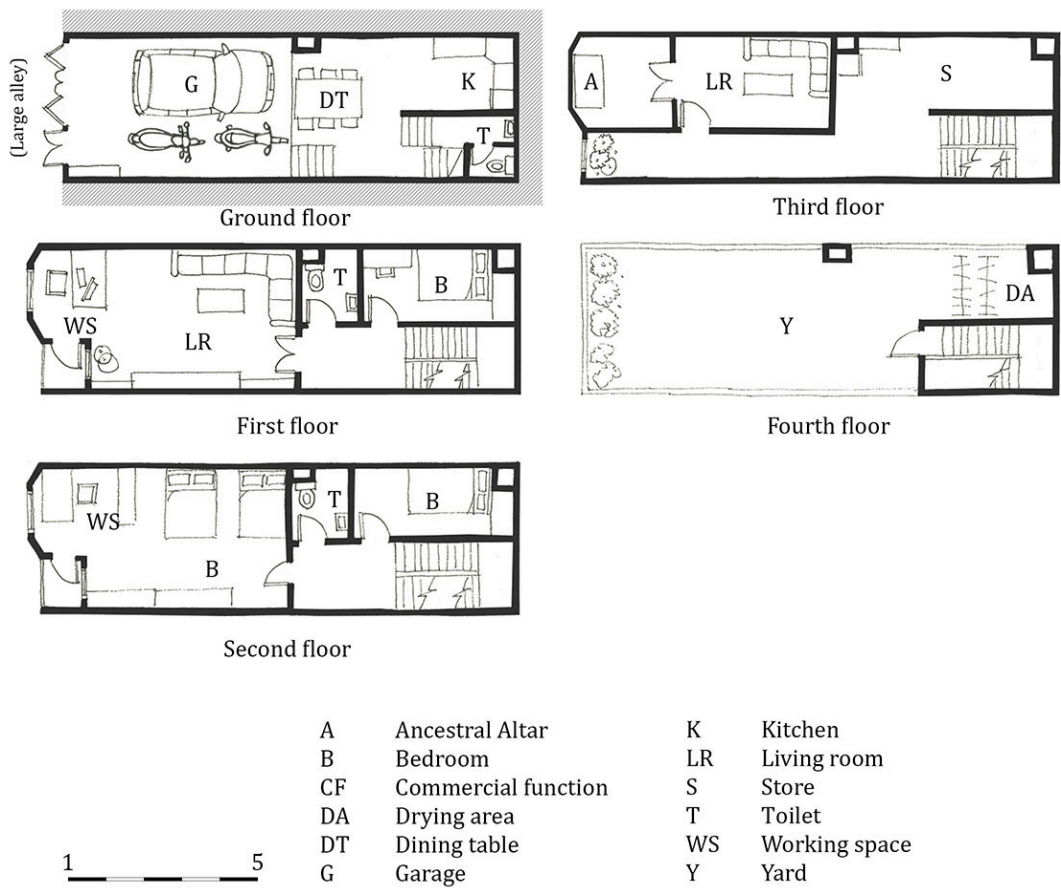
Figure 79: Housing plan of case H4

Figure 80: Domestic spaces of case H4

Case H4 is five-storey building. The case is located in *Cầu Giấy* district, in the house area developing by a state institution. There is one entrance looking towards to a street while other side attached to neighbour's houses. The house covers an area of 48.4 square meters. The house has tube shape, which is quite common in Vietnam. The width of the building is 4 meters while the length is 12.1 meters.

One the ground, there is a garage for car and motorbike and the kitchen and toilet in the rear. The kitchen and toilet ground are in slightly higher level. This housing layout with a garage for car is popular in Vietnam in recent year. The first floor consists of living room, master bedroom and one toilet. The second floor has two bedrooms for children and for guest. The third floor has library, store and ancestral altar's room. Garden and clothes drying area are in the highest floor.

Case study H5 (Visited in 12/07/2016)

Case H5 is located in one work-unit in *Đống Đa* district. A house has three storeys that cover an area of 89.6 square meters. Housing plot has special shape due to extension process. Original plot has L shape. Lately, household bought another house, which is one-storey building. As a result, the house has this unique shape. There are several entrances. The main entrance faces toward to the communal yard. Two other entrances are used as entrances to the shops and rent space.

In term of spatial organisation, the main living space of household is in the central parts of building. In the ground floor, two wings are using for rent: one is for local shop and one for small restaurant. The first floor is dining and sleeping area of household. The second floor is using as student accommodation.

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Figure 81: Housing plan of case H5

A	Ancestral Altar	K	Kitchen
B	Bedroom	LR	Living room
CF	Commercial function	S	Store
DA	Drying area	T	Toilet
DT	Dining table	WS	Working space
G	Garage	Y	Yard

Figure 82: Domestic space of case H5

Case study H6 (Visited in 22/08/2017)
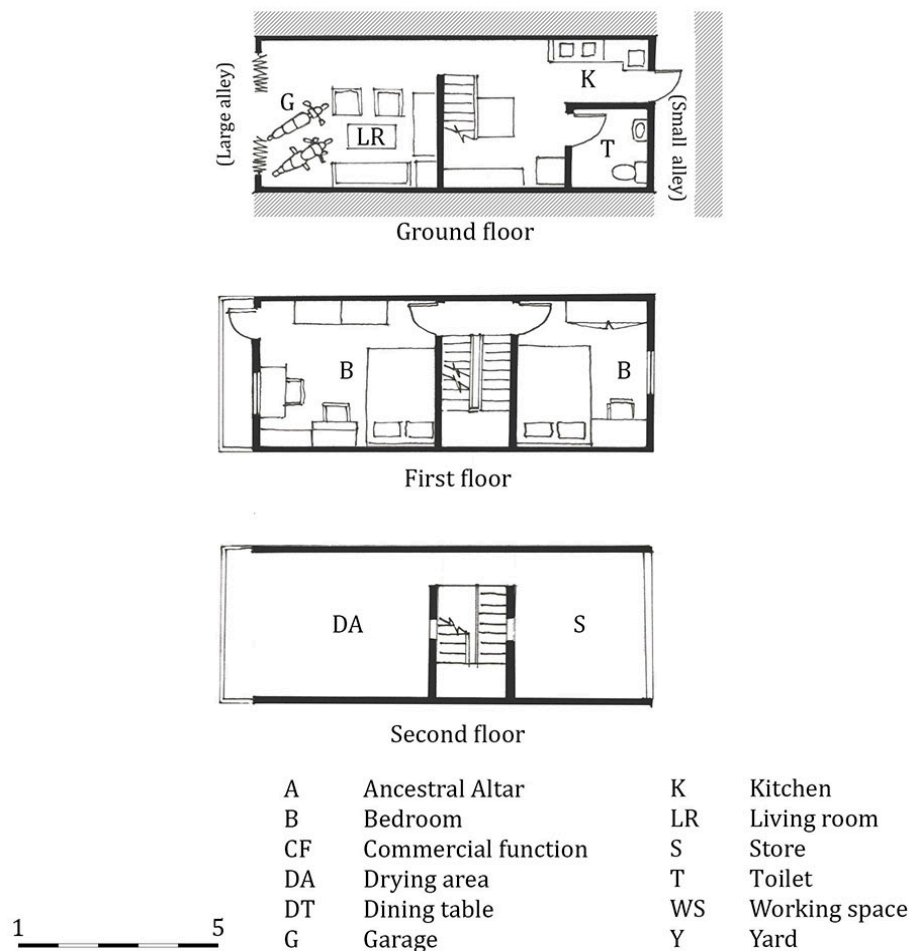
Figure 83: Housing plan of case H6

Case H6 is located in one work-unit in *Đống Đa* district. A house has three storeys including the store and yard. The building covers an area of 40 square meters. Housing plot has rectangle shape, having 4 meters wide and 10 meters long. The house has two entrances: one to the large alley and one to small alley. The building has three storeys. The building has simple brick structure.

In term of spatial organisation, the ground floor and first floors are using as living space while the third level is using as storage. The hierarchy of spaces shows clear different between front/back, lower/higher. In the ground floor, the front room is family living and guest welcome area. The rear side contains kitchen and toilet. The first floor contains two bedrooms. According to household responds, this spatial organisation is quite popular in the 1990s in this neighbourhood. The main transportation is motorbikes and bicycles; thus, there is no garage. Therefore, the main living room is also used as parking area. Also, due to small housing plot and

number of living spaces, there is no separated room for an ancestral altar. Therefore, the ancestral altar has been attached into wall of main bedroom.

Figure 84: Domestic space of case H6

Case study H7 (Visited in 25/08/2017)
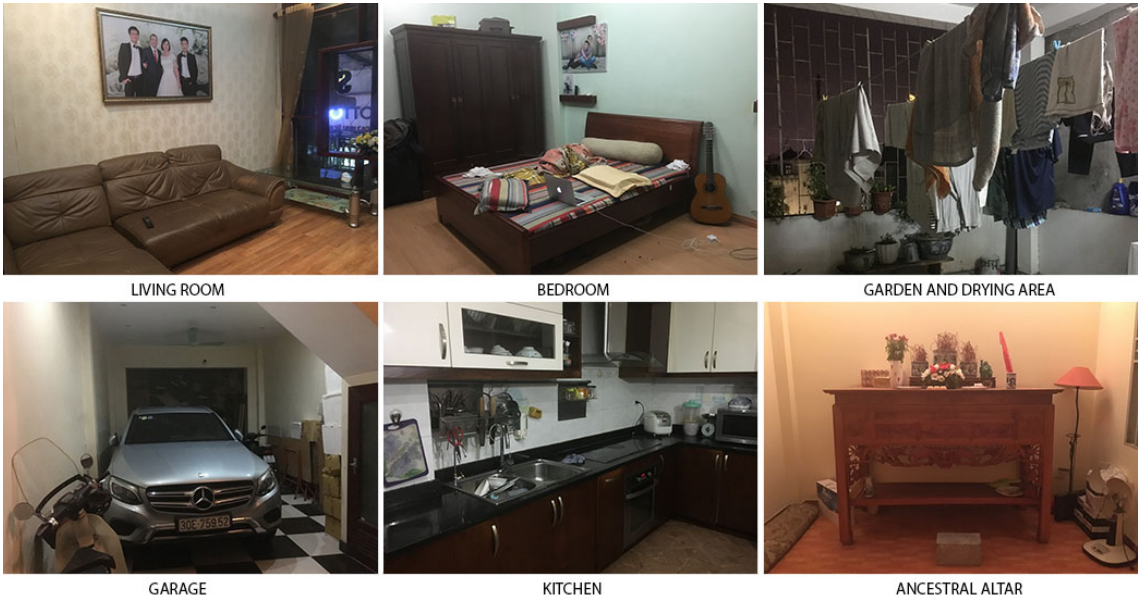
Figure 85: Domestic space of case H7
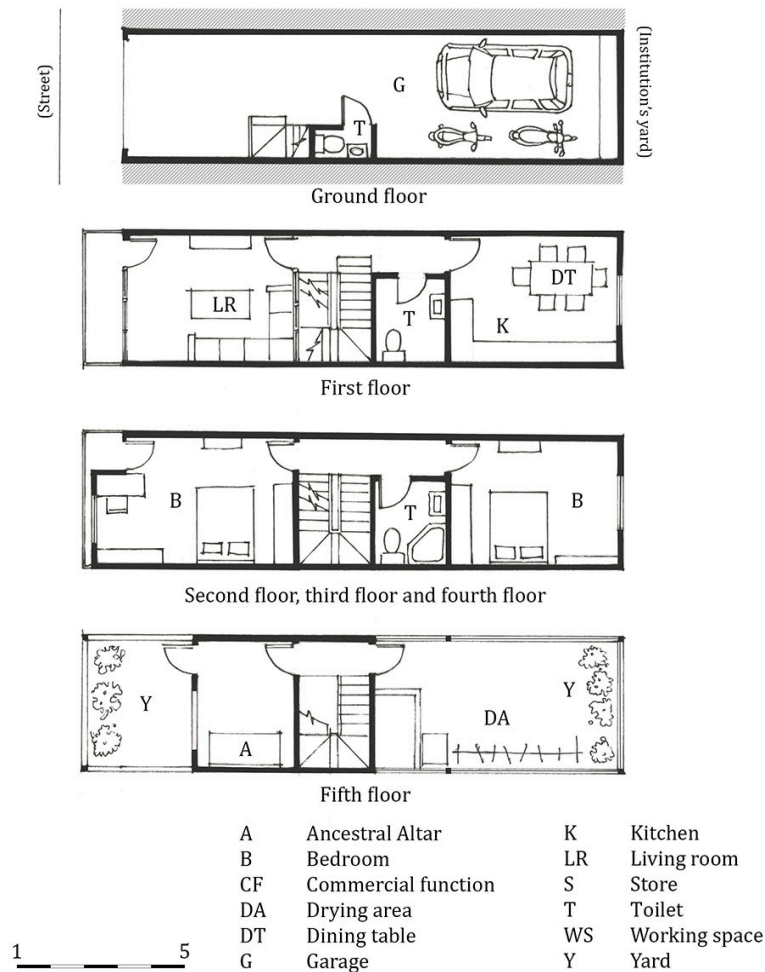
Figure 86: Housing plan of case H7

Case H7 is located in one work-unit in *Đống Đa* district. The house has six storeys, which covers an area of 60 square meters. A housing plot has rectangle shape that has 4 meters wide and 15 meters long. The house has one entrance looking to the main street. The house is adjacent to neighbours' houses in two wings and army's camp in the rear. The main structure is reinforced concrete.

Regarding spatial hierarchy, the ground floor is garage. The living room and kitchen are located in the first floor while bedrooms are in upper floors. The highest floor has two gardens and ancestral altar's room.

Case study H8 (Visited in 03/09/2017)

Case H8 is situated in one formal village namely *Yên Phụ*. A house covers an area of 48 square meters. The housing plot has rectangle shape, which has 4 meters wide and 12 meters long. The house has two entrances. One opens to the main street

while another opens to small communal alley in the rear of building. Two sides of building are adjacent to neighbour's houses.

On the ground floor, a space in the frontage is parking area of motorbikes. The following space is living area while toilet, kitchen and staircase locate in the rear. The master bedroom is on the first floor while the daughter's bedroom is on the second floor. The storage and garden are in the highest floor.
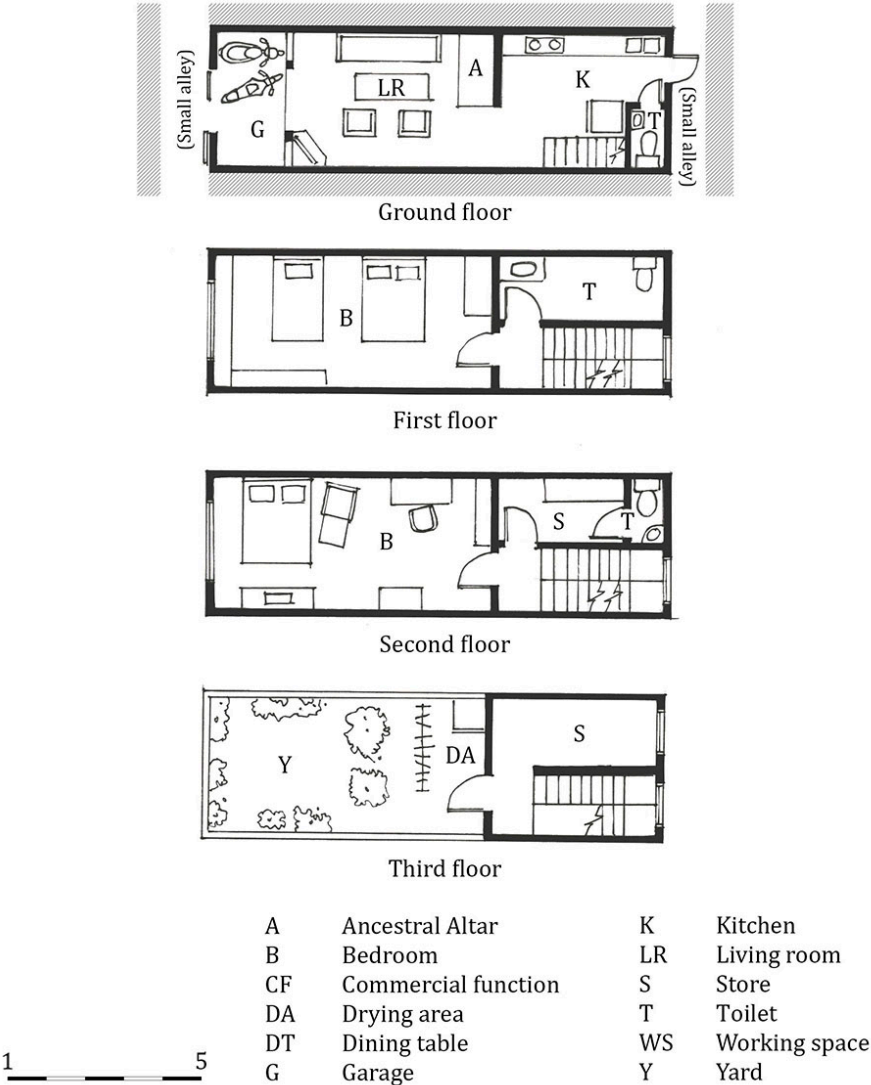
Figure 87: Housing plan of case H8

A	Ancestral Altar	K	Kitchen
B	Bedroom	LR	Living room
CF	Commercial function	S	Store
DA	Drying area	T	Toilet
DT	Dining table	WS	Working space
G	Garage	Y	Yard
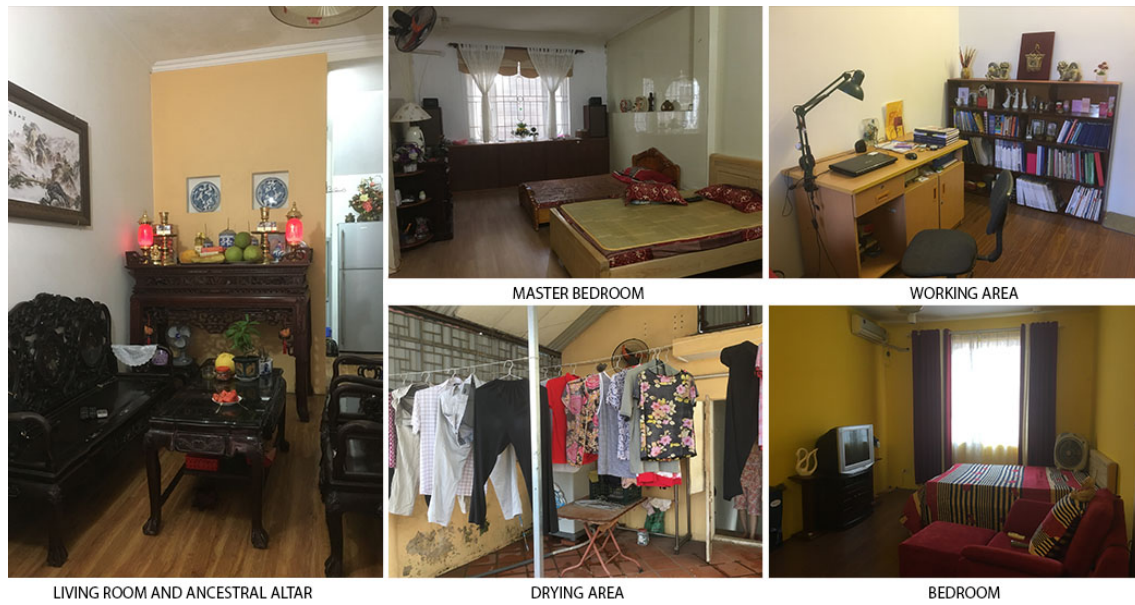
Figure 88: Domestic space of case H8

Case study H9 (Visited in 03/09/2017)

A	Ancestral Altar	K	Kitchen
B	Bedroom	LR	Living room
CF	Commercial function	S	Store
DA	Drying area	T	Toilet
DT	Dining table	WS	Working space
G	Garage	Y	Yard
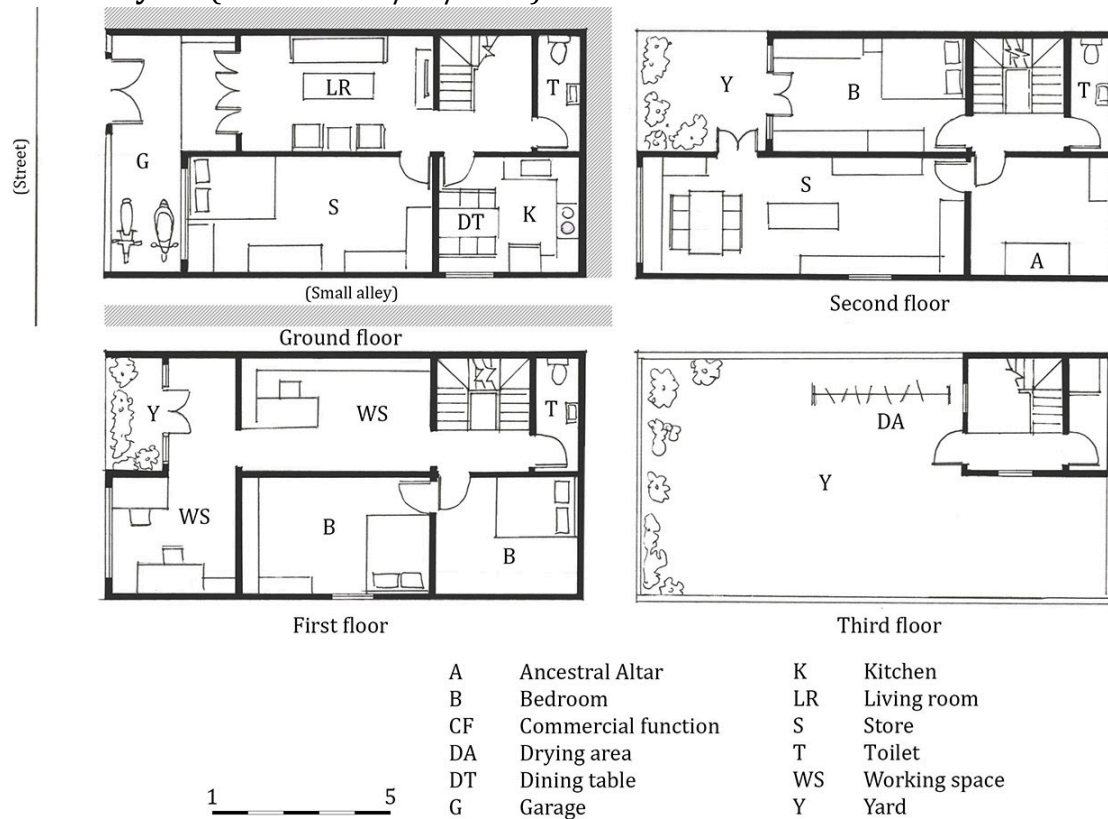
Figure 89: Housing plan of case H9

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Figure 90: Domestic space of case H9

Case H9 took place at a location near the Hanoi economic university. Originally, this area was designed for university employees in the 1990s. House plot covers an area of 94.5 square meters. Housing plot has rectangle shape, which has 7 meters wide and 13.5 meters long. The house is four-storey building. There is one entrance in the frontage. The house is attached to neighbour's houses and communal alley in other sides.

There is an open space for garage of motorbikes in the front. The ground floor has living room, bedroom for elder people and toilet and kitchen in the rear. The staircase, which is used as connecting space between levels, is located in the rear. Meanwhile, there is a large sky well in the staircase for day lighting. The bedrooms and working areas are on the first and second floor. The third floor has large garden and separated washing room.

Case study H10 (Visited in 05/09/2017)

Case H10 is located in new urban area namely *Văn Quán* in *Hà Đông* district. The house plot has an area of 75 square meters. The shape of housing plot is rectangle, which has 5 meters wide and 15 meters long. The house has five storeys. There is only one entrance to the main street while other sides of building are neighbours' houses. The build-up area covers 84 percentage of housing plot.

A framework of this house is built by developers. The household hire an architect to modify and to finish designs. The garage is open space in the original plan. In order to ensure the sense of security, the household transformed the garage into the enclosed spaces by adding temporary roof. The interior and spatial layout is based on ideals of household.

A	Ancestral Altar	K	Kitchen
CF	Commercial function	LR	Living room
		S	Store
DA	Drying area	T	Toilet
DT	Dining table	WS	Working space
G	Garage	Y	Yard
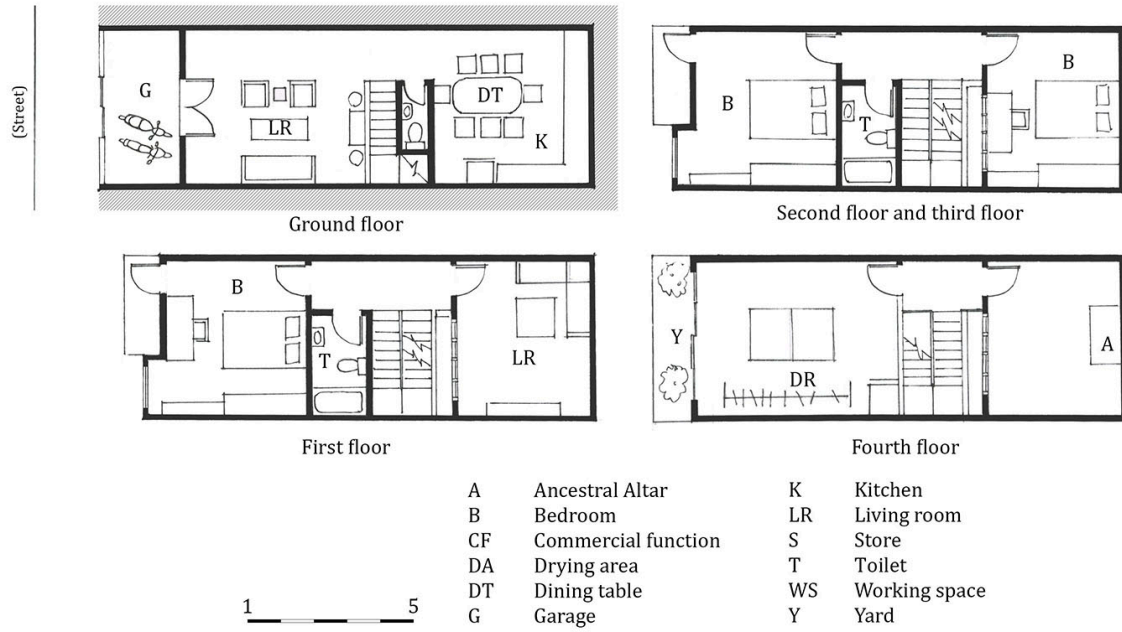
Figure 91: Housing plan of case H10

Figure 92: Housing plan of case H10

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Case study H11 (Visited in 05/09/2017)
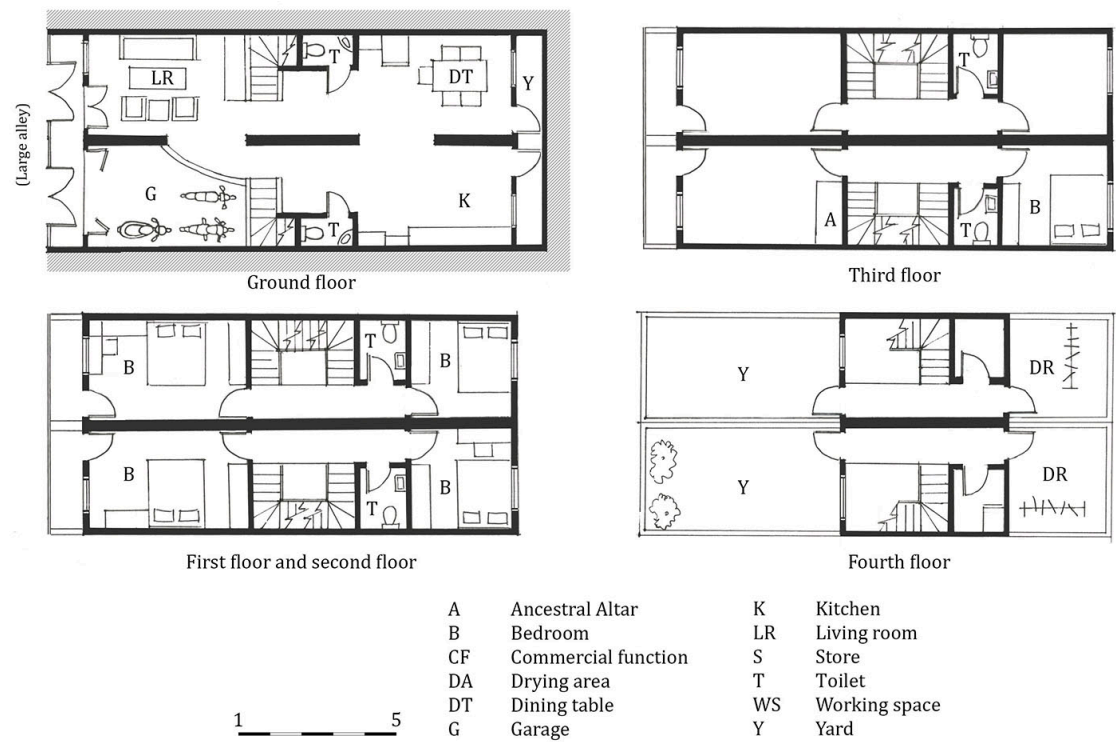
Figure 93: Housing plan of case H11

Figure 94: Domestic space of case H11

Case H11 is located in work-unit area in *Thanh Xuân* district. House plot has an area of 112 square meters. The shape of housing plot is rectangle, which has 7.1

meters wide and 15.8 meters long. The house has 5 storeys. There is only one entrance to the main street while other sides of building are neighbours' houses.

The spatial organisation of this house is slightly different with previous cases. There are two staircase and structure systems in this house. According to responds of household, the house could be divided into two small houses in the future for the children. Also, the house was built to provide living spaces for extended family; thus, there are many bedrooms in this house. The ground floor has living room, garage and large kitchen. The uppers floor contains private bedroom and ancestral altar. The top terrace is garden and clothing drying area.

Case study H12 (Visited in 06/09/2017)

Ground floor

Third floor

First floor and second floor

Fourth floor

A	Ancestral Altar	K	Kitchen
B	Bedroom	LR	Living room
CF	Commercial function	S	Store
DA	Drying area	T	Toilet
DT	Dining table	WS	Working space
G	Garage	Y	Yard
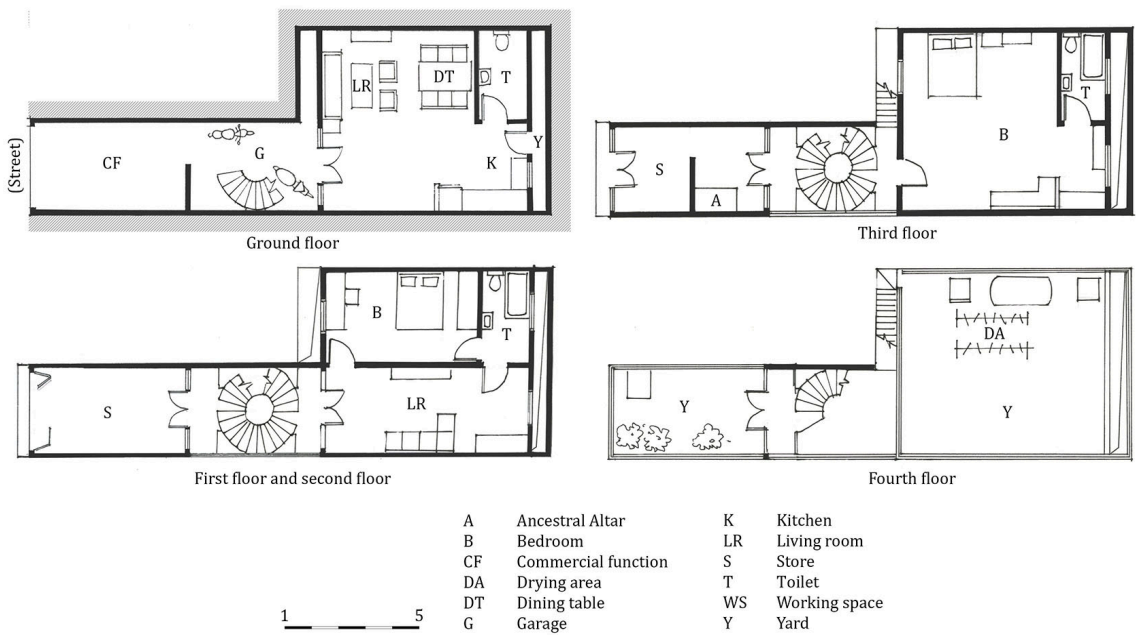
Figure 95: Housing plan of case H12

Case H12 locates in old residential area in *Đống Đa* district. House plot has special shape, which is unusual in the urban area. To explain about the L shape, household revealed that in the old day, the housing plot had rectangle shape. In the 1990s, they needed money to invest into their business; thus, they sold part of land. The current house has 5 stores. There is only one entrance to the main street while other sides of building are neighbours' houses.

In the ground floor, the front space is using as commercial area. Behind the staircase is place of living room and kitchen. The back of building has small courtyard to promote cross ventilation. The staircase in this house is different from staircases in previous cases owing to spiral shape. It was designed by interest of

household. The upper floors contain complex of bedroom, private living room and toilet. Gardens are located in the top terraces.

Figure 96: Domestic space of case H12

Case study H13 (Visited in 08/09/2017)

A	Ancestral Altar	K	Kitchen
B	Bedroom	LR	Living room
CF	Commercial function	S	Store
DA	Drying area	T	Toilet
DT	Dining table	WS	Working space
G	Garage	Y	Yard
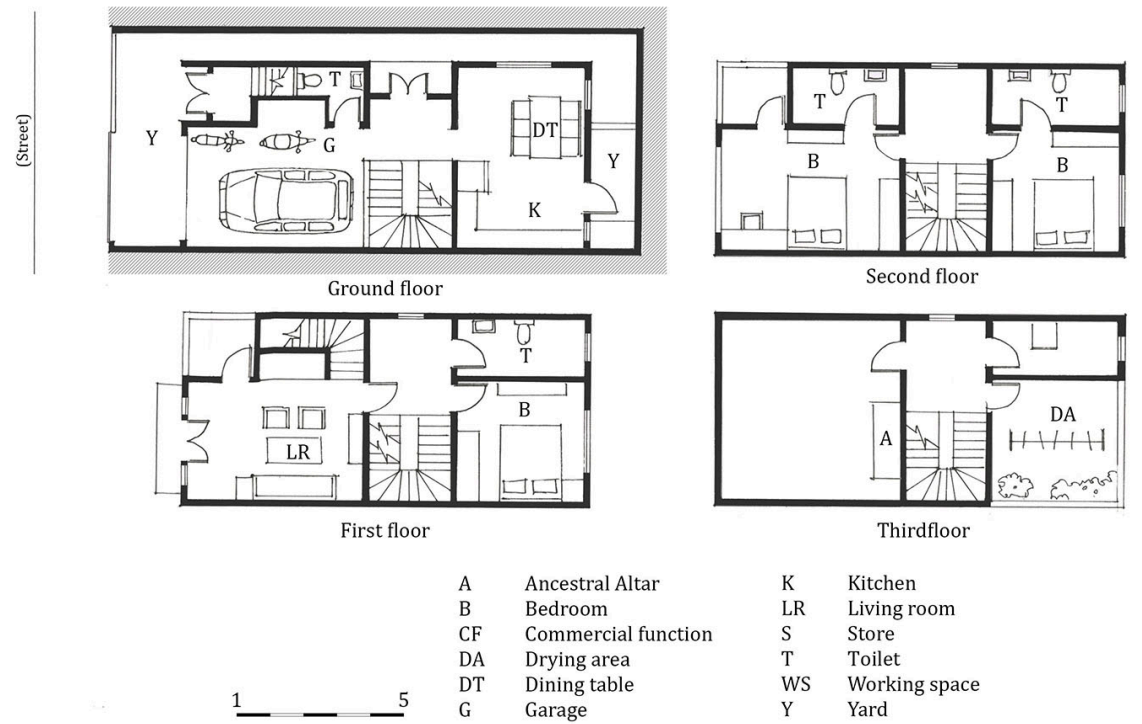
Figure 97: Housing plan of case H13

Figure 98: Domestic space of case H13

Case H13 locates in new urban area namely *Mễ Trì Thượng* in *Từ Liêm* district. A house has 4 storeys, which is semi-detached house. House plot has rectangle shape, which has 6.8 meters wide and 16 meters long.

According to responds of household, in 2016, the house was built over the framework, which was built by developers. Household has to hire architects to design the details of building including external and interior design. This house has internal garden in three sides of building. The ground floor is used as garage and kitchen. The main living room and bedrooms are situated in the first and second floors. The third floor is used as places of ancestral altar and laundering.

Interestingly, when designing, there are two staircases in this case. One, which is located in the centre, is to connect all levels. Meanwhile, there is another stair to connect the living room and main entrance. By that, guests could directly access to living room without crossing through kitchen and garage.

Case study H14 (Visited in 08/09/2017)

The case H14 locates in new urban area in the centre of Hanoi city. The house plot has rectangle shape, which has 5.5 meters wide and 16 meters long. The house has 6 storeys. There is only one entrance to the main street while other sides of building are adjacent to neighbours' houses.

Due to newly built house, the building has garage in the underground level, the ground of building has been levelled around 1.5 meters. Beside the staircase, the house has one elevator for elders and children. In the ground floor, there is a main living spaces and office of family-based business. The upper floors are private

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bedroom, ancestral altar. The household also create two gardens in the top terraces.

A	Ancestral Altar	K	Kitchen
B	Bedroom	LR	Living room
CF	Commercial function	S	Store
DA	Drying area	T	Toilet
DT	Dining table	WS	Working space
G	Garage	Y	Yard
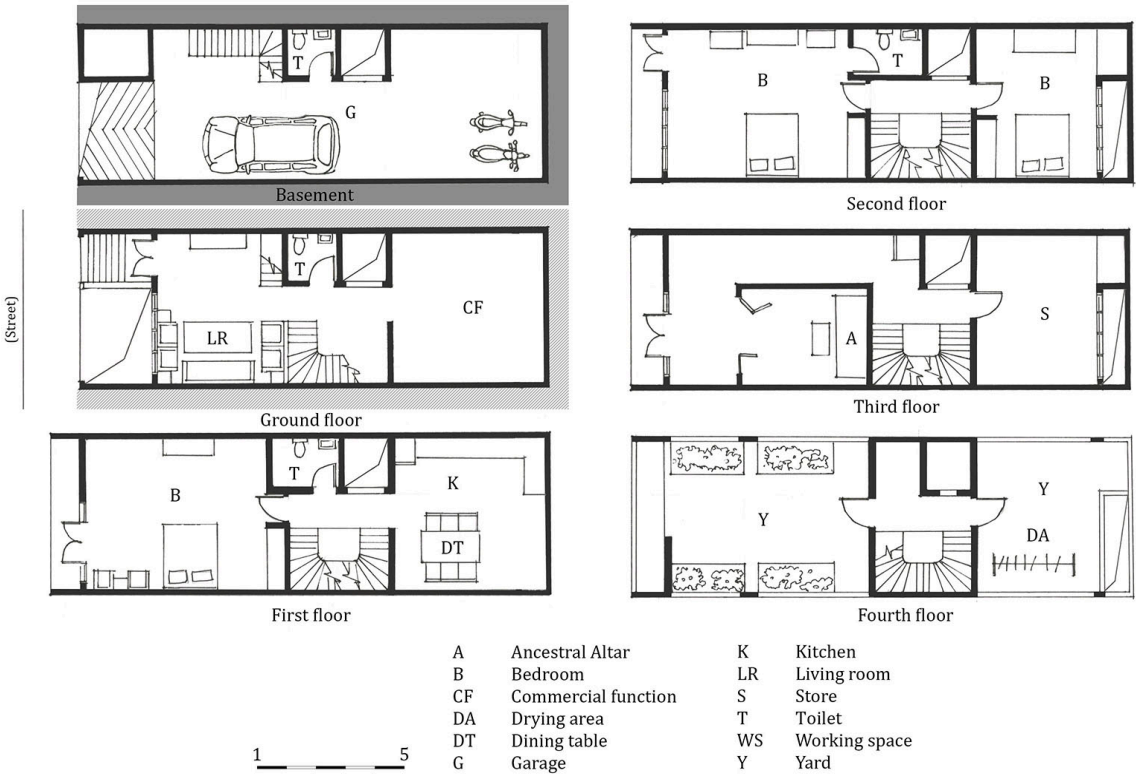
Figure 99: Housing plan of case H14

Figure 100: Domestic space of case H14

Case study H15 (Visited in 08/09/2017)

Case H15 locates in the outskirt of Hanoi city. The house plot has rectangle shape, which has 4 meters wide and 13.5 meters long. The total area of housing plot is 54 square meters. The house has 4 storeys. There is only one entrance to the main street while other sides of building are neighbours' houses.

A	Ancestral Altar	K	Kitchen
B	Bedroom	LR	Living room
CF	Commercial function	S	Store
DA	Drying area	T	Toilet
DT	Dining table	WS	Working space
G	Garage	Y	Yard
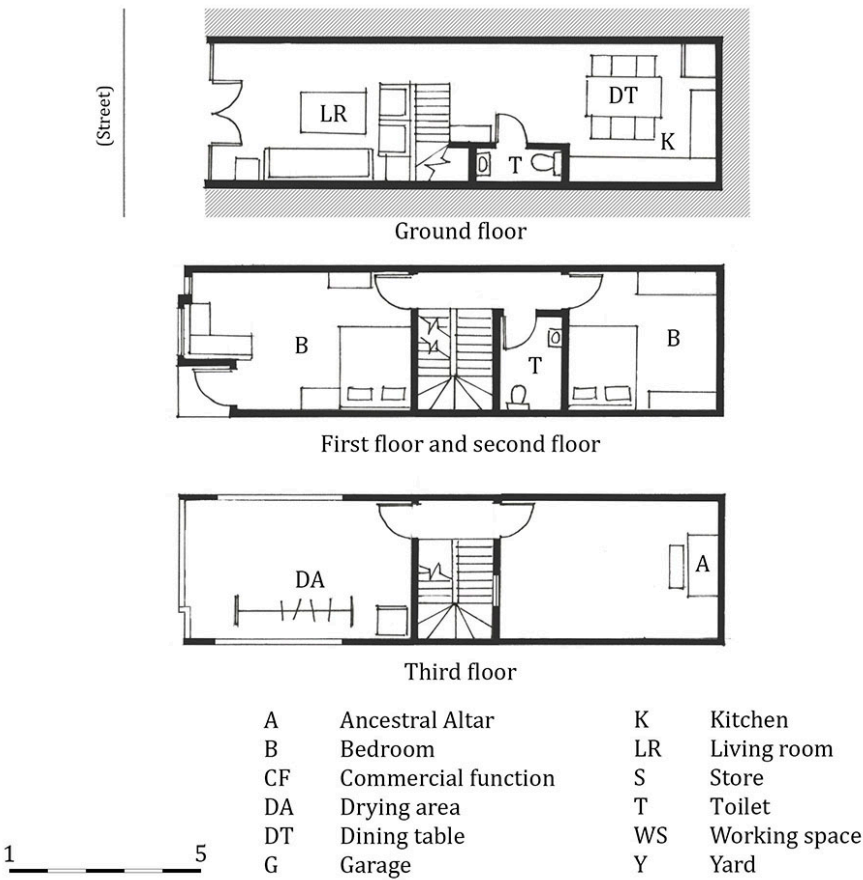
Figure 101: Housing plan of case H15

Figure 102: Housing plan of case H15

Case study H16 (Visited in 09/09/2017)

A	Ancestral Altar	K	Kitchen
B	Bedroom	LR	Living room
CF	Commercial function	S	Store
DA	Drying area	T	Toilet
DT	Dining table	WS	Working space
G	Garage	Y	Yard
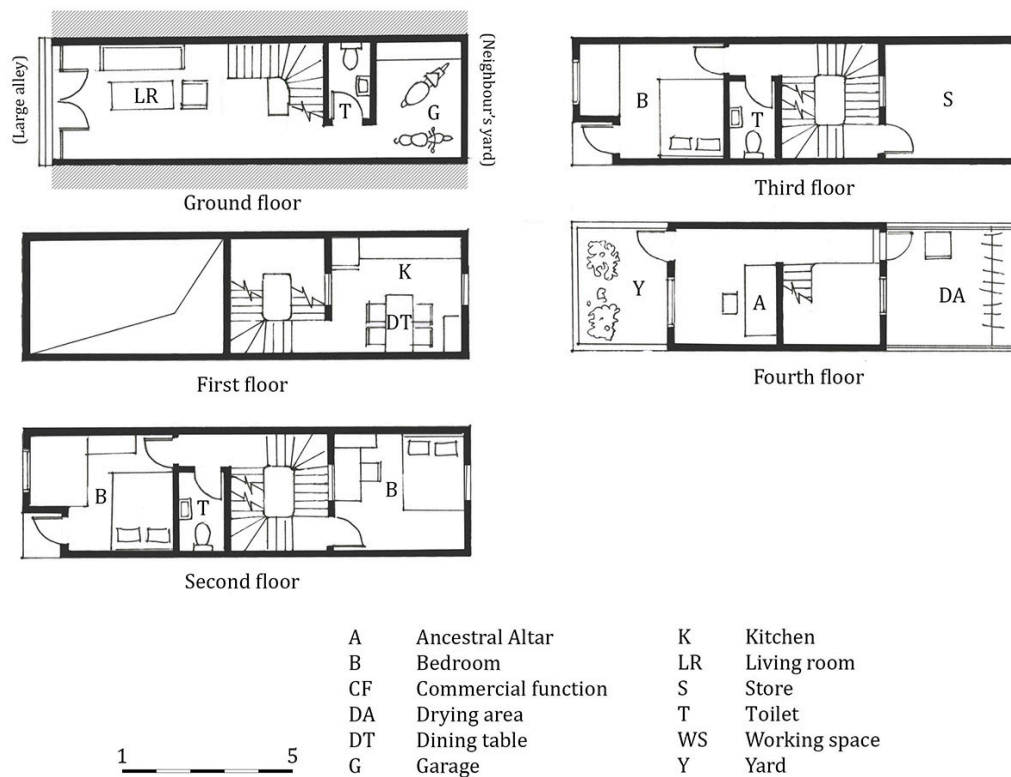
Figure 103: Housing plan of case H16
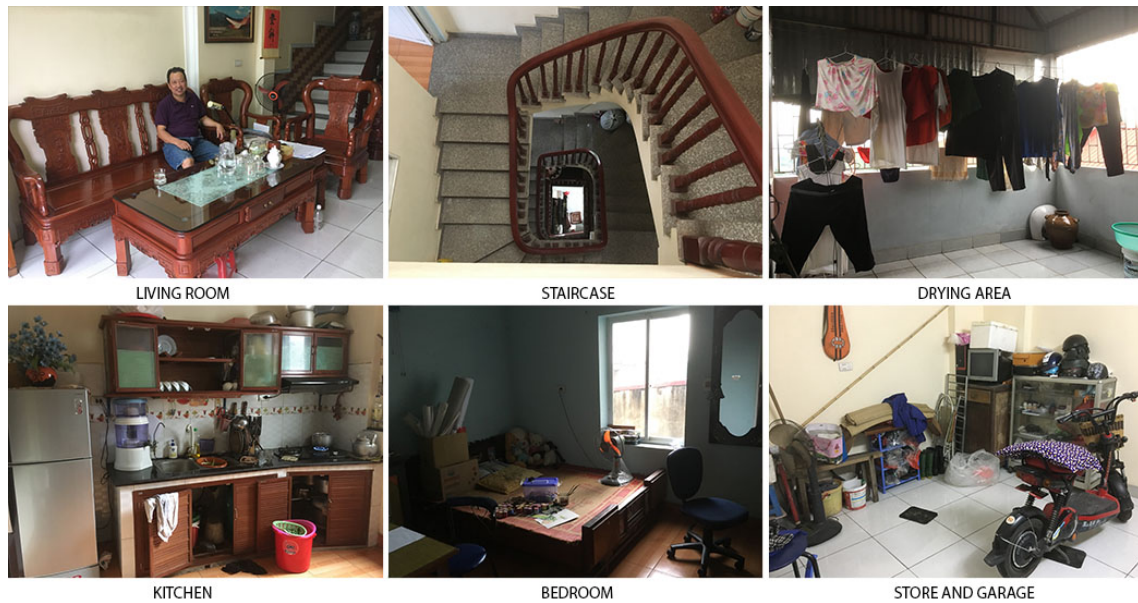
Figure 104: Domestic space of case H16

Case H16 locates in work-unit in the *Long Bien* district. The house plot has rectangle shape, which has 3.75 meters wide and 12.8 meters long. The total area of housing is 48 square meters. The house has 5 storeys. There is only one entrance to the main street while other sides of building are adjacent to neighbours' houses.

The design of this case has some differences comparing to previous case studies. First of all, in the ground level, the garage for motorbikes is designed in the rear of building. Secondly, although the house is situated in flat area, the house has various levels. Each room situated in different levels due to interest of household.

Case study H17 (Visited in 09/09/2017)

Case H17 locates in work-unit in the *Long Bien* district. House plot has rectangle shape, which has 3.8 meters wide and 14 meters long. The total area of housing plot is 53.2 square meters. The house is 3 storey-building. There is only one entrance to the main street while other sides of building are adjacent to houses of neighbours. The main structure is reinforced concrete. There is no paining in the interior walls yet. This suggests that the construction is still in process. Family members respond that they would finish the interior by themselves when they have free time.

The plan of building is quite similar with previous case studies. The distinct characteristic is the windows in the rear and in one side of building. Those windows open toward to neighbour houses. Before building the house, household has an agreement with neighbours to create windows for cross ventilation. When

neighbours upgrade or build the house in the future, the windows will be blocked as they will have functioned as normal walls.
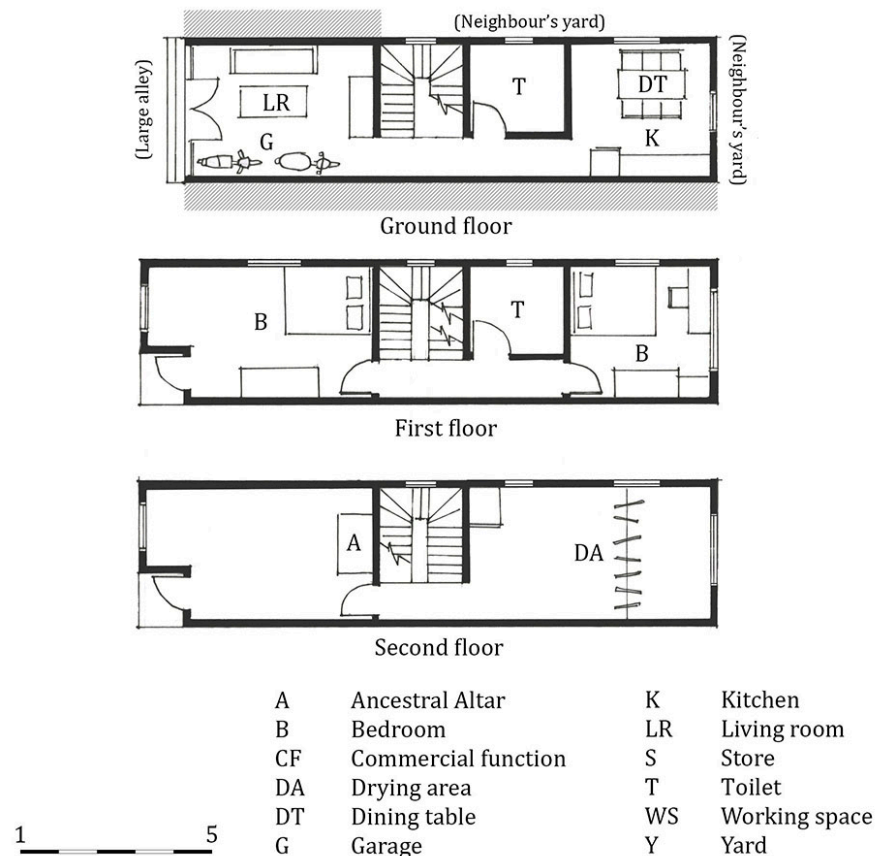
Figure 105: Housing plan of case H17

Figure 106: Domestic space of case H17

Case study H18 (Visited in 10/09/2017)

The case H18 locates in new urban area locating in the *Long Bien* district. The house plot has rectangle shape, which has 4 meters wide and 12 meters long. The total area of housing is 48 square meters. The house has 5 storeys. There is only one entrance to the main street while other sides of building are attached to neighbours' houses.

Due to setback rule, the front space of building is used as garden. There is a garage and toilet on the ground floor. The first floor has storage. Kitchen and living room are in the second floor. The third floor and the fourth floor are place of bedrooms. The ancestral altar and garden are on the highest floor

A	Ancestral Altar	K	Kitchen
B	Bedroom	LR	Living room
CF	Commercial function	S	Store
DA	Drying area	T	Toilet
DT	Dining table	WS	Working space
G	Garage	Y	Yard
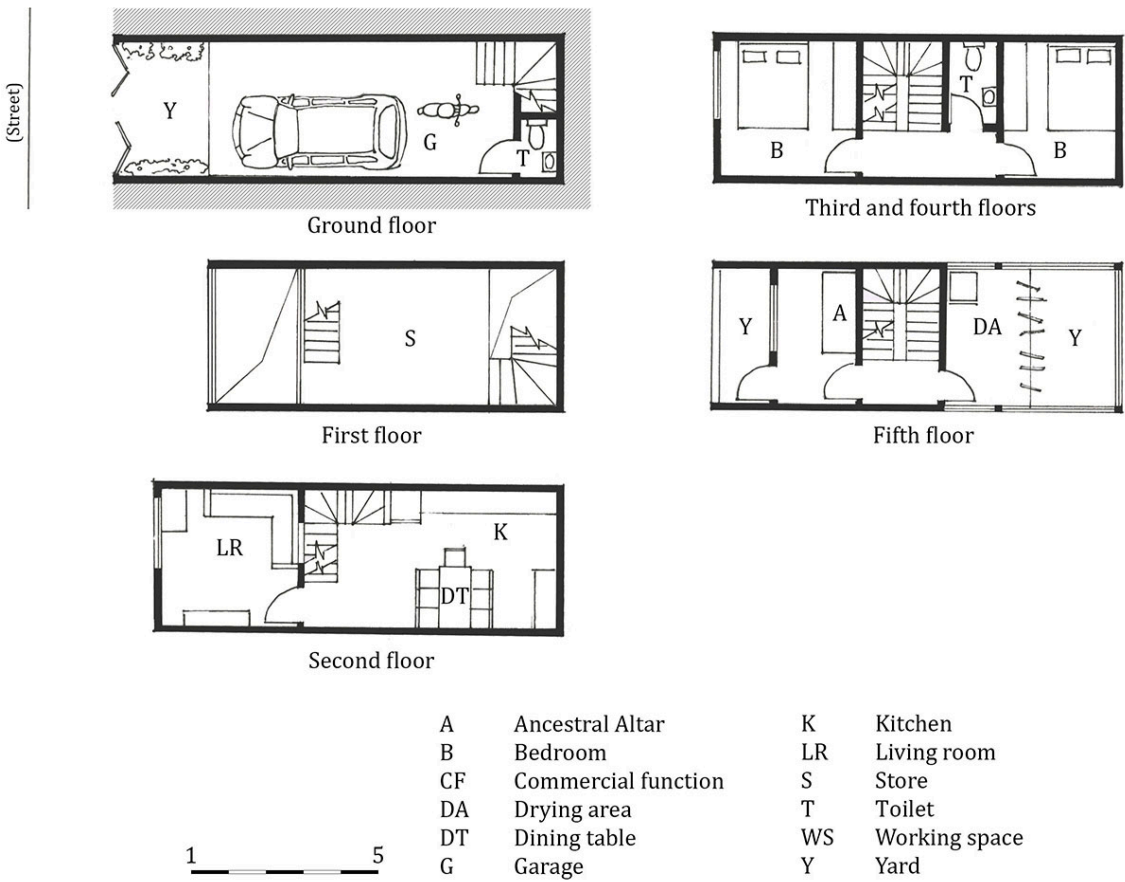
Figure 107: Housing plan of case H18

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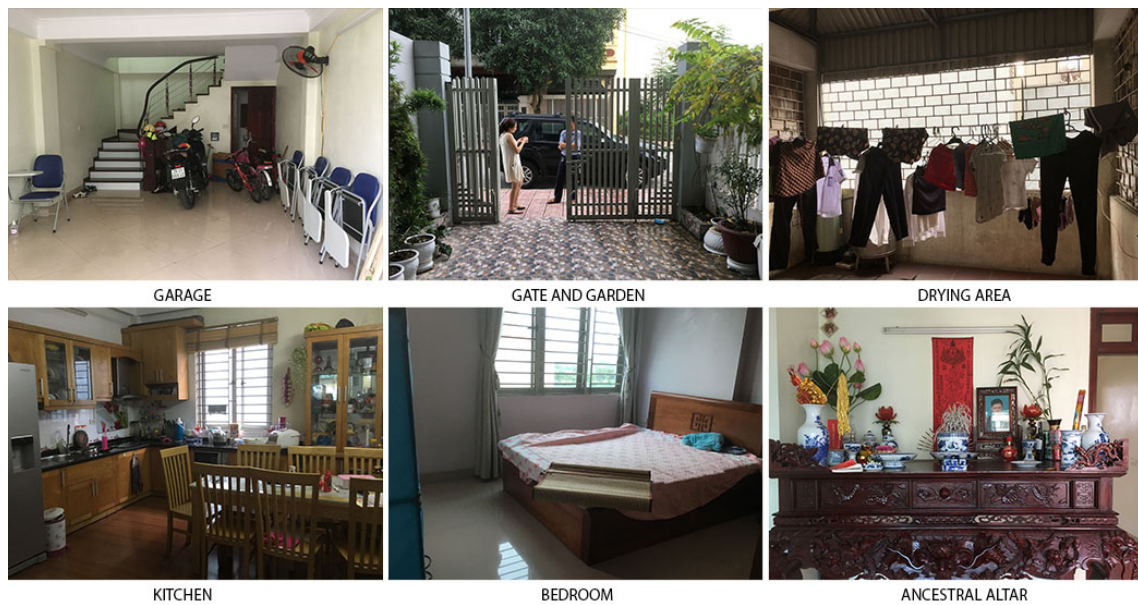
Figure 108: Domestic space of case H18

No.	Location	Number of living spaces	Number of floor (s)	Plot area (m2)	Building coverage ratio (%)
1	Work-unit area	14	4	127.3	82.75
2	Work-unit area	12	6	60.6	100
3	Work-unit area	8	4	22.5	100
4	Work-unit area	12	5	48.4	100
5	Work-unit area	13	3	89.6	100
6	Work-unit area	5	3	40	100
7	Work-unit area	15	4	60	100
8	Urban village	9	4	48	100
9	Work-unit area	14	4	94.5	76.45
10	New urban area	15	4	75	83.33
11	Work-unit area	26	4	112	92.5
12	Urban village	15	4	100.8	90.15
13	New urban area	12	4	108.8	65.49
14	New urban area	13	6	88	100
15	Urban village	10	3	54	100
16	Urban village	11	5	48	100
17	Urban village	8	3	53.2	100
18	New urban area	12	5	48	79.2

Table 15: Main characteristics of collected case studies

Table 15: Main characteristics of collected case studies. It shows that each case study has various distinct characteristics regarding number of living spaces and number of floors. It means that each building has been designed differently in three types of settlements rather than fixed physical models. Also, majority of cases studies have high building coverage ratio while the area of housing plots are very

lows. For further details, the following sections explain the differences and similarities in housing form and spatial organisation of case studies.

5.3.2 Housing form

Before going to details of case studies, it is importance to mention the difference of general characteristics of self-built housing in three different urban neighbourhoods in Hanoi city. Figure 109 compared main characteristics of neighbourhoods. Generally, housing typologies in urban village seem unregulated. By contrast, housing in work-unit area and new urban area have clear planning structure. As a result, housing typology in work-unit area and new urban have seem follow regulations and standards.

	Block layout	Plot characterstics	Building density	Housing facade example

Square 1: Urban village

Square 2: Work-Unit area

Square 3: New urban area

250   0 m
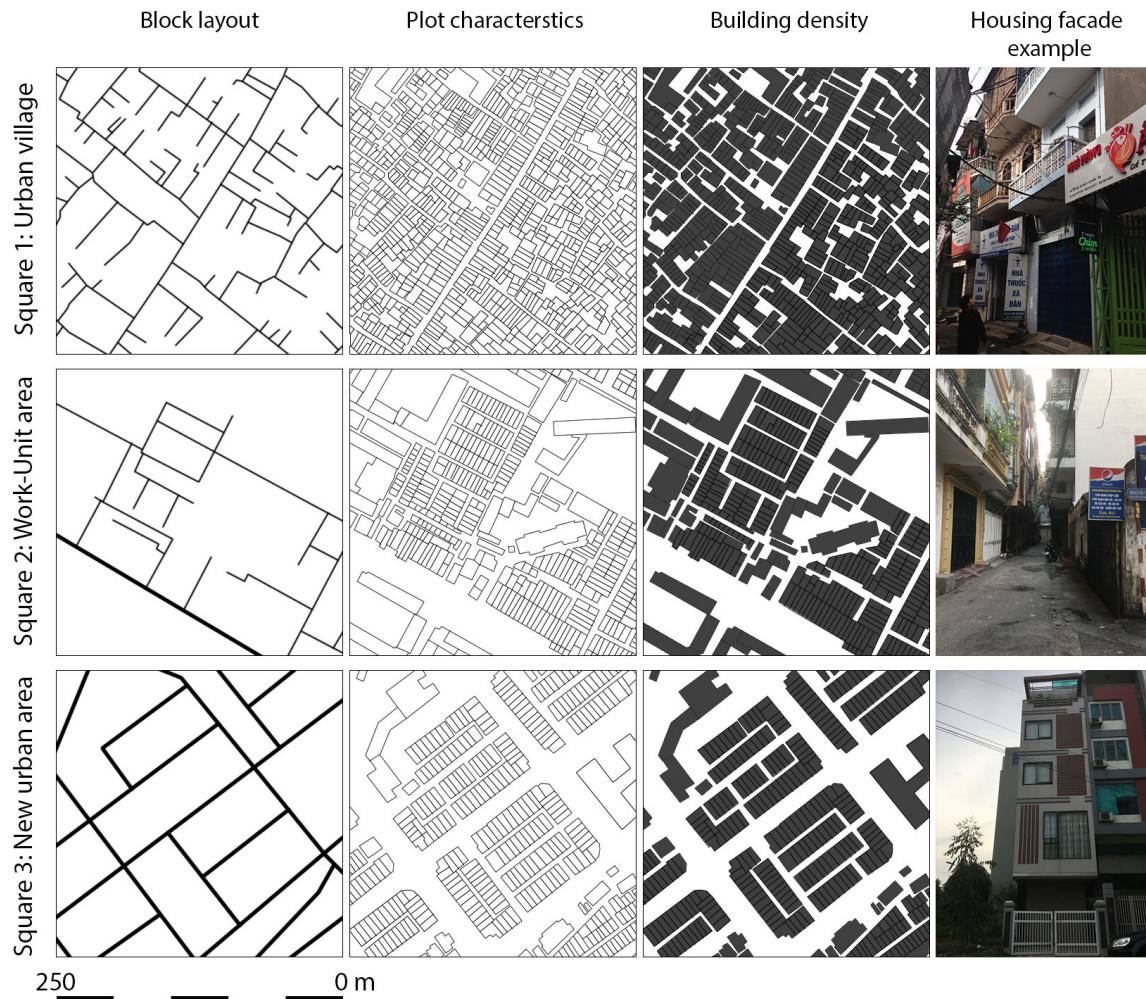
Figure 109: Overview characteristics of neighbourhoods and self-built housing in Hanoi since the economic reform[20]

There are two main reasons for unregulated structure and housing form in urban village. Firstly, households often develop local infrastructure and detailed planning in their own housing plots by themselves. In this regard, one big plot could be divided into smaller housing plots. Size of housing; therefore, is depending on intention of households rather than local planning (Fanchette, 2015; Van et al., 2003). In order to create accessibility for housing, which is locating in the end, a shared pathway (*Ngõ chung* in Vietnamese) could have been made. As a result, housing plots and size of alleys in urban village are unregulated. Most of alleys are very narrow and dark. The width of alleys is approximately two meters. The size of housing plot is varying depending on location and self-planning strategies of

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[20] For details of each square, please see Appendix D

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households. For example, one interviewee, who are living in case H17, revealed that:

> *I got this house from my parent. When my parent passes away in 1995, the land had been divided into six smaller housing plots. My two brothers, my sister and I, each got one housing plot for living. Meanwhile, two plots were sold and money from land selling was equally distributed to my brothers, sister and I to build new houses and for saving.*

Mrs N. Ngoc, interview in 09-09-2017
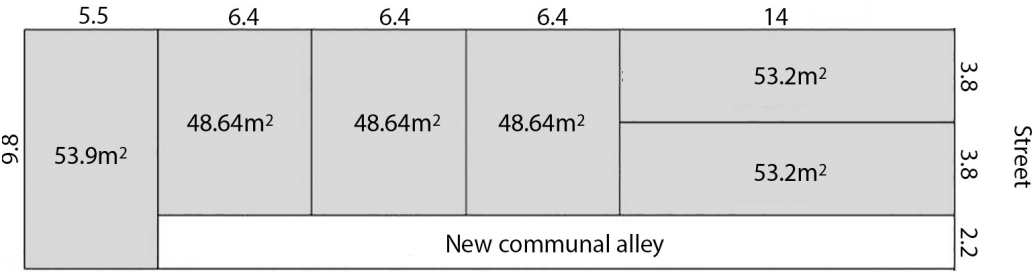
Figure 110: Self-divided housing plots in urban villages' area according to Mrs Ngoc

Secondly, owing to limited planning control, inhabitants in urban villages always exploit the regulations to maximize their living spaces (Ngo, 1998; Bousquet, 2016 and Koh, 2006). Due to unclear regulations and planning during the transitional period in the 1980s and 1990s, households were free to build whatever they want in the village's settlements. Uncontrolled building activities took place in urban village in many years.

> *After the reform, this area did not have plan. Many houses did not have building certificates [...]. With big buildings, in theory, they have to get plans and building certificates; however, in reality, the building may have modified the original plans [...] To avoid future conflict, households have to negotiate with each other when building a house*

N. T. Truong, interview in 25-08-2016

Generally, all buildings had to apply the standard building codes; nevertheless, most households had able to rebuild their houses as big and high as possible through different tricks. For examples, the height of private houses and building density are limited depending on the size of housing plots. Nevertheless, those policies evidently do not slow down the housing development and extension of housing in the urban villages. Particularly, if the housing plot has an area less than fifty square meters, the build-up area could cover the entire housing plot. Therefore, households divide their housing plots into smaller plots of around 40 to

50 square meters for their children or selling. By that, most households in the urban villages have able to rebuild their houses cover all the plots with concrete frame and brick walls. Meanwhile, the building regulations have clearly implied that setbacks in all sides of the building should be inside the housing plot. Nevertheless, there is no permit in practice that allows owners to change the design during practice after inspection. Normally, house owners apply the regulations in the structural grid in the ground floor. Inspectors generally come and check the structural grid and foundation of building. As a result, house owners always take advantage of this to extend upper floors over the beam line to increase floor area. Due to those reasons, houses in traditional areas are very close to each other. Even though it is illegal, in the case that the local officials come to check the dwelling's design, households often seek informal resolutions to uncover their wrongdoings (Tran and Ngai, 2017). In exchange, the officials will turn on blind so that the officials at higher levels will not know about that case. Alternatively, a household could pay a fine called "*phạt để tồn tại*"; after that, the illegal parts of dwelling could be retained (Koh, 2006). Consequently, the building density in the urban village is very high.

> *The building plans and certificate are just used for the administrative procedures. In reality, in some areas, the building regulations are applied very strictly in some parts of the house such as length and depth of logia and balconies, particularly with housing locating in the main streets. However, in reality, the houses always have various different aspects with the original plans.*

> *N. T. Luc, 60 years old, interview in 03-09-2016*

In term of living environment, housing in urban village often has mix-function between living spaces and shops. Although mix-function building could be found in new urban area and work-unit, a concentration of mix-function buildings in urban village appeared in large scale, along main streets and large alleys. To explain about this phenomenon, most households living in urban village are farmer, after losing the agricultural land, finding a new job is a challenge; as a result, they design parts of their houses for private business (Nguyen, 2016; Bousquet, 2016). The income from the business is significant for household to pay living costs.

On the other hand, households living in work-unit's area work in public services and state companies nearby while the new middle classes often choose to live in new urban areas. Thus, shops in work-unit and new urban area focus on commercial services such as offices and English centre. A diversity of small shops, restaurant and street market could not find in work-unit area and new urban area. For example, one interviewee living in new urban area revealed that:

> *The rent of ground floor in this new urban area is very expensive. It could be approximately 30 million VND per month calendar. A rent for*

a house is much more expensive. The house that has four floors with 90 square meters could be rent for 3000 dollars per month. Most of rent houses are using for offices and English centre [...]

N. T. Hoang, interview in 05-09-2017

In term of typology, not all self-built housing had similar size; nevertheless, they shared a similar characteristic: a tube form, which is long and narrow. All four case studies in new urban area have tube form. In urban village and work-unit area, eleven case studies have tube form and three cases have unidentified shapes of typology, (Figure 111) (Please see appendix E for details of case studies). Particularly, three cases (H2, H5 and H12) have special shape due to housing expansions (See section 6.4.3.2 for details). Because the main typology of self-built housing has tube shape, the self-built housing form is always referred as tube house or "*Nhà Ống*" in Vietnamese (Kien, 2008b). The tube form in different urban neighbourhoods in Hanoi, Vietnam since the economic reform in 1986 could be explained by two following reasons:

Figure 111: Typology of housing plots (Detailed of case studies, please see appendix F)

Firstly, that shape provides essential needs for living spaces for work-unit and new urban area. Because of housing shortage, tube house form has been planned to maximise the number of houses. Each plot is planned for basic living spaces for a single nuclear family. The typical plot has an area between forty to sixty square meters; the width of plot is about four meters while the length of plot is between ten to fifteen meters.

Secondly, the tube house is popular in urban villages due to living styles. In the past, Hanoi was popular trading town, and commercial spaces were common part of traditional house; thus, the typology of building was often very long and narrow. After the economic reform, the informal economy still shared large amount of family income. Thus, in the frontages are often used as shops or for rent to generate income. A house, which has large façade, will have more advantage for attractive customers rather than a house with small facade. Meanwhile, within the market

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system, a big façade house in large streets is much valuable prices; thus, most housing has tube form.
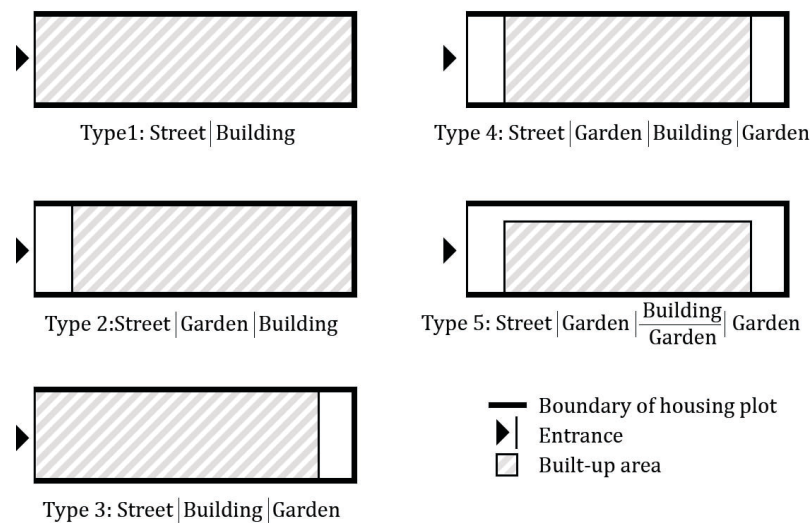
Figure 112: Different types of built-up area in case studies

Although the typology of self-built housing shares common tube form, detailed analysis of samples indicates that built-up area of housing could be classified to 5 different types regarding the relationship between access way and built-up area (Figure 112). To explain about this, among 18 case studies, the regulations of neighborhoods also significantly contributed to the housing typology. As explain in the previous section, the built neighborhood of self-built could be classified into three types including (1) work-unit areas, (2) new urban area and (3) urban village. Overall, type 1, 2, 4 and 5 could be found in new urban area; by comparisons, type 1 and 3 are common housing typology in both work-unit area and urban village.

In term of architectural aspects, table 16 shows general characteristics of housing in each type of urban neighborhood. Generally, house in new urban area have four to five storeys while housing in work-unit area has four storeys. Houses in urban village have three to four storeys. Besides, the area of housing plot in new urban area is larger than the one in work-unit, which is larger than area of plot in urban village. In term of building coverage, houses in urban village and work-unit tended to cover all housing plot. By contrast, house in new urban area have to follow strict regulations; thus, the building coverage ratio of buildings in urban area is smaller than those in other urban areas.

Location of building	Average number of storey (n)	Average plot area (m2)	Average building coverage ratio (%)
New urban area	4.75	79.95	82
Work-unit area	4.11	72.77	94.63
Urban village	3.8	60.8	98.03
Mean	4.17	71.04	92.77

Table 16: Overview characteristics of housing design (Based on 18 collected case studies)

In term of construction, of self-built housing construction in all urban areas applied similar materials and structure. Particularly, among 18 case studies, 17 cases have reinforced concrete structure and brick wall. Only one case, which was built in the early 1990s, uses bricks as framework and wall. The findings of housing materials and construction based from 18 cases studies are quite similar with other report of housing in Hanoi (Loan and Nishimura, 2004). It means that although the quality and conditions of infrastructure and services are depending on local planning, the quality of housing construction is much depending on the care of house owners. In this regard, households always use permanent materials for housing constructions.

Figure 113: Example of materials in one building under construction process. (Top left) A local builder put mortar on the wall, (top right) Concrete for structure and brickwork for wall, below left: Unfinished staircase, below right: Electronic wire under the wall.

5.3.3 Spatial organisation

This part analyses function and spatial organization of collected case studies of self-built housing in Hanoi city. For illustration, spatial syntax was applied. Based on space syntax techniques, plans of collected self-built housing has been transformed into access map (Please see appendix E for details). Specifically, within space syntax techniques, the space elements are reduced into simplified forms to present structural concept. Within that concept, all spaces are equally significant no matter the size of space, and each space is analysed in term of its relationship to other spaces in the same network. The reduction of plans is known as the justified access graphs where spaces are represented by the circles while paths between spaces are represented by lines. Each space is connected to other spaces according to the number of spaces that need to be passing through the system.
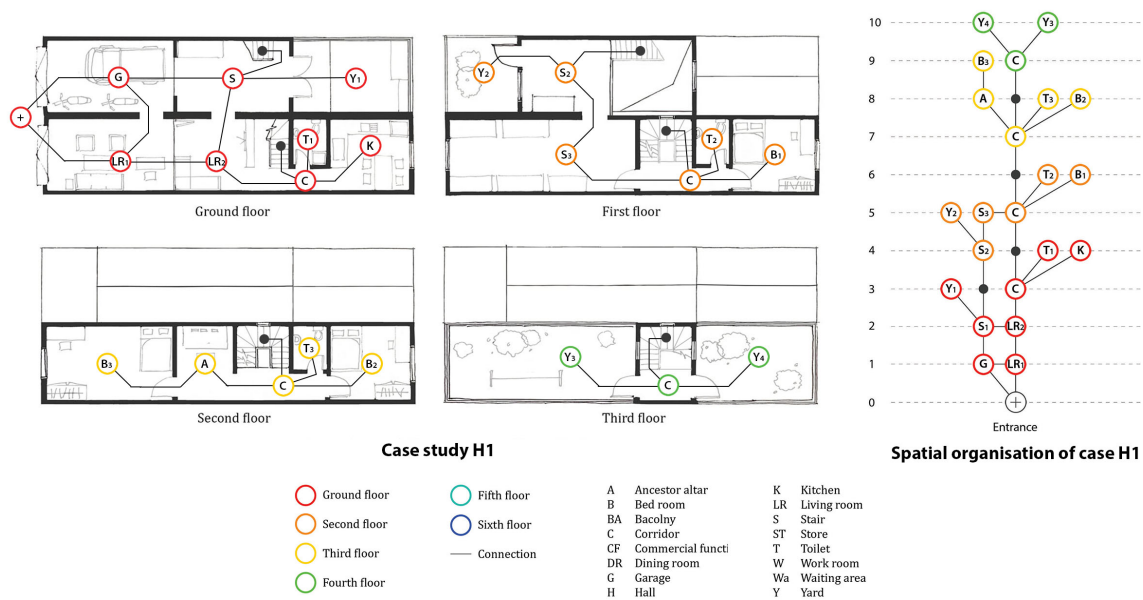
Figure 114: Spatial structure of case H1

For exampe, figure 114 illustrates the spatial connections of case H1 and spatial diagram. Each circle is represented for one room while color of circle represented for level of floor within a house. Each room is coded according to its function such as B for bedroom and K for kitchen. The staircase is represented as black dot. Each space has particular depth that shows the connection between its space and surrounding spaces. For example, the depth of entrance is 0 while the depth of kitchen is 4. It means that everyone needs to pass at least 4 spaces from the entrance to the kitchen.

Spatial organisation of case studies
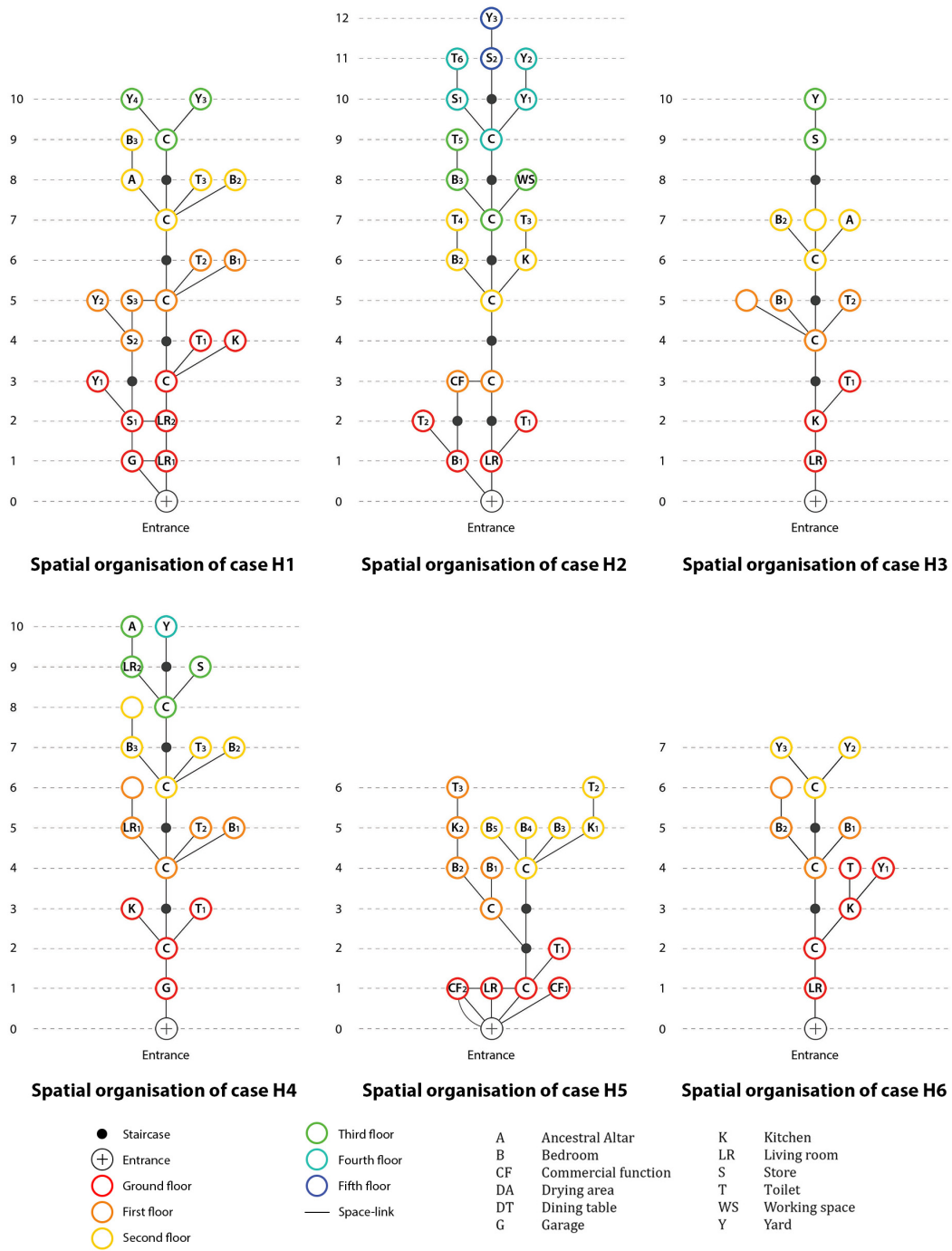
Figure 115: Spatial organisations of case studies

In the case study H1, the building has two main entrances. One let to main living space and other one opened into the garage. Due to two entrances, the organisation appears as ring structure. Overall, there are three rings in the complex. Of these three rings, one is external while two are internal. The ring's structures pass

though several functional rooms including garage, store and living rooms. Despite that, except the living rooms, all spaces in ring structures are supported spaces for family business and parking area. The other main living spaces, such as bedrooms, kitchen and worship room, connect directly with corridor in each level. Thus, an organisation of the other main living spaces appeared as tree structure.

Similarly, House 2 has two main entrances. One opened to main living room while other opened to bedroom of elder. Thus, the organisation has one large ring structure. In addition, there are two main living spaces that are directly attached with the ring. The family living room and bedroom for elder person are at depth 1. The other living spaces are located behind the ring in the upper floors. The family room is using as mix-function including worship area, guest welcoming area and garage for motorbike in the night. Both bedroom and living room can pass though family business office in the second floor. From the second floor, the spatial organisation appeared as tree structure.

House 3 appears at first sight to be simple linear plan. There is only family living room at the depth 1, following by kitchen, toilet and staircase. The bedrooms and worship room locate in the second and third floors. Due to no garage and dining room, the living room is using as family space for guest welcoming, dining and parking space for motorbikes and bicycle in the night.

House 4 has a simple tree structure. The ground floor is using for garage and kitchen while living room, bedrooms and worship room are locating in the upper floors. From first to fourth floor, each floor has three rooms. Two of them are living rooms while another room is a toilet. The fifth floor is using as worship area and yards.

House 5 is spatially unlike any previous case, although its functional labelling is familiar. As the justified graph shows, the spatial complex is that of ring structures with multi entrances. There are four spaces at the depth 1; two of them are renting room to generate family income. The living room is using as mix function with guest welcoming area, working space, ancestral altar and parking area for motorbike in the nigh time. The other family spaces including bedroom and kitchen are locating in the first floor. The third floor is designed with three small bedrooms and supported spaces for rent. The renting area in the second floor and family area shares a staircase.

House 6 has simple linage complex. Again, the living room is using for family activities and parking area for motorbikes. The kitchen is locating behind while bedrooms are locating in the upper floor.
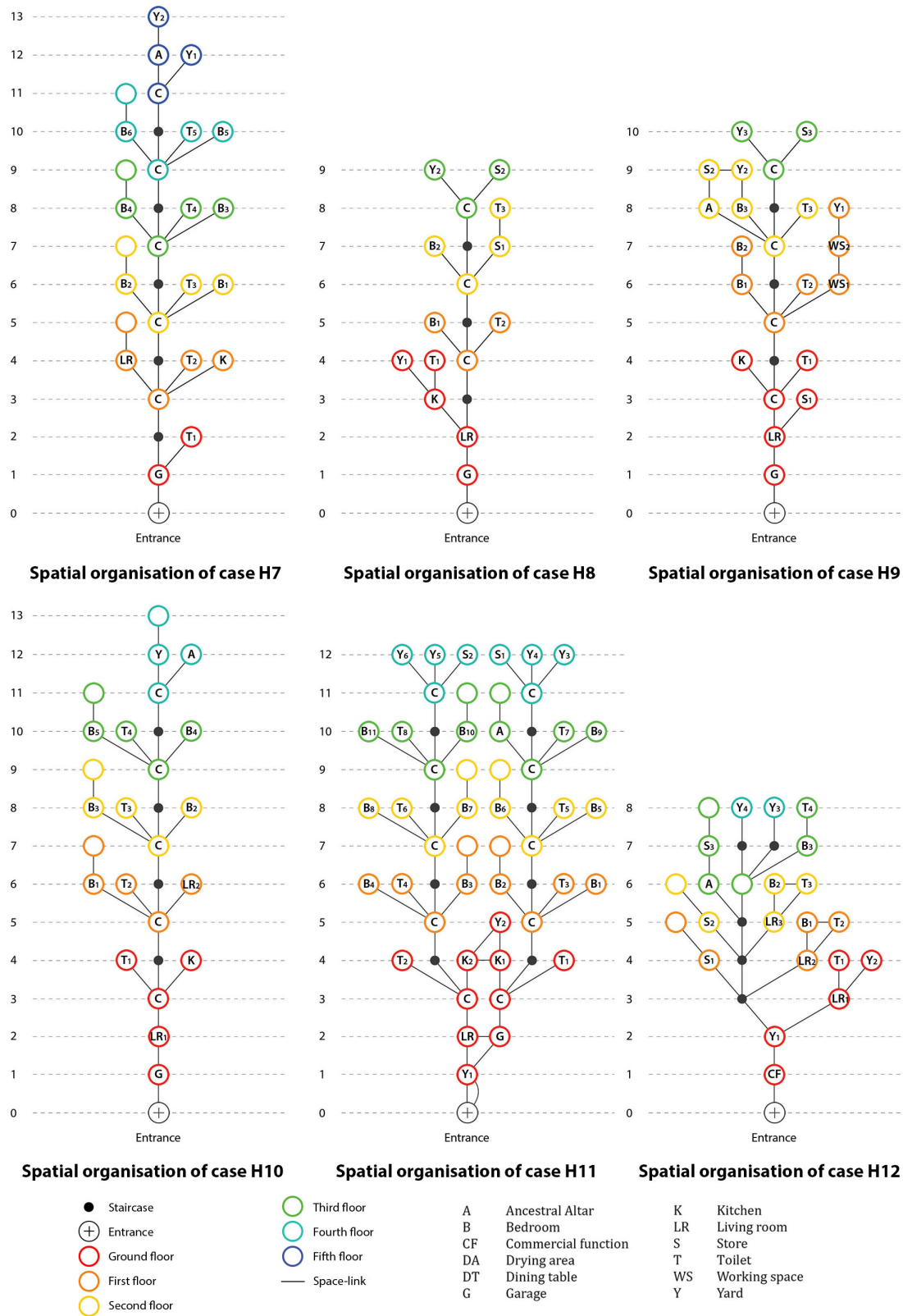
Figure 116: Spatial organisations of case studies

House 7 has clear tree structure. Unlike other case studies, in this house, the ground floor is using only for garage and store while all main living spaces including kitchen and living room are locating in the first floor. The bedrooms are in the second, third and fourth floors. The ancestral altar and garden located in the highest level in the house.

House 8 appears to be simple lineage plan. All the communal family spaces are locating in the ground floor while private spaces are locating in the upper floor. The house has small garage in the frontage, following by a mix space between ancestral altar for worship and family activities space.

House 9 is both spatially and functionally quite unlike any house so far. The spatial diagram shows one ring structure in the third floor that connecting worship room with store, yard and bedroom. In the second floor, two bedrooms are directly connecting together.

House 10 again has clear tree structure. All social spaces are locating in the ground floor while upper floors are using for individual bedrooms. The worship room and yard locate in the top level.

House 11 has unique spatial complex. This house has large number of spaces. The ground floor has four ring's structures while two separated tree structure appear in the upper floor. All communal family spaces are locating around the ring's structures.

House 12 has more functional difference than any other previous case. There is no corridor in the house; thus, the staircase becomes the connection point between two parts of each floor level. In the first and second floor, each has a ring's structure showing the relationship between three private spaces: bedroom, private living room and toilet.

House 13 is another case of unique spatial structure. The house has three ring's structure. The living room and kitchen are in different structure. Private spaces such as bedrooms are located behind the rings.

Within this approach, case study H14 could not applied to analyse because H14 has a lift that does not match with coding and representation of space.

House 15 is another simple tree form. All public family living spaces are located in the ground floor while upper floors are using as private rooms. Each level has one toilet.

House 16 has tree structure; however, the spatial organisation of this case is slightly differenced with another tree form. The staircase and corridor are used as connection spaces in each floor rather than only corridor in previous case studies.

Some rooms are directly attached with staircase while some rooms are attached with corridors.

Finally, both case 17 and 18 have simple tree structure.

Spatial organisation of case H13

Spatial organisation of case H15

Spatial organisation of case H16

Spatial organisation of case H17

Spatial organisation of case H18
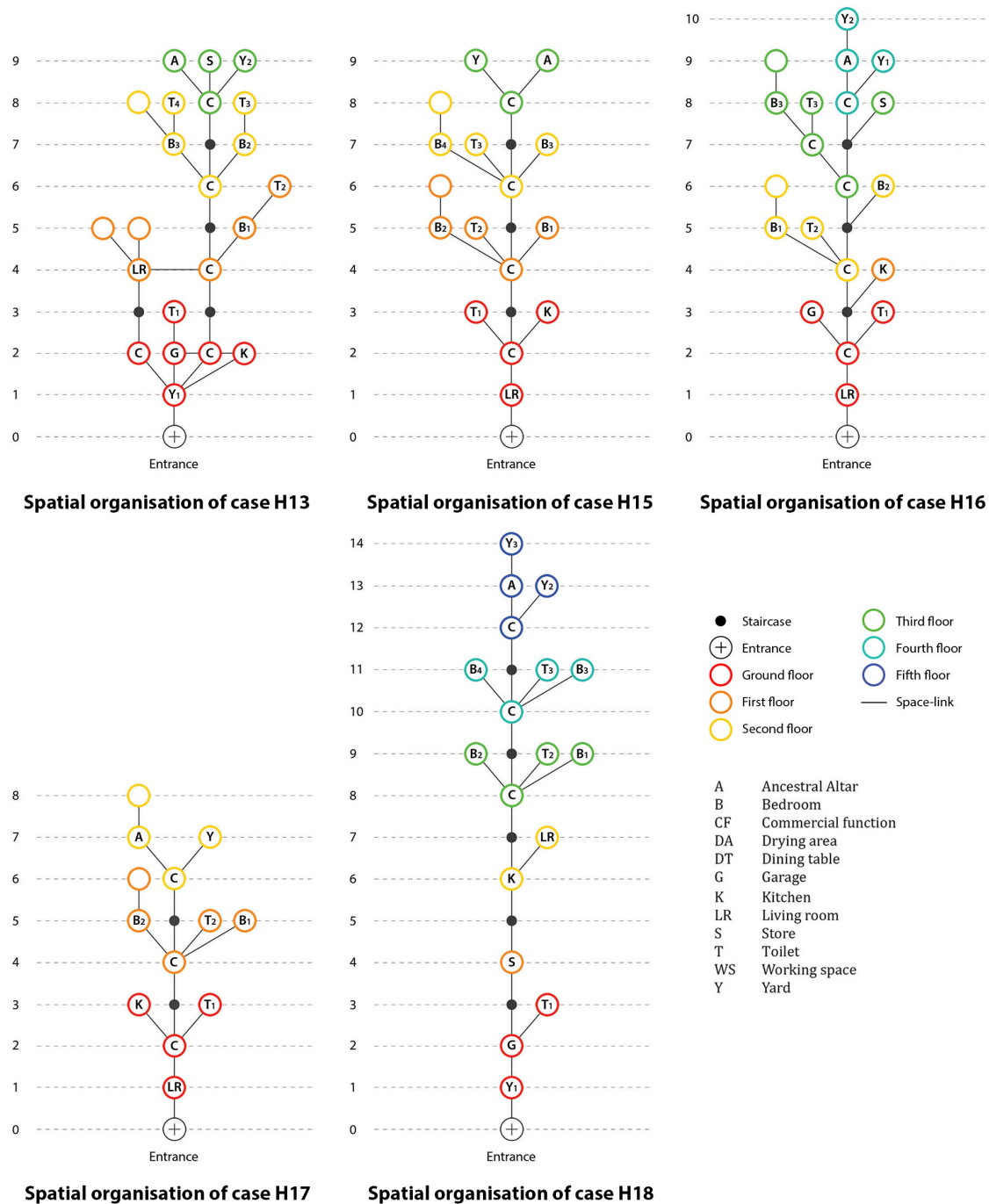
Figure 117: Spatial organisations of case studies

Room name	Number of recorded among case studies	Depth of space							Level		
		1-2	3-4	5-6	7-8	9-10	11-12	13-14	1	2	3+
Separate garage	11	10	1	-	-	-	-	-	11	-	-
Living room	21	13	4	2	1	1	-	-	14	4	3
Kitchen	18	2	13	3	-	-	-	-	13	3	2
Bedroom	61	1	2	24	22	10	2	-	1	21	39
Ancestral altar	17	3	-	2	4	5	1	2	3	1	13
Garden	39	4	4	2	6	12	8	3	9	2	28

Table 17: Summary location of domestic space in the spatial organisations

Table 17 overviewed main spatial organization of self-built housing. Although each case study has its own spatial structure, the spatial organization of main living spaces including garage, living room, kitchen, bedroom, ancestral altar and garden seem follow several principles:

Firstly, there is a clear hierarchy of private and communal spaces in all cases of self-built housing. Garage and living room are commonly found in the first or second space. Kitchen is generally found in behind the garage and living room (Depth 3-4). The depths of bedroom and ancestor altar are often from 5 to 10. The depth of garden is popular from depth 7. Therefore, it seems that each function is attached to specific part of building. Meanwhile, table 17 also shows level of main living spaces. Although each house has different spatial structure, family communal spaces including garage, living room and kitchen are identified with spaces in the ground and first floors. By contrast, private spaces such as bedrooms are always located in upper floors. This order shows the high level of control of private rooms. In practice, family public rooms should be easily access from both households and guests; by contrast, bedrooms are private spaces of household. Consequently, the private bedroom is separated from social family spaces, and they are hidden from public views by located in the upper floors.

Secondly, in the ground floor, the front of building is function as the main living spaces such as living room and garage. Supporting spaces, such as kitchen are located in the rear. In other meaning, the front is always the public and it is decorative and respectable. By contrast, the back is the semi-public spaces. Where the domestic services are performed. Whereas the front is displayed, the back is hidden from public views.

Thirdly, all contemporary houses have enclosed form. It means that there are no internal courtyards in the ground floor. Although some buildings have yards in the ground floor and in the terrace, all of those are external courtyards. Most of gardens are in the top terraces.

Function	Mean depth	Mean integration
Commercial area	4.60	0.34
Garage	5.45	0.35
Living room	4.51	0.31
Kitchen	4.68	0.32
Bedroom	4.50	0.28
Toilet	5.28	0.33
Yard	6.22	0.39
Ancestral altar's area	5.06	0.35

Table 18: Number, mean depths and mean integration values for functions in contemporary houses (See appendix F for calculation methods)

Finally, integration values[21] of living spaces in contemporary self-built housing saw different spatial orders. Specifically, table 18 shows the integration values of contemporary houses. The integration values of function, which are following the order from the most integrated to the most segregated could be listed as: bedrooms (0.28), living room (0.31), kitchen (0.32), toilet (0.33), commercial function (if have, 0.34), garage (0.35), worship room (0.35) and yard (0.39). Those order means that bedrooms, living room and kitchen are the most integrated parts while yard, commercial area, garage and worship room are the most segregated part in the complex. In other word, bedrooms, living rooms, kitchens and toilets are always located in the centre of spatial complex.

For presentation, a typical spatial organisation of main living spaces is illustrated in figure 118. In the ground floor, the front space is tending to be the main living space while the rear is common supporting spaces including toilet and kitchen. The rooms in upper floors are the private bedrooms. The top terrace is using as garden and clothes drying area. Meanwhile, in all level, the centre of building is the staircase.

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[21] Integration values is described as accessibility of the system and social relations in space (Please see appendix F for calculation methods and details of all case study)

	Frontage	Centre	Back

Top level: Clothes drying area and garden | Staircase / Corridor | Garden or storage

Upper levels: Ancestral altar or bedroom | Staircase / Bathroom / Corridor | Bedroom

Ground level: Commercial function (if have) living room and garage | Staircase / Bathroom / Corridor | Kitchen
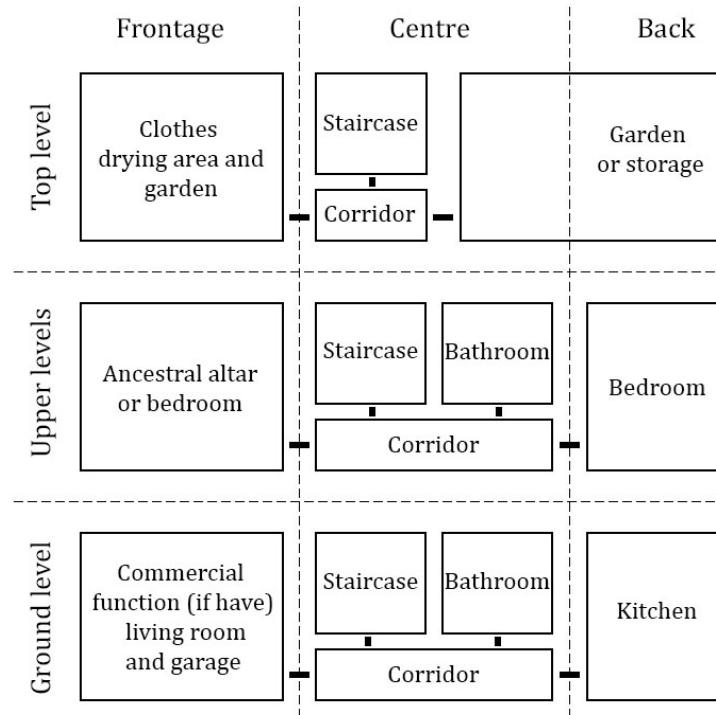
Figure 118: Typical spatial hierarchy of contemporary self-built housing regarding classification of front-back and top-down[22]

Although figure 118 shows the typical spatial organisation, it is worth noting that detailed design of garage is much depending on infrastructure of urban areas and types of transportation. In Vietnam, most garages in self-built housing are for motorbikes, only few houses have garage for car. Rapid motorisation and increasing use of private transport has been occurring in Vietnamese cities since the economic reform in 1986 (Luu, 2002). As a result, the cities are identified with the low use of public transportation and high proportion of private transportation. In this regard, motorbike has become the symbol of personal mobility and convenience for existing Vietnamese urban structure due to following reasons:

Firstly, as describe in section 4.4, during the central economic planning period (1954-1986), the ideal of the socialist city was to create self-radiant neighbourhood namely the living quarter that was focused on relationship between working and living place. Principally, workplace was closely linked to the place where individual lived, and commuting throughout the city was not necessary. Thus, infrastructure became less important. Normally, individual commuted by foot and bicycle. Due to lack of detail planning and further development strategies, transport infrastructure

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[22] Drawing by author based on spatial organisation data among collected case studies

during the central economic command period was not gaining much attention. As a result, the current length of road per capital in Vietnamese cities is extremely low compared to other Asia countries. In the meanwhile, the exiting urban structure is dominated by narrow alleys and small streets, which could not access by car and bus (World Bank, 2011).

Secondly, since the liberalisation of the economy in 1986, citizens are free to choose where they would like to live and work. In addition, the new economy is relating in special districts that attract people not only from other parts of city but also from rural areas. Consequently, the means of transportation has changed. Particularly, citizens are using motorbikes to travel due to its affordable prices and convenience.

Thirdly, despite that new master plan have aimed to develop the transport system, most projects heavily focused on primary roads. In addition, the new projects often took long period of time before launching. For example, metro and urban railway network introducing in the master plan consist of eight lines. Currently, there is only two lines are under construction. The line *Nhon-Hanoi* was started in 2006 and aimed to finish in 2010. However, due to various reasons, the project has been delayed several times and the launching time is still unclear. Therefore, excepted for main streets, the residential traffic system and its services seem not developed. Lack parking spaces, road system and modern public transportation result in that motorbike became popular choice of Vietnamese residents (World Bank, 2011).

Although garage is designed for motorbikes, not all houses in work-unit and urban village have separated garage. Specifically, among 18 case studies, there are 7 cases didn't have garage. All 7 cases are located in work-unit area and urban village. To explain about this phenomenon, analysis of planning of case studies shows that there is evidence of mix-function spaces for housing in small alley. The motorbikes do not take many spaces; thus, it could be put in the spare spaces in the living room. Moreover, normally, house owners often put their motorbikes in front of their house in the daytimes (Figure 120) and using living room for parking for night. Thus, putting motorbikes into living room in the night do not significantly impact on family activities. For example, one interviewee revealed that

> *[...] Because I live in the city, so there is not much space for the garage. The parking area is located in the ground floor, in the living room. However, I only park there in the evening; in the daytime, I put my motorbike to the communal yard, in front of my house [...].*

> *N. T. Truong, interview in 25-08-2016*

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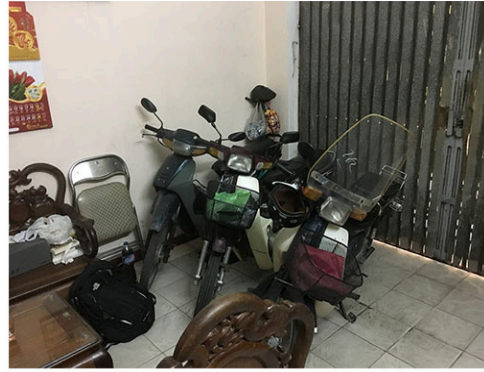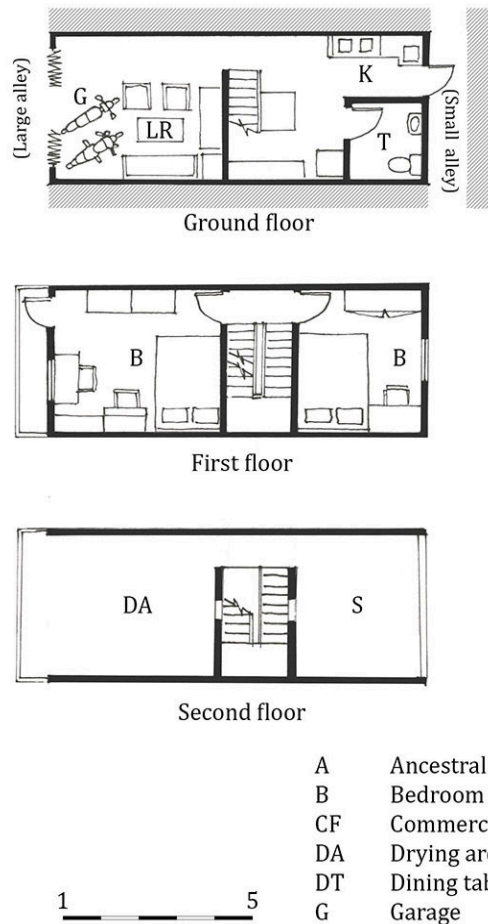
Figure 119: Due to locating in small alley, the living room is used as motorbike parking area

Figure 120: Motorbikes are parked in the front of house in the alleys in urban village (left) and in work-unit area (right) (Images by the author)

Among 11 cases having garage, the location of motorbike parking area is normally situated in the front spaces (Figure 121). Only one case has motorbike garage in the rear of building. In addition, most garages are only large enough for two or three motorbikes. Only when households have intention to buy car, the ground floor could be transferred into car garage (Figure 122). In this regard, main living rooms will be moved from ground floor to the first floor.

Figure 121: Parking area in the front of building
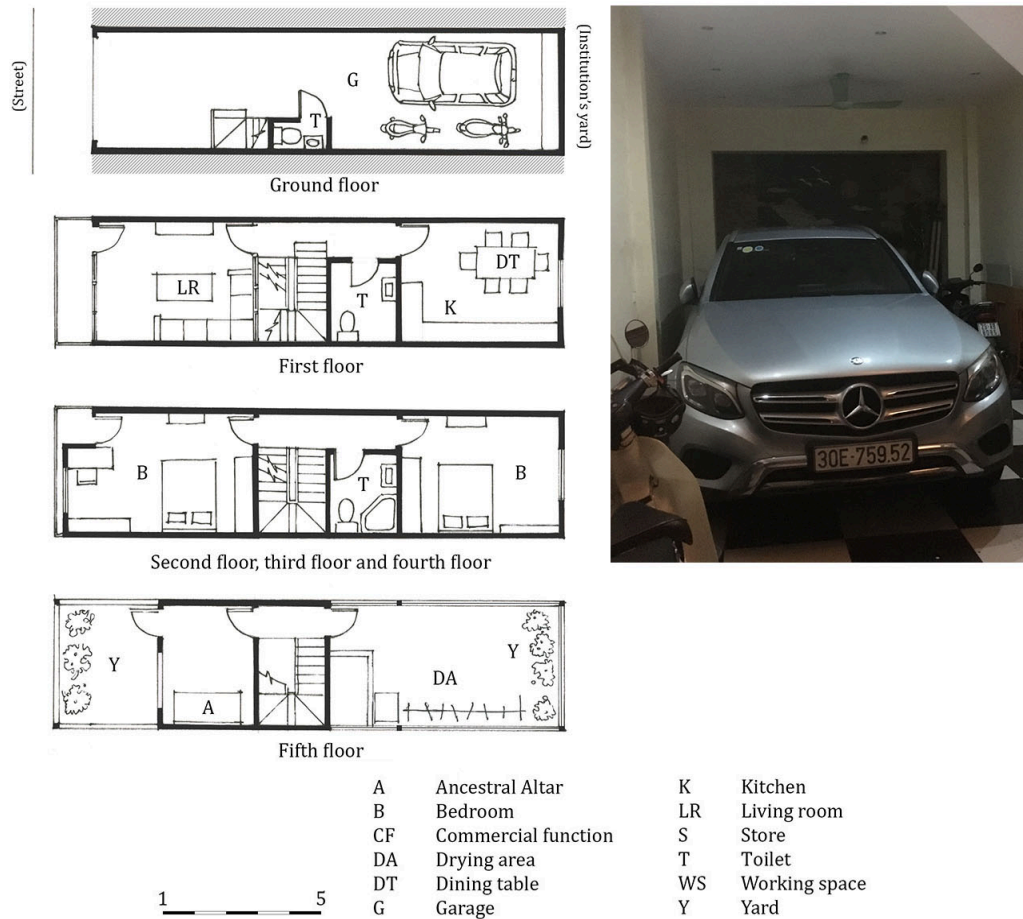
Figure 122: House in street or large alley might use ground floor as garage, living room and kitchen are located in the first floor.

5.4 Summary

Overall, this chapter investigates characteristics of self-built housing in urban settlements in Hanoi city. After the economic reform since 1986, new housing policy and housing models have been introduced to promote households to invest into housing productions. Since then, self-built housing has been accounted for 80% of housing production in Vietnamese cities. In case of Hanoi city, the models of self-built housing are blended in three different types of urban settlements in Hanoi city: (1) work-unit, (2) new urban area and (3) urban village. In common, the developers have responsibility for developing facilities and infrastructure while households are free to make decision in design and construction processes. Meanwhile, diversity of housing typology could be found owing to diversity of planning of residential areas.

Particularly, in the 1990s, state distributed land to state institutions, by that, those institutions could develop housing for their employees. In work-unit areas, housing plots were distributed to workers who purchased a plot cheaply as part of their salary. Work-units simply divided their parcels into rows of plot following traditional layout, which was narrow and long. Each work-unit had responsibility to develop basic infrastructure and services such as roads, water pipes, and power lines in their areas. The built-up area of housing is very high due to unclear regulations for residential planning and lack of controlling.

Since 2000s, a model of new urban area has been implemented as strategy for residential area. The developers have to implement infrastructure before the construction of houses started. The plots, unfinished house and finished house could be sold on the market to customers; their payment directly financed the infrastructure. In addition, developers have to design the landscape, plot and public services such as school and park according to urban planning. Thus, self-built housing in new urban area is a combination of developer's action in land and infrastructure preparation and self-built activities of household in housing construction. The qualities of facilities and infrastructure are generally good compared to other urban neighbourhoods to make areas became an attractive living environment. The developers create the planning including the sizes, form and basic layout of housing regarding building regulations; thus, the houses in new urban areas have uniform in term of height, floor and sizes. The house owner may build or finish the house by themselves with their own choices of colours, styles and decorative materials.

During the city expansion, various rural villages have been intergraded into city's structure, and they became urban village. In urban village, the circulation network is based on old structure of original village; thus, the alleys and lanes are generally small. Since village became part of urban structure, there are several projects to improve infrastructure and services through the model: *state and people partnership*. Local government hired private developers to improve essential

infrastructure and services such as water piles and power lines. In term of planning, there is no clear planning and regulations in urban villages. Meanwhile, due to high value of land price, villagers tend to divide their own land into small housing plots. Some plots could be distributing to the villager's children while the rest are sold to new middle class. As a result of spontaneous development, the built-up area and density of housing are very high.

In term of housing characteristics, each case study has various distinct characteristics. Although majority of case studies has tube shape, which is long and narrow, form and spatial layout of case studies are different. The differences are mainly based on choices of households and contextual background of settlements.

Generally, this chapter contributes to deeper understanding of relationship between neighbourhood planning and self-built housing in the context of Hanoi city. It shows that the self-built housing has been applied in different housing models, which are blended in three different types of urban settlements including work-unit, new urban area and urban village. The built environment of those areas shared several similar characteristics regarding the role of state and public sectors. They provide infrastructure and essential services for the urban settlement while households are free to make decision in design process. The findings support that the role of neighbourhood planning and regulations should be clearly made in initial stage of urban projects. Without planning and framework, areas of self-built housing could turn into unhealthy living environment.

This chapter highlighted characteristics of self-built housing in different urban areas in Hanoi; nevertheless, it does not show decision-making process and how Vietnamese living styles influenced on characteristics of housing design. The next chapter will study the process of decision-making by household in design and construction process, how family spaces are used, and how senses of place are created in the contemporary self-built housing.

CHAPTER 6 HOUSING DESIGN AS A REFLECTION OF FAMILY NEEDS

Previous chapters explained the built environment of Hanoi city and characteristics of urban settlements as well as main general characteristics of case studies of contemporary self-built housing; nevertheless, they do not discuss in details regarding the connection between Vietnamese living styles, family needs and beliefs and housing design. Within self-built housing, households are directly involved in housing design and construction processes to balance different factors to meet their own requirements. Thus, this chapter highlight how households made decision-making process and how the family needs, beliefs and living style influenced on detailed design of contemporary self-built housing in Hanoi city. The outcome of this chapter argues that when households participate in housing process, households not only focused on physical elements, such as materials and structure, but also rituals, cultural norms and family living styles to meet the family requirements and to create sense of place. The participation of households in design and construction processes; therefore, is crucial in order to achieve sustainable development.

This chapter have six main parts. The first part shows the involvement of household in decision-making and building processes. The second part highlights the sense of safety and dangers and its influence on self-built housing by exploring how people use spaces in special occasion, such as construction process, or during worshiping and ceremonies at home. The third part indicates the dirtiness and cleanliness and their influences on self-built housing. The fourth part shows an influence of sense of intimacy and strangers on communal and private spaces. The fifth part shows relationship between living spaces and natural environment, such as natural lighting and ventilation in the context of Hanoi city. The last part highlights other requirement of living spaces and its transformation, change and adaptation.

For the purpose of analysis, all housing cases provide general information on possible themes and indicate common tendencies in housing area. In addition, some specific cases offer detailed explanation that could support further understanding of the themes.

6.1 Decision making and involvement of households in design process

6.1.1 Decision making: to buy, to rent or to build the house
Basically, there are three options for households to arrange for their dwellings: (1) buying a house (2) buying a land and build a house on that land, or (3) renting a house. Therefore, it is important to find out why the Vietnamese people prefer to build their own house. According to responds of households, there are five main reasons why Vietnamese prefer to build their own houses rather than to buy or to rent a house:

Firstly, self-built housing provides basic living spaces since the economic reform. During the late 1980s, Vietnam suffered an economic crisis and housing shortage. Lack of shelter meant that many people had to live in poor conditions. On the other hand, commercial housing projects were not popular in Vietnam at that time. Therefore, the land price is very cheap since the beginning of economic reform, and they tend to build their own houses rather than buying a house.

> *During the early 1990s, this area was a planned area with many small plots. I bought one plot and use my finance and self-organised activities to build the house. The price of land at that time was not expensive as current land price.*
>
> *H. Chien, interview in 25-08-2017*

Secondly, within self-built activities, house owners could build the house based on their family needs and finance. Particularly, owners might build the house with several phrases depending on their finance and requirements about living spaces. The housing process is quite similar with incremental housing in other developing countries. Owners always build basic structure in the first phrase. Overtime, when their family needs change due to family growth and new requirements about living spaces, households could upgrade their houses higher and bigger in the late phrases. The process of self-built activities is continuous until the building reaches the expectations of owner's family.

> *House was designed regarding my family needs; however, after a period of living, there are many unexpected issues. The original house plan focused on basic living spaces and working spaces; nevertheless, when I had children, the house is needed to be transformed to create more living rooms; or if the family has a business at home, the ground floor can be used for business. As a result, a design of my house has significantly changed since I built it.*
>
> *N. T. Luc, interview in 03-09-2016*

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Thirdly, self-built housing is benefit regarding commercial purposes. Within Vietnamese attitude, having own house is always better than buying or renting a house. The literature has several proverbs such as "*Ăn chắc mặc bền*"[23] and "*An cư lạc nghiệp*"[24] that highlight an important of owning a house. Those proverbs mean that only when people owing a house, people could start their career. In addition, a house is a valuable commercial product to invest. Overtime, the price of urban housing is always increasing due to locating in city and developed infrastructure projects nearby. By comparison, values of other products, such as car and apartments, decrease overtime. Thus, the Vietnamese tend to invest into the self-built houses. One interviewee revealed that:

> *[...] I would like to live a house on the ground. The land price is always increasing. Therefore, price of house always increases as well. In addition, if the house is locating in main streets, the ground of building could be used for commercial functions to make profit.*

> *N. T. Hoang, interview in 05-09-2017*

Fourthly, through self-built activities, the households have experience with the housing design to control quality of design. When building a house, house owner always seeks advices from other experience families or relatives to check the quality of building and suppliers of materials. Although the system is informal, it is efficient and extensive because house owners always want to invest the good things for their own home. By contrast, if buying the house, a family can only get an offer at the late stage of construction when the decisions making affecting housing quality of building will already have been made. A family also cannot know how the design well due to not making any decisions and responsibilities to the house. In addition, mass houses were constructed according to commercial suppliers of housing; thus, the design mostly based on prediction and assumption of needs rather than real family needs.

> *[...] I would prefer to build the house rather than buying a house [...] In many areas, the investors or developers buy the land and build houses. The houses always look good to attract customers; however, overtime, the houses may have various issues due to cheap materials and poor construction qualities that could affect and damage the house. Thus, if people have good financial conditions, I would suggest they to build their own house [...]*

> *N. K. Anh, interview in 04-09-2017*

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[23] Similar to English proverb "*Comfort is better than pride*"
[24] The proverb means that only when a man has a home, he could totally focus on his career

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Finally, although there are numerous housing projects investing by private developers, developer housing in new urban areas are aimed to target high-income groups[25].

Due to the research explained above, self-built housing is the primary option for Vietnamese households to create affordable dwellings and to meet preferences of family needs and living styles since the economic reform in 1986. By contrast, mass housing projects tend to focus on high-income classes through marketing of western living styles; thus, households often choose to build the house by themselves. In addition, during the design and construction process, household could involve to control quality of building.

6.1.2 A household's role in housing process
Based on respond of households, they actively participate in many stages of design and construction process. Those stages could be summarised as (1) assessment and preference of housing design, (2) designing and (3) supervision and contribution.

Creating assessment and preference of housing design: when deciding to build the house, assessments and preference of family needs is important to determine the physical form and shape of building. During interviewing, households were asked about the detail's preferences of housing design. All households highlighted that when design a house, they always considered basic living spaces for domestic activities. The basic physical needs are including bedroom, kitchen, living room and other supporting spaces such as toilet. In this regard, family size and composition are main factors to determine physical characteristic of building, such as number of bedrooms and supporting spaces. For example, interviewees revealed that:

> *We just designed a house for living space only. My housing plot is located in the end of alley; thus, it is impossible to create shop or commercial functions in my house. Therefore, in design process, we just consider number of living space that we might have.*
>
> *N. T. B. Van, interview in 09-01-2016*

> *Regarding number of living spaces, my family had four people; thus, we designed a house with four bedrooms in my house. Three beds are for my parents, my sister and I. There is also one bedroom in the ground floor for my grandparent when they visit us.*
>
> *L. T. T. Loan, interview in 03-09-2017*

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[25] Please see section 4.5.3.2 for details

There are four people in my family; however, my daughter got married, and she is living in husband's family in Long Bien district. Thus, at the moment, there is only my son, my husband and I live in this house. So, there are only two bedrooms: one for my son and one for me and my husband. That is only different between my house and other houses. If there are many people in one household, the house will be built higher and having more bedrooms.

Mrs N. Ngoc, interview in 09-09-2017

Meanwhile, beside family structure, size of housing plot also impacted on housing design. Commonly, plot for self-built housing in urban area often very small. Based on case studies, an average area of housing plot is from forty to seventy square meters. Within that plot, house owners generally claimed that it is difficult to create efficient living spaces with one or two storeys building. Therefore, households tend to build their house up to four to six storeys; by that, they could maximise number of living spaces and floor area.

[...] My total housing plot is nearly 50 square meters. Some of my neighbour's plots are bigger, about 60 square meters. However, it is still quite small for living spaces. Therefore, in Vietnam, the house often developed in vertical axis. In the past, the maximum number of floors is four. Now, the number of storeys could reach to seven [...]

N. K. Anh, interview in 04-09-2017.

Besides that, to create assessment, households normally visit houses of their friends and relatives, who have similar living styles, to ask about building experiences and samples of architectural drawings. When designing, household often copy some parts of those buildings to create their own preference.

Designing: after deciding what the household want, the next stage of housing process is to making plans. According to Vietnamese regulations, every urban housing construction needs to have building construction permit; otherwise, the building is considered as illegal construction, and local officers should demolish it. Practically, regulatory construction inspections always come to check the structural and permitted designs after the foundation phase. Due to that reason, homeowners have to hire professional architects in order to get the architectural drawings.

Although owners fully understood the important of professional advices, architect's involvement is considered as unnecessary, and their roles are frequently limited in the early stage of housing design due to following reasons:

Firstly, house owners think that architects are trained to developed aesthetical elements; as a result, owners might consider hiring architect if the work is need

beautification, interiors designs or any particular requirements. In addition, the owner believed that architect made design decisions based on physical and economic reasons rather than needs of house owners. Thus, owners always put their opinions on drawings. The architectural elements including spatial organization, functions and aesthetic preference are discussed with family members. Lately, the concept was transferred to architects to get architectural drawings and construction permit. Thus, the role architects are limited to only provide some documents and technical solutions for building permits. Besides that, household believed that the architectural of the house is very simple and architectural drawings are not necessary. If there is any problem with the construction method, household could ask the experience master builders for technical details.

> *[...] I did not ask architects to design my house. I designed the house by myself. Then, I hired an architect to draw the detailed plans. I decided every aspect of my house, such as the location of doors, windows and the dimension of rooms, where is the lighting bulbs or even the way to arrange electric wire [...]. I only seek the advices from the experience builders and architects for construction methods [...].*

> *N. T. Luc, 60 years old, interview in 03-09-2016*

Secondly, if the house owner has knowledge, experience and background in building construction, they tend to fully control the housing process.

> *[...] I have some knowledge regarding construction and building. Thus, I designed the house. When I have a free time, I drawn the house. In Vietnam, mostly, the house applied a same structure system including concrete beams, concrete column and brick wall. Thus, the construction is quite simple [...]*

> *N. K. Anh, interview in 04-09-2017*

Thirdly, if household hire architect to design the house, the household's role is still significant. When the architects design a house, the designs are always based on the ideal of households. Normally, the architects will prepare some different initial plans. Based on those plans, household will determine which one is more suitable with their needs.

> *[...] Regarding architectural drawings, I asked local architects to design a house. I give them some basic information about my land such as the width and the depth. I told him that I planned to build three or four floors. Then, architect provided me some suggestions and drawings with some basic living spaces [...] Based on the architect's*

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For example, figure 123 shows two plans covering the same housing plot. The differences between those two plans are included the spatial layout and structure of building. Based on household's choice, architects will develop those plans by providing further technical and detailed drawings and images.
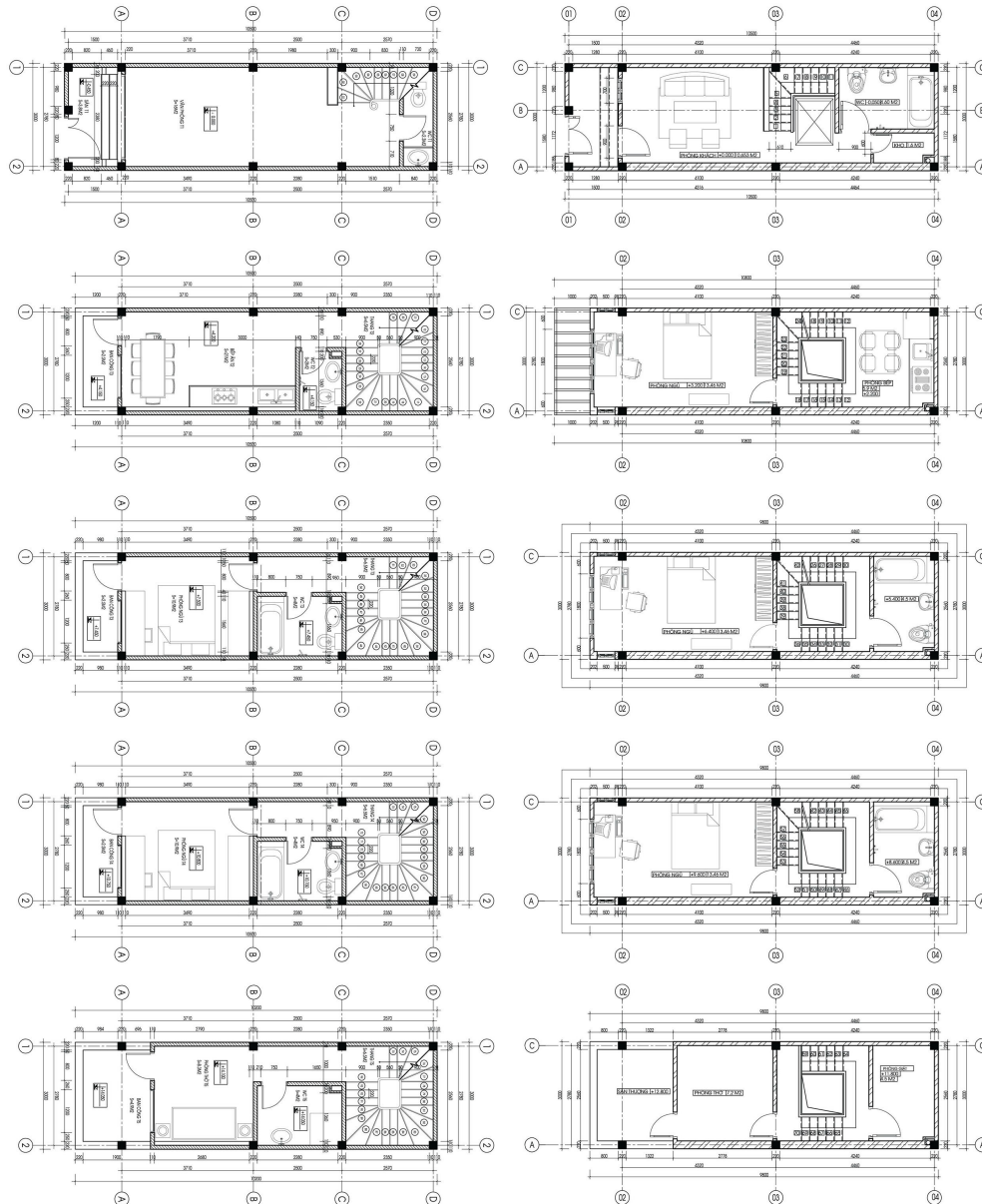
Figure 123: Two initial plans drawn by architects regarding descriptions of household about living spaces (Collected by author from local architect Thi)

Supervision and contribution: during the construction process, households involved in design and construction activities in different approaches.

Firstly, they had to negotiate with neighbours about the impacts of construction activities on their houses and communal spaces. Particularly, before building the house, the neighbour's agreements are very important. The construction might have stopped when neighbours reported the building do not follow regulations or problems regarding safety, and the construction might be affected to their houses. In Vietnam, most of self-built housing has to attach with neighbour's buildings. Therefore, an approval from neighbours is necessary. Agreement and co-operation help to ensure that collateral damage of loss of rights caused by construction work or unacceptable design is compensate. Otherwise, if the construction affects other buildings such as damage to wall and structure, owners have to pay for bigger compensation. Even if the house does not affect other buildings, the construction might be stopped if the work done does not conform the construction licence, or the safety regulations are violated. Thus, local officers and inspectors can suppose the building. Therefore, neighbour 's support is critical. If the building violates the regulations, neighbours may help to persuade the local officers that there is no harm is done to anyone and no further action should be taken. Meanwhile, in urban area, there is not much space to gather materials and construction wastes. Normally, a gathering point normally situates in the alley or pavement nearby. Thus, the gathering point may block walkway and impact on accessibility of neighbours. By having agreement with neighbours, the household could use part of public space for gathering materials in particular time in daytime.

Secondly, households could become supervisor to check housing process, materials and quality of work.

> *My son worked in the daytime and he cannot stay at home to manage the construction. Therefore, my husband and I helped him to supervise and manage everything about the house including labour and materials. My husband hired a group of local builders to build the house and check their works.*

> *Mrs. Ngoc, interview in 09-09-2017*

Thirdly, when building, households didn't fully build the house by themselves. In most cases, households always hire a group of experience builders to construct main parts of buildings. House owners always seek constructors and builders through their network of friends and relatives. For example, one household responded that:

> *[...] In the old day, one group of builders built my neighbour house. When builders finished their jobs, other families visited the new building*

and checked the quality of construction. If the qualities of building were good, they would ask that builders' group to build their houses. Therefore, my house and neighbour's houses were built by the same group of builders [...]

Finally, during the housing process, households might involve construction activities to finish some tanks. The process of building could be classified into two main steps. The first stage is called "*xây thô*", which is basic framework structure while the second stage is to finish the house. After the first stage, house owners might involve housing process through some simple works to finish their houses, such as wall paintings and decorate interior when they have free time.

The building techniques for two-storey building were very simple [...] I have some experience about housing construction; thus, I draw the plan by myself. During construction, I hire a group of builders to do hard parts. I buy the materials and manage the builders. Also, during the weekend, I asked my friends to come and help me to do some simple parts of construction.

Figure 124: An unfinished construction

To sum, this part highlights the involvement of household in different stages of housing process, from making decision to build the house, creating housing

assessments and preferences, designing and building. The following sections will explain further details about interconnection between socio-cultural needs and spatial organisation.

6.2 Sense of "*safe*" versus "*dangerous*" spaces

As describe in theoretical perspective chapter, a house has two settings (Lawrence, 1982, 1987; Rapoport, 1969; Canter, 1977; Tuan, 1979 and Blundell, 2016). Firstly, it is a physical shelter that defines the spaces. It provides security and protection for domestic activities. Despite that, housing designs in difference cultural backgrounds have different spatial layout, order of space and the ways people use the room. It suggested that beyond the pragmatic principles, other elements are also significant in determining the design process. Specifically, perception, belief and psychological behaviour have considerably influenced on physical structure and sense of place.

This part explains how households apply their traditional rules and ceremonies to create sense of safety regarding rituals and family identity in design process, construction process and when living. This part has three sub-sections. The first subsection describes sense of safety and danger in Vietnamese culture. The second highlight an influence of Feng Shui principles in design process. The third one highlights the ritual activities during construction process. The last one shows the application of Vietnamese traditional practice and ceremonies at home. All of those parts highlight that meaning of a house, in architectural terms represents a physical shelter, but in self-built practice, it becomes home to Vietnamese once ritual activities are conducted to give protection to the house.

6.2.1 Conception of "safe" and "dangerous" spaces in traditional Vietnamese housing

In Vietnam, a distinction between safe and dangerous spaces is made when a child is still very young. A door in traditional houses has a high step namely "*Ngưỡng cửa*" to make boundaries between outside spaces and inside spaces. Children were told that outside is a dangerous place, and they should be stay inside for safety; only when they are mature, they could across the step to the outside world.

A sense of danger is not only referring to crimes and predators, but also natural spirits. Vietnam is considered as one of the earliest agricultural civilisations; therefore, Vietnamese believed that natural phenomena such as strong rain, wind and storm are created by spiritual forces (Tran, 1997; Vu, 2007). Accordingly, there are three different worlds in the universe including heaven for gods, earth for human and hell for evil spirits and ghost who died in unnatural ways (Cuc, 1999). In order to keep inside of the house to be safe, various rituals and ceremonies at home are required as an essential part of Vietnamese life. Ritual practices occur to send these dark spirits away and to gain protection from gods, otherwise, living in

that area is uncomfortable. Hence, Vietnamese households always conduct rituals during construction processes and at home in order to seek protection and blessings from gods (Ho, 2008).

Besides, Vietnam is located next to China; thus, to certain extent, Vietnamese has adapted Chinese culture in various aspects of life. The relationship between human and nature could be seen in the philosophy of Yin and Yang. Yang represents for masculine while Yin represents for feminine. The interaction of two opposite forces creates the senses of human life such as hot and cold, day and night, female and male, sky and earth, moon and sun. The Yin and Yang philosophy influence architecture through Feng Shui theory. Theoretically, Feng Shui theory aims to achieve the balance between life and other natural elements (Ho, 2003). Human shelters and surrounding living environment have a strong connection to keep balance life. Therefore, the theory is important to show positive affected and recommendation into design. Consequently, probably for the majority of Vietnamese, a building without the application of Feng Shui is inferior to live in (Ngo, 1998).

A sense of safety is also applied in practices of ancestral worship at home (Vu, 2007). Accordingly, Vietnamese people believe in the after-life. People go to the after-life world when they die; however, their souls or spirits still exist in the human life. The spirits would stay side by side with family members to assist and participate in all family activities. Thus, a destiny of each person depends on not only his/her human life, but also his/her ancestors. Likewise, the magnitude of success in terms of career and life for each family member is attributable for the merits of their respective ancestors. Therefore, worshipping to ancestors at home has become a popular and important practice in every Vietnamese family.

In sum, relationship between safe and danger refers not only to physical and visible structure for security but also to conception of being safe. Inside is a human living space while outside is a dangerous place and unnatural forces. Traditionally, a housing design has to follow particular set of rules to create sense of safety. For details, the following sub-section will explain details of sense of safety in contemporary self-built housing.

6.3.2 Application of Feng Shui principles in housing design process
In architecture, there are numerous architectural principles such as choice of location, geometrical forms, orientation, division of spaces and design details. For example, landscape elements, such as tree, mountains and rivers, were considered as friends, and they had considerably impact on the spiritual life of owner. So, specific sites of the house would be designed following Feng Shui rules to create balance. For example, there are Dragon points, which ensures good quality of life element (Ngo, 1998). Traditionally, dragon points are surrounded by small hills representing for Blue Dragon and White Tiger in two sides with high mountains in

the back and water running around. Blue Dragon is the symbol of the light as opposed to Tiger - the symbol of the dark. Two symbols create balance for the human life. Apart from ritual meaning, Feng Shui also plays a significant role in formulating principles to reduce the negative effects of local environment on the houses. High mountains and hills aim to block strong wind, while slow water flowing is vital for daily life.

Based on responds of households, in urban areas of Hanoi city, it is difficult to choose idealist site regarding Feng Shui principles. Therefore, households didn't apply Feng Shui principles to determine the location and direction of building.

> *It is quite difficult to apply Feng Shui principles into location of housing. It is because the direction of plot is depending on planning rather than my ideal. In addition, when I got this plot from my company, the area of plot was randomly distributed. Although I didn't like direction of my house, which is facing the Southwest, my family did not have any other choice.*

> *N. K. Anh, interview in 04-09-2017*

Beside choosing site, Feng Shui is also important to determine the spatial organisation of living space and arrangement of furniture. Accordingly, the spatial layout may vary with the age of house owners. Traditionally, Feng Shui masters would use the special compass taking into consideration the age of house owner with reference to the stars and five elements in order to pick up a good location, the direction of furniture, particularly the respective arrangement of main living spaces and kitchen in the house (Ngo, 1998).

In collected case studies of contemporary self-built housing, households still determine Feng Shui principles as important factors for references of arrangement of furniture and landscapes. Nevertheless, households would determine different ways to apply Feng Shui principles in their houses: by asking Feng Shui master or learning from books and advices from relatives.

For example, one interviewee responded that he asked Feng Shui masters about details aspects of housing as following:

> *When building the house, I asked two Feng Shui masters: one professional in Feng Shui principle, one professional on geomancy. They considered the location of land, worshiping and estimated the day for construction. They also considered my age with other detailed architectural aspects such as the width of door, location of toilet, direction of kitchen, direction of bedroom and direction of ancestral altar [...]*

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In many cases, even when some households did not seek consultancy from Feng Shui masters, this does not stop the owners from applying Feng Shui principles themselves. During the process of building, household learn from Feng Shui principles from book and advices from other relative members and professional designers. Those principles are including an arrangement of furniture and devices in living room, kitchen, toilet, and the direction of ancestral altar and beds. Particularly, one interviewee revealed that:

> *About other Feng Shui factors, I learned them during construction processes. In Vietnam, architects and professional designers have to know about Feng Shui theory to give advice to households. Meanwhile, ordinary people like me, only checked and learned about Feng Shui theory when I built the house. For example, when I design the kitchen, I realized the mistake about the locations and the heights of kitchen stove and the water sink; so, I destroyed them and rebuilt the kitchen stove and water sink again based on Feng Shui theory […].*

> *N. T. Luc, interview in 03-09-2016*

Besides, application of Feng Shui in housing design are also depending on ideas and beliefs of households. For example, the date of construction is associated with the birth date of the house-owner. Feng Shui does not only influence the choice of building site, but also provides the framework for house-owners to make decision on housing design and construction process (Phuong & Groves, 2010). A good day for construction should not have rain or strong wind; thus, the day and time for building construction are always chosen from Feng Shui masters. Certainly, the Feng Shui principles are not likely to determine good weather; nevertheless, they are necessary activities in many parts of construction. As a result, households carefully select a day for construction.

> *Building a house is important things in the life. Thus, I asked a master of Feng Shui to check the designs. He checked the location, direction of building, and my age to estimate the good day for construction, arrangement of furniture and worship activities.*

> *T. V. Dien, interview in 08-09-2017*

In addition, landscape constructions are also applied to create harmony living environment regarding Feng Shui principles. One household stated that

> *I did a research about Feng Shui theory before building this house. For example, the water fountain over there (in the balcony) was designed regarding Feng Shui principles. At the moment, there is a dengue disease in Hanoi; thus, there is no water in the fountain. Normally,*

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there is a lot of water in the fountain, and it is very beautiful. Besides main living spaces, Feng Shui principles had been applied in kitchen, master bedroom and shire room in the top floor.

H. Chien, interview in 25-08-2017

Figure 125: The water fountain in the frontage balcony of Chien's house

The design and colour of interior spaces also could be applied Feng Shui principles. For example:

The choice of colour of room is depend on the fate of each member that based on Feng Shui theory. The main colour of the first and second floor is green that repenting for wood elements. That colour is good for my fire fate. Another example is my daughter room. Her age is belonging to earth fate, so her room is covered by dark pink colour that represented for fire elements.

Mr Luc, interviewing in 03-09-2016

In essence, application of Feng Shui is very importance to create sense of place in Vietnamese culture; however, each households would applied principles of Feng Shui in different ways depending on their ideas and interests.

6.3.3 Worship during construction process

The performance of ritual ceremonies in Vietnam has a long tradition. Taking the legendary story of the *Cổ Loa* citadel by the King *An Dương Vương* – which was built at least two thousand years ago - as an example, during the construction process, it was believed that the citadel had collapsed many times due to evil

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spirits. At the end, the King *An Dương Vương* resorted to worship to the gods. As a result, a golden turtle appeared to guide the King how to build the citadel successfully. Another example is from the construction of the *Thăng Long* citadel. Similar to the case of the *Cổ Loa* citadel, the wall of the *Thăng Long* citadel collapsed several times due to unknown reasons. After worshipping in the *Long Đỗ* temple, the King dreamed of a white horse coming to the shrine and running from East to West before disappearing in the temple. The King ordered to build the walls following the footprints of the horse. Since then, the construction process became smooth and the citadel was finished later. Hence, the worshipping activities during the building process has been become common and popular activities in the Vietnamese society for such a long time.

To explain for the popularity of worshipping activities in Vietnam, the reasons root in the Vietnamese beliefs in gods, evils and spiritual forces. Accordingly, the evil spirits and ghost who died in unnatural ways may occupy the building area. Ritual practices occur to send these dark spirits away, otherwise, living in that area is uncomfortable. Besides, building a house is a milestone in human life. The Vietnamese proverb "*tậu trâu, cưới vợ, làm nhà*"[26] indicates three most significant events in human life, and one of them is building a house. In addition, a house is considered as a symbol of multiple universes. A house is purified by ritual procession and is still regarded as dividing line between the sacred and profane worlds. Hence, households conduct ritual activities in order to seek protection and blessings by gods and ancestors (Ho, 2008).

Due to the importance of ceremony in the Vietnamese culture, not surprisingly, most households always performed several ceremonies during housing construction. Generally, there are three important ritual activities calling "*Lễ Động Thổ*", "*Lễ Cất Nóc*" and "*Lễ Nhập Trạch*" (Ho, 2008). The day and time for those ritual activities are always carefully choose based on the age of household and Feng Shui principles.

Before ground-breaking process, a ceremony namely "*Lễ Động Thổ*" is acted to seek blessings and honouring from the god of land and ancestors in order to keep the foundation safe, and the house is free of evil elements. In this ceremony, the household would prepare some food offerings. The type of food offerings depends on the customs of each region; in common, they would include a steamed rooster, a piece of steamed pork meat, boiled eggs and shrimps, bowls of rice and salt, three cups of white wine, a five-fruit tray, two traditional lamps, joss papers and flowers. At the chosen time, the food offerings would be arranged in the construction area. The house-owners must wear formal clothes and burn the incense to worship

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[26] Buying a buffalo, getting married and building a house

following the respective speech in ritual books. The meaning of such speech is to recall gods and their ancestors, to offer them with traditional food in exchange for their protection for the newly building. Then, once joss paper is burnt and wine is throwing to the land, only after that, the construction could start.

During the construction process, several similar ceremonies could be held for different parts of a house, particularly for the roof and each floor level. For example, under the Vietnamese perception, the roof is considered as the most important part of a building. Therefore, before starting to construct the roof structure, the same ritual ceremony or "*Lễ cất nóc*" is performed to report to the god of land that the construction is nearly finished.

When the construction is finished, another ceremony, namely "*Lễ nhập trạch*" takes place before moving into the new house. The last ceremony aims to inform the god of land and ancestors about the new home and to wish for a wealthy and healthy life in the new house. In this ceremony, apart from food offerings, the household has to bring a bowl of incense, a Vietnamese mat, a brush, a traditional kitchen, bowls of rice and water. Those items would be arranged following Feng Shui theory, and then the host will burn the incenses to start the ritual ceremony.

Majority of households generally shown that worships are important parts of building construction. Normally, elder male person will do the ritual activities while other members help to prepare food and necessary items for the ceremony. For example, one interviewer highlights the importance of ceremonies:

> *It is necessary to worship during building process. When building the house, I have to consider my age to choose the good time; I also do some ritual activities before the ground breaking. When finish one floor, I do the same thing to avoid bad things and show the respect to the land gods, especially when finishing the top floors. Before living, I do a huge ceremony and invite my friends to come and cheer with me [...].*

> *N. T. Truong, interview in 25-08-2016*

The ritual activities are not only for wishing good, but it is also significant because the meaning of ceremonies is believed as giving the life to the house. Therefore, many particular traditional rules were applied. For example, one household revealed that:

> *When I built this house, my age was 46 years old, which is not good for building or anything, related construction process. Therefore, I asked my friend who were 45-year olds for ground-breaking ceremony. He excavated in the four corners of plot and the planned area for ancestor*

altar. When constructing the basement or any floor, he helped me for other ritual activities as well. When finishing, I did the "Nhập Trạch" contract, which mean that I bought his house in Vietnamese custom. [...] My wife did a lot of ritual activities at that time such as "Hoàn Long Mạch". Basically, during ground-breaking process, the dragon point was cut; so, when the house was finished, my family did a ritual activates to heal that point [...] By doing that ritual, the house belongs to my family [...].

<div align="right">

N. T. Luc, interview in 03-09-2016

</div>

The above respond suggested that the ritual activities around the building process are necessary. The meaning of home is not only in the physical design, but it also related with the ritual satisfactions. Although in contemporary society, some households did not do all ceremonies, they did important ceremonies and celebrate the end of construction by open a party. For example, one household stated that:

The only ritual thing is when I moving the ancestral altar into the house. As you know, it is Vietnamese culture, so there should be an ancestral altar in the house for worship. Thus, my father selected good days and time when moving the altar. Then, my wife and I invited some friends and relative members come and have a party for cheering with us about new house. On other festival days, we make some ceremonies as well such as in kitchen god's day and Lunar New Year.

<div align="right">

Mr V. N. Ngoc, interview in 08-09-2017

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In brief, in Vietnamese society, ritual practices are an integrated part of the construction process due to the Vietnamese beliefs in gods, ancestors and evil spirits. A house, in architectural terms represents a physical shelter, but in practice, it becomes home to Vietnamese once ritual activities are conducted to give life to the house.

6.3.4 Worship and ceremonies at home
6.3.4.1 Ancestor worship at home

Apart from rituals during the design and construction processes, local religion and beliefs about cosmos and ancestors jointly create a comfortable living place (Nguyen, 2005). This part explains the common ritual activities and ceremonies within Vietnamese houses.

Regarding the local religion, in Vietnam, it is a blend of three main religions including Buddhism, Confucianism and Daoism, also known as the three teachings ("*Tam giáo đồng nguyên*" in Vietnamese). Accordingly, Vietnamese people believe in the after-life; typically, a house represents a gateway between the human life and the after-life. People go to the after-life world when they die; nevertheless, they

could still affect the wealth and happiness of their family members in the human life. In other words, even when the death people enter the eternal realm, their souls or spirits still exist in the human life. The spirits would stay with family members to assist all family activities. As a result, Vietnamese people also believe that the destiny of each person depends on not only their human life, but also their ancestors (referring to the proverb "*trần sao âm vậy*" in Vietnamese). Such beliefs highlight the significant role of ancestors in Vietnamese families. Therefore, worshipping to ancestors has become a popular and important practice in Vietnamese families (Nguyen, 2005; Bui, 2001; Phan, 2005). According to Vu (2007, p232), "*no Vietnamese do not worship ancestral event if they live alone or live far away from home or in different place with different custom*".

Ancestor worship has several meanings. Firstly, it pays the tribute to the deceased relatives. In Vietnamese culture, the younger generations in general ought to express their gratitude to the older generations, who have nurtured, fostered and brought them up. Thus, ancestor worship roots in the perception of moral debt ("ơn" in Vietnamese) - that humans were born into this world owing to their ancestors; therefore, people should be indebted to their ancestors. In the case that the older generations, such as grand-grandparents, grandparents and parents are still alive, the younger generations need to repay the moral debt in the forms of obedience and respect. Otherwise, the repayment of moral debt is through ritual practices particularly toward the ancestors. Besides, Vietnamese folk poems and proverbs have further promoted remembrance activities to the older generations. For example, one of the most popular folks in Vietnam is "*Công Cha như núi Thái Sơn, Nghĩa Mẹ như nước trong nguồn chảy ra. Một lòng thờ Mẹ kính Cha, Cho tròn chữ hiếu mới là đạo Con*"[27]. The folk strongly remind the vital role of parents and ancestors in the life (Ho, 2008).

Secondly, ancestor worship in Vietnam seeks to educate the younger generations about value and personality (Ho, 2008). Given each individual human has his/her family root, if a person neglects their ancestor, that person would lose his/her identity. That meaning can be seen in the proverb: "*Con người có tổ có tông, như cây có cội, như sông có nguồn*"[28].

Thirdly, the customs of worshiping is the opportunities for family members and relatives to tighten their kinship. In fact, the worshiping activities are generally opened for extended family members. During some specific days such as the death

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[27] The folk poem means that: "*Father's painstaking is as great as Mount Thai Son. Mother's kindness is as inexhaustible as water flowing from its source. We must always respect and honor our parent; only by that, we can fulfill our obligations as children*"

[28] People have ancestor as tree has root as river has its source.

anniversaries of a common ancestor, relatives often visit each other to join the worship in order to maintain the identity of the whole extended family. Conventionally, the house of the eldest son shall be the chosen place of worship.

The ancestor worship in Vietnam could be divided into two types (Phan, 2005 and Bui, 2001). The first type involves the reunion of family in the ancestral hometown ("*quê*" in Vietnamese). In festivals and national holidays, Vietnamese people mainly return to their hometown ("*về quê*" in Vietnamese). In their ancestral hometown, there are likely to have a common site for ancestral hall ("*nhà thờ họ*" in Vietnamese) where most of ancestor worship activities occur. The second type of ancestor worship is the establishment of ancestor altar inside the house. Vietnamese facilities conduct worship activities at home on their family annual remembrance days or on the traditional festive days (Figure 126).

Figure 126: The Vietnamese ancestral altars in contemporary self-built housing in different ceremonies. (Clockwise from top left) (1) Ancestral altar during wedding ceremony, (2) Ancestral altar during kitchen god's festival, (3) Ancestral altar during death anniversary, (4) Ancestral altar during normal day.

Most of the ancestor worships activities happen around the ancestor. Traditionally, the altars are commonly made by timber with decoration by traditional symbols such as dragons and clouds (Figure 127). On the altar, the highest table is only for

the deceased relatives more remote than parents of the house-owners. Incense is an indispensable offering in Vietnamese ritual activities together with others like fresh flower and traditional food. The smoke of burnt incense is believed to connect the living people with the deceased in ritual ceremonies. With relevance to the worship objects, they must represent five elements including metal, wood, water, fire and earth. For this reason, the worship objects usually include incense bowl, candle rack, incense tube, wine and water tanks and large wooden compote (Bui, 2001). In rich families, ancestral altars sometimes have the distich to remind of the role of ancestors. According to Vietnamese belief, the cosmos combines three different worlds; of which, ancestors and gods live in the heaven. Thus, the ancestral altars are favourably put in the cleanest area of the house; and it should be away from kitchen and toilet. In traditional rural house, ancestral altar always is always located in the centre of main living room. In historical urban area, ancestral altar in traditional house is commonly situated in the highest level far away from toilets and bathroom.

Figure 127: Drawings of ancestral altar in the traditional Vietnamese paintings (Le, 2012, p 76, 78)

Interestingly, among eighteen collected case studies, the principles and meaning of ancestral altar in modern time evidently remain unchanged; nevertheless, the

location of ancestral altars is much depending on priority and available spaces of each household.

Overall, the location and arrangement of ancestral altars are still of utmost important in all houses. Strikingly, in most of case studies, the ancestor altars are located in a separate and clean room and often in the highest floors of the houses (Figure 128). Such choice of location follows traditional rules in order to avoid bad luck (Phan, 2005).
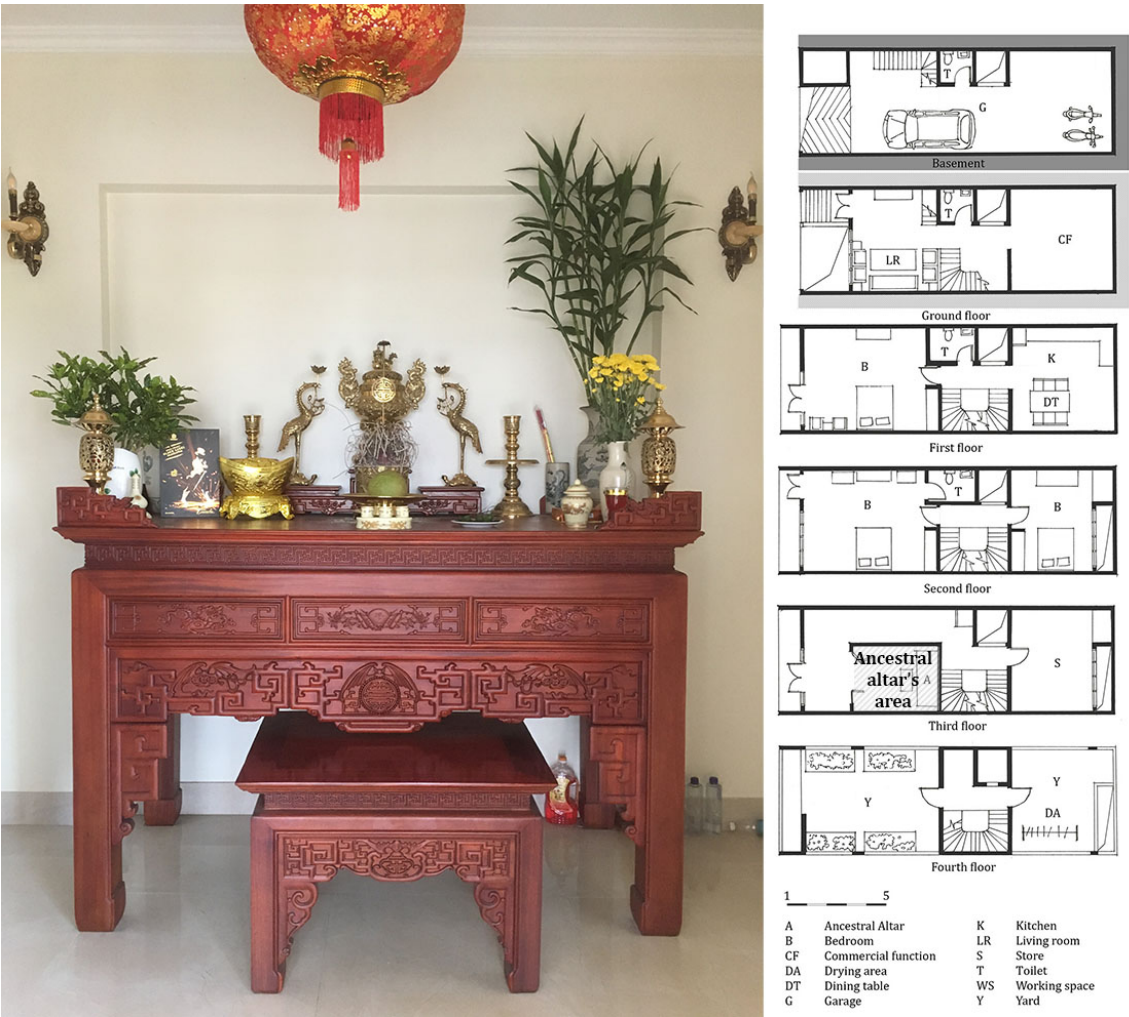
Figure 128: Location of ancestral altar in the third floor in case H14

Although the location of ancestral altar should be located in the highest storey, in practice, household also could choose location of ancestral altar regarding their health conditions. Particularly, there are two cases having ancestral altar in the living room. To explain about this, the oldest male member is the head of the extended family; thus, the ancestor altars are in the living room in the ground floor, where is convenient for older members to perform activities.

[…] In theory, the ancestor should be located in the highest place of the house. However, it is quite difficult to bring food and other things to the altar for ritual activities, particular for such old people like me. Furthermore, because I am the eldest son in my family, so I planned the ancestor altar in the ground floor. This location is convenient because when relative members visit, they could burn the incenses to honour the ancestors […].

N. T. Truong, interview in 25-08-2016

Figure 129: Location of ancestral altar in the ground floor of Truong's house

Similarly, another household explains the reason to set their ancestral altar in the living room as following:

In my family, when my parent built this house, there was a separate worship room in the second floor. However, since my parent were over 60, the health conditions of my parent were not very good. Also, my mother's legs have injuries. Therefore, my parent cannot go to the worship room frequently, particularly in ceremonies or festive days. Thus, they decide to put the ancestral altar in the living room.

P. M. L. Phuong, interview in 03-09-2017
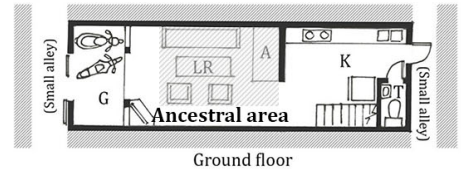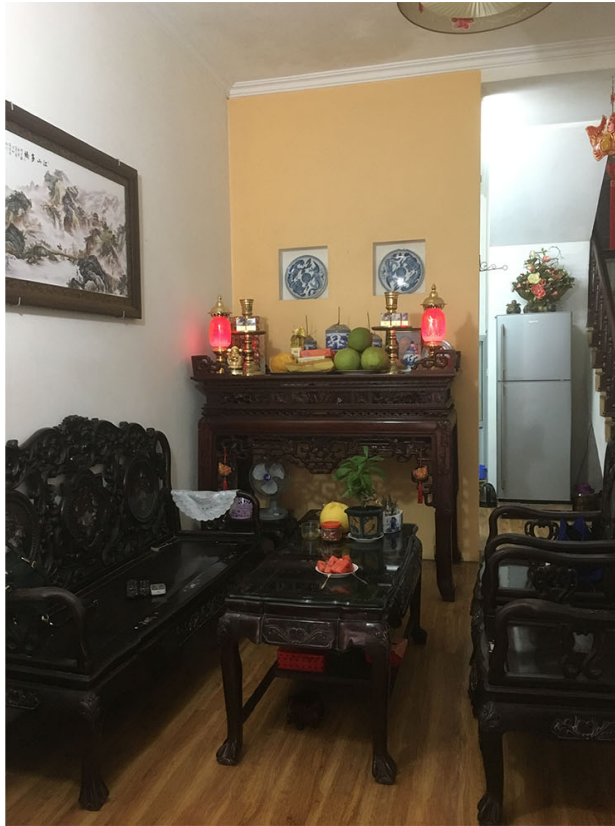
Figure 130: Location of ancestral altar in the ground floor of case Phuong's house

Meanwhile, in one case, due to small size of the house, there are not many empty spaces in the house; thus, the house owner attaches the ancestral altar to the wall of bedroom (Figure 131). Particularly, the ancestral is situated above the bookshelves. This location is considered as highest and cleanest place in the house to fit with traditional rules.
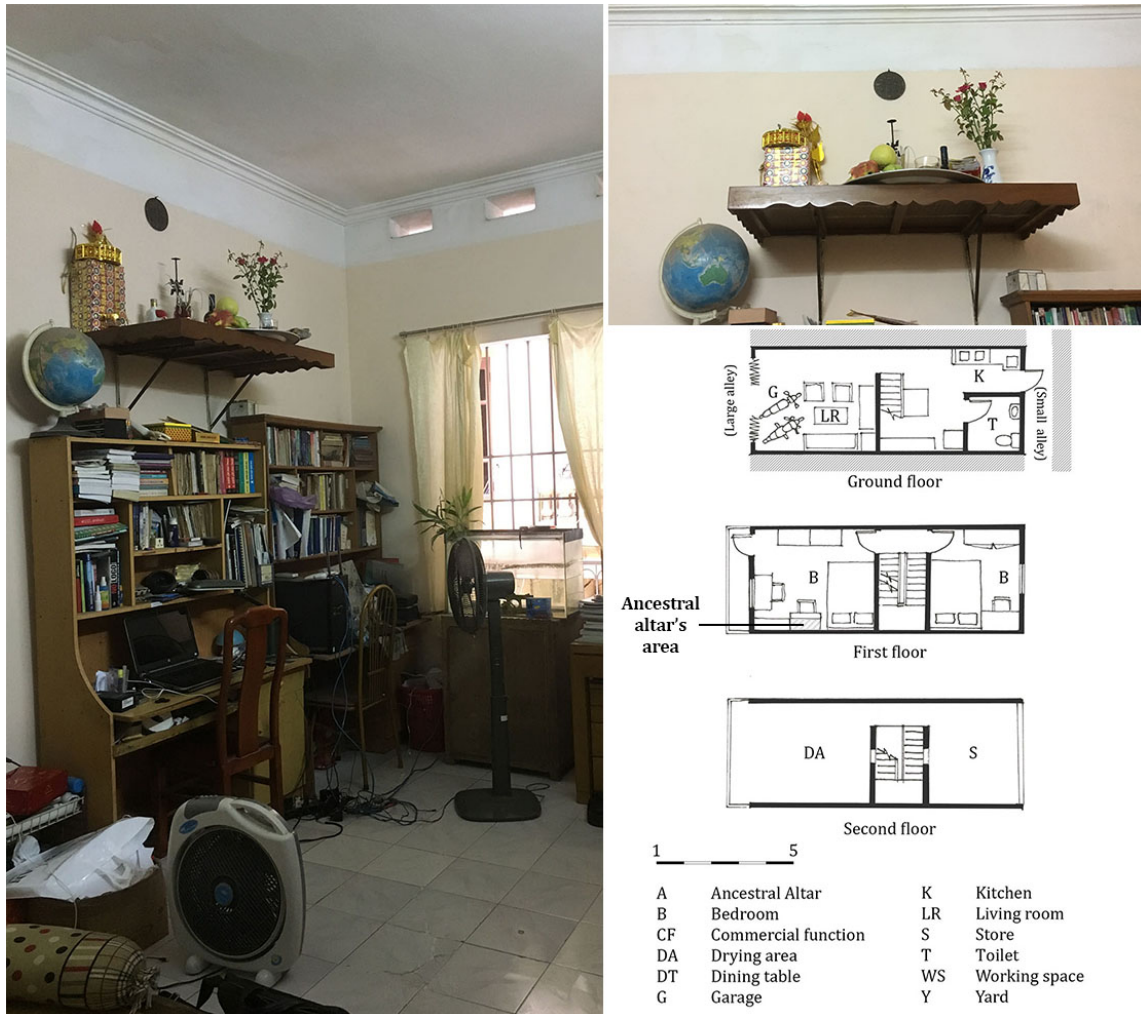
Figure 131: Ancestral altar was attached to the wall in case H6

The location of ancestor altar also could affect the arrangement of other furniture through particular rules. For example, the location of ancestral altar could affect the arrangement and direction of bed. Specifically, when sleeping, occupants have to put their heads towards the altar while their feet pointing in a direction away from the altar. Those rules are affecting to the arrangement and direction of beds. One interview revealed that:

> *[...] the direction of beds cannot parallel with the length of building, which represents as the direction of death people during funeral events. Thus, the beds always parallel with the width. In addition, when sleeping, the feet have to point in direction away from the ancestor altar [...]*

> *N. T. Luc, 60 years old, interview in 03-09-2016*

Ground floor

First floor

Second floor

Third floor

A	Ancestral Altar	K	Kitchen
B	Bedroom	LR	Living room
CF	Commercial function	S	Store
DA	Drying area	T	Toilet
DT	Dining table	WS	Working space
G	Garage	Y	Yard
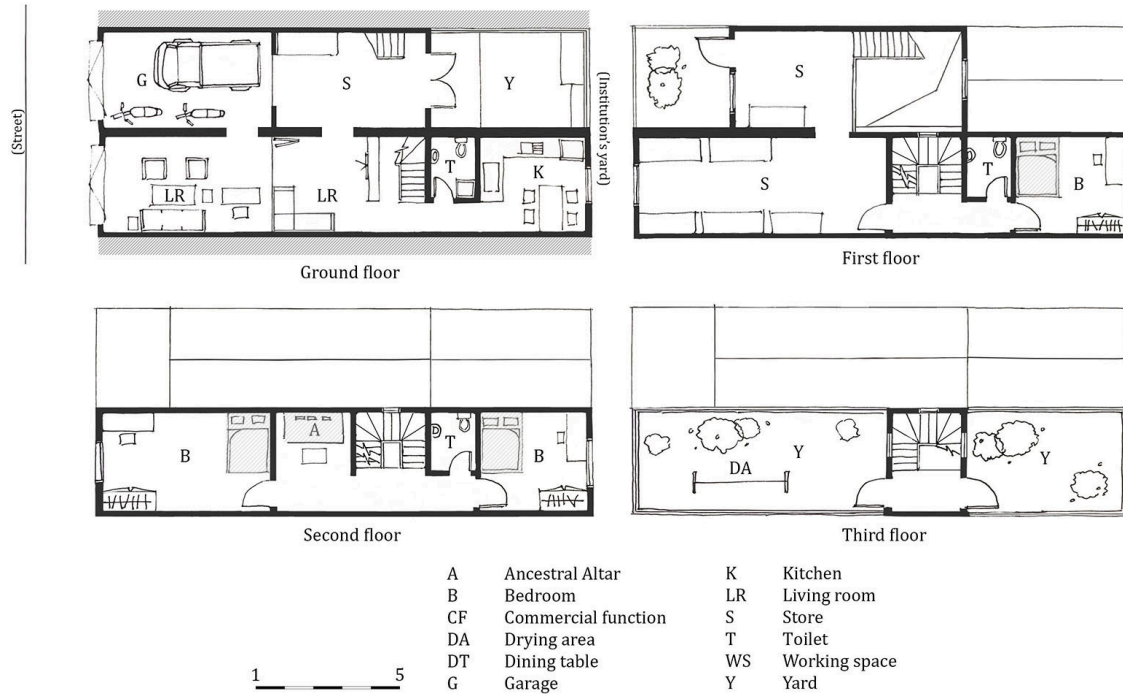
Figure 132: Arrangement of beds in Luc's house following traditional rules

6.3.4.2 Festivals and occasional ceremonies at home

Religions practices are important part of Vietnamese living styles (Ho, 2008 and Bui, 2001). Besides ancestral worship, there are various ritual activities relating dwelling. Among many festivals, there are several important festivals (Ho, 2008), such as *Tết Ông Táo* (festival of kitchen gods), *Tết Nguyên Đán* (held in the first day of the year following lunar calendar), *Tết Thanh Minh* (held in first day of lunar month), *Tết Vu Lan* (held in the fifteenth day of the seventh month) and *Tết Trung Thu* (held in the fifteenth ay of the eighth month when the moon is full). When participating in the ceremony, people should wear formal dresses. The ritual actives aim to wish good things for their home and family members. All ceremonies shared one thing in common. All of them happen at home, around the ancestral altar and in living spaces.

Based on observation, household still conduct rituals at home during festivals and ceremonies. Particularly, one of most important part of ritual is preparing food for worship. Although there are different spaces for eating in traditional house and contemporary house, the process of food preparation seems not changed too much. There are different processes of food preparation in normal day and in ceremonies time. In normal day, food is cooked in kitchen, and people eating in dining table after cooking. On the other hand, in ceremonies times such as festival days and death anniversaries, food is an occasion for sharing, giving and expression of remembering. After cooking, a set of traditional dishes and flowers always put in

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front of ancestral altar (Figure 133). Then, household start a ceremony by burning incenses and put them into the incense bows. Only when finishing ritual activities and incenses are completely burned, family could start to enjoy their meals. The rituals aim to show respect to death members and ancestors.

Figure 133: Food is arranged for worship in front of ancestral altar during ceremony

Besides ancestral worship, during festival, households also practice rituals to gain protection from gods and to avoid mysterious forces. Some of the most popular gods are including kitchen gods (*Ông táo)*, land god (*thổ địa*) and god of wealth (*thần tài*) (Bui, 2001). Today, the Vietnamese households still practice ceremonies to seek blessing from those gods at home. Meanwhile, during ghost festival, households are also offering food to ghosts and unnatural spirits (Figure 134). The ritual activities happen outside the house, particularly in the sidewalk. The aim of this purpose is to prevent ghost and natural forces from crossing into a house.

Figure 134: Food is arranged to worship during ghost festival in front of the house

Traditionally, the house is the host place for most of special ceremonies in human life such as wedding and funeral events. In all ceremonies at home, the worship in front of the ancestor altars is an indispensable activity with the aim to inform the ancestors about a new member or a deceased member in the family. During those days, the altar is always kept clean. Meanwhile, the ceremony theatres would be subject to the housing location and its surrounding landscape. For example, if the house faces the main street and the pavement is big enough, the family could hire the tent to create a temporary space for ceremony in front of their house (Figure 135). Since special ceremonies such as wedding and funeral is vital in Vietnamese culture; thus, according to policy and regulation, public spaces around the house could be used for family activates as long as such use of public space do not cause traffic congestions. Under some circumstances, family has to resort to the public space near their house, such as school, public hall or public service area for the ceremony.
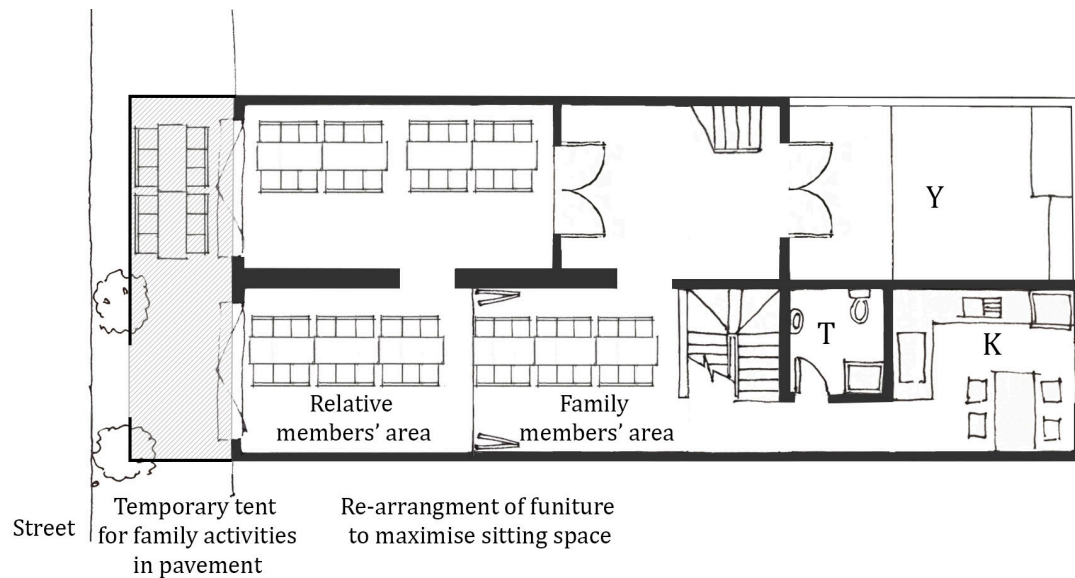
Figure 135: Arrangement of interior and exterior during the ceremony. (Top) Planning of domestic spaces. (Bottom left) "*Rạp cưới*" – a temporary structure covers the front space of the house in the pavement during ceremony days, (Bottom right) re-arrangement of interior during ceremony.

6.3 Sense of "*dirt*" versus "*clean*" spaces

6.3.1 Conception of "dirt" and "clean" spaces in Vietnamese traditional housing

In Vietnamese culture, sense of clean and dirt space represents in various aspects of daily activities and rituals. For example, the head is considered to be the sacred part of the body; this, it is impolite to pat the head of a Vietnamese adult. Similarly, lower parts of body are considered as source of dirty. Thus, a Vietnamese person will feel offended if someone places a foot on the desk or pointing towards him or her. Similarly, when sleeping, occupants have to put their heads towards the altar while their feet pointing in a direction away from the altar.

A sense of cleaning and dirt also used to present personal characteristic and genders. Particularly, reputation is more important than material values in

Vietnamese culture. For example, according to proverbs "*Hùm chết để da, người ta chết để tiếng*"²⁹,"*Đói cho sạch, rách cho thơm*"³⁰ and "*Giấy rách phải giữ lề*"³¹, a person, who did not harm anyone no matter how difficult situations is, is considered as cleaning and good person. By contrast, a person, whose has discrimination again people, or has occupations related with dead bodies (For example, killing animals), is considered as "*đồ tể*". They and crimes and thieves are classified as sources of uncleanness (Hoang, 2003, p333).

The classification of cleaning and dirty also could be seen in differences of gender. Owing to Chinese influence and local religions, Yin Yang philosophy became very popular in Vietnam during the period from the ninth century to the late nineteenth century. Yin presents for male and positive effects, while yang present for female and negative effects. Thus, woman is considered as more polluted than men. As a result, during feudal periods, men always have important role in society while woman has limited rights (Tran, 1997). A head of family is always an eldest man, and he has duty to exercise in running his family. Meanwhile, having a boy in family is vital because the eldest son would assume duties of his father when he died. According to a Vietnamese proverb: "*Nhất nam viết hữu, thập nữ viết vô*", a family that had no son to continuous a process is considered to have disappeared forever no matter how many daughters that family has. In addition, owing to influence of Confucianism, woman has responsibility to take care of domestic work including cleaning, cooking and washing. Therefore, kitchen is considered as identical place of woman, and man should not allow doing domestic work in the kitchen area.

A sense of cleaning also is practiced in various regional beliefs. For example, ancestral altar generally located in scared space; thus, location of ancestral altar should be kept clean and to avoid unclean things. Before preforming rituals during festivals and ceremonies, household have to wear formal clothes and keep their body cleaning before worshipping. Meanwhile, the Vietnamese considered guest welcoming as important activity to maintain friendship, and to show hospitality of households (Tran, 1997). Therefore, guest-welcoming area is always located near main entrance, and is separated from dirty spaces to maintain sense of cleaning.

To summary, although classification of cleaning and dirt is a basic classification in various cultures for domestic spaces, in Vietnamese culture, dirt refers not only to physical and visible dirt but also to conceptual dirt. Domestic spaces must follow particular orders to represent and maintain the cleanliness of the family who live there. For example, in traditional town house in Hanoi during the nineteenth

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²⁹ *A tiger dies and leaves his skin, a man dies and leaves his name*
³⁰ Similar to English proverb: "*A clean fast is better than a dirty breakfast*"
³¹ Similar to English proverb: "*A gentlemen keeps his integrity even in poverty*"

century[32], a layout of domestic spaces often follows particular order: shop - courtyard-living space – courtyard- supporting spaces (kitchen and toilet). In this regard, dirty space including kitchen and toilet are always located in the back of building, and those spaces are physically separated from other living space by internal courtyard. This order is not only relating with hygienic issues, but also reflects meaning of place. Guest welcoming area and area of ancestral altar is respective spaces; thus, those spaces should be keeping clean. In this regard guest-welcoming area is always located in the front while ancestral altar is always located in the highest level in domestic spaces.

6.3.2 Classification of "dirt" and "clean" spaces in contemporary self-built housing

The connection between cooking activities and living space has been highlighted by various scholars (Rapoport, 1969 and Lawrence, 1987). According to Rapoport (1969), religion, ritual, belief and customs could affect cooking habits, and the activities of cooking could impact the house form. Everything about cooking has meaning, such as relationship between cooking spaces and other living spaces, who has responsibility to cook, what time of day the meal is eaten, who sits where at the table or what order the food is served in, who serves it, how to cook. Consequently, kitchen and cooking activities are great indicators of culture. Cooking activities are not simply as to transfer raw materials into cooked materials to eat, but they also seen as identity and social generators. Similarly, Lawrence (1987) highlighted that a process of preparation of food, cooking and eating pattern reflect social behaviour. Although the process of cooking and eating is one of most primary human activities to all cultures, the process is usually related to cosmic, religion and kinship. Cooking and eating could be associated with ritual activities and ceremony, to be done by individual or particular groups. As a result, the change of social activities relating kitchen area also could impact on the changes of spatial layout and the design of domestic spaces.

Specifically, there are various changes in kitchen area. The first change is a relation between kitchen and internal yard. As described before, before the 19th century, the traditional urban tube houses always had two main components including living areas and supporting spaces. Living space located in the frontage while supporting spaces including kitchen, toilet and bathroom were physically separated from other living spaces through the internal courtyard. By contrast, since the economic reform in 1986, the kitchens have been directly attached to main living spaces, and the internal courtyard has been disappeared.

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[32] Please see section 4.2.3 for detailed characteristics of traditional town house in historical quarter in Hanoi city

The second change is the use of kitchen. Particularly, in the traditional society, cooking, bathing, using toilet and laundering were considered as one set of dirty and unclean activities. Hence, all supporting areas including kitchen, bathing and toilet were located in the same area in the rear and far away from other living spaces. By comparison, based on observation on contemporary self-built housing of Hanoi city, the domestic system has reserved the kitchen for activities related to the preparation of food and dishwashing. A separated laundry area was normally provided in the gardens locating in the top terrace, and separated toilet and bathroom taken for granted in each floor. Therefore, it is clear that, today, cooking and dishwashing, laundering, and bathing have been considered as three different sets of activities. Each activity is functioned in specific room.

Finally, in contemporary houses, the kitchen often contains the dining table. Within Vietnamese culture, eating activity is preferred as process to enjoy good food and to create healthy body. Therefore, eating activity often took place in clean spaces. In the plans of traditional houses in regions of Hanoi as well as in the literature, there is no evidence of dining table in the kitchen area. By contrast, since the economic reform in 1986, a common location of eating area has been changed from living space to kitchen. It is evidence that in 6 cases, due to small kitchen, the main living room is also eating area. On the other hand, in 12 cases, the house has large kitchen, and kitchen always contains a set of dining table.

To explain about those changes, the assumption about the transformation of domestic spaces is based on changes in social hierarchy and an introduction of domestic facilities.

Firstly, the role of woman has experienced remarkable changes. Before the twentieth century, the land is controlled by landlord and villages community; thus, after cultivating seasons, poor famers had to find extra jobs such as cullies, labour job or craftsmen in urban areas. The landlord and merchants class often have several maids who doing domestic work. Thus, food preparation activities were done by maids. Otherwise, the domestic work should be done by female members owing to social and family hierarchy. By contrast, in the contemporary society, no household hire maid to do domestic work unless there is a need of special care for elders or baby. In addition, the role of women in society has significantly changed owing to woman rights and education system. Although in family, most of Vietnamese woman still holds responsibility for domestic activities (Knodel et. al, 2005); nevertheless, the meaning of kitchen is no longer identical place of woman.

Figure 136: Kitchens with modern facilities

Secondly, the introduction of domestic electrical facilities has become common in the Vietnamese house since the economic reform (Figure 136). In the mid of the twentieth century, most urban dwellings had very little service equipment. A typical traditional house was ventilated by non-glazed windows having timber shutters while cooking equipment were minimal. Thus, the segregation of services spaces and living spaces aimed to avoid the impacts of smoke, smell and fire to other parts of building. On the other hand, since the reforms, the influence of domestic technology was considerable upon the development of domestic architecture. Various new types of domestic products have been introduced. The Vietnamese households always attempt to use domestic machines in recently. For example, table 18 shows that various types of machines in the kitchen. Among those machines, rice cooking, electronic stove, fridge, hood and fan are the most popular items. Thus, the role of courtyard used to reduce the effects of smoke and smell have become less important in contemporary housing.

Product's name	Number of records
Oven	1
Fridge	18
Washing machine	1
Micro wave	9
Toaster	0
Electronic kettle	7
Television	3
Electronic fan	12
Hood	13
Electronic stove	15
Gas stove	6
Rice cooker	18

Table 19: Electronic devices in the Vietnamese kitchen

Interestingly, although the use of kitchen has changed since the economic reform in 1986, the local activities and habit are still influence on meaning of domestic spaces. It is worth noting that the application of domestic electrical facilities in kitchen area is selected rather than random choices. For example, table 19 shows that oven and toasters are still not popular in Vietnam while rice cooker became vital items in kitchen of each household. In other worlds, although Vietnamese society has adopted modernity, various domestic activities are still based on local and traditional living styles. Vietnamese still use rice as main ingredient in every meal. Besides, fish sauce and other smell sources are still used daily. Thus, application of domestic electrical facilities helps to improve hygienic issues, it does not help to change meaning of place. Generally, households still referred kitchen as dirty space owing to smell and waste during cooking process, and the household would not entertain friends in the kitchen area. Therefore, in special events and ceremonies, household always eat in the living room, where is more formal and cleaning (Figure 137). In this regard, it is not surprised that in contemporary self-built housing the location of kitchen is located in a rear of building, and the kitchen is blocked from the main living room by wall or staircase.

Figure 137: Food is prepared to eat in living room in special events

In Vietnam, the main family living room is also a guest welcoming room. Therefore, design of living room is highly considered to reflect sense of cleanness. Before the economic reform in 1986, the main living room was represented as symbol of family values, unity and continuity. Consequently, the living space always located in the centre of building, and the interior of living room had to follow particular principal design, which was based on symmetrical arrangement (Ngo, 1998). The middle of living spaces was a set of furniture with table in the centre and two long chairs in two sides. Meanwhile, in the traditional tube houses, which were built during the nineteenth century, the living rooms were always designed next to main courtyard[33]. As described before in chapter four, the form of traditional town houses does not only reflect protective structure, but it also implies the ideology and perception of the Vietnamese culture. Internal courtyards are indispensable parts in the traditional urban housing layout to create a harmonious environment, and to bring life energy into the buildings. Within urban conditions, it is usually difficult to obtain an ideal site according to Feng Shui principles; therefore, in order

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[33] Please see section 4.2.3 for characteristics of traditional town house in Hanoi city

to achieve a desirable living environment, the form of a courtyard house has been selected as an ideal model. The main living spaces in traditional Vietnamese houses always surround their courtyard to create sense of privacy, security, to restrict noise and dust, to offer light and air.

In cases of contemporary self-built housing, according to observation data and responds of households, a connection between living room and internal courtyard has experienced major change. Particularly, there is no evidence of internal courtyard around the living room. There are several reasons for this change. Firstly, majority of households explain that due to small housing plot and high requirement of living spaces, they tended to maximise built-up area to increase floor area. Thus, a house surrounding by courtyard and gardens is considered as dream house, when housing plot is large and land price is cheap. Secondly, the role of large courtyard to promote fresh air movement seems not as importance as to increase the room space. To replace courtyard, a small sky-well and roof vent are designed in the staircase area for cross ventilation[34]. In case of very hot days, households could use electronic products such as fan and air-conditions to achieve comfort.

	Description	Number of record
Electronic devices	Television	13
	Computer/ laptop	3
	Fan	17
	Air condition	7
Other furniture	Cupboard	6
	Traditional wooden set of table and chair	15
	Sofa	4
	Image of landscape based on Feng Shui principles	13
	Image of family members	6
	Ancestral altar	2

Table 20: Common furniture in living room

Although a relationship between living space and courtyard has changed due to application of new electronic devices, the role of living room is still remaining importance for family activities and guest welcoming. Particularly, in the living room, household often display various types of modern electronic products and valuable good such as television, set of karaoke, DVD driver and speaker to provide new leisure activities (Table 20). Meanwhile, the decoration and arrangement of furniture in living room are highly following traditional rules and symmetrical arrangement. The wooden set of table and chair, which is decorated with traditional symbols, are still popular in living room (Figure 138). Meanwhile, to

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[34] Please see section 6.5 for details

create harmony between living spaces and natural elements, an image of landscape following Feng Shui and traditional rules could be found in majority of living rooms in case studies (Figure 139).

Figure 138: Common traditional set of table and chair, which was arranged following traditional rules in living room
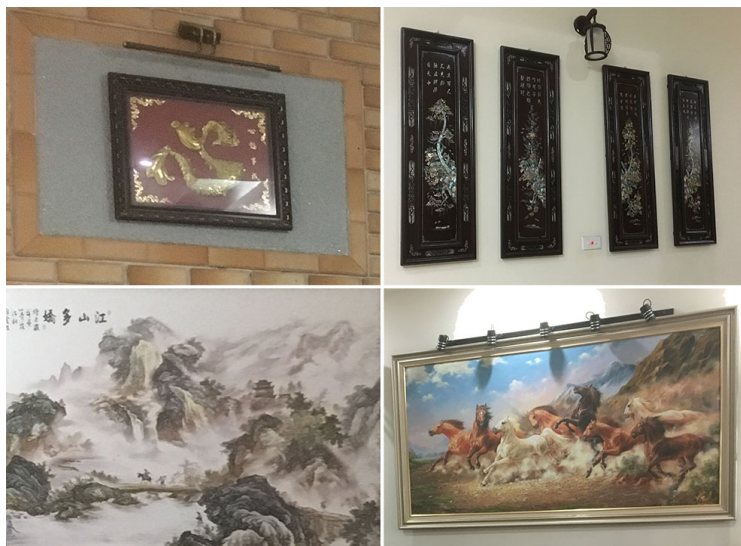
Figure 139: Traditional images in case studies. (Clockwise from left to right) (1) picture of traditional text representing for particular value and good things for family, (2) pictures of landscape in four seasons, (3) picture of eight horses representing for wealth and prosperity, (4) picture of landscape containing sky, mountain and water.

Regarding location of living room, basically, there are two main locations for living rooms in contemporary self-built housing (Figure 140). Commonly, living room is located in the front room of ground floor while kitchen is situated in the back. In case if household have (car) garage; living room is located in the upper floor while (car) garage and kitchen are located in the ground floor to maintain sense of cleanness and dirt. Meanwhile, ancestral altar is importance in each Vietnamese family; thus, a location of ancestral altar generally situated in the highest area.

$$\frac{\text{Front}}{\text{Back}} = \frac{\text{"Cleaning"}}{\text{"Dirt"}} = \frac{\text{Respective space}}{\text{Supporting space}} = \frac{\text{Living room}}{\text{Kitchen}}$$

$$\frac{\text{Top}}{\text{Down}} = \frac{\text{"Cleaning"}}{\text{"Dirt"}} = \frac{\text{Respective and sarced space}}{\text{Supporting space}} = \frac{\text{Living room/ Ancestral altar}}{\text{Kitchen/Car garage}}$$

Figure 140: Classification of cleaning and dirty regarding location of living room, kitchen, ancestral altar and car garage in contemporary self-built housing.

To sum, it is evident that since the economic reform in 1986, the meaning and use of kitchen have significantly changed owing to new social values, living styles and application of modern domestic products. As a result, there are various changes in kitchen area. Those changes are including the separation of toilet, bathing and laundering from activities of cooking and dish washing, disappearance of internal courtyard and emerged trend of eating in the kitchen area. Nevertheless, the kitchen is still refereed as dirty and unclean area; therefore, in all case studies, kitchens are located in the rear of buildings, and kitchens are separated from main living room by wall or staircase. On the other hand, the use of living room is for family activities and guest welcoming; thus, a location of living room is highly considered in design process. Normally, the front space is kept for living room while the rear room is kitchen. Meanwhile, if household has (car) garage, a living room could be located in the first floor. In addition, ancestral altar should be located in the living room or in separated room in highest floor to maintain sense of cleanness.

6.4 Sense of "*communal*" versus "*individual private*" spaces

6.4.1 Conception of "communal" and "individual private" spaces in Vietnamese traditional housing
In Vietnam, an ideology of being a member of a family (and a community) is vital (Vu, 2007). A meaning of Vietnamese word for "*house*" (*Nhà*) also could be understood as members of family who living in that house (Tran, 1997). In other words, a house is not only referring to physical structure, but also a sense of family.

Particularly, every decision is not based on individual desire, but upon a duty to family. Family is more important than individual. When a child is born, a name is selected following order: family, middle and first names rather than reversed order

in Western countries. This order addresses that a new member belongs to a family (or community) rather than a new individual. In addition, according to proverb: "*Cha mẹ đặt đâu, con ngồi đấy*", when children are in the age of marriage, they have to follow rules by parent to select their partners rather than following romantic love and personal choices. The aim is to select person, which has similar background, to maintain family and communal interests. Even if the marriage is not happy, a family encourage they to sacrifice individual interests and to endure difficulties of marriage for the sake of family.

A sense of family is also seen in daily rituals. For example, a traditional Vietnamese family followed extended multi-generational pattern rather than nuclear family. A family with three or four generations living together under the same roof is considered as symbol of happiness. Even in case children living in separated place, they should build theirs house near their parent's houses, by that, they could take care parent when they are in old age. Meanwhile, when eating, dishes are prepared in table for sharing (Tran, 1997). The Vietnamese use their own chopsticks to take food from the dishes to their rice bowls. In a food tray, there is only one bowl of fish sources in the centre for sharing. There is no individual dish for each member.

Traditionally, sleeping close together in the same room was considered more intimate for Vietnamese families than being isolated in separate rooms. It was common for children to sleep with parents in the largest room. Only when the children grow up, they could have separated room away from parent. Nevertheless, individual private bedroom is not common in Vietnamese traditional houses was built before nineteenth century[35]. Every room could be used as mix-function; even bedroom could be grouped with eating activities or other family living spaces if necessary (Phan, 2005, p 318).

To summary, the family values in traditional society focused on being a member of family (and community) rather than individualism. Everyone has a duty to contribute to family rather than personal interests. In this regard, before the economic reform in 1986, no space in Vietnamese traditional houses is considered as "*individual private*" space.

6.4.2 Classification of "communal" and "individual private" spaces in contemporary self-built housing

Sleeping space is very important spaces regarding health, privacy, safety and comfort. Despite that, the meaning of sleeping area has experienced various changes. Specifically, during feudal periods, extended family, which consists of several generations living together under one roof, is symbol of happiness. By

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[35] Please see section 4.1.3 for rural housing and 4.2.3 for traditional urban housing

comparison, among eighteen households, the common household have two generations while only four families have three generations. Meanwhile the popular household size is from two to four people, and the number of children is quite low. The household's structure from case studies is quite similar with current Vietnamese family structure from other reports (For example: UN-Habitat, 2014). It means that the Vietnamese household's structure has changed from extended family to nuclear family since the economic reform. Interestingly, the size of household is decreased; nevertheless, number of bedrooms is going up. To explain about this phenomenon, it is important to highlight the change in sense of privacy in contemporary society.

Firstly, the use of sleeping room is moving from social family space to one function space for sleeping. As described before, traditionally, it was unusual for a person to have his own room. Each room in traditional houses was used as multi-functional space, and it was not easy for an individual to retreat to a private space. Thus, the number of bedrooms in traditional house is very low. For example, in the survey study by Phe and Nishmura (1991), few traditional houses, which were built during the nineteenth century in the old quarter of Hanoi, have more than two bedrooms. On the other hand, within the collected case of contemporary self-built houses, there are number of building has three to four bedrooms. To explain about this, common responds show that babies and young children normally sleep in the same space as their parent. After the children reach puberty, parent always prepare separated rooms or "*phòng riêng*" for their children. This action aims to give a greater sense of privacy, and children have to learn how to be more independent. Thus, number of bedrooms is much depending on number of family members, and the role of bedroom is moving from public space to private space. For example, two interviewees respond that:

> *[...] I had two sons [...] In the next few years, when my children growing up and are going to get marry, we might need to rebuild the house to create more rooms and living areas. Each of my sons will need one private room [...]*

> *V. V. Bach, interview in 22-08-2017*

> *My son is 27 years old now, and he needs a private room. In the old day, when my son was small, he always sleeps with us, but now, he is mature. He is going to get marry as well; therefore, a private bedroom is necessary.*

> *N. T. B. Van, interview in 09-01-2016*

Secondly, bedroom has become physical boundary of personal identity. In contemporary society, family member tends to spend much of their time in private bedroom, particularly for young generations. Therefore, the interior design of each

bedroom is much depending on the personal living styles of room owner. For example, one interviewee highlighted that:

> *[…] I want a separated changing room. Thus, in the second floor, there are three rooms, my bedroom, changing room and bathroom. On the other hand, my parent lives in the first floor, and there is only bedroom and bathroom in that floor. The material and colour are based on our interests as well. Each floor has different colour and decoration styles. For example, in my room, in the past, I choose blue colour for wall. However, in 2010, I want to make something new and creative; therefore, I repainted my room with yellow colour […]*

<div align="right">

P. M. L. Phuong, interview in 03-09-2017

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Ground floor

First floor

Parent's bedroom in the first floor

Second floor

Third floor

Phuong's bedroom in the second floor

A	Ancestral Altar	K	Kitchen
B	Bedroom	LR	Living room
CF	Commercial function	S	Store
DA	Drying area	T	Toilet
DT	Dining table	WS	Working space
G	Garage	Y	Yard

Figure 141: Two different designs of bedrooms in Phuong's house

Besides sense of privacy and personal identity, the living comfort has been highly considered in contemporary society. As home ownership provided scope for personal provisioning, house owners invested considerable effort and interest in their houses to create dream home. Owning to modern facilities and provision of

services, each floor might have attached with one bathroom to provide more comfort. If the house is large, each bedroom might have its own bathroom reflecting high sense of comfort.

Particularly, table 21 highlighted the household characteristics and its connection with number of rooms among 18 collected case studies of self-built housing in Hanoi city. The family size is quite similar with number of bedroom and bathroom. It means that decision for number of bedrooms and bathroom is much depend on the number of family members. Particularly, most of households have less than one person per bedroom and bathroom.

Number of bedrooms	(n)	(%)	People per bedroom	(n)	(%)
Two or three	11	61.1	Less than one person per bedroom	5	27.8
Four or five	5	27.8	One to two person per bedroom	13	72.2
Six or more	2	11.1	More than two person per bedroom	0	0
Number of toilets			People per bathroom		
One to three	11	61.1	Less than one person per bathroom	2	11.1
Four or five	5	27.8	One to two person per bathroom	15	83.3
Six or more	2	11.1	More than two person per bathroom	1	5.6

Table 21: Relationship between living rooms and family size

6.5 Human living space versus natural elements

6.5.1 Ideology about human living spaces and natural elements in Vietnamese traditional housing

Theoretically, climate has been widely accepted as an important factor in architecture. Specifically, climate affects human comfort due to the impact of air temperature, humidity and radiation. Beside the main function as a living space, a house is considered as a system to reduce the impact of climate on living spaces. Housing does not control climate; however, within the design and techniques, "*micro-climate*" is controlled to provide acceptable living spaces for the occupiers. This part explains the impact of local climatic conditions on choices of detailed design.

The most popular climate classification system is the Koppen system, which categorises climate regarding the temperature and the precipitation. Accordingly, there are five main types of climatic conditions including tropical, dry, temperate, snow and polar climates (Markus, Jurgen, Christoph, Bruno and Franz, 2013). Meanwhile, the updated version of the Koppen system is the Trewartha system that shows more detailed classification about regional climate (Michal, Eva, Tomas and Jaroslava, 2014). According to the Trewartha classification system, Hanoi situates in a humid subtropical area, which is extremely hot in the summer, and cool in the

winter due to impact of seasonal cold wind from the North. Thus, the local architecture has to deal with various climatic issues such as high temperature and sun heat (Kukreja, 1978).

Traditionally, vernacular housing is constructed with low-sustainable techniques (Van Anh and Fausto, 2013; Ngo, 1998). Those techniques could be seen in numerous aspects of the house design including layout, orientation and organisation of plants and garden. The building layout is a complex system including gate, hedge, screen, basin, main building and supporting construction such as kitchen and storage. Facade of building always faces to the south to avoid the disadvantages due to annual hot wind. Meanwhile, various types of trees surround the main living areas to provide microclimate. Normally, the front of building has a row of palm tree while the rear has banana trees. Palm trees provide shading during midday while banana trees help to block cold wind from the north. In case of contemporary self-built housing, households always use several traditional principles in design process to respond to local climatic conditions.

6.5.2 Cross ventilation principles in contemporary self-built housing
Due to high temperature, ventilation is significant in architectural principles in tropic climate. In most cases, the orientation of building is depended on the planning; thus, not many households highlight the important of orientation to catch the wind in contemporary design. Despite that, other strategies responding to natural ventilation are clearly identified. Firstly, windows and door are always designed as big as possible in the main facades. One interviewee revealed that:

> *[...] The door and windows are very large for ventilation. Thus, when opening the windows, the living spaces are always cool, even in the summer. We just use air condition for cooling in some special days in summer when the temperature is very high [...]*

D. Q. Dinh, interview in 09-09-2017

Secondly, sky wells are also used for ventilation. Courtyards are principal characteristic of traditional Vietnamese buildings. The courtyards are boundaries by housing constructions and walls. The traditional rural house and traditional tube house always has at least one courtyard to control air movement. By comparison, the households revealed that contemporary housing plots are too small to create courtyard in self-built house. Thus, the sky wells, which apply similar principles of courtyards, are used to promote airflows. The sky wells normally located in staircases. Generally, the connection between staircase and sky-well could be classified into three types (Figure 142). Type one is popular in large house. On the other hand, type two and type three are common in small houses; in this regard, the size of sky-well could be reduced to increase area of

other living spaces. Meanwhile, there is always have a roof vent in the roof of staircase area; so, the sky well is always ventilated when windows and doors are opened (Figure 143).

Type 1: Staircase with large skywell (6 CASES **33.3%**)   Type 2: Staircase with small skywell (7 CASES **38.9%**)   Type 3: Staircase with no skywell (5 CASES **27.8%**)

Figure 142: Staircases are using as sky-well for ventilation in case study's samples

1 Roof vent   3 Window in back wall
2 Window in back wall   4 Window opens toward to staircase

Figure 143: Ventilation system in case H16

Interestingly, although the principles of natural ventilation are common in all case studies, not all case studies applied those principles in the same ways. Households applied those principles in housing design process in different ways depending on location of building and its relation with neighbour's buildings and preference of living spaces. Basically, the relationship between a house and neighbour's buildings could be simply categorised in four types (Figure 144):
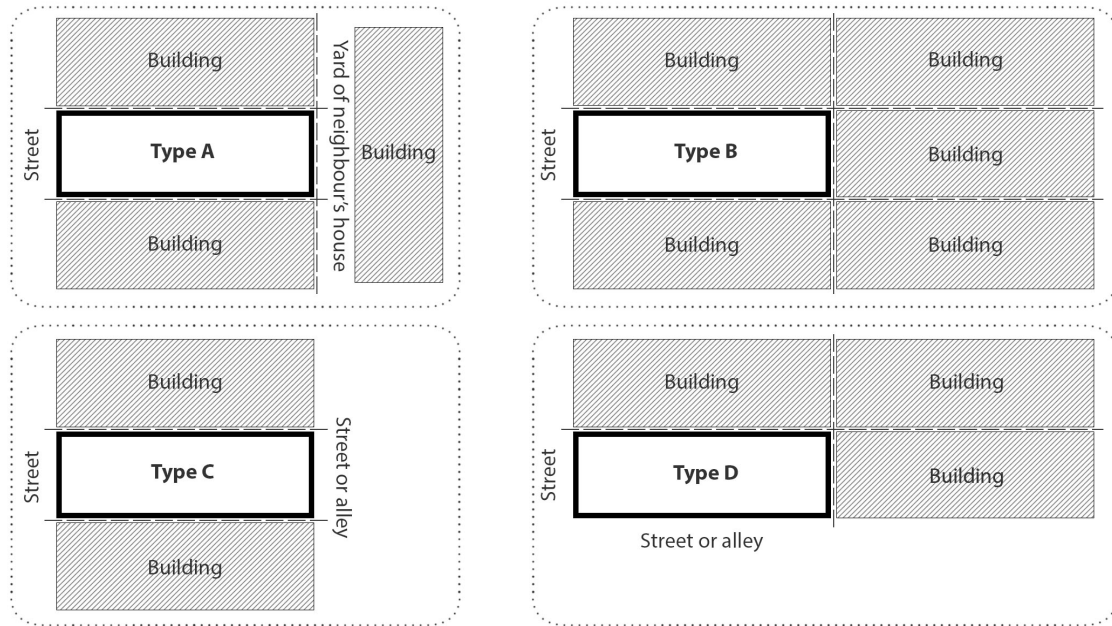
Figure 144: Different types neighbour's house characteristics. (Type A) the building is surrounded by neighbour's plots; however, there is a gap between two buildings in backside, (type B) the building is surrounded by neighbour's buildings, (type C) the building is surrounded by neighbour's buildings in two wings, (Type D) the building is surrounded by neighbour's buildings in backside and wing.

In type A, the front space is normally the street while the rear side is the other owner's land use. Despite that, there is a gap between two rows of building. To take advantage of clear spaces in the front and in the rear, the house owners always negotiation with neighbours to create windows in the rear facade for cross ventilation. For example, one interviewer revealed that:

> *[...] Because my neighbours did not have any plan to upgrade their house to three or four floors; so, I had agreement with my neighbour to create windows that opened toward to my neighbour's house in the upper floors. If my neighbours want to upgrade their houses in the future, they could simply block the windows by the walls, and those windows will be functioned as normal wall [...]*
>
> *N. T. Luc, interview in 03-09-2016*

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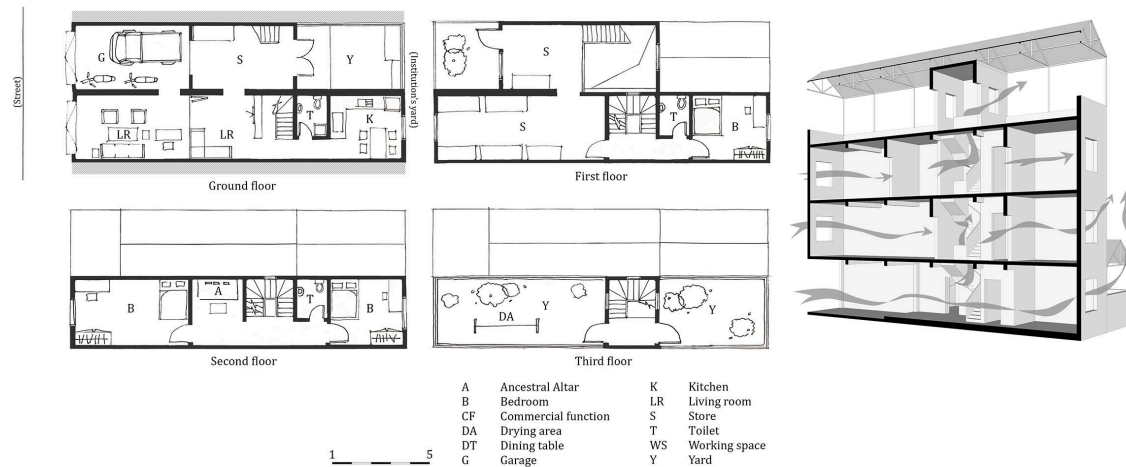
Figure 145: Ventilation diagram of case study H1

Figure 145 showed the ventilation diagram of case study H1. This case is fully surrounded by neighbour's plots; however, the rear of buildings is the yards of an old collective company. Thus, house owners seek permissions from the company when building their houses to create windows in the rear walls for cross ventilations.

Figure 146: Internal doors and windows are always opening for cross ventilation in case H1

If the building is surrounding by neighbour's building, or when household fail to have agreements with neighbours, there is an alternative way to promote airflows. Figure 147 shows the ventilation techniques in type B. Specifically, case H14 has

two sky-wells, one locates in staircase area, and another locates in the rear of building in upper floors. Within those designs, all main living rooms always have fresh and cool air movement when household open doors or windows in the front.

A	Ancestral Altar	K	Kitchen
B	Bedroom	LR	Living room
CF	Commercial function	S	Store
DA	Drying area	T	Toilet
DT	Dining table	WS	Working space
G	Garage	Y	Yard
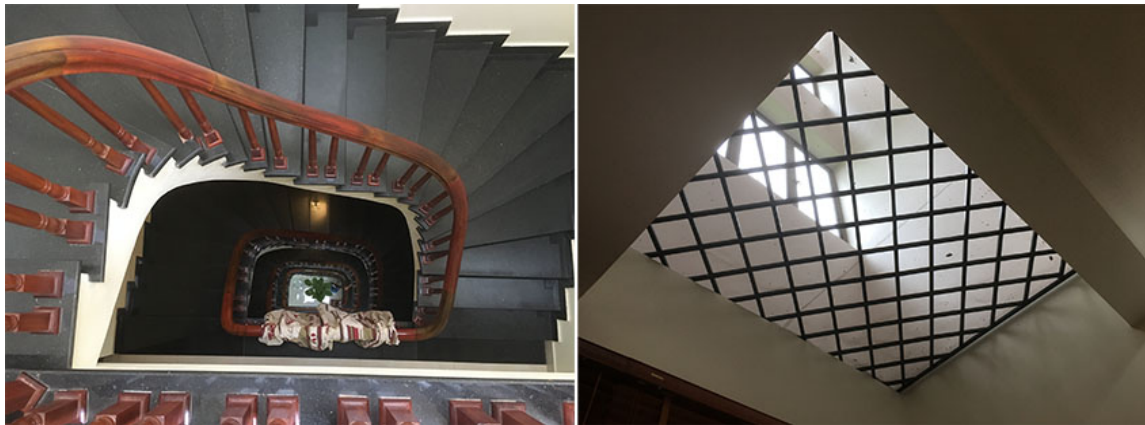
Figure 147: Internal sky-wells in stair case and in rear of building in case H14

Within type C and D, house owners generally created large windows in two main façades for cross ventilation (Figure 148 and Figure 149). Meanwhile, depending on requirement of living spaces; household would decide a location of staircase. Particularly, if there are no needs of large living room, the staircase will be located in the centre of building. On the other hand, if household wish to have large rooms for domestic activities, a staircase would be situated in the rear.

A	Ancestral Altar	K	Kitchen
B	Bedroom	LR	Living room
CF	Commercial function	S	Store
DA	Drying area	T	Toilet
DT	Dining table	WS	Working space
G	Garage	Y	Yard
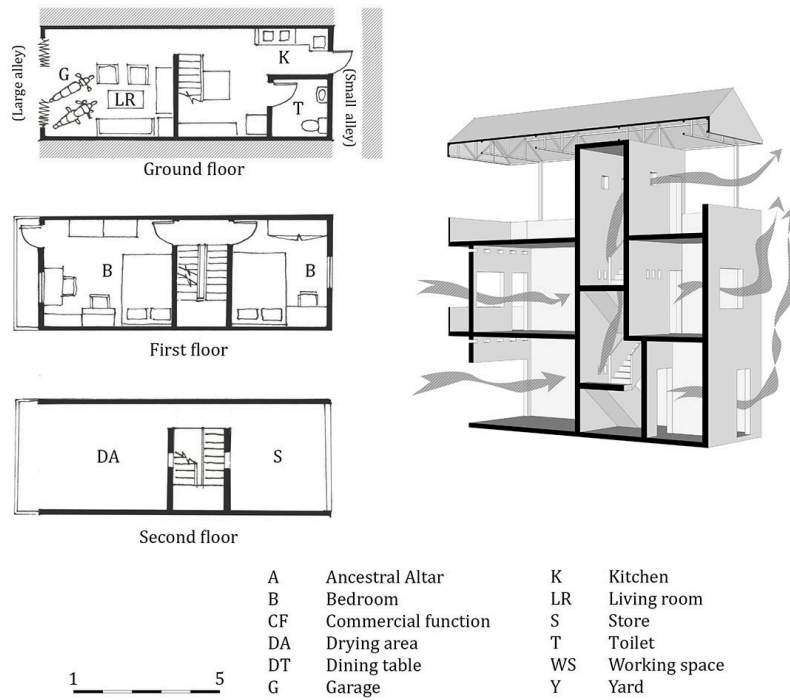
Figure 148: Large door and windows in the front and back for cross ventilation in case H6

A	Ancestral Altar	K	Kitchen
B	Bedroom	LR	Living room
CF	Commercial function	S	Store
DA	Drying area	T	Toilet
DT	Dining table	WS	Working space
G	Garage	Y	Yard
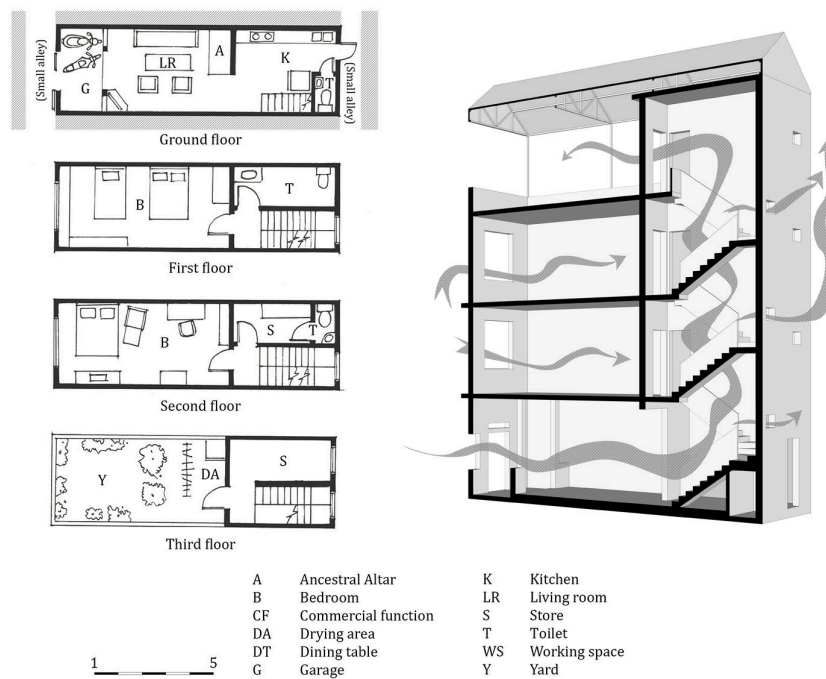
Figure 149: Large door and windows in the front and small windows in the back for cross ventilation in case H8

6.5.3 Lighting system in contemporary self-built housing

Besides cross ventilation, natural lighting is another importance factor contribute to the living comfort. Despite strongly awareness of importance of day lighting, most households stated that due to the planning and settlement characteristics, it is difficult to catch natural light. Particularly, because the house is mostly surrounding by neighbour's buildings; so, the only way to get natural lighting is in the main facades. However, the orientation of main façade is depending on neighbourhood planning. Thus, not all rooms in case studies could access natural lighting. For instance, two interviewees highlighted that:

> *[...] There is lack of day lighting in my house. For example, my room is located in the rear. Even there is a large window, which opened toward to small courtyard, in my room; my room is still dark inside. So, most of the time, I have to use the electric light in my room. Even in other part of the house, such as the living room, is very dark inside. If we open all windows and doors, the day lighting in this room is fine. However, nobody open doors and windows during the whole day. Thus, even in daytime, my family still have to use artificial light in some rooms.*

> *D. Huong, interview in 05-09-2017*

> *In term of the day lighting, there is only one main façade. Thus, it is difficult to catch day lighting into the living spaces of my house [...] we mostly use electronic lighting, even in the daytime. Thus, we pay much money for electronic bills in Vietnam.*

> *H. Chien, interview in 25-08-2017*

6.5.4 Reduce heating system in contemporary self-built housing

Beside ventilation and lighting, heating is another important climatic factor influenced on housing design. During the summers, the sun heat may affect the walls and roofs, and results in increased temperature inside the house. In order to reduce the effect of sun heat, the household often use top storey as transitional space between outside and external space. The top floor is called as "*Tầng tum*", and that floor is not using for domestic living space. The top floor is only using as garden, playing area, clothes drying area and storage (Figure 150).

> *[...] My wife and I plant many kinds of trees and flowers in the top terraces. The trees are not only providing fresh air and shading; they also good for living environment [...]*

> *N. T. Truong, interview in 25-08-2016*

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Figure 150: Top floors are places of gardens and clothes drying area in contemporary houses

Meanwhile, household always covered the top levels by adding corrugate roof panels. By that, the sun heat could not directly impact on the living spaces in lower levels.

> *[...] Covering the top floor are corrugated roof panels. Within the Vietnamese condition, it is important to prevent hot and rainy. The corrugate roof panels are very popular today to cover the top terraces in Vietnamese houses. In the past, we used sponges' tiles to cover the roof, but those materials are still not good within Vietnamese conditions. The climate is changing quickly between day and night. Thus, since the reform, people start to use the corrugate roof panels for the houses. When you looking the city in top floor of high-rise buildings, red and blue colour of corrugate roof panels could be easily to recognise in everywhere in Hanoi [...]*
>
> *N. K. Anh, interview in 04-09-2017*
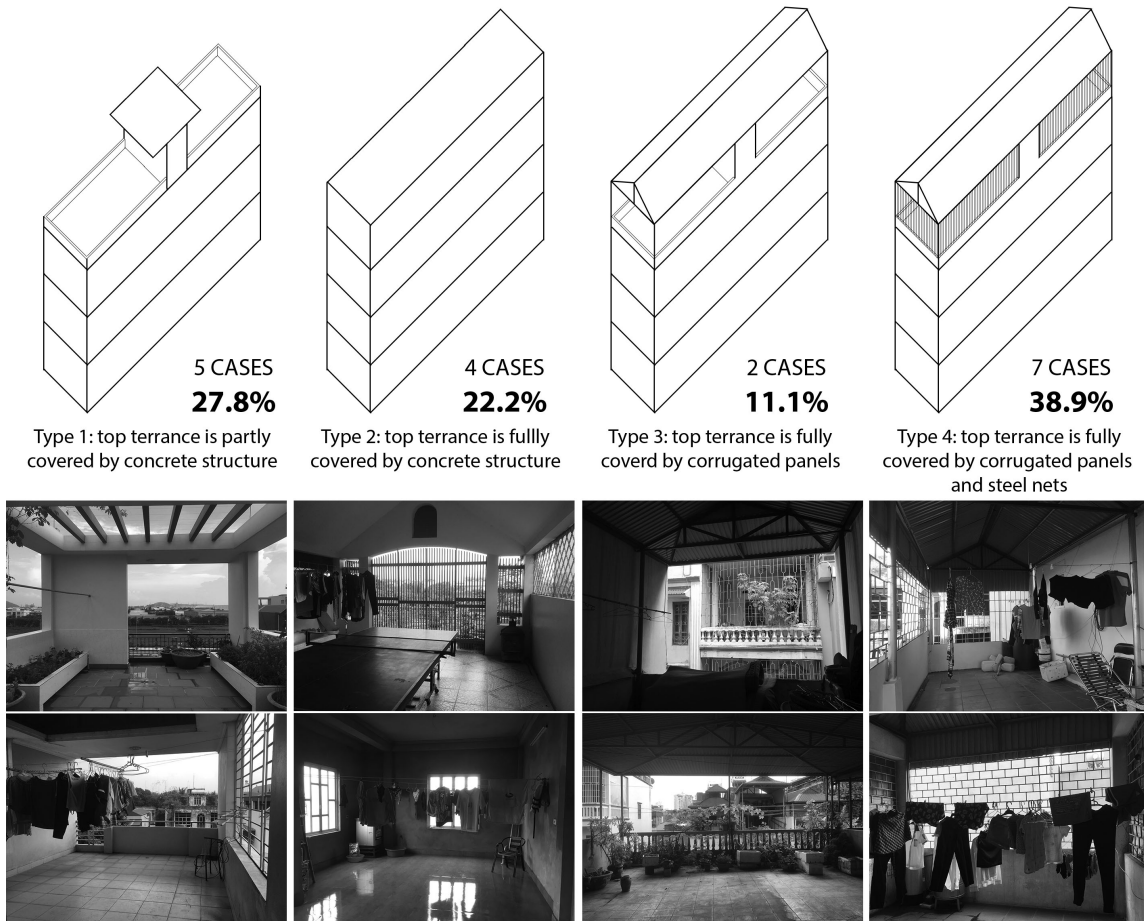
Figure 151: Different covering structure at the top terrace

Interestingly, there are four main types of roof level (Figure 151). The first type is finding with concrete level and a way to access top terraces in the middle. The second type is flat roof. Third type is the innovation of first type with a corrugated iron panel that cover the roofs. In the final type, the top terraces are covered by both steel nets and corrugated metal sheets. The main reason for different types of covered roof is also based on different requirements for security. For example, some house owners revealed that:

> *[...] I got a security system to defence again thieves. It was steel frame that cover all windows and yards. All doors, which go to garden, are locked; my wife and I only open their doors only when necessary. The Vietnamese thieves are very good in climbing; they can be considered as spy man. They always go to inside by doors or windows in the top floor rather than those in the ground floor. Therefore, during the festivals, I always remind myself and other members to check the doors and windows in top floor [...].*
>
> *N. T. Truong, interview in 25-08-2016*

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[…] The safety of my house is very good. For example, the fourth floor is used for dry area, thus I planned the steel frame to cover around the top terrace. So, the thieves cannot easy to access into the house […] In case of fire, I have fire exit door in top terrace that could open toward to my neighbour houses.

<div align="right">

N. T. Luc, interview in 03-09-2016

</div>

Meanwhile, if the sense of neighbourhood is good and there is no record of crime, there is no need of steel nets for protection:

If the house located in street, the house always has many steel frames to cover balconies, window and top terraces. This area is planned for state staffs; therefore, people in this area generally are friendly, and it would be very safe to live here. In addition, my house is located in alleys; and we do not have any private business or shop. Thus, not many people going to this area. Therefore, I didn't use steel net to cover top terrace. For security, in the terrace, I just setup steel door for protection. Other part of building such as window, I just used normal timber window.

<div align="right">

V. V. Back, interview in 22-08-2017

</div>

6.6 Other needs and continuous transformation process

6.6.1 Other family needs and expectations about domestic spaces

Beside the basic needs, there are three different other needs that contributed to the housing form: (1) new requirement of living spaces, (2) modernisation and (3) other living purposes.

(1) New requirement of living spaces due to family life-cycle: According to the family life-cycle concept (Jansen, Coolen and Goetgeluk, 2011), different stages of nuclear family formation (cohabitation/marriage), expansion (birth of children), contraction (children moving out) and dissolution (divorce or death of a spouse) let to changes in the size and composition of households as well as preferences and needs of households. For example, Tipple (2000) highlighted that original housing provides needs of accommodation for the couple. When they have children, their need of living spaces increases. However, when the children grow up and move out, the need for space saw decreased trends.

In the context of Vietnamese culture, many generations often lived under the same roof (Vu, 2007). A family having three or four generations (tam đại đồng đường, tứ đại đồng đường) is a symbol of happiness. Even when the children grow up and live separately, the children should always live near parent's house. Today, the family trend is moving from extended family to nuclear family; however, the family values

are still bond from generation to generation. Children are still living with their parents unless they could afford a new house. Meanwhile, there is increasing level of privacy. Each member requires a private bedroom. Thus, although the structure of family is decreased, the requirement of living space is experienced opposite trend. For example, one interviewee stated that:

> *[...] There are seven people in my family. They are me, my wife, my daughters and son [...] I buy a plot of land including a house in that land in 2009; but the house is too small for my family. Thus, I destroyed that house and built a new one several years later. The new house has four floors for living spaces. Nearly each member has private bedroom [...]*

> *N. T. Luc, interview in 03-09-2016*

Meanwhile, some family expanded the housing plot for their children's needs in the future. When their children grow up, they might need new house to start new family. Thus, the big housing plot could be divided into smaller plots for inheriting. By that, next generations could build the house by themselves when they move out. As a result, the Vietnamese households tend to buy addition plot when the price of land was cheap. For example, one interviewee revealed that:

> *My grandparent has two children, my mother and my aunt. So, my grandparent plans to divide the house in the future. When my grandparent passes away, the house will be separated into two parts. My parent will take one while my aunt will take one. By that, they could create their own living spaces for their family [...]*

> *Huong, interview in 05-09-2017*

For details, the Huong's house has two separated structure and staircases (Figure 152). In this regard, the ground floor is using as common social spaces including living room, kitchen, dining room and garage. Nevertheless, the rooms in upper floors are separated in two equal parts by wall.

Figure 152: The Huong's house could be separated into two equal parts in the future for inheriting

(2) Modernisation: most households do not have enough money to construct total large house; thus, it is easy for family to build the house in different phases. Households do not need to build full big house if their economic conditions are insufficient. Households tend to build the necessary spaces to satisfy their basic needs. When they have better income, new requirements of living spaces or inappropriate living conditions, they might upgrade or rebuilt the house later phases. For example, one household revealed that:

> *We have planning to renovate the building in the near future. Because when I built this house, the building use only brickwork; thus, the*

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construction is limited in two or three floors. However, when my sons get married, they will need new rooms. I planned to rebuild the house with concrete structure including beams and columns, and built up to four to five floors. I also want to upgrade the living room and kitchen as well, it is too old and dirty now.

<div align="right">V. V. Bach, interview in 22-08-2017</div>

(3) Other living purposes: Because the land price always increased overtime, particularly in the city centre, investment on land became the most important priority. If people have good finance, they might buy two or more adjacent plots. The unused spaces could be turned into home-based business such as restaurant, local shops or education centre.

[...] In many new urban areas locating around the outskirt of Hanoi, new houses were considered as type of investment rather than living. This area was built after when the new urban area Linh Đàm was complete. It was the first new urban area in Hanoi. Most early new urban areas were mainly for living. But now, everything changes; people buy a house for rent or investment [...] The land price is always increasing. Therefore, price of house always increases as well. In addition, if the house is locating in main streets, the ground of building could be used for commercial purpose to generate profit [...] Most of rent houses are for offices and English centre

<div align="right">N. T. Hoang, interview in 05-09-2017</div>

In Vietnam, the shop-house model, which is adopted from Chinese merchants during feudal period, is very popular in modern time. The term shop-house referred to buildings that accommodate commercial and residential function at the same time. Since the economic reform in 1986, the free market system provides opportunities for private business. The adoption of flexible working space inside the house has been facilitated. If the house locating in main streets, house owners would build the house as big as high as possible to maximize commercial benefits. Consequently, houses locating busy streets have at least one space for commercial purposes or family business in the ground floor while upper floors are using for family living spaces (Figure 153).

Figure 153: Shops in the self-built housing in typical urban street in Hanoi

To sum, this section shows that beside the basic family needs, there are three other requirements of living space: (1) new living spaces to satisfy the family needs in the future due to family life-cycle, (2) modernisation to improve living conditions when household have better income and (3) other living purposes.

6.6.2 Transformation process to meet other family needs

According to Tipple (2000) and Cooper (1974), when the socio-cultural needs changed, households tend to improve their house to meet the new requirements such as services and living spaces. Consequently, physical characteristics of building are continually transformed until the households meet their satisfactions. In the context of self-built housing in Hanoi city, when there is a need of living spaces, the house could be changed and modified by six approaches: modification of rooms, vertical extension, horizontal extension, remodelling of building, mix approach for physical extension and separation.

Modification of rooms and re-arrangement of furniture

Modification of room and re-arrangement of furniture is the basic approach in most cases. For example, in case study H1, the household run a private business relating clothes and fabric. Thus, when living, the household decided to use the frontage space for family garage. In addition, several empty rooms are converted into workshop and store. Therefore, there is not much different between living spaces

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and commercials area. The only different is the interior design and furniture. The houses were planning as family living spaces; then, depending on the potential location for commercial activities and business types, household will decide which space will become the commercial areas later. The living spaces are turned into commercial spaces with litter modification and changes in interior (Figure 154).

Ground floor

First floor

Second floor

Third floor

A	Ancestral Altar	K	Kitchen
B	Bedroom	LR	Living room
CF	Commercial function	S	Store
DA	Drying area	T	Toilet
DT	Dining table	WS	Working space
G	Garage	Y	Yard

1 _____ 5
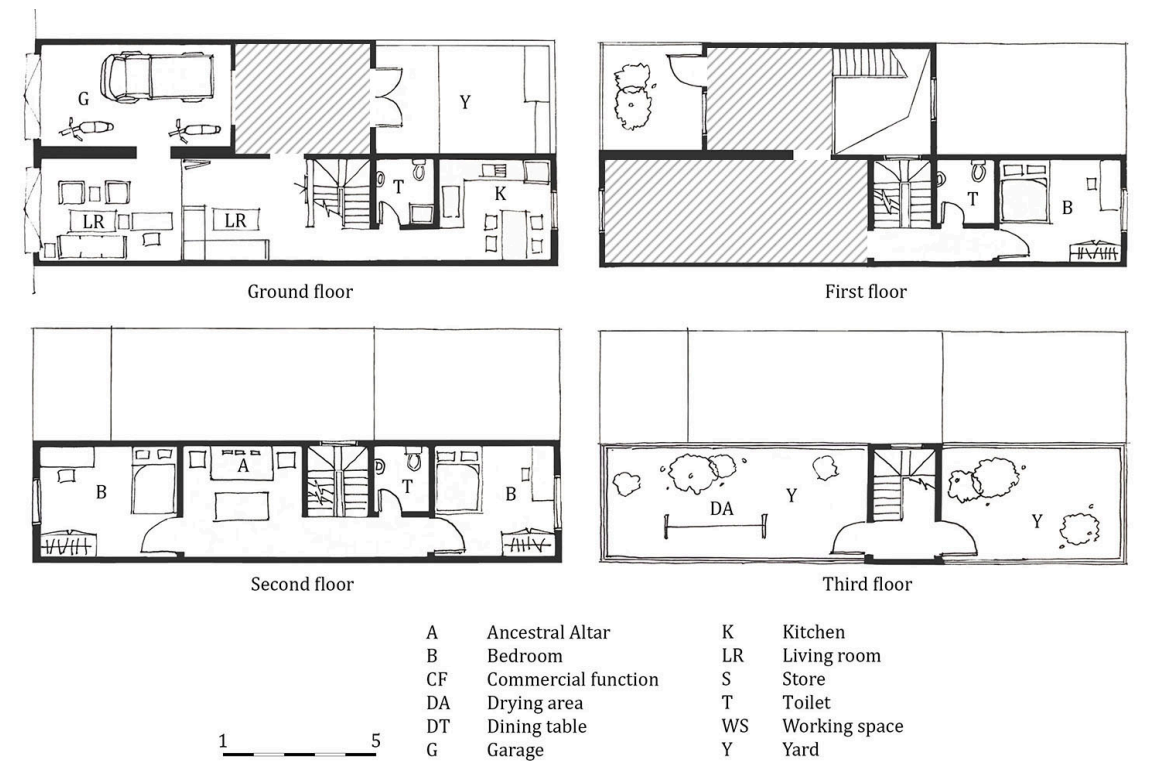
Figure 154: Store for commercial activities in case study H1

Vertical extension is a basic approach to create new living room. This approach is applied when the household only need one or two new rooms. Specifically, the case study H4 originally has three floor levels. In the past, a storage and an ancestral altar are occupied the second floor (Figure 155). When the son grows up and he needs a privacy room. Demolition of a house and built new house are unnecessarily due to efficient cost and time. Consequently, the household decided to add one storey in the top. The new space is connected with the second level though the steel staircase in the balcony. The second floor was changed to become bedroom for the son while the new room is for storage and dying area.
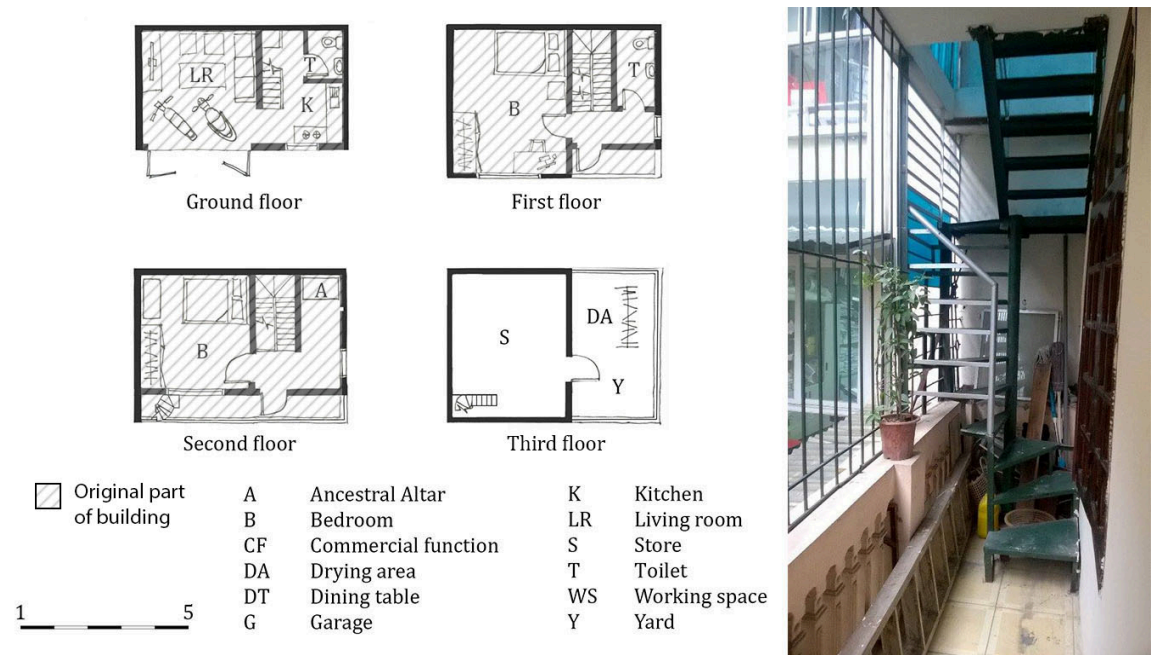
Figure 155: Extended spaces in vertical axis. (Left) new floor plan, (Right) an iron stair is using to connect second floor and third floor.

Horizontal extension is another popular approach to increase living spaces. Evidence from case studies has shown that most houses' plots have a tube shape. Besides that, among eighteen case studies, three cases have unidentified plot's shape. In addition, although most case studies have tube form, there are several cases having the large width. Though interview with households, although housing plot is based on a planning system, the significant difference between case studies could be explained by housing needs and priority of each family when building the house. Particularly, housing plot could be merged with the adjacent plots to create larger plot.

Specifically, in the case H1, the plot area was grouped from two smaller plots. The original plot had tube shape with 3.7 meters' width and 17.2 meters' length (Figure 156). Overtime, due to natural family growth, there are increased requirements of

larger living spaces. In 2016, Mr. Luc bought neighbour's house, and then he merged new building with original his house to create larger building. Because of merging, the area of housing plot increased twice compared to original one (Figure 157). Meanwhile, when buying neighbour's building, Mr Luc decides to destroy parts of wall in the ground and first floor to create connection between original house and new building.

A	Ancestral Altar	K	Kitchen
B	Bedroom	LR	Living room
CF	Commercial function	S	Store
DA	Drying area	T	Toilet
DT	Dining table	WS	Working space
G	Garage	Y	Yard
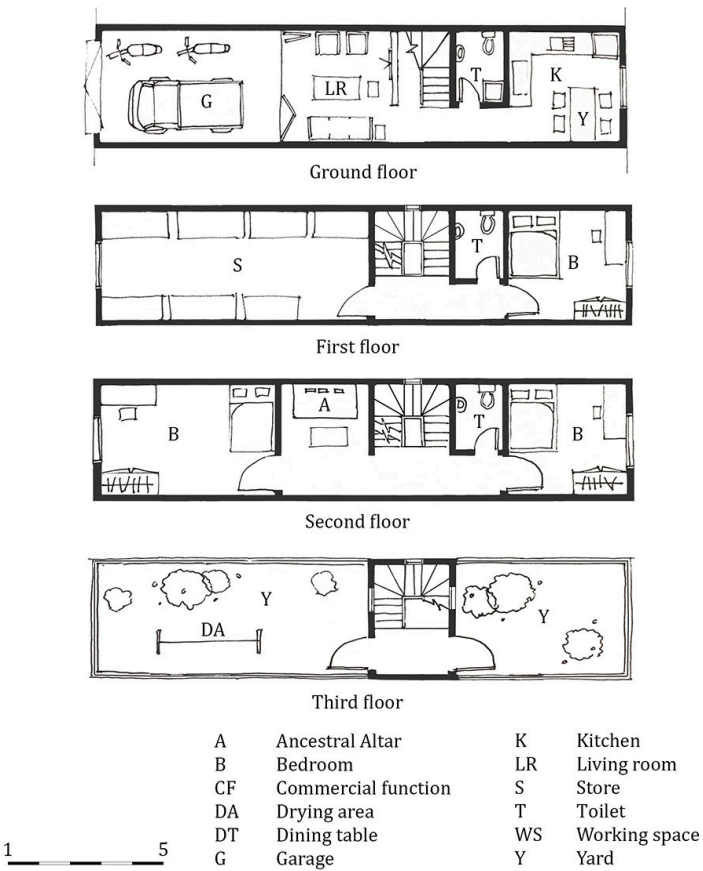
Figure 156: Planning of case H1 before expansion
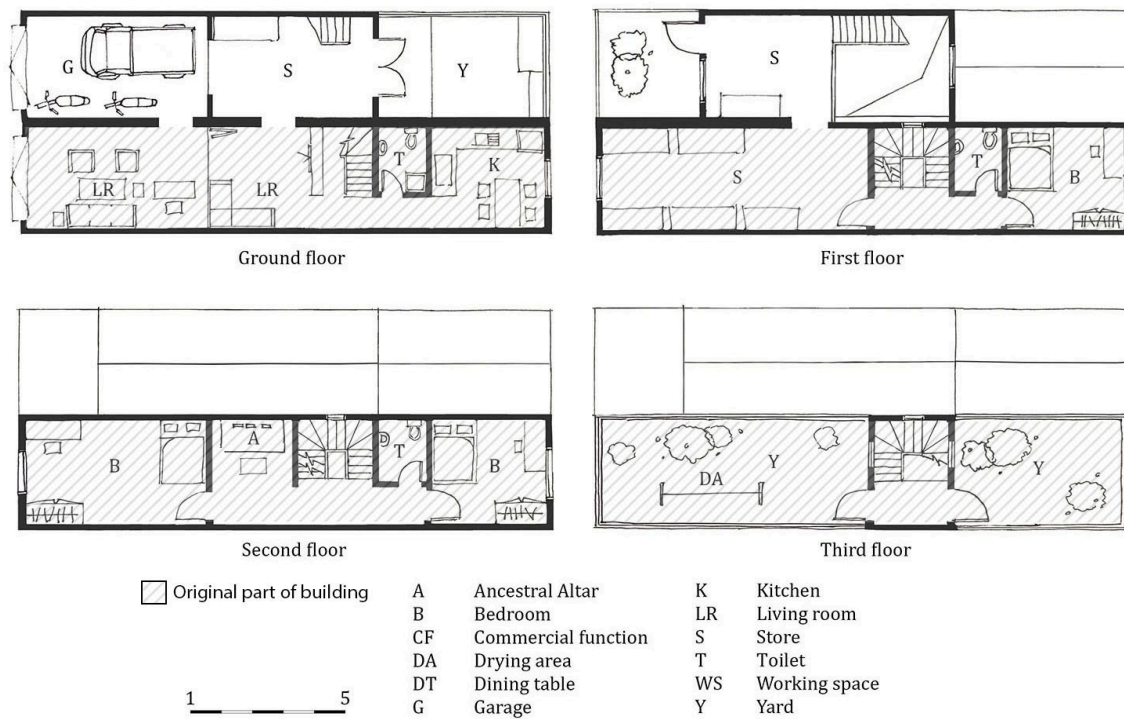
Figure 157: plan of case study H1 after expansion

Besides merging, during the transition period, many areas had poor planning; housing plot generally did not follow standard sizes (See chapter 5 for more details). Specifically, housing plots in historical residential settlements generally not followed any standard planning and housing sizes. Thus, when house owners extended or merged with other plots, the housing plot becomes unidentified shape. For example, case study H5, the plot was merged from two separated plots in work-unit area (Figure 158).
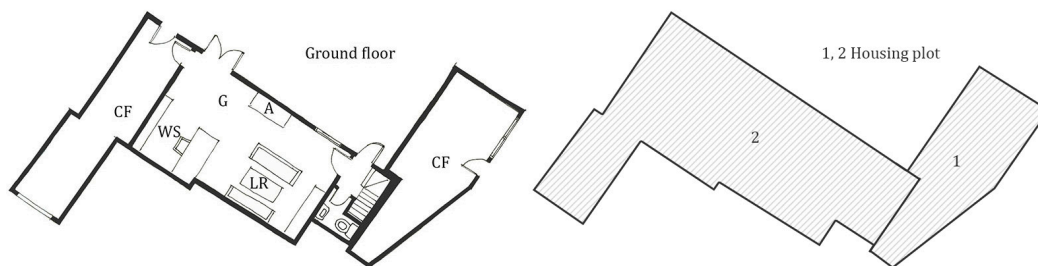
Figure 158: Ground levels and housing plots of case study H5

Rebuilt the house is a third approach to create new living spaces. Household always make improvement when the desired level of housing needs changes. For example, Mrs Loan described that:

In the past, my father taught at the natioal University of Economy. When the University developed this area for teachers and employees, he was allocated one small house. The orignial house was very simple with two main rooms: one for living room and one for bedroom and supported spaces: kitchen and toilet in separated building in the backside. In 1997, when my family had good saving and land price was very cheap, we bought the next house and then, we merged it with our house to create bigger building. In 2004, my family decide to rebuilt the house using solid materials, such as concrete for framework [...]

Loan, interview in 03-09-2017

Similarly, another household decide to rebuild the house because the old house is too old and decay. The new house would use solid materials to increase number of living spaces.

We have planning to renovate the building in the near future. Because when I built this house, the building use only brickwork; thus, the construction is limited in two or three floors. However, when my sons get married, they will need new rooms. I planned to rebuild the house with concrete structure including beams and columns, and built up to four to five floors. I also want to upgrade the living room and kitchen as well, it is too old and dirty now.

V. V. Bach, interview in 22-08-2017

Mix methods is another method to increase living space. For example, the case study H2 was grouped from three different plots. In the past, they were three separated plots for three different single families and one block for kitchen and toilet. In 1990 and 2004, Mr Truong bought two adjacent housing plots and merged them together to create large housing plot. Later, he rebuilt part of building and create extension in vertical axis.

In 1982, my wife was working in a Waterway transport company. The company moved to this area, and the company distributed the land and house for their employees. My wife was allocated small house. Overtime, when my family has better finance, we bought neighbour's houses, and upgrade and rebuilt the house [...]

N. T. Truong, interview in 25-08-2016

Specifically, the original house had two different plots, one for living space and smaller one for the kitchen. The main house has two floors (Figure 159). In the ground floor, after the entrance was the stair and small lobby that connect to bedroom and also living space. The toilet was planned under the stair. The second floor connected directly with another bedroom and ancestor altar.

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Ground floor　　　First floor

A	Ancestral Altar	K	Kitchen
B	Bedroom	LR	Living room
CF	Commercial function	S	Store
DA	Drying area	T	Toilet
DT	Dining table	WS	Working space
G	Garage	Y	Yard
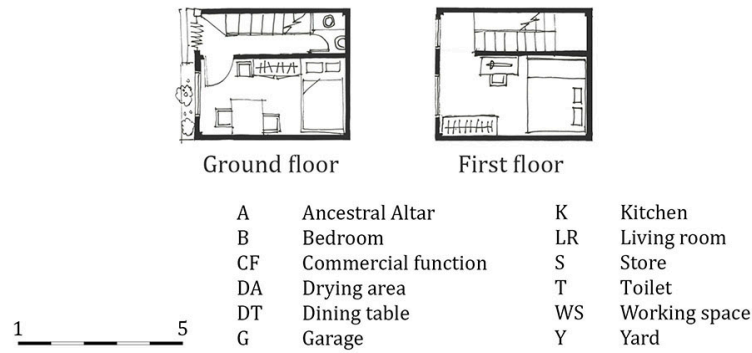
Figure 159: Case study was built H2 in 1982 (Based on description of owner)

In 1990s, the house owner bought the neighbour's house and rebuilt the building based on the old foundation. The new building has four floors with concrete structure (Figure 160). In 2004, the house owner bought the next house and rebuilt the house again in 2010. The new building has six floors (Figure 161).

Ground floor　　　First floor　　　Second floor　　　Third floor

▨	Original part of building			
A	Ancestral Altar	K	Kitchen
B	Bedroom	LR	Living room
CF	Commercial function	S	Store
DA	Drying area	T	Toilet
DT	Dining table	WS	Working space
G	Garage	Y	Yard
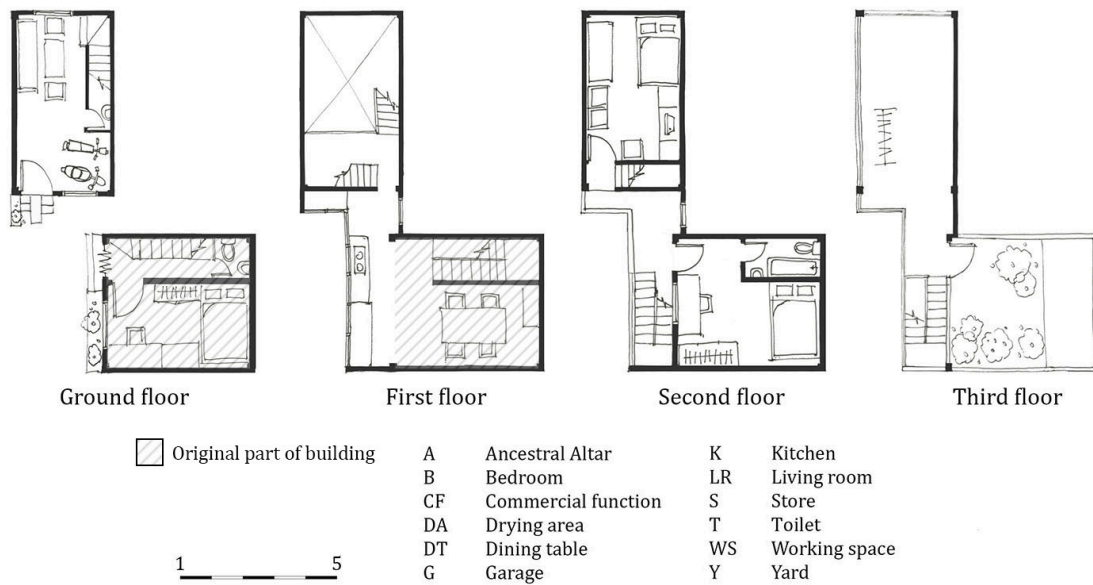
Figure 160: Case study H2 was rebuilt during 1990s (Based on description of owner)

Ground floor

First floor

Third floor

Fourth floor

Fifth floor

Sixth floor

Part of building before upgrading	A	Ancestral Altar	K	Kitchen	
	B	Bedroom	LR	Living room	
	CF	Commercial function	S	Store	
	DA	Drying area	T	Toilet	
	DT	Dining table	WS	Working space	
1 5	G	Garage	Y	Yard	
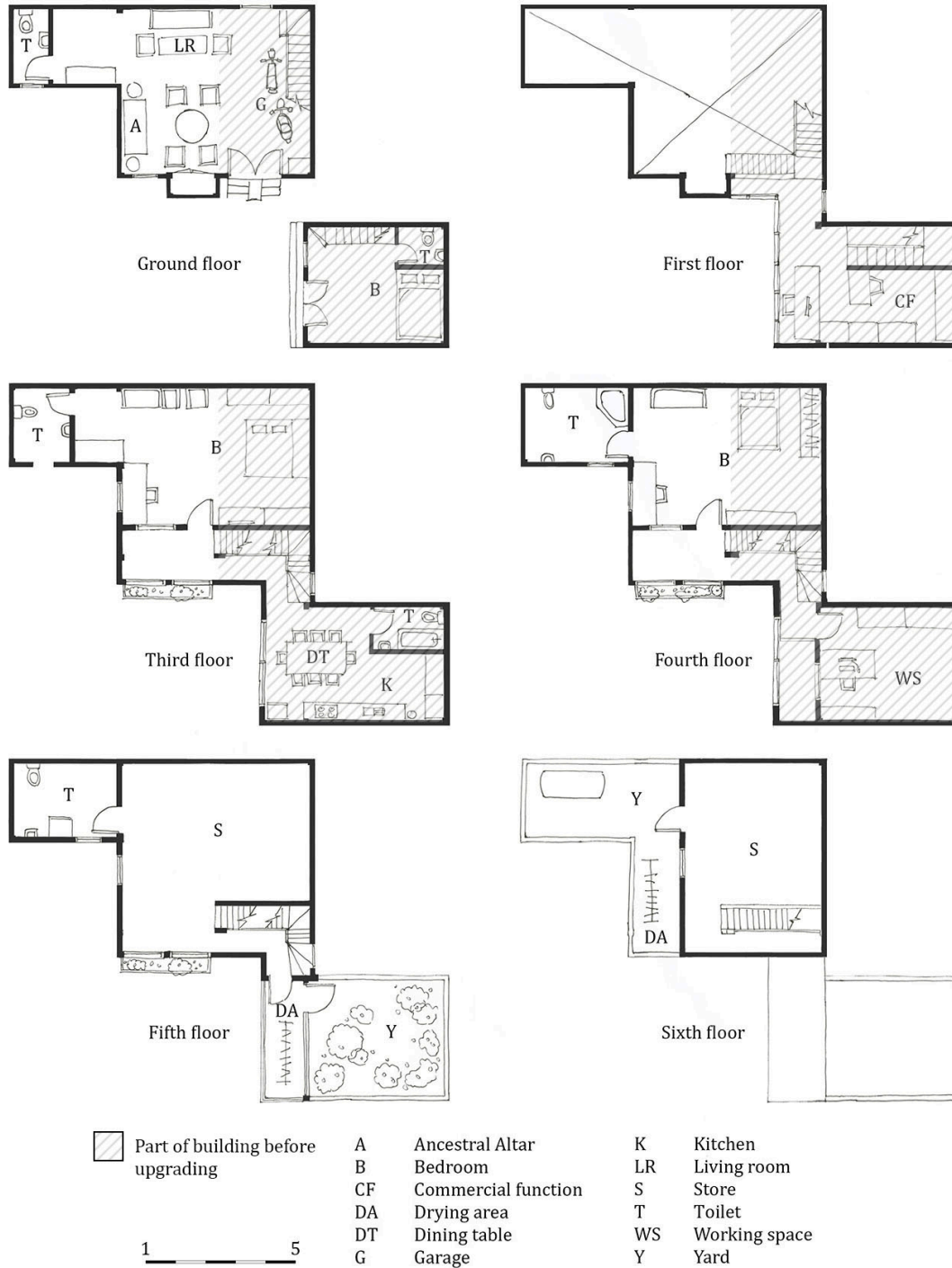
Figure 161: Current plan of case study H2, which was rebuilt during 2010s (Based on description of owner)

Separation

Although most case studies are expanding overtime, there is one case has been divided into two smaller buildings. The aim is to sold smaller part for family business investment. Specifically, according to respond of household in case H12, the original housing plot has rectangle shape. Nevertheless, the current housing plan has L shape due to dividing.

Old housing plot

Two housing plots after separation

Ground floor

Third floor

First floor and second floor

Fourth floor

A	Ancestral Altar	K	Kitchen
B	Bedroom	LR	Living room
CF	Commercial function	S	Store
DA	Drying area	T	Toilet
DT	Dining table	WS	Working space
G	Garage	Y	Yard

Figure 162: Housing plan after separation result in L shape in case H12

6.7 Summary

This chapter investigates how households contribute to the self-built housing process in the context of Hanoi city, Vietnam to meet their own needs and requirement of living spaces. The chapter starts with decision-making and involvement of household in design and construction process. Then, it shows the influence of several socio-cultural factors on design of self-built housing. Those factors are including sense of safe and dangers, a sense of dirtiness and cleanliness, sense of communal space and private spaces, a connection between living spaces and natural elements, and other requirements of living spaces and process of changes, transformation and adaptation of self-built housing to meet other family needs.

This chapter highlights that when households participate in housing process, households not only focused on physical elements, but also rituals, cultural norms and family living styles to meet the family requirements and to create sense of place. By applying the traditional rituals and norms to create sense of place, Vietnamese contemporary self-built housing is different with housing in other parts of the world and housing built by developers. In addition, although the rituals and traditional norms are important in Vietnamese culture, each family would apply those norms in different ways depending on the living styles and priorities of household. For example, the ancestral altar is indispensable item in Vietnamese house; nevertheless, the location of ancestral altar could be situated in the highest room or in the living room or part of bedroom. In other word, each household has different requirements and priorities, and the participation of households in housing process helps to provide flexibility for household to make decision and choices regarding their requirements of living spaces.

To sum up, chapter 4,5 and 6 present the findings of this study from different levels of built environment. Chapter 4 shows historical development of Hanoi city through different built environment and urban housing. This chapter helps to provide general background of Hanoi city and the connection between housing ideology and housing policies and urban housing in Vietnam before and after the economic reform. Chapter 5 discussed 18 case studies of self-built housing located in three different types of urban settlements in Hanoi city. Chapter 5 also highlights the role of developers and planner to provide infrastructure and services in neighbourhood levels. Chapter 6 reveals decision-making of households and their choices in housing process to meet their own requirement of living spaces and to create sense of place. The following chapter will summary the main lessons learnt from this study and suggestion for further studies.

CHAPTER 7 DISSCUSION AND CONCLUSION

This chapter highlights main findings and lessons learn from this studying. This chapter has three main sections. The first section discusses the main findings and lessons to answer the research questions. The second section highlights the implications of this research to support theoretical concept and design practice. The last section shows contribution and limitations of this study.

7.1 Research findings and valuable lessons

This thesis started by discussing the critical view concerning the development of housing in developing countries and in Vietnam for particular. Although there are four main factors for sustainability including environment, economy and social and cultural factors, recent housing schemes mainly emphasized on green perspectives (such as resources saving, using recycle materials or passive house) and economic factors relating supply and demand while social-cultural aspects (such as living styles, inspiration and households' preferences) are gaining little attention. According to UN-Habitat (2012), sustainable housing is not just about economic and green perspectives; the concept of sustainable housing also covers socio-cultural aspects. A house cannot be considered sustainable if they create negative influence on both the environment and social life.

Each culture obtains distinctive approaches in design process to maintain their cultural values and ideology; thus, the detailed designs of housing are embodiment of socio-cultural environment (Rapoport, 1969). Unfortunately, there is not clear what are socio-cultural values in the contemporary societies. In the literature, although Vietnamese housing architecture has been studied through different approaches, socio-cultural values are commonly concerned with traditional elements in vernacular housing. Meanwhile, there are several studies about influence of social aspects and political policies on housing in Vietnam. For example, Gough and Tran (2009) and Tran and Dalholm (2005) highlighted that privatisation policies could lead to increasing socio-spatial disparities and inequality in collective apartments. They argued that some groups, including senior officials and war veterans, get better supports from state than other groups. Nevertheless, those studies did not show how households contribute the design and construction processes to meet the family needs. Thus, there is necessary to examine contemporary housing via different perspectives in order to explore the interconnection between dwellings and households needs and socio-cultural values in the age of globalisation and modernisation.

This study focused participation of households in design and construction processes on self-built housing in context of Hanoi city, as a mode to understand the influence of family needs and socio-cultural needs on housing design. Firstly, it investigates the changes in built environment and housing policies to support for self-built activities and characteristics of contemporary self-built housing in Vietnam, particularly in Hanoi city. Secondly, self-built housing is examined as cultural production, and grounding it in a real-life built environment provides new insights complexity that is sensitive for the dynamics between local and global fusions. Within self-built activities, individuals and households are critically responding to design and build the house by themselves regarding their socio-cultural background, living environment and their needs. Study of participation of households in self-built housing; therefore, indicates how household build their

houses to adopt built environment and living styles in the context of Hanoi city. The benefits of this study, theoretically and empirically, provide a nuanced perspective for researchers and policy-makers to find other way of doing housing architecture that is sensitive with socio-cultural context and background of users.

Particularly, this study has four main objectives. Firstly, it identifies the housing policies, built environment and main characteristics of Vietnamese housing before and after the economic reform in 1980s in Hanoi city. Secondly, it investigates how people build and use their houses to meet needs within three different types of urban neighbourhoods in Hanoi city. Thirdly, it analyses the relationship between the contemporary self-built houses and the built environment of urban neighbourhoods in Hanoi city. Finally, it explores the meaning of home and sense of places in Vietnamese culture and their influences on contemporary self-built housing design. In order to achieve those objectives, the structure of this thesis is divided into 5 main body chapters as following:

Firstly, as presenting in this study, chapter 2 discussed the existing studies on the definition of self-built housing, cultural influence on housing design. It also discussed the connection between housing and urban environment (regulations and planning of settlements and housing) and housing and home environment (households' needs, perception and identity of household). This chapter highlighted that self-built housing is not simply the result of physical factors, but is a consequence of a whole range of socio-cultural factors seen in different scales of built environment (including urban environment and home environment). This chapter provides the framework for investigation of self-built housing in Hanoi.

Secondly, chapter 3 highlights the research methodology and research methods, which had been applied in this study. Due to complex setting of meaning and perceptions about self-built housing and household's needs, qualitative strategies have been applied in this study. The research methods are including systematic review of archival records and planning documents, and field studies in Hanoi city including observation, interview with local households and case studies of contemporary self-built housing.

Thirdly, chapter 4,5 and 6 present the findings of this study. Chapter 4 helps to explain the context of Hanoi city before 1986 and the housing environment since the economic reform in 1986. This chapter discussed different urban fabrics in respective historical urban development processes and changes in housing policies in Hanoi. The outcome of this chapter demonstrate that traditions embedded in the housing design are not fixed but should be considered as a process of learning, changing and adaptation in different living conditions and built environment. Chapter 5 explains the urban settlements and characteristics of contemporary self-built housing in Hanoi city. Although the background and physical layout of

settlements are different, they share similarities regarding the responsibility of developers and planners to provide infrastructure and services. In the meanwhile, each household could directly involve in housing process. Thus, each case study has various distinct characteristics. Chapter 6 highlights the role of households in decision-making process and how the family needs, beliefs, traditional norms and living styles influenced on detailed design of contemporary self-built housing in Hanoi city. It reveals that the design of contemporary self-built housing does not only change physical environment, but also based on a matrix of socio-cultural factors.

For details, the following parts will summary lessons learnt from this study to answer the research questions and implication, recommendation and suggestions for theory, further practice and education.

7.1.1 Research question 1: How did city development and Vietnamese housing policies influence housing characteristics and local communities in Hanoi city before and after the economic reform in 1986

After exploring the historical development of urban housing in Hanoi city and analysis of self-built housing after the economic reform, a number of unique features of self-built housing could be summarized as following.

This study demonstrated that the urban environment of Hanoi city has been influenced by different external culture throughout the history, and each period in the history had its own special house forms and urban fabrics. Therefore, there is no fixed concept of so-called Vietnamese self-built housing.

As discussed in chapter 4, the popularity of contemporary self-built housing in Vietnam has been the result of the special housing policies since the economic reform in 1986. From 1954 to 1986, under the influence of SoViet ideology, the Vietnamese state applied central economic planning. In this regard, no self-built activities were allowed during this period. The only type of housing production was the collective apartment, which was built by the state agencies. During the 1980s, however, there were numerous issues with the housing policies within central planning system. Thus, in 1986, the Vietnamese government decided to move from central economic planning to socialist-orientated market system. Changes in political and economic system in 1986 played major contribution to the decision-making process of households. New housing policies and laws have been introduced to provide legal supporting for self-built activities. The role of state; therefore, is transformed from providers and constructors to enablers and facilitators while the households could actively participate on housing process. As a result, the economic reform has opened a new path for development of self-built urban housing in Vietnam. Today, self-built housing is accounting for approximately 80 percentage of housing production in Vietnam.

The self-built activities were not new phenomenon in the Vietnamese history. Nevertheless, the main difference between contemporary self-built housing and vernacular buildings in the past is that contemporary buildings were constrained by housing policies and planning system. In pre-colonial period, traditional urban settlement in Hanoi city was built without the application of planning system. The building techniques of traditional urban house were influenced by form and structure of vernacular houses. The study suggests that the popularity of contemporary self-built housing was owing to various problems of housing policies during the central economic planning. The current Vietnamese institutions and state manage the system through laws, regulations and planning to determine the role of different groups in the housing process. For example, developers have responsibility to provide infrastructure and services for self-built areas and households provide funding and design ideas to their own houses. In view of this, the contemporary self-built housing is fundamentally different from vernacular houses built in the past.

7.1.2 Research question 2: How did different urban areas affect the development of self-built housing in Hanoi city?

As presented in chapter five, different housing models have been applied in Hanoi since the economic reform in 1986. Depending on housing models and urban fabrics formed in different periods, urban settlements could be classified into three main types: work-unit, new urban area and urban village area. In particular, there is a clear distinction between formally planned neighbourhoods developed by state units (work-unit area), formally planned neighbourhoods developed by private developers (new urban area) and development and transformation of formal villages under the process of urbanisation (Urban village area). The differences among those neighbourhoods were reflected in term of planning policies, supporting services and infrastructure and various regulations for housing.

The work-unit areas have been planned as place for state employees. Therefore, the responsibility for planning, infrastructure and services was based on work-units. The planning pattern applied principles of previous housing model: "*the collective quarter*" during the central economic planning (1954-1986). The aims were to provide low-cost housing and to improve living conditions; thus, during the 1990s, housing plots and basic construction were directly sold to state employees. The state companies and work-unit generally build up basic infrastructure and supporting services. Household could upgrade or rebuild a house.

The new urban area was those planned by private developers in order to attract property buyers; therefore, the new urban area very often provided various benefits such as having large green space, wider roads and better infrastructure services. Households in the areas could build larger house and better quality

houses regarding their needs. A building should follow local regulations and planning requirement.

The urban village areas developed based on traditional layout of formal rural village, which involved many small alleys and close knitted neighbourhood. The infrastructure and services in urban village were generally upgraded through various small-scale projects and funded by both state and local residents. Nevertheless, despite quality of infrastructure and services in urban villages were not as good as those in other urban settlements, households could access to clean water, electricity and essential services. Regarding housing architecture, households often attempt to maximise living areas; thus, the built-up area is very high although most of housing in urban village has small housing plots.

Although different housing models and built environment of local context provide different levels of infrastructure, supporting services and building regulations, they share a common theme regarding the role of local government and public sectors and households. The local government provide regulations and housing models while the public sectors (state institution and developers) create planning and provide infrastructure service to support self-built housing programmes.

Three types of urban neighbourhoods provided diverse contexts for contemporary self-built housing in Hanoi city. As a result, when deigning a house, households not only need to think about internal spaces but also have to consider the relationship with external living conditions and neighbourhood. This research project suggests that external environment such as street, landscapes and infrastructure and services significantly influenced the characteristics of housing design, which were shared by houses in all three urban areas. For example, internal spatial arrangements of house have always been decided by the orientation of their front entrance, which connect to the streets or main alleys. Festival ceremonies of the families tend to extend from internal space to the streets in front of the house, and these temporary extensions were permitted by law and regulations. In this case, urban village areas have kept more characteristics of traditional neighbourhood.

7.1.3 Research question 3: How did the households make decisions and take actions to design and construct their own houses in Hanoi since the economic reform in 1986
In the context of Hanoi city, owing to housing shortage and poor conditions of housing built by state and private developers, self-built housing is a popular option for majority of Vietnamese households, who could participate in housing design and built processes since the early 1990s. In this regard, households spend much effort to build their houses to achieve their requirements of living spaces, and to construct idea homes if possible for both daily practices and ritual needs.

On the one hand, households have preferred contemporary materials, such as concrete framework and brick for walls, to pursue comfort internal environment since the economic reform in 1986. Meanwhile, households were also involved in different stages of design and construction processes. During design process, household would seek advices from experienced families, relatives and designers. During construction process, household did not build all parts of building. Instead, specialists could be hired to do main parts of construction while households act as supervisor to control the work and quality of construction.

On the other hand, when household make decisions during housing process, their needs for daily practices and ritual ceremonies have been incorporated in the creation of the home environment. In the context of self-built housing in Hanoi, the way Vietnamese households living, sleeping, eating and other activities at home is much depending on socio-cultural norms. Those norms help to create senses about "*cleaning*" and "*dirty*", "*communal*" and "*individual private*" spaces, "*safe*" and "*dangerous*" spaces, living area and natural elements and other needs. As a result, when building a house since the economic reform in 1986, it seems that each Vietnamese household have specific ideas about how the house should be, and where and when the activities should took place? In other meaning, a decision-making have been influenced by households' needs and living styles.

The outcome; therefore, supported that a house not only expresses the physical and economic factors, but it also reveals the social and cultural environment (Rapoport 1969; Waterson, 1997; Lawrence, 2000). Particularly, a house is designed to provide spaces for domestic activities including eating, sleeping, entertaining guest and many other functions. Nevertheless, each culture has its special ways to respond to those activities (Bourdieu, 1997; Canter, 1974). Therefore, housing in one region has its own characteristics to reflect socio-cultural environment (Rapoport, 1969).

This study also suggests that the socio-cultural values that influenced house design in Vietnam have been changing and transforming. The economic reform in 1986 opened a new page of socio-cultural transformation owing to global economic system and influence of external culture. The Vietnamese learnt new values through different sources, such as travelling and getting information in television and Internet; therefore, a new set of socio-cultural values has been transforming. Meanwhile, it is worth noting that old values still effect on various aspects of life.

Specifically, analysis of self-built housing in this thesis revealed that the sense of place has been created through various traditional rituals and rules. For example, during design process, Feng Shui principles could be applied into detailed aspects of design such as size of door and window, arrangement of furniture and other decorative aspects. In the meanwhile, during construction process, various

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ceremonies and ritual activates could be performed. Last but not least, when living, households always practice traditional rules and custom such as ancestor worship and traditional ceremonies and rituals. All of those activities have two aims. The main aim is to produce sense of place and family identity. The underlying aim is to get blessing from gods and ancestors; by that, a house could be lasting and family members living in that house could feel safe.

The self-built housing design reveals how the occupants adopt new ideals, living styles and values under the influence of globalisation. Specifically, as presenting in this study, an organisation of domestic space could be decided through classification of front-back and top-down spaces that were similar to those in traditional tube houses (Figure 163). It seems that in each type, households have specific ideal about function and location of each room in the spatial organisations. To explain about those similarities and differences, this study explored relationship between physical organisation of domestic spaces and socio-cultural norms, which help to shape classifications of "*cleaning*" versus "*dirty*", "*safe*" versus "*danger*", "*communal*" space versus "*individual private*" space.
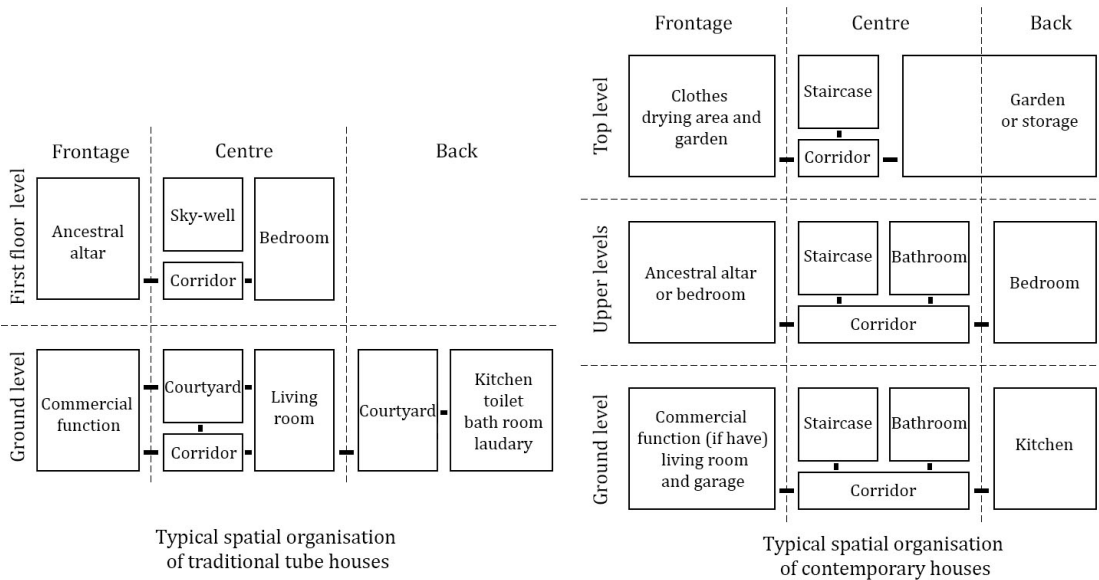
Figure 163: Transformation of spatial arrangement between traditional tube house and contemporary self-built housing[36]

My research findings suggested that each domestic space is attached to particular meaning in those classifications. For example, ancestral altar is important for Vietnamese family to create family identity and seek blessing from ancestors; thus, each house always has one ancestral altar. Meanwhile, in order to show respect to

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[36] Please see section 4.2.3 for spatial organisation of traditional tube house and section 5.3.2 for spatial organisation of contemporary self-built housing

ancestors, the location of ancestral should locate in cleaning area. In this regard, a sense of cleaning is not only referred to hygienic issues; but also, represents a psychological concept of "*cleaning*". Commonly, the highest space is considered as the cleanest place, and the ancestral altar should always situate in highest room. Similarly, living room should be a "*cleaning*" space; therefore, living room should always locate in the front of the house while kitchen, which is referred as dirty area, is commonly located in the rear.
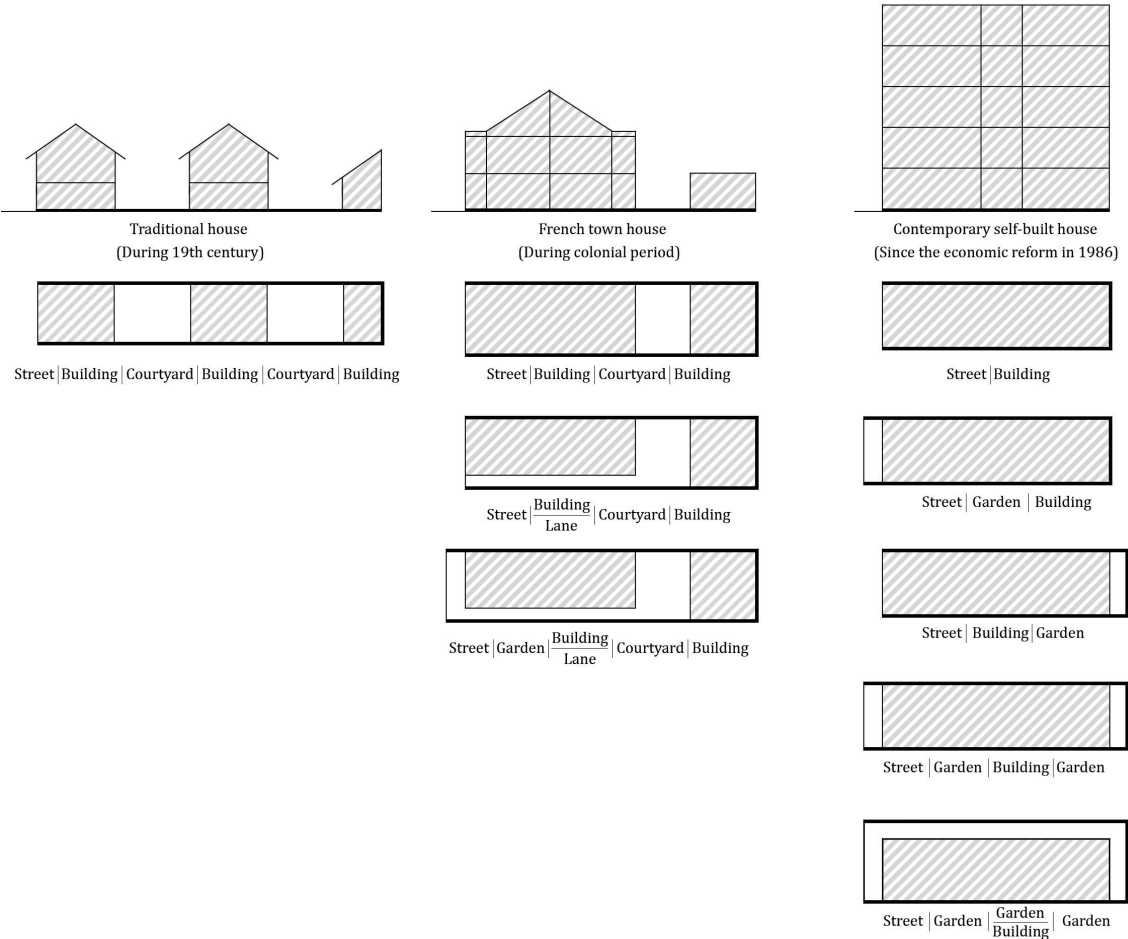
Figure 164: Changes in socio-cultural needs result in natural changes of form of self-built housing in Hanoi city

One the other hand, sense of individual privacy has become popular in contemporary society. As a result, households increased number of individual private bedrooms. Similarly, a connection between human and nature also changed owing to application of modern domestic products and requirement of contemporary living spaces. As a result, there is a change in housing form (Figure 164). While in the traditional houses and colonial town houses that were built before the economic reform, the domestic spaces are separated away from

supporting space by internal back courtyards, in contemporary self-built house, the kitchen are directly attached to other main living spaces and the design of backyard became less popular.

7.2 Implication, recommendations and suggestions for theory and practice

7.2.1 Implication for theory
Firstly, as presented in this study, participation of households in housing design and construction processes help to improve housing conditions and meet the family needs. In the cases of self-built housing in Hanoi, Vietnam, households often applied folk knowledge and personal experience to design and construct their home. The design of self-built housing; therefore, meet the household's expectation and socio-cultural needs (such as classification of so called "dirty" and "cleaning", "safe" and "dangers" areas). In addition, various aspects of housing design could be modified and transformed overtime to meet new living conditions. When people are involved in the decision-making process, they could modify the house according to their own requirements to create sense of place and family identity. The participation of households in housing process; therefore, should be considered as one of key elements to achieve sustainable housing.

Secondly, this study also highlighted that the development of self-built housing and neighbourhood could not success without the support of housing policies. In the context of Vietnam and Hanoi city, self-built housing has been promoted in different types of neighbourhoods. In common, the state agencies and developers have responsibility to develop infrastructure and services in the local areas. Without planning and supporting housing policies, self-built housing area can turned into modern slums quickly.

Thirdly, this study demonstrated that design and construction of self-built housing is not only transformed physical environment but also had influence on socio-cultural factors and background of households. Much of housing productions of the 21st century are taking place in developing countries, but majority of the theories of how housing function remain rooted in developed world. Thus, housing models and practices are constantly borrowed and replicated across borders owing to processes of globalisation and modernisation. Very often architectural design practices focus on physical aspects including materials, structure, advanced technologies and formal planning regulations. But self-built housing focused on local households' own expectation about their ideal home, which is influenced by socio-cultural context and living styles of each individual.

7.2.2 Implications for further design practice
Recently, the sustainable development is growing concerns in academic forums. Despite that, the studies of sustainable housing seem to focus on green perspectives, such as green house and reduce energy with fewer studies

investigating social and cultural aspects of sustainable design. In addition, many studies on Vietnamese houses focus on vernacular architecture rather than discuss current realities and living conditions in societies. In addition, there is a lack of study on households may design and construct their own houses within the restriction of their capabilities and regulations.

The importance of self-built activities in housing process; therefore, is rooted in perception and living styles of its households. In other words, successful housing designs could not be separated from households' participation in the design processes.

The housing should be viewed as process of continual change to meet the family needs, and occupants should have a choice in the process of design and construction. Particularly, as households' members grow and habits, lifestyle and requirements might different between different families; so, it is clear that each family has different expectations about their dream house and meaning of home.

Based on the findings of this study, it is reasonable to suggest that there is a need of framework for self-built activities, which emphasis on the role of households and communities, apart from those of central government and local government.

However, this study highlighted that the central government should also provide the supporting policies and planning for self-built housing through laws and regulations. The current planning mechanism needs to incorporate the participation of households in housing process as a solution for sustainable housing development.

In various developing countries, the self-built housing is frequently considered as illegal or informal construction; nevertheless, it provides alternative way of making building to meet family needs and socio-cultural values of users. The self-built activities; therefore, should be recognised in the laws and housing policies to encourage households to participate in housing process.

Secondly, local government and developers should prepare good planning support for self-built housing activities. The common problem of self-built housing areas is lack of planning and provisions of essential infrastructure and services. As a result, in self-built housing areas in Hanoi city, there is a high-density of building and high built-up area, particularly in old residential areas such as urban village (Section 5.2.1). Meanwhile, there are some common problems in the most collected self-built cases, such as lack of natural lighting and inaccessibility for public transportation system. Good planning strategies should provide solutions to those problems.

Thirdly, quality-checking system should be set up and training courses for self-built activities could be provided to residents to ensure quality of building construction.

Though self-built process, households often found information through different sources. Self-built housing could impose potential risk owing to poor qualities of construction. By provide guidance and training courses, it would help to reduce the risk of unsafe construction.

To sum up, this section argues that participant of households in housing design and construction process is a useful option to create sustainable housing and to meet family needs. However, the role of state and public sectors should not be under estimated.

7.3 Limitations of this study

As described in the introduction chapter, this study has three following aims. The first aim is to identify the main characteristics of Vietnamese self-built housing under the influence of globalisation and modernisation processes. The second aim is to investigate household needs and the socio-cultural context that had influence on self-built housing design in Vietnam. The third aim is to provide suggestions and guidance for future housing projects. This part explains how those aims have been achieved and contribution to knowledge of this study.

The finding of this study demonstrates main characteristics of contemporary self-built housing through analysis of built environment and socio-cultural context of Hanoi city. The study of self-built housing in this project revealed how household made use of their knowledge, local planning principles and expert's expertise to create their own houses. Particularly, the study demonstrate that households have applied advanced techniques and new materials to their houses in order to achieve comfortable and modernised living spaces within urban areas of Hanoi city. In addition, various aspects of housing design are based on understanding of traditional rules of spatial hierarchy in houses. Meanwhile, new living styles are also affected by increasing trends of nuclear family and sense of privacy in families.

Although this research has reached its aims, there were some unavoidable limitations:

Firstly, this research was conducted only on small number of samples, and it focused on opinion of households and on collected case studies of contemporary self-built housing in Hanoi city. Due to difficulties to collect data in specific neighborhood and lack of information from local authorizes (e.g: details about planning, population, buildings and historical development of neighborhoods), this study could not produce a full picture about the differences between housing in different urban areas in Hanoi city. Therefore, future research can be developed though continuing investigation of contemporary housing in different urban areas in Hanoi city.

Secondly, this study did not compare the characteristics of self-built housing and housing built by developers. Therefore, future studies are needs to present a more

balanced picture showing whether similar characteristics of self-built housing might have been adopted by housing built by developers. Even so, it is clear that self-built housing has played importance role in construction Vietnamese built environment and provide affordable housing for majority of Vietnamese households.

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APPENDICES

Appendix A: In-depth Interview Guidelines
This research aims to define and construct the sustainable design guidelines for urban house in the context of urbanization in Hanoi. The intention of the information of the survey is to understand the current reality of urban houses and identify the house based on the perspective of designer or architects. We intend to disseminate our research finding at conferences and through articles in journals.

Name of interviewee……………………………………………………………………………………

Record place of an interview……………………………………………………………………………

Record time of an interview……………………………………………………………………………

Themes	Issues
The occupants' democracy	Personal information: - Household members (Includes relatives and staff) - Family story (Includes when they take decision to move/built in their current house) - When children grew up, do they move out of the house or continues living with their parents
Socio-cultural setting in home environment	Home preferences: - How and when family interact with other neighbourhoods or relatives in the house? - What/ how do they feeling safety in their houses? - The use individual/ communal spaces - The personal requirements for living spaces and their houses? Family needs: - The demand and the satisfaction - The use of workplace or working/studying spaces - When the children grew up, do they require individual rooms? - Opinions about current house Religion activities: - The use of ancestor altar and another ritual place - The ritual during construction process - The use of space for ceremony during special day - The Feng-Shui theory and its application on detailed design and plans.

	Daily activities:
	- The use and arrangement of cooking and eating spaces. The advantage and disadvantages of that arrangement.
	- The social leisure (watching TV, reading, listening music, chatting)
	- The arrangement of bed rooms
	Spatial organization:
	- The connection of spatial layout
	- The arrangement of interior and furniture
	- Form and structure of building
	- Connection between outside and inside
	Home and identity:
	- The use of ancestor altar and another ritual place
	- The ritual during construction process
	- The use of space for ceremony during special day
	- The Feng-Shui theory
	Climatic respond:
	- The use of natural techniques (Ventilation and lighting)
	- The use of modern devices (Air-condition and fan)
	- The use of materials
Urban environment	Development strategies
	- Historical development
	- Political ideology and housing policies
	- Housing and neighbourhood concept and development strategies
	Residential area:
	- Regulations and planning
	- Types of housing
	- Street system, public services and facilities

Appendix B: Physical Mapping and Observation Guideline

Themes	Issues
Physical architectural design	- Size of the house/ spaces - Kind of rooms/ spaces and facilities available - Number of rooms and occupants living in the house (Including staffs, relatives and tenants) - Form of the houses - The main functions (Complex function: Commercial place, workplace and living spaces or only living spaces) - The spatial connections - Main construction and materials
Socio-cultural setting in home environment	Daily activities - How kitchen and dining space are using for preparing meals in daily activities and ceremony days - How dining spaces are using for eating meals - The arrangement of sleeping spaces - The uses of spaces in different times - Social interactions (when relatives or visitors come) Family needs: - Determining private, semi-private and communal space. - Playing spaces for children. Religion spaces: - The location of ancestor altar and its connection with other rooms - The detail design of ancestor altar and use in ceremony days Home and identity: - The design and interiors rooms - The requirement of household and their living styles
Neighbourhoods environment	Development strategies - Historical development - Political ideology and housing policies - Housing and neighbourhood concept and development strategies Residential area: - Regulations and planning - Types of housing - Street system, public services and facilities

Appendix C: Transcript of interviews

(Details of full name, age and jobs of family members are not including in this part)

Interview with Mr Luc (03-09-2016)

How many member in your family?

My family has 6 people including me, my wife, my mother and three sons.

How do you get this house?

I got this house in 1982 from Vietnam Inland Waterways Administration, when I was an employee three. At this time, this area did not have plan, administrations just divided the plot into their worker or employees, and then household organized to build the houses by themselves. Many houses did not have building certificates because bride's issues. With big buildings, in theory, they have to get plans and building certificates; however, in reality, the building may modify the original plans, and no one check their building during construction time"

Do you remember the original form of building? How many times this building was renovation and when?

It is two stories building; the house was built by simple materials with brick, timber and tiles. I bought the neighbourhood building in 1990, and then I create walkway though two building. The big first renovation was in 1992 when I upgraded the house into three stories. Then I buy another plot, which located next to my house and destroy some parts of wall for walkway in 2004. I renovated the building second time in 2010; I destroyed new building and part of old building to create new one as same as today.

What space do you use for guest welcoming activities?

I use living room in the ground floor for guest welcoming activities. In the past, when my best friends visited me, I used to use the garden for talking and chatting. But now the garden is too high in the fourth floor, so I now only use the living room.

So how about your relative members? And how do you arrange the sleeping space for guest?

In the past, we don't have sleeping space for guests. Now, we have more bedrooms, if someone sleep in my house, I and my wife will move to another room and let s/he sleep in my room.

How do you ensure your house safety?

I got a security system to defence again thieves. It was steel frame that cover all windows and yards. All doors, which go to garden, are locked; my wife and I only open their doors only when necessary. The Vietnamese thieves are very good in climbing; they can be considered as spy-man. They always go to inside by doors or windows in

the top floor rather than those in the ground floor. Therefore, in the festival days, I always remind myself and other members to check the doors and windows in top floor.

How does your dwelling respond to the sense of privacy?

Because my sons have growing, so generally, each member has one private room. However, today, because two of them are moving out, so we have more non-use rooms. I have to check their rooms frequently to make sure they are in good conditions. So, in festival days such as lunar New Year, when my sons and their families come back, they have a sleeping space.

What do you feel about your house at the moment? Do you want to change anything in your house?

Of cause, there are some problems. For example, when I built this house, I did not think about drying area and gardens. Also, we need bigger living space for family activities, when my son's families come, the grandchildren do not have playing area.

How about Vietnamese ritual activities? How do you use your ancestor altar?

In theory, the ancestor should be located in the highest place in the house. However, it is quite difficult to bring food and other thing to the ancestor for ritual activities, particular with old people like me. Furthermore, because I am the eldest son of my father, so I planned the ancestor altar in the ground floor. This location is convenience place because when relative members coming, they can burn the incenses to honouring the ancestors. In the ancestor, I put the images of ancestor and symbol of learning god. Also, there are three incense bowls.

Do you do anything about ritual activities during construction processes?

Yes, I have. It is necessary to do it. When building the house, I have to consider my age to choose the good time; I also do some ritual activities before the ground breaking. When finish one floor, I do the same thing to avoid bad things and show the respect to the land gods, especially when finishing the top floors. Before living, I do a huge celebration and inviting my friends to come and cheer with me.

How about the location of ancestor altar?

The location of my ancestor altar is based on Wind-Water theory. Based on my age, the East direction is good for my family; so, the main direction of ancestor altar faced the East. In front of ancestor, I planned water pots to suit with Wind-Water theory while next to ancestor altar; I arranged some pots and picture, which have images about mountainous areas.

How do you arrange the living spaces for daily activities?

I arranged the dining table in the kitchen areas for cooking and eating. About living

spaces, because my house is located in urban area, so there is not much space for family activities. In theory, the house should have one living room for guest welcoming and watching television, so the worshiping room in the ground floor is using for living space. When the grandchildren come, I often take them to my room because it has television, and the children love it.

How about the parking area? Does your house have garage?

Because I live in the city, so there is not much space for the garage. The parking area is located in the ground floor, in the living room. But I only park there in the evening; in the daytime, I put my motorbike to the communal yard, in front of my house.

How about the arrangement of furniture?

The arrangement of furniture is based on my perception, which is following some principles of Wind-Water theory. For example, the bed facing the North, so when sleeping, the direction of legs is facing to the South. The toilet is located in the North site to block unhealthy wind. Besides that, in the bedroom, I arranged the bookcases and table for working spaces, which based on my interested.

Do you plan any trees or small plants in your house?

Yes, I do. My wife and I planned many kinds of tree in the yards locating in upper floors. The tree not only provides fresh air and shading, but they also good for living environment basing on Wind-Water theory. Sometime, when cooking, my wife goes to gardens to take some ingredients as well.

Do there is any particular rule on the choice of floors or the height of building?

In Vietnam, the height of each floor normally is 3.3 meters. Depend on the economic, the number of floors is between from 3 to 5, maximum is 5 to fix with the urban regulation.

What is your opinion about other neighbourhood's building? Do they apply building regulations?

In theory, all buildings have to get the building certificate before constructing; however, during construction process, the design has been built in different ways. For example, in certificate, they can only build 3 floors; in reality, the house can be up to 5 or 6 floors.

Interview with Mr Truong (25-08-2016)
When did you built your house?
In the past, this area was beloning to one landlord name Van Tin. He did a food product to export. The south of this area is a market place and trading area. The main building

located in the centre of land, which is now the house of Mr Thi. The supported space such as kitchen, toilet was located around. In 1982, my wife was working in a Waterway transport company. The company moved to this area and distributed the land for their employees. My wife was allocated small house. Overtime, when my family has better finance, we upgrade and rebuilt the house.

What factors did you consider when building this house?

Originally, my wife was allocated a house with nearly 20 square meters. It is very old house with two floors, simple material with brick and tiles. When we got children and money, we buy my neighbourhood's house and rebuilt the house to make living spaces for my children. The house is located in the small alley; thus, we do not consider commercial function when building this house

Do you remember the original form of building?

It is two stories building; the original house was built using simple materials, such as brick and timber. There were two rooms in the ground floor: one bedroom and toilet. The first floor is bedroom.

Since then, how many times did you renovate this building?

I bought the neighbourhood's building in 1990, and then I create walkway though two building by destroyed parts of wall. The big first renovation was in 1992 when I upgraded the house into three stories. Then I buy another plot, which located next to my house and destroy some parts of wall for walkway in 2004. I renovated the building second time in 2010; I destroyed new building and part of old building to create new one as same as today.

What space do you use for guest welcoming activities?

Currently, I use living room in the ground floor for guest welcoming activities. In the past, when my best friends visited me, I used to use the garden for talking and chatting. But now the garden is designed in the highest level, so I now only use the living room.

When someone visits your house, such as relative members, how do you arrange the sleeping space for guests?

In the past, we don't have sleeping space for guests. Now, we have more bedrooms, if someone would stay in my house, my wife and I will prepare another room for s/he

How do you ensure your house safety?

I got a security system to defence again thieves. It was steel frame that cover all windows and yards. All doors, which go to garden, are locked; my wife and I only open their doors only when necessary. The Vietnamese thieves are very good in climbing; they can be considered as spider-man. They always go to inside by doors or windows in

the top floor rather than those in the ground floor. Therefore, in the festival days, I always remind myself and other members to check the doors and windows in top floor.

How does your dwelling respond to the sense of privacy?

Because my sons have growing, so generally, each member has one private room. However, today, because two of them are moving out, so we have more non-use rooms. I have to check their rooms frequently to make sure they are in good conditions. So in festival days such as lunar New Year, when my sons and their families come back, they have a sleeping spaces.

What do you feel about your house at the moment? Do you want to change anything in your house?

Of cause, there are some problems. For example, when I built this house, I did not think about drying area and gardens. Also, we need bigger living space for family activities, when my son's families come, the grandchildren do not have playing area.

How about Vietnamese ritual activities? And how do you use your ancestor altar?

In theory, the ancestor should be located in the highest place in the house. However, it is quite difficult to bring food and other thing to the ancestor for ritual activities, particular with old people like me. Furthermore, because I am the eldest son of my father, so I planned the ancestor altar in the ground floor. This location is convenience place because when relative members coming, they can burn the incenses to honouring the ancestors. In the ancestor, I put the images of ancestor and symbol of learning god. Also, there are three incense bowls.

Do you do anything about ritual activities during construction processes?

Yes, I have. It is necessary to do it. When building the house, I have to consider my age to choose the good time; I also do some ritual activities before the ground breaking. When finish one floor, I do the same thing to avoid bad things and show the respect to the land gods, especially when finishing the top floors. Before living, I do a huge celebration and inviting my friends to come and cheer with me.

How do you select location of ancestor altar?

The location of my ancestor altar is based on Wind-Water theory. Based on my age, the East direction is good for my family; so, the main direction of ancestor altar faced the East. In front of ancestor, I planned water pots to suit with Wind-Water theory while next to ancestor altar; I arranged some pots and picture, which have images about mountainous areas.

How do you arrange the living spaces for daily activities?

I arranged the dining table in the kitchen areas for cooking and eating for convenience. About living spaces, because my house is located in urban area, so there is not much

space for family activities. In theory, the house should have one living room for guest welcoming and watching television, so the worshiping room in the ground floor is using for living space. When the grandchildren come, I often take them to my room because it has television, and the children love it.

How about the parking area? Does your house have garage?

Because I live in the city, so there is not much space for the garage. The parking area is located in the ground floor, in the living room. But I only park there in the evening; in the daytime, I put my motorbike to the communal yard, in front of my house.

How about the arrangement of furniture?

The arrangement of furniture is based on my perception, which is following some principles of Wind-Water theory. For example, the bed facing the North, so when sleeping, the direction of legs is facing to the South. The toilet is located in the North site to block unhealthy wind. Besides that, in the bedroom, I arranged the bookcases and table for working spaces, which based on my interested.

Do you plan any trees or small plants in your house?

Yes, I do. My wife and I planned many kinds of tree in the yards locating in upper floors. The tree not only provides fresh air and shading, but they also are good for living environment regarding on Wind-Water theory. Sometime, when cooking, my wife goes to gardens to take some ingredients as well.

Do there is any particular rule on the choice of floors or the height of building?

In Vietnam, the height of each floor normally is 3.3 meters. Depend on the economic, the number of floors is between from 3 to 5, maximum is 5 to fix with the urban regulation.

What is your opinion about other neighbourhood's building? Do they apply building regulations?

A long time ago, this area did not have plan, administrations just divided the plot into their worker or employees, and then household organized to build the houses by themselves. Many houses did not have building certificates because bride's issues. With big buildings, in theory, they have to get plans and building certificates; however, in reality, the building may have modified the original plans, and no one check their building during construction time. To avoid future conflict, households have to negotiate with each other when building a house.

Interview with Mrs Van (01-09-2016)

When did you built your house?

My husband built this house 20 years ago. I was a worker for Tong Cong Ty Van Tai Duong Thuy (the waterway transport company); therefore, the company allocated this housing's plot to me for living spaces. All of my neighbours were worked in that company as well. After 1986, I bought the plot from the company and rebuilt a house on it. Before that, it was a two-story building.

What factors did your family consider when design the house?

We just designed a house for living space only. My land is located in the end of alley; thus, it is impossible to create shop here. Therefore, we just consider number of living spaces do we have. My total housing area is quite small; thus, we designed a house with three floors.

Did you hire architect to design your house or did you design the house by yourself?

No, we didn't hire architect to design my house. Building a house is very simple. But as living in urban area, we need a planning to submit to local officer. Thus, we ask an architect to draw basic plan. Based on that plan, we decide many architectural features, such as size and materials of door and windows.

Who did you ask if your house has technical problems?

In term of construction, because my house has only three floors; so, the construction is quite simply. Nowadays, all building used the concrete structure. We hire a local group of builders to build the house for us. During construction time, my husband, who had experience with buildings construction, supervised the builders.

Did you consider Feng Shui during process of building this house?

No, we didn't not consider Feng Shui theory. The only application of Feng Shui is the location of ancestral altar. It should be located in cleanest area in the house.

Did you change anything since you live here?

Yes, we upgrade the house one time. We added a new floor five year ago. My son is 27 years old now, and he needs a private room. In the past, when my son was small, he always sleeps with us, but now, he is mature. He is going to get marry as well; therefore, private room is necessary.

In special ceremony such as lunar New Year, do you often have a party in your house or in restaurant?

During holiday, we always came back to my husband's hometown for several days. Then we come back here and visit relatives and neighbours. Often, during that time, we invite friends and relatives visiting my house to have lunch or dinner with my family. It is a traditional habit of Vietnamese to show the polite.

What activities do you often do at home?

My husband and I have to go to work in the daytime. My son is got a job in the Technology Company; so, he is going out most of the time as well. We just come back the house in the evening. So, at home, I am always preparing food. After diner, we may watch television together. Then, we go to bed early to prepare for the next day.

How did your house respond to local climatic conditions?

As you know, Vietnamese climate is very hot in summer and cold in winter. Therefore, my house has big windows in each floor for ventilation in summer. Thus, we always open windows and using fan for cool air movement. Only in special day, which is too hot, we use air conditions. On the other hand, in the winter, we always have to wear many clothes to keep body warm.

What is your opinion about other neighbourhood's building? Do they apply building regulations?

In theory, all buildings have to get the building certificate before constructing; however, during construction process, the design have been built in different ways. For example, in certificate, they can only build 3 floors; in reality, the house can be up to 5 or 6 floors.

Interview with Mr Anh (04-09-2017)

When did you built your house?

I built this house 20 years ago. At that time, this Cau Giay district had very few state companies. Then, the companies from inner city moved out to this areas. Each company had land to built houses for its own employees. My wife was employ in Hoc Vien Chinh Tri Quoc Gia Ho Chi Minh (Ho Chi Minh National Academic Of Politics). Thus, she was distributed this plot for living from her company. This area was firstly planned for 44 families. Each plot has 50 to 60 square meters. Before that, this area was just a agricultural land for banana trees.

How many people in your family?

There are four people in my house. There are including my wife, two daughters and me. Both my daughter has named Trang. The old daughter studied at the University of civil engineering about ten years ago. When finishing, she moved to Australia for working and living there. My younger daughter is studying in South Korea. Now, in the Ho Khau book, this family still has four people. However, in reality, there are only two people including my wife and me.

What factors did you consider when building this house?

My total housing plot is nearly 50 square meters. Some other plots are bigger, about 60 square meters. However, it is still quite small. In Vietnam, the house often developed in vertical axis. In the past, the maximum number of floors is four. But now, the number could reach to seven. Some contemporary houses have lifts inside the house. My house exactly is 48,5 square meters.

Did you hire architect to design your house or did you design the house by yourself?

Actually, I have some knowledge regarding construction and building. Thus, I designed the house. When I have a free time, I drawn the house. In Vietnam, mostly, the house applied a same structure system including concrete beams, concrete column and brick wall. Thus, the construction is quite simple.

Did you consider Feng Shui or other material about living spaces?

It is quite difficult to apply Feng Shui principles into the house. It is because the direction of plot is depending on planning rather than my ideal. In addition, the area of plot was randomly distributed to the employee. For example, my house is facing the Southwest, but my family did not have any other choice at that time. Regarding other Feng Shui principles, I was trying to design the house to get natural ventilation and always cool as much as it could be. In the backside, I made a sky well to trap the wind for cross ventilation. In Vietnamese urban area, there are other functional parts, such as garage area, kitchen, bedrooms and shire room in top floor. Covering the top floor are corrugated roof panels. Within the Vietnamese condition, it is important to prevent hot and rainy. The corrugate roof panels are very popular today to cover the top terraces in Vietnamese houses. In the past, we used sponges' tiles to cover the roof, but those materials are still not good within Vietnamese conditions. The climate is changing quickly between daytime and night. Thus, since the reform, people start to use the corrugate roof panels for the houses. When you looking the city in top floor of high-rise buildings, red and blue colour of corrugate roof panels could be easily to recognize in everywhere in Hanoi. The tiles are still good, but the tiles need a supported structure. Furthermore, the price of tiles is very expensive and tile's roof took more time during construction. Due to those reasons, corrugate roof panels have become very popular.

Did you repair or changed anything since living in this house?

No, we did not change anything since we build the house nearly 20 years ago. When my daughters get married next year, I may repaint some rooms. There is not necessary to have any room. The ground floor is using as garage and kitchen; the first floor is using for main living room. In the upstairs are bedrooms. The next up floor is library and shire room. The final floor is space for garden.

In special ceremony such as lunar New Year, do you often have a party in your house or in restaurant?

Within Vietnamese culture, we always cerebrate special events in home. Normally, we often visit my friends, neighbourhoods and relative family members. During that time, we spend most of our time at home for party. In addition, the restaurant always closed during festival times.

What kind of activities do you often do at home?

In the evening, we are always watching film and news. My house also has a karaoke space to sing during party. In my opinion, the house is very big for us. It is because when the children grow up, they are moving out result in many empty rooms. Because my house is not located in main streets, thus, it is difficult to use empty room for rent. In addition, because the house is a living are for family; thus, we don't want other people moving around the house.

Did you consider green architecture?

Yes, I did. For example, when building the wall in the main façade, I use hollow brick to reduce the impacts of heat. In some area such as balcony, I put some small trees.

What do you think about contemporary Vietnamese houses? And what are your opinions about limited size of the house?

To build a basic house, it requires at least two rooms each floor. In addition, there should be a toilet for each floor. Thus, the limited size of the house is about 40 square meters for basic house. To be better, the plot size should be about 60 square meters to provide good living spaces.

Did you consider having gardens in the house during the process of designs?

Yes, I did. But it is impossible to have a garden in the ground floor. In Vietnam, the plot is arranged next to each other. Thus, I have a wind trap in the top floor for ventilation only. The garden is only in the top terrace. Moreover, in the past, the state companies just supported the land while the house is depending on family needs and finance. Normally, the house has at least four floors without garden in the ground floor.

Do you like to buy a ready house or self-organize to build the house?

In my opinions, I would prefer to build the house rather than buying a ready one. The high-rise building is developing only because of high density of population in the city centre. In many areas, the investors or developers buy the land and built houses. The houses always look good; however, overtime, the houses may have various issues such as cheap materials and poor construction that could damage the house. Thus, if people have conditions, I would suggest building the house.

What do you think about self-built housing in Vietnam today?

In the city centre, there is not much empty land. Most developed projects are locating in

the outskirt of the city. Each project has several high-rise building and housing plot for Villa, detached house and row house. At the moment, the housing plot for self-built is only in few in the city centre, the projects for self-built housing are mainly locating in the rural districts or towns around Hanoi. The self-built is popular because it supported for people needs. For example, architecture has many different styles, and each person is interested in particular style such as Western architecture. Some people may prefer to use concrete while another may use glazing for the façade. Thus, even in one residential area, there are many different styles of architecture. Only in new developed projects, the architecture of housing is similar with other due to regulations and management of developers. In my living area, it is difficult to control the high level of housing and architecture styles. Furthermore, the house in Vietnam is quite high compared to houses in other countries where the normal house has only two to three floors. In new street, the housing architecture is chaotic due to different colour, styles and height of building. If foreigners look at Vietnamese houses, their comments always can be classified in two opposite ideals. One may interest in Vietnamese houses due to self-expression of each building while other may say that housing architecture is chaotic and uncontrolled.

In other countries, people may rent the house. But in Vietnam, people always want to have a house for their own. The literature has several proverbs such as An Chac Mac Ben and An Cu Lac Nghiep that describe the habit of Vietnamese people to own something. Therefore, people may do whatever they can to get a house.

Interview with Mr Thi (12-07-2016)

When did your family decide to build this house?

We did not built this house. My father bought it in 2002 from old state employe. In the past, this is a shelter for state employee who have high rank. Then he modified and rebuilt some parts of building for our family. Because the house is too big for my family; thus, some parts of building is using for rent. The top floor is using as student accommodation. In 2012, I bought another neighbour's house, and that building is for rent as local food store.

What are your requirements about your living spaces when you modified and changed the house? Do you plan to change anything in the future?

In the past, my wife and me lived with my parent. When we had a baby, we decided to move out to create new home. As my parent got this house, and it is quite near my parent's house; therefore, I decided to move to this house. Also, I could visit my parent nearly every day. When we moved in, we realized that the house was too big, and we could not use all of rooms. We decided to use ground floor and first floor for family living space while top floor is using for rent. My house's location is in the city centre and near some universities. So, we decided to use top floor for student accommodation.

A new door was created in the stair case area for student. By that, they could move to their room without access to the main family living spaces.

Did you do ritual activities when moving and changing any parts of building?

I am not, but my father did when he rebuilt a house. When we moved in, He did a Le Nhap Trach, which is a traditional custom in Vietnam.

How about ancestral worship? What do you think about the important of ancestral worship in your house?

Well, it is important in Vietnamese culture. Every house should have an ancestral worship. In my parent's house, there is a big ancestral altar. However, because we just moved in this house; thus, we have to setup a new one. My ancestral altar is quite simple. It is because we always cerebrate ceremony in the main ancestral altar in my father's house. During national festival such as Tet, we put some traditional food into the ancestral altar.

How do you decide to arrange furniture in your house?

For the furniture, it is just for convenience. There are not many choices of arrangement in furniture in the house. For example, in this living room, traditionally, there is only ancestral altar and set of chairs and big table. But the location of ancestral altar is based on Feng Shui principles; thus, we just put the furniture set in this area mainly for convenience. There is a fish tank in the corner because my house has a small child, and she really likes to play with fish. Some posters are attached in the wall during birthday events. Also, I need a working space; thus, I put a working desk and bookshelf in living room.

As I see, your family has two motorbikes. How do you park your motorbikes in your house?

Because there is not parking area in this house. Thus, in the evening, I put my motorbikes in to the living room, near the entrance. In the daytime, I just put my motorbikes in front of my house and lock it. So, it should be saved. Everybody in this area do the same thing. Majority of housing in this area do not have separated parking area. Therefore, you can see motorbikes are parking in everywhere near the entrances.

How do you make sure your house is safety and security?

In this area, some families have been robbed before. Thus, for the security, I always check the doors and windows in the evening to make sure that they are locked at night.

What do you think about sustainable design and its application in your house?

For the Vietnamese house, the most important factor is natural ventilation. The summer in Vietnam is very hot. In my house, there are various big windows for

ventilation. However, due to located in urban conditions, all main façades are blocked by neighbour's house. Thus, ventilation is only good in some cool day. Most of the time in the summer, we still have to use electronic fans and air condition for cooling.

How is about natural lighting?

For the lighting, if we open the windows, it would be fine. For example, in my bedroom, there are huge windows in the main façade. So, in the daytime, my room is quite bright.

What is your opinion on contemporary urban housing?

There is a movement of new architecture using new materials and green styles. As can be seen in many architecture websites, there are many new famous architects such as Hoang Thuc Hao and Vo Trong Nghia architects.

What is your opinion on sustainable architecture?

It is difficult to say what is sustainable architecture. Basically, there are three main principles of sustainable architecture including environmental, social and economic factors. In term of housing design, depending on conditions and family needs, there are different targets of sustainable design. As climate changes, the most important factor is fit with local climate.

Interview with Mr Bach (22-08-2017)

When did you built your house?

I built this house 25 years ago. At that time, I worked for the eletronic company. I were distributed this plot for living. The plot was fourty square meter for each family. After the reform, I bought this plot directly from the company and I had got the right to use the land.

What did you considered when designing the house?

Because my house located in small alleys far away from main streets; thus, when design the house, I was not thinking about commercial functions. Also, when we built this house, there is only my wife and I; thus, we built only two stories. However, when I had two sons, the total number of family members is four; thus, the building is quite small for us at the moment. We have to put many things in the top terraces because we don't have any space inside the house. In addition, the house is very old now. As you could see around my neighbourhood, all other house is new one and they were built by concrete structure. Thus, my neighbour's houses are generally higher than my building and having more living spaces. In the next few years, when my children growing up and are going to get marry, we need to rebuild the house to create more rooms and living areas. Each of my son will have his own private room.

Did you hire architect to design your house?

No, I designed a house by myself. The building techniques for two stories were very simple. Also, during central economic command period, I has some experience about housing construction; thus, I draw the plan by myself. During construction, I buy the materials and manage the builders. Also, during the weekend, I asked my friends to come and help me to do some simple parts of construction. However, when we rebuilt the house in the future, we might need to hire architects.

Did you consider Feng Shui when designing your house?

No, I did not. In the feudal period, Feng Shui is significant to determine the location and direction of buildings. On my situation, I was allocated the plot from my company; thus, I could not make a choice regarding direction and location. The only Feng Shui principles were applied in my house was location of ancestral altar and arrangement of interiors such as bed directions and kitchen. In theory, the ancestral altar should be located in separated space; however, because my house is too small, we have to hang the ancestral altar to the wall in the main bedroom.

Did you change anything since your family living in this house?

No, we did not change anything. We have planning to renovate the building in the near future. Because when I built this house, the building use only brickwork; thus, the construction is limited in two or three floors. However, when my sons get married, they will need new rooms. I planned to rebuild the house with concrete structure including beams and columns, and built up to four to five floors. I also want to upgrade the living room and kitchen as well, it is too old and dirty now.

Did you consider sustainable design when built this house, such as ventilation and natural lighting?

Yes, I did. The house has big windows and ventilation holes in main façades for natural cross ventilations. In term of lighting, it is difficult to get natural lighting in urban area. My neighbour's houses have four to six floors that always block the sunlight. Moreover, within the tropical climate such in Hanoi, it is very hot and people always want to avoid direct sunlight, particularly in the roof level. Thus, I built the iron roof to cover the top terrace to reduce the effect of heating into living spaces.

How about the sense of safety and security?

If the house located in street, the house always has many steel frames to cover balconies, window and top terraces. This area is planned for state staffs; therefore, people in this area generally are friendly. It would be very safe to live here. In addition, my house is located in alleys; and we do not have any private business or shop. Thus, not many people going to this area. Therefore, I didn't use steel net to cover top

terrace. For security, I just setup steel door for protection. Other part of building such as window, I just used normal timber window.

Interview with Mr Chien (25-08-2017)

When did you built your house?

I built this house in 2009.

How did you have the housing plot in this area?

During the early 1990s, this area was a planned area with many small plots. My wife and I bought one plot, and we use our finance and self-organised activities to build the house. The price of land at that time is not expensive.

How many floors in our house?

This house has 6 floors. All spaces in the house are using for living purposes. There is no commercial space in my houses. The basic floor has 60 square meters.

Did you ask architect to design the house? And what factors did you consider when built this house?

Yes, I asked the architects to design the house. The architects provide some suggestions regarding planning, regulations and my ideals. Then, based on their suggestions, I modified some aspects of design to fix with our purposes. The architects also designed the interiors for me.

Did you consider Feng Shui theory and building regulation before design this house?

Yes, I did. I did a research about Feng Shui theory before building this house. For example, the water fountain over there (in the balcony) was designed regarding Feng Shui principles. At the moment, there is a dengue disease in Hanoi; thus, there is no water in the fountain. Normally, there is a lot of water in the fountain, and it is very beautiful. Besides main living spaces, Feng Shui principles had been applied in kitchen, master bedroom and shire room in the top floor. For the detail, the direction of kitchen stove is based on my age. The master bedroom is located in the central room of the house while the shire room is located in the six floors. In the shire room, the direction of ancestral altar is based on my age as well.

Did you consider Feng Shui in arrangement of furniture and interior design?

No, I didn't

Did you repair or upgrade the house when your family living in this house?

No, I didn't. I will upgrade only when the house is really old or when I want to add commercial spaces into the house. However, at the moment, the building is fine for us.

Also, when my sons get married, they may move out; thus, in the future the house is quite big for two or three people.

Did you consider sustainable aspects in your housing such as natural lighting and ventilation system?

My house is designed for natural ventilation only. For the lighting, there is only one main façade. Thus, it is difficult to catch lighting into the house. In term of ventilation, my house has many windows in the front and back facades for cross ventilation. Furthermore, there is a sky well in the staircase area and wind trap in the roof. Thus, in my opinion, the natural ventilation in this house is very good. Also, for the lighting, we mostly use electronic lighting, even in the daytime. We pay much money for electronic bills. In Vietnam, it is tropical climate, which is extremely hot; thus, when designing a house, we mainly focused on ventilation rather than other factors.

Do you often have family party and celebration in your house?

Yes, I do. I have a lot of Vietnamese celebration in my house. In some occasion, my parent also comes here to visit our family. Thus, the number of bedrooms is basically more than necessary.

Did you do any celebration or ritual activities during the process of building the house?

I just considered some aspects such as direction of kitchen and ancestral altar. For the ritual activities, I did not take it during construction time. Because during the 1990s, majority of rituals activities were believed as superstition. When finished the building, we just invite some close friends and relatives to dinner in my house.

Interview with Mrs Phuong (03-09-2017)

When did your family build your house?

My family built this house in 1999.

What decisions did you consider when building this house?

Historically, this residential area is in Yen Phu village. When my parent moved to Hanoi, they brought land in this area, and they built a basic shelter with brickwork for wall and structure. The house had one floor with two rooms and one kitchen in the back. In 1999 my parent decided to rebuild the house to make larger living spaces. The current house has a small parking area for motorbikes in the front, a living space and kitchen in the ground. The upper floors were designed for my parent' bedroom and my bedroom. Each floor has a private toilet.

Did you hire architect to design your house?

Yes, we did. We gave architect basic information about the area; how many floors and how many rooms are needs. Architect suggested some plans; then, we modified it regarding our needs.

And then, how did your family manage to build this house?

My father hired local master builders to build the house. He discussed with master builder and gave him drawings of my house. They constructed the house following that plan.

Did your change any parts of original plan during the construction process?

Yes, we did. For example, I want a separated changing room. Thus, in the second floor, three are three rooms, my bedroom, changing room and bathroom. On the other hand, in the first floor, which is using for my parent's room, there is only bedroom and bathroom. The material and colour are based on our interests as well. Each floor has different colour and decoration styles. For example, in my room, in the past, I choose blue colour for wall. However, in 2010, I want to make something creative; then, I repainted and modified my room with yellow colour. Since then, the room seem much brighter and cleaner.

How did you make decisions on material and architectural style of building? Did you check it in magazine, friend recommends or Feng Shui masters?

When we built the house, we just focused on number room and area living spaces. We did not care too much about the architectural styles. When the builders built the house, they suggest us different kinds of finished materials for different room, then we selected materials depending on out interest. When we lived in this house, we changed the floor material from tiles to timber because it is more convenience. Particularly, in the winter, the tiles are very cold but the timber floor is fine. In addition, I am a designer; thus, I designed my room when I had free time.

Did your family consider Feng Shui principles, ritual activities or ceremony for your house?

I am not remembering exactly; but my parent did some ceremonies when building this house. About Feng Shui, it is very difficult to apply in urban condition. Thus, most Vietnamese family just consider the local of ancestral altar. When we my parent building this house, there was a separated worship room in the second floor. However, since my parent's age was over 60, the health of my parent is not good. My mother's legs also have injuries. As a result, my parent cannot go to the worship frequently, particularly in ceremonies or festival days. Thus, the ancestral altar is put in the living room.

What do you think about sustainable design and its application in your house?

In Vietnam, the climate is tropical; thus, it is very hot in summer and cool in winter. Thus, most housing has to deal with natural ventilation. My house is quite similar with other housing; it has big windows in the main façade for ventilation. Moreover, because within the past planning, the backside of my house is a small communal yard; thus, we could not build over that area. We create windows on the back wall for ventilation. In addition, each bedroom has an air condition. If it is too hot, we just turn on the air condition.

How about natural lighting?

For the lighting, because there are many windows in the front and back. Thus, the lighting is good. The only problem is the lighting in the living room. We have to use electronic lighting in this room.

Interview with Mrs Loan (03-09-2017)

Can you please describe how did you decide to build your house?

In the past, my father taught at the natioal University of Economy. When the University developed this area for teachers and employees, he was allocated one small house. The orignial house was very simple with two main rooms: one for living room and one for bedroom and supported spaces: kitchen and toilet in separated building in the backside. In 1997, when my family had good saving and land price was very cheap, we bought the next house and then, we merged it with our house to create bigger building. In 2004, my family decide to rebuilt the house using solid materials, such as concrete for framework.

Did your family ask architect to design the house?

Yes, I did. My father asked his friend, who was an architect and lecture in the University of civil engineering to design a house.

Did you remember how your father build this house?

No, I didn't. I never ask my father about the design of this house before.

Did your father consider commercial function when you building your house?

No, he did not. In the old day, this area was a residential area for teachers and local officers, who were working in the nearby universities. Thus, there were no commercial activities in this area. When local authorities upgraded the riverside and build the new road (Tran Dai Nghia road), this area became a commercial street due to proximity to city centre. In addition, there is a university dormitory nearby. Knowing the advantages of this area, many neighbours start to create food shops, restaurant,

Internet shops, book store or photocopy shops in the ground floors of their houses. But my father still keeps the ground floor for living spaces.

Did your father consider Feng Shui theory when building this house?

No, I did not know anything about that. But most of elder people did that. So, when my parent built this house, I believed my parent did some kind of ritual activities.

How did your family design live spaces? Did your family consider any examples?

Regarding number of living spaces, my family had four people; thus, my parent designed a house with four bedrooms in my house. Three beds for my parents, me and my sister. There is also one bedroom in the ground floor for my grandparent when they visiting us. However, since my sister married three year ago, she and her husband moved out to live in abroad countries. Thus, her bedroom is empty now. So, the house is quite big at the moment. Even in theory, in Ho Khau system, my sister is still living here; however, rarely she comes to Vietnam. She is only come back home in festivals or family ceremony. My parents also very like to plan flowers and trees. Thus, around the house, there are many open spaces for flower and small trees.

How did your family determine colour and arrangement of furniture inside the house?

My parent chosen yellow colour because it is look cleaning. In term of arrangement of furniture, for example in this living room, a traditional set of table and chairs were arranged parallel with the depth of the house. It is a traditional pattern, which could be seen in Vietnamese vernacular houses.

When your family designed this house, did your family consider natural ventilation and lighting?

Yes, we did. For example, my father creates many windows in the main façade for ventilation. When opening the window, the room is very cool. In the balconies, my parent plans many small trees and flowers for fresh air. In addition, in the staircase, there is a large sky well for ventilation as well. Thus, my house is very cool, even in the summer.

For the lighting, because my house has a shape of the tube form, which is very popular in Vietnam, only some rooms near the main façade could access to natural lighting. On the other hand, most rooms in the back are very dark. Even when we create some windows that faced the small alley, the rooms in the rear are still very dark because my neighbour's houses are too high.

So, do you want to change anything in your house in the future?

At the moment, this house is good for us. My sister already gets marry, and she is living in her husband's house in Australia. Thus, we don't use all rooms for living. When I get

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> *marry, I will move out as well; and the house will be very large for only my parents.*

Interview with Mr Hoang (05-09-2017)

When did your family built your house?

My father built this house in 2007. In this area, the house was built with basic structure and framework, as we called as "Xay Tho". Thus, every house in this developed area had the same form regading heigh, number of floor, size of building as well as number of room. The only different features are the decoration and interior design.

Do you like to build the house or buy the finished house?

It is depending on market system, between demand and supply. At the moment, because the supply is over the demand; thus, most people buy a house for living. In the past 10 years, people always buy a house for investment. In many new developed areas locating around the outskirt of Hanoi, new houses were considered as type of investment rather than living.

This area was built when the Linh Dam urban area was completed. Thus, my residential area was one of the first new urban areas in Hanoi. Most buildings in this area were bought by investors. But now, everything changes. The policy supports for high-rise apartment, thus, the housing supply increased quickly. Thus, people, particularly with young couples, tend to live in apartment.

Do you would prefer to living in a landed house rather than apartment?

Surely, I would like to live in a house. The land price is always increasing. Therefore, price of house always increases as well. In addition, if the house is locating in main streets, the ground of building could be used for commercial functions to generate profit. For example, the rent of ground floor locating in main streets in this area is very expensive. It could be approximately 30 million VND per month calendar. A rent for a house is much more expensive. The house locating in Quang Trung Street that has four floors with 90 square meters could be rent for 3000 dollars per month. Most of rent houses are using for offices and English centre. Furthermore, people just live in the apartment because they don't have money. If they have enough money, they would buy a house because that is a habit of Vietnamese.

The price of land is increased significant, particularly in city centre. For example, in the last 10 years, in 2007, the land price in My Dinh urban area is between from 30 to 40 million VND per square metre. That is the price for good location. However, today, the land price is 150 million VND per square metre. In Bac Ninh town, in the past, the land price is just 10 million VND per metre. At the moment, the land price is approximate 30 to 40 million VND per square meter. In Lao Cai city, 10 years ago, the land price is just

1 million VND per square meter, but now, it is 11 million VND per square meter. In Da Nang, the plot located near the coast has price of 3 to 4 million VND per square meter. Nowadays, the land price is 40 million VND per square meter.

On the other hand, if people invest on apartment, the price of apartment is not significant changes, and the profit from apartment for rent also is very low. For example, if people buy an apartment, which cost 3 billion VND, the profit per year is only around 5 to 8 percentage per year. In addition, the apartment in Keangnam tower has price of 2000 dollar per square meter. Today, the price is still unchanged. That is the price of luxury apartment. If people invest into normal apartments, the price also decreased overtime.

Because the land is scary in the city at the moment, thus the land price increased quickly; therefore, people tend to invest on the landed house. The area nearby this area, two or three years ago, the normal plot would cost several VND billion. But today, the same plot would cost 20 VND billions.

Did your family ask architect to design the house? What factors did you consider when built this house?

Yes, we did. My family hire an architect to design the interiors. The main structure of this house is similar with another building in this area. Thus, what make the different is the detailed of design such as colour, motifs, decorative styles, choice of materials, size of window and door.

Did you considered Feng Shui theory and building regulation before design this house?

I am not sure about this. You should as my father about this for more details.

Interview with Mrs Huong (05-09-2017)

What factor did your family consider when building this house?

My family have seven people. They are including me, me daughter, my parent, my aunt and my grand parent. Therefore, my house were designed with four floors. The top terrances are using for garden and clothing dyring area. Each floor has four rooms. Although there are large number of room in my house; my family seldom used all of them. Most of them are using as storeage.

Did your family hire architect to design the house?

As I remember, there were some drawings of my house. My father hired an architect to design the house in 2000. However, I did not remember where are the drawings now. Architect just designed the basic function, and then my parent modified some aspects of design to suit with our living requirement such as the arrangement of interiors, choice

of materials. Nowadays, building has to get the drawing before construction process. But in the past, this area is the outskirt of city. So, it is not necessary to have planning, people just ask the builders to build the house.

Why does your house have two separated staircases?

My grandparent has two children, my mother and my aunt. So, they aimed to divide the house in the future. When my grandparent passes away, the house will be separated. My parent will take half while my aunt will take half. So, they could create their own living spaces.

Does your family have any plan to change or upgrade the house in the future?

No, my family doesn't have any plan. The house is too big for us now. There is plenty of room. In addition, in Vietnamese culture, when I get married, I will move to husband's house. Thus, my family does not need any new spaces. Even now, this house is still too big for us.

Do you think your house is good for natural lighting in the daytime?

For the lighting, there is lack of natural lighting inside the house. For example, my room is located in the backside and being surrounded by neighbour's houses. Even there is a small courtyard and big window in my room; it is still difficult to catch natural lighting. So, I use electronic lighting in the house event in the daytime. Even in the room we are sitting now (living room), the room is very dark inside. If we open all windows and doors, the natural lighting in this room is fine. But nobody open doors and windows for all time in a day. Thus, even in daytime, we still use electronic lighting.

How do you think about natural ventilation in your house?

In the top level, there is a wind trap for ventilation. In my opinion, this type of house is quite popular. My neighbour's houses have the same form and structure and ventilation system. When I visit my neighbour's houses, there is nothing difference. Maybe because in the past, there was a group of builders built all houses in this area. When they finishing one house, another family asked that group to build the house. Therefore, all house in this area have similar design.

How do you often spend time at home?

In normal day, I have to go to company to work. Then, I go to gym and I just come back home in the evening. At the weekend, I spend more time at home. My parent has same time life. Only my grandparent, because they are too old; so, they mostly stay at home.

Does your family often worship at home?

Yes, my family did. In Vietnamese culture, there is an ancestral altar locating in the highest floor. In every national festival, my father always worships in front of the

ancestral altar. We normally prepare some traditional dishes and offer them to the ancestral altar.

Does your family considered Feng Shui theory when building this house?

I am not sure about that. But I think my grandparent did some ritual activities when building this house.

Interview with Mrs Thu (06-09-2017)

How many people in your family?

My family has six people. They are including my parent, my brother, his wife and their baby.

Can you describe how did your father build this house?

My family built this house on 2002. As you can see, my house has very special shape. In the past, my house is bigger than this one. It is including my house at the moment and the neighbour's house. In the past, my parent need money to invest to their business, and the house is too big for us. Thus, we sold part of building. Today, when you looking at the main facade, you could see that my house and neighbour's house have similar architectural styles as well. My father designed the house by himself. Because my house is located in the main street; thus, the font spaces is using for rent. We are living in the backside. The staircase is very special because it was designed regarding to the interest of my parent. If you check other houses, no body built a stair with a circle shape like us. But my parent really like it. Arround the stair case is a hugh glazing windows for lighting and nice views. Also. There are many rooms in my house, the ground floor and part of first floor are using for shops and store. My family only lives in the upper floors.

How about design of each room?

Each room has particular design that based on interest of each person. If you go around the house, you will see different room have different decoration and styles. About my room is decorated with green background colour. I also buy some images and text style on the Internet to put in the wall.

If you father designs the house, did he have plans to apply building permission? And is anybody come and check the house when you build this house?

Yes, he did. Because my father has some experience on building construction; thus, he designed the house. We have plans of the house as well, but I don't know where is it now. My father manages the process of building such as buying materials and hiring some workers.

Did you change anything when living here? And do your family have any plan to

change anything in the future?

No, we didn't change anything since we are living here.

Do you or your father practice ritual activities during process of building a house?

I am not sure about this, but I think my father did. In the garden, my father built a small altar for land god. In addition, there is also an ancestral altar in the third floor. During every special event, event when I had an exam, my parent always worships to wish good things.

Do your family often celebrate party or family activities in the house?

Yes, we did. My family always eats at home. Sometime, during holiday or at the weekend, my parent's friends or relative come and have a party. But if we are too busy to cook, we go to out for eating or buying food because it is more convenience.

Do your family consider sustainable design in your house?

Yes, my father did. As you see, in the staircase, there is a large window for ventilation and lighting. In the backside of building, my father makes a sky well for ventilation as well; therefore, the house is very cool, even in the summer. In the garden locating in the rooftop level, my parent plans many types of tress. The house also covered by corrugated panel for heat-resistant.

If so, do you often use electronic products for ventilation and lighting?

Yes, I did. For the lighting, because my neighbourhood's houses are very high as well, so they block the lighting. Only some parts in my house have natural lighting during daytime including the staircase and highest floor. On the other hand, the bedrooms and living rooms have to use electronic lighting in both daytime and night. The ventilation is fine. But if the weather is too hot, we still have to use it. In the winter, we have to use heater as well.

Interview with Mr Ngoc (08-09-2017)

When did you built your house?

I buy and built this house seven year ago, in 2010. This area is a new developed area (namely Me Tri Thuong), that not too far from the city and near my working place. Thus, I bought one plot for my family. When I bought this one, at that time, it was unfished construction (Nha Xay Tho in Vietnamese). The developer just built the basic infrastructure and frame of building. I had to hire architects in local firm to redesign the house including plan, interiors and exteriors.

Did you have any requirement about the living spaces when design the house? And if

yes, how did their requirement influence on choice of design

Yes, I wanted to create modern house for my family. There were just three people in my family including me, my wife and my son; thus, we did not need a large house with many rooms. Therefore, we asked architect to design two bedrooms. Other parts of building are basic room in any family: garage, kitchen and living room. In the third floor, I am using one room for ancestral altar while other rooms in that story is using for store and laundry room. The architect gave us some ideas, perspective views when finishing and detail plans. We just check and modified some parts such as choice of colour and types of materials.

Did you ask Feng Shui master when designing this house?

No, I did not. Because the framework was designed by developers. So, all housing in this area had to follow similar form and function. My family only decide the architectural styles and interiors based on our living styles rather than Feng Shui principles.

How about ritual activities?

The only ritual thing is when I moving the ancestral altar into the house. As you know, it is Vietnamese culture, so there should be an ancestral altar in the house for worship. Thus, my father selected good days and time when moving the altar. Then, my wife and I invited some friends and relative members come and have a party for cheering with us about new house. On other festival days, we make some ceremonies as well such as in kitchen god's day and Lunar New Year.

Did you considered sustainable factors when design your house?

Yes, I did. The house has many windows in each façade for ventilation. There is a large sky-well in the staircase; thus, in the daytime, we do not need to turn on lighting in that area. However, for the rooms in the ground floor, it is very dark inside. Thus, sometime we still have to use electronic lighting and fan.

Interview with Mr Thanh (08-09-2017)

Can you describe process of building this house?

In the past, we lived in the village nearby. When this area was developed for villagers, my family bought one plot in this area for me. After marrying, we had some saving and we decide to build this house three years ago.

So, how do you design your house?

I am an architect. I learnt architecture in Hanoi during 2004-2008 in Hanoi. After practiced, I opened architectural firm five years ago. Therefore, I got many experiences about housing designs. For this house, I draw it by myself. This is the last construction, which I draw it from start to finish. For other construction, I always ask my employees

to draw. The house is a basic type of building in Vietnam and the construction is very simple. The different between my house and other surrounding house is the elevation. I designed the elevation next to staircase for my grandmother. She is very old now; thus, climbing to upper floors is a challenge for her. In addition, because my family background is based on farmer; thus, in the top terrace levels, I planned several places for vegetable and small fruit's trees.

Did you consider the Feng Shui principle in your house?

No, I didn't consider Feng Shui as important elements during design process. Although in Vietnam, Feng Shui is very important; but, for my house, I only applied for the location and direction of ancestral altar. Other designed aspects are based on my ideal and experience.

How did you determine the colour for your house?

I chose the colour. The colour of main rooms should be good for my age regarding Feng Shui principles. My age is belonging to fire fate. Thus, the main living spaces are covered by green colour that is believed to help sustain fire element.

How did you house apply sustainable elements?

In Vietnam, the most important principle of housing design is ventilation. Vietnam is located in tropical climate; thus, it is very hot, particularly in the summer. For that reason, my house has many large windows for cross ventilation. In addition, in the staircase area, there is a large sky-well that connected all floor with top floor, which has several holes for ventilation. For the lighting, because the house has many large windows; thus, the natural light is good in frontage rooms. Other sides of building were blocked by neighbourhood's house; thus, it is difficult to get natural light for rooms in the backside. Therefore, I designed another sky well from the kitchen to the top terrace in the backside for ventilation and lighting in the daytime. Nevertheless, many rooms are still dark inside.

How about lighting system?

For the lighting, because the house has many large windows; thus, the natural light is good in main façade. Other sides of building were blocked by neighbourhood's house; thus, it is difficult to get natural light for rooms in the backside. Therefore, I designed another sky well from the kitchen to the top terrace in the backside for ventilation and lighting in the daytime.

Why don't use the steel net to cover the terrace like another house?

I don't use steel frame like another house. If the thief could climb to the top terrace, they still could not access to inside due to large steel doors. I always check those doors

very carefully.

Do you want to change anything about the housing design at the moment?

This house is quite new, and it is still good. So, we don't have plan to change anything.

Interview with Mr Dien (08-09-2017)

When did you built your house?

I built this house 6 year ago.

Can you describe how did you built the house and what factors did you considere when building this house?

In 2005, when the land price in this area was very cheap, my family bought the housing plot of 54 square meters. When I got enough money to build the house, I came to architectural company and ask architects to design a house. I gave them the location of building and the plot. I asked them for several suggestions. When designing, I asked my family and friends to give me some ideals; then, I exchanged ideal with architects. They help me to do a final "Ho so thiet ke" (Housing drawings) to apply for building license. When I got the license, I found a local master builder to build my house. I did not have any special requirements about the house. Because architects were trained in university, so the housing plans were fine. Meanwhile, most housing in Vietnam has similar plan and form; so, there is nothing special in my house.

Did you ask Feng Shui master when designing this house?

Yes, I did. Building a house is important things in the life. Thus, I asked a master of Feng Shui to check the designs. He checked the location, direction of building, and my age to estimate the good day for construction, arrangement of furniture and worship activities.

Since then, did you change any part of design?

No, I didn't. This house is quite new and the design is very good. My friends and relatives always say my house are great.

During construction process, did you do any ritual activities? Such as Le Don Tho

Yes, I did. During building a house, we did many ceremonies following traditional customs. Before building process, a bought many Vietnamese books about custom and tradition. Today, many young people did not care about those ritual activities and custom. Nevertheless, within my belief, the aims of those ceremonies are not superstitious; I just want to wish good things from land gods to protect the house.

Did you apply sustainable principles in your house? Such as ventilation and natural

lighting

Yes, I did. As you can see, the front door as very large for ventilation. Thus, the living space is always cool, even in the summer. We just used air condition in some special day in summer where the temperature is very high. In normal day, we just open the door to get fresh air and natural ventilation. For the lighting, the backrooms are always dark, particularly the kitchen. But, that problem is quite common in Vietnam because the form of land is narrow and long.

Interview with Mr Dinh (17-09-2017)

When did you built your house?

This area is neighbouur 39 in Dong Anh town. In the past, my mother was worker for state company. She was allocated a plot for her family. I am a soldier; thus, I got another plot in another area. I built this house in 2011.

Do there any planning for this residential area? As I see, each housing plot has different characteristics regading form and sizes.

In the past, the street that crosses this area was a railroad. Later, the railroad was moved to other place, and it was redeveloped in to communal road with concrete to create convenience for local inhabitant. The plot of my mother had a rectangular shape, which was based on the past planning. However, when the communal road was built, there is a small gap between housing and the road. My neighbours normally buy that plot locating in front of the house between the communal roads. Then they merge it with their plot to create bigger plot. Thus, each plot in this residential area has different size.

Did you ask Feng Shui master when designing this house?

Yes, I did. I ask two Feng Shui masters: one professional in Feng Shui principle, one professional on geomancy. They considered the location of land, worshiping and estimate the day for construction. Based on my age, they considered detail architectural aspects: first, dimension of door, second, location of toilet, third, direction of kitchen, fourth, direction of bedroom and fifth, direction of ancestral altar. Because we could not move the plot; thus, the direction of the house is fixed. If the direction is good for my age, so it is ok. Because the direction of house is not good for my age, the masters did ceremony namely "Tran Phong Trach" to provide good thing for my family. The interiors and furniture are based on my ideal; however, there are three exceptions. First one is direction of my bed regarding Feng shui theory and my age. Second and third are the direction of ancestral altar and kitchen.

Did you change anything when living here?

No, I didn't. Since I live here, I feel that everything such as life are health are good. The only change is the roof of veranda in front of my house. I create that space to avoid rain and sunlight. Those elements are not necessary to consider Feng Shui principles.

Did you consider the dimension about the space in the house?

Regarding architectural aspects, I asked local architects to design a house. I gave them basic information about my land such as the width and the depth. I told him that I planned to build three or four floors. Then, architects provided me drawings with some basic living spaces with living room, bedrooms. I was planned to create ground floor as garage for car; thus, the room was designed big enough for medium car. The living room was planned in the first floor. I just provided some comments and modified some parts of design.

During the construction, I changed some parts of design to suit with my living style. For example, I did not have many to buy a car; so, I used the space in the ground floor for living room. I crease secondary beams in the structure of ground floor; by that, the roof of ground floor is higher than original plans in design.

How did you determine the colour for your house?

Colour is based on my choice. The colour of main rooms should be good for my age regarding Feng Shui principles. My age is belonging to fire fate. Thus, the main living spaces are covered by green colour that is believed to help sustain fire element.

Did you often celebrate party, family activities in the house?

Yes, I did. My family often eats at home during weekend. Sometime, some relative members who work far way in other hometown, come back to visit their families. Thus, we always held party at home to celebrate reunion event. In holiday, we always move to other relative's house to maintain the relationship, which is important in Vietnamese culture. You could see around my living room, there are various images of members in my family.

Did you considered saving energy in your house? Such as when did you use air-condition, electronic fan.

Yes, I did. We just used air condition in some special day in summer where the temperature is very high. In normal day, we just open the door to get fresh air and natural ventilation. If the climate is hot, I have to use electronic fan. For the lighting, I use electronic lighting. When I going out, I just turned off the lighting.

What happen if your children get married? Will you celebrate the event at home?

I will create a temporary tent in front of my house for guest sitting area. For eating, I will hire an event place to cook during the event. If I built a tent in front of my house, I did not need any certificate or filling any form. I just need to prepare some signs or

noted in the communal broad or around the house; so, people will understand that my house has a special event and need a space for activities. It is traditional in Vietnam, when your house is preparing a wedding or funeral event, you just highlight with the community by signs or some texts. People will choose other ways to go. In addition, the event is happened for just two or three days, so, it does not make any inconvenient for community.

Interview with Mrs Ngoc (06-09-2017)

When did you built your house?

My son built this house since March. This house is not finished yet; however, it is already for living. Because lack of finance, thus, my son decide to finish the house when he has time. The house is only needed to decoration such as painting. My family moved and lived in this house a month ago and everything is still fine.

How did you have this housing plot and where did you live before?

I got this house from my parent. When my parent passes away in 1995, the land had been divided into six smaller housing plots. My two brothers, my sister and I, each got one housing plot for living. Meanwhile, two plots were sold and money from land selling was equally distributed to my brothers, sister and I to build new houses and for saving. My old house was very small and simple because the building materials during 1990s are not popular and good as materials in recent years. My husband and I could only able to build one storey brick house. There were only two rooms: one living room and one bedroom. The kitchen and bathroom were in the rear in separated construction. Most of households in my neighbourhood had similar layout. Only in recent years, people have money would build four-five storeys housing.

How did your family design the house? Did your family ask architects?

Yes, we did. My son hired architect in the district. However, my son worked in the daytime and he cannot stay at home during construction time. Therefore, I and my husband helped him to control and manage everything about the house including labour and materials. My husband asked a group of local builders to build the house and check their works. Those builders are living in this town, and they built most of the house around this area.

Did you ask Feng Shui master when designing this house?

Yes, I did. I ask a Feng Shui master to check my house. He gave me some comments on some aspects of design including location of kitchen and ancestral altar. As Vietnamese custom, it is important to determine good days and time for building, so I asked him to check my age and choosing the time as well.

How about the living spaces such as number of rooms, location of other rooms?

About the living rooms, the architects design according to number of family members. There are four people in my family; however, my daughter got married, and she is living in husband's family in Long Bien district. Thus, at the moment, there is only my son, my husband and I live in this house. So, there are only two bedrooms: one for my son and one for me and my husband. That is only different between my house and other house. If there are more people, the house will be bigger and having more bedrooms.

How did your son build this house?

My son worked in the daytime and he cannot stay at home to manage the construction. Therefore, I and my husband helped him to supervise and manage everything about the house including labor and materials. My husband asked a group of local builders to build the house and check their works. During the construction process, we learnt a lot of lessons about management. For example, during the harvesting seasons, worker returns to their house. As a result, we have to hire another group of builders to finish the house.

Why don't use contact with supervisor construction company?

In Vietnam, the builders and supervisors might connect with each other to replace main materials or reduce size of steel; thus, it is necessary to buy materials and to check materials and construction works by ourselves.

How about ventilation and natural light? Did you consider those factors when designing a house?

I am not sure about architecture, but this type of house is quite common in Vietnam. The houses are always designed with large windows for ventilation.

Do you use air conditioner for cooling?

Yes, I did, but I my family also use it during hot day in the summer. In the city center, there is less tree result in needs of using air conditioner. This area is in the outskirt of city; thus, there is many trees surrounding the house. So, inside the house, the spaces are always cool. Only in hot day with high humidity, I use fan and air conditions for cooling.

How do you think about lighting inside the house?

The lighting is quite fine. I just open the door and window.

Interview with Mrs Nga (10-09-2017)

When and why did you built your house in this area?

My husband built this house four years ago, in 2013. When we married in 2010, we

lived with my husband's parent. Although living with parent was fined, I liked to be independence. After marring, we did a study about new housing areas. We found that this area locates quite near our home villages; thus, we decide to buy the land and build the house here.

Could you please describe about the process of design and building? What are your requirements about the living spaces and its influence on architecture

We did not have any special requirements. The living spaces are quite similar with other houses. As we have good saving, we decided to buy a car. Thus, the ground floor is design as garage. The first floor has some differences. Because our children are two smalls; thus, they need playground. However, there are not many parks of public spaces around this area. In addition, playing in the street is two dangerous because of many vehicles. Therefore, the first floor was designed as playground for children and store. The main living spaces including kitchen and family living room were planned in the second floor for convenience. Upper floors were designed as our private bedrooms and ancestral hall.

Did your family hire architect to design this house?

Yes, we did. It is important to have housing drawing and construction license before building the house. During the construction time, the ward's officer could come and check the house. If they found that we did not following the drawing or regulations. They may destroy the illegal parts. For example, some of my neighbours had to destroy the hanging roofs because it does not have in the plans. We hired an architect, who is friend of my husband. We described our needs to him, and then he suggested some options for us. Based on his drawings, we change some parts in the plan such as the playground for my children in the first floor.

When building a house, did your family found any difficulty about techniques or detailed construction? If yes, how did you solve those problems?

Yes, we got many problems with techniques when building this house. Because this is the first time we build the house; so, we don't have any experience in architecture or construction. Thus, we have to learn and get experience from my parents and my husband's friend. During building process, they came and check the detailed for us.

Besides architects, did your family ask Feng Shui master to check design of your house?

No, we did not. Traditionally, we have to consider Feng Shui principles. Many elders people, like my parent, might did it, but younger generation like us did not considered Feng Shui as the most important. Therefore, when buying the land, we just considered the infrastructure, communal facilities and land price.

How did you make decision about finished materials?

When finishing the framework, the builder suggested several types of materials for floors and wall. However, the choice of materials was mainly based on our finance. We selected the one, which we could afford. Particularly, in ground floor and first floor, we used tiles because those areas are not main living space. On the other hand, we used industrial wood for the floor of the kitchen and living room. The wood is cleaning and easily to clean. Also, our children could play in the wood floor.

How do you feel about ventilation and natural lighting in this house?

I am not sure so much about architectural design; however, the ventilation is good. When designed this house, the architect suggested to create a wind trap in the roof level for natural ventilation. The lighting is good because the house has many windows.

How do you feel about your house at the moment? Do you want to change anything in this house?

No, I don't. The design is fine. With most of the house in the city centre, the ground floor is using for shop. We are thinking about making a small shop in the ground too, but this area is quite new and far away from main streets. Therefore, it is not benefit to open the shop at the moment. Also, maybe in the future, when I got second child and my children grow up, they will need their own private rooms, we might change the design of my house at that time.

Did you practice ancestral worship? And what do you think about ancestral worship today?

Yes, we did. The ancestral worship is part of Vietnamese culture. It is one good characteristic of Vietnamese society. In my hometown, every house has one ancestral altar in the ground floor in the main living room. However, housing in urban area like in my house, due to form of building, the ancestral altar normally locates in the highest level. Also, the room for ancestral altar should be keep clean. In special events such as lunar New Year, we always cook traditional food and offered them to our ancestors.

Did your family do any other ritual activities during construction process?

Yes, we did. When we build this house, my husband's father did Le Don Tho. I think that ritual activity is a common practice.

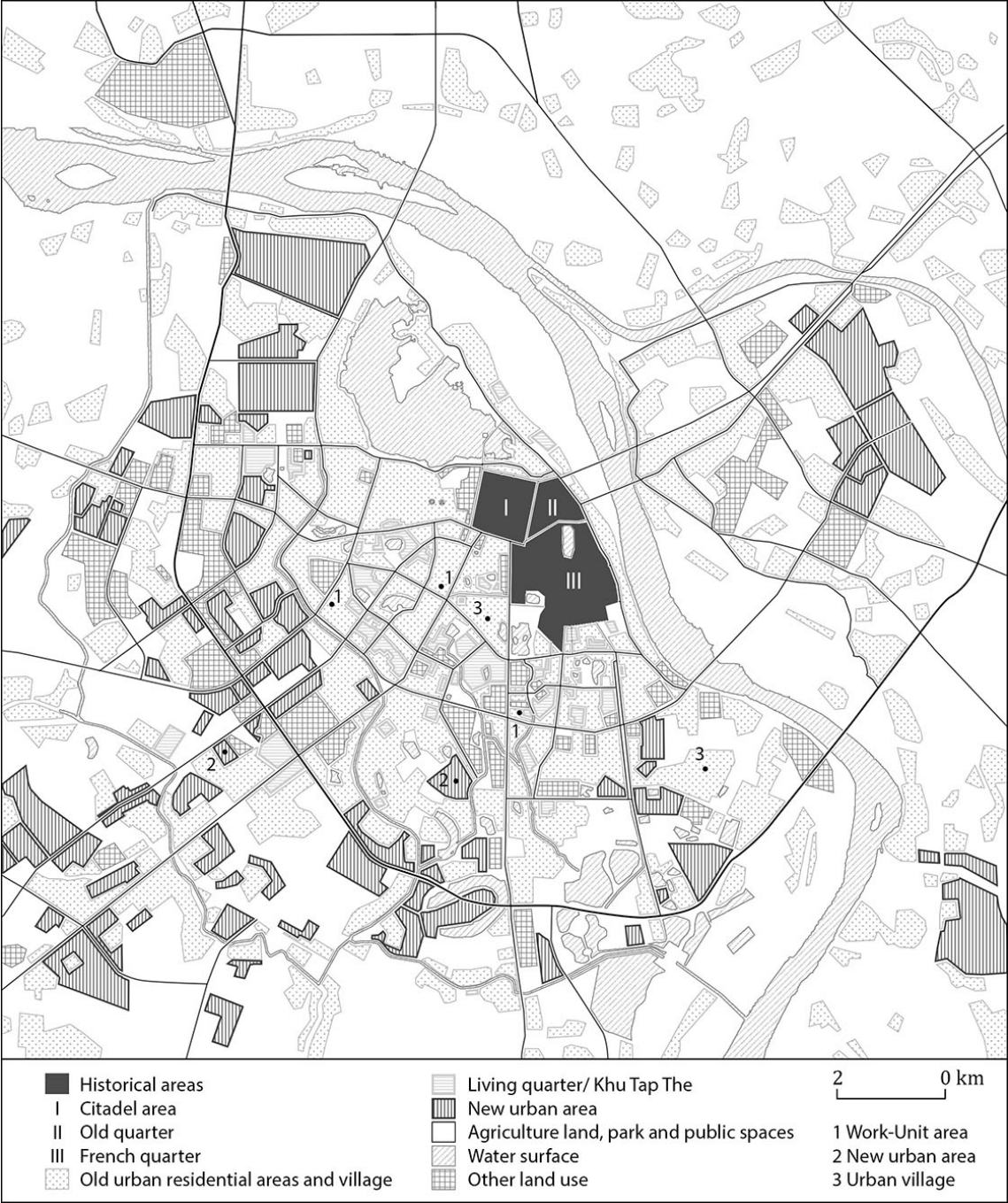**Appendix D: Location of urban residential settlements of Hanoi**

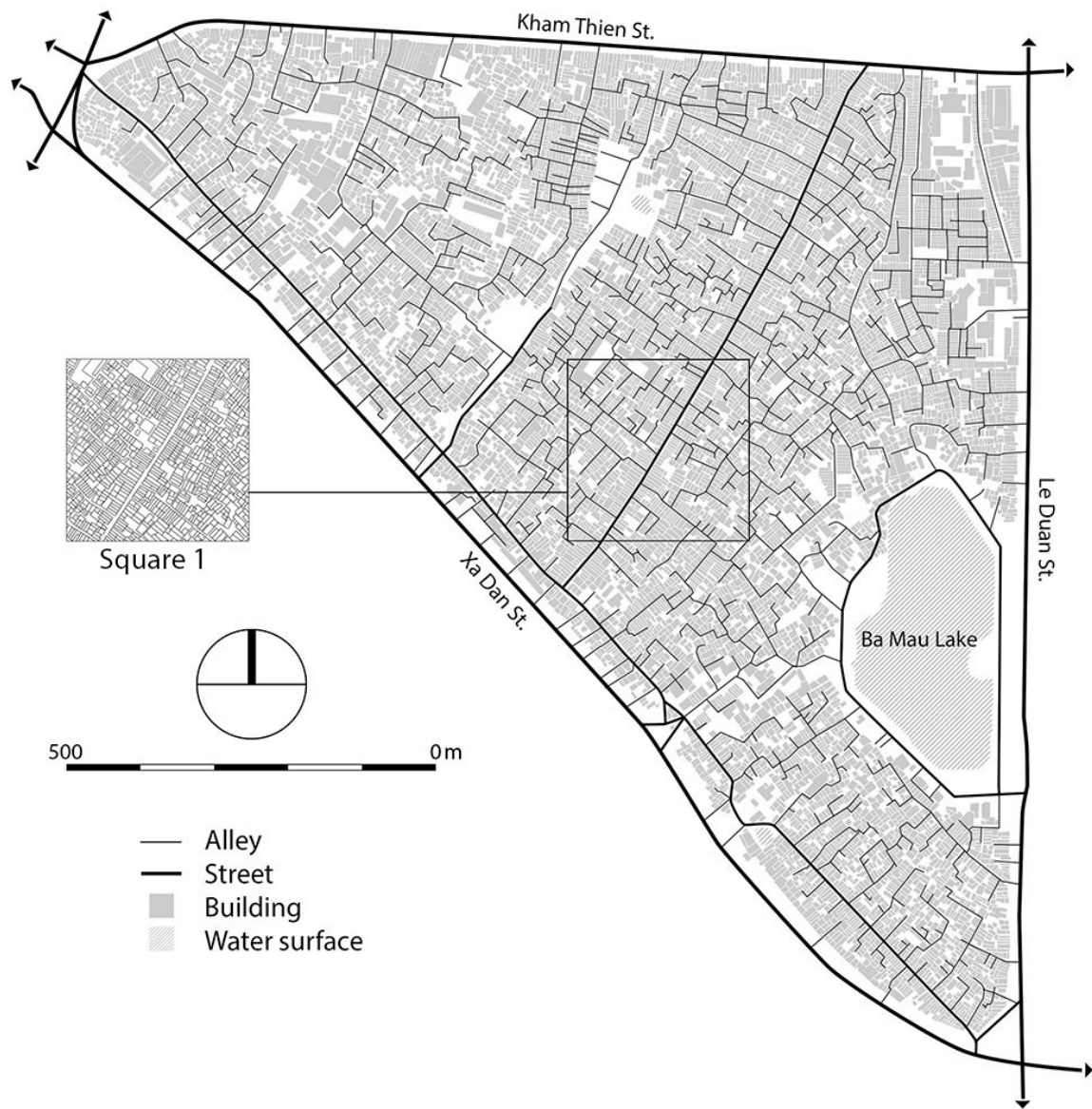Figure 165: Locations of residential settlements representing in chapter four and five

Figure 166: Location of square 1 in one block of urban village in the *Đống Đa* district

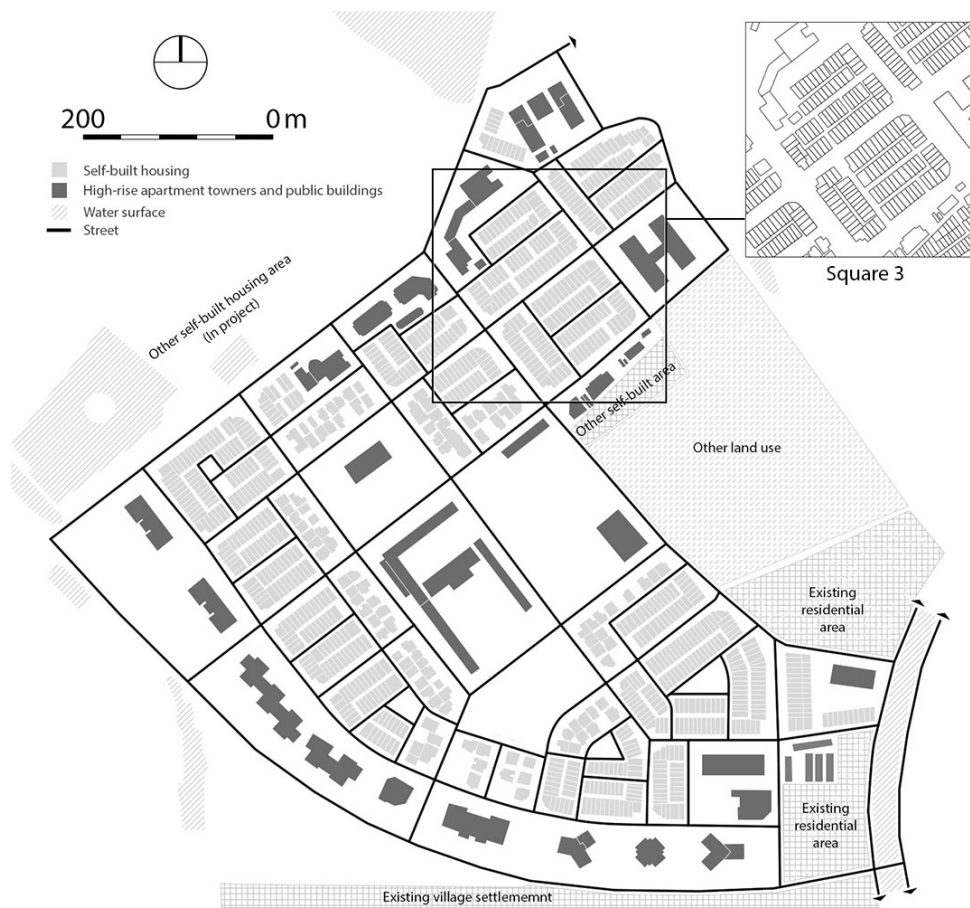Figure 167: Location of square 2 in one work-unit area in *Đống Đa* district

Figure 168: Location of square 3 in one new urban area namely *Định Công* in Hanoi

Area	Built-up density (%)	Building area (sp m2)
Square 1: Urban village	79.04	49,400
Square 2: Work-unit area	59.72	37,325
Square 3: New urban area	45.34	28,378

Table 22: Built-up density and building area in three areas

Appendix E: Spatial syntax

Space syntax analysis is a well-known set of techniques as the representation of quantification of spatial patterns that related the typological relationship within settlement or buildings (Hillier & Hanson, 1984). The aim of space syntax study is to develop an approach describing the inhabited spaces under the social logic. A house is a socio-cultural production. Thus, space syntax is a powerful tool to map the habitus, the division and spatial hierarchies, which reveals the vision of the world. In this study, the space syntax has been applied to highlight spatial organisation.

Within space syntax techniques, the space elements are reduced into simplified forms to present structural concept. All spaces are equally significant, and each space is analysed in term of its relationship to other spaces in the same network. The reduction of plans is known as the justified access graphs where spaces are represented by the circles while paths between spaces are represented by lines. Each space is connected to other spaces according to the number of spaces that need to be passing through the system. The depth of one space is recorded based on how many spaces need to cross from another space to access to that space.
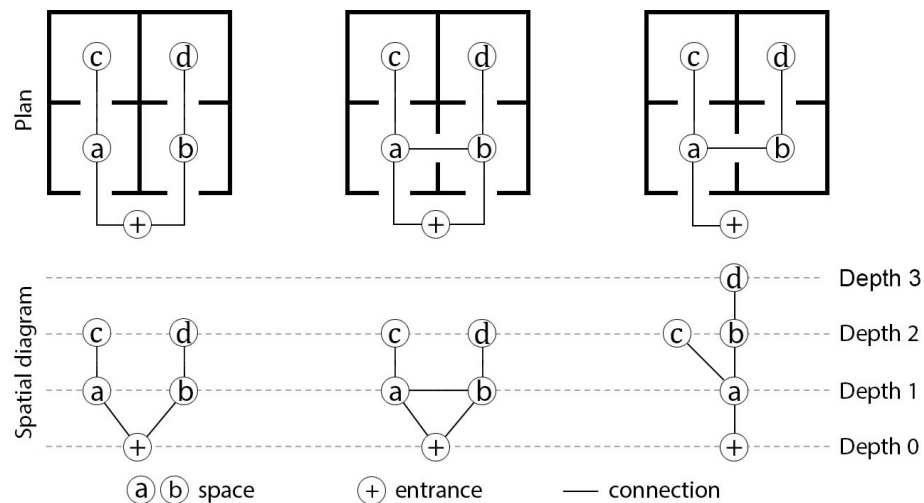

Figure 169: The spatial organization and conceptualized organization in space syntax analysis (Adopted from Hillier & Hanson, 1984, p 148-149)

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Particularly, the above figure show planning and spatial diagram of three examples. Example in the left showed that a building has two space a and b and entrance, and there is no connection between sapce a and b. Therefore, in spatial diagram, the depth of space a and b is 1 and both spaces are directly connected with entrance. An example in middle shows a connection between entrance and space a and b. Because, there is a connection between space a and b; in spatial diagram, space a could be access directly from entrance or from path crossing through space b. Meanwhile, the depth of entrance is 0; thus, depth of space a and b in this complex is 1. The last example in the right showed that there is no connection between space b and entrance. Thus, space b could only be access by crossing through space a. In this regard, space a has depth 1 and space b has depth 2.

For example, figure below shows plans and spatial organisation of case study H1. The left image highlights spatial connection between different space in the plans while the right diagram shows spatial organisation
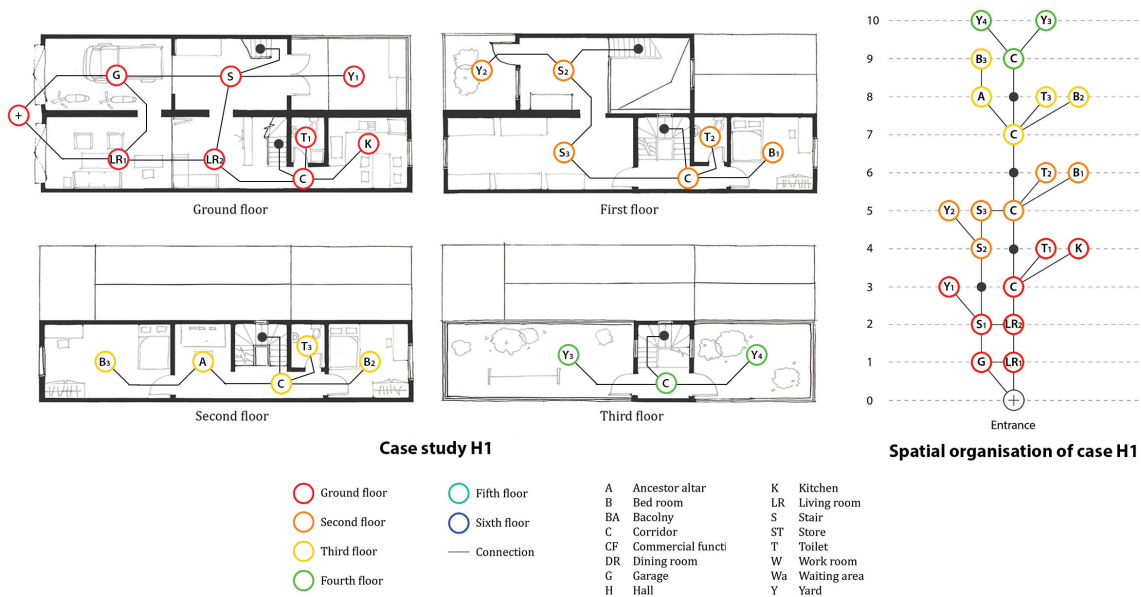

Figure 170: Housing plan and spatial organisation of case H1

Integration values

Parameters	Description
Di	$Di = \sum_{j=1}^{n} d_{ij}$ Di = Depth Value n = total components
MDi	$MD_i = \dfrac{\sum_{j=1}^{n} d_{ij}}{(n-1)}$ MDi = Mean depth value
RAi $RAAi$	$RA_i = \dfrac{2(MD_i - 1)}{(n-2)}, RRA_i = \dfrac{RA_i}{D}$ RA = relative asymmetry RRA = real relative asymmetry $D = \dfrac{2(n(\log_2((n+2)/3) - 1 + 1}{(n-1)(n-2)}$ D = coefficient related to the number of lines given by Hillier & Hanson (1984)

Figure 171: Calculation of integrated value (Hillier & Hanson, 1984)

Besides that, the space syntax is concerning the openness of the system based on mathematic calculations. The structural system is analysed according to the number of interiors spaces and how many spaces have to cross to one particular space. The system with many spaces having to travel is considered as deep while few spaces to be crossed is considered as shallow. The concept of space is determined by the depth of that space in the system, and the depth has become the key point to calculate the "*Mean depth*" (MD), and integration values including "*Relative asymmetry*" (RA) or "*Real relative asymmetry*" (RRA), which reveal the accessibility of the system and social relations in space (Hillier & Hanson, 1984). RA values indicate numerical values, which has a range from 1 to 0. A low value mean that a space tends to integrate the system while a high value indicate that a space tends to segregate form the system. In other meaning, if Ra is low, the plan has a quality of symmetry and the spaces are equal to each other in term of control.

For example, figure 136 shows RA Values of point in three examples of spatial diagrams, which has similar number of spaces. Nevertheless, the Ra of each point in those diagrams is depending on the connection between that point and surround spaces in the complex. For details of calculation, point (+) of spatial diagram in the left has the Depth Values = 0+2x1+2x2=6 (Point a and b have depth 1 while point c and d have depth 2). In this regard, the Mean Depth Value of that point is 6/(5-1)=1.5. The Integration value; therefore, is 2x(1.5-1)/(5-2)=0.333.

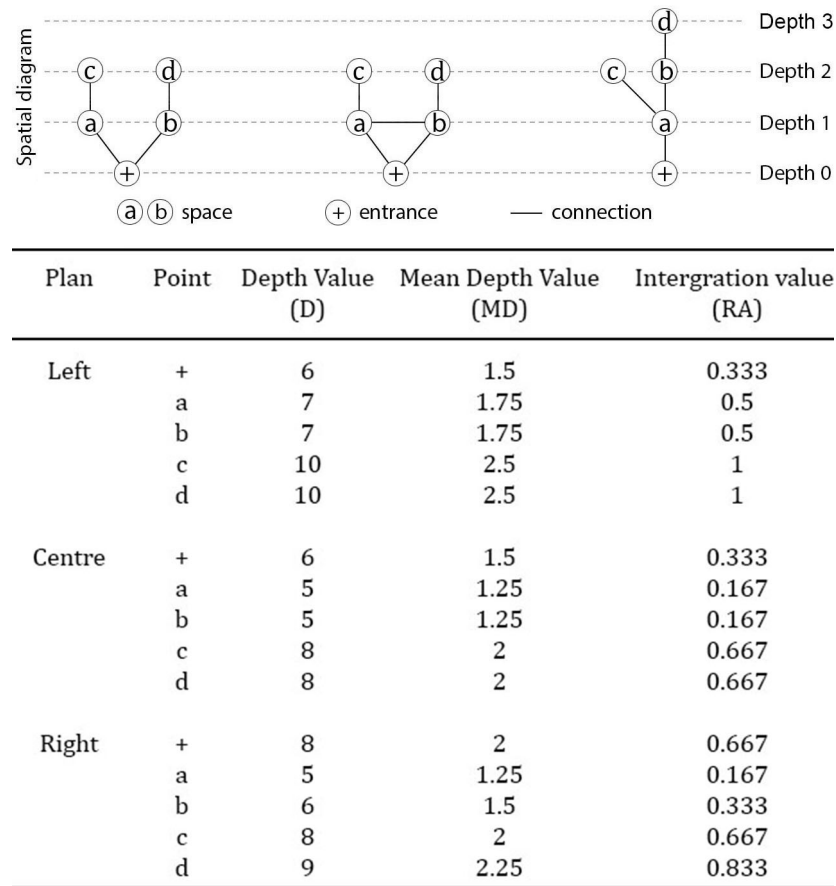| Plan	Point	Depth Value (D)	Mean Depth Value (MD)	Intergration value (RA)
Left	+	6	1.5	0.333
	a	7	1.75	0.5
	b	7	1.75	0.5
	c	10	2.5	1
	d	10	2.5	1
Centre	+	6	1.5	0.333
	a	5	1.25	0.167
	b	5	1.25	0.167
	c	8	2	0.667
	d	8	2	0.667
Right	+	8	2	0.667
	a	5	1.25	0.167
	b	6	1.5	0.333
	c	8	2	0.667
	d	9	2.25	0.833

Figure 172: RA values of three examples

For further investigation, the integration value (RA) is applied to estimate integration of space in each complex system. The RA value is calculated in only main living spaces including garage, living room, kitchen, bedroom, ancestral altar, toilet, store and garden. Other spaces such as corridors and staircases will not be calculated.

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Case study	Number of cells	Space-link ratio	Intergration value (RA)	
			Min	Max
H1	27	1.11	0.20	0.41
H2	29	1.03	0.27	0.48
H3	17	1	0.35	0.66
H4	24	1	0.26	0.46
H5	20	1.15	0.29	0.52
H6	15	1	0.34	0.54
H7	32	1	0.23	0.45
H8	18	1	0.31	0.53
H9	26	1.04	0.22	0.44
H10	29	1	0.24	0.48
H11	57	1.07	0.19	0.36
H12	34	1.06	0.18	0.32
H13	27	1.11	0.21	0.37
H15	15	1	0.27	0.47
H16	24	1	0.26	0.46
H17	16	1	0.29	0.45
H18	24	1	0.26	0.61
Mean	25.78	1.04	0.255	0.467

Table 23: Basic syntactic data of all case studies of contemporary self-built housing

Table 22 show basic data of all collected case studies. Cells are including number of living spaces and staircase. According to Hillier & Hanson (1984), the space-link ratio is the number of links plus one, over the number of spaces. A tree will therefore have a value of 1, and values above 1 indicate the degree of "*ringiness*" in the complex. Among 17 case studies, 10 cases have tree structure while 7 cases have rigniness structure. The RA values of each case were presented in the table 24. Accordingly, if the RA values of spaces are small, it means that those spaces are more integrated in the complex (Hillier & Hanson, 1984). For example, in the case H1, the most integrated space is Store 3 with RA=0.20, following by Living room 2 with RA=0.23. The order of RA from left to right shows the hierarchy from spaces with most integrated space to spaces with the most separated spaces.

Case study	Order
H1	S3 < LR2 < S2 = B1 = T2 < S1 < K = T1 = A < B2 = T3 = B3 < LR1 = Y2 < G < FC = Y1 < Y3 = Y4 0.20 0.23 0.24 0.24 0.24 0.26 0.28 0.28 0.28 0.29 0.29 0.29 0.30 0.30 0.34 0.35 0.35 0.41 0.41
H2	K = B2 < B3 < WS < CF < T3 = T4 < LR = T5 < Y1 = S1 < FC =B1 = S2 < Y2 = T6 < T1 < Y3 < T2 0.27 0.27 0.28 0.29 0.31 0.32 0.32 0.35 0.35 0.36 0.36 0.40 0.40 0.40 0.41 0.41 0.42 0.47 0.48
H3	T2 = B1 < K < A = B2 < LR < T1 < S < FC < Y 0.35 0.35 0.36 0.38 0.38 0.46 0.48 0.53 0.59 0.66
H4	B3 < B2 = T3 < B1 = T2 = LR1 < LR2 < S < G < T1 = K < Y = A < FC 0.26 0.27 0.27 0.28 0.28 0.28 0.35 0.36 0.37 0.38 0.38 0.43 0.43 0.46
H5	FC < LR < B2 < T1 < B1 < K1 < B3 = B4 = B5 < CF1< K2 < T2 < T3 0.29 0.30 0.31 0.33 0.34 0.35 0.36 0.36 0.36 0.39 0.41 0.50 0.52
H6	B2 < K = B1 < LR < Y1 = T < FC < Y2 = Y3 0.34 0.36 0.36 0.38 0.51 0.51 0.53 0.54 0.54
H7	B2 = B4 < B1 = T3 = B3 = T4 < B6 < LR = B5 = T5 < K = T2 < G < A < Y1 < FC = T1 < Y2 0.23 0.23 0.24 0.24 0.24 024 0.28 0.29 0.29 0.29 0.30 0.30 0.34 0.38 0.39 0.41 0.41 0.45
H8	LR < T2 = B1 < S1 < B2 < G < K < T3 < T1 = Y1 < FC < S2 = Y2 0.31 0.34 0.34 0.35 0.37 0.38 0.39 0.36 0.50 0.50 0.52 0.53 0.53
H9	WS1 = B1 < T2 < B3 = A < T3 < LR < WS2 < T1 = K = B2 < G = Y2 = S2 < S1 < Y1 < S3 = Y3 < FC 0.22 0.22 0.23 0.26 0.26 0.28 0.29 0.30 0.31 0.31 0.31 0.33 0.33 0.33 0.37 0.38 0.40 0.40 0.44
H10	B3 < B2 = T3 < B1 < LR2 = T2 < B4 = T4 = B5 < K = T1 < Y < LR1 = A < G < FC 0.24 0.25 0.25 0.26 0.27 0.27 0.29 0.29 0.29 0.35 0.35 0.36 0.37 0.37 0.41 0.48
H11	G = LR = K1 = K2 < Y1 = Y2 < T1 = T2 < FC = B1 =T3 = B2 = B3 = T4 = B4 < B5 = T5 = B6 = B7 = T6 = 0.19 0.19 0.19 0.19 0.20 0.20 0.22 0.22 0.24 0.24 0.24 024 0.24 0.24 0.24 0.27 0.27 0.27 0.27 0.27
	= B8 < B9 = T7 = A = B10 = T8 = B11 < Y3 = Y4 = S1 = S2 = Y5 = Y6 0.27 0.31 0.31 0.31 0.31 0.31 0.31 0.36 0.36 0.36 0.36 0.36 0.36
H12	LR3 = Y1 < LR2 = S2 < S1 = A < LR1 < T3 = B2 < CF = B3 = S3 < Y2 = T1 < CF = T4 = Y3 = Y4 0.18 0.18 0.19 0.19 0.20 0.20 0.24 0.25 0.25 0.27 0.27 0.27 0.31 0.31 0.32 0.32 0.32 0.32
H13	LR < B1 < B3 < B2 < Y1 < G < K < T2 < T4 < T3 < FC < T1 < Y2 = S = A 0.21 0.22 0.24 0.25 0.27 0.28 0.29 0.30 0.32 0.33 0.34 0.36 0.37 0.37 0.37
H15	B2 < B1 = T2 < B4 < B3 = T3 < LR < K = T1 < A = Y < FC 0.27 0.28 0.28 0.30 0.31 0.31 0.37 0.38 0.38 0.45 0.45 0.47
H16	B1 = B2 < T2 < K < S < B3 < T3 < LR < T1 = G = A < Y1 < FC < Y2 0.26 0.26 0.27 0.31 0.32 0.33 0.34 0.36 0.37 0.37 0.37 0.38 0.45 0.46
H17	B2 < B1 = T2 < LR < T1 = K < A < FC = Y 0.29 0.31 0.31 0.39 0.41 0.41 0.43 0.45 0.45
H18	B1 = T2 = B2 < K< S = LR = B3 =T3 = B4 < A < Y2 < G < Y1 = T1 = Y3 < FC 0.26 0.26 0.26 0.28 0.37 0.37 0.37 0.37 0.37 0.47 0.48 0.49 0.57 0.57 0.57 0.61

Table 24: Integration values of case studies