A Comparative Study on User Satisfaction in Terms of Spatial Flexibility and Adaptability of Housing

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ABSTRACT

In recent years, increasing population growth in cities resulted in mass housing construction with typical plan arrangements that caused dissatisfaction of dwellers regarding housing quality. Existing mass housing does not meet users' changing needs due to lack of some degree of flexibility and adaptability in housing design during early design stages. Dwellers' satisfaction increases if they have the opportunity to adjust their housing with their changing needs and expectations.

The main aim of this research is to evaluate dwellers' satisfaction in terms of spatial flexibility and adaptability. This study is expected to prepare a guideline for designers and users to increase housing satisfaction regarding spatial flexibility and adaptability. First, significant factors about housing, mass housing, housing quality, dwellers' satisfaction, and flexibility and adaptability have been extracted from a literature survey.

In the next stage, a brief explanation about the emergence of mass housing in North Cyprus is given. In the following, four residential apartment groups constructed in different decades, 1980s, 1990s, 2000s and 2010s, from different construction companies are selected to evaluate their satisfaction level in terms of spatial flexibility and adaptability. Data is collected through observation, questionnaires, and interviews, and SPSS software is used for analysis of questionnaires. The plans of buildings are drawn to show the original plan and the modified plan. The alterations which were done by users over time to adjust their housing to their changing needs are shown by physical analysis. The flexibility and adaptability of case studies is evaluated

according to the criteria which is extracted from literature review. Finally, the results show the relationship between alteration possibilities and satisfaction level.

Keywords: mass housing, housing quality, dwellers' satisfaction, flexibility and adaptability, spatial flexibility and adaptability

ÖZ

Son yıllarda standart toplu konut inşaatlarına sebebiyet veren nüfus artışı, ikametçinin konut kalitesine yönelik memnuniyetsizliğine yol açmaktadır. Mevcut toplu konutlar genellikle kullanıcıların değişen ihtiyaçlarını karşılamamaktadır. Konutlarını farklı kullanıcıların ihtiyaç ve beklentilerine uygun değişiklikleri yapmaya olanak tanıyan esnek tasarım ilkeleri, doğrultusunda tasarlanması, memnuniyet seviyesini arttıran önemli bir unsurdur. Genellikle sorun, erken tasarım aşamasındaki konutun esnekliğindeki ve uyumluluğundaki bazı aşamaların eksikliğidir. İkametçilerin memnuniyeti, konutları kendi değişen ihtiyaçlarına ve beklentilerine göre adapte etme imkânlarının olması halinde, artış göstermektedir.

Bu araştırmanın esas hedefi, ikametçilerin memnuniyetlerinin mekânsal esnekliğe ve uyumluluğa göre değerlendirilmesidir. Bu araştırmanın tasarımcılar ve kullanıcılar için mekânsal esnekliğe ve uyumluluğa yönelik konut memnuniyetini arttırmak adına bir kılavuz oluşturması beklenmektedir. Çalışmada öncelikle konut, toplu konut, konut kalitesi, ikametçinin memnuniyeti, esneklik ve uyumluluk ile ilgili bir literatür taraması yapılmıştır.

Sonraki aşamada, Kuzey Kıbrıs'taki toplu konutların ortaya çıkışıyla ilgili kısa bir açıklama verilmiştir. Bunu takiben, farklı zaman aralıkları ve gelişimi ile – 1980'ler, 1990'lar, 2000'ler ve 2010'lardan – ve farklı inşaat firmalarına ait, benzer özelliğe (3 yatak odalı) sahip dört apartman kompleksi, mekânsal esneklikleri ve uyumlulukları ile ilişkili memnuniyet seviyelerini değerlendirmek için seçilmiştir. Veriler, yerinde gözlem, anket ve karşılıklı görüşmeler ile toplanmıştır ve anketlerin analizi için SPSS

yazılımı kullanılmıştır. Ayrıca fiziksel analiz yapılmıştır. Yapıların orijinal ve değiştirilmiş tasarımını göstermek için çizimler yapılmıştır. Kullanıcıların konutlarını değişen ihtiyaçlarına yönelik ayarlamalarına bağlı zaman aşımından meydana gelen değişiklikler, fiziksel analiz ile gösterilmiştir. Vaka çalışmalarının esneklik ve uyumlulukları, literatür taramasından alınan kriterlere göre değerlendirilmiştir.

Son olarak, sonuçlar, seçilmiş konut gruplarındaki esneklik ve uyumluluktaki sınırlı tasarımların ikametçinin sadece birkaç tip değişiklik yapmasına olanak vermesine rağmen değişiklik yapma olasılıklarının daha yüksek bir memnuniyet sağladığını göstermiştir. Diğer bir deyişle, erken tasarım aşamalarındaki esneklik ve uyumluluğun belli bir oranda değerlendirilmesi daha yüksek bir ikametçi memnuniyetini sağlayacaktır.

Anahtar kelimeler: toplu konut, konut kalitesi, ikametçi memnuniyeti, esneklik ve uyumluluk, mekânsal esneklik ve uyumluluk

To My Family

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Last but not the least, I would like to give my special thanks to my family, who offer me love and support all throughout my studies and life. I dedicate this thesis to them as a small symbol of my gratitude.

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Chapter 1

INTRODUCTION

Nowadays, rapidly increasing population and as a result, mass housing construction has led to inappropriate housing quality. Providing maximum housing with minimum price became the priority of construction companies over quality.

The Industrial Revolution and Second World War brought about important changes which caused evolutions in technology, demographic transformation and different lifestyles. Therefore, these changes required a new design pattern for more adaptability of prospective dwellings according to the dynamic nature of human lives (Friedman, 2002).

New design principles are needed to provide users the possibility of living in their housing as long as they desire without feeling forced to move to another house because of lack of spatial flexibility and adaptability (Proudfoot, 2007).

Inhabitants' satisfaction is one of the most significant indicators in evaluating the design quality. Each feature of physical components impacts occupiers' satisfaction, performance, and mood. Successful housing performs in such ways as to respond to residents' requirements. Improper housing which does not satisfy dwellers can influence their regular activities, behavior, communication with family members and other, which reduce the quality of life and level of satisfaction (Kim, et al., 2005).

Some improvements in contemporary housing design and flexible design patterns are needed to increase housing quality and performance. The flexible design impacts users' satisfaction because it offers them various ways to arrange spaces according to their needs.

1.1 Definition of the Problem

The research problem is dissatisfaction of dwellers in terms of spatial flexibility and adaptability due to designing typical plans for different users in mass housing projects. Absence of concern for some degree of flexibility & adaptability during the initial design resulted in users' adjustments according to their new priorities but limited them to only a few possible alterations. Including some degree of flexibility and adaptability in the early design stages will provide more alteration options. Inappropriate housing design influences the quality of life of residents.

1.2 Aim and Objective

The main aim is to evaluate dwellers' satisfaction regarding spatial flexibility and adaptability. Understanding the main concerns of dwellers and how they will adjust their living space with their new needs at the time will be shown in this study. For this purpose, four mass housing groups with three bedrooms from different construction companies and four different time periods, 1980s, 1990s, 2000s, and 2010s were selected to observe changes and evaluate the satisfaction level over time.

1.3 Research Methodology

This thesis is a comparative study and the data collection method of this research is literature survey, observation, questionnaires, and interviews. This study covers qualitative and quantitative research methods. First, theoretical background from a literature survey was completed for this study. The questionnaire was designed in such a way to understand the type of modifications by residents, reasons for these

alterations, and the satisfaction level regarding spatial flexibility and adaptability of housing. The questionnaire was distributed among 236 units in four mass housing projects, and half of each project were interviewed.

Eighty-eight questionnaires were answered by the residents of social housing in "İsmet İnönü Bulvarı", 52 questionnaires by Levent Apartments' residents in Çanakkale Göleti close to "Gazi-Mustafa Kemal Bulvari", 16 questionnaires by Döveç Apartments' residents close to "İsmet İnönü Bulvarı" behind new Lemar market, and 80 questionnaires were answered by residents of Noyanlar mass housing in Çanakkale Gandular behind China Bazaar. One to one interviews were done with some of the residents to understand the reasons of modifications.

The data evaluation was done through analyzing the photos, plans, observation notes, questionnaires, and interview notes. The plans of social housing, Levent, Döveç Apartments, and Noyanlar mass housing were drawn to show before and after alterations. The physical analysis was done to show the types of alterations within the housing by users. Mathematical evaluation such as percentages were calculated according to the questionnaires' data in SPSS software. As tenants do not have the same opportunity as the owners to make any changes in their houses, they are omitted from the analysis. All the results are shown in pie-charts, bar-graphs and tables. In the following, flexibility and adaptability of selected cases is evaluated according to the criteria extracted from theoretical background.

1.4 Limitations

Four mass housing groups from four different construction periods of time, 1980s, 1990s, 2000s, 2010s, and companies have been selected in Famagusta, North Cyprus.

Three bedroom midrise apartments have been chosen for this study as they are the most preferred types of flats by families. The process of flexibility and adaptability can be categorized in different stages of design, construction, and usage stage, but generally the users of selected cases have not been involved in design and construction stage. Thus, this study focuses on the usage stage. There are three types of flexibility including spatial, structural, and cultural. The main focus of this study is on spatial flexibility and adaptability. Another important issue which should be mentioned is that because most people did not answer the question about their income level, no analysis could be done according to this factor.

Chapter 2

DWELLERS' SATISFACTION REGARDING SPATIAL FLEXIBILITY AND ADAPTABILITY

In this chapter, a literature survey on housing, mass housing, housing quality, users' satisfaction, and flexible and adaptable housing with some decent samples is done. To achieve a satisfactory housing design, users' preferences and needs according to rapid changes of lifestyles should be taken into consideration.

Increasing population lead to the growth of mass housing construction around the world to provide sufficient accommodations for individuals. On the other hand, lifestyles, and expectations are changing rapidly due to the development of technology, so some changes are expected in current housing designs in order to meet inhabitants' needs and desires. Considering these facts in early design stages provides more satisfactory designs which respond to dwellers' expectations. The main intent of this chapter is to describe mass housing quality, satisfaction indicators in housing design, and spatial flexibility and adaptability in housing to understand the key issues in designing flexible and adaptable mass housing with a higher satisfaction level.

2.1 Housing

Housing has been one of the main necessities of human beings throughout history. Various studies and descriptions on the subject of housing have been done by different researchers. Dostoğlu (2000) describes housing as a shelter to respond to the primary needs of people. According to Erginbaş (1961), housing cannot be described just as a

shelter, it consists of all social and cultural factors of a society. As Gür (2000) mentioned, humans made shelters to protect themselves from the outdoors but with the improvement of civilization and new activities and functions, they made new kinds of shelters to fit their new requirements. Rapoport (1990a, 1998) describes housing as a system of settings within which certain activities happen.

The concept of housing represents more than a shelter. It should provide a livability index for people such as access to social networks like other activity places, shops, etc. Housing provides physical needs like security as well (Wahab, 2002). On the other hand, housing is not just for responding to physical needs but also representing the social and cultural issues of a society. Housing represents all political, social, financial, and cultural characteristics of a country which can display the identity of that society (Rapoport, 1969).

The current life situation imposes loads of stress on people who face financial and social challenges in their daily life. Therefore, all the challenges and psychological needs of individuals should be considered in housing to provide a living space protecting human beings from these daily challenges for some hours every day. Thus, many parameters should be well thought-out in housing design such as social, physical, cultural, and environmental aspects because all of the mentioned issues interact with each other (Inah Sylvester, et.al, 2014).

It is obvious that culture is an important issue in housing formation which has led to the existence of a variety housing forms around the world which represent different cultures. Also, housing as a major and primary need of human beings represents the traditional vernacular architecture of the society and culture. Housing design should

be done carefully because it is more than a dwelling or neighborhood; housing has great impact on residents' quality of life. As can be seen around the world, many changes are happening in all aspects like ecology, economy, culture, and the configuration of families, so a different kind of housing design should be figured out (Rapoport, 1995b, 1990, 2000).

The Industrial Revolution in the nineteenth century brought about the increased use of machinery, large population in cities, land reform, and so on, and therefore, human beings, their living place, work, and nature became inseparable (Powell, et al., 1990). So, mass housing was generated to accommodate more individuals with the least cost. As Kiray (1982a) mentions, "Apartments are the dwelling of new middle classes, wage workers and civil servants that emerged with the industrial society. They developed parallel to the form and speed of the society to create middle strata." (Duben, 1991).

Different types of housing includes row houses, separate houses, detached, semi-detached, duplex houses, triplex houses, single and multi-story houses, terraced houses and apartments. Every apartment block has more than one residential unit and can contain commercial parts, etc. The main focus of this research is based on mid-rise apartment type mass housing.

2.2 Mass Housing

The main reason for the emergence of mass housing was the quick growth of population. Many factors such as the Industrial Revolution, World Wars, and communism played significant roles in the genesis of mass housing.

Mass housing can be described as a massive approach to respond to the sheltering requirements of large numbers of people. This growing population increased housing

demands, so the mass housing idea was proposed as a practical solution. The Industrial Revolution, World War I and World War II can be named as the causes of the necessity of mass housing construction. The Industrial Revolution and the founding of factories created more job opportunities which brought people from rural areas to industrial areas for work, thus housing demands in these districts increased as well (Pitts, 2004).

On the other hand, the First and Second World Wars caused the immigration of people to safer areas, the demolition of homes, homeless people, and a shortage of housing, therefore, construction of mass housing increased to solve these problems (Serageldin, 1988). Many architects such as Le Corbusier, Walter Gropius, and Bruno Taut tried to find a solution for the housing problem by designing different housing types. One of the first mass housing projects was designed by Le Corbusier with standardized mass manufactured components which can be seen in Figure 2.1.

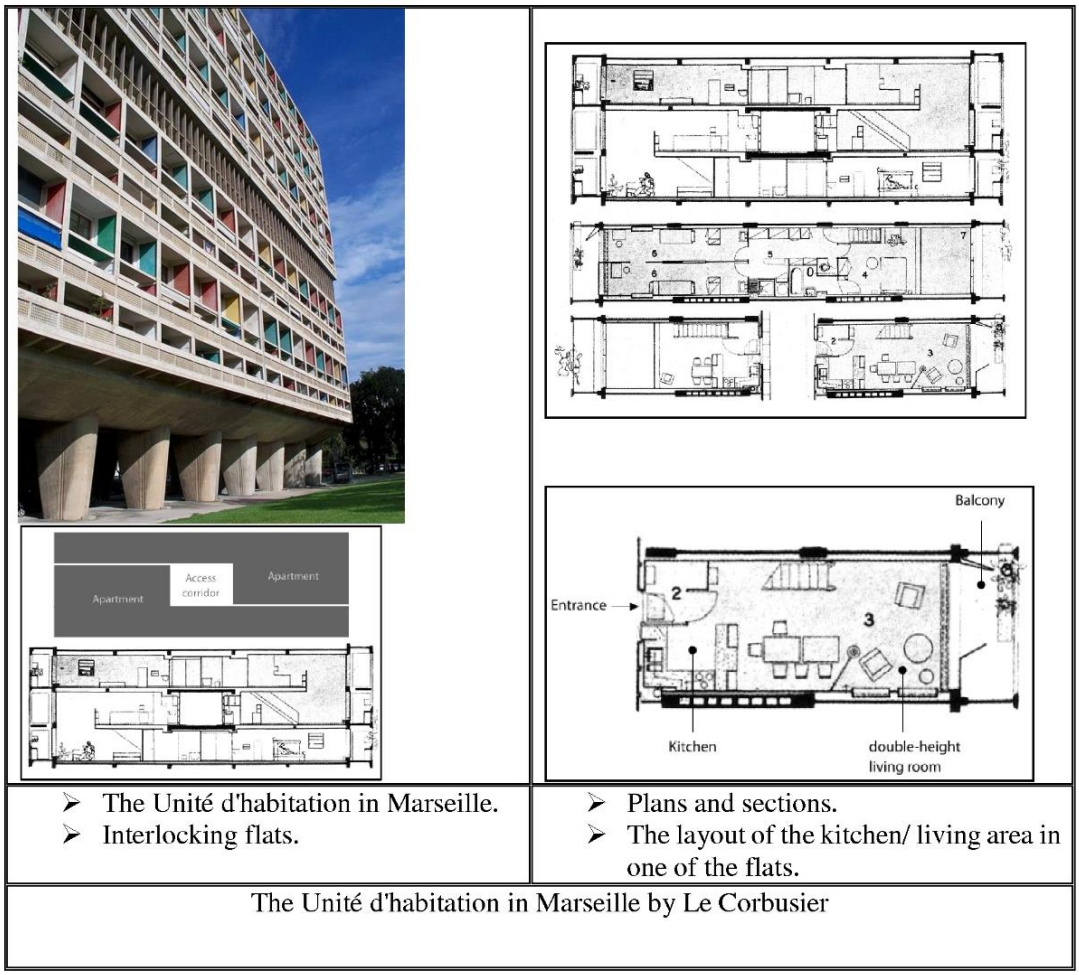
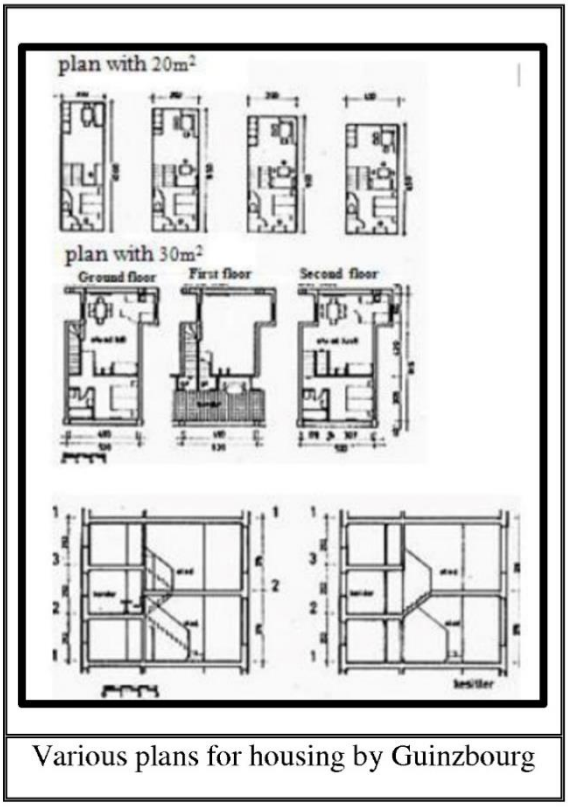


Figure 2.1: The Unité d'habitation (1947-1952) (URL 1).

One of the other examples of mass housing is in the Soviet Union after the revolution in Russia to provide housing for more people as fast as possible to solve a housing shortage. The expenses were kept at a minimum by the reduction of floor area. Another factor in creating mass housing was the Communism Movement to provide the same living environment for all people from different social and economic classes to solve inequality problems in the society (Teige, 2000).



Various plans for housing by Guinzbourg

Figure 2.2: Proposing various models for housing (URL2).

A complex of row housing, clubs, theaters, cinema, and baths in Moscow.

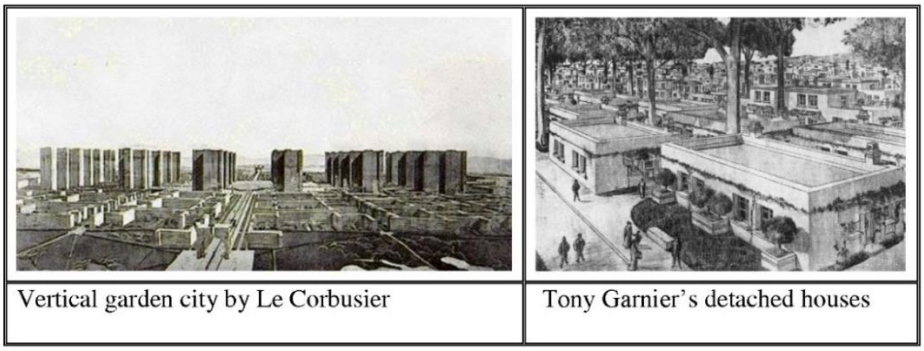
Figure 2.3: Mass housing growth in Soviet Union (Teige, 2000).

The communism idea affected architecture by generating "communist architecture" which involved, integration of working and living spaces which can be seen in communist nations like Russia and Prague. These giant structures show the power of these societies (Arabacıoğlu, 2011).

Expansion of mass houses in horizontal way | Expansion of mass houses in vertical way

Figure 2.4: Some of mass houses belonging to the Communism period in Prague

Different forms of mass housing ideas can be seen in Figure 2.5 and Figure 2.6. As mass housing forms can be categorized into vertical and horizontal arrangements, the main focus of this study is on vertical mass housing forms which is the apartment type.



Vertical garden city by Le Corbusier | Tony Garnier's detached houses

Figure 2.5: Various forms of mass housing (Teige, 2000).

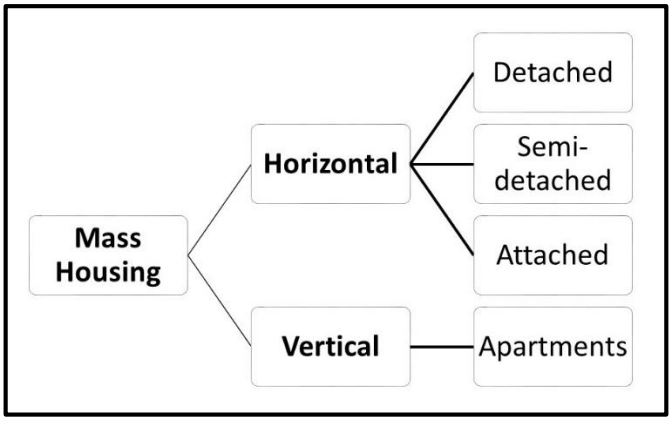


Figure 2.6: Different kinds of Mass Housing (Teige, 2000).

The current mass housing situation does not possess the appropriate quality which influences the quality life of dwellers. Architects can create solutions for mass housing problems by means of their creativity and abilities as designers. After the Industrial Revolution, designing villas for rich people became the main subject in architecture. All the new construction materials, techniques, and design ideas were used in architecture for these kinds of buildings while comparable effort cannot be seen in mass housing design at that time (Teige, et al., 2002).

On the other hand, most of the mass housing projects aim to provide accommodations for groups of people who cannot afford the current costs, so the government tries to build them as cheaply as possible by using poor construction techniques, materials, and so on to minimize the costs. According to Rabeneck, Sheppard and Town, "tight-fit functionalism" in mass housing design of the twentieth century caused bad living conditions with cell type rooms. Therefore, the changes which were done by normal people in their living spaces can show the housing problems and users' needs. Designers can get inspiration from the easiest and most effective solutions used by people (Rabeneck, et.al, 1973; Powell, et al., 1990).

All the mentioned reasons caused low housing quality, residents' dissatisfaction, housing mobility, and housing modification which was done by dwellers to increase their quality of life in regards to housing.

2.3 Housing Quality

In most countries the government has a big role in providing housing for people, but it looks like housing quality gets the least attention. Generally, they focus on preparing maximum housing with minimum cost. One of the main issues in designing mass

housing is the fact that a considerable amount of land belong to governments, so it is difficult for private companies to participate in design by considering the quality of design. The government priority is accommodating more families without consideration for quality. On the other hand, private companies' priority is getting back their investment very fast, so they always choose the quickest way to build mass housing projects. Mostly, both private and governmental sections do not consider cultural and social aspects while at the same time ignore the effects on people's lifestyles. The quality of architectural aspects is the last issue which is considered in mass housing projects (Powell, et al., 1990).

Housing quality is very essential and any mistake affect the dwellers. Its quality affects residents' life quality such as psychological, physical, and social characteristics of occupants. It is not possible to evaluate the housing quality only according to functional and physical characteristics of the spaces; the sense of life which is experienced by the inhabitants is significant as well. Quality can be assessed according to the flexibility and adaptability capability of the spaces and also the level of satisfaction (Altaş, et al., 1998).

Some other researchers believe that housing quality can be measured from two different aspects, objectively and subjectively. Objective aspects consider the physical features while subjective aspects are related to the sensations of dwellers experienced in the house. Subjective issues have more influence on the satisfaction level (Weidemann, et al, 1985; Francescato et al., 1989; Francescato, 2002).

Various ways can be studied in evaluation of housing quality. Designing a housing labeling method can be helpful for assessment of housing quality from different

aspects such as function, comfort, adaptability, and spatial arrangement. For example, for evaluating the degree of adaptability, the features such as separate structure, extension potential in the future, and other significant issues can be examined (Kim, et al., 2005).

Another notable fact is that recent changes in technology and the structure of societies around the world should be considered carefully to obtain good quality in housing. New inventions, technologies, and materials can be very affective in the development of housing design. Designers should try to use them to achieve a better housing quality for all types of people from all social classes. In contrast, all the current building rules might have to be given minimum attention to achieve a good housing design because there is little chance to reach this goal according to the existing rules. The fact that the structure of the family has changed should be considered as well. Most single people desire to have their own house and most women now work outside the home, so designing housing according to the previous definition of home, family, and women is not a good idea for the current time (Teige, et al., 2002).

Many variables have great influences on housing quality. In housing design the cultural backgrounds should be considered carefully as an important variable, otherwise, it can lead to dissatisfaction because people will try to fit themselves in their living space by making changes in their behavior, lifestyle, socialization, physical settings, etc. So, it influences the original culture (Rahim, et al., 2012). Another important fact is that housing quality and its surrounding environment quality are interlocked, and they have a great impact on the characteristics of each other in such a way that their interaction can be seen in housing selection. The quality of the housing environment can be assessed on the basis of cultural issues such as norms,

expectations, ideals, images, and so on. Environmental quality can be observed from various concerns like social and psychological phases. The quality affects the lifestyle and quality of life of people (Rapoport, 2000, 1995d, 1990, 1985, 1995c, 1985, 1995a, 1990a; Khattab, 1993).

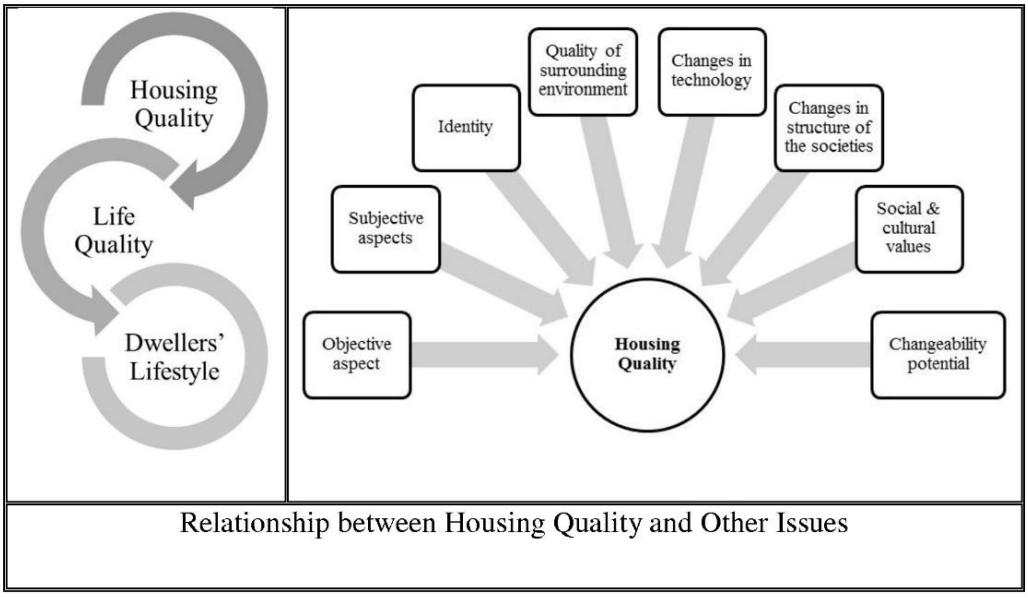
Several ideas have been offered for increasing quality but one of the most significant ones is Habraken's idea. Mass housing quality improved through the "Support and Infill" idea which was proposed by Habraken in 1964. His idea made the layout and structure of the residential building independent from each other which led to the possibility of various layouts within housing units. This theory was a kind of development in technology and techniques of mass production. Another benefit of Habraken's idea is that residents are considered as part of the design to participate in their housing design in the future by making alterations according to their needs. According to Habraken, a building which is designed in respect to social and cultural values and also people lifestyle can have the quality to respond to individuals expectations. Less infill makes the potential of adjustment easier (Habraken, 1976).

Governments should support practical ideas to achieve good quality housing because housing quality is directly related and affects the life quality of people. It has a great effect on health, safety, feelings and so on. Thus, housing quality is a vital issue in a human being's life. That is the reason that aspects such as surrounding environment, culture, society, identity and all other aspects should be considered in order to achieve a satisfactory housing design. The whole design should be in balance with the lifestyle of the users (Powell, et al., 1990). Consequently, one of the major factors for assessment of housing quality is the changeability potential of the housing according to changing needs and lifestyle. Architects should design housing not only according

to the present needs of people but also to future needs. Hence, people would not feel forced to move to another place in the future because of lack of spatial flexibility and adaptability. They should consider the usual factors needed by every human being to feel relaxed and happy (Proudfoot, 2007).

As mentioned above, minimum time and cost in mass housing have a higher degree of importance than quality. This low quality of housing lead to low quality of life and noteworthy impacts on people's lifestyles, therefore, their satisfaction levels decrease. However, if there is potential for flexibility and adaptability within the housing which gives the opportunity for people to adjust their living space to their needs and desires, more satisfaction and higher life quality can be seen. Housing should have the quality of being able to adapt with individuals' expectations and needs to some extent.

The fact that a great design from an architect's viewpoint cannot necessarily be great from a dweller's viewpoint, like the Maiden Lane Housing, should be kept in a designer's mind. Thus, architects should think through the occupants' priorities and expectations for a satisfactory design. The dwellers' requirements can be seen from the kind of alterations which were done by them (Bekleyen, et al., 2013). So, Interaction between housing quality and other issues can be seen in Figure 2.7.



Relationship between Housing Quality and Other Issues

Figure 2.7: Interaction of housing quality and other factors

2.4 User Satisfaction

‘‘Design is for users’’, said by Rapoport, which means the success of a design can be evaluated through the satisfaction level of the consumers (Rapoport, 2004).

User satisfaction regarding housing depends on many issues such as their individual character, priorities, comfort, physical aspects of internal spaces, space perception and opinions. Understanding the components which impact their satisfaction can be helpful for better designs. Although it is difficult to evaluate residents’ satisfaction regarding physical aspects of the housing, it is obvious that the interior space arrangement of housing and changeability potential affect their satisfaction level (Davis, et al., 1970; Hourihan, 1984).

It is clear that various groups have diverse requests and perceptions of housing, so this diversity should be well thought-out in design. The same building classification and models cannot be designed for all types of occupants (Cho, et al., 2011). One of the

problems is that every single country has some housing standards but not all of the housing built according to these standards can respond to inhabitants' desires. For example, one of the reasons of dissatisfaction is lack of enough interior space in housing which is caused due to calculation according to the current standards (Cruickshank, et al., 2014).

As stated before, various issues influence dwellers' satisfaction. Peoples' perception of spaces can be mentioned as one of the issues which affects their satisfaction level such as passageway length, bathroom, kitchen, bedrooms, and all spaces shapes, the arrangement of them, how these spaces are connected and work with each other and how they are situated, and in general the plan shape (Baum, et al., 1977;1980). Another important factor in satisfaction can be the degree of individual control over their living space. When social bulk is high, social interaction will increase as well which will affect the degree of privacy according to the plan arrangement and, in result, the satisfaction level (Gifford, 1997).

Culture is another essential indicator because it shapes users' expectations, characteristics, and beliefs. Absence of cultural and social consideration in early design stags is a significant cause of housing alteration and user dissatisfaction. For example, privacy plays an important role in some Asian cultures. The size of different interior spaces can have diverse degrees of importance in particular cultures. A large kitchen is required in some cultures due to the types of foods they enjoy and the time required for preparing the traditional food (Mohit, et al., 2010; 2009).

It is known that individuals' expectations change with time, and the physical organization of spaces can affect the kind of use of housing. Because moving costs

more and their neighborhood ties might be lost, most people prefer to stay in their current accommodation if they have the opportunity to alter their units according to their needs instead of moving to a new place (Saji, 2012).

So, a flexible and adaptable design provides opportunity to the inhabitants to make some alterations in their accommodation according to their necessities which pleases them. In contrast, absence of flexibility and adaptability possibility reduces the degree of satisfaction which results in a design with lower degree of success (Amole, 2009).

2.4.1 Housing Satisfaction

Internal spaces of housing affect many significant phases such as privacy, family lifestyle, kind of activities, and even affecting their moods in such a way which might result in physical and psychological diseases. Consequently, the impressions of spaces on individuals cannot be ignored (Cruickshank, et al., 2014). In addition, other issues of housing are essential as well. It can be said that satisfaction is influenced by housing itself, neighborhood, location, and accessibility to other locations, quality of life, ownership, and many other factors. If the residents find these features opposed to their requirements and priorities, their satisfaction decrease (Landale, et.al, 1985; Lu, 1998; Moore, 1986; Lee, et.al, 2010).

One of the significant results of housing dissatisfaction is housing mobility which has many negative aspects. Many scholars of different research areas have been studying factors affecting housing satisfaction and housing mobility since the 1980s. Housing satisfaction and mobility has social impacts as well because high numbers of housing mobility caused unsteadiness in neighborhoods. Housing mobility should be considered as an important decision in dwellers' lives. Unpleasant and weak housing condition lead to dissatisfaction and movement (Rothenberg, et.al, 1991).

According to Rossi, housing movement is the most preliminary way chosen by households to respond to their needs. There are many factors which lead to the decision to move such as changes in household life, housing stress, transition from tenant to ownership, marriage, and changes in number of family members. These changes define new space consumption, so users move to another house to have adequate space. The neighborhood impacts residents' satisfaction and movement as well. Residents' perception and quality of neighborhood influence their decision regarding movement (Rossi, 1955). For example, when many building modifications have been done in a neighborhood area which affect the façade, it might be unpleasant to others' eyes which influences their satisfaction and movement decision.

Furthermore, urban growth reduces satisfaction because of increasing pollution, noise, and so on. On the other hand, the facilities which make social contacts and activities easier affect satisfaction level. Housing mobility as a behavior can be affected by job distance as well which shows people try to adjust to their current needs in this way. In general, many issues of the surrounding environment affect satisfaction level such as accessibility and distance to public transportation, schools, and services as well as characteristics of the neighborhood like green spaces and medical facilities. According to Temelováa and Slezákováa in their study of elderly people living in Prague, people who changed their living place against their desire because of financial issues, being close to children, marriage or death of family members, stayed close to their prior neighborhood to keep their attachments and also used some services of the previous neighborhood. So, attachments to social contacts impact the mobility decision as well. From an urbanization point of view, reduction of satisfaction level can be a result of urban development because of negative aspects like noise and traffic (Temelováa and Slezákováa, 2014).

The fundamental point is that all people try to get housing that matches their needs and fits with their budget and other conditions and limitations. These needs can change during a lifetime. For example, the first baby of a couple might cause many changes such as need of more space and easier accessibility to some locations and facilities (Mulder; 1999; De Groot, 2011).

Consequently, satisfaction indicators can be categorized according to various parameters such as demographic features like profit. Some other factors related to accommodation are ownership status, unit physical characteristics, length of stay, and neighborhood features. Individual factors are things such as employment status, education level, income, social relations, health issue, job status, and immigration status. Satisfaction can be evaluated according to job, income level, housing condition, and leisure (Diaz-Serrano, et.al, 2010). As has been mentioned, a variety of factors play great roles in housing satisfaction.

2.4.2 Satisfaction Indicators

Numerous factors are involved in the determination of satisfaction indicators. Various factors such as ownership situation, income level, lifestyle, and how society supports people in terms of housing impacts users' life quality and satisfaction. One important factor in user satisfaction is supportive housing. For instance, well-designed housing should support the key functions and social necessities of users (Barrett, et.al, 2006).

Satisfaction has both subjective and objective indicators, so objective indicators and subjective ones should be studied in parallel. Dwellers' individual characteristics are an effective parameter in users' satisfaction and housing mobility. Considering the same features in housing design to provide dwellers' comfort does not result in similar residents' reactions. Some of them might find these facilities beneficial while others

perceive them as useless. Therefore, residents' perceptions are important indicators, and in addition, the physical characteristics of housing and the surrounding neighborhood play a significant role in dwellers' satisfaction **(**Clark, et.al, 1983; Hwang, et.al, 2006).

Housing satisfaction is interrelated to financial and socio-demographic issues of each individual and family. Financial issues relates to whether the family or individual can afford the proper house corresponding to their needs while socio-demographic issues relates to the step of each family or individual in their life cycle. As an example, more satisfaction is expected from a household with higher income because of the opportunity to get a house which fits their needs (Eluru, et.al, 2008).

Socio-demographic and economic status are correlated to preferences and requirements of dwellers regarding housing. Individuals' expectations and needs are related to social class and financial status, therefore, physical features of housing should meet users' preferences and requirements as well. So, all the essential needs which are caused by different stages of life, various social classes, and housing physical characteristics interrelate and work together. For instance, people from a higher social class with higher income require a better quality living space. Conflicts between essential needs and housing quality will lead to housing dissatisfaction. This correlation is dynamic because according to changing needs in various life stages, space demands and priorities change as well. For example, marriage or having children requires more space while in contrast, divorce requires less space. Therefore, many people choose moving to another place (Speare, et.al, 1975; Rossi, 1955).

Neighborhood characteristics can be mentioned as some other important factors affecting housing satisfaction from both social and physical aspects. Easy access to work or study and being close to activity areas like restaurants, parks, social gathering areas, leisure, and friends and family, are important as well (Chen, et.al, 2000).

As it mentioned before, various issues should be studied to be able to obtain the most significant indicators of satisfaction. Some key facts should be considered carefully to understand the main indicators. For example, one of the important issues to think through is categorizing dwellers according to various concerns such as different needs, types of users, and number of family members while considering the fact that since users' needs change over time, the housing units should also have the potential to change over time (Moller-Jensen V., 2008). On the other hand, occupants express their crucial requests, perceptions, characteristics, and even the weaknesses of the design by modification (Rapoport, 1969; 1981; Nasar, 1989). For example, religious opinions can be named as one of the factors affecting the importance of privacy. Some people prefer separation of female and male guests when they invite people over, but a lack of this kind of consideration can affect their socialization (Rahim, et al., 2012).

One of the significant facts that should be kept in mind during design is that dwellings as the living place of humans have been frequently changed, modified, modernized, and adjusted over time. Different modifications such as various kitchen and bathroom designs, expansion of the flat, up-dated mechanical devices, etc. can be seen in housing. Therefore, continuous modifications have been displayed by users in their homes to find a solution for their needs by themselves (Benson, 2010). On the other hand, housing mobility can be perceived as a behavior to adjust to changing needs during a life span. This movement is the result of satisfaction level which is influenced

by issues like socio-demographics, financial situation of people, physical features of housing, ease of access to different places, etc. Understanding people's profiles and housing features can be helpful in obtaining ideas about household requirements, limitations or priorities which are intensely connected to their satisfaction level and decisions about movement or modification.

So, according to the mentioned facts, some satisfaction indicators can be derived. Variables for housing satisfaction can be seen in the following figures, and according to these factors, satisfaction can be evaluated.

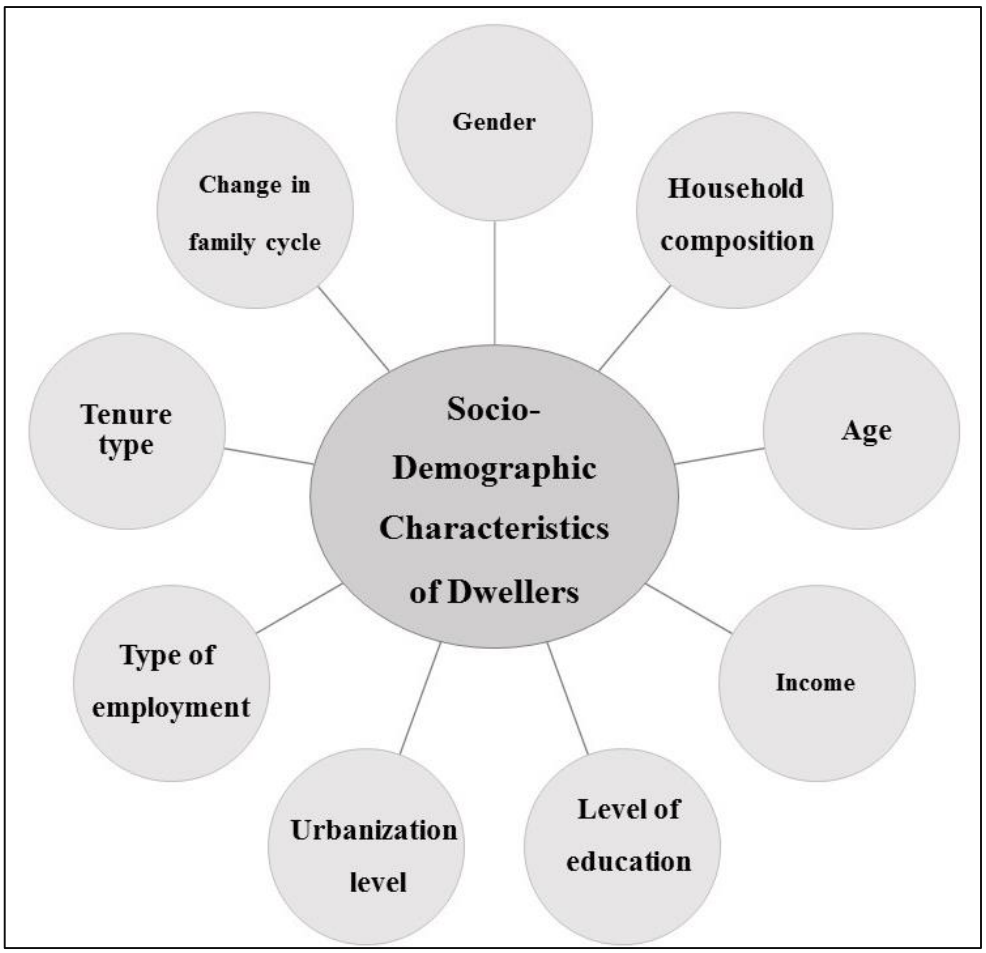


Figure 2.8: Users' characteristics

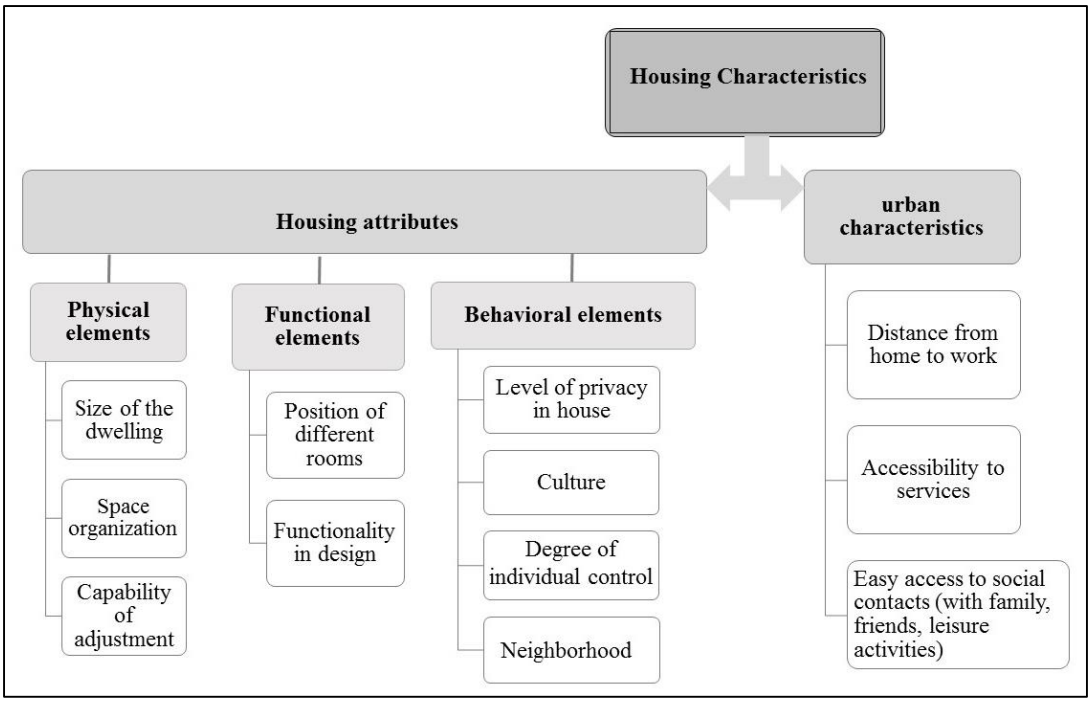


Figure 2.9: Effective Housing Characteristics on users' satisfaction

As declared, users' requirements are different according to their socio-demographic and socio-economic features, and therefore, the interaction of these characteristics can impact satisfaction level. Less satisfaction can be seen in more urbanized areas due to some problems like noise, pollution, etc. Easier access to social contacts such as contact with family, friends and leisure activities increase housing satisfaction level (Grigolon, et.al, 2014).

Housing attributes have a higher degree of importance rather than urban attributes such as accessibility to work or school. According to some studies, homeowners are more satisfied than renters. Singles have higher satisfaction levels in apartments than families with children. Units with less than 50 m^2 cause dissatisfaction for both single and couples. Satisfaction levels increase with age because of the improvement in financial situation caused by getting older and being able to afford matching housing needs (Elsinga, et.al, 2005).

The interaction of individuals' situation and dwelling features have significant impact on satisfaction due to changing needs and priorities linked to changing life stages. According to Walter and Li studies (2007), lifestyle can specify priorities, the ways people live, and in the end the decision people make about where they choose to live. A longitudinal study can be helpful to achieve more success in housing design by studying the changes which happen over the time like changes in composition of the household. Housing preferences can be evaluated according to different lifestyles and expectations which are the results of different educational levels, age, place of residence, sex, occupation, location, size, and type of the living place, etc. (Rapoport, 1985, 1998). So, all personal, housing, and urban features have a great impact on the satisfaction level of people.

2.5 Flexibility and Adaptability in Housing Design

The flexibility notion was suggested in the early twentieth century. European society confronted a serious challenge about accommodation after the Second World War. Mass housing became a great possibility and later on, architects felt the need to provide the opportunity for residents to contribute to housing design to reorganize the spaces according to their necessities (Dhar, et al., 2013). After the Industrial Revolution architects and users became separated and dwellers had to just observe their housing design outcome despite the fact that, in the past, people used to make their own houses. Flexibility concept aimed to make some tools available for users to be able to modify their living space according to their constant necessities (Friedman, 2011).

Maison Domino and Maison Citrohan by Le Corbusier can be named as the first examples of flexible housing. He designed a free standing skeleton made of reinforced framework for Maison Domino in 1919. Flexibility and adaptability became possible

because of separation of the infill or temporary components and long term components which made multiple usage of spaces and space transformation possible. It was a good solution in mass housing construction as well because of the standardized components (Fig 2.10) (Till, Wigglesworth, & Schneider, 2004-6).

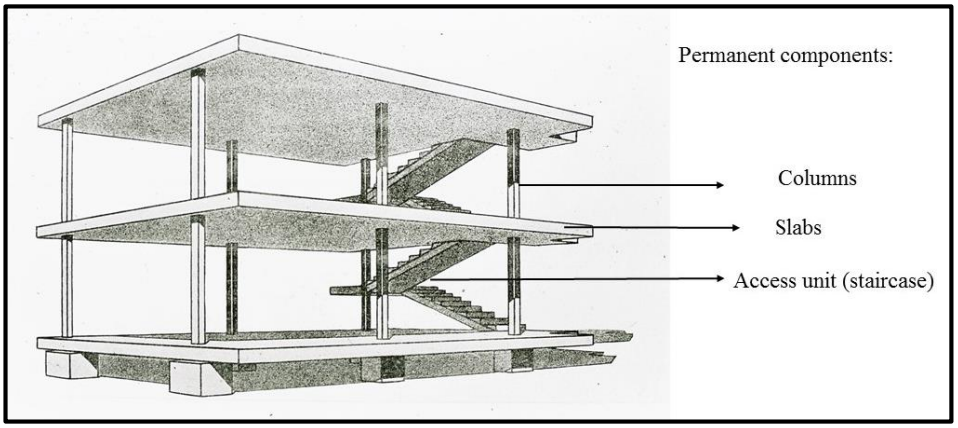


Figure 2.10: Maison Dom-ino (Till, Wigglesworth & Schneider, 2004-6).

Le Corbusier's Maison Citrohan with various arrangements from 1919 to 1927, can be another flexible design example which has the same structural system as Maison Domino. Open area, space adaptability and functional changeability of spaces became possible as a result of free standing columns and space freedom (Fig 2.11) (Risselada, 1991).

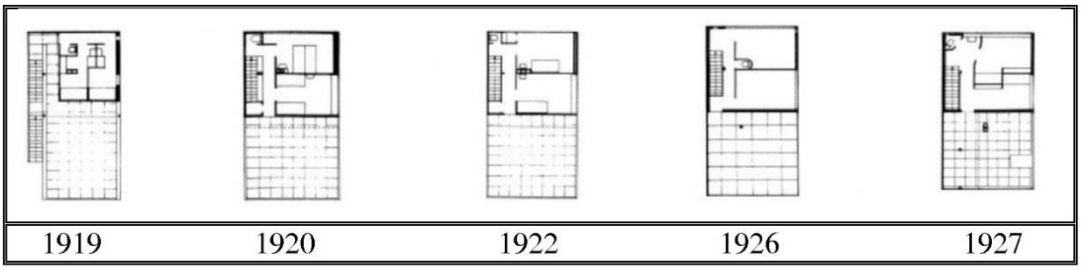


Figure 2.11: Variety of the plans in Citrohan Houses (Risselada, 1991).

Flexibility and adaptability have different descriptions by different researchers from 1973 such as Andrew Rabeneck, David Sheppard and Peter Town until 2007 by Tatjana Schneider and Jeremy Till. Some of the important ones can be seen in the following tables. As can be seen in the tables some scholars differentiate flexibility and adaptability while some other ones define flexibility including adaptability.

Table 2.1: Definitions of flexibility and adaptability from different point of views

Authors' name	Year	Flexibility	Adaptability
Andrew Rabeneck, David Sheppard, Peter Town	1973	"Flexibility" is suggested against "tight-fit functionalism(p.698). Flexible housing should be capable of providing "choice" and "personalization" (p.698).	Adaptability refers to housing units that can be "easily altered as circumstances changed" (p.699).
	1974	Flexibility idea deals with the "constructional technique and services distribution" (p.86).	Adaptability is related to the "planning and layout" of a building including the sizes of spaces and their relationship (p.86)
Guy Oddie	1975		"The capacity of physical alteration by relocation, replacement and removal of components in respect to either the constructional elements or services of the buildings or by addition of further components towards increased adaptability."
John Habraken	1976	Possibility of having different layouts, changing the floor area, either by additional construction or by changing the boundaries of the units.	
William Fawcett	1978	Flexibility as the uncertainty and changeability of the relationship between activities and spaces.	
Schroeder	1979	Flexibility means adaptation without changing building structure (quoted in Hofland & Lans,2005)	
. **John Lang**	1987	Flexibility refers to possibility of changing the structure for more accommodating different needs. Usually, it implies a change in the enclosing boundary and its internal structure. In a flexible space for instance, the walls between rooms are easily movable	

Authors' name	Year	Flexibility	Adaptability
Herman Hertzberger	1991	He proposed idea of "polyvalence". Polyvalence refers to "a form that can be put to different uses without having to undergo changes itself "(p.147)	
Steven Groák	1992	Flexibility refers to "capability of different physical arrangements" (pp.15-17).	Adaptability means "capability of different social uses" (pp.15-17).
Gerard Maccreanor	1998	Flexibility is a design idea which results to the collapse of the traditional layout" (p.40).	Adaptability is "a different way of viewing flexibility" which refers to Trans functionality and multi functionality (p.40) He highlights that most adaptable buildings were those not originally planned for flexibility" (p.40).
Andrian Forty	2000	"The incorporation of 'flexibility' into the design allowed architects the illusion of projecting their control over the building into the future, beyond the period of their actual responsibility for it." (p.143) The confusion in meaning of flexibility" is based on two contradictory roles: "it has served to extend functionalism and so make it viable" and "it has been employed to resist functionalism." (p.148)	
Eli Stoa	2003		He concentrated on 3 phases for defining adaptability. Generality: layout allows multifunctional use and accessibility without changes or rebuilding. Flexibility: layout of the building or area is adaptable through changes and rebuilding, Elasticity: extension and division of usable spaces through or without rebuilding.
Tatjana Schneider, Jeremy Till	2007	Flexibility in the context of housing is "achieved by altering the physical fabric of building"(p.5)	Adaptability in the context of housing "is achieved through designing rooms or units so that they can be used in a variety of ways" (p.5). The ways that spaces are organized, the circulation arrangements and the organization of spaces. It covers polyvalence.

According to Rabeneck, Sheppard and Town (1974), considering fixed components of the buildings which are the structural system and the service spaces is essential to achieve a flexible design. The dimension and organization of the rooms, the relationship between the rooms and their functions are the issues for adaptability.

In Steven Groák's book (1992), "adaptability" is defined as potential for alterations regarding the internal space arrangements in units, while "flexibility" is defined as the possibility for different physical arrangement in both the interior and exterior setting of the unit. Groák's definition and Rabeneck, Sheppard and Town's perception seem to agree.

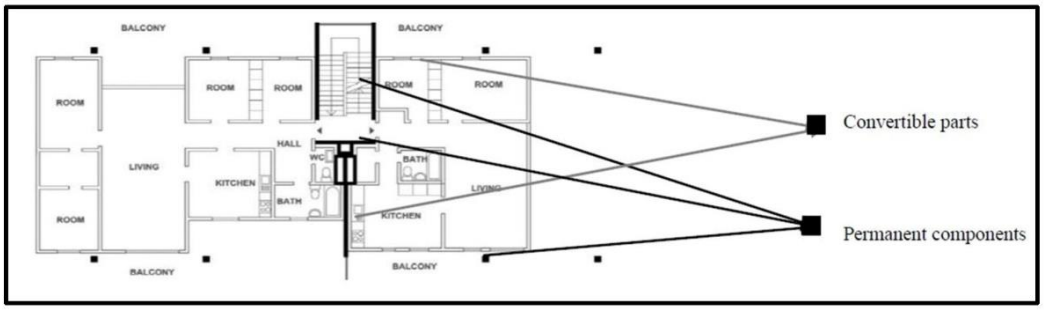
Groák's description was developed by Schneider and Till in 2007. Adaptability can be attained by designing spaces in such a way as to be used in various manners, mainly through the organization of spaces and circulation arrangements. Flexibility can be reached by modifying the physical arrangement such as usage of foldable furniture or walls, enlargement of spaces and linking spaces to each other.

According to these explanations, adaptability is related to the spatial organization of units to achieve the changes of usage, while flexibility is not only linked to alterations of envelopes and internal spaces, but also to the relocation of service areas and changes in structural systems of the building. Therefore, flexibility covers adaptability and consists of both physical and social aspects in the housing.

According to Hertzberger's book (1991) "Lessons for Students in Architecture", flexibility is the potential of various usages while suggesting "polyvalence" term from a new point of view.

Maccreanor (1998) supported Hertzberger' s idea by mentioning that many designers tried to achieve flexible buildings by surrounding a fixed service area with a changeable layout arrangement, but most of the modified buildings had not been designed for flexibility and adaptability.

As can be concluded according to the mentioned definitions, flexibility can be perceived as the potential for physical changes which is interrelated to structure and service areas. Kallebäck Experimental Housing can be named as an example which provided chances for residents to make physical modifications in both interior space and structure systems over time (Fig2.12).



Alternation of inner spaces and structure have been done by residents to achieve flexibility Kallebäck Experimental Housing by Erik Friberger in Sweden (1960)

Figure 2.12: Kallebäck Experimental Housing (Till, et al., 2004-6).

As stated before, flexibility contains adaptability as well like designing an adaptable house in Britain in 1962 which provided opportunities for dwellers to change the inside of their houses according to their needs (Fig2.13).

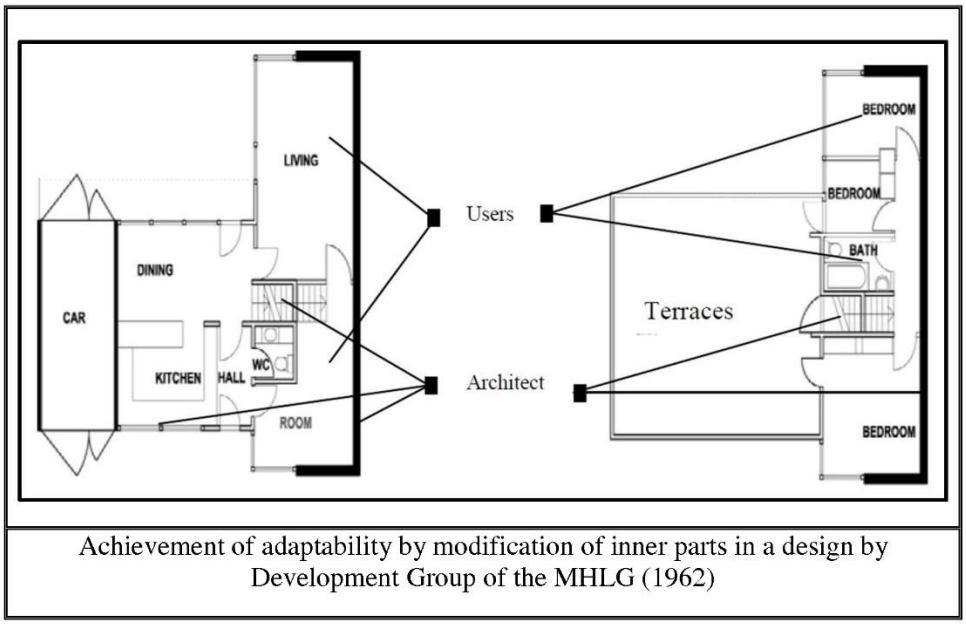


Figure 2.13: Adaptability potential in a housing design by MHLG (Schneider & Till, 2007).

On the other hand, Dluhosch (1974) and Schroede (1979) have opposing ideas which accept flexibility as the capability of modification without changes in structural system. Adaptability is defined as a concept containing flexibility by Oddie (1975) who explains adaptability as the potential for physical changes with the existing service areas and structural components.

Most definitions admit that flexibility contains adaptability as well, while flexibility covers both interior and exterior layouts and adaptability is related to interior alterations without structural changes.

Flexibility and adaptability idea can be observed from two different views:

A. more alteration displays more flexibility possibility

B. more alteration presents lower satisfaction regarding the design

Understanding to what extent the degree of flexibility and adaptability should be considered during initial design for more satisfaction is very important (Altaş, et al., 1998).

In comparison with the past, architects today face new challenges for housing design such as extension of life because of development of medical science or using living space for work as well. There is contrast between life and housing because over time people and their way of life and usage of every spaces in the house change while the house remains the same. So, people try to adapt themselves to the living place or change their housing. Steel-frame house in 1927 by Mies Van Der Rohe for Stuttgart Exhibition can be named as the beginning of adaptable housing. It gave the opportunity to the residents to reposition the internal walls according to their needs (Friedman, 2002).

As discussed before, flexibility has been defined in different ways. According to Dluhosch (1974), flexible housing has the potential to change while keeping the same base. Flexible housing has the capability of various layouts such as changes in flat area by changing the restrictions of the flat from Habraken's (1976) point of view. Changing the potential of a building according to social and technical changes and changing needs is the definition of Schneider and Till (2007) of flexible housing. There are two kinds of flexibility; the first type intentionally considers opportunity for changes during the initial design while the other kind happens by accident. Both the interior and exterior of the building should be considered for a flexible design because both have their own limitations while affecting each other (Dluhosch, 1974; Habraken, 1976; Schneider and Till, 2007).

Changes in most of aspects such as social, cultural, financial, etc. are related to changes in usage and need of spaces in housing. According to Dluhosch (1974) two various kinds of needs impact housing performance. One of them works over time, for example, when children grow up and leave, while the other one results from diverse needs related to space, for example, a family lifestyle changes so they need other types of spaces as well. People's space needs change according to cultural, financial, and social changes or because of changes inside the family such as age. As a result, they need different kinds of spaces in different periods of time and situations.

Housing mobility has increased due to many reasons, but lack of flexibility opportunity and strict space characteristics which do not allow flexibility may be some of the reasons for mobility. Financial issues should be considered as an important factor in flexible design. People have different incomes and needs during different periods of life. For example, when parents get old and children leave the house, parents will stay with plenty of space which costs a lot to maintain so flexibility can save money. They will be able to make changes and rent the extra space while if there is no flexibility, they may have to move to an apartment in order to decrease space and spending. By being aware of users' social class and financial situation, the flexible design and selection of flexible building elements can be based on these issues so that later on the users will have less difficulty in modifying their living space (Friedman, 2011).

2.5.1 Achievement of Flexibility and Adaptability in Housing Design

There are some reasons for shortage of flexible design such as absence of awareness, cooperation, financing, and disagreement with this concept completely, and the building regulations such as defined standards (Schneider & Till, 2006).

For flexible design an appropriate method should be selected for design to be able to meet different usage of spaces but if the method is based on some limited features, the flexibility opportunity will be difficult. The flexibility possibilities should be something understandable for users such as construction materials and method should be acceptable for users and cannot be useful if it is against users' cultural and social background. Connections between flexibility ideas and the actual housing process should be well thought-out carefully to be able to suggest some ideas to achieve flexibility to some extent. Almost all the flexibility ideas have been founded on an attitude to hierarchy. The correlation of supportive structure and interior parts are important. Development of technology provided the option for adaptable design such as new and easier structural systems. Using less bearing internal walls while using more prefabricated building elements became possible by these new structures. Residents have the chance to redesign their living places to some extent (Friedman, 2011).

For obtaining a flexible design, the structure should be built in such a way to have the possibility for numerous plans. One of the concepts for development of flexibility degree in residential buildings was the "support and infill" method which was proposed by Habraken (1964). The components which are comparatively permanent in the building like the building base and shared services, called support. While the elements with comparatively shorter lifetime and removable opportunity from the support, called infill. This system used in many countries such as China, Japan, and etc. (Habraken, 1976).

Proper structural systems should be created to make a flexible design possible. One of the structures can be done by steel framing which conclude manufactured light steel

frame. All the building elements are manufactured and there is empty space in the middle of profiles for wires, pipes, and etc. All the dimensions are specified to keep the boundary of the building to avoid enlarging building beyond the limitations (Peters, 2005).

Habraken (1964) proposed an idea which has two construction parts, one part is everlasting supports and the whole unit which shape within this structural system can be separable and also he defined a zone and margin system to make various layouts possible. The flexibility degree can be determined through the relation of soft which means the light weight partitioning or separable elements and hard which means the structural elements without detachability opportunity. As can be seen in some projects which have been built based on the idea of Habraken, there will be more adaptability opportunity by increasing the soft proportion in design (Friedman, 2011).

Open Building opinion is a recognized approach for adaptability in design which defines each different stages of interference in the existing surroundings. Accordingly, every architectural design should be completed at every stage by considering the next step while the end product should allow some flexibility opportunity by more flexible restrictions (Kronenburg, 2007).

The degree of flexibility in building can be at the level of holding the potential of changing function. Each unit should have the capability of separability or connectivity from spatial, technical, vertical, and horizontal aspects of changes in the size of the flat. Another important feature of a flexible design is that the interior plan should have the potential of different usage without strict limitations. The essential parts of the building like structural system, zoning, service areas, construction, modular elements,

and usages should be designed carefully for a flexible design. Another significant factor in flexible design is the technological part of the building. Proper setting of services, material, construction, clear division of stable and moveable components, separate internal layout are the important issues allowing various settings easier. Proper distance between building elements and load bearing components is very important because it will provide the opportunity of replacement of walls, partitions, and therefore creating different spaces. Some other methods like the 'intelligent floor' which means the placement of sockets and other services in floor or in floor ducts, are beneficial. A flexible building has potential for different physical setting and usages as well (Schneider & Till, 2005, 2006). As can be seen in figure 2.14, various layouts are possible by replacement of the interior walls.

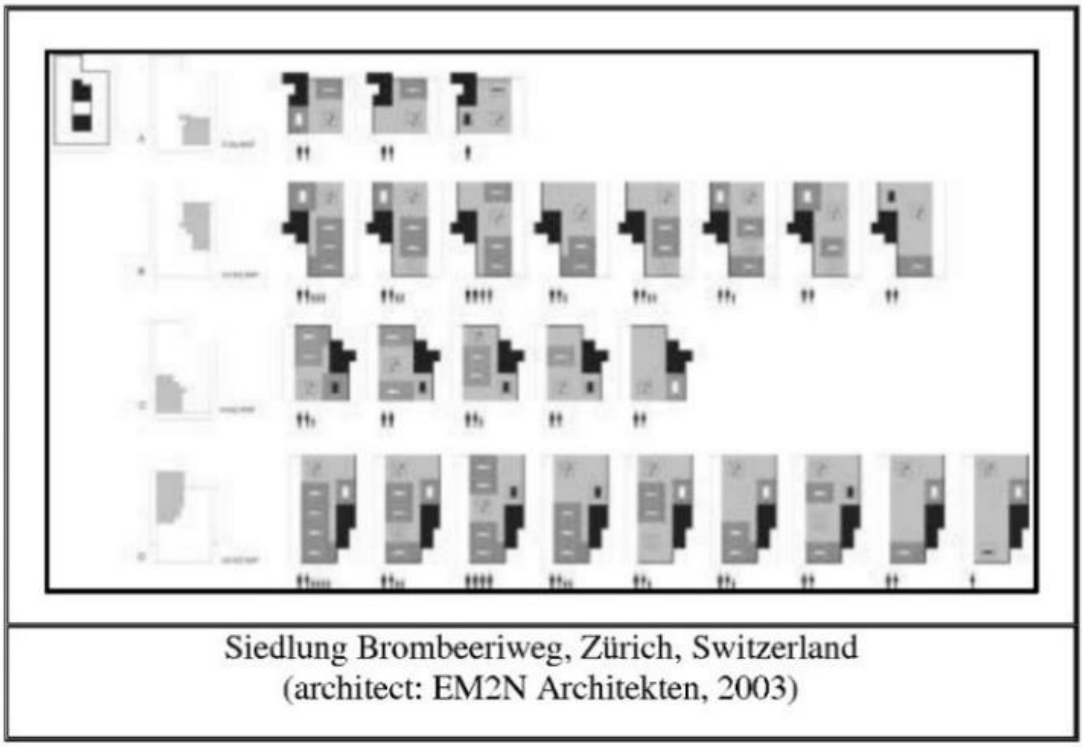


Figure 2.14: Siedlung Brombeeriweg, Zürich, Switzerland

The following project (figure 2.15) belongs to a complete prefabricated house project suggested by Walter F. Bogner, 1942. He invited 43 architects to participate in an adaptable house design for responding to diverse needs. An 8*8 feet horizontally and vertically framework was the basis of his design while considering wet area, splits the floor area in such a way addition of components can prepare spaces for a family with two or three family member, and for more family members by expanding the shell.

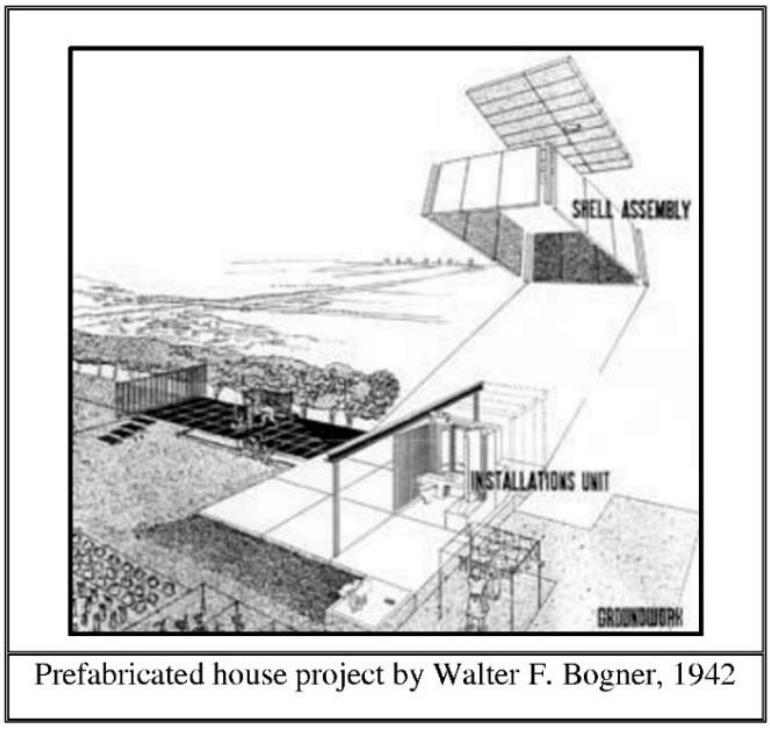
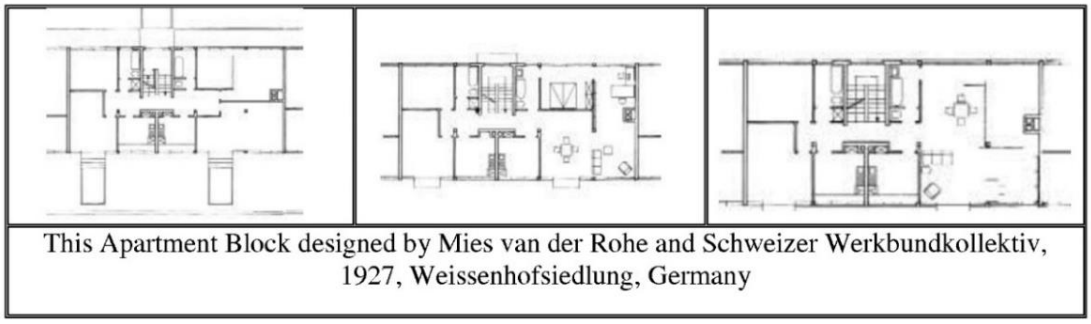


Figure 2.15: Prefabricated house project (Kirsch, 1989).

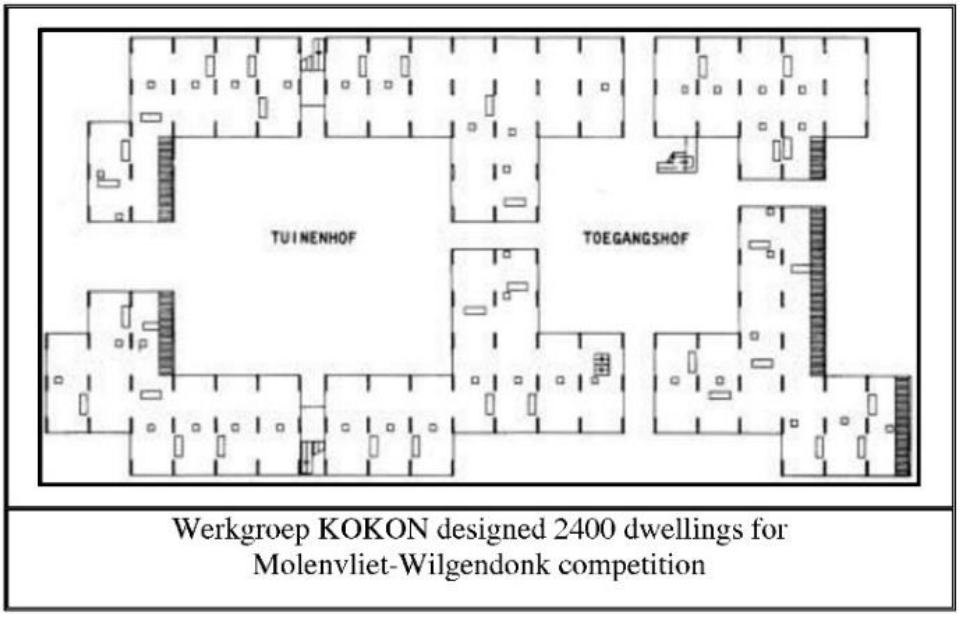
As the following plans show (Fig 2.16), usage of minimum loadbearing components in the interior part made a kind of structural frame with the capability of different divisions. According to Mies van der Rohe, one of the main concepts of architecture was flexibility because a building lifespan is longer rather than the first purpose which is built for. The wet area should be permanent, but the rest can be changeable.



This Apartment Block designed by Mies van der Rohe and Schweizer Werkbundkollektiv, 1927, Weissenhofsiedlung, Germany

Figure 2.16: Mies van der Rohe and Werkbundkollektiv's design (Kirsch, 1989).

The following project (Fig2.17) contains a cast-in-place concrete framework support structure while having openings in the slabs for vertical mechanical chases and stairs for different layouts. The facade is made of a prefabricated wooden framework. Users participated during different design stages.



Werkgroep KOKON designed 2400 dwellings for Molenvliet-Wilgendonk competition

Figure 2.17: Molenvliet-Wilgendonk competition (Werf and Froyen, 1980).

The most famous construction system for flexible design proposed by Habraken named Open Building or support and infill system. He suggested using manufactured building components such as slabs, beams, columns, and also separating support which

is the building base from infill which is the internal part for easier assembling (Habraken, 1976). Takenaka Corporation designed Flexsus House in Japan (Fig2.18) which warranties a stability of 100 years and flexibility of room plans while adaptability for different lifestyles. Slabs and wall columns without hanging beams and a double floor system for public circulation made the structure of this building. All parts are at the least contact with the main structure for easier replacement.

Figure 2.18: Flexsus House (Kendall, et al., 2000)

A flexible building should contain the capability of adjusting with recent needs and technologies. ‘Hard’ and ‘soft’ method can be named as one of the systems of obtaining a flexible design. There is a more complete technique for flexible design which can be categorized in different manners. One of them can be considering flexibility in various scales which can be the whole building, each unit, or each room in the house. Another one can be specification of techniques for a flexible design achievement which is in use and technology classification. Use discusses about the role of flexible plan in flexibility opportunity while technology explains about the role

of services and construction of the building. Both can be classified as ‘soft’ and ‘hard’ methods. Soft is the less specified parts, but in contrast hard is the more specified sections and designer is dominant in definition of usage of spaces by the time. More space is needed in soft use rather than the hard with less space which resulted in multifunctional spaces (Oliver, 2003).

Soft use: It can be seen in traditional housing, which could accommodate all family members while considering climatic and cultural aspects. Soft use can be seen in Letná project (Fig 2.19) which had a distinct service area and all the rooms had the same dimension connecting to a central hall independently (Svácha, 1995).

Figure 2.19: Letná project (Svácha, 1995)

A good sample of flexible housing in recent years ADP Architektur und Planung’s Hellmutstrasse in Zurich with three separate zones (Figure 2.20). There are rooms in the upper part of the unit which have the same size and load bearing walls separated them from each other. Partitions can be added as well. Wet areas are located underneath. A different zone for the living area and kitchen is located at the bottom, but it has the potential of being as an independent studio. Common terraces and an

outer staircase give access to all flats. The issues such as discovering the proper locations for service areas, accessibility, appropriate dimension of modules to give the opportunity for duplication of elements, a kind of construction method which make long span and lightweight infill partitions possible, all can be dominated for a flexible design. Järnbrott housing design in Sweden shows the fact that more degree of flexibility should be considered in smaller units because smaller units have done more modifications by the time (Schneider, & Till, 2005).

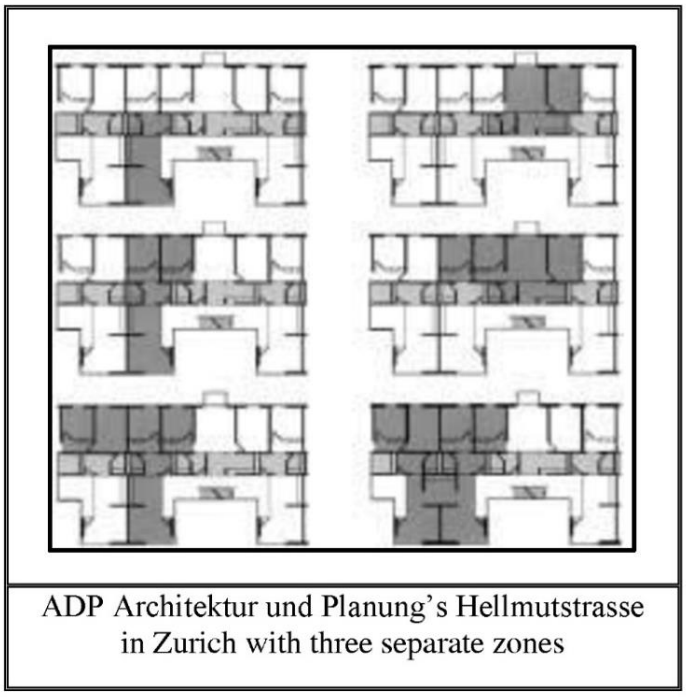


Figure 2.20: ADP Architektur und Planung's Hellmutstrasse (Schneider, & Till, 2005).

Hard use: Strong defined space by designer is known as hard use. It works very well when the designer wants to locate foldable or moveable elements. Schröder House by Rietveld or Lawn Road apartments by Wells Coates are good examples of it (Schneider, & Till, 2005).

Hard Technology: The technologies such as supports and infill structure by John Habraken which proposed for flexibility purpose named as hard technology. The support is fundamental permanent elements and the infills are moveable (Habraken, 1976).

Soft Technology: The kind of techniques, providing the opportunity of making the flexibility possible more independent from the construction system, can be called soft technology. For instance, Genter Strasse by Otto Steidle with Doris and Ralph have been changed noticeably within thirty years because of the manufactured frame. The load bearing components in Brandhöfchen by Rüdiger Kramm are columns and beams without any interior load bearing wall (Steidle, 1977).

A good sample is Diagoon Houses by Herman Hertzberger founded on the 'incomplete building' concept which suggest preparing a fundamental framework for the building and allowing the users to participate in their living place design. The most complete investigation of flexible housing design in recent years is Residential Open Building by Kendall and Teicher (Kendall, et al., 2000).

Achievement of flexible design will be possible by avoiding restrict design ideas. Placement of minimum load bearing elements during construction or avoiding a kind of roof shape such as trussed rafter which minimize expansion potential, minimizing non-adjustable services, avoiding restrict functionalist design, can be useful for a flexible design.

The London terraced house is a sample of flexible design which have been adjusted many times. Some flexible patterns can be derived from the patterns used in this

building. One of the factors is related to the size of the space and the function of it. The size of the space and degree of flexibility are related to each other and also tight defined function of space will decrease degree of flexibility. Another critical factor is the construction method. A complicated construction method which requires various professions for changing each part cannot be a good idea. The simple construction system will face less difficulty for changes in the future. Considering adaptation capability during the design process has an important role as well, for instance location of service core, staircases, and entrance should be studied carefully with all possibilities of changes in the future. A very good example of this method is a Peter Phippen's work in the United Kingdom. The staircases and service area have different zone at the center and also the plan arrangement is in such a way, providing various alterations such as relocation of the rooms on each side of the unit and capability of modifications in the back and front of the building (Schneider, & Till, 2005).

Some other patterns can be driven from flexible commercial offices for housing design, such as perfect classification of all layers. Structure, services, construction, interior dividing walls, façade, and finished surfaces, all should have clear categories so, later adjustment will be easier. A typical plan organization gives alternations for future, open plan with long span provide the opportunity of adding and eliminating non load bearing partitions. Tight space specification reduces the flexibility degree. A central structure can prepare a good location for services and easier access. Placement of services is another important factor, because a good placement provides vertical and horizontal changes easier. They should be arranged into simply reachable ducts. Flexibility can be observed in various phases such as functional like multifunctional spaces, cultural like privacy, spatial like division of spaces.

2.5.2 Spatial Flexibility and Adaptability

Flexibility should provide different layouts in an architectural form and have the opportunity for prospect changes, but most of the mass housing project companies do not agree with this concept because it might cost them more while the costumers might not be able to afford buying houses. Adaptable design allows the users to participate in the design process by passing time and new technologies. It gives the chance of improvement to the design and the impact of dwellers can be seen in design decisions and shape the spaces according to their liking (Kronenburg, 2007).

Inner spaces should be settled in such a way that reorganizing of spaces do not affect the façade otherwise affect the original building identity and character. Increasing the number of bedrooms, or expanding the living room, dining room, kitchen, and car porch, or separating the kitchen from living area, can be seen as the most common internal modifications by users in their dwellings (Saji, 2012).

The spaces should be planned in such a way to cover diverse usages, but if they are designed according to purpose of using and strict characteristics, spatial flexibility is infeasible. The circulation area, how all spaces are connected, and how all internal spaces work together can be very effective to achieve a flexible design. Functionalist design makes the hierarchy of the space more important which will lead to a lower degree of changing usage. Very strict physical settings can produce many limitations of usage for dwellers in a long time. There is more flexibility and adaptability option in bigger areas by dividing possibility (Callado, 1995).

Some designers discovered flexibility and adaptability in traditional houses and tried to obtain some model from architecture of the past to use in the contemporary

architecture. The houses with a courtyard in the center and the space organization around the courtyard in hot and arid climate in the Middle East is one of the patterns of traditional architecture. The architects of old houses well thought-out all social, climatic, cultural, and functional phases of that period in the design. Consequently, the achievement was successful and appropriate. But when the designers used the courtyard notion in a contemporary context in Turkey, Akabe housing of Sanliurfa, it was unsuccessful regarding user satisfaction. The traditional ideas can be used in current architecture, but the fact that individuals' preferences were reformed over the time should be considered. Some patterns of traditional architecture can be utilized according to the users' necessities of the current time to obtain a pleasing design (Bekleyen, et al., 2013).

Housing alteration is common because the interior spaces is not proper for all types of ways of life, so a particular space arrangement should be molded for a flexible design. An open plan arrangement might give more opportunity of flexibility and adaptability possibility. For a flexible and adaptable design, considering window placement, façade, and separation of private and public zone are important (Rahim, et al., 2012).

The building envelope and internal part such as circulation area, spatial layout, rooms, and all other spaces are correlated together. Many factors have influences on the spatial flexibility and adaptability potential, some of the main issues which should be considered during design for more flexibility and adaptability opportunity can be seen in the following tables (Friedman, 2002).

Some significant factors which should be considered in spatial flexibility and adaptability have been dominated in the following tables:

Table 2.2: Effective spatial factors on interior adaptability (Friedman, 2002).

Manipulation of spaces	
Functional zones	Refers to how the overall space of a dwelling unit can be arranged according to zones (e.g., public, private, daytime, nighttime) to allow a greater degree of adaptability
Spatial configurations and strategies	Relates to specific design strategies and configurations that permit a space to be easily adaptable at a macrolevel
Access to and circulation between or within spaces	Considers how circulation between and through spaces and entry into them will affect adaptability
Spatial arrangement	
Function of rooms and auxiliary spaces	Analysis of how each room and its unique use, as well as auxiliary spaces, can be arranged to become more adaptable
Growth (add-in) and division	
Growth	Explores the possibility of home design, where unused indoor spaces will later be added into the main space
Division	Considers design strategies whereby a space will be divided to make room for a new use or an independent-dwelling unit
Manipulation of subcomponents	
Technology of and access to utilities	Describes the means by which the home's interior utilities, their placement, and access to them, once installed, will affect adaptability
Interior premanufactured components	Introduces and explores premanufactured components, such as demountable partitions, for their installation and use in achieving adaptability in the home's interior
Surface finishes	Considers the effect that occupants have in choosing surface finishes, such as for the walls or floors, and their effect on adaptability

Table 2.3: Effective structural factors on interior adaptability (Friedman, 2002).

Manipulation of Volumes	
Urban configuration	Study of the assembly of dwellings and their effect on future change in the urban context
Unit typology	Refers to the effect that the chosen type of dwelling (e.g., rancher, bungalow, cottage) will have on adaptability
Condition of attachment	Refers to the relation that a single dWelling unit will have with an adjacent unit (e.g., detached, semidetached, row)
Ground relation	Considers the effect that the chosen placement of the building on the ground (e.g., slab on grade, basement) will have on adaptability
Spatial Arrangement	
Dimensions and proportions	Considers the effect that the dimensions or the proportions of an entire dwelling or a portion of it (a floor) will have on the building's potential for adaptability
Access	Investigates how the designation of one or several accesses (e.g., front or back doors) will influence the building's present and future adaptability
Circulation	Considers the location of the circulation routes and means through a volume (e.g., vertical stair shaft)
Growth (Add-On) and Division	
Growth	Refers to the incorporation of design strategies and means to enable expansion beyond the initial volume (add-on)
Division	Refers to the incorporation of design strategies and means to facili-tate division of a volume (i.e., single or several levels) into smaller units, as the need arises
Manipulation of Subcomponents	
Facade	Considers the effect that the building's facade will have on adapt-ability during construction and use. It also deals with aspects related to the occupants' ability to personalize the exterior of their home prior to or after moving in
Structure and assembly	Considers the effect that a choice of structural system (e.g., post and beam, bearing partitions) will have on the entire building's adaptability. This section also examines the building from a production-process point of view, where the entire structure can either be constructed on-site or prefabricated in a plant and deliv-ered to the site
Services	Studies the effect that the access, type, and location of main ser-vice conduits will have on the building's adaptability

Clear definition of various zones such as public or private and daytime or nighttime, a correct location of these zones in plan arrangement, equilibrium of dimensions of the zones, separate wet area can increase flexibility and adaptability opportunity. Considering similar proportion spaces in housing can shape multiuse spaces for different purposes. As the connection between spaces is important, a right location of circulation area within the housing unit will provide easier alteration. Another factor is an appropriate location of stairs for flexible and adaptable design. There are different schemes such as locating stairs in the middle of functions, between a linear arrangements, or like an attachment to the main space, which will increase the flexibility and adaptability potential. Flexible and adaptable design needs a well though space design as well. For instance, a space can be multi-purpose or carrying out more than one function and also one space can have changeable usage according to the situation. Many different spaces can be designed within a unit just by appropriate placement and usage of furniture such as using bookshelves as a partition for division of spaces (Friedman, 2002).

Another concept to achieve flexible and adaptable design is an open plan idea which provides the potential of adjusting to numerous prospect needs of the dwellers. Some of the building components should have the possibility to be interchanged. This idea makes the participation of dwellers possible. Long and short time components, temporary and permanent elements, support and infill, all should have clear divisions and categories (Wilkinson, 2000).

As it has been mentioned before, one of the main issues for flexible design is free plans. As can be seen in Villa Savoye by Le Corbusier, all the spaces are incorporated and connected to each other. A smooth flow should be seen in spaces combinations.

Another example of flexible and adaptable building which can be named, is Une Petite Maison which was built by Le Corbusier in 1923 for his parents. Flexible elements can be seen in this design such as a movable screen for separating the guest room for short term use or the opportunity of extension of table for guests. Even all the furniture has been designed based on this concept such as the drawers shaping a desk with a view to the lack. Other successful flexible houses are Van der Leeuw house in Rotterdam by Jan Brinkman and Cornelis van der Vlugt or E-1027 house in Roquebrune-Cap-Martin in France by Eileen Gray (Kronenburg, 2007).

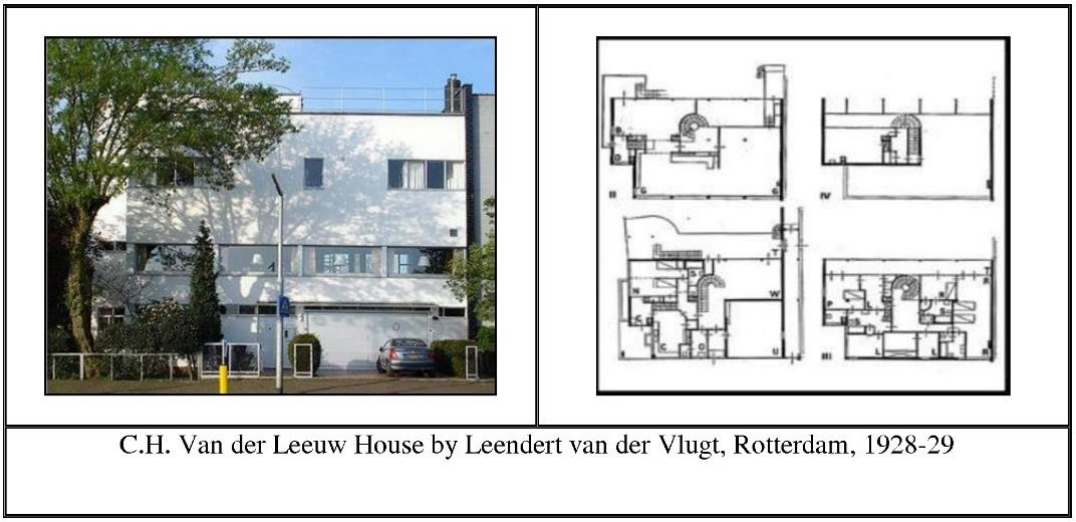


Figure 2.21: C.H. Van der Leeuw House (URL 3).

One of the flexible architectural works which can be mentioned is E-1027 by Eileen Gray which shows the collaboration between residents and the surrounding environment. A good combination of furniture and building components can be seen in this building. Movable furniture such as tables, cabinets, seats, and etc., which are connected to the walls and surfaces created more capacity for flexibility. Placing a multi-function space is very essential for a flexible design. For example, the main hall in this building has multi-purpose usage such as living area, dining space, bar, and

guest room. This building has smaller rooms as well which have related usage while every interior space connects to the outside area to give the opportunity of extension of the rooms or for a better view (Gray, et al., 2002).

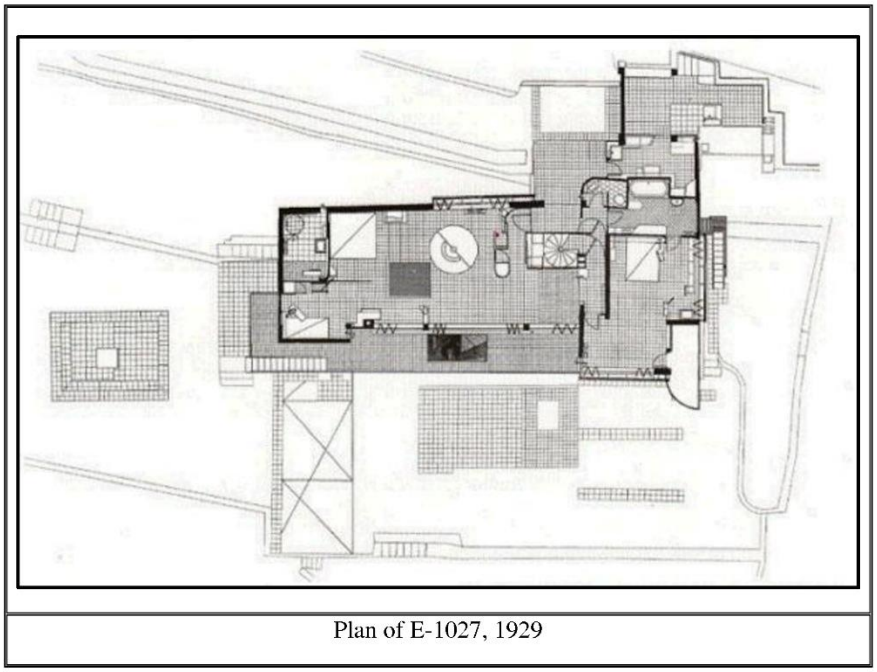


Figure 2.22: E-1027 by Eileen Gray (Gray, et al., 2002).

Rietveld Schroder House by Gerrit Rietveld (Fig 2.23) is one of the most well-known flexible architectural works with a regular ground floor plan against the upper floor area which had the option of dividing spaces by partitions to prepare spaces according to needs. He designed a house with the opportunity of variable internal spaces according to every one's desire and need with locating the permanent walls in such a way to shape a free plan and unfixed internal space (Kronenburg, 2007).

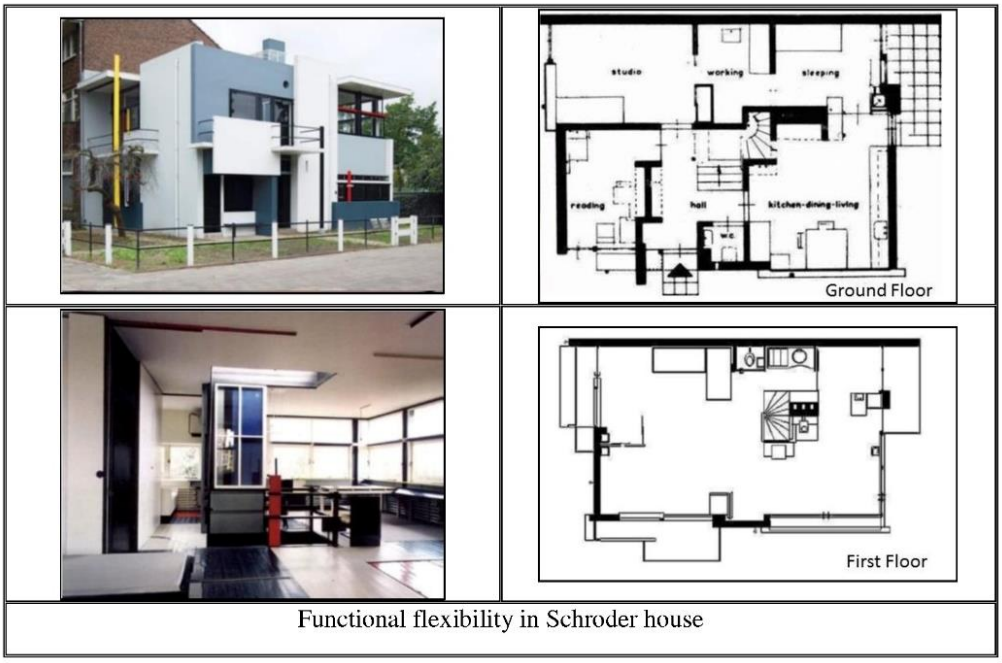
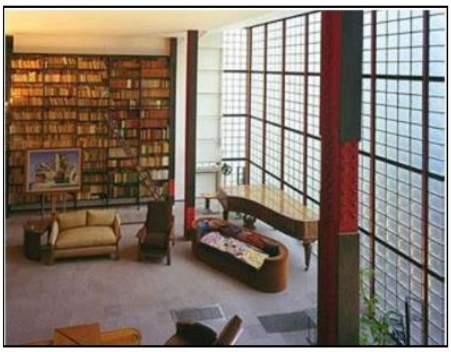


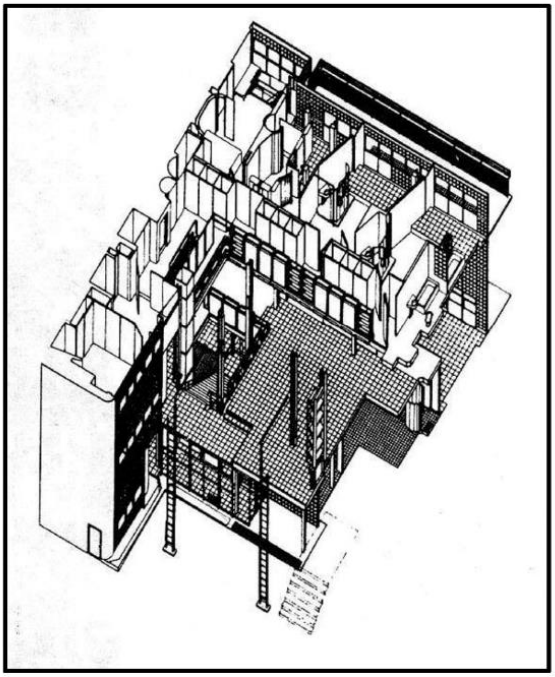
Figure 2.23: Schroder house (URL 6).

Maison de Verre is famous because of the active interrelating spaces with a very smooth movement in the plan. The structural components are permanent while the fittings are moveable such as sliding and foldable walls. Flexible furniture such as chairs, tables, desk, and etc. are required to fit in a flexible housing such as the furniture in Tugendhat House by Mies van der Rohe. All the furniture designed specifically for this house and interior spaces defined by them. Free unbroken movement within the spaces can be seen easily. All the architectural spaces supposed to have free flow in the plan to achieve a flexible design (Benson, 2010).



La Maison de Verre: Pierre Chareau's modernist masterwork

Figure 2.24: Pierre Chareau's design (URL 5).



Axonometric plan of La Maison de Verre: Pierre Chareau's modernist masterwork

Figure 2.25: La Maison de Verre (Hoyt, 2007).

Construction became easier by manufactured components. The modular system became possible by prefabricated building elements so the potential of flexible design increased because it provided various layouts and put the modules together in different ways within minimum time. One of the architects who worked on flexibility is Albert

Frey, who designed multi-purpose furniture, folding partitions, and other foldable furniture to make maximum usage of the spaces. One of the well-known housing project is Dymaxion House by Buckminster Fuller. The main aim of this project was good quality housing with mass-production. After the World War II, finance, quickness, and flexibility were important so, standardization proposed as an important tool to reach to these purposes. Standardization and prefabrication provided various types of plans easier, cheaper, and faster. Steven Holl's work based on the "hinged space" concept created a flexible housing with sliding walls, some surfaces could rotate or move according to the resident's needs and desire and also the spaces were responsive to seasonal changes as well (Kronenburg, 2007).

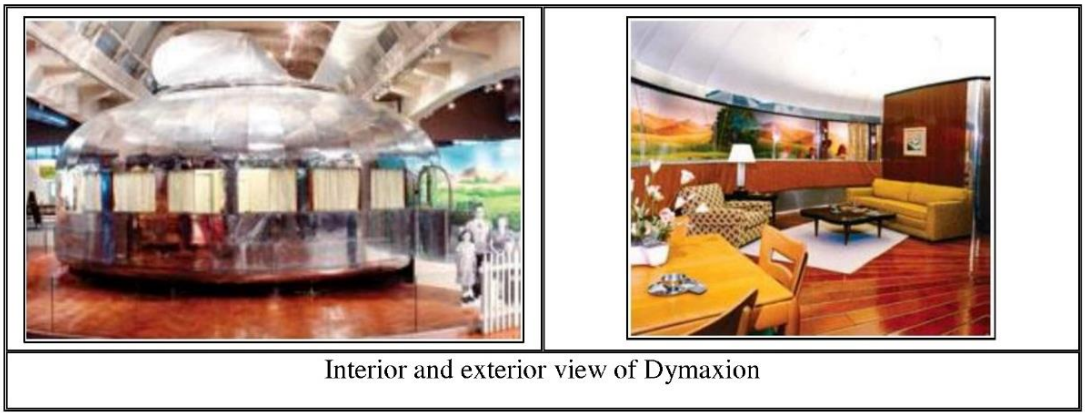


Figure 2.26: Different views of Dymaxion (URL4).

One of the successful flexible housing project is NEXT21 in Japan, the permanent construction is reinforced concrete fame after that the internal parts designed independently. Residents of some units participated in the design process to discover their priorities. Numerous standardized building elements have been used in this building, so different layouts or systems can be adapted during the time by the dwellers. These buildings are flexible from different aspects such as different layouts, moveable walls, stairs, and floors. Designers should be aware of to what extent

flexibility is required in design, then according to that many parts of the building can be made changeable or replaceable.

In the next chapter, the satisfaction level of users in four selected case studies from four decades and construction companies in terms of spatial flexibility and adaptability and also the degree of flexibility and adaptability of these mass housing groups are evaluated according to the significant criteria extracted from literature survey.

Chapter 3

ANALYSIS OF SELECTED HOUSING GROUPS IN FAMAGUSTA, NORTH CYPRUS

In this chapter the overall information regarding housing and mass housing development in North Cyprus is given. Then, four apartment type, mass housing projects from different construction companies and the periods of 1980s, 1990s, 2000s, and 2010, in Famagusta in terms of spatial flexibility and adaptability, and user satisfaction is evaluated.

3.1 A Brief Explanation about Mass Housing Development in North Cyprus

Cyprus is the third largest island of the east Mediterranean and it had been affected by various powers such as Assyrians, Hellenics, Romans, Byzantines, Arabs, Venetian, the Ottomans, British, in the past because of its significant location (Hill, et al., 1949; Özay, 2005). Mass housing development in North Cyprus started during the British period (1878-1960). The first building regulation was also established by British which led to quick housing expansion in North Cyprus. They affected the island by introducing new functions and facilities which led to the creation of new job opportunities and services, so immigrating of people to cities increased. Mass housing construction was a proper way to provide enough accommodation for the increasing population. The first example of mass housing project of North Cyprus is Samanbahçe then, the others followed this project. William Caruana's Row Houses in Nicosia,

Police Public Row Mass Houses in Kaymaklı, and CMC workers' housing are some of the significant examples (Özderen, 2001).

Building construction reduced because of the war from 1963 till 1968 and Göçmen houses were built to solve the housing shortage in 1965. After the war and setting up the Turkish Republic of North Cyprus in 1983 by Turkish Cypriots, housing construction increased in order to be responsible for society need and also accommodate students of the established universities. Mass housing projects were built in different areas, but mostly in the major cities and diverse periods. Various kinds of housing such as apartments, terraced, detached, single and double story houses were built, but the most constructed type is apartments (Keleş, 1998).

By changing the social and economic conditions from the late 1990s, housing growth changed as well. Growth of students' number and attraction of foreigners increased housing demand in North Cyprus. Some of the mass housing projects in different cities of North Cyprus can be seen in figure 3.2 (Hoşkara, et. all, 2009).

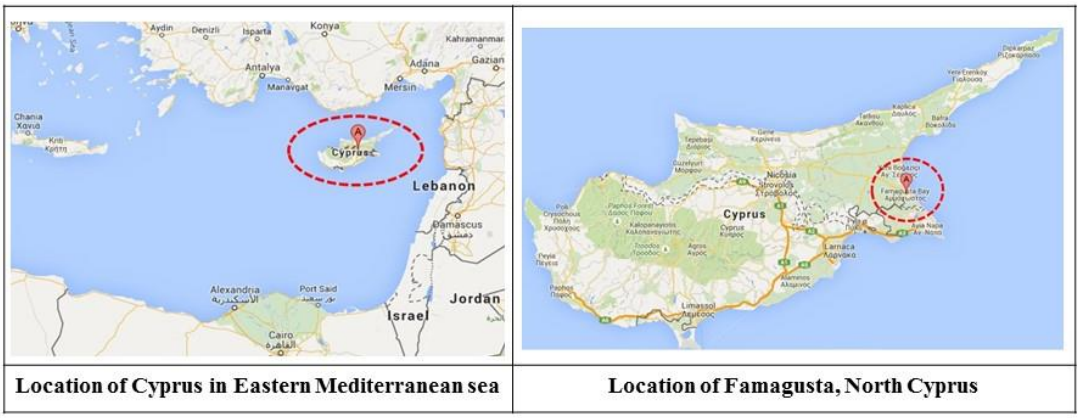


Figure 3.1: Location of Cyprus and Famagusta in North Cyprus (URL 7).

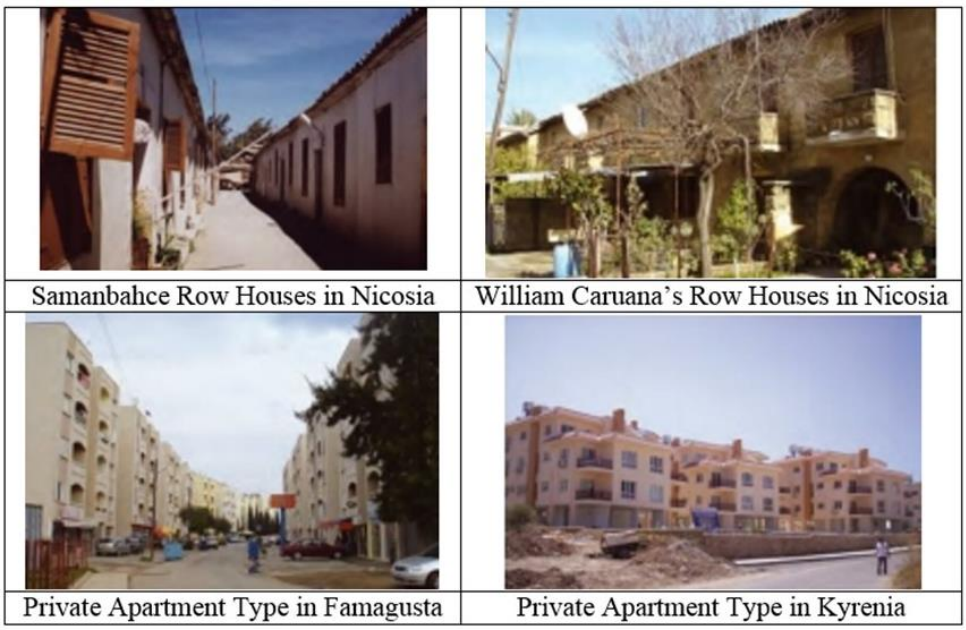


Figure 3.2: Mass housing samples in North Cyprus (Hoşkara, et. all, 2009).

Four selected case studies are located in Famagusta which is the second biggest city of Northern Cyprus and located on the east coast of this island. The city contains many valuable historical heritages and four major regions, Walled City, Asagi Maras, which is developed by the Greek Cypriots, Maras, which has been closed to residence since 1974, and the recently developed quarters (Doratli, et al., 1999). After the establishment of Eastern Mediterranean University and Istanbul Technical University, which increased the student population, housing demand and in result mass housing construction in Famagusta increased.

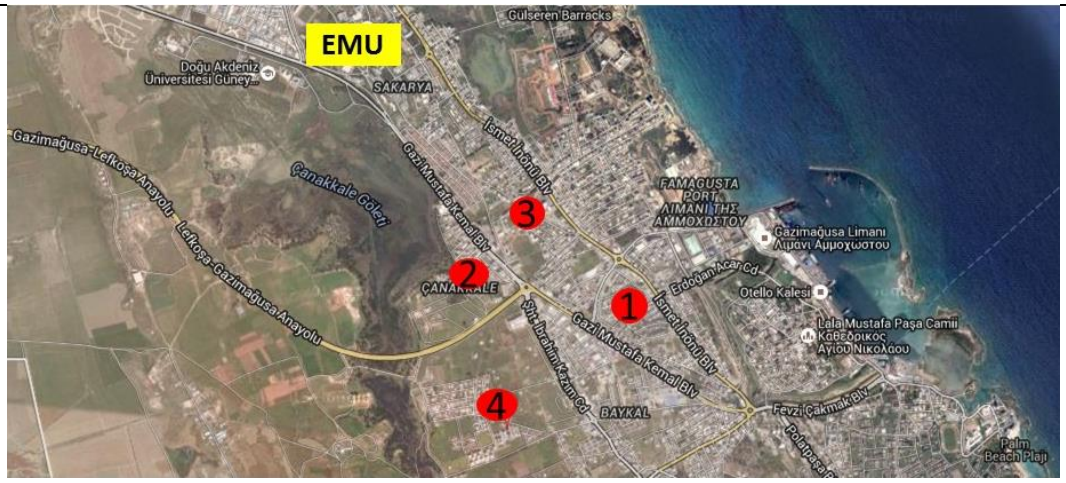
3.2 An Introduction to Case Studies

Four mass housing project from 1980s, 1990s, 2000s, and 2010s from different construction companies have been selected to evaluate user satisfaction in terms of spatial flexibility and adaptability. The main concentration of this thesis is mid-rise apartment types with three bedroom. Information of the selected case studies can be seen in the following table.

Table 3.1: Selected case studies

	1)Governmental Social Housing	2) Levent Apartments	3)Döveç Apartments	4)Noyanlar Apartments
Construction date	1980s	1990s	2000s	2010s
Location	"İsmet İnönü Bulvarı"	Çanakkale	"İsmet İnönü Bulvarı"	Çanakkale Gandular
Unit area	130 m^2	120 m^2	130 m^2	120 m^2
Number of blocks	22	13	4	20
Number of units	176	104	32	160
Number of bedrooms	3	3	3	3
Number of questionnaires	88	52	16	80
Number of owners	65	22	13	52
Number of tenants	23	30	3	28

Location of Case Studies in the City of Famagusta (URL 7).



3.3 Method of Analysis

A survey has been done on four mass housing projects in the city of Famagusta constructed in four decades, 1980s, 1990s, 2000s, and 2010s. These variations give the chance of evaluating the user satisfaction level due to spatial flexibility and adaptability which resulted in some modifications by users. The questionnaires were distributed within 236 dwellers in May 2015. The number of questionnaires for each project is half of total units. 88 questionnaires were answered by the users of social housing in "İsmet İnönü Bulvarı", 52 questionnaires by Levent Apartments' residents in Çanakkale Göleti close to "Gazi-Mustafa Kemal Bulvari". , 16 questionnaires by Döveç Apartments' dwellers close to "İsmet İnönü Bulvarı", behind new Lemar market, and 80 questionnaires were answered by residents of Noyanlar mass housing in Çanakkale Gandular behind China Bazaar. The questionnaires are evaluated by SPSS software. The physical analysis has been done through observations on the site, taking photos, and drawing plans.

3.4 Analysis of Case Studies

3.4.1 Case Study No. 1: Governmental Social Housing in "İsmet İnönü Bulvarı" (1980s)

There are twenty two apartment blocks which are five story buildings. The ground floor has being used for commercial function. The blocks are separate from each other and there is a gap between them. The mentioned housing was constructed in 1980s. The project is located after Cami Cemberi roundabout and mosque. The area of each unit is 130 square meter. The apartment blocks are located face to the main street and behind that. 176 three bedrooms residential units have been constructed.

Figure 3.3: Governmental Social Housing in "İsmet İnönü Bulvarı"

3.4.1.1 Physical Analysis

The original plan can be seen in Figure 3.4. People made various changes in their units such as adding balcony to living room and kitchen, combining bath and WC, and opening the kitchen to living room which will be discussed in the following analysis. Most of the changes such as closing balconies are illegal.

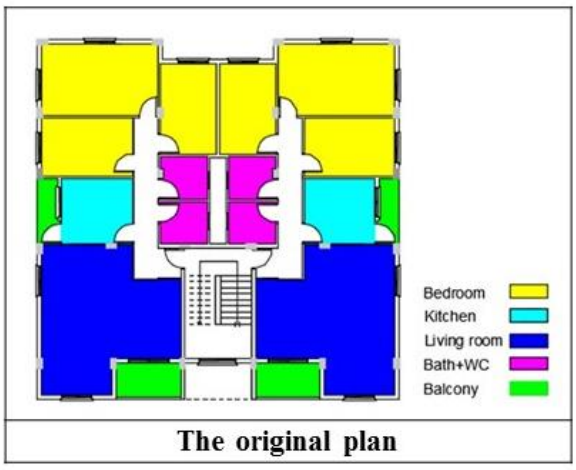


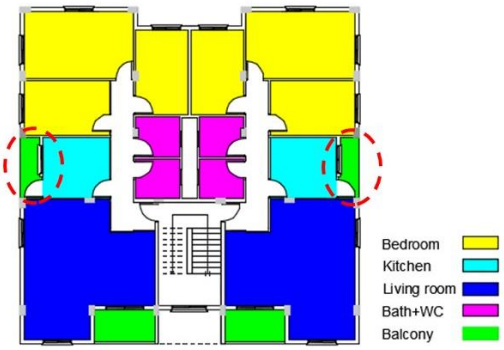
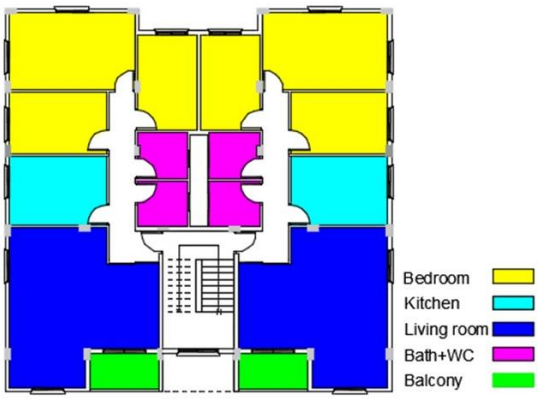
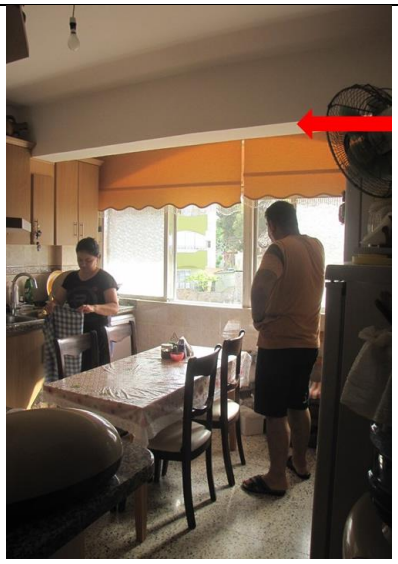
Figure 3.4: Original plan

3.4.1.1.1 Kitchen

Addition of terrace to kitchen which have been done by some units can be seen on façade of the building. One of the residents's main problem was the small size of the kitchen so, some of them added the balcony to the kitchen area for bigger space. The

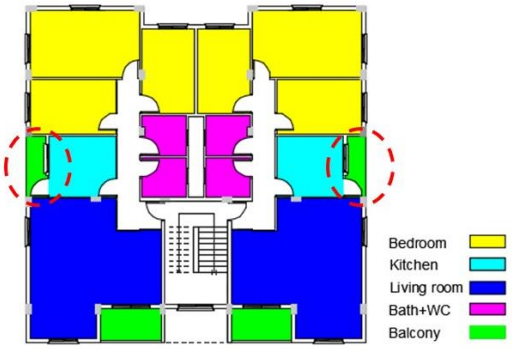
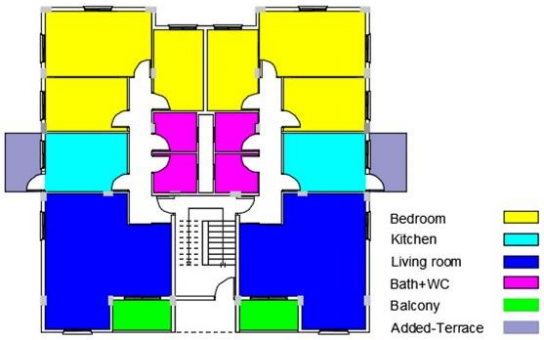
original and changed plan, the exterior and interior view of this modification can be seen in table 3.2.

Table 3.2: Integration of the balcony into the kitchen

Integration of the balcony into the kitchen/ Reflecting on the building facade	
	
Original Plan	Reflecting on the facade
	
Modified Plan	Interior view of modified kitchen

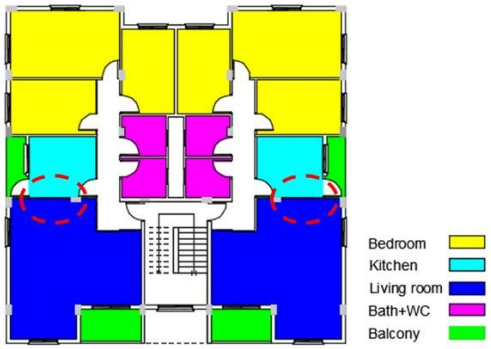
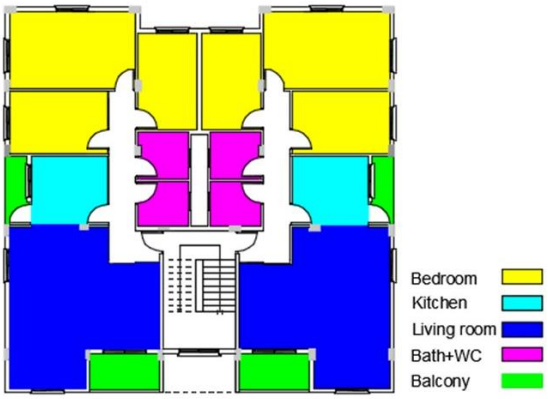
As can be seen in table 3.3, one of the units integrated the balcony into the kitchen area for bigger kitchen space and made a bigger terrace for the kitchen.

Table 3.3: Constructing a bigger terrace

Integration of the balcony into the kitchen and constructing a bigger terrace/ Reflecting on the building facade	
	
Original Plan	Reflecting on the facade
	
Modified Plan	Construction of a bigger balcony
	
View from constructed balcony toward the street	Interior view of the kitchen and balcony

Some other units opened the kitchen to the living room for easier access and perceiving larger area which can be seen in table 3.4.

Table 3.4: Opening kitchen to the living room

Opening kithen to the living room/ Not reflecting on the facade	
	
Original plan	Kitchen without changes
	
Modified Plan	Interior view of opened kitchen to living room

3.4.1.1.2 Living Room

Addition of balcony to living room is another modification which has been done by some users. These changes are visible on the building façade (Table 3.5). The residents found the balcony size useless, thus, some of the units integrated the balcony into the

interior space while some others closed the balcony and kept it separate from the living room. Various usage of the closed balcony can be seen in table 3.6.

Table 3.5: Closing balcony of the living room

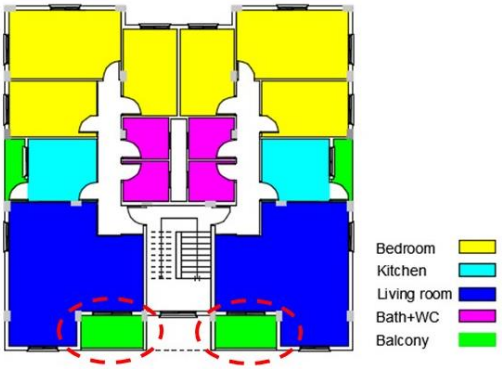
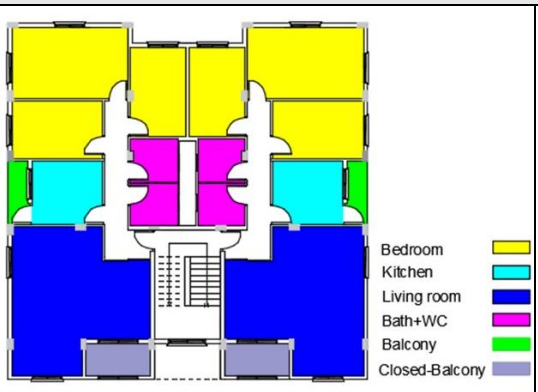
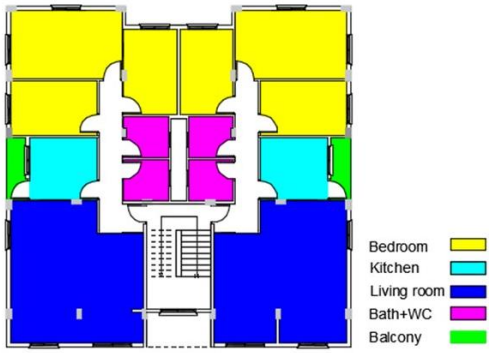
Balcony of the living room	
	
Original Plan	Interior view of unchanged living room
Closing balcony of the living room/Reflecting on the facade	
	

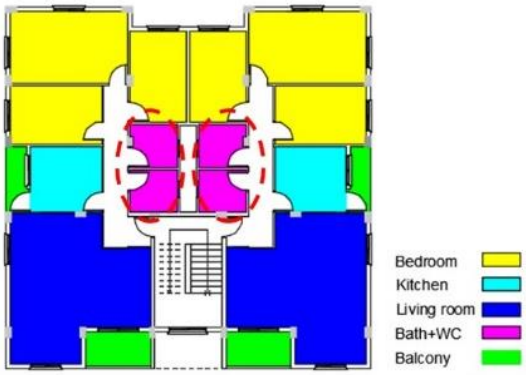
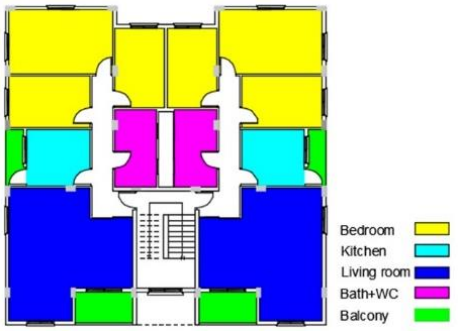
Table 3.6: Various usage of closed balcony

<table>
<tr><th colspan="2">Closing balcony without integration of balcony into the living room / Reflecting on the facade</th></tr>
<tr><td> 
</td><td>  </td></tr>
<tr><td>Plan</td><td>Interior view</td></tr>
<tr><th colspan="2">Integration of balcony into the living room/ Reflecting on the facade</th></tr>
<tr><td> 
</td><td>  </td></tr>
<tr><td>Modified Plan</td><td>Interior view</td></tr>
</table>

3.4.1.1.3 Service Area

The bath and WC are separate in the original plan while some dwellers removed the wall between two wet areas and combined these two spaces together to achieve more comfortable area (table 3.7).

Table 3.7: Change in wet areas

<table>
<tr><th colspan="2">Service areas/ Not reflecting on the facade</th></tr>
<tr><td colspan="2"> 
</td></tr>
<tr><td colspan="2">Original Plan</td></tr>
<tr><td>  </td><td>  </td></tr>
<tr><td>Separate WC</td><td>Separate bath</td></tr>
<tr><td> 
</td><td>  </td></tr>
<tr><td>Modified Plan</td><td>Combination of Bath and WC</td></tr>
</table>

3.4.1.1.4 Bedrooms

Dwellers did not make any changes in the bedrooms but they desire to be able to change.

3.4.1.1.5 Changing Function

As can be seen in table 3.8, some units changed the function of residency to commercial such as beauty salons and insurance office without changing the layout.

Table 3.8: Changing function

Changing function/ Reflecting on the facade
 
Exterior view
 
Interior view

3.4.1.1.6 Potentials of Different Floors

As the ground floor of this mass housing project is designed for commercial function, more potential for ground floor units cannot be seen like other cases. It seems all floors have the same opportunity.

3.4.1.1.7 Adaptation of Shutters to the Building Openings

Adaptation of shutters to windows and doors has various benefits such as increasing privacy, security, sound and thermal insulation, sun protection, and light control. Some units have applied shutters to the windows.

Table 3.9: Adaptation of shutters

Adaptation of shutters to the building openings/ Reflection on the façade	
	
Reflecting on the facade	
	
Reflecting on the facade	**Interior view**

3.4.1.2 Statistical Evaluation

Most of the residents own the units while 26.1% are tenants. Some people did not modify their living place because of their tenancy status (Table 3.10). As tenants do not have any possibility to change, they are omitted from this analysis. The analysis of this study is focused on owners as they have alternation opportunity.

Table 3.10: Ownership status

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	owner	65	73.9	73.9	73.9
	tenant	23	26.1	26.1	100.0
	Total	88	100.0	100.0	

43.1% of the residents are living in social housing between 26 till 30 years and 15.4% of them live there between 21 till 25 years.

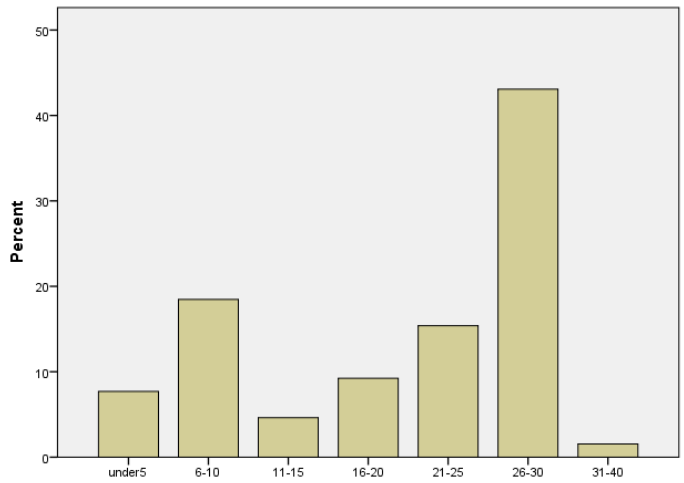


Figure 3.5: Length of residency

Use of space, location of the houses in the city, and price are the most important reasons for choosing this place to live according to residents of this project. Some others choose social housing, according to other issues (Fig. 3.6).

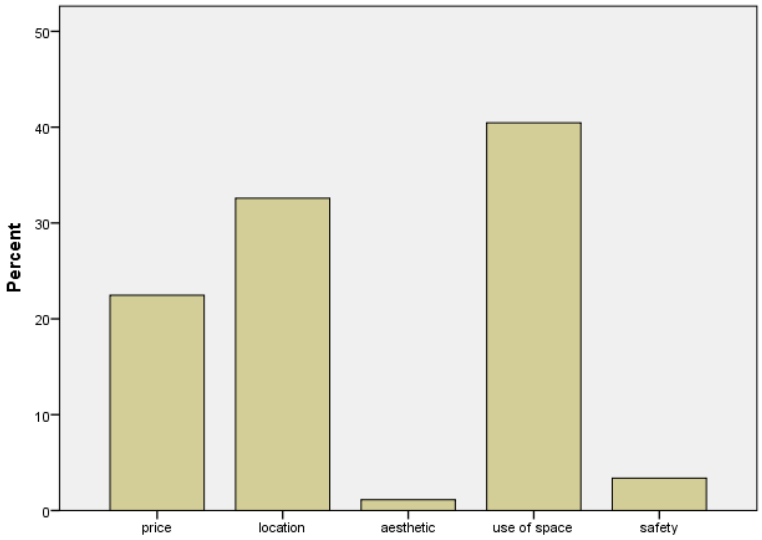


Figure3.6: Reasons of choosing social housing to live

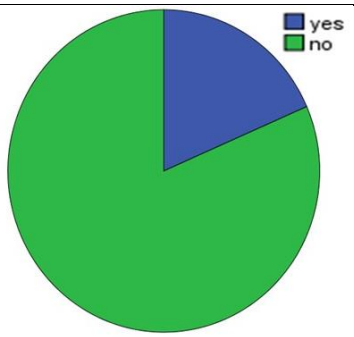
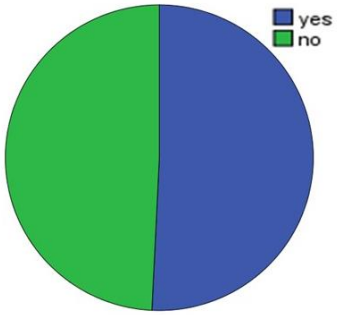
According to table 3.11, 93.8% of dwellers wish to move to another house, while 6.2 like their living place. According to interviews most of the inhabitants like villa type houses.

Table 3.11: Wish to move to another house

		Percent	Valid Percent	Cumulative Percent
Valid	Yes	93.8	93.8	93.8
	No	6.2	6.2	100.0
	Total	100.0	100.0	

As can be seen in the pie chart most of the dwellers (81.5%) do not see the potential of modification in their units. The fact that they made many changes and used most of the potential should be mentioned. So, their idea shows they are seeking for more flexibility and adaptability potential in their living place. As can be seen in the pie chart more than half of the users (50.8%) m`odified their houses (Table 3.12).

Table 3.12: Flexibility potential and alternations

	
Potential of flexibility and adaptability	Users who made changes

As it mentioned above, more than half of the dwellers have made changes in their units. According to figure 3.7, most of modifications have been done in the balcony and kitchen area of the house with the percentage of 54.5%.

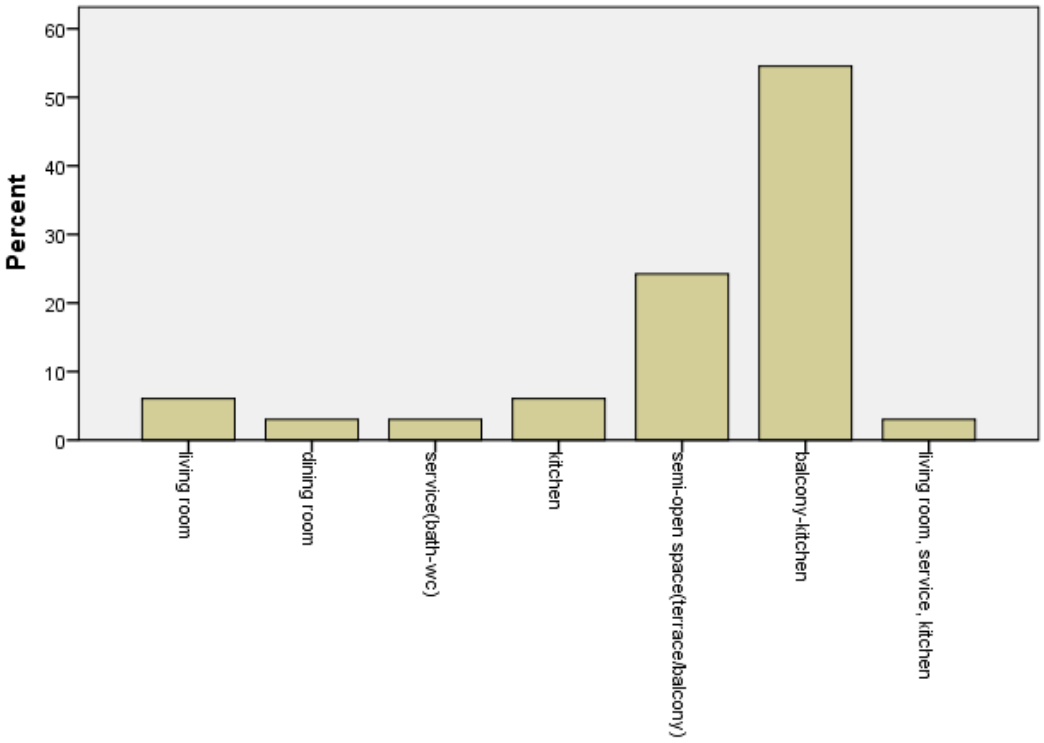


Figure 3.7: Where the modifications happened

Lack of enough usage area and comfort have been the reasons of these modifications by users (Fig.3.8).

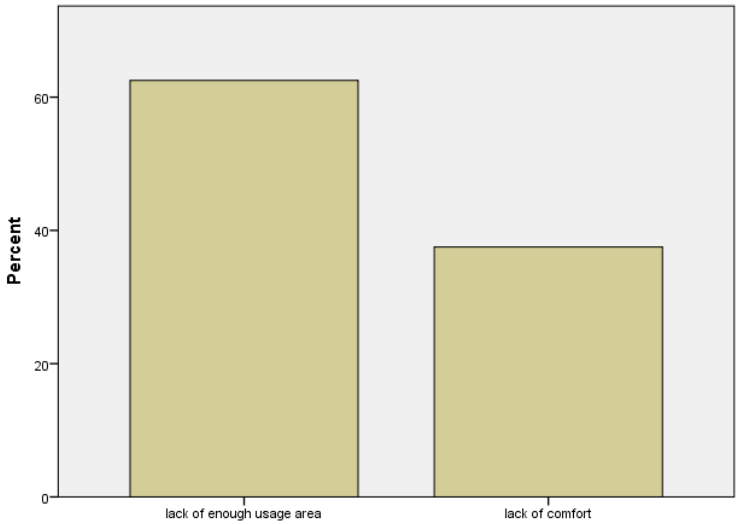


Figure 3.8: Reasons of these modifications

Closing the balcony has been the most common kind of modification (57.6%) in social housing (Fig.3.9).

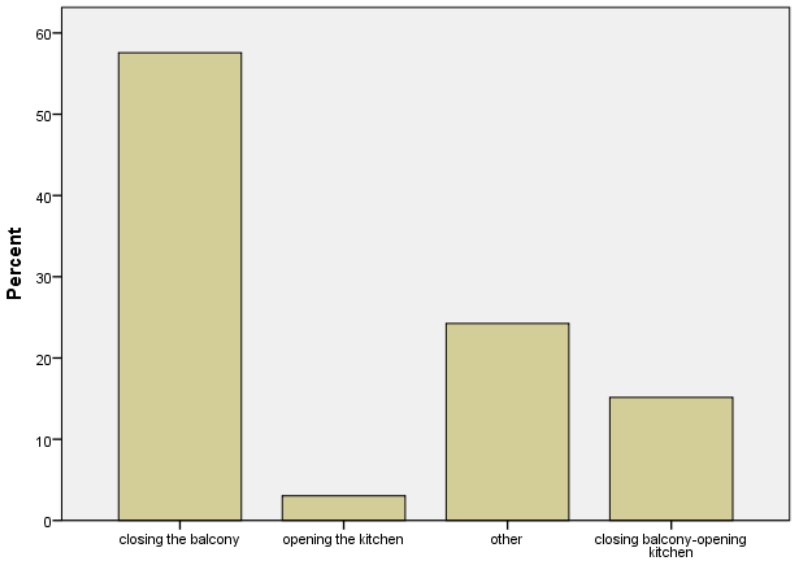


Figure 3.9: Type of modifications

As can be seen in figure 3.10, people have made the changes by themselves (60.6%) and just few of them got help from architects, interior architects, and masters.

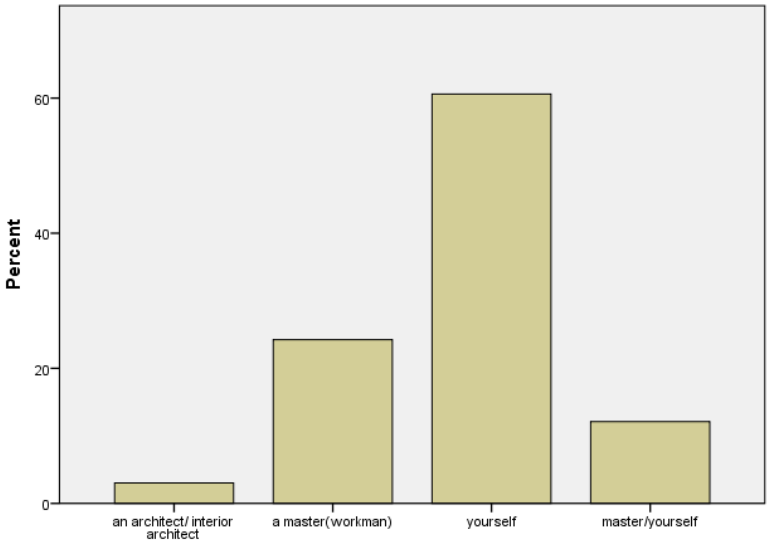


Figure 3.10: Using professional for modification

As can be seen in the following figure, they are still seeking for more alternations in their unit according to their needs, taste, lifestyle, desires and etc. to make them more satisfy such as the alternation of bedrooms (51.5%), semi open spaces, services and dining area (Fig.3.11).

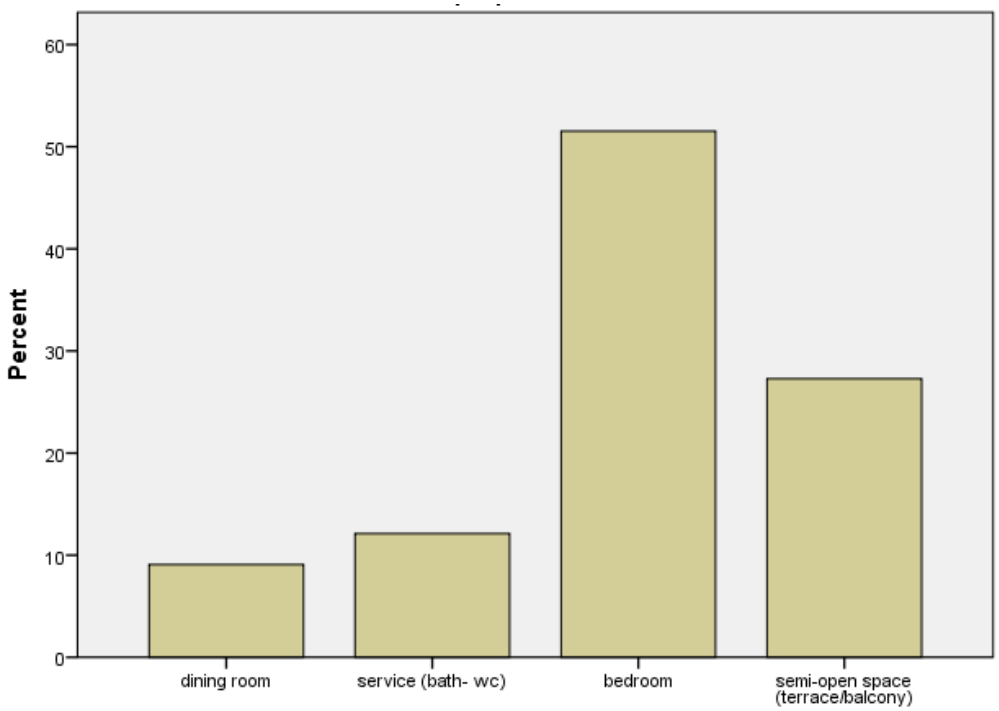


Figure3.11: Parts of units which should be changed according to residents' desires

According to questionnaires none of the users had difficulties with their neighbors and also any restrictions related to the building legislations for modifications.

On the other hand, 49.2% of people did not change their unit, wish to be able to make changes in different parts of their unit especially in service, kitchen, and balcony area (Fig.3.12).

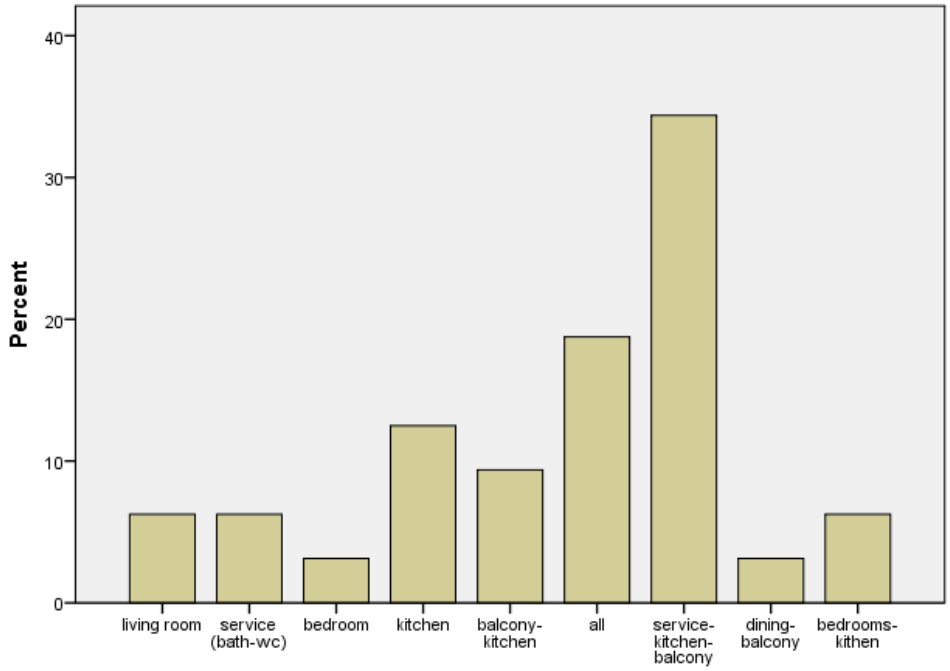


Figure 3.12: The needed changes

Most of them (53.1%) wish to be able to open the kitchen to living room for easier access and bigger perception of the space (Fig.3.13).

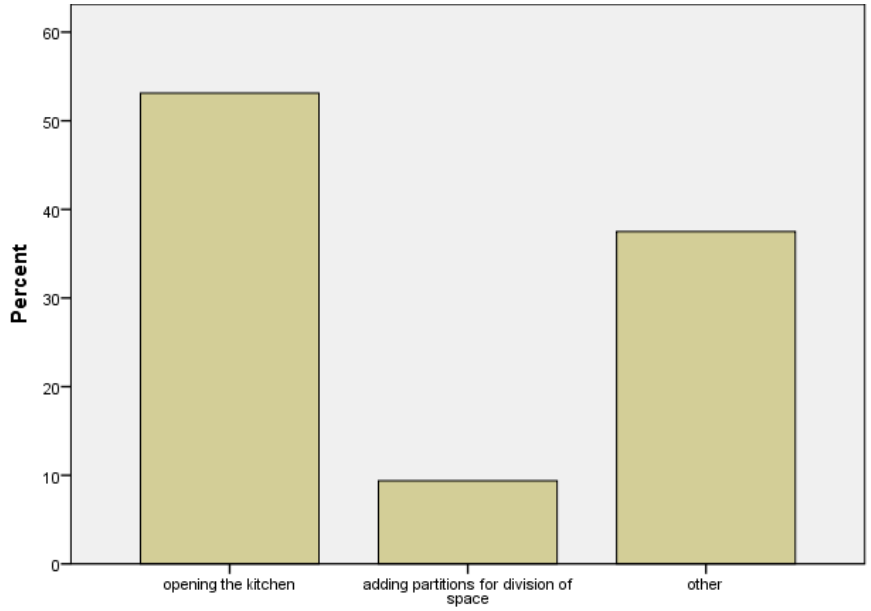


Figure 3.13: Type of changes

Table 3.13 shows that the users did not change their houses because of different reasons. The most significant reasons can be no possibility because of the size and then budget. Some others did not change because of location of the installation system, structural system, and other reasons.

Table 3.13: Reasons of not to make any changes

		Percent	Valid Percent	Cumulative Percent
Valid	no possibility because of the size	53.2	53.2	53.2
	budget	25.5	25.5	78.7
	because of the structural system	8.5	8.5	87.2
	location of installation system(such as pipes)	10.6	10.6	97.9
	others	2.1	2.1	100.0
	Total	100.0	100.0	

Satisfaction level:

According figure 3.14, 46.2% of residents are neither satisfied nor dissatisfied regarding comfort of different spaces of their units.

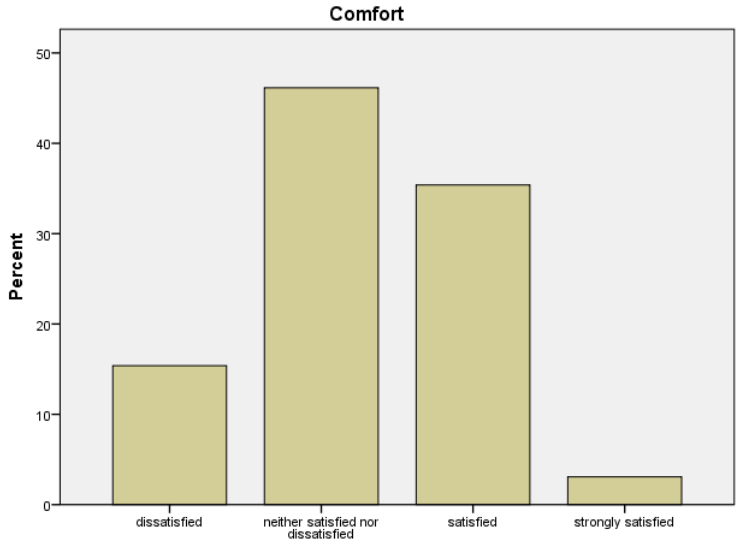


Figure 3.14: Satisfaction regarding comfort

As can be seen in figure 3.15, satisfied status has the highest level (64.6%) for privacy of all spaces such as privacy of living room, kitchen, and so on.

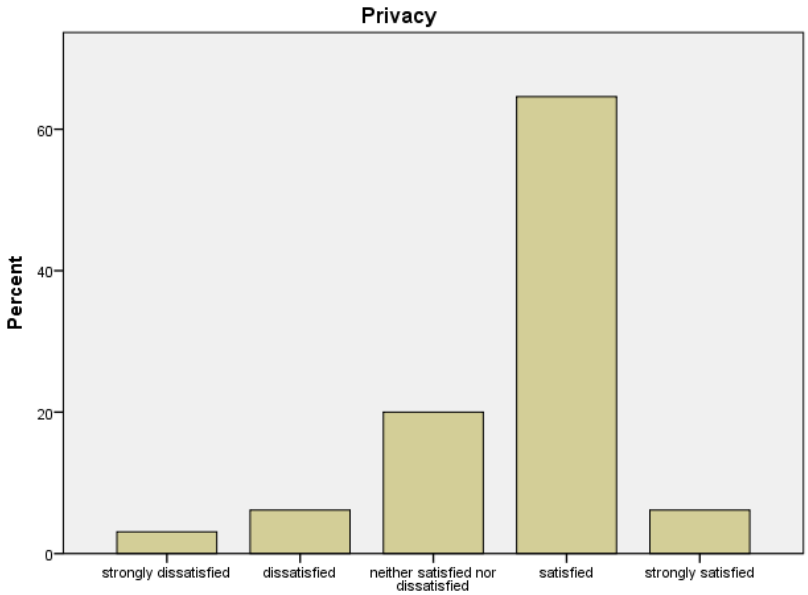


Figure 3.15: Satisfaction regarding privacy

Almost half of the users, 47.7% of residents are satisfied regarding size of living room, dining area, kitchen, semi open spaces, and other spaces of their house (Fig. 3.16).

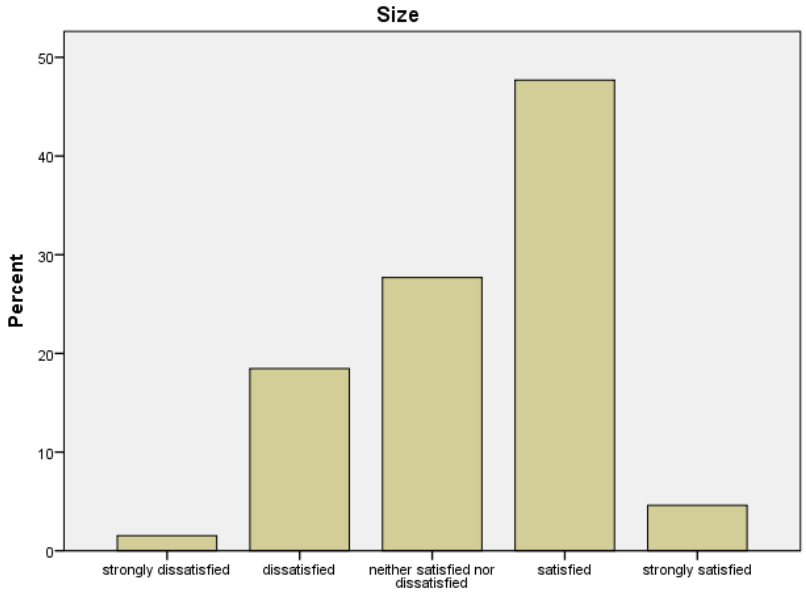


Figure3.16: Satisfaction regarding size

As can be seen in figure 3.17, 56.9% of residents are satisfied with location of living room, kitchen, bedrooms, and other spaces.

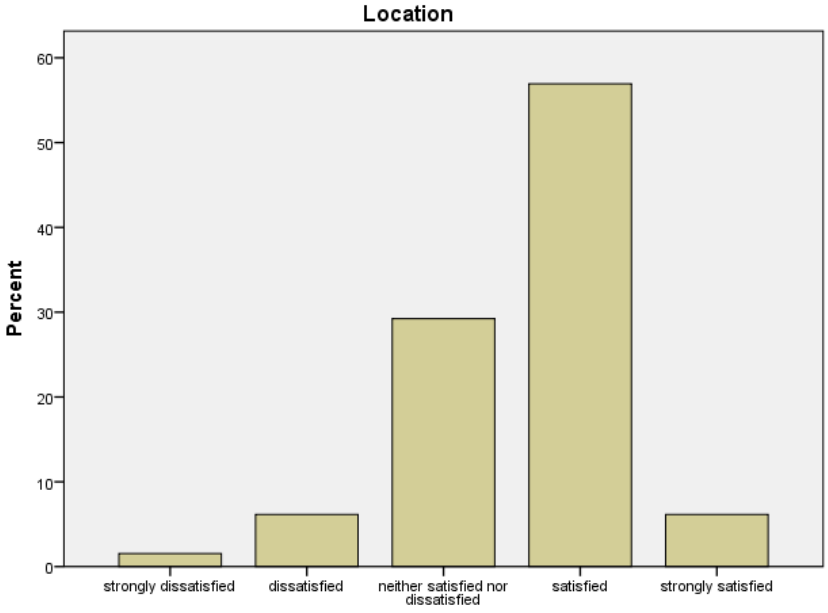


Figure 3.17: Satisfaction regarding location of spaces

Satisfied status has the highest level (49.2%) regarding usage of space in living room, bedrooms, kitchen, and so on (Fig. 3.18).

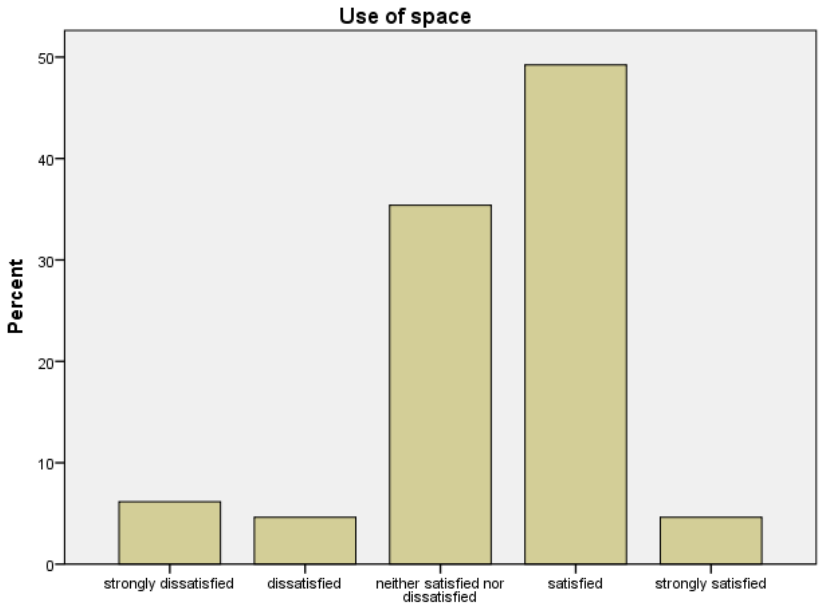


Figure 3.18: Satisfaction regarding use of space

Nearly half of dwellers (46.2%) are satisfied with access from other spaces to living room, kitchen, bedrooms, and etc. (Fig.3.19).

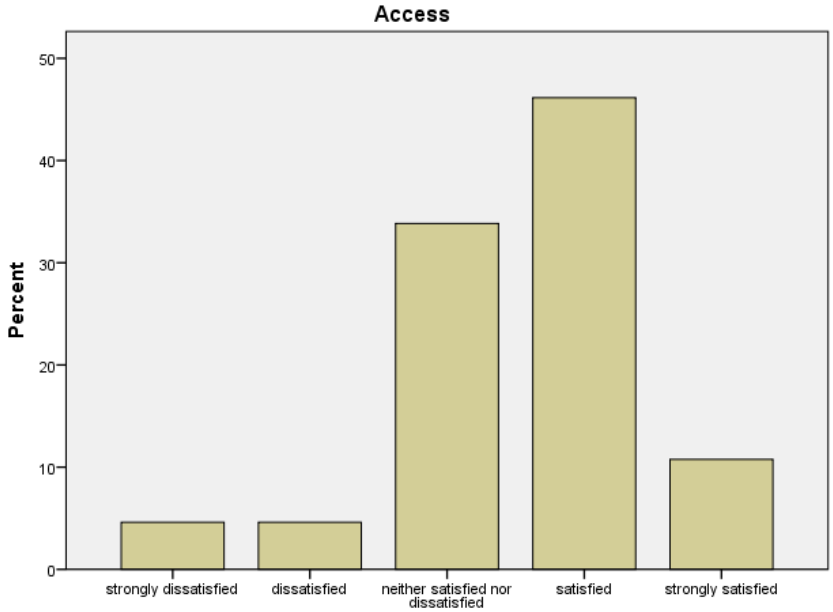


Figure 3.19: Satisfaction regarding access

Satisfied level has the highest level of relationship between spaces with percentage of 49.2% of users (Fig.3.20).

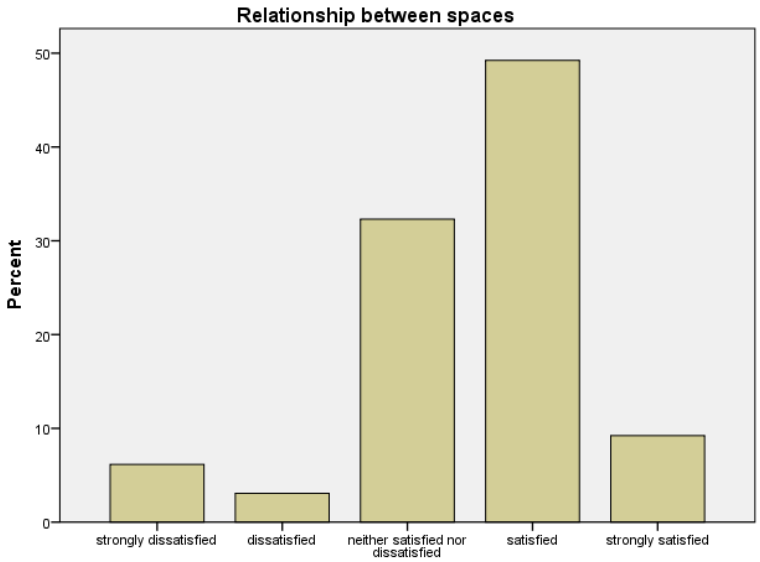


Figure 3.20: Satisfaction regarding relationship between spaces

47.7% of residents are neither satisfied nor dissatisfied with location of openings of their units as it gives them lower opportunity to make changes in their units (Fig.3.21).

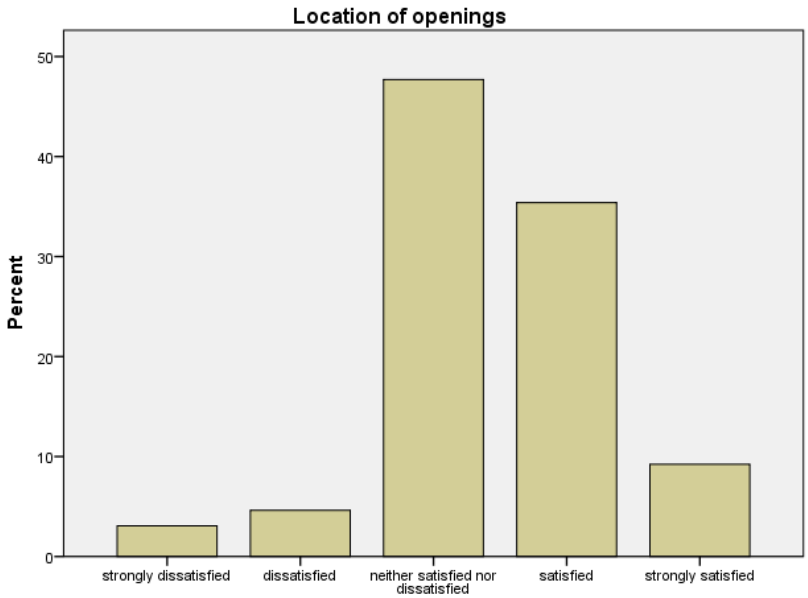


Figure 3.21: Satisfaction regarding location of openings

As can be seen in figure 3.22, 43.1% of users considered rate 3 for circulation between spaces.

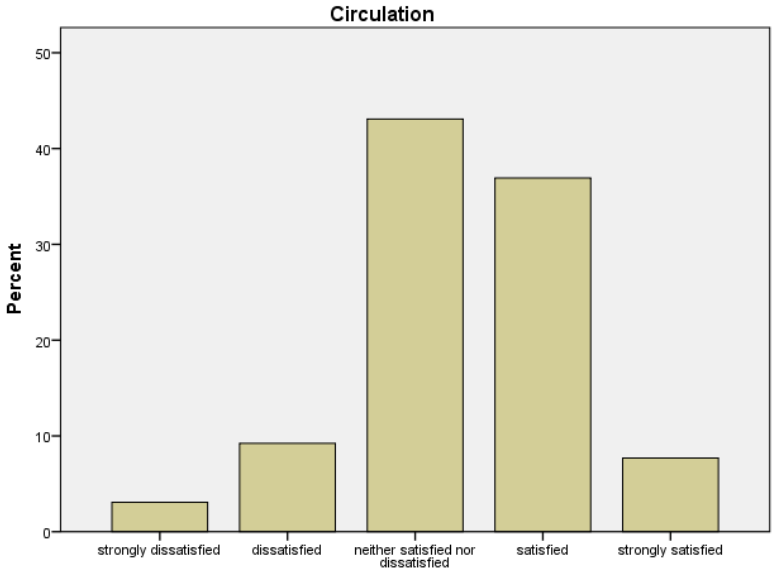


Figure 3.22: Satisfaction regarding circulation

Most of the residents do not like aesthetic aspects of these social housing, 26.2% of them are strongly dissatisfied, 40% are dissatisfied, while 33.8% are neither satisfied nor satisfied with this issue. None of the users is satisfied with aesthetic issues of this mass housing project (Fig.3.23).

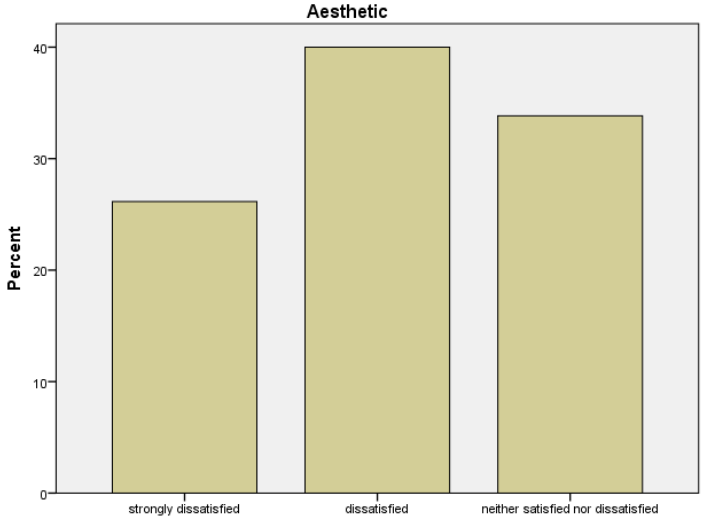


Figure 3.23: Satisfaction regarding aesthetic

Table 3.14 shows the total satisfaction level of residents regarding comfort, privacy, size, location, use of space, access from other spaces to each function, relationship between spaces, location of openings, circulation between spaces, and aesthetic aspects of the social housing.

Table 3.14: General satisfaction level

		Percent	Valid Percent	Cumulative Percent
Valid	Strongly dissatisfied	1.5	1.5	1.5
	Dissatisfied	6.2	6.2	7.7
	Neither satisfied nor dissatisfied	44.6	44.6	52.3
	Satisfied	46.2	46.2	98.5
	Strongly satisfied	1.5	1.5	100.0
	Total	100.0	100.0	

General satisfaction of residents, according to the mentioned issues can be seen in figure 3.24. Neither satisfied nor dissatisfied with 44.6% has the second status after satisfied status, which has the highest level with percentage of 46.2%.

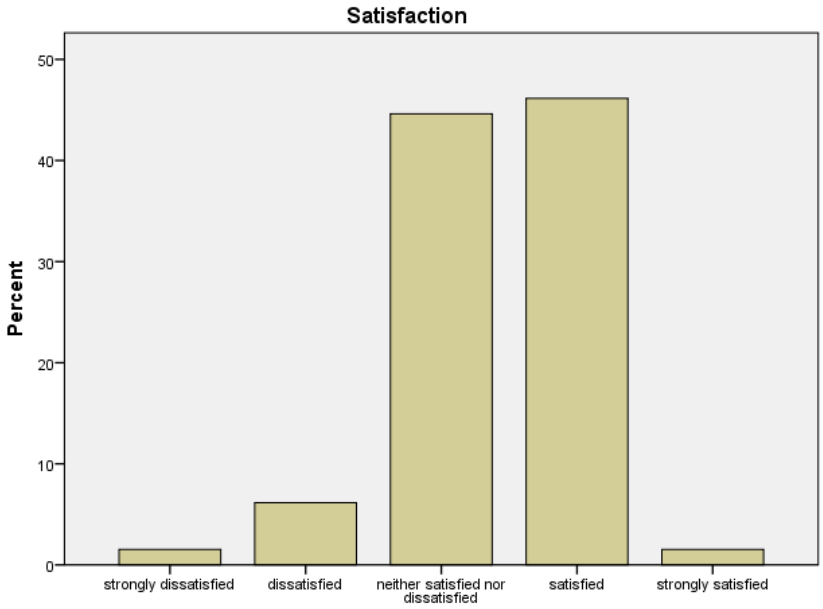


Figure 3.24: General Satisfaction Level

3.4.2 Case Study No. 2: Levent Apartments in Çanakkale Göleti close to "Gazi-Mustafa Kemal Bulvari" (1990s)

There are thirteen apartment blocks while being four story buildings. The blocks are separate from each other and there is a gap between them. These housing were constructed in 1990s with 104 units in total. The project is located in Çanakkale Göleti close to "Gazi-Mustafa Kemal Bulvari". The area of each unit is 120 square meter with three bedrooms. Levent apartment blocks can be seen in figure 3.25.

Figure 3.25: Levent Apartments

3.4.2.1 Physical Analysis

Figure 3.26 shows the original plan. Closing the balcony of the living room and kitchen, and opening the kitchen to the living room are the type of alterations by residents of Levent Apartments. Most of the changes such as closing balconies or taking garden on their possession on the ground floor are illegal.

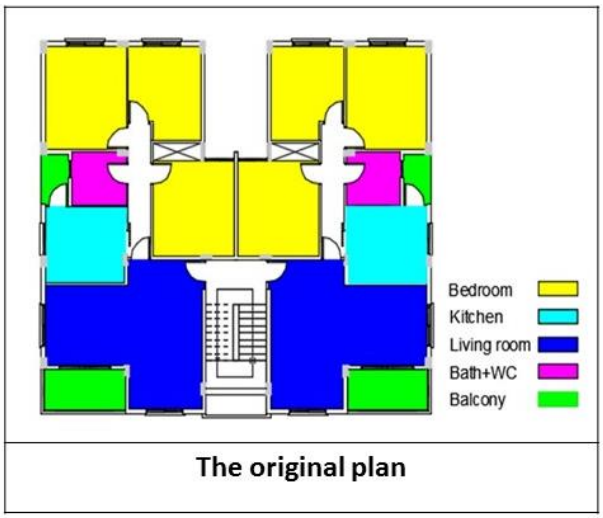
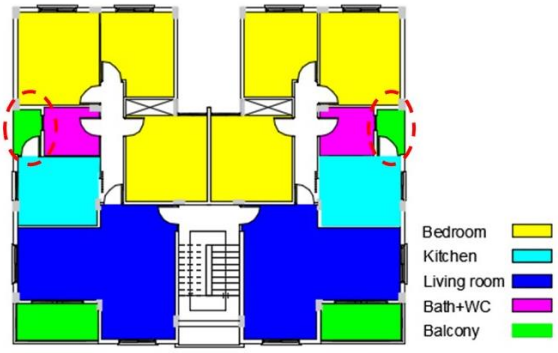
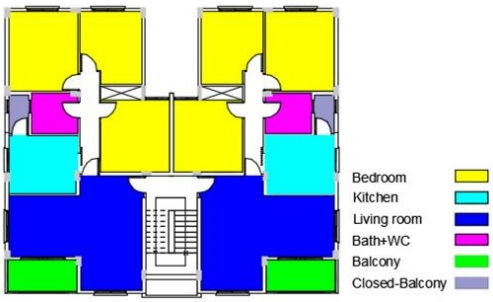


Figure 3.26: Original plan

3.4.2.1.1 Kitchen

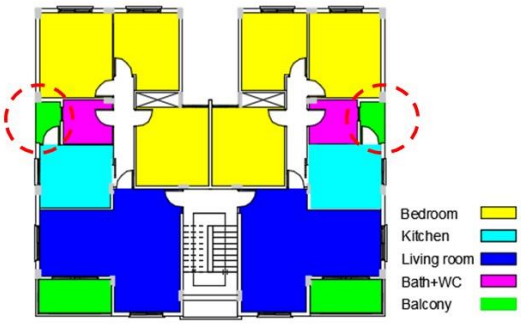
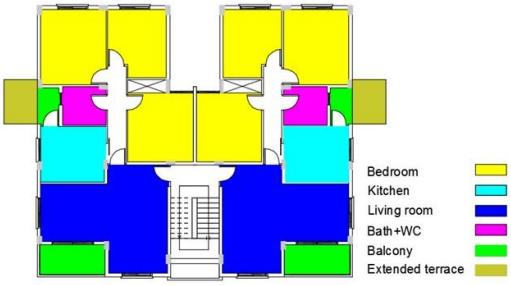
Closing the kitchen balcony which has been done by some units can be seen on façade of the building . One of the main problems from the residents' point of view was the small size of the kitchen so, some of them closed the balcony of the kitchen to use as storage. The fact that the size of the balcony is not useful from dwelleres' point of view should be mentioned as well. They made the space of balcony more efficient by this modification.

Table 3.15: Closing balcony of the kitchen

Closing balcony of the kitchen and using it as a storage/ Reflected on the facade	
	
Original Plan	Reflecting on the facade
	
Plan	Closing kitchen balcony

As can be seen in table 3.16, extension of the kitchen balcony and construction a bigger terrace is another kind of alternation by users due to inappropriate size of balcony.

Table 3.16: Constructing a bigger terrace

<table>
<tr><th colspan="2">Extension of the balcony and Constructing a bigger terrace/ Reflecting on the facade</th></tr>
<tr><td> 
</td><td>  </td></tr>
<tr><td>Original Plan</td><td>Kitchen balcony before changes</td></tr>
<tr><td> 
</td><td>  </td></tr>
<tr><td>Modified Plan</td><td>Construction of a bigger terrace/ Reflecting on the facade</td></tr>
<tr><td colspan="2">  </td></tr>
<tr><td colspan="2">View from the extended terrace</td></tr>
</table>

some of the units opened the kitchen to the living room for easier access and perceiving larger area which can be seen in the following photos in tables 3.17 and 3.18.

Table 3.17: Opening Kitchen to living room

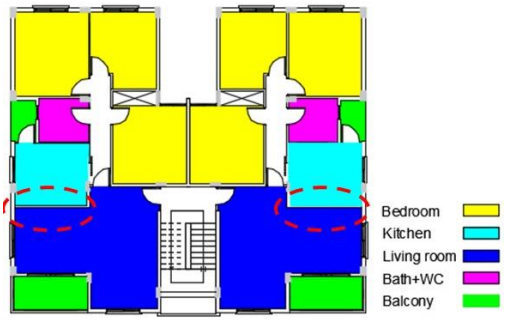
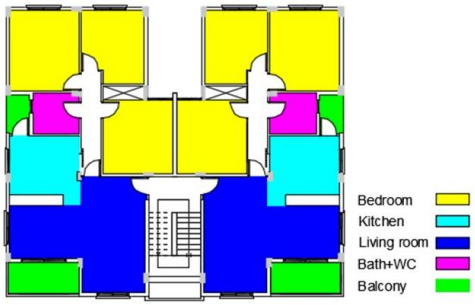
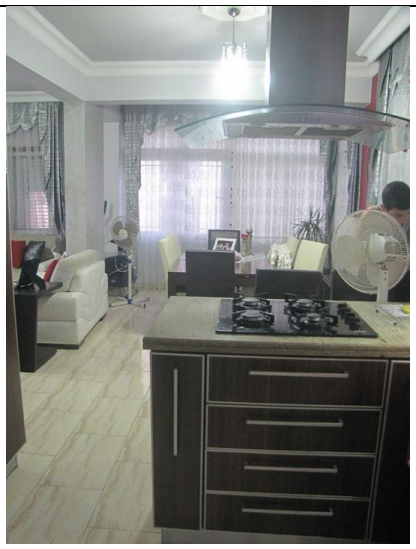
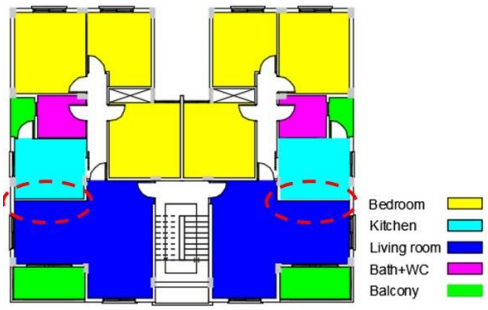
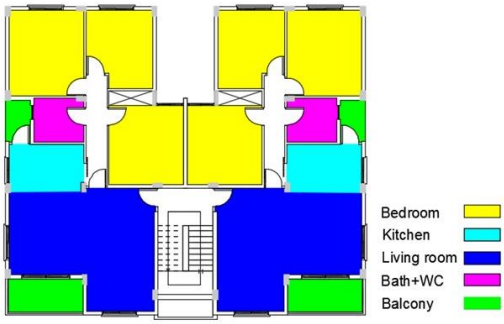
<table>
<tr><th colspan="2">Opening kitchen to the living room/ Not Reflecting on the facade</th></tr>
<tr><td> 
</td><td> 
</td></tr>
<tr><td>Original Plan</td><td>Plan</td></tr>
<tr><td>  </td><td>  </td></tr>
<tr><td>View from living room to the opened kitchen</td><td>View from opened kitchen to the living room</td></tr>
</table>

Table 3.18: Opening kitchen to living room

Opening kitchen to the living room/ Not Reflecting on the facade	
	
Original Plan	Plan
	
View from living room to the opened kitchen	View from opened kitchen to the living room

3.4.2.1.2 Living Room

As can be seen in tables 3.19 and 3.20, some units found the size of balcony useless, so some of them integrated the balcony into the interior space of living room and some others closed the balcony while keeping separated from the living room for various usages.

Table 3.19: Balcony of the living room

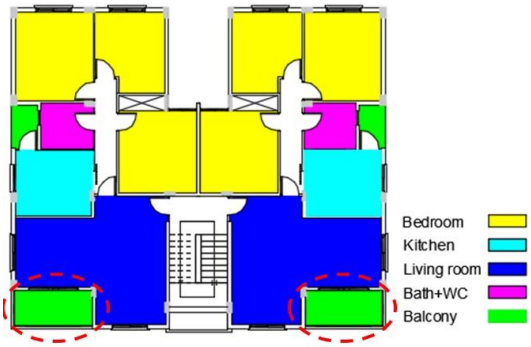
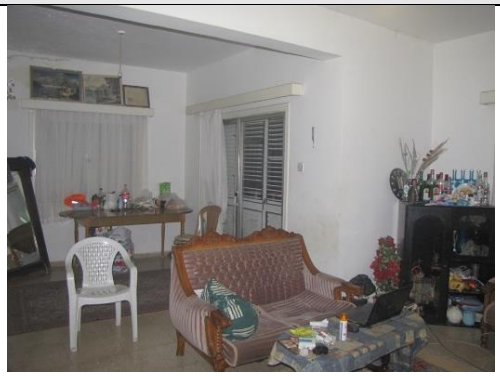
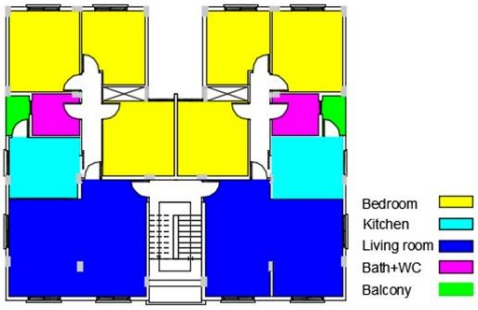
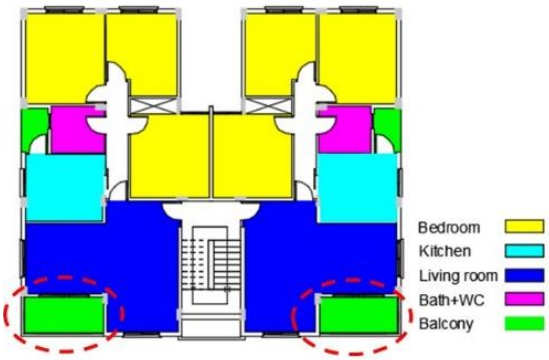
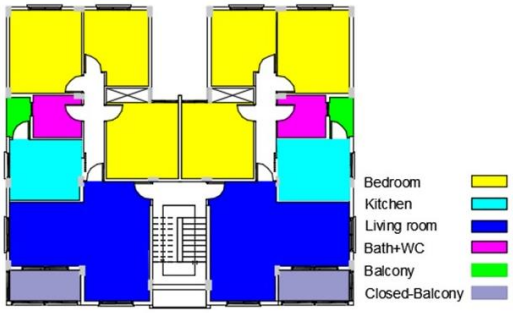
<table>
<tr><th colspan="2">Balcony of the living room</th></tr>
<tr><td> 
</td><td>  </td></tr>
<tr><td>Original Plan</td><td>Interior view of unchanged living room</td></tr>
<tr><th colspan="2">Integration of balcony into interior space of living room/Reflecting on the facade</th></tr>
<tr><td> 
</td><td>  </td></tr>
<tr><td>Plan</td><td>Closing balcony reflecting on the facade</td></tr>
<tr><td colspan="2">  </td></tr>
<tr><td colspan="2">Interior view</td></tr>
</table>

Table 3.20: Balcony of living room

<table>
<tr><th colspan="2">Closing balcony of the living without integration of balcony into interior space of living room/Reflecting on the facade</th></tr>
<tr><td colspan="2"> 
</td></tr>
<tr><td colspan="2">Original plan</td></tr>
<tr><td> 
</td><td>  </td></tr>
<tr><td>Plan</td><td>Reflected on the facade</td></tr>
</table>

3.4.2.1.3 Service Area

Dwellers of this mass this mass housing project did not make any changes in service area of their units due to the small size of this area.

3.4.2.1.4 Bedrooms

Residents did not modify the bedrooms but they desire to make alternations.

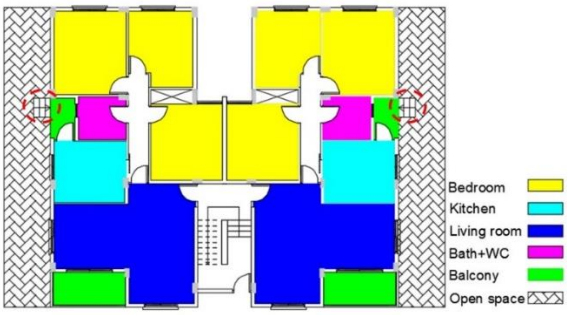
3.4.2.1.5 Changing Function

Changing function cannot be seen in this apartments like the first case study.

3.4.2.1.6 Potentials of Different Floors

The units located on the ground floor have the opportunity of using the gap between two blocks as their private open or semi-open space. Some of the ground floor units closed the gap between two blocks and added a roof to create a private semi-open space for their units. They use these spaces for parking, gathering area, a safer play area for their kids, and other activities. Some other added some steel elements on top of it to be able to cover this created private semi-open space with textile whenever is needed (Table 3.21).

Table 3.21: Ground floor opportunities

More opportunity for ground floor units	
	
	
	

3.4.2.1.7 Adaptation of Shutters to the Building Openings

Adaptation of shutters to windows and doors has various benefits such as increasing privacy, security, sound and thermal insulation, sun protection, and light control. Some units have applied shutters to the windows.

Table 3.22: Adaptation of shutters

Adaptation of shutters to the building openings/ Reflection on the façade	
	

3.4.2.2 Statistical Evaluation

Most of the residents live in rental units and just 42.3% of dwellers live in their own units. Some people did not modify their living place because of their tenancy status (Table 3.23). As tenants do not have any possibility to change, they are omitted from this analysis. The analysis of this study is focused on owners as they have alternation opportunity.

Table 3.23: Ownership status

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	owner	22	42.3	42.3	42.3
	tenant	30	57.7	57.7	100.0
	Total	52	100.0	100.0	

36.4% of residents live in Levent apartments between 11 till 15 years while 22.7% live there between 16 till 20 years (Fig.3.27).

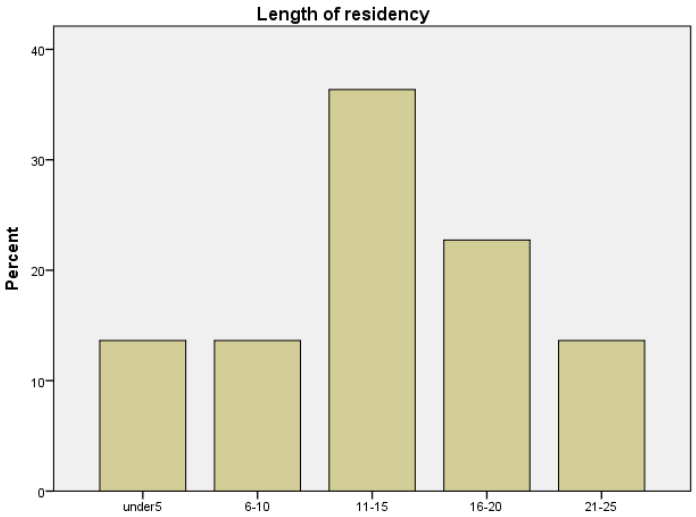


Figure 3.27: Length of residency

Price and use of space are the most important reasons for choosing this place to live according to residents of this project (Fig.3.28).

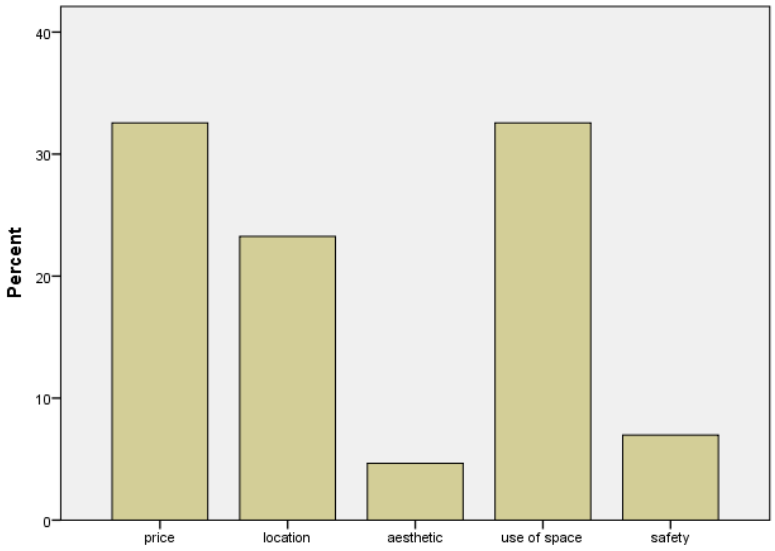


Figure 3.28: Reasons of choosing Levent apartments to live

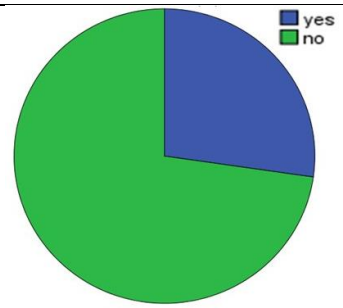
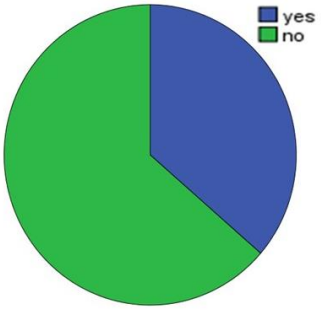
According to table 3.24, 77.3% of dwellers wish to move to another house, while 22.7% like their living place. According to interviews most of the inhabitants like to live in villa type houses.

Table 3.24: Wish to move to another house

		Percent	Valid Percent	Cumulative Percent
Valid	Yes	77.3	77.3	77.3
	No	22.7	22.7	100.0
	Total	100.0	100.0	

As can be seen in the pie chart most of the dwellers (72.7%) do not see the potential of modification in their units. On the other hand, most of the users (63.6%) did not modify their houses. According to observations, the dwellers have lower income level rather than the other cases (Table 2.25).

Table 3.25: Flexibility potential and alternations

	
Potential of flexibility and adaptability	Users who made changes

As I t mentioned before, just 36.4% of residents have made changes in their unit. According to figure 3.29, 50% and 37.5% of modifications have been done in the balcony and kitchen area of the house.

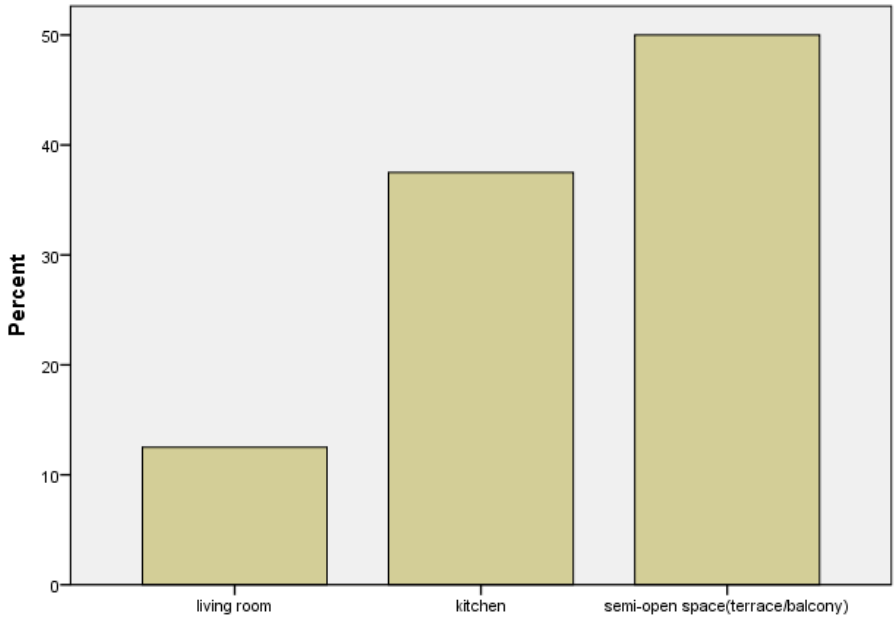


Figure 3.29: Where the modifications happened

Lack of enough usage area and comfort have been the most important reasons of these modifications by users (Fig.3.30).

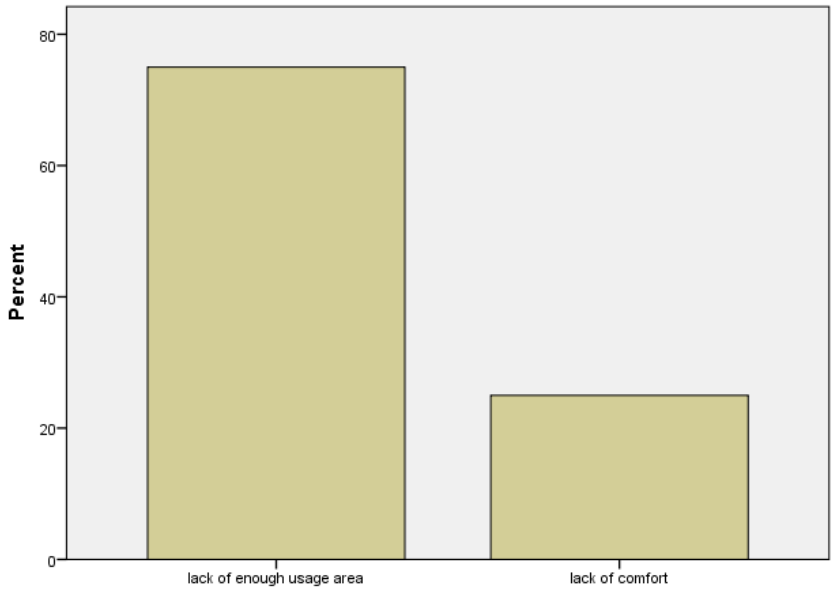


Figure 3.30: Reasons of these modifications

Closing the balcony has been the most common kind of modification in Levent apartments (Fig.3.31).

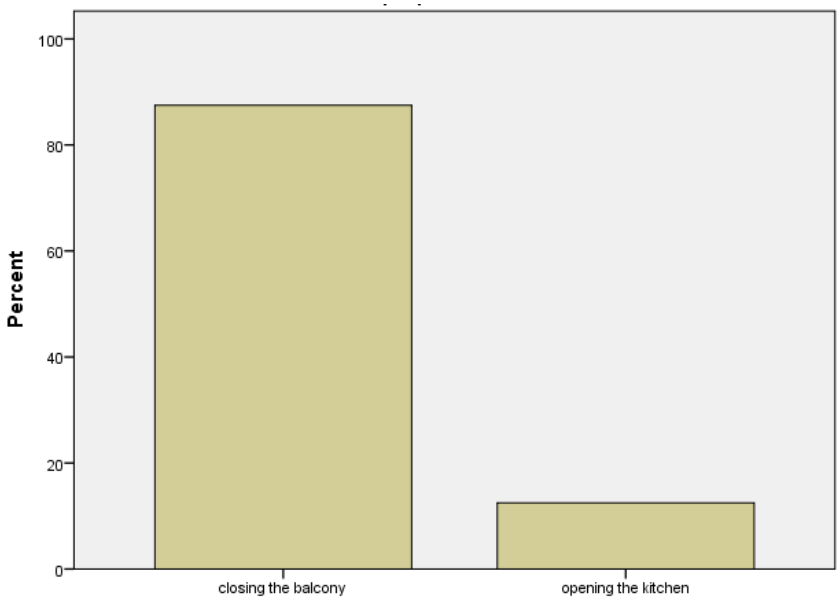


Figure 3.31: Type of modifications

As can be seen in figure 3.32, people have made the changes by themselves (62.5%) and just few of them got help from civil engineer, and masters.

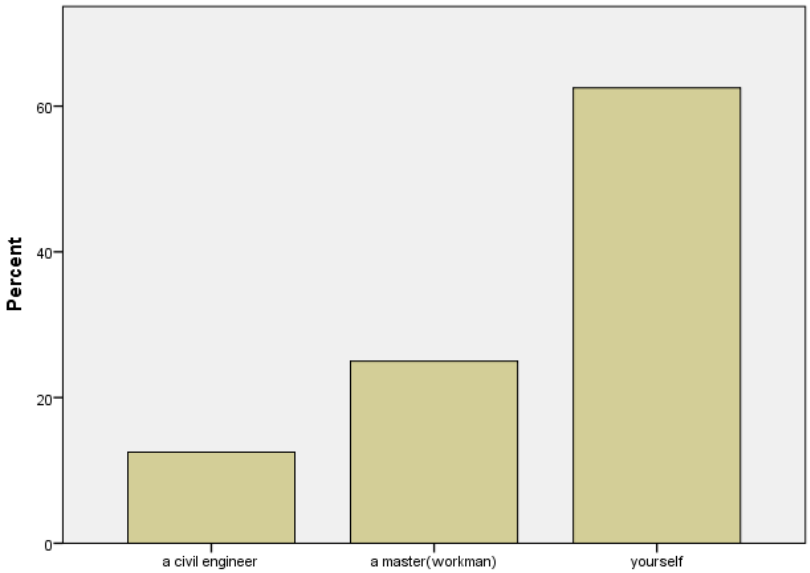


Figure 3.32: Using professional for modification

62.5% of residents want changes in bedrooms, kitchen, and service areas of their unit according to their needs, taste, lifestyle, desires and etc. to make them more satisfy. So, they want more flexibility opportunity (Fig.3.33).

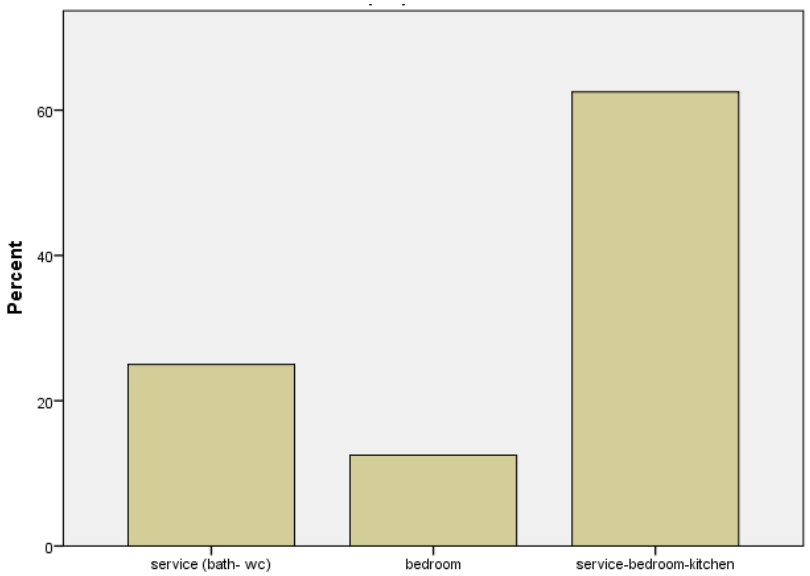


Figure 3.33: Parts of units which should be changed according to residents' desires

According to questionnaires none of the users had difficulties with their neighbors and also any restrictions related to the building legislations for modifications. On the other

hand, 63.6% of users did not make any changes in their units, wish to be able to make changes in all parts of their unit (Fig.3.34).

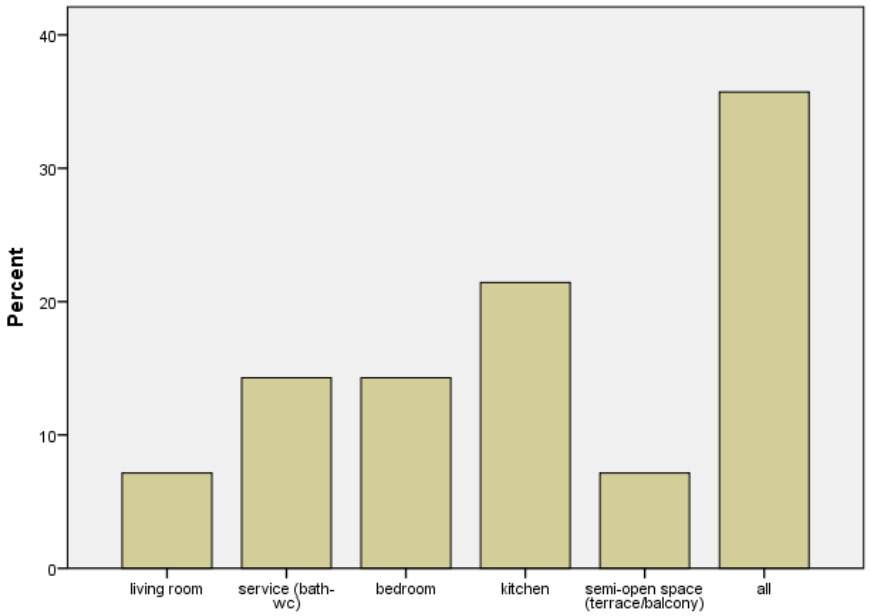


Figure 3.34: The needed changes

Most of them (57.1%) wish to be able to open the kitchen to living room for easier access and bigger perception of the space (Fig.3.35).

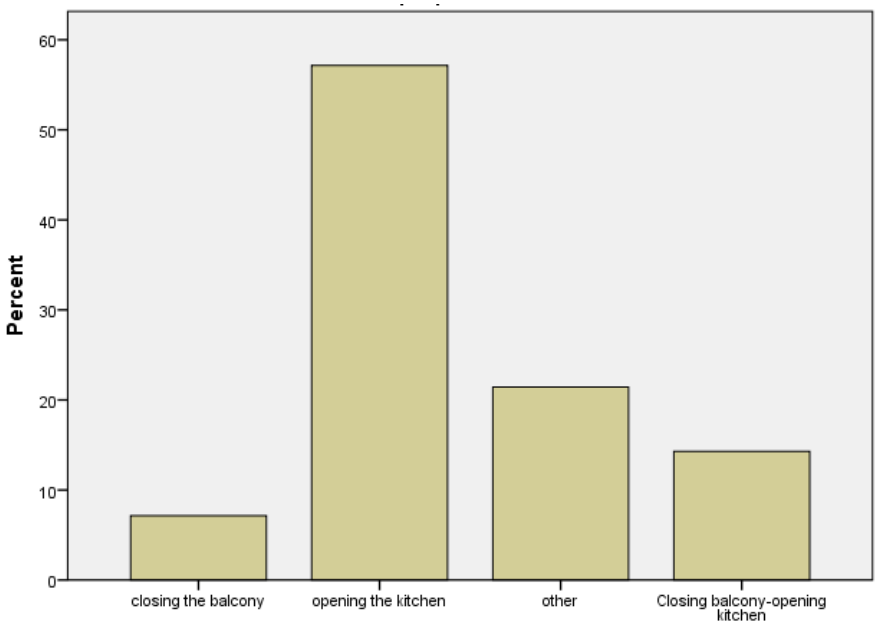


Figure 3.35: Type of changes

Table 3.26 shows that the users did not change their houses because of different reasons. The most significant reasons can be no possibility because of the size and budget. Some of them did not change because they do not know how to change, location of the installation system, structural system, and etc.

Table 3.26: Reasons of not to make any changes

		Percent	Valid Percent	Cumulative Percent
Valid	no possibility because of the size	42.9	42.9	42.9
	budget	28.6	28.6	71.4
	because of the structural system	4.8	4.8	76.2
	do not know how to do it	4.8	4.8	81.0
	location of installation system(such as pipes)	14.3	14.3	95.2
	location of the openings	4.8	4.8	100.0
	Total	100.0	100.0	

Satisfaction level:

According figure 3.36, half of residents are neither satisfied nor dissatisfied regarding comfort of different spaces of their units.

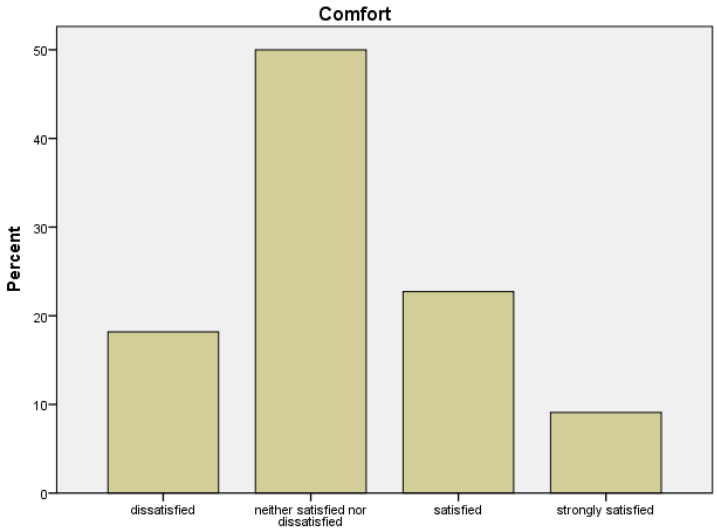


Figure 3.36: Satisfaction regarding comfort

As can be seen in figure 3.37, satisfied status has the highest level (36.4%) for privacy of all spaces such as privacy of living room, kitchen, and so on, while 31.8% considered rate 3 for privacy.

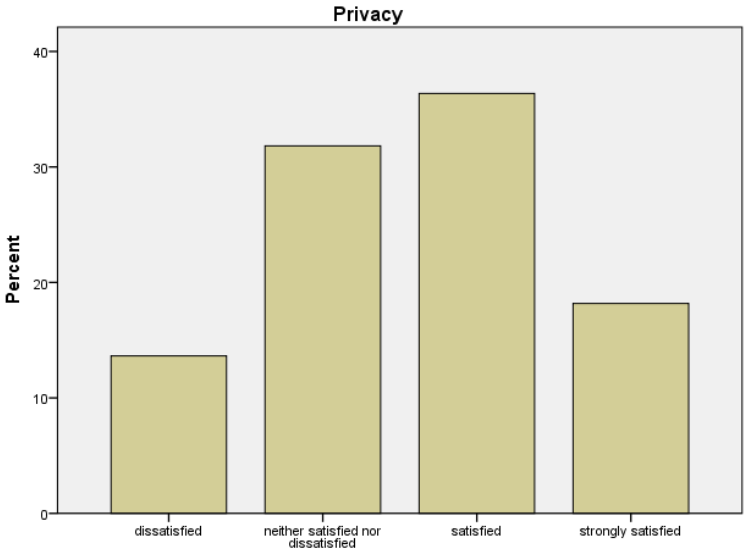


Figure 3.37: Satisfaction regarding privacy

45.5% of residents are neither satisfied nor dissatisfied regarding size of living room, dining area, kitchen, semi open spaces, and other spaces of their house (Fig. 3.38).

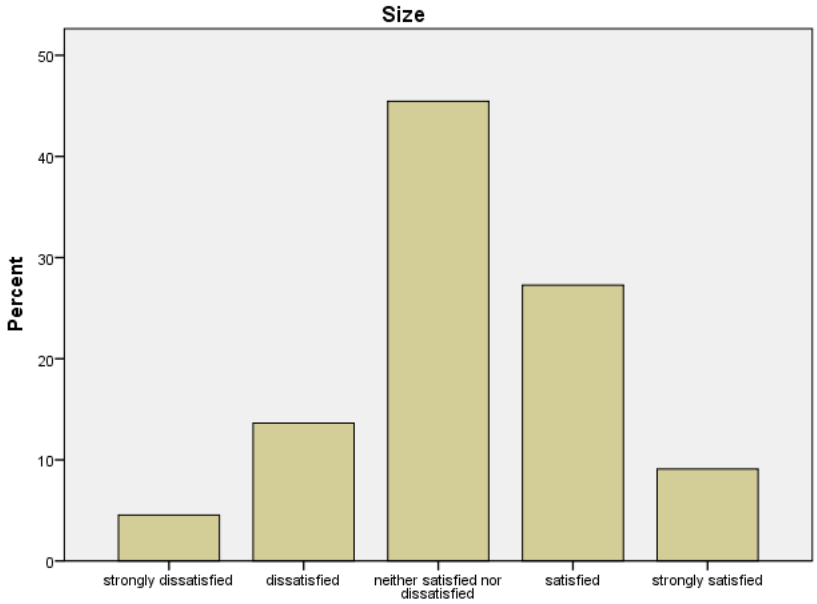


Figure 3.38: Satisfaction regarding size

As can be seen in figure 3.39, 59.1% of residents are satisfied with location of living room, kitchen, bedrooms, and other spaces.

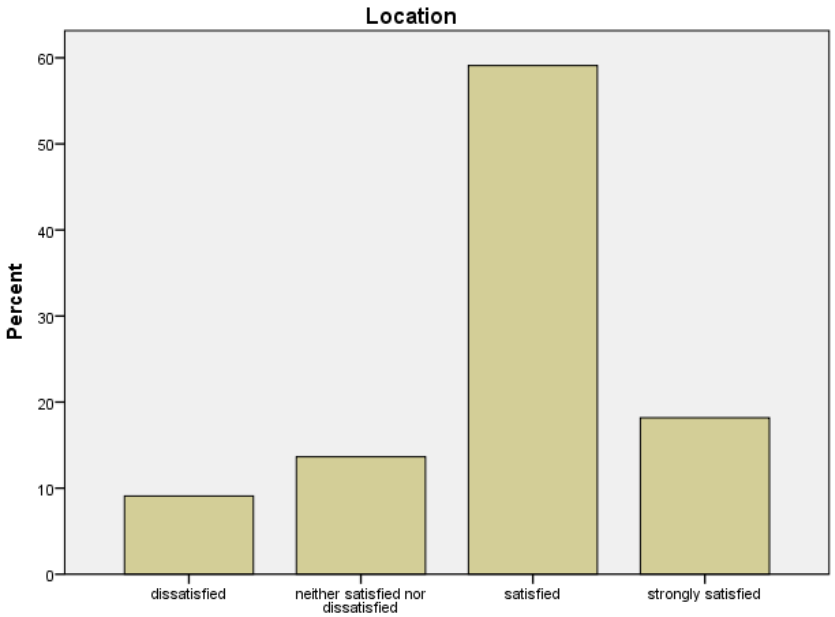


Figure 3.39: Satisfaction regarding location of spaces

Neither satisfied nor dissatisfied status has the highest level (54.5%) regarding usage of space in the living room, bedrooms, kitchen, and so on (Fig. 3.40)**.**

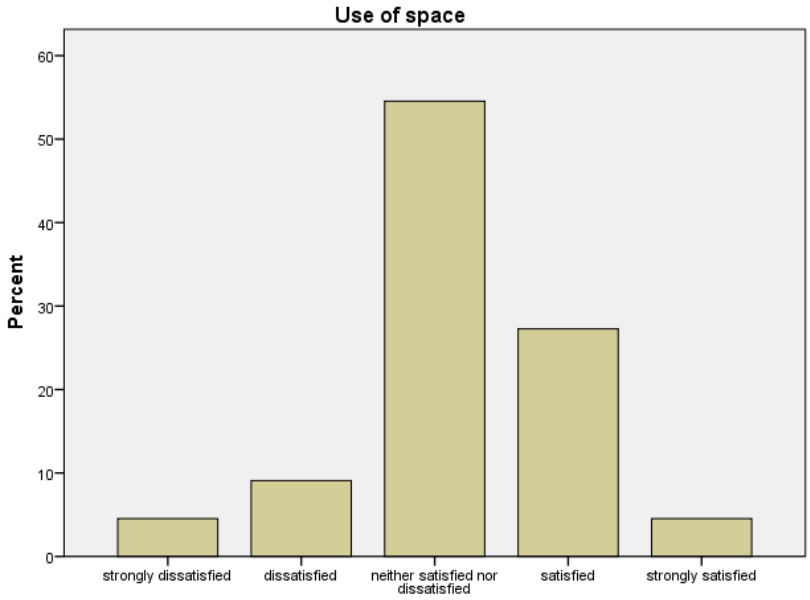


Figure 3.40: Satisfaction regarding use of space

Most of the dwellers (45.5%) are satisfied with access from other spaces to living room, kitchen, bedrooms, and etc. (Fig.3.41).

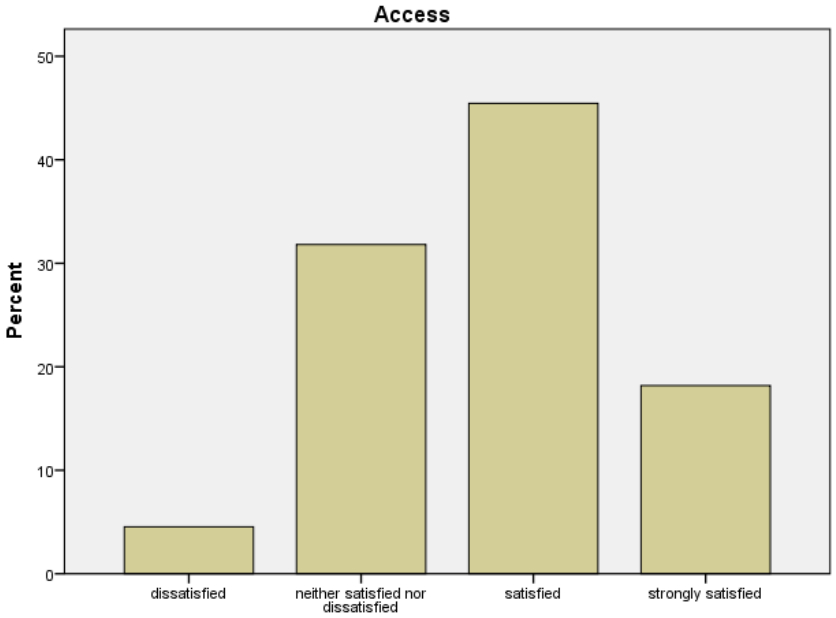


Figure 3.41: Satisfaction regarding access

Neither satisfied nor dissatisfied level has the highest level of relationship between spaces with percentage of 54.5% of users (Fig.3.42).

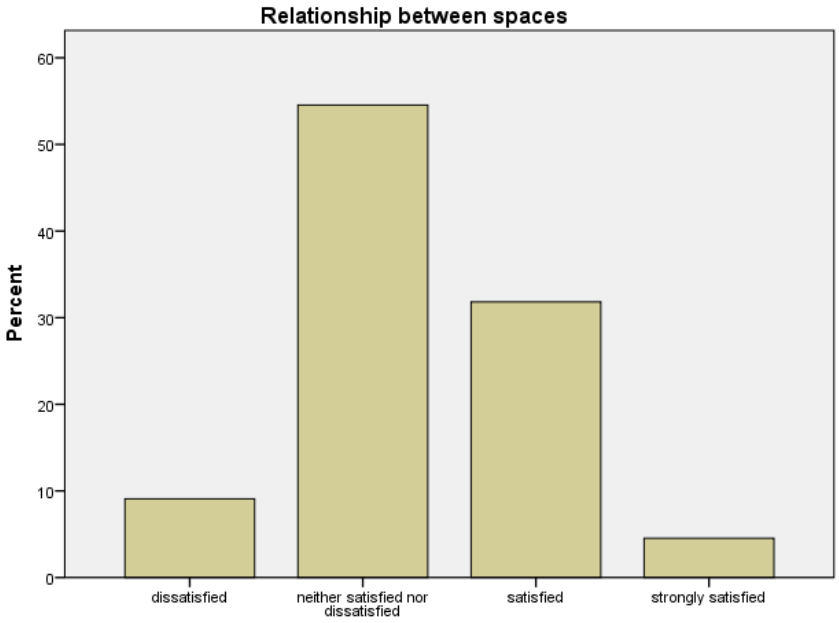


Figure 3.42: Satisfaction regarding relationship between spaces

Half of the residents are neither satisfied nor dissatisfied with location of openings of their units as it gives them lower opportunity to make changes in their units (Fig.3.43).

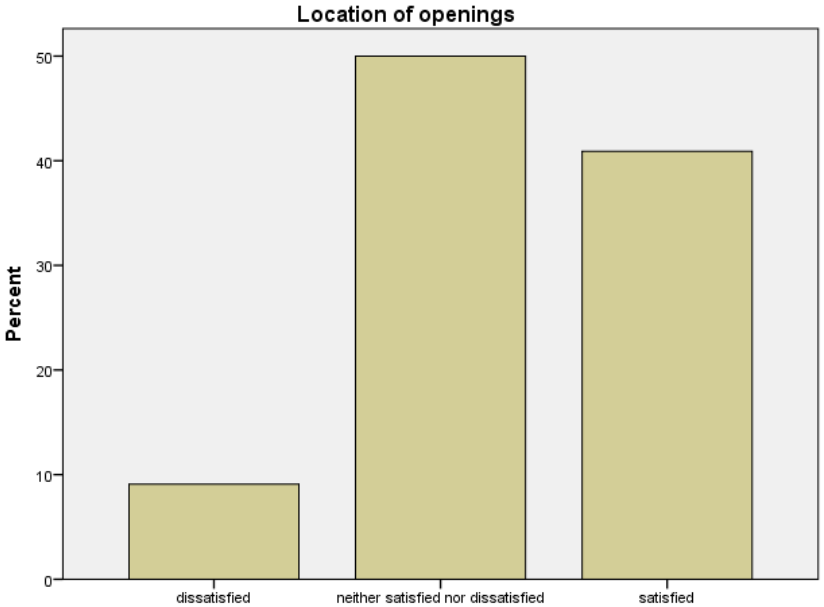


Figure 3.43: Satisfaction regarding location of openings

As can be seen in figure 3.44, most of users considered rate 3 and 4 for circulation between spaces.

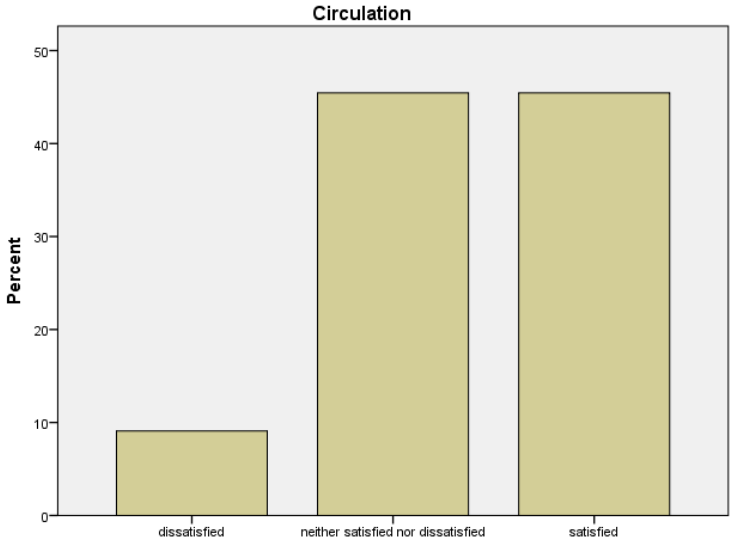


Figure 3.44: Satisfaction regarding circulation

Most of the residents do not like aesthetic aspects of Levent apartments, 36.4% of them are strongly dissatisfied, 40.9% are dissatisfied, and 22.7% are neither satisfied nor satisfied with this issue. None of the users is satisfied with aesthetic issues of this mass housing project (Fig.3.45).

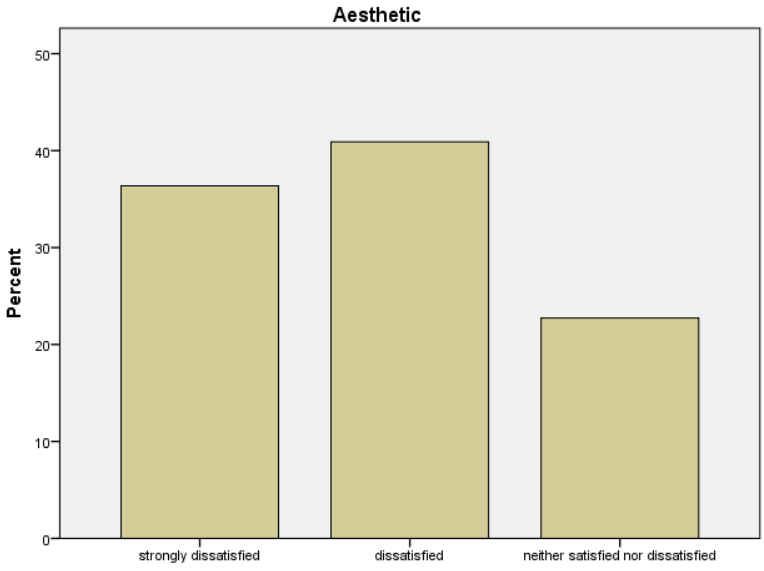


Figure 3.45: Satisfaction regarding aesthetic

Table 3.27 shows the total satisfaction level of residents regarding comfort, privacy, size, location, use of space, access from other spaces to each function, relationship between spaces, location of openings, circulation between spaces, and aesthetic aspects of the social housing.

Table 3.27: General Satisfaction Level

		Percent	Valid Percent	Cumulative Percent
Valid	Strongly dissatisfied	4.5	4.5	4.5
	Dissatisfied	9.1	9.1	13.6
	Neither satisfied nor dissatisfied	50.0	50.0	63.6
	Satisfied	31.8	31.8	95.5
	Strongly satisfied	4.5	4.5	100.0
	Total	100.0	100.0	

General satisfaction of residents, according to the mentioned issues can be seen in figure 3.46. Neither satisfied nor dissatisfied with 54.5% has the highest level while after that satisfied status has the second level with percentage of 36.4%.

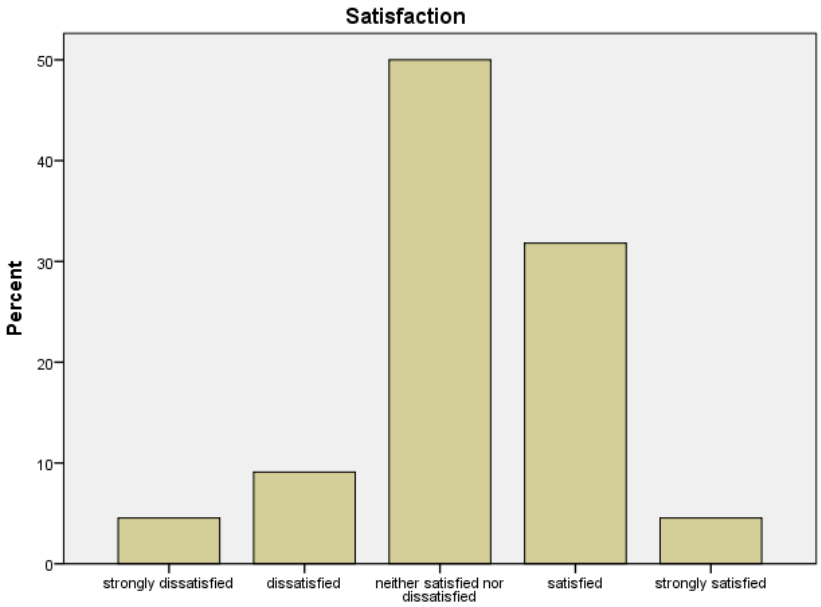


Figure 3.46: General Satisfaction Level

3.4.3 Case Study No. 3: Döveç Apartments close to "İsmet İnönü Bulvarı", behind new Lemar market (2000s)

There are four apartment blocks while being five story buildings. Penthouses are located on the top floor, but as no one is living there and they are for sale by their owners so they are omitted from this study. The blocks are separate from each other and there is a gap between them. These housing were constructed in the early 2000s. The project is located behind the new Lemar market and a closed stadium. The area of each unit is 130 square meter. 32 three bedrooms residential units have been constructed except the penthouses.

Figure 3.47: Döveç Apartments

3.4.3.1 Physical Analysis

Figure 3.48 shows the original plan. Residents have not made changes as much as other cases. Some of them opened the kitchen to living room for easier access, perceiving bigger area, and aesthetic issues. Two of the units closed the balcony of the bedroom to make the space of balcony more useful.

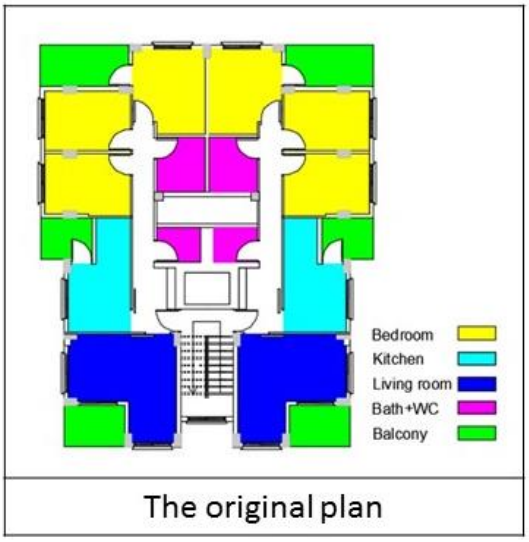
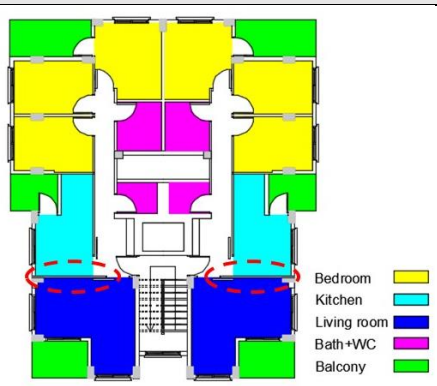
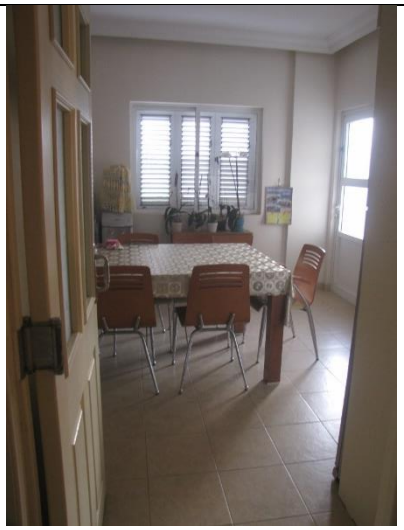
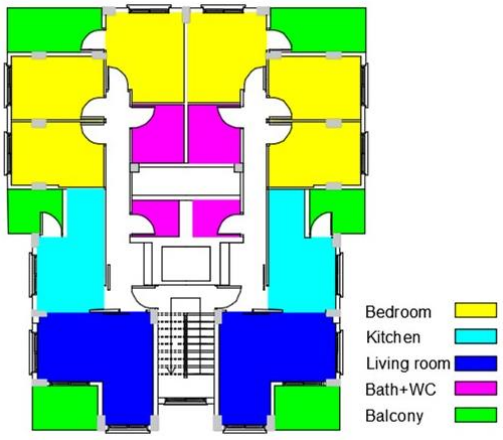


Figure 3.48: Original plan

3.4.3.1.1 Kitchen

Some units removed the wall between kitchen and living room for easier access, creating a bigger dining area, bigger perception of space, and aesthetic issues. Table 3.28 shows original plan and a unit with opening kitchen to living room.

Table 3.28: Opening kitchen to living room

<table>
<tr><th colspan="2">Opening kitchen to living room/ Not reflecting on the facade</th></tr>
<tr><td colspan="2"> 
</td></tr>
<tr><td colspan="2">Original Plan</td></tr>
<tr><td>  </td><td>  </td></tr>
<tr><td>View from living room toward the kitchen wall and living room entrance</td><td>View toward unchanged kitchen</td></tr>
<tr><td> 
</td><td>  </td></tr>
<tr><td>Plan</td><td>View from living room toward opened kitchen</td></tr>
</table>

3.4.3.1.2 Living Room

Differences of living room with opened kitchen and without it can be seen in table 3.29.

Table 3.29: Living room

Living room view before and after modification

Living room without opening kitchen

View from opened kitchen toward living room and balcony

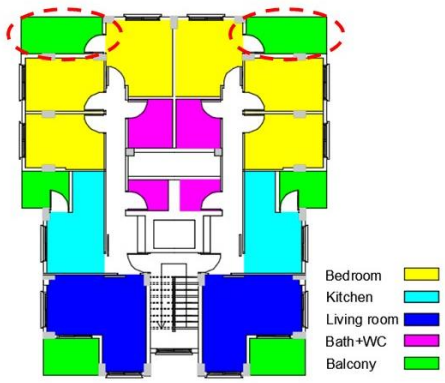
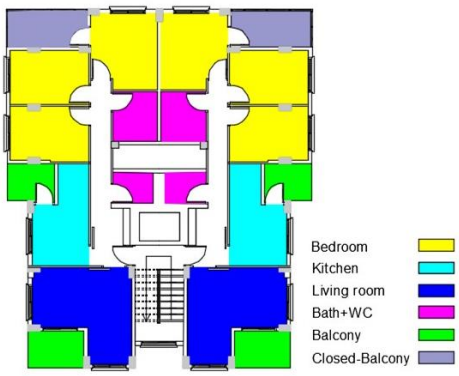
3.4.3.1.3 Service Area

Dwellers of this mass this mass housing project did not make any changes in service area of their units.

3.4.3.1.4 Bedrooms

Two units closed the balcony of bedroom to make the space more useful (Table 3.30).

Table 3.30: Balcony of the bedroom

Closing balcony of the bedroom/ Reflecting on the building façade	
	
Original Plan	Plan
	

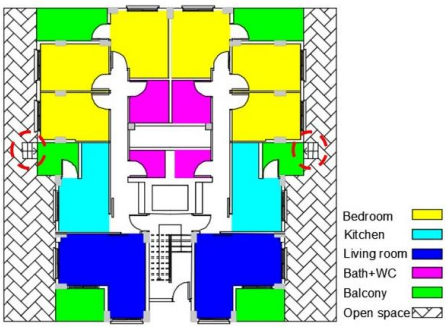
3.4.3.1.5 Changing Function

Changing function cannot be seen in this apartments like the first case study.

3.4.3.1.6 Potentials of Different Floors

The units located on the ground floor have the opportunity of using the gap between two blocks as their private open/semi-open space. They use these spaces for parking, gathering area, a safer play area for their kids, and other activities. (Table 3.31).

Table 3.31: Ground floor opportunities

More opportunity for ground floor units	
	
	

3.4.3.1.7 Adaptation of Shutters to the Building Openings

Adaptation of shutters to windows and doors has various benefits such as increasing privacy, security, sound and thermal insulation, sun protection, and light control. Some units have applied shutters to the openings of their units.

Table 3.32: Adaptation of shutters

Adaptation of shutters to the building openings/ Reflection on the façade	
	
Sound insulation and more privacy for ground floor unit	Interior view
	

3.4.3.2 Statistical Evaluation

Most of the residents own the units while 18.8% are tenant (Table 3.33). Some people did not modify their living place because of their tenancy status. As tenants do not have any possibility to change, they are omitted from this analysis. The analysis of this study is focused on owners as they have alternation opportunity.

Table 3.33: Ownership status

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	owner	13	81.3	81.3	81.3
	tenant	3	18.8	18.8	100.0
	Total	16	100.0	100.0	

69.2% of the residents are living in these apartments between 6 till 10 years (Fig.3.49).

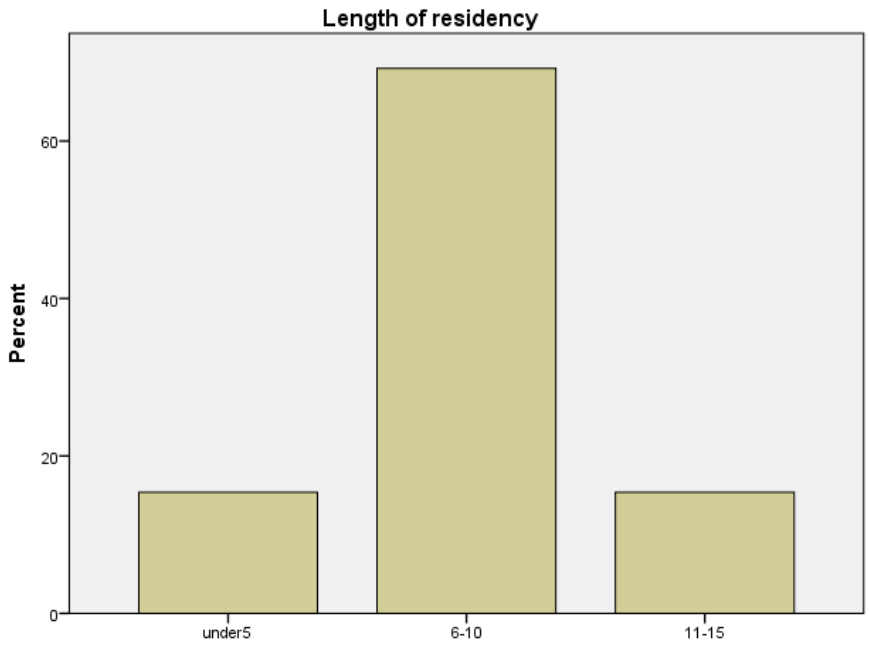


Figure3.49: Length of residency

Location of this housing project is the most important reasons of choosing this place to live according to residents of this project. Some others choose these apartments according to various issues such as price and use of space (Fig.3.50).

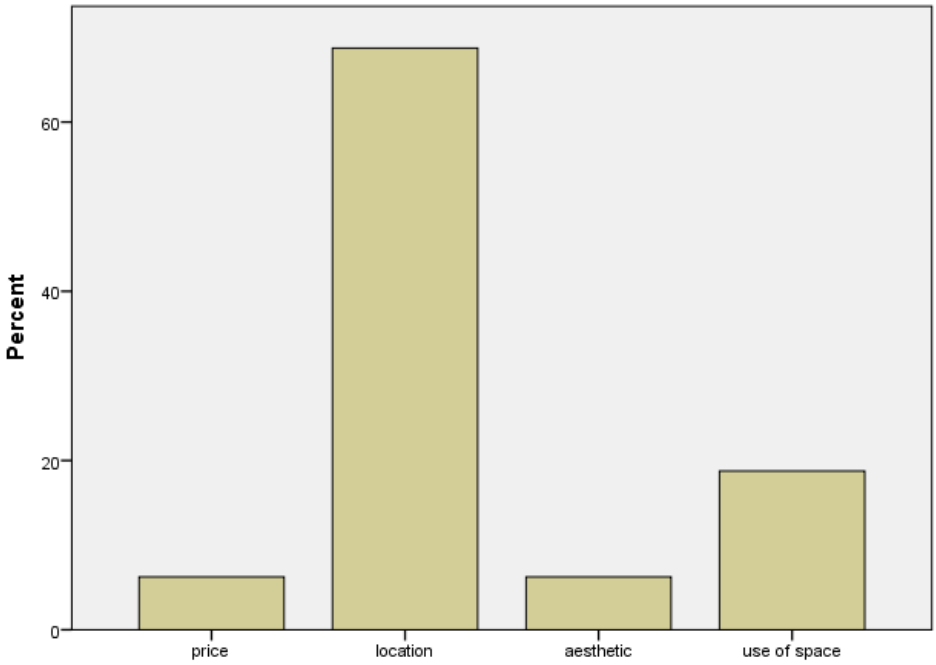


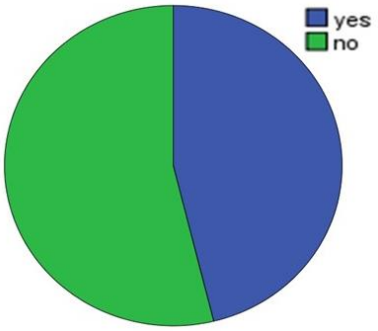
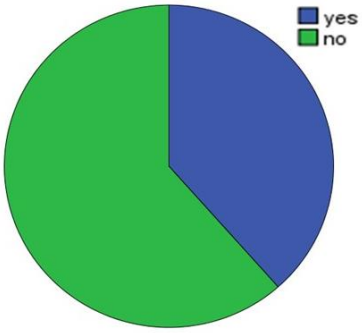
Figure 3.50: Reasons of choosing Döveç apartments to live

According to table 3.34, 30.8% of dwellers wish to move to another house, while 69.2% like their living place. According to interviews those inhabitants who wish to move to villa type houses while most of residents like their houses.

Table 3.34: Wish to move to another house

		Percent	Valid Percent	Cumulative Percent
Valid	Yes	30.8	30.8	30.8
	No	69.2	69.2	100.0
	Total	100.0	100.0	

Table 3.35: Flexibility potential and alternations

	
Potential of flexibility and adaptability	Users who made changes

As can be seen in the pie chart most of the dwellers (53.8%) do not see potential of modification in their units while 46.2% believe that their unit has the potential of modification if they wish. 61.5% of residents did not make any changes in their unit and just 38.5% of them have done modification (Table 3.35).

As it mentioned before, 38.5% of residents have made changes in their dwellings. According to figure 3.51, most of modifications have been done in kitchen area of the house with the percentage of 60%.

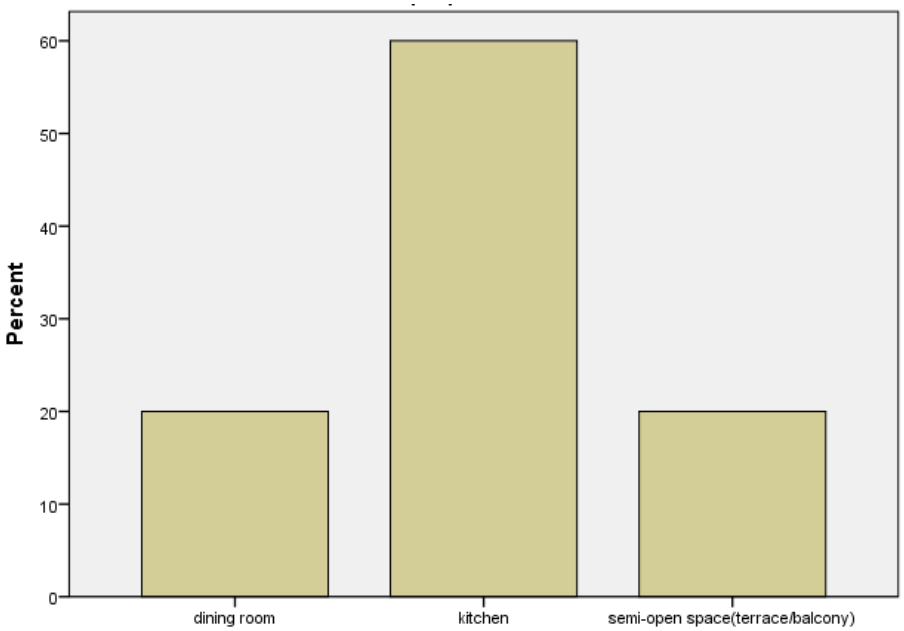


Figure 3.51: Where the modifications happened

Lack of aesthetic has been the most important reason of these modifications by users and the other reason was lack of comfort (Fig.3.52).

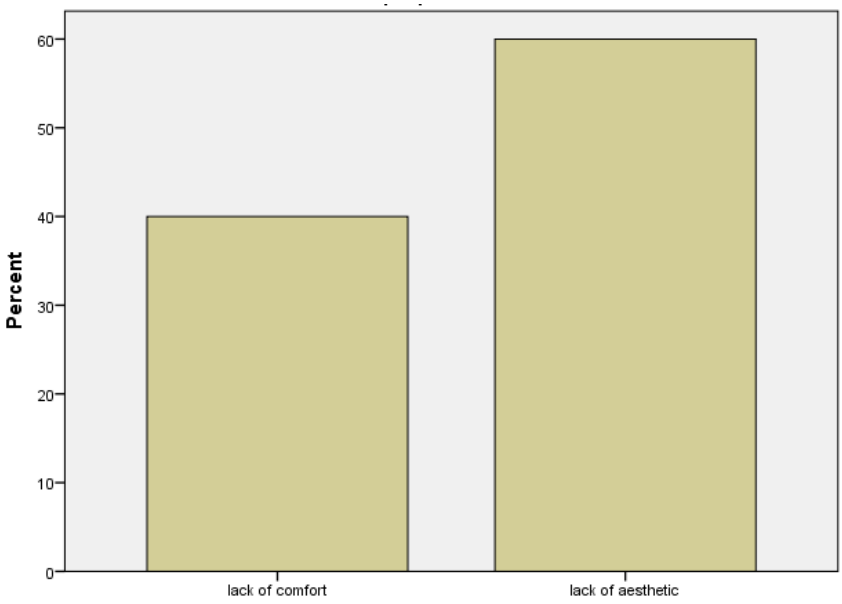


Figure 3.52: Reasons of these modifications

Opening the kitchen has been the most common kind of modification (80%) in these apartments for easier access, more aesthetic, perceiving larger area (Fig.3.53).

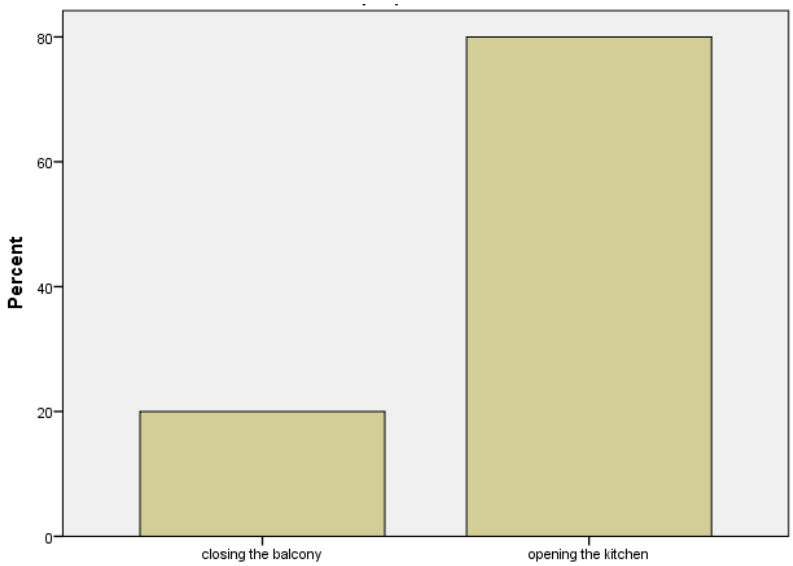


Figure 3.53: Type of modifications

As can be seen in figure 3.54, most of people have done the changes by themselves and just few of them got help from architects/ interior architects, civil engineers, and masters.

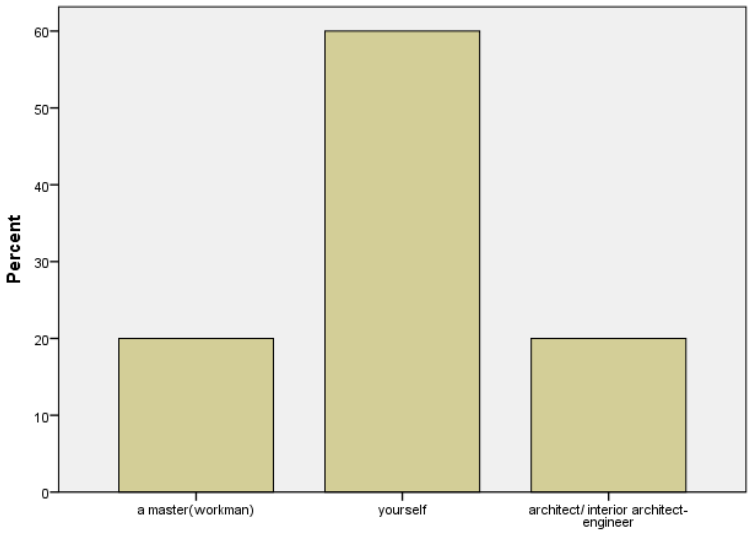


Figure 3.54: Using professional for modification

Most of the residents want changes in service and semi-open spaces of their unit according to their needs, taste, lifestyle, desires and etc. to make them more satisfy. They desire to have a separate service in master bedroom (Fig.3.55).

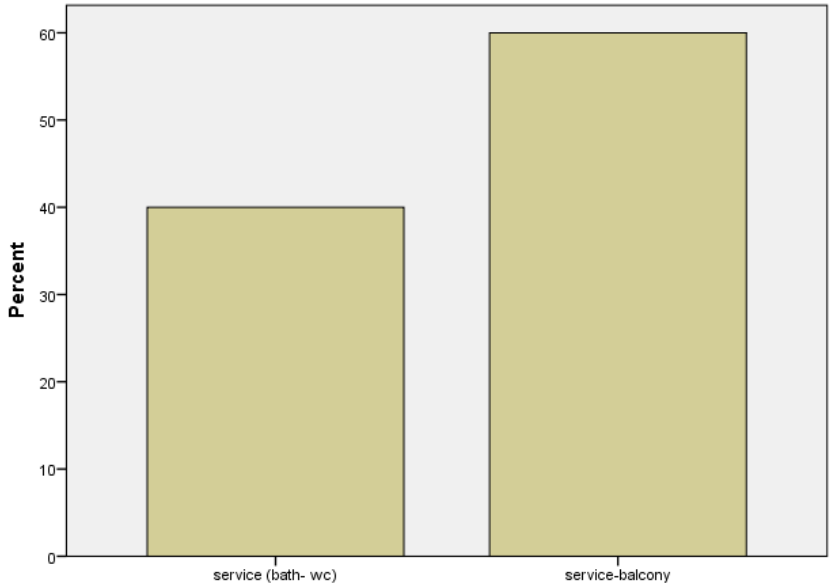


Figure 3.55: Parts of units which should be changed according to residents' desires

According to questionnaires none of the users had difficulties with their neighbors and also any restrictions related to the building legislations for modifications.

On the other hand, 61.5% of users did not make any changes, wish to be able to make changes in different parts of their unit especially in balcony area with percentage of 62.5% (Fig. 3.56).

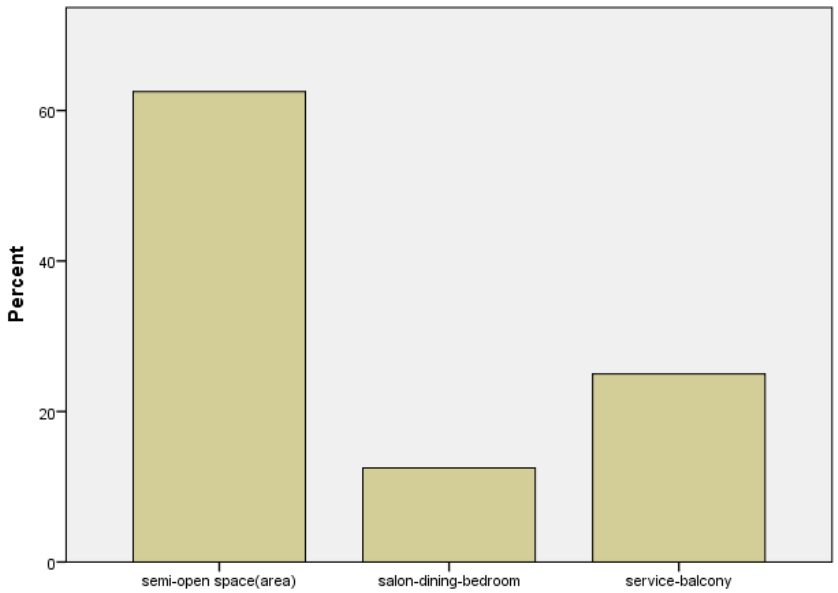


Figure 3.56: The needed changes

Half of them wish to be able to do other type of changes (Fig.3.57). According to interviews with some of them, they wish to have larger semi-open space which is not possible and also they want a separate service area for master bedroom.

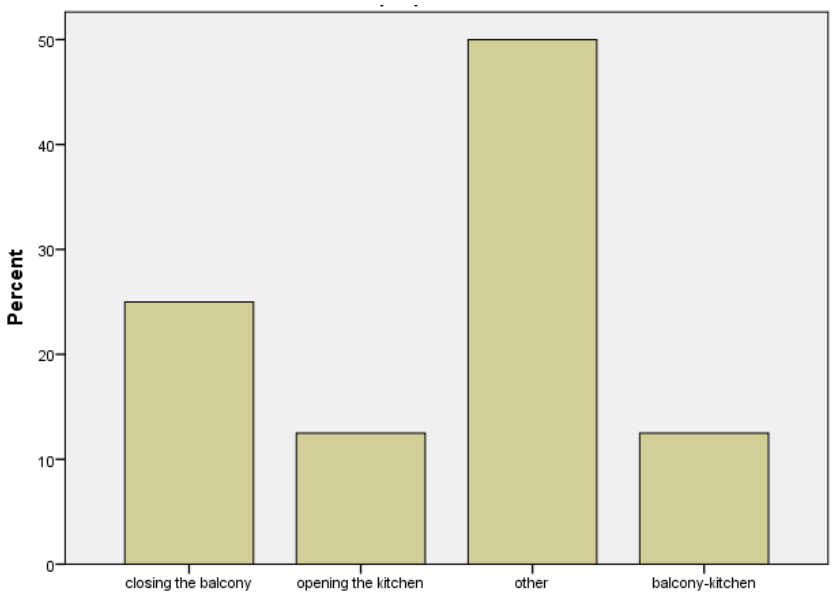


Figure 3.57: Type of changes

Table 3.36 shows that the users did not change their houses because of different reasons. The most significant reason is that they do not need any changes. Some of them did not change because they do not know how to change, location of the installation system, and budget.

Table 3.36: Reasons of not to make any changes

		Percent	Valid Percent	Cumulative Percent
Valid	no need for changing	44.4	44.4	44.4
	budget	11.1	11.1	55.6
	do not know how to do it	33.3	33.3	88.9
	location of installation system(such as pipes)	11.1	11.1	100.0
	Total	100.0	100.0	

Satisfaction level:

According figure 3.58, satisfaction level of residents is very high regarding comfort of different spaces of their units.

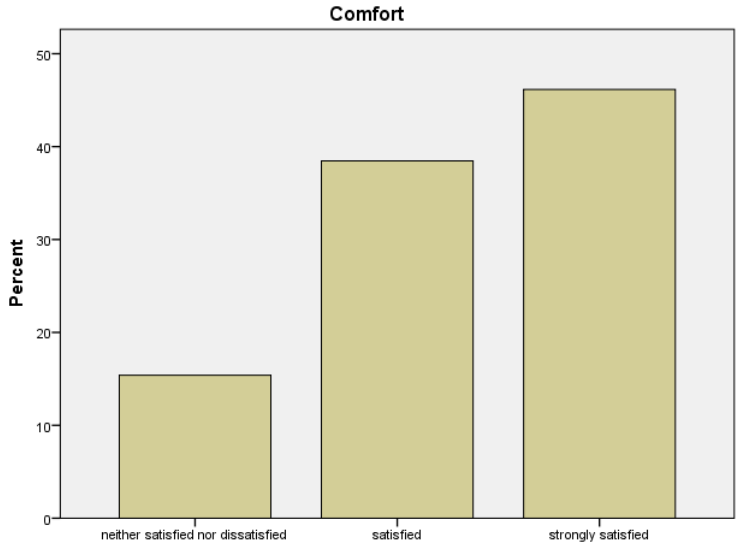


Figure 3.58: Satisfaction regarding comfort

As can be seen in figure 3.59, satisfied status has the highest level (61.5%) for privacy of all spaces such as privacy of living room, kitchen, and so on.

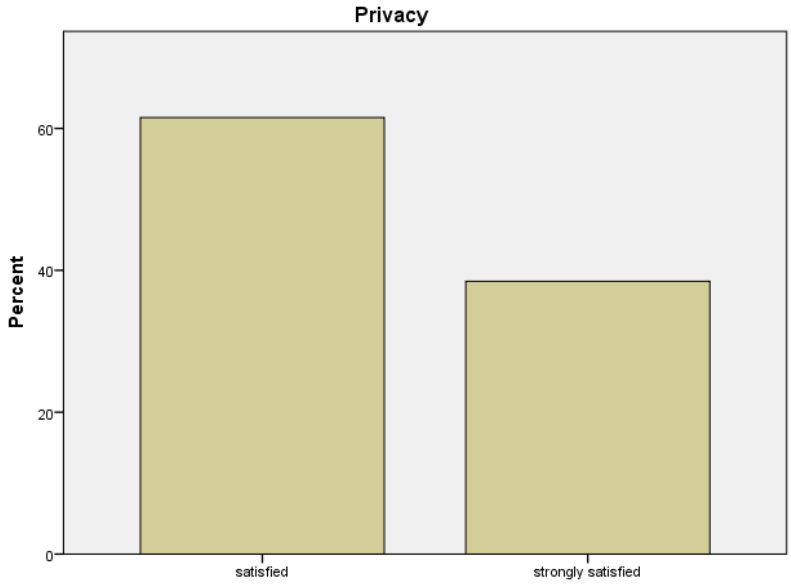


Figure 3.59: Satisfaction regarding privacy

53.8% of residents are satisfied with size of living room, dining area, kitchen, semi open spaces, and other spaces of their house (Fig. 3.60).

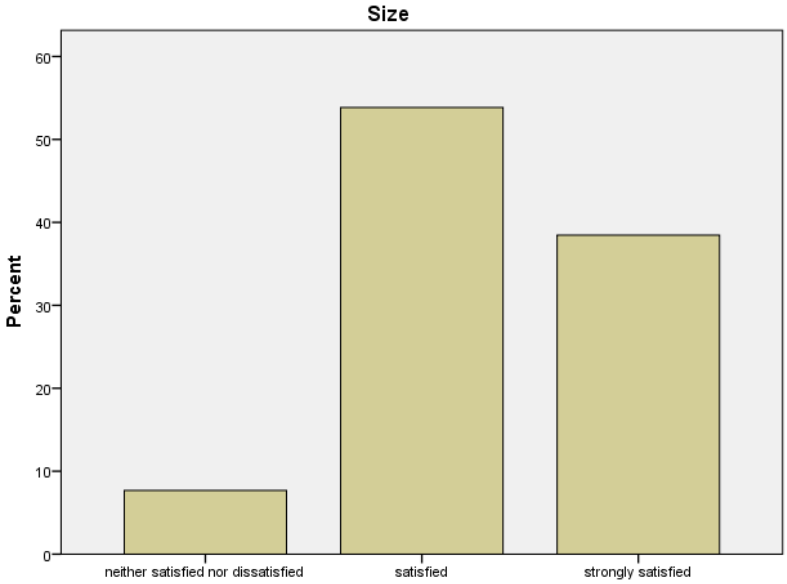


Figure 3.60: Satisfaction regarding size

As can be seen in figure 3.61, most of residents are satisfied with location of living room, kitchen, bedrooms, and other spaces.

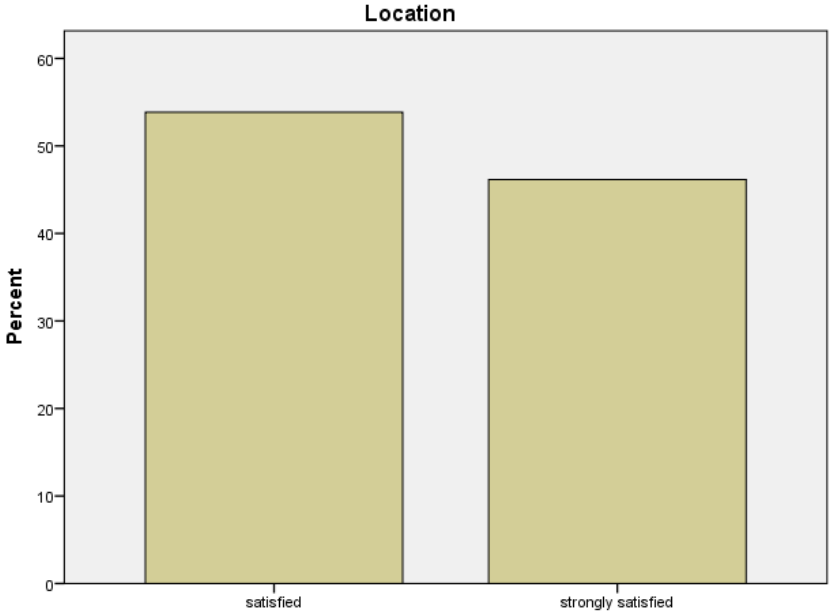


Figure 3.61: Satisfaction regarding location of spaces

Strongly satisfied status has the highest level (53.8%) regarding usage of space in living room, bedrooms, kitchen, and so on (Fig. 3.62).

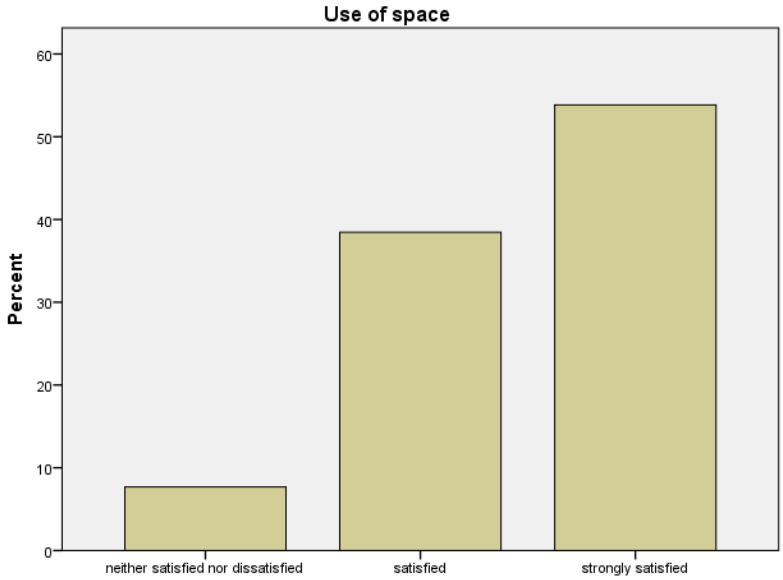


Figure 3.62: Satisfaction regarding use of space

Satisfaction level regarding access from other spaces to living room, kitchen, bedrooms, and etc. is high (Fig.3.63).

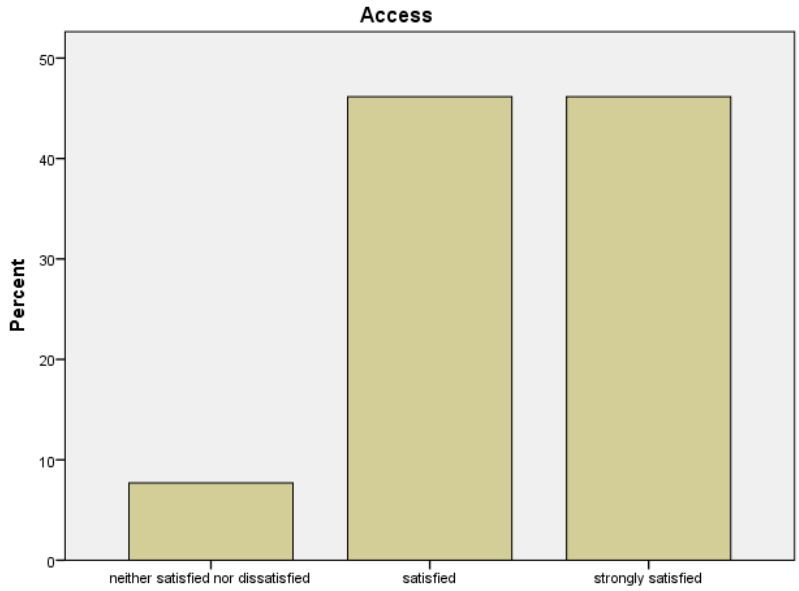


Figure 3.63: Satisfaction regarding access

Strongly satisfied level has the highest level of relationship between spaces with percentage of 53.8% of users (Fig.3.64).

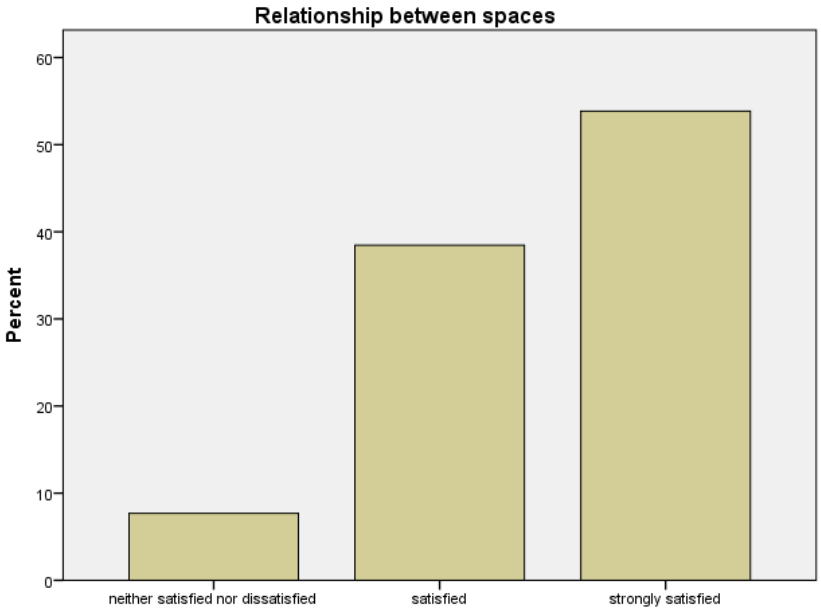


Figure 3.64: Satisfaction regarding relationship between spaces

As can be seen in figure 3.65, 69.2% of residents are strongly satisfied with location of openings of their units.

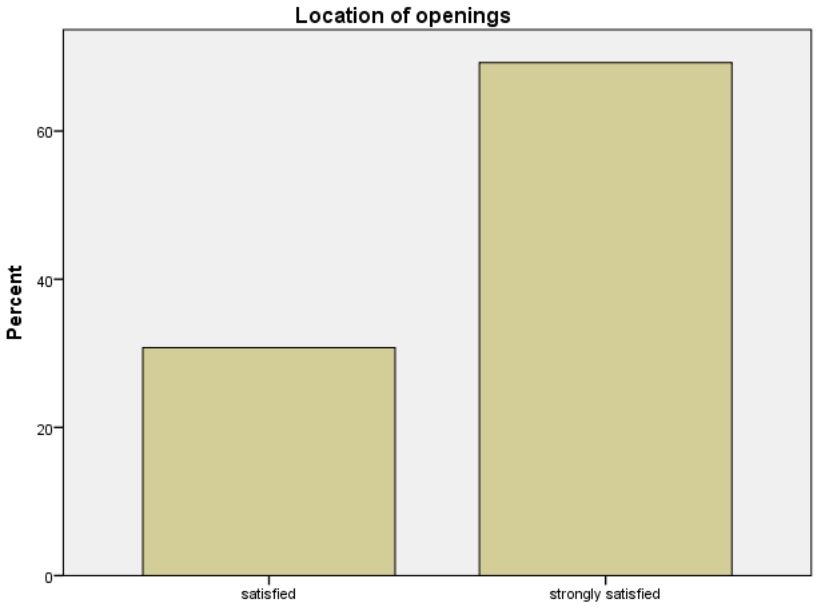


Figure 3.65: Satisfaction regarding location of openings

As can be seen in figure 3.66, most of users are strongly satisfied with circulation between spaces.

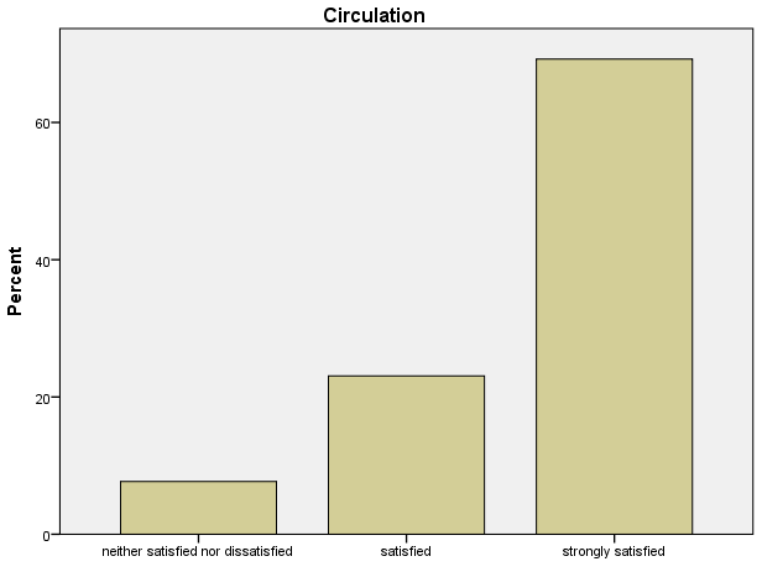


Figure 3.66: Satisfaction regarding circulation

46.2% of residents are strongly satisfied, 30.8% are satisfied, and 23.1% are neither satisfied nor dissatisfied with this issue. Their satisfaction level regarding aesthetic is higher than two previous cases (Fig.3.67).

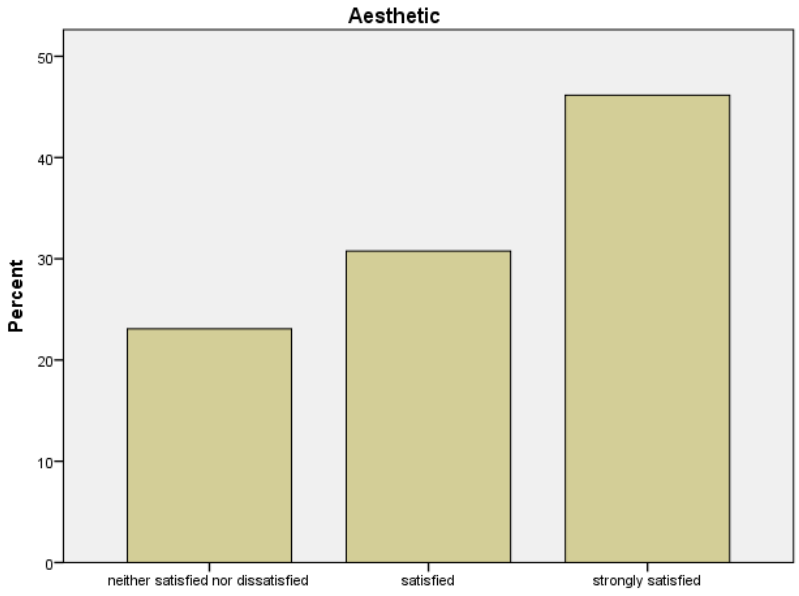


Figure 3.67: Satisfaction regarding aesthetic

Table 3.37 shows the total satisfaction level of residents regarding comfort, privacy, size, location, use of space, access from other spaces to each function, relationship between spaces, location of openings, circulation between spaces, and aesthetic aspects of the social housing.

Table 3.37: General satisfaction level

		Percent	Valid Percent	Cumulative Percent
Valid	Satisfied	46.2	46.2	46.2
	Strongly satisfied	53.8	53.8	100.0
	Total	100.0	100.0	

General satisfaction of residents according to mentioned issues can be seen in figure 3.68. Satisfied status with percentage of 46.2% has the second status after strongly satisfied with percentage of 53.8%. Satisfaction level of these apartments is higher than two previous cases.

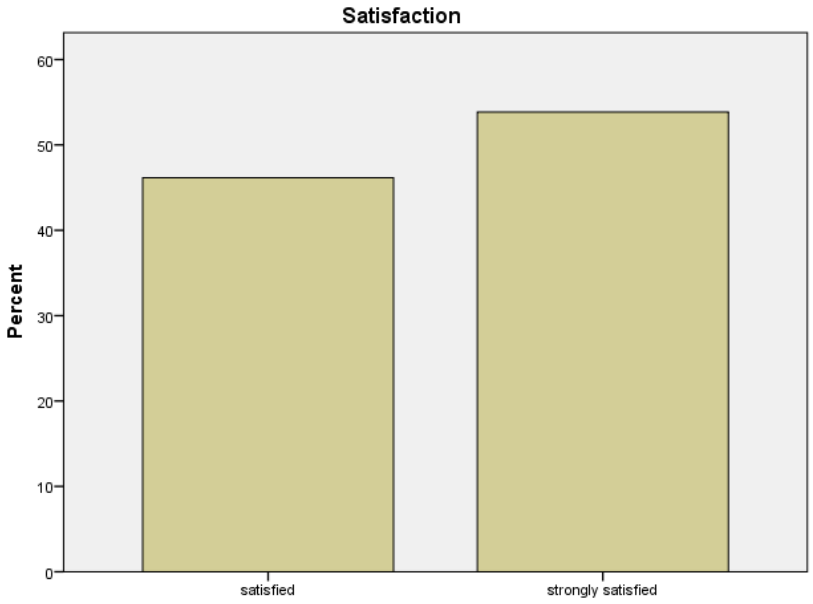


Figure 3.68: General satisfaction level

3.4.4 Case Study No. 4: Noyanlar mass housing in Çanakkale Gandular behind China Bazaar (2010s)

There are 20 apartment blocks while being 4 story buildings. The blocks are separate from each other and there is a gap between them. These housing were constructed in 2010s. The project is located in Çanakkale Gandular behind China Bazaar. There are 160 residential units in total with three bedrooms. The area of each unit is 120 square meter.

Figure 3.69: Noyanlar mass housing in Çanakkale Gandular

3.4.4.1 Physical Analysis

Figure 3.70 shows the original plan. People made various changes in their units such as adding balcony to living room and kitchen, and opening the kitchen to living room.

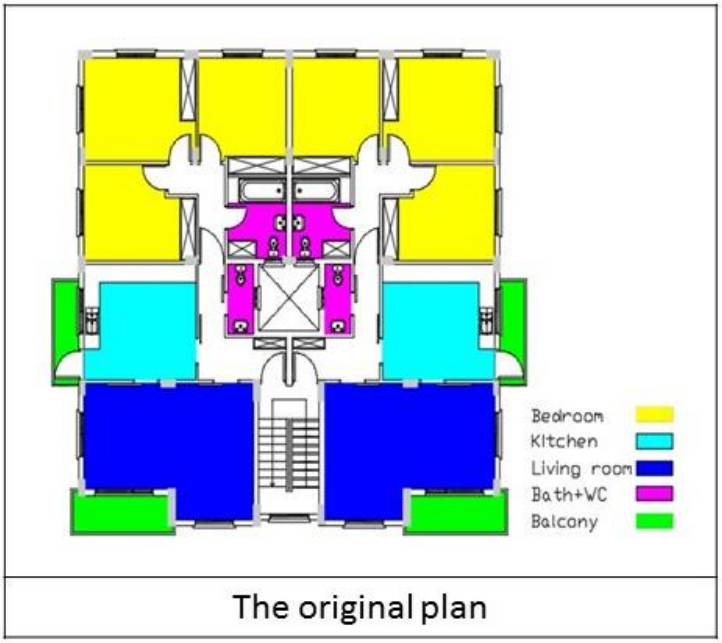


Figure 3.70: Original plan

3.4.4.1.1 Kitchen

Closing balcony of the kitchen due to the small size of the balcony has been done by some units which is reflected on façade of the building (Table 3.38). As can be seen in table 3.39 one of the units have extended kitchen balcony to have bigger terrace. The other type of alternation by users is opening kitchen to living room and removing the entrance door of living room for easier access and perception of bigger area (Table 3.40).

Table 3.38: Closing balcony of kitchen

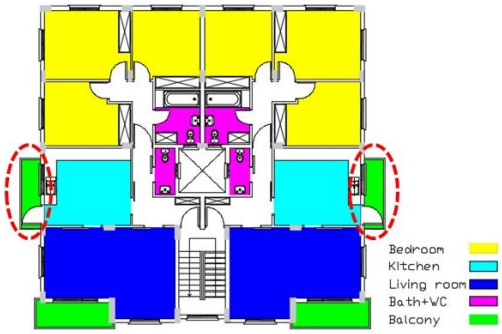
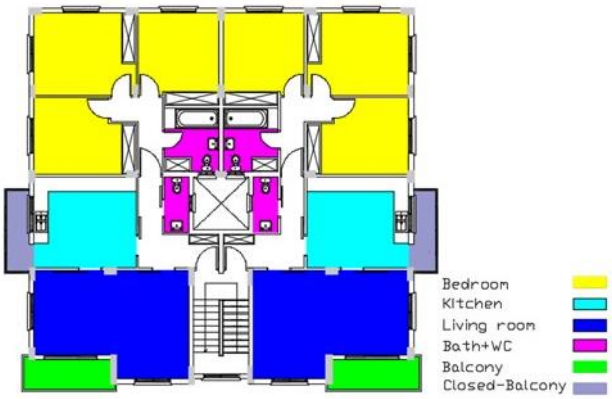
Closing kitchen balcony/ Reflecting on the façade	
	
Original Plan	Interior view of a kitchen without modification
	
	
Reflecting on the building facade	

Table 3.39: Extension of balcony

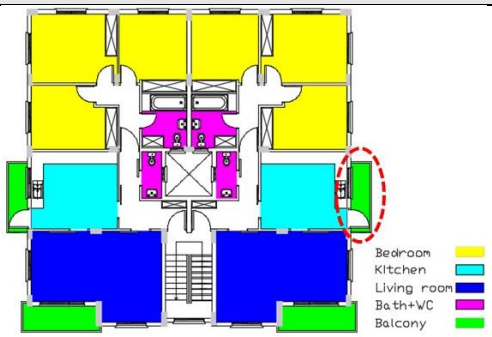
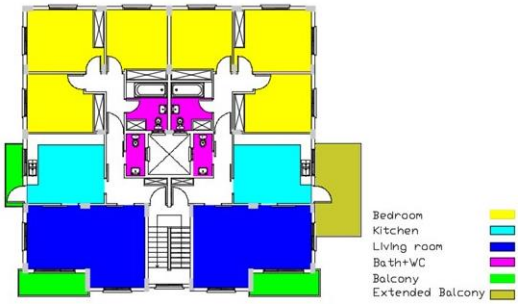
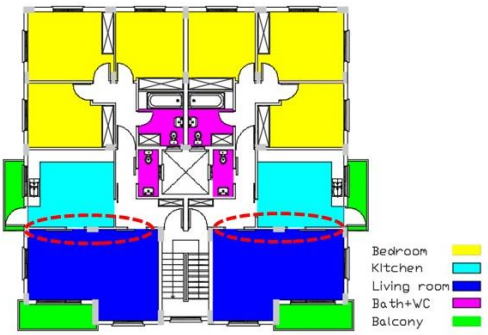
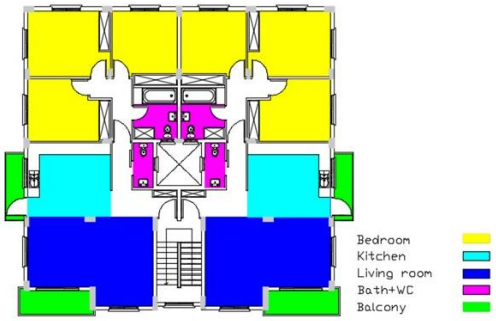
<table>
<tr><th colspan="2">Extension of kitchen balcony/ Reflecting on the building facade</th></tr>
<tr><td> 
</td><td> 
</td></tr>
<tr><td>Original Plan</td><td>Plan</td></tr>
<tr><td colspan="2">  </td></tr>
<tr><td colspan="2">Extension of the balcony</td></tr>
<tr><td>  </td><td>  </td></tr>
<tr><td>View toward the extended terrace</td><td>View from extended terrace to kitchen door</td></tr>
</table>

Table 3.40: Opening kitchen and removing living room entrance door

<table>
<tr><th colspan="2">Opening kitchen to the living room and removing the entrance door of the living room/ not reflecting on the facade</th></tr>
<tr><td> 
</td><td> 
</td></tr>
<tr><td>Original Plan</td><td>Modified Plan</td></tr>
<tr><td>  </td><td>  </td></tr>
<tr><td>Removing living room entrance door</td><td>Opening kitchen to the living room</td></tr>
<tr><td colspan="2">  </td></tr>
</table>

3.4.4.1.2 Living Room

Closing living room balcony is another modification which have been done by users. As can be seen in table 3.41, closing living room balcony reflect on the building façade. Residents who found balcony size inappropriate, closed it and various usages of it is visible in the following photos. Some other units closed the balcony and removed the existing door from living room to the balcony. Some of the units locating on the top floor, have added some railing to both balconies of living room and kitcchen to secure for children (Table 3.42).

Table 3.41: Closing balcony of living room

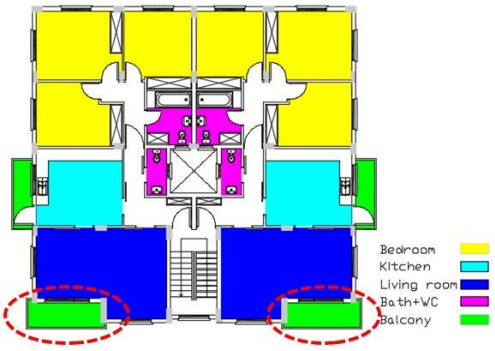
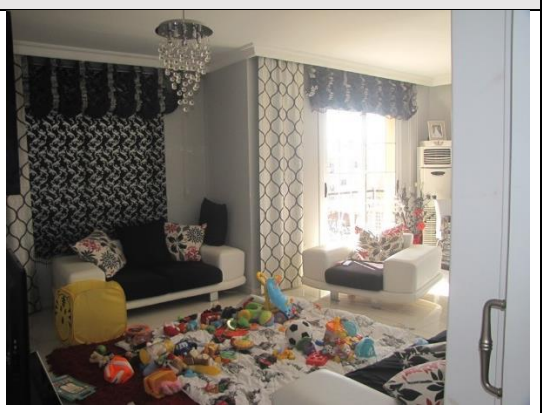
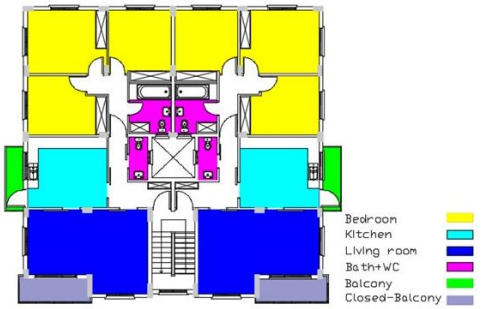
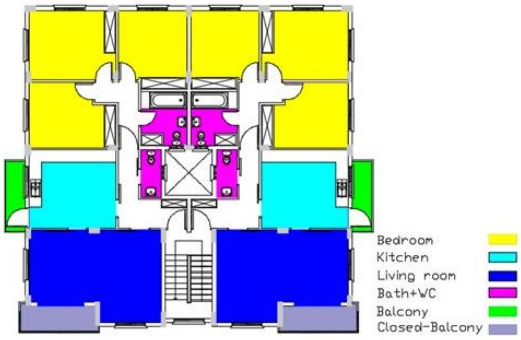
Closing balcony of the living room/ Reflecting on the building facade	
	
Original Plan	Living room without changes
	
Plan	Reflection on the facade
	
Closing balcony of the living room with keeping the existing door	Type of usage of closed balcony

Table 3.42: Closing balcony of living room

<table>
<tr><th colspan="2">Closing balcony of the living room/ Reflecting on the building facade</th></tr>
<tr><td> 
</td><td>  </td></tr>
<tr><td>Plan</td><td>Reflection on the facade</td></tr>
<tr><td>  </td><td>  </td></tr>
<tr><td>Closing balcony of the living room and removing the existing door</td><td>Closed balcony</td></tr>
<tr><th colspan="2">Increasing the safety of both balconies</th></tr>
<tr><td colspan="2">  </td></tr>
</table>

3.4.4.1.3 Service Area

Dwellers of this mass this mass housing project did not make any changes in service area of their units.

3.4.4.1.4 Bedrooms

Residents did not modify the bedrooms like the previous case study.

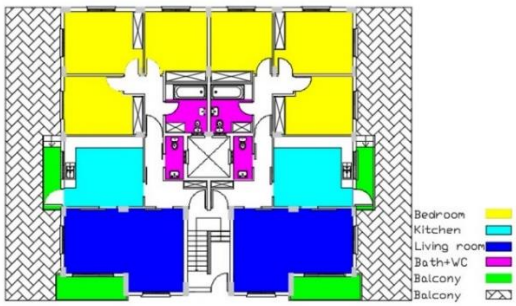
3.4.4.1.5 Changing Function

Changing function cannot be seen in this apartments like the first case study.

3.4.4.1.6 Potentials of Different Floors

The units located on the ground floor have the opportunity of using the gap between two blocks as their private open/ semi-open space. Some of the ground floor units closed the gap between two blocks and added a roof to create a private semi-open space for their units. They use these spaces for parking, gathering area, a safer play area for their kids, and other activities. (Table 3.43).

Table 3.43: Ground floor opportunities

More opportunity for ground floor units	
	
	
	

3.4.4.1.7 Adaptation of Shutters to the Building Openings

Adaptation of shutters to windows and doors has various benefits such as increasing privacy, security, sound and thermal insulation, sun protection, and light control. Some units have applied shutters to their units' openings.

Table 3.44: Adaptation of shutters

Adaptation of shutters to the building openings/ Reflection on the façade


3.4.4.2 Statistical Evaluation

Most of the residents own the units while 35% are tenants (Table 3.45). Some people did not modify their living place because of their tenancy status. As tenants do not have any possibility to change, they are omitted from this analysis. The analysis of this study is focused on owners as they have alternation opportunity.

Table 3.45: Ownership status

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	owner	52	65.0	65.0	65.0
	tenant	28	35.0	35.0	100.0
	Total	80	100.0	100.0	

All of the residents are living in the mentioned housing under five years (Fig.3.71).

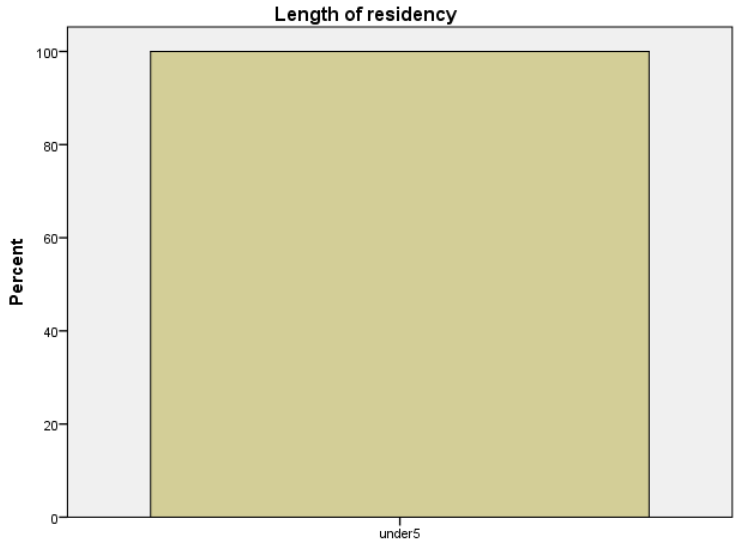


Figure 3.71: Length of residency

Use of space and then location are the most important reasons of choosing this place to live according to residents of this project. Some others choose Noyanlar housing according to other factors (Fig.3.72).

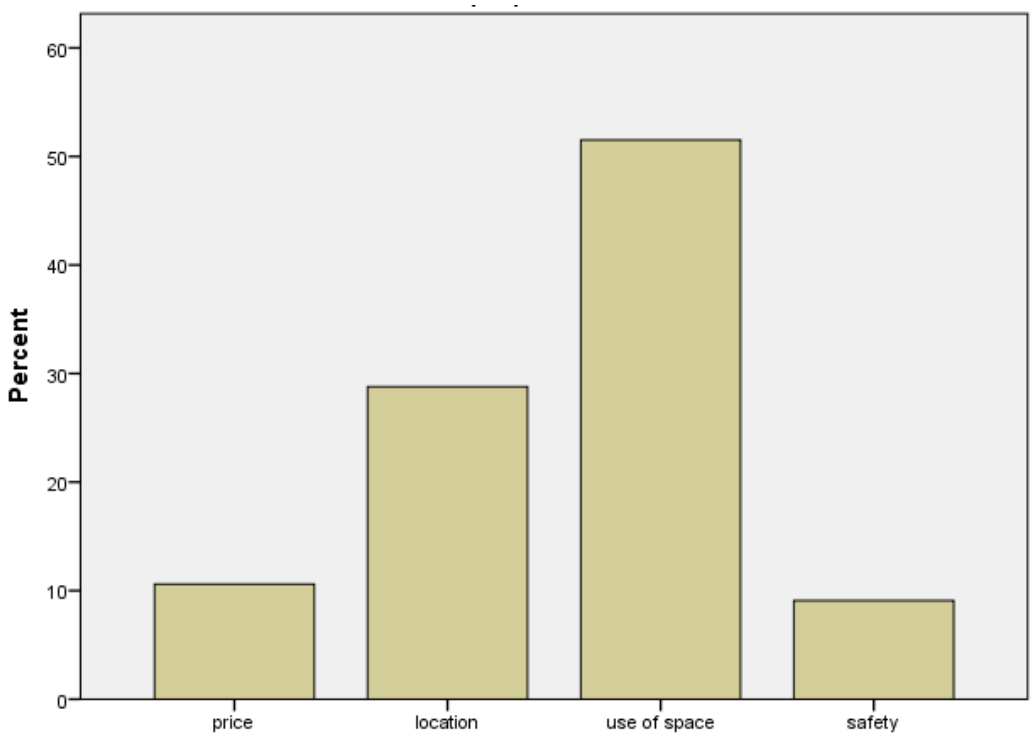


Figure 3.72: Reasons of choosing Noyanlar housing to live

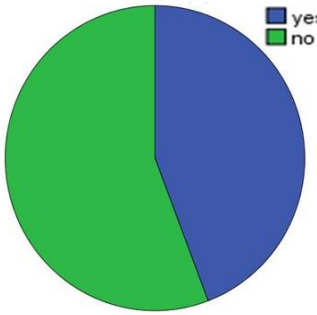
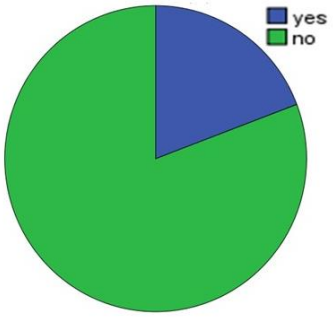
According to table 3.46, most of dwellers wish to move to another house, while 30.8% like their living place. According to interviews most of inhabitants prefer villa type houses.

Table 3.46: Wish to move to another house

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	36	69.2	69.2	69.2
	No	16	30.8	30.8	100.0
	Total	52	100.0	100.0	

As can be seen in the pie chart, most of the dwellers do not see the potential of modification in their units while 44.2% of them see flexibility and adaptability potential in their units. As can be seen in the other pie chart, few of the users (19.2%) modified their houses. Most of them (80.8%) did not make any modification. The fact that these mass housing project has been constructed recently and people will do more modifications by the time, should be considered.

Table 3.47: Flexibility potential and alternations

	
Potential of flexibility and adaptability	Users who made changes

As it mentioned before, 19.2% of users have done changes. According to figure 3.73, most of modifications have been done in the kitchen area and semi-open space of the house.

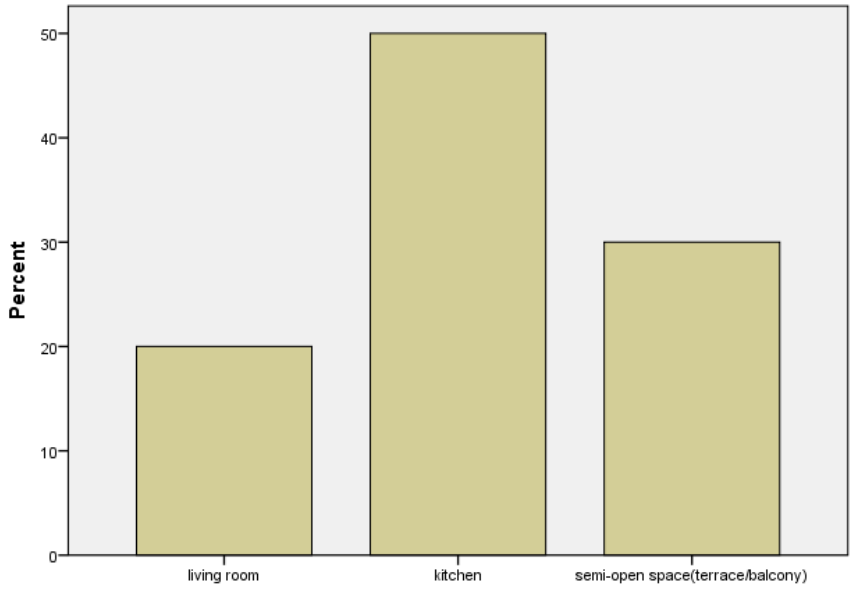


Figure 3.73: Where the modifications happened

Lack of enough usage area, Lack of comfort, and lack of aesthetic have been the reasons of these modifications by users (Fig.3.74).

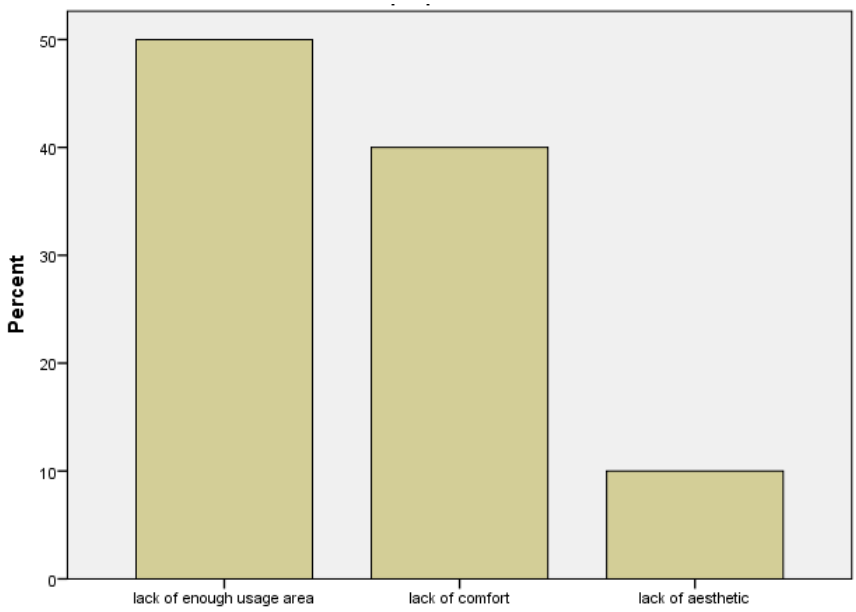


Figure 3.74: Reasons of these modifications

Opening the kitchen has been the most common kind of modification in Noyanlar apartments while closing the balcony with percentage of 40% is the second common modification (Fig.3.75).

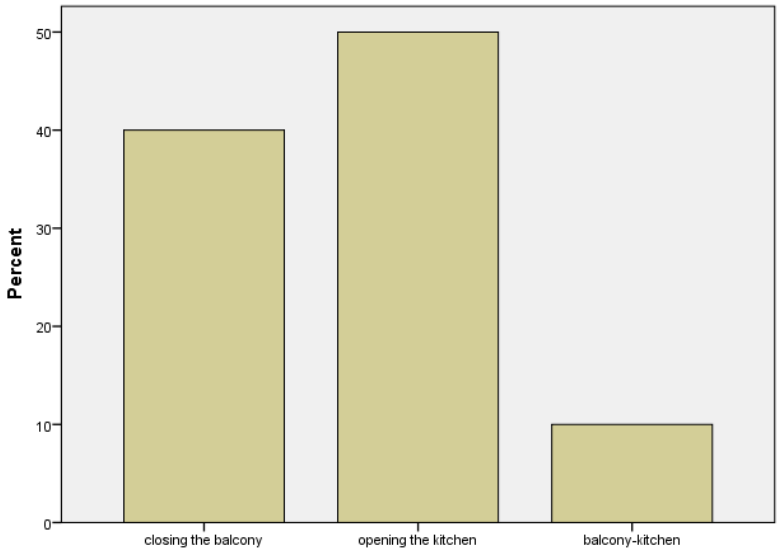


Figure 3.75: Types of modifications

As can be seen in figure 3.76, most of people have made the changes by themselves and just few of them got help from masters as well.

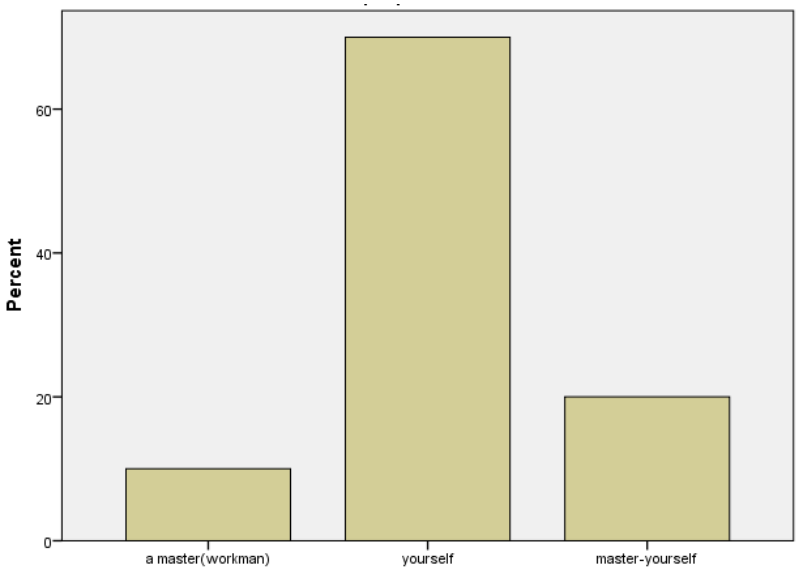


Figure 3.76: Using professional for modification

Many residents want changes in semi-open spaces, dining area, and service of their unit according to their needs, taste, lifestyle, desires and etc. to make them more satisfy (Fig.3.77). They wish to be able to have big open/semi-open spaces, and separate service for master bedroom. They did not find the size terraces useful.

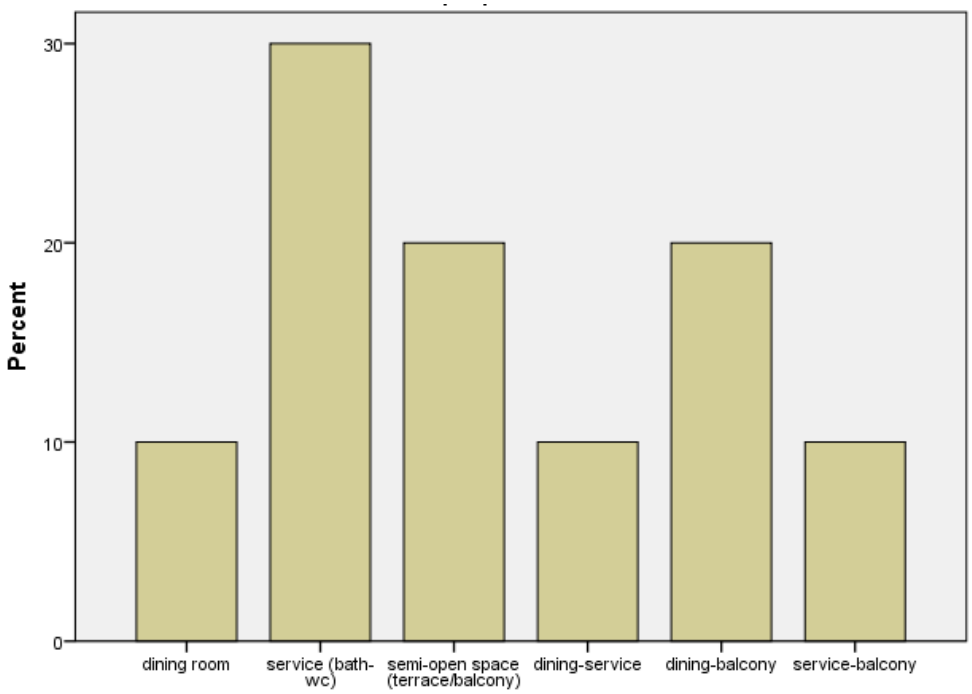


Figure 3.77: Parts of units which should be changed according to residents' desires

According to questionnaires none of the users had difficulties with their neighbors and also any restrictions related to the building legislations for modifications.

On the other hand, 80.8% of users did not make any alternation in their units, wish to be able to make changes in different parts of their unit especially in balcony, kitchen, and dining area (Fig. 3.78).

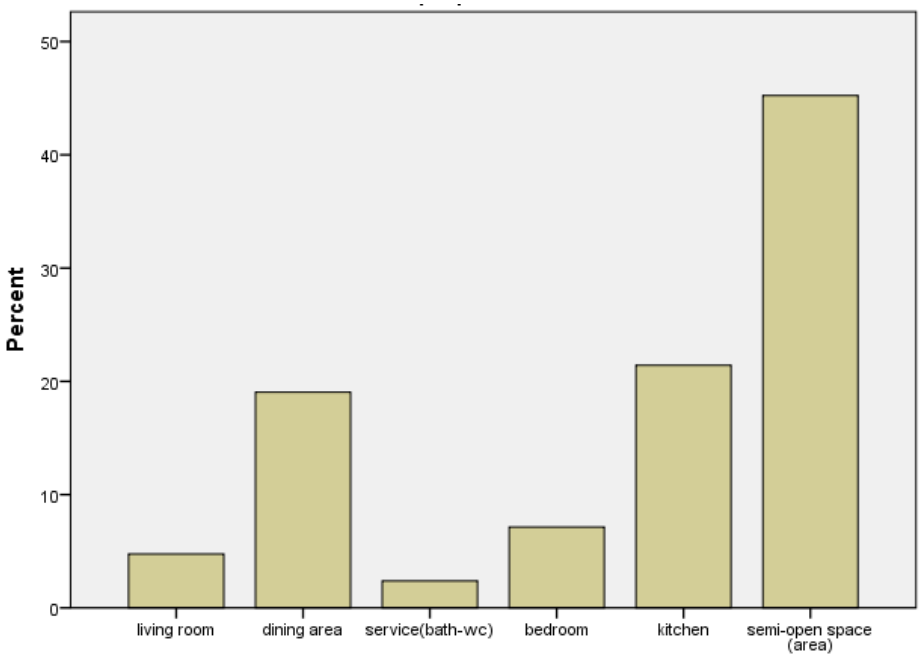


Figure 3.78: The needed changes

Most of them wish to be able to open the kitchen to living room for easier access and bigger perception of the space and also closing balcony for more interior space (Fig.3.79). Another important demand is having a big open/semi-open space.

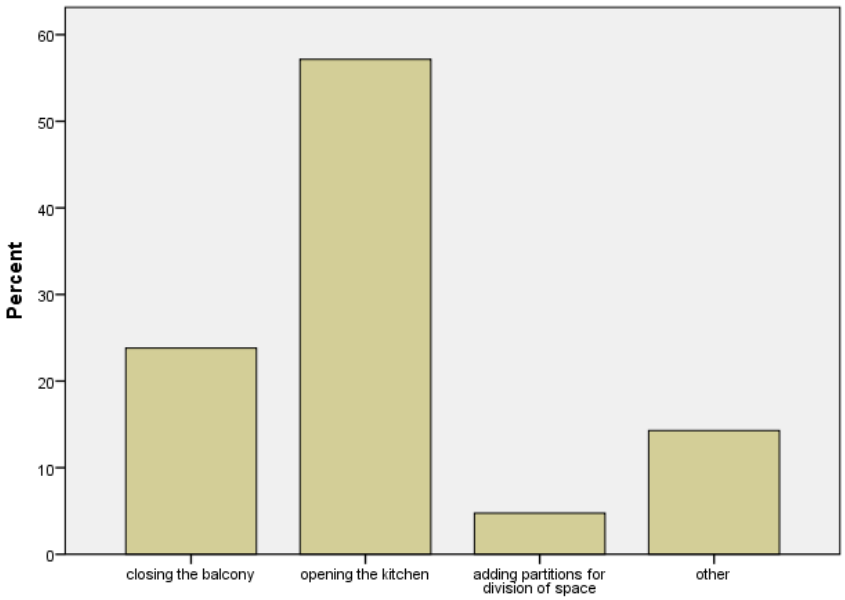


Figure 3.79: Type of changes

Table 3.48 shows that the users did not change their houses because of different reasons. The most significant reasons can be no possibility because of the size and budget. Some of the residents did not change because they do not know how to change, location of the installation system, structural system, and etc. some others believe that there is no need for changing.

Table 3.48: Reasons of not to make any changes

		Percent	Valid Percent	Cumulative Percent
Valid	No need for changing	19.0	19.0	19.0
	No possibility because of the size	40.5	40.5	59.5
	Budget	21.4	21.4	81.0
	Because of the structural system	9.5	9.5	90.5
	Do not know how to do it	2.4	2.4	92.9
	Others	7.1	7.1	100.0
	Total	100.0	100.0	

Satisfaction level:

According figure 3.80, 59.6% of residents are satisfied regarding comfort of different spaces of their units while 40.4% are strongly satisfied.

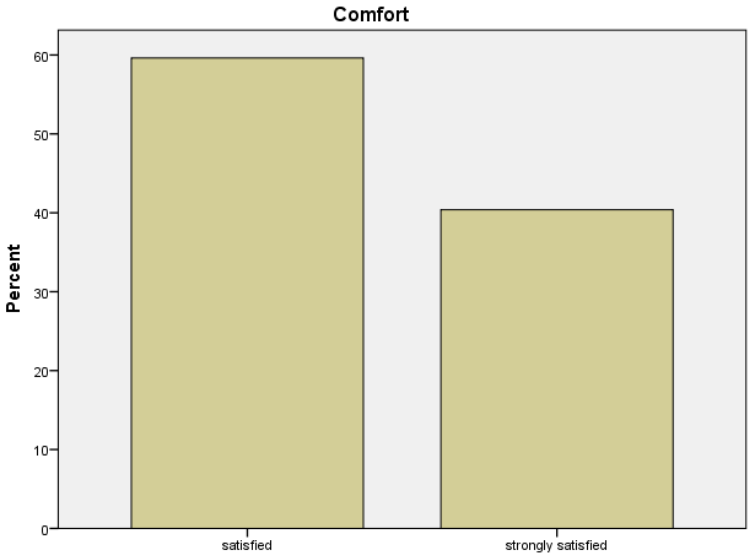


Figure 3.80: Satisfaction regarding comfort

As can be seen in figure 3.81, satisfied status has the highest level (80.8%) for privacy of all spaces such as privacy of living room, kitchen, and so on.

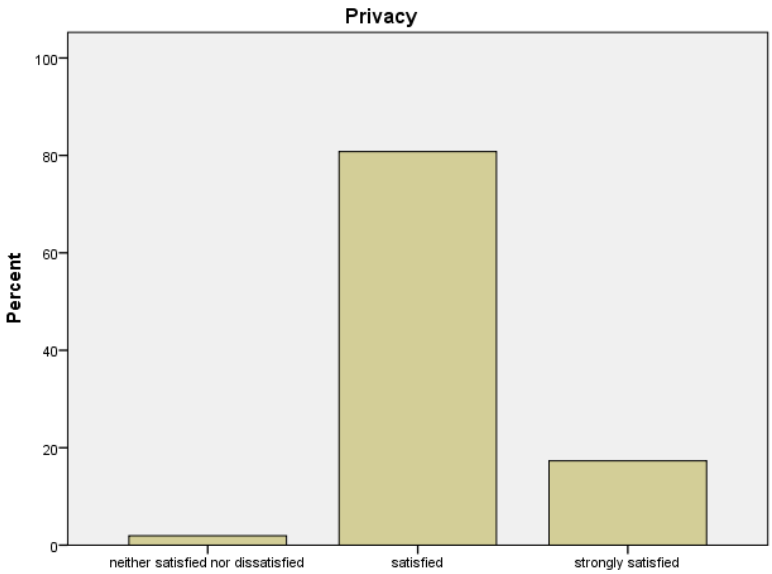


Figure 3.81: Satisfaction regarding privacy

76.9% of residents are satisfied regarding size of living room, dining area, kitchen, semi open spaces, and other spaces of their house (Fig. 3.82).

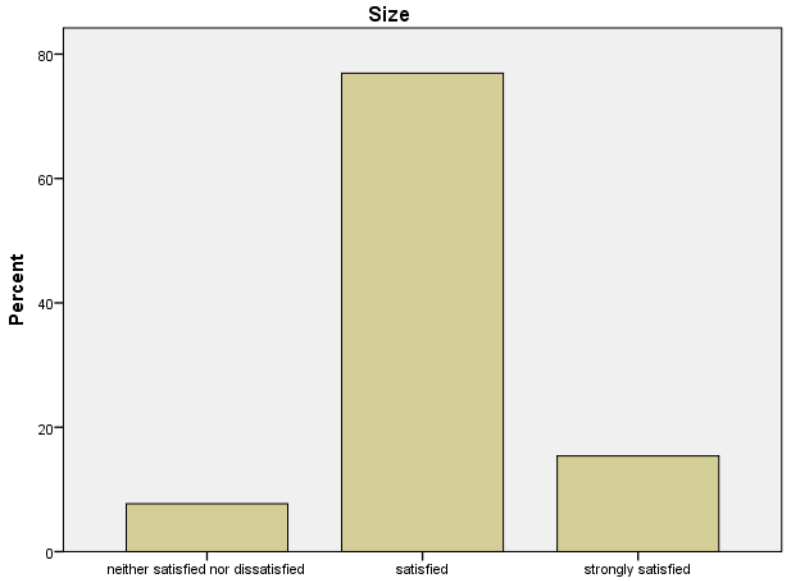


Figure 3.82: Satisfaction regarding size

As can be seen in figure 3.83, 73.1% of residents are satisfied with location of living room, kitchen, bedrooms, and other spaces.

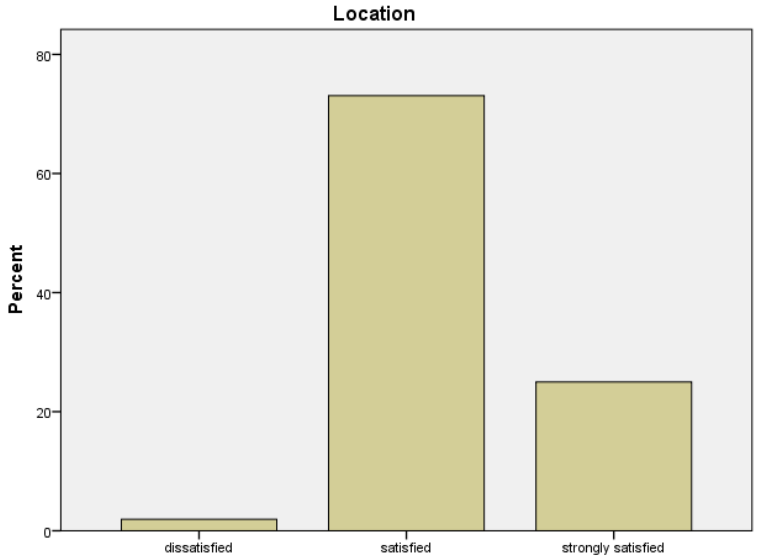


Figure 3.83: Satisfaction regarding location

Satisfied status has the highest level (55.8%) regarding usage of space in living room, bedrooms, kitchen, and so on while 42.3% are strongly satisfied (Fig. 3.84)**.**

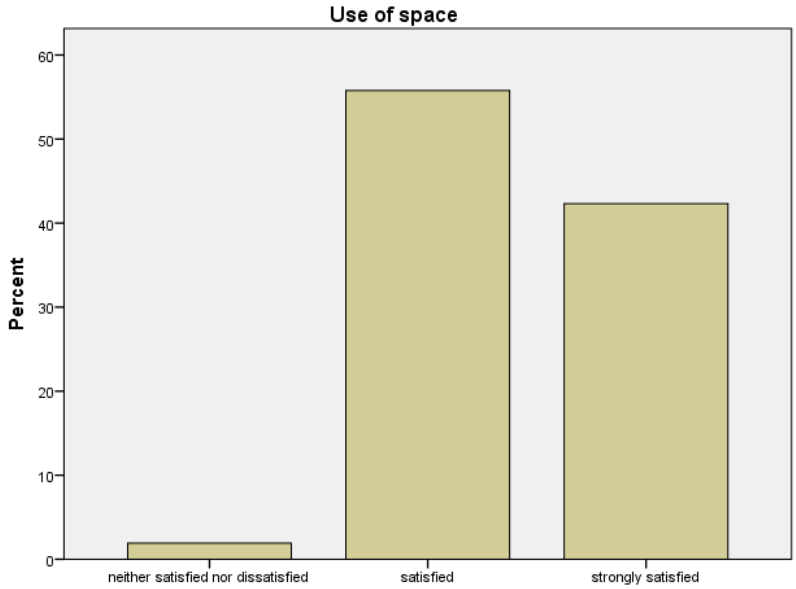


Figure 3.84: Satisfaction regarding use of space

Most of dwellers are satisfied with access from other spaces to living room, kitchen, bedrooms, and other spaces (Fig.3.85).

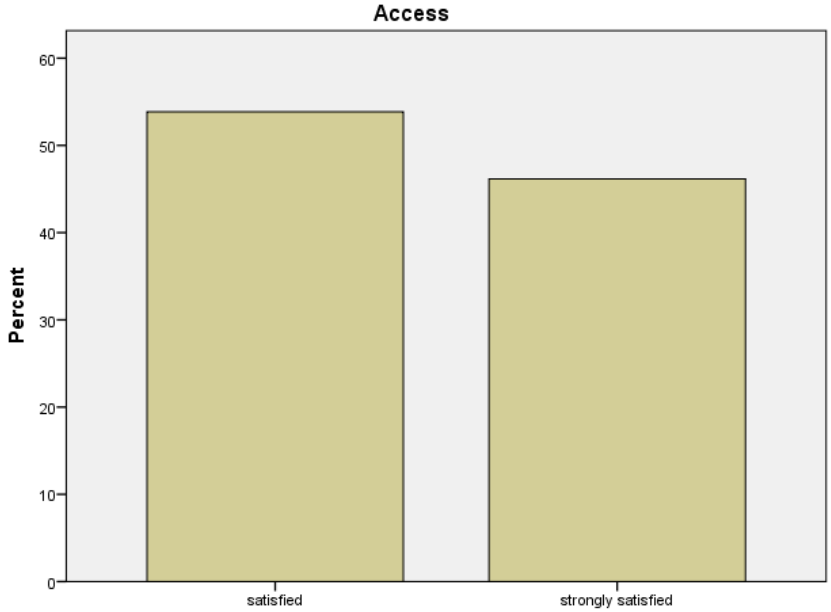


Figure 3.85: Satisfaction regarding access

Satisfied level has the highest level regarding relationship between spaces with percentage of 65.4% from users' point of view (Fig.3.86).

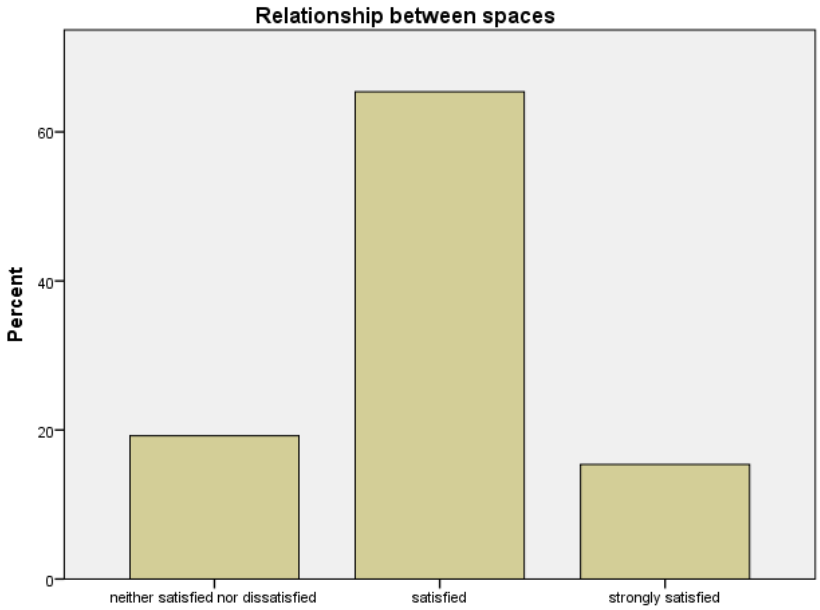


Figure 3.86: Satisfaction regarding relationship between spaces

Most of residents are satisfied with location of openings of their units, while 34.6% are neither satisfied nor dissatisfied (Fig.3.87).

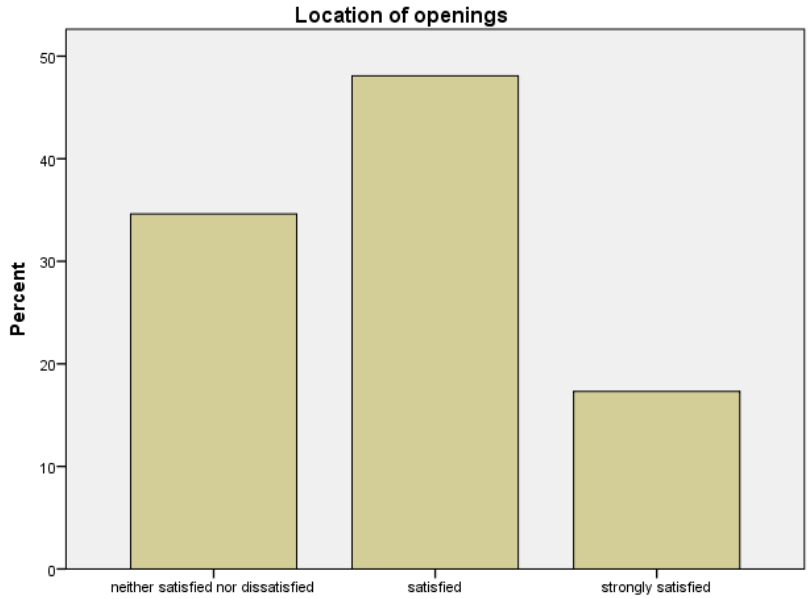


Figure 3.87: Satisfaction regarding location of openings

As can be seen in figure 3.88, 57.7% of users are satisfied with circulation between spaces while 26.9% are neither satisfied nor dissatisfied.

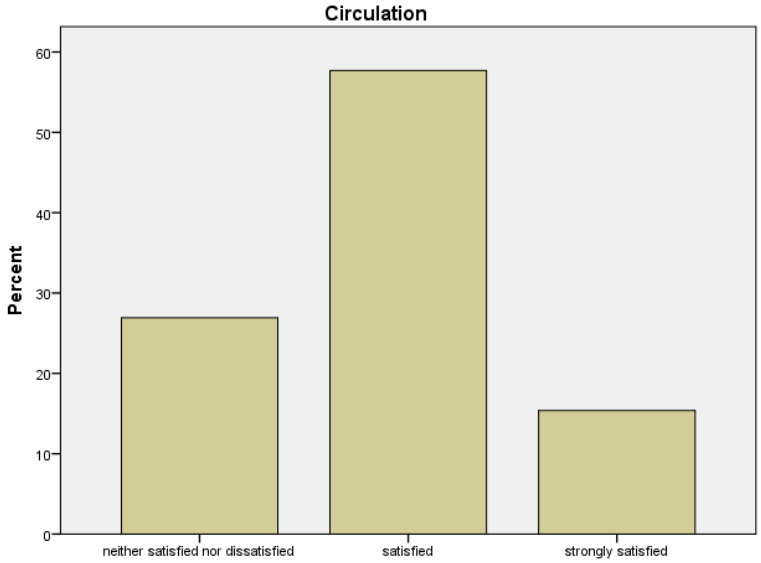


Figure 3.88: Satisfaction regarding circulation

Most of the residents (51.9%) are satisfied with aesthetic aspects of Noyanlar apartments while 30.8% of them are neither satisfied nor satisfied with this issue. (Fig.3.89).

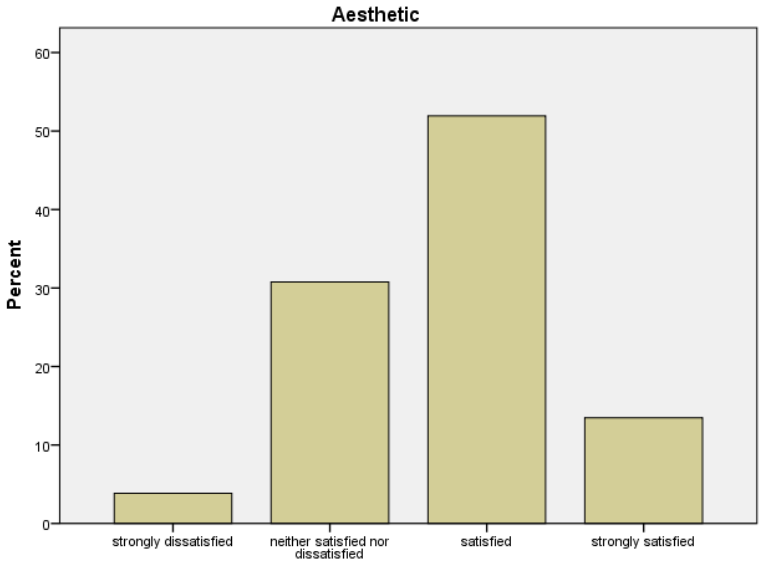


Figure 3.89: Satisfaction regarding aesthetic

Table 3.49 shows the total satisfaction level of residents regarding comfort, privacy, size, location, use of space, access from other spaces to each function, relationship between spaces, location of openings, circulation between spaces, and aesthetic aspects of Noyanlar apartments.

Table 3.49: General Satisfaction Level

		Percent	Valid Percent	Cumulative Percent
Valid	Neither satisfied nor dissatisfied	1.9	1.9	1.9
	Satisfied	82.7	82.7	84.6
	Strongly satisfied	15.4	15.4	100.0
	Total	100.0	100.0	

General satisfaction of residents, according to the mentioned issues can be seen in figure 3.90. Strongly satisfied with 15.4% has the second status after satisfied status which has the highest level with percentage of 82.7%.

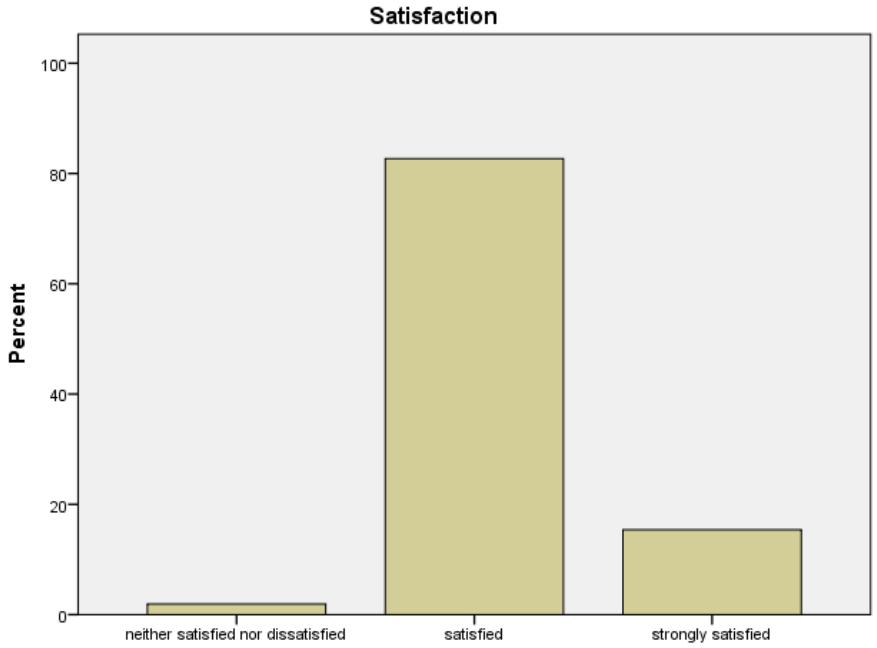


Figure 3.90: General Satisfaction Level

3.5 Comparison of Four Case Studies

Analysis of all four cases have been compared and shown in the following table.

As can be seen in table 3.50, most of people own their units except Levent apartments with 57.7% tenancy status which increase their dissatisfaction and inability of modification. So, tenants are omitted from this analysis.

Table 3.50: Comparison of ownership status

Ownership status				
	Social Housing	Levent Apartments	Döveç Apartments	Noyanlar Apartments
Owner (%)	73.9	42.3	81.3	65.0
Tenant (%)	26.1	57.7	18.8	35.0

As four case studies have been constructed in different time periods, the length of residencies are different (Table.3.51).

Table 3.51: Comparison of length of residency

Length of residency				
	Social Housing	Levent Apartments	Döveç Apartments	Noyanlar Apartments
Under 5 years (%)	7.7	13.6	15.4	100
6-10 years (%)	18.5	13.6	69.2	
11-15 years (%)	4.6	36.4	15.4	
16-20 years (%)	9.2	22.7		
21-25 years (%)	15.4	13.6		
26-30 years (%)	43.1			
31-40 years (%)	1.5			

According to table 3.52, the most important reason for residents of social housing was use of space and location, for Levent users was price, location, and use of space, for

Döveç dwellers was location of the apartments in the city, and for Noyanlar users was use of space and location. Different reasons for selecting these mass housing projects can be seen in the following table.

Table 3.52: Comparison of reasons for choosing theses houses

Why did you choose this place to live in?				
	Social Housing	Levent Apartments	Döveç Apartments	Noyanlar Apartments
Price (%)	22.5	32.6	6.3	10.6
Location (%)	32.6	23.3	68.8	28.8
Aesthetic (%)	1.1	4.7	6.3	0
Use of space (%)	40.4	32.6	18.8	51.5
Safety (%)	3.4	7.0	6.3	9.1

Most of the users wish to move except users of Döveç Apartments (Table.3.53) who like their houses which can show that their satisfaction is more than the other cases' users.

Table 3.53: Comparison in terms of wishing to move to other house

Do you wish to move to another house?				
	Social Housing	Levent Apartments	Döveç Apartments	Noyanlar Apartments
Yes (%)	93.8	77.3	30.8	69.2
No (%)	6.2	22.7	69.2	30.8

More than 40% of Döveç and Noyanlar users believe that their unit has the potential of changing while most of Social housing and Levent apartments' users do not see any potential for changes in their units (Table 3.54). The fact that Social housing residents have done the highest modification can be the reason that they do not see modification potential in their living place, more than others with percentage of 50.8% (Table 3.55). So, there is no more capability of changing in this mass housing project.

Table 3.54: Comparison regarding Potential of changing

Do you think your unit has the potential of changing?				
	Social Housing	Levent Apartments	Döveç Apartments	Noyanlar Apartments
Yes (%)	18.5	27.3	46.2	44.2
No (%)	81.5	72.7	53.8	55.8

According to table 3.55, Social housing residents have done the most modification while Noyanlar users have done the least modification. As Noyanlar have been construed recently (early 2010s), more modification might be done in the future.

Table 3.55: Comparison of amount of modifications

Did you make any changes in your house?				
	Social Housing	Levent Apartments	Döveç Apartments	Noyanlar Apartments
Yes (%)	50.8	36.4	38.5	19.2
No (%)	49.2	63.6	61.5	80.8

People who made changes:

Table 3.56 shows which spaces have been changed by People who said they modified their houses. Balcony and kitchen have been changed the most in Social housing. The reason is the small size of kitchen and also size of balcony is not appropriate. Balcony

has been changed in Levent more than other spaces. The reason is the small size of balcony. Residents of Döveç Apartments and Noyanlar modified the kitchen more than other spaces for easier access, perceiving larger area, and aesthetic.

Table 3.56: Where the modifications happened

Where did you make these changes?				
	Social Housing	Levent Apartments	Döveç Apartments	Noyanlar Apartments
Living room (%)	6.1	12.5	0	20.0
Dining area (%)	3.0	0	20.0	0
Service (Bath-WC) (%)	3.0	0	0	0
Bedrooms (%)	0	0	0	0
Kitchen (%)	6.1	37.5	60.0	50.0
Semi-Open space (Terrace/Balcony) (%)	24.2	50.0	20.0	30.0
Balcony-Kitchen (%)	54.5	0	0	0
Living room, Service, Kitchen (%)	3.0	0	0	0

Lack of usage area is the dominant reason of the modification in Social housing, Levent, and Noyanlar apartments. Lack of aesthetic aspects is the most important reason of modification in Döveç Apartments (Table. 3.57).

Table 3.57: Comparison of reasons of modifications

Why did you make changes?				
	Social Housing	Levent Apartments	Döveç Apartments	Noyanlar Apartments
Lack of enough usage area (%)	62.5	75.0	0	50.0
Lack of privacy (%)	0	0	0	0
Lack of comfort (%)	37.5	25.0	40.0	40.0
Lack of aesthetic (%)	0	0	60.0	10.0

Closing balcony is the most common modification which have been done by Socail housing and Levent residents. Opening the kitchen is the most common modification type by Döveç and Noyanlar users (Table.3.58).

Table 3.58: Comparison of type of changes

What kind of changes did you make?				
	Social Housing	Levent Apartments	Döveç Apartments	Noyanlar Apartments
Closing the balcony (%)	57.6	87.5	20.0	40.0
Opening the kitchen (%)	3.0	12.5	80.0	50.0
Adding partitions for division of space (%)	0	0	0	0
Other (%)	24.2	0	0	0
Balcony-Kitchen (%)	15.2	0	0	10.0

Most of users have done the mentioned modifications by themselves. Döveç residents got help from professionals more than others (Table. 3.59).

Table 3.59: Comparison of help from professionals

How did you do these changes? By the help of				
	Social Housing	Levent Apartments	Döveç Apartments	Noyanlar Apartments
An architect/ Interior architect (%)	3.0	0	0	0
A civil engineer (%)	0	12.5	0	0
A Master (Workman) (%)	24.2	25.0	20.0	10.0
Yourself (%)	60.6	62.5	60.0	70.0
Master+ yourself (%)	12.1	0	0	20.0
Architect/ interior architect-engineer (%)	0	0	20.0	0

Table 3.60 shows the parts of the house which should be changed according to users' needs, taste, lifestyle, desire, and etc. to make them more satisfy, so people search for more flexibility opportunities. For example, 51.5% of social housing residents want

changes in bedrooms while 62.5% of Levent dwellers want changes in service, bedrooms, and kitchen of their units. 60% of Döveç residents want changes in service and balcony because they like bigger semi-open spaces and separate service for master bedroom. Noyanlar users want changes in different parts of their unit especially semi-open spaces, service, and dining area. The fact that cultural issues are very essential should be mentioned because people enjoy using open/ semi-open spaces in North Cyprus and this size of balcony is not appropriate for them.

Table 3.60: Comparison regarding parts of units should be changed for more satisfaction

Which parts of your units should be changed according to your needs, taste, lifestyle, desires and etc. (to make you more satisfy)?				
	Social Housing	Levent Apartments	Döveç Apartments	Noyanlar Apartments
Living room (%)	0	0	0	0
Dining area (%)	9.1	0	0	10.0
Service (Bath-WC) (%)	12.1	25.0	40.0	30.0
Bedrooms (%)	51.5	12.5	0	0
Kitchen (%)	0	0	0	0
Semi-Open space (Terrace/Balcony) (%)	27.3	0	0	20.0
Service-bedroom-kitchen (%)	0	62.5	0	0
Service-balcony (%)	0	0	60.0	0
Dining-service (%)	0	0	0	10.0
Dining-balcony (%)	0	0	0	20.0
Service-balcony (%)	0	0	0	10.0

People who did not make any changes:

On the other hand, some people said they did not make any changes. Table 3.61 shows the parts of the units they wish to change. In social housing, 34.4% said kitchen, balcony, and service should be changed while 18.8% want changes in all spaces. Levent users want changes in all parts especially bedrooms, service area, and kitchen.

Changing of semi-open spaces is high in Döveç and Noyanlar which can be because of the cultural issues. People enjoy open spaces therefore, the size of the existing semi-open spaces is not appropriate for them.

Table 3.61: Desired spaces to change

In which part of your house do you wish to make changes?				
	Social Housing	Levent Apartments	Döveç Apartments	Noyanlar Apartments
Living room (%)	6.3	7.1	0	4.8
Dining area (%)	0	0	0	19.0
Service (Bath-WC) (%)	6.3	14.3	0	2.4
Bedrooms (%)	3.1	14.3	0	7.1
Kitchen (%)	12.5	21.4	0	21.4
Semi-Open space (Terrace/Balcony) (%)	9.4	7.1	62.5	45.2
Balcony-kitchen (%)	0	0	0	0
All (%)	18.8	35.7	0	0
Service-kitchen-balcony (%)	34.4	0	0	0
Dining-balcony (%)	3.1	0	0	0
Bedroom-kitchen (%)	6.3	0	0	0
Living room-dining-bedroom (%)	0	0	12.5	0
Service-balcony (%)	0	0	25.0	0

Opening the kitchen is the most common type of modification which is required by people who did not modify in Social housing, Levent, and Noyanlar. Residents of Döveç Apartments want a bigger semi-open space and separate service for master bedroom (Table.3.62).

Table 3.62: Required types of changes

What kind of changes do you wish to do?				
	Social Housing	Levent Apartments	Döveç Apartments	Noyanlar Apartments
Closing the balcony (%)	0	7.1	25.0	23.8
Opening the kitchen (%)	53.1	57.1	12.5	57.1
Adding partitions for division of space (%)	9.4	0	0	4.8
Other (%)	37.5	21.4	50.0	14.3
Balcony-kitchen (%)	0	14.3	12.5	0

According to table 3.63, no possibility because of the size and budget are the most important reasons of not making any changes in Social housing, Levent, and Noyanlar. In Döveç apartments, 44.4% of users did not change because they believe that there is no need for changing and 33.3% did not have enough information to make changes.

Table 3.63: Comparison of reasons of not modifying

What are the reasons of not to make any changes?				
	Social Housing	Levent Apartments	Döveç Apartments	Noyanlar Apartments
No need for changing (%)	0	0	44.4	19.0
No possibility because of the size (%)	53.2	42.9	0	40.5
Budget (%)	25.5	28.6	11.1	21.4
Because of the structural system (%)	8.5	4.8	0	9.5
Do not know how to do it (%)	0	4.8	33.3	2.4
Location of installation system (such as pipes) (%)	10.6	14.3	11.1	0
Location of the openings (%)	0	4.8	0	0
Others (%)	2.1	0	0	7.1

Satisfaction level:

Satisfaction regarding comfort of living room, dining area, kitchen, and other interior spaces of Noyanlar apartments is higher than other cases while Levent apartments has the lowest satisfaction level regarding comfort (Table.3.64).

Table 3.64: Comparison of Satisfaction regarding comfort

Satisfaction regarding comfort				
	Social Housing	Levent Apartments	Döveç Apartments	Noyanlar Apartments
Strongly Dissatisfied (%)	0	0	0	0
Dissatisfied (%)	15.4	18.2	0	0
Neither satisfied nor dissatisfied (%)	46.2	50.0	15.4	0
Satisfied (%)	35.4	22.7	38.5	59.6
Strongly satisfied (%)	3.1	9.1	46.2	40.4

As can be seen in table 3.65, satisfaction regarding privacy of Döveç users is higher than others while Levent has the lowest level.

Table 3.65: Comparison of Satisfaction regarding privacy

Satisfaction regarding privacy				
	Social Housing	Levent Apartments	Döveç Apartments	Noyanlar Apartments
Strongly Dissatisfied (%)	3.1	0	0	0
Dissatisfied (%)	6.2	13.6	0	0
Neither satisfied nor dissatisfied (%)	20.0	31.8	0	1.9
Satisfied (%)	64.6	36.4	61.5	80.8
Strongly satisfied (%)	6.2	18.2	38.5	17.3

The satisfaction regarding size is high in Döveç and Noyanlar and is less in social housing and Levent apartments (Table.3.66).

Table 3.66: comparison of Satisfaction regarding size

Satisfaction regarding size				
	Social Housing	Levent Apartments	Döveç Apartments	Noyanlar Apartments
Strongly Dissatisfied (%)	1.5	4.5	0	0
Dissatisfied (%)	18.5	13.6	0	0
Neither satisfied nor dissatisfied (%)	27.7	45.5	7.7	7.7
Satisfied (%)	47.7	27.3	53.8	76.9
Strongly satisfied (%)	4.6	9.1	38.5	15.4

Döveç users have the most satisfaction regarding location of interior spaces while Social housing dwellers have the least (Table.3.67).

Table 3.67: Comparison of Satisfaction regarding location of spaces

Satisfaction regarding location of spaces				
	Social Housing	Levent Apartments	Döveç Apartments	Noyanlar Apartments
Strongly Dissatisfied (%)	1.5	0	0	0
Dissatisfied (%)	6.2	9.1	0	1.9
Neither satisfied nor dissatisfied (%)	29.2	13.6	0	0
Satisfied (%)	56.9	59.1	53.8	73.1
Strongly satisfied (%)	6.2	18.2	46.2	25.0

According to table 3.68, satisfaction of Döveç and Noyanlar users regarding usage of spaces is higher than others while Levent has the lowest level.

Table 3.68: Comparison of Satisfaction regarding use of space

Satisfaction regarding use of space				
	Social Housing	Levent Apartments	Döveç Apartments	Noyanlar Apartments
Strongly Dissatisfied (%)	6.2	4.5	0	0
Dissatisfied (%)	4.6	9.1	0	0
Neither satisfied nor dissatisfied (%)	35.4	54.5	7.7	1.9
Satisfied (%)	49.2	27.3	38.5	55.8
Strongly satisfied (%)	4.6	4.5	53.8	42.3

Satisfaction regarding access from other spaces to living room, kitchen, bedroom, dining area, and other spaces is higher in Noyanlar Apartments and is lowest in Social housing (Table.3.69).

Table 3.69: Comparison of Satisfaction regarding access

Satisfaction regarding access (access from other spaces to living room, kitchen, bedrooms, and etc.)				
	Social Housing	Levent Apartments	Döveç Apartments	Noyanlar Apartments
Strongly Dissatisfied (%)	4.6	0	0	0
Dissatisfied (%)	4.6	4.5	0	0
Neither satisfied nor dissatisfied (%)	33.8	31.8	7.7	0
Satisfied (%)	46.2	45.5	46.2	53.8
Strongly satisfied (%)	10.8	18.2	46.2	46.2

Satisfaction regarding relationship between spaces is high in Döveç and Noyanlar while is lower in Social housing and Levent (Table.3.70).

Table 3.70: Comparison of Satisfaction regarding relationship between spaces

Satisfaction regarding relationship between spaces				
	Social Housing	Levent Apartments	Döveç Apartments	Noyanlar Apartments
Strongly Dissatisfied (%)	6.2	0	0	0
Dissatisfied (%)	3.1	9.1	0	0
Neither satisfied nor dissatisfied (%)	32.3	54.5	7.7	19.2
Satisfied (%)	49.2	31.8	38.5	65.4
Strongly satisfied (%)	9.2	4.5	53.8	15.4

Satisfaction of Döveç inhabitants regarding location of openings which will provide more flexibility and adaptability opportunity is higher than the rest. Social housing and Levent users have low satisfaction (Table.3.71).

Table 3.71: Satisfaction regarding location of openings

Satisfaction regarding location of openings				
	Social Housing	Levent Apartments	Döveç Apartments	Noyanlar Apartments
Strongly Dissatisfied (%)	3.1	0	0	0
Dissatisfied (%)	4.6	9.1	0	0
Neither satisfied nor dissatisfied (%)	47.7	50.0	0	34.6
Satisfied (%)	35.4	40.9	30.8	48.1
Strongly satisfied (%)	9.2	0	69.2	17.3

Döveç users are more satisfied with circulation of their units rather than the others while Social housing and Levent have low satisfaction (Table.3.72).

Table 3.72: Comparison of Satisfaction regarding circulation

Satisfaction regarding circulation				
	Social Housing	Levent Apartments	Döveç Apartments	Noyanlar Apartments
Strongly Dissatisfied (%)	3.1	0	0	0
Dissatisfied (%)	9.2	9.1	0	0
Neither satisfied nor dissatisfied (%)	43.1	45.5	7.7	26.9
Satisfied (%)	36.9	45.5	23.1	57.7
Strongly satisfied (%)	7.7	0	69.2	15.4

As can be seen in table 3.73, Döveç residents have the highest satisfaction regarding aesthetic issues while Levent has the lowest satisfaction level.

Table 3.73: Comparison of Satisfaction regarding aesthetic aspects

Satisfaction regarding aesthetic aspects				
	Social Housing	Levent Apartments	Döveç Apartments	Noyanlar Apartments
Strongly Dissatisfied (%)	26.2	36.4	0	3.8
Dissatisfied (%)	40.0	40.9	0	0
Neither satisfied nor dissatisfied (%)	33.8	22.7	23.1	30.8
Satisfied (%)	0	0	30.8	51.9
Strongly satisfied (%)	0	0	46.2	13.5

Table 3.74 shows that the general satisfaction level of Döveç users regarding all the mentioned issues is higher than the other cases' users. Noyanlar users' satisfaction has the second position while higher satisfaction can be seen in Social housing than Levent Apartments.

Table 3.74: Comparison of General satisfaction level

General satisfaction level				
	Social Housing	Levent Apartments	Döveç Apartments	Noyanlar Apartments
Strongly Dissatisfied (%)	1.5	4.5	0	0
Dissatisfied (%)	6.2	9.1	0	0
Neither satisfied nor dissatisfied (%)	44.6	50.0	0	1.9
Satisfied (%)	46.2	31.8	46.2	82.7
Strongly satisfied (%)	1.5	4.5	53.8	15.4

Consequently, according to comparison of analysis of four selected case studies, more alternation possibility lead to a higher satisfaction level.

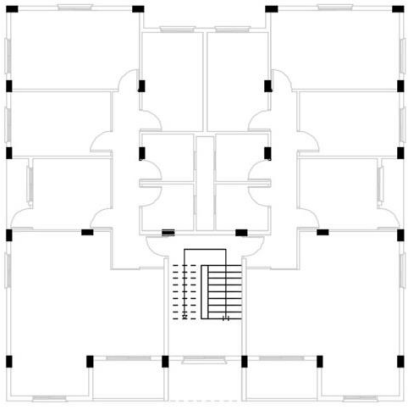
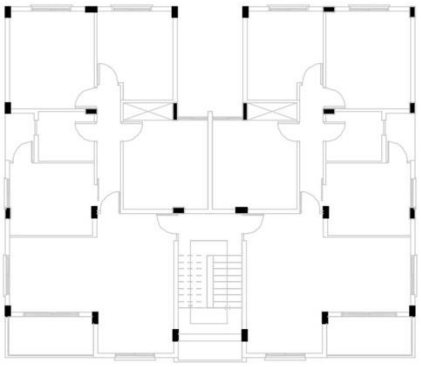
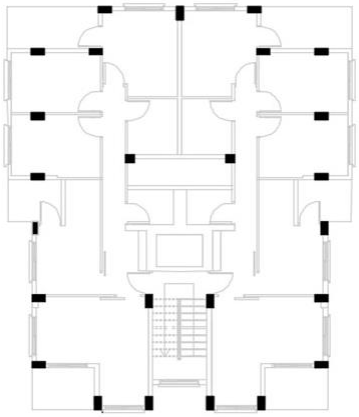
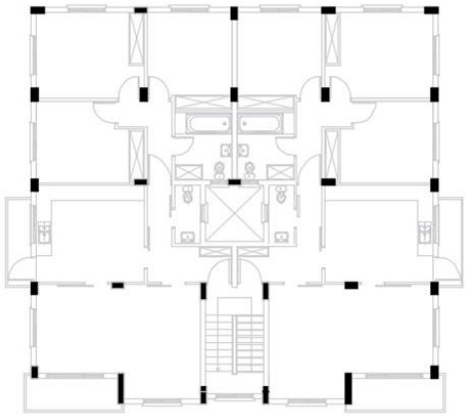
3.6 Evaluation of Flexibility and Adaptability of Case Studies

Flexibility and adaptability of four selected mass housing projects are evaluated according to the principles discussed in chapter two. As it mentioned before, each unit should have the capability of separability or connectivity from spatial, technical, vertical, and horizontal aspects for changes in the flat.

3.6.1 Structure

The frame system consists of reinforced concrete columns, beams, and slabs have been used as structure system of all the projects. The structural methods proposed by scholars to achieve flexibility and adaptability cannot be seen in none of the projects (Table.3.75).

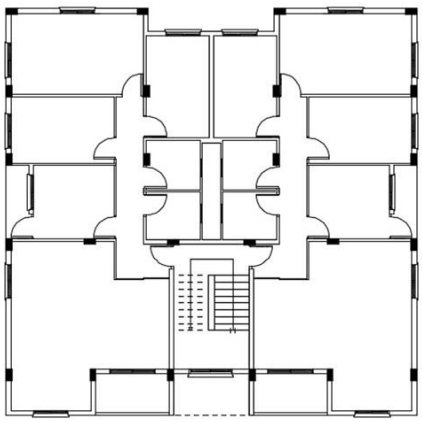
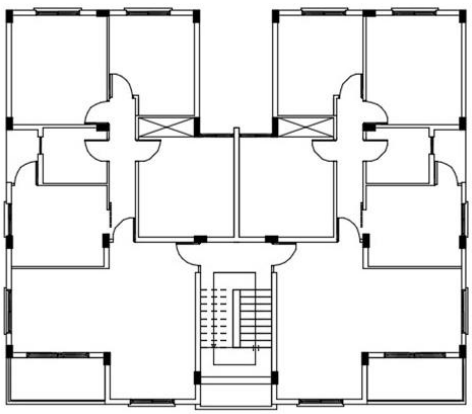
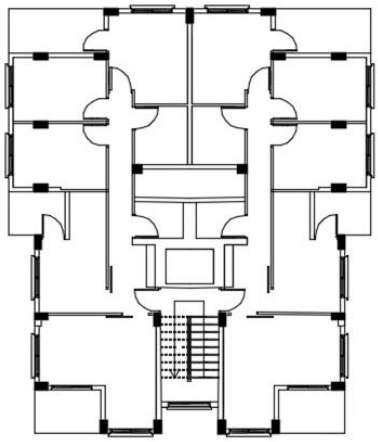
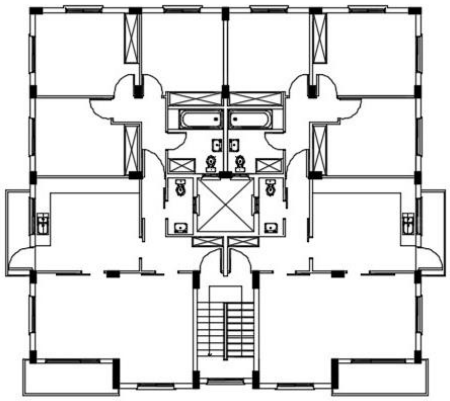
Table 3.75: Structural system

Governmental Social Housing (1980s)	Levent Apartments (1990s)
	
Döveç Apartments (2000s)	Noyanlar Apartments (2010s)
	

3.6.2 Plan

As can be seen in the plans, the permanent walls have not been located in such a way to shape a free plan. Concrete interior walls have been used instead of manufacture light partitions which provide the possibility of creating different spaces by replacement of walls and partitions. Strict characteristics of each space according to its purpose of using is visible in the plan. Lack of similar proportion of spaces, potential for various plans, and free flow in the plan have decreased flexibility and adaptability opportunity.

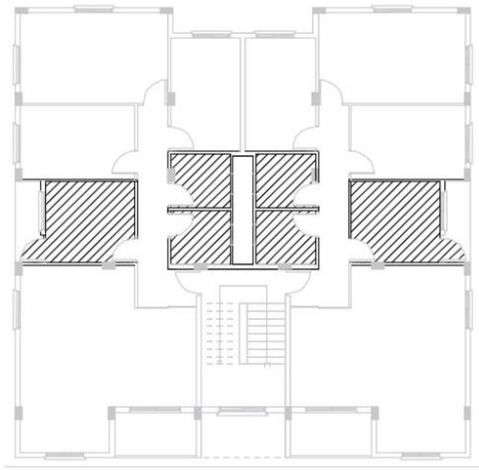
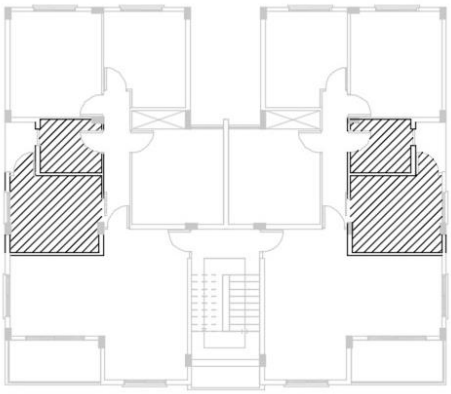
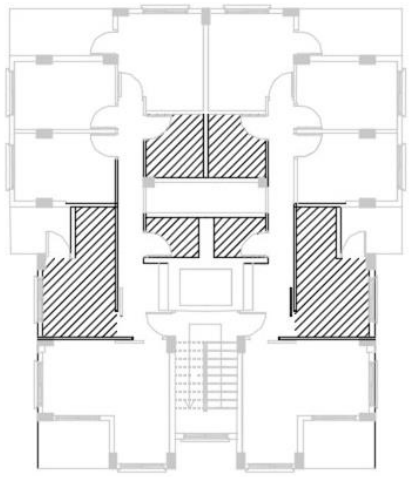
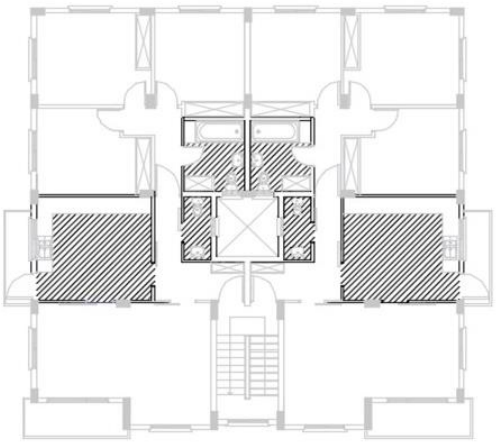
Table 3.76: Plan

Governmental Social Housing (1980s)	Levent Apartments (1990s)
	
Döveç Apartments (2000s)	Noyanlar Apartments (2010s)
	

3.6.3 Location of Installation Systems

As bathroom and kitchen need installation systems such as pipes, designing a separate zone for these areas increases flexibility and adaptability potential. On the other hand, the limitations of vertical installation system is more than horizontal so, an improper location of installation systems creates limitations for later alternations in this part. In Levent apartments a separate zone is defined for them but the problem is an inappropriate size of bathroom.

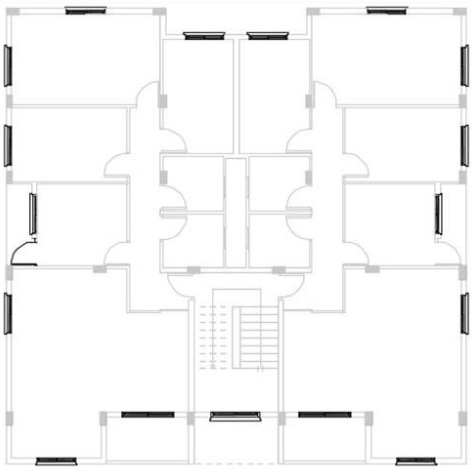
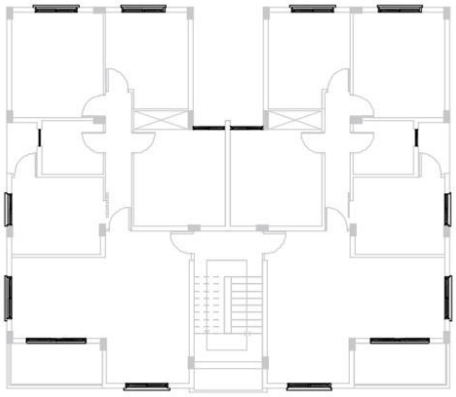
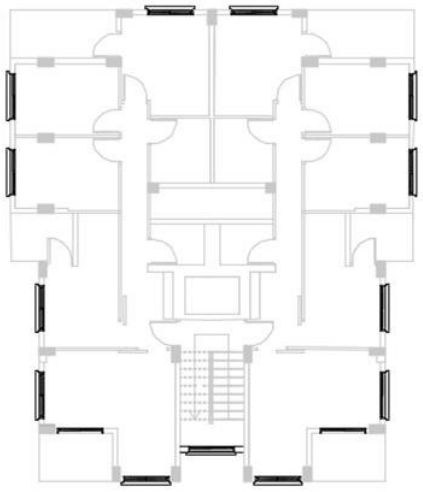
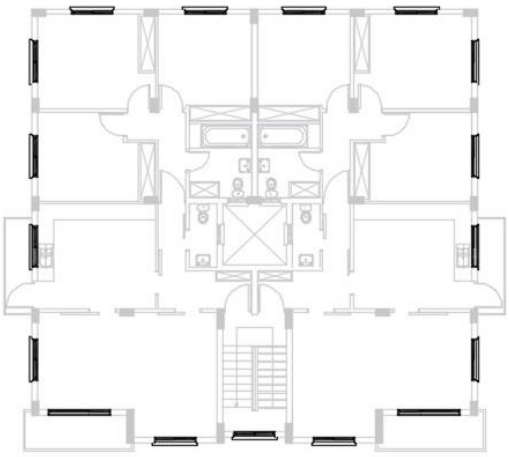
Table 3.77: Installation system

Governmental Social Housing (1980s)	Levent Apartments (1990s)
	
Döveç Apartments (2000s)	Noyanlar Apartments (2010s)
	

3.6.4 Openings Placement

The opening placement is another important concern due to building envelope. The openings located according to the function of each space which has been labeled strictly. So, in a flexible and adaptable design, window placement should be in such a way that changing of interior parts do not affect the façade.

Table 3.78: Window placement

Governmental Social Housing (1980s)	Levent Apartments (1990s)
	
Döveç Apartments (2000s)	Noyanlar Apartments (2010s)
	

As has been shown, none of the flexibility and adaptability principles have been utilized in the selected mass housing projects, but dwellers tried to adjust their living place with their needs. More alternation possibility lead to a higher satisfaction level but dwellers are limited to few certain alternations due to absence of some degree of flexibility and adaptability in the selected cases.

Chapter 4

CONCLUSION

The main intention of this study is to understand user satisfaction through a comparative study on spatial flexibility and adaptability of housing. For this purpose four mass housing projects located in Famagusta, the second largest city of North Cyprus, and constructed in the 1980s, 1990s, 2000s, and 2010s from different construction companies were selected as case studies.

In this respect, the significant criteria for users' satisfaction and spatial flexibility and adaptability were extracted through reviewing the theoretical background. In the next step, satisfaction levels of users and the degree of flexibility and adaptability in selected cases were evaluated.

Chapter two was dedicated to the explanation of the emergence of mass housing and how the quality of life of users can be affected by housing quality which is interrelated with many factors such as objective aspects (physical characteristics of housing), subjective aspects (users' experience of space), identity issues, quality of surrounding environment, development of technology, changes in structure of societies, social and cultural values, and changeabiliy potential.

One of the most significant indicators for evaluating design success is users' satisfaction. Dwellers' satisfaction can be influenced by various factors such as users'

income, education level, age, expectation, physical characteristics of housing and the surrounding environment. The main focus of this study is the evaluation of users' satisfaction in terms of spatial flexibility and adaptability.

Another important subject is the emergence of flexibility and adaptability in housing design. Many architects tried to find ways to achieve flexibility and adaptability in their design, so the flexibility and adaptability potential over the years was shown in some of the examples. Some methods for achieving the potential for flexibility and adaptability were recommended by some designers.

Perfect classification of all layers is necessary to achieve flexibility and adaptability in housing design. A clear classification of various zones such as structure, services, public/ private, usage, staircases, and other important zones should be done carefully in the early design stages. Correct location of these zones in plan arrangement, equilibrium of dimensions of the zones, clear division of stable and moveable components, and many other factors provide more opportunity for flexibility and adaptability.

Restrictive design ideas, kinds of roof shapes such as trussed rafters which minimize expansion potential, tight space specifications with strict physical settings, functionalist designs which cause the hierarchy of spaces, complicated structural systems instead of a simple structure, expensive construction methods and materials, and other aspects decrease the flexibility and adaptability potential.

Users should be considered carefully as well. For example, users' priorities, participation of users during different design stages, their financial issues, and

understandable construction materials and methods for users are important factors to consider in design.

Some other essential aspects which should be considered carefully can be:

- Designing each stage by considering the next step,
- Open plan with long span,
- Usage of standardized and prefabricated components,
- Using modular system and an appropriate dimension of modules,
- Considering window placement so rearranging of spaces does not affect the building façade and building envelope,
- Location of entrance, services, ducts, and etc.
- Free flow in the plan, organization of spaces, and circulation arrangements,
- Multiple usage of spaces,
- Placement of minimum load bearing elements during construction,
- Manufactured light building elements,
- Using moveable or foldable walls.

Many methods have been proposed by scholars such as:

“Support and infill” method: emphasizes separation of permanent and temporary building elements. Support is the building base and permanent elements while the moveable elements are called infill.

“Hard and soft” method: Soft use refers to less specified spaces when more space is available in contrast to hard use which refers to more specified usage of space by designer when less space exists which results in multifunctional spaces. Hard

technology means separation of detachable and inseparable elements at the beginning of design while soft technology refers to flexibility opportunity independent from the construction system with minimum dependency on the structure.

“Incomplete building” concept: suggests preparing a fundamental framework for the building and allowing the users to participate in their living space design.

“Polyvalence”: refers to surrounding a fixed service area with changeable layout arrangements interrelated to structure and service areas by designing according to standardized modules.

“Intelligent floor”: means placement of sockets and other services in floor or in floor ducts.

In the next stage, the satisfaction level of users and flexibility and adaptability potential of four selected case studies from four decades and construction companies in terms of spatial flexibility and adaptability was evaluated.

As was shown in chapter three, the number of owners was higher than tenants except for the Levent apartments, but as tenants do not have any opportunity to make changes in their units, they have been omitted from this study. Users of the mentioned mass housing groups selected their living space according to various priorities. For example, the most important reason for residents of governmental social housing was use of space and location, for Levent users it was price, location, and use of space, for Döveç dwellers it was location of the apartments in the city, and for Noyanlar users it was use of space and location.

According to the analysis, most of the users wish to move to another house except users of Döveç Apartments who like their houses. This indicates that their satisfaction level is higher than the other cases' users. Most residents prefer villa type houses because of cultural issues. The number of residents who believe that there is no flexibility and adaptability potential in their units is higher in social housing and the Levent apartments than Döveç and Noyanlar. The fact that social housing residents have done the most alterations may be the reason that they do not see flexibility and adaptability potential in their living space as much as the others, so there is no more capability of changing in this mass housing project.

Social housing (1980s) residents have done the most alterations while Noyanlar (2010s) users have done the least modifications. Döveç (2000s) users have done more changes than Levent (1990s) inhabitants. The most common modifications have been closing balconies due to inappropriate size of balconies and kitchen, opening kitchen to living room for perceiving a bigger area, creating a proper dining area, and easier access. As people desire to have larger open/semi-open spaces, closing balconies has been done by many of them as they did not find the size of balcony useful. They are still seeking more opportunities for change in bedrooms of the unit such as a separate service for master bedroom and bigger open/semi-open spaces. Lack of usage area and comfort were emphasized as the most important reasons for these alterations. Most users did the modifications by themselves rather than hiring professionals.

Most users who did not make any alterations in their living space wish to be able to make changes in kitchen, bedrooms, service, and semi-open spaces. Budget, no possibility due to size, and lack of enough information regarding flexibility and

adaptability were mentioned as the most important reasons for not making any alterations.

At the end, general satisfaction of dwellers regarding comfort, privacy, size, location, use of space, access from other spaces to each function, relationship between spaces, location of openings, circulation between spaces, and aesthetic aspects were evaluated. The satisfaction levels of Döveç users is higher than the other cases' users. Noyanlar users' satisfaction has the second position with the least amount of alterations by users. The satisfaction levels of social housing dwellers with the most amount of alterations is higher than Levent Apartments.

Table 4.1: Satisfaction level and amount of alternations

Amount of alternations by users	**Case studies**	**Satisfaction Level**	**Case studies**
The most	Governmental Social housing	**The highest**	Döveç Apartments
Second	Döveç	Second	Noyanlar Apartments
Third	Levent Apartments	Third	Governmental Social housing
The least	Noyanlar	**The lowest**	Levent Apartments

So, it can be concluded from the analysis that alteration possibilities lead to higher satisfaction levels. As none of the principles and methods which were proposed for achieving flexibility and adaptability were utilized in the selected case studies, no flexibility and adaptability can be seen.

People will continue housing modifications due to their changing needs, desires, and expectations and also their perception of home as a personal setting while personalization is a never ending process.

Considering cultural factors has a great role in people's satisfaction. As mentioned, most people closed the balconies. People who live in North Cyprus enjoy open/semi-open spaces, and therefore, the size of existing balconies is not appropriate and useful for them. They prefer to close the balconies to have more interior space. In fact, inappropriate size of semi-open spaces caused losing its function, while this size of balcony is proper in many other countries because of their culture.

The satisfaction levels of Döveç and Noyanlar are higher because they were constructed after 2000, so their design meets people's needs and expectations. Döveç Apartments have the highest users' satisfaction level because people could change over time as they wished. So, as people's expectations and needs keep changing, more alterations will be seen in Döveç and Noyanlar apartments over time. In the past, people chose social housing and Levent which was constructed according to that period of time's needs and expectations, but social housing users could keep their satisfaction level higher than Levent by making alterations. None of the methods and principles of flexibility and adaptability were utilized in the mentioned housing, but

dwellers tried to adapt their housing to their needs and expectations which resulted in a limitation of users to a few certain types of alterations.

As many factors such as expectation, perception, etc. affect dwellers' satisfaction, designers can keep housing satisfaction levels of users higher by considering flexibility and adaptability potential as much as possible in housing design. As has been shown during the analysis, residents of these houses are limited to certain modifications such as closing balconies and opening kitchens. After doing these alterations like the first case study, they cannot change more because of a lack of enough flexibility and adaptability opportunities and also the expense.

By utilizing the mentioned methods and principles to increase spatial flexibility and adaptability in housing design with respect to cultural issues, the achievement of users' satisfaction will be possible.

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APPENDICES

Appendix A: Sample of questionnaire given to the households living in the selected mass housing projects in English

This questionnaire is designed for research purpose for my Master Thesis in Architecture (Faculty of Architecture in Eastern Mediterranean University). The data will be used for analyzing chapter of thesis with the title of "A Comparative Study on User Satisfaction in Terms of Spatial Flexibility and Adaptability of Housing."

Gender:	Male ☐ Female ☐
Age:	Under25 ☐ 26-35 ☐ 36-45 ☐ 46-55 ☐ above 56 ☐
Nationality:	TRNC ☐ Turkey ☐ Other …….
Occupation:	Employee ☐ Self-employed ☐ Retired ☐ Governmental Officer ☐ Worker ☐ House wife ☐ Student ☐ Other ……
Education:	Primary school ☐ Secondary School ☐ University ☐ Master/ PHD ☐
Salary:	Less than 1500 TL ☐ 1500-2500 TL ☐ 2500-3500 TL ☐ More than 3500 TL ☐
Ownership Status:	Owner ☐ Tenant ☐

Length of residency:	**Your unit square meter:**	**Number of family members:**
……	……	……..

1) Why did you choose this place to live in?

Price ☐ Location ☐ Aesthetic ☐ use of space ☐ Safety ☐

2) Will you suggest to someone else to live in this unit?

Yes ☐ No ☐

3) Do you wish to move to another house?

Yes ☐ No ☐

Questions Regarding Satisfaction

4) Are you **satisfied** with the

		Strongly Dissatisfied = 1	Dissatisfied = 2	Neither satisfied nor dissatisfied = 3	Satisfied = 4	Strongly satisfied = 5
Comfort of	Living room					
	Dining area					
	Bedrooms					
	Kitchen					
	Service (Bath-WC)					
	Semi-Open space (Terrace/Balcony)					
Privacy of	Living room					
	Dining area					
	Bedrooms					
	Kitchen					
	Service (Bath-WC)					
	Semi-Open space (Terrace/Balcony)					
Size of	Living room					
	Dining area					
	Bedrooms					
	Kitchen					
	Service (Bath-WC)					
	Semi-Open space (Terrace/Balcony)					
Location of	Living room					
	Dining area					
	Bedrooms					
	Kitchen					
	Service (Bath-WC)					
	Semi-Open space (Terrace/Balcony)					

Use of **Space** in	Living room					
	Dining area					
	Bedrooms					
	Kitchen					
	Service (Bath-WC)					
	Semi-Open space (Terrace/Balcony)					
Access from other spaces to	Living room					
	Dining area					
	Bedrooms					
	Kitchen					
	Service (Bath-WC)					
	Semi-Open space (Terrace/Balcony)					

5) Are you **satisfied** with

	Strongly Dissatisfied = 1	Dissatisfied = 2	Neither satisfied nor dissatisfied = 3	Satisfied = 4	Strongly satisfied = 5
Relationship between Spaces					
Location of Openings (windows-doors)					
Circulation between spaces					
Aesthetic aspects					

Questions Regarding Flexibility and Adaptability

6) Which parts of your units should be changed according to your needs, taste, lifestyle, desires and etc. (to make you more satisfy)?

Living room ☐ Dining area ☐ Service (Bath-WC) ☐

Bedrooms ☐ Kitchen ☐ Semi-Open space (Terrace/Balcony) ☐

7) Do you think your unit has the potential of changing?

Yes ☐ No ☐

8) Did you make any changes in your house?

Yes ☐ No ☐

If Yes:

9) Where did you make these changes?

Living room ☐ Dining area ☐ Service (Bath-WC) ☐

Bedrooms ☐ Kitchen ☐ Semi-Open space (Terrace/Balcony) ☐

10) Why did you make changes?

Lack of enough usage area ☐ Lack of Privacy ☐

Lack of Comfort ☐ Lack of Aesthetic ☐

Others…….

11) What kind of changes did you make?

Closing the balcony ☐ Opening the kitchen ☐

Adding partitions for division of space ☐ Others…….

12) How did you do these changes? By the help of

An architect/ Interior architect ☐ A civil engineer ☐

A Master (Workman) ☐ Yourself ☐ Others…….

13) Did you have any difficulties with your neighbors while doing modifications?

Yes ☐ No ☐

14) Did you have any restrictions related to the building legislations?

Yes ☐ No ☐

If No Changes:

15) In which part of your house do you wish to make changes?

Living room ☐ Dining area ☐ Service (Bath-WC) ☐

Bedrooms ☐ Kitchen ☐ Semi-Open space (Terrace/Balcony) ☐

16) What kind of changes do you wish to do?

Closing the balcony ☐ Opening the kitchen ☐

Adding partitions for division of space ☐ Others…….

17) What are the reasons of not to make any changes?

No need for changing ☐ No possibility because of the size ☐

Budget ☐ Because of the structural system ☐

Do not know how to do it ☐ Location of installation system (such as pipes) ☐

Location of the openings ☐ Others…….

If there is more explanation:

Thank you for your time and participation

Sample of questionnaire given to the households living in the selected mass housing projects in Turkish

Bu anket Yüksek Lisans (Doğu Akdeniz Üniversitesi, Mimarlık Fakültesi, Mimarlık Bölümü) tezim için araştırma amaçlı hazırlanmıştır. Bilgiler "evlerdeki adapte edilebilirlik ve mekansal esneklik faktörlerine göre kullanıcı memnuniyetleri üzerine karşılaştırmalı çalışma" konulu master tezimin bölümündeki analizler için kullanılacaktır.

Cinsiyet:	Erkek ☐ Kadın ☐
Yaş:	25 Altı ☐ 26-35 ☐ 36-45 ☐ 46-55 ☐ 56 Üstü ☐
Uyruk:	KKTC ☐ Türkiye ☐ Diğer ……
Meslek:	çalışan ☐ serbest çalışan ☐ Emekli ☐ Devlet çalışanı ☐ işçi ☐ ev hanımı ☐ Öğrenci ☐ Diğer……
Eğitim:	Ilk okul ☐ Lise ☐ üniversite ☐ Master/ PHD ☐
Maaş:	1500 TL den az ☐ 1500-2500 TL ☐ 2500-3500 TL ☐ 3500 TL den fazla ☐
Mülkiyet durumu:	Mal sahibi ☐ kiracı ☐

Ikamet süresi:	**Konut buyuklugu (metre kare):**	**Aile uyesi sayisi:**
…….	……	……..

1) Neden burada yasamayi tercih ettiniz?

Fiyat ☐ Konum ☐ Estetik ☐ Kullanım alanı ☐ Güvenlik ☐

2) Baska birisine burada yasamayı önerir misiniz?

Evet ☐ Hayır ☐

3) Baska bir eve tasinmak istiyor musunuz?

Evet☐ Hayır ☐

Memnuniyet konusundaki sorular

4) Asagidakiler konusunda memnun musunuz?

		Kesinlikler Memnun değil = 1	Memnuniyetsiz = 2	Ne memnun ne de değil = 3	Tatmin olmus = 4	Cok memnun = 5
Konfor (Rahatlık)	Salon					
	Yemek alani					
	Yatak odasi					
	Mutfak					
	Servis (Banyo-Tuvalet					
	Yarı Açık alan(Teras /Balkon)					
Mahremiyet (özellik)	Salon					
	Yemek alani					
	Yatak odasi					
	Mutfak					
	Servis (Banyo-Tuvalet					
	Yarı Açık alan(Teras /Balkon)					
Mekan Boyutları	Salon					
	Yemek alani					
	Yatak odasi					
	Mutfak					
	Servis (Banyo-Tuvalet					
	Yarı Açık alan(Teras /Balkon)					

Lokasyon	Salon					
	Yemek alani					
	Yatak odasi					
	Mutfak					
	Servis (Banyo-Tuvalet					
	Yarı Açık alan (Teras /Balkon)					
Kullanım/ işlevsellik	Salon					
	Yemek alani					
	Yatak odasi					
	Mutfak					
	Servis (Banyo-Tuvalet					
	Yarı Açık alan(Teras /Balkon)					
Ulaşılabilirlik (Diğer alanlardan ulaşım)	Salon					
	Yemek alani					
	Yatak odasi					
	Mutfak					
	Servis (Banyo-Tuvalet					
	Yarı Açık alan(Teras /Balkon)					

5) Asagidakiler konusunda memnun musunuz?

	Kesinlikler Memnun değil = 1	Memnuniyetsiz = 2	Ne memnun ne de değil = 3	Tatmin olmus = 4	Cok memnun = 5
Mekanlar arasındaki ilişki					
Açıklıkların konumu (pencere-kapı)					
Mekanlar arasındaki sirkülasyon					
Estetik yaklaşım					

Esneklik ve adapte edilebilirliğe dayalı sorular

6) Hangi bölüm sizin ihtiyaç, yaşam tarzı, gereklilik vb. gore değiştirilebilir? (sizi daha memnun etmek için)

Salon ☐ Yemek alanı ☐ Servis (Banyo-Tuvalet) ☐

Yatak odaları ☐ Mutfak ☐ Yarı Açık alan (Teras /Balkon) ☐

7) Sizce evinizin değişm yapmak için potansiyeli var mı?

Evet ☐ Hayır ☐

8) Evinizde herhangi bir değişim yaptınız mı?

Evet ☐ Hayır ☐

Eğer Evet:

9) Nerede değişiklik yaptınız?

Salon ☐ Yemek alanı ☐ Servis (Banyo-Tuvalet) ☐

Yatak odaları ☐ Mutfak ☐ Yarı Açık alan (Teras /Balkon) ☐

10) Ne için değişiklik yaptınız?

Yeterli kullanım alanı eksiliği ☐ Mahremiyet (Özel alan) eksikliği ☐

Konforlu alan yetersizliği ☐ Estetik yetersizliği ☐

Diğer …….

11) Ne tür değişim yaptınız?

Balkonu kapatma ☐ Mutfağı açma ☐

Mekanlara eklemeler yapma ☐ Diğer ……

12) Bu değişimleri kimin yardımı ile yaptınız?

Mimar / iç mimar ☐ İnşaat mühendisi ☐ Usta (işçi) ☐

Kendiniz ☐ Diğer …….

13) Bu değişiklikleri yaparken komşularınız ile bir sıkıntı (zorluk) yaşadınız mı?

Evet ☐ Hayır ☐

14) İmar yasalarına gore herhangi bir kısıtlama ile karşılaştınız mı?

Evet ☐ Hayır ☐

Eğer herhangi bir değişim yok ise:

15) Evinizin hangi bölümünde değişiklik yapmak isterdiniz?

Salon ☐ Yemek alani ☐ Servis (Banyo-Tuvalet) ☐

Yatak odalari ☐ Mutfak ☐ Yarı Açık alan (Teras /Balkon) ☐

16) Ne tür bir değişim isterdiniz?

Balkonu kapatmak ☐ Mutfağı açmak ☐

Mekanlara eklemeler yapmak ☐ Diğer …….

17) Değişiklik yapmamanızın sebebi nedir?

Değişime gerek yok ☐ Boyutlar imkan vermiyor ☐

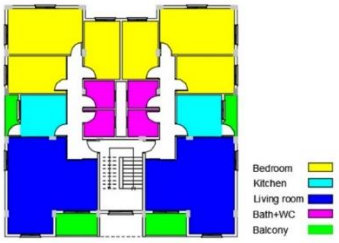
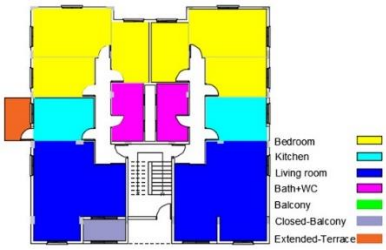
Bütçe ☐ Stüröktür sistemi yüzünden ☐

Nasıl yapacağımı bilmiyorum ☐ Tesisatların sisteminden dolayı (boru hatları vb.) ☐

Açılıkların (pencere, kapı) konumu ☐ Diğer …….

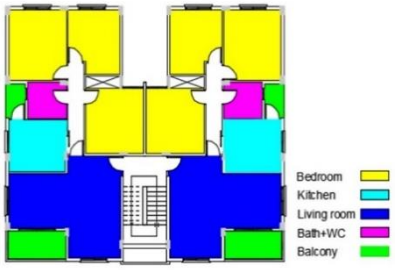
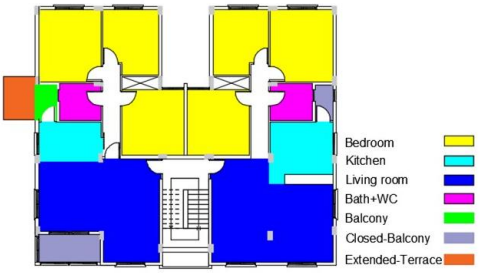
Appendix B: Inventory Tables

Inventory Table No.: 1	**Project Name:**	Governmental Social Housing
	Location:	İsmet İnönü Bulvarı
	Construction Date:	1980s
	Number of floors:	5
	Building Materials:	Concrete
	Structural System:	Skeleton Frame Structure

Site Location	**Building Image**
	
Original Plan	**Changed Plan**
	

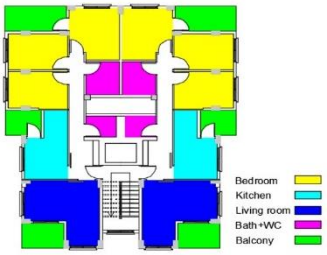
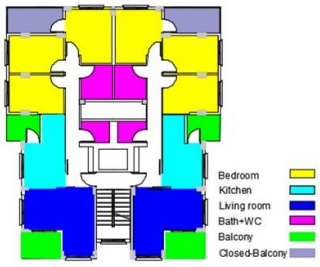
Alternations	
Kitchen	
Closing balcony of the kitchen with integration of the balcony into the kitchen/ Reflecting on the building facade	✓
Closing balcony of the kitchen without integration of the balcony into the kitchen/ Reflecting on the building facade	-
Extension of kichn balcony / Reflecting on the building facade	✓
Opening kithen to the living room/ Not reflecting on the facade	✓
Living room	
Closing balcony with integration of the balcony into the living room/ Reflecting on the facade	✓
Closing balcony while keeping separated from living room /Reflecting on the facade	✓
Removing the entrance door of the living room/ not reflecting on the facade	-
Bedroom	
Closing balcony of the bedroom/ Reflecting on the building facade	-
Service area	
Combination of Bath and WC/ Not reflecting on the facade	✓
Changing function/ Reflecting on the facade	✓
Adaptation of shutters to the building openings/ Reflection on the facade	✓
More potential for ground floor units	-

Inventory Table No.: 2	**Project Name:**	Levent Apartments
	Location:	Çanakkale Göleti close to "Gazi-Mustafa Kemal Bulvari"
	Construction Date:	1990s
	Number of floors:	4
	Building Materials:	Concrete
	Structural System:	Skeleton Frame Structure

Site Location	**Building Image**
	
Original Plan	**Changed Plan**
	

Alternations	
Kitchen	
Closing balcony of the kitchen with integration of the balcony into the kitchen/ reflecting on the building facade	✓
Closing balcony of the kitchen without integration of the balcony into the kitchen/ reflecting on the building facade	✓
Extension of kichn balcony / Reflecting on the building facade	✓
Opening kithen to the living room/ Not reflecting on the facade	✓
Living room	
Closing balcony with integration of the balcony into the living room/ Reflecting on the facade	✓
Closing balcony while keeping separated from living room /Reflecting on the facade	✓
Removing the entrance door of the living room/ not reflecting on the facade	-
Bedroom	
Closing balcony of the bedroom/ Reflecting on the building facade	-
Service area	
Combination of Bath and WC/ Not reflecting on the facade	-
Changing function/ Reflecting on the facade	-
Adaptation of shutters to the building openings/ Reflection on the facade	✓
More potential for ground floor units	✓

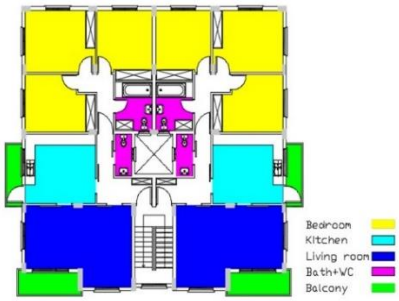
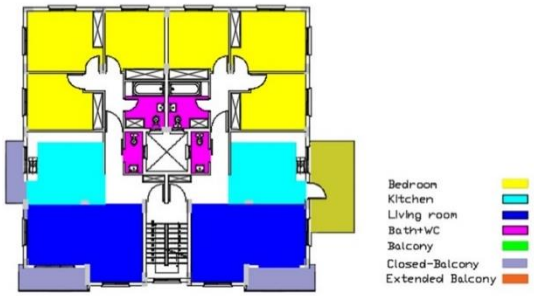
Inventory Table No.: 3	**Project Name:**	Döveç Apartments No. 13,14,15,16
	Location:	"İsmet İnönü Bulvarı", behind new Lemar market
	Construction Date:	2000s
	Number of floors:	5
	Building Materials:	Concrete
	Structural System:	Skeleton Frame Structure

Site Location	**Building Image**
	
Original Plan	**Changed Plan**
	

Alternations	
Kitchen	
Closing balcony of the kitchen with integration of the balcony into the kitchen/ reflecting on the building facade	-
Closing balcony of the kitchen without integration of the balcony into the kitchen/ reflecting on the building facade	-
Extension of kichn balcony / Reflecting on the building facade	-
Opening kithen to the living room/ Not reflecting on the facade	✓
Living room	
Closing balcony with integration of the balcony into the living room/ Reflecting on the facade	-
Closing balcony while keeping separated from living room /Reflecting on the facade	-
Removing the entrance door of the living room/ not reflecting on the facade	-
Bedroom	
Closing balcony of the bedroom/ Reflecting on the building facade	✓
Service area	
Combination of Bath and WC/ Not reflecting on the facade	-
Changing function/ Reflecting on the facade	-
Adaptation of shutters to the building openings/ Reflection on the facade	✓
More potential for ground floor units	✓

Inventory Table No.: 4	**Project Name:**	Noyanlar Canakkale Apartments
	Location:	Çanakkale Gandular behind China Bazaar.
	Construction Date:	2010s
	Number of floors:	4
	Building Materials:	Concrete
	Structural System:	Skeleton Frame Structure

Site Location	**Building Image**
	

Original Plan	**Changed Plan**
	

Alternations	
Kitchen	
Closing balcony of the kitchen with integration of the balcony into the kitchen/ reflecting on the building facade	✓
Closing balcony of the kitchen without integration of the balcony into the kitchen/ reflecting on the building facade	✓
Extension of kichn balcony / Reflecting on the building facade	✓
Opening kithen to the living room/ Not reflecting on the facade	✓
Living room	
Closing balcony with integration of the balcony into the living room/ Reflecting on the facade	✓
Closing balcony while keeping separated from living room /Reflecting on the facade	✓
Removing the entrance door of the living room/ not reflecting on the facade	✓
Bedroom	
Closing balcony of the bedroom/ Reflecting on the building facade	-
Service area	
Combination of Bath and WC/ Not reflecting on the facade	-
Changing function/ Reflecting on the facade	-
Adaptation of shutters to the building openings/ Reflection on the facade	✓
More potential for ground floor units	✓