FLEXIBILITY AS A TOOL TO REDESIGN POLYVALENT SPACES: CASE OF "ZOGU I ZI" APARTMENT IN TIRANA

A THESIS SUBMITTED TO
THE FACULTY OF ARCHITECTURE AND ENGINEERING
OF
EPOKA UNIVERSITY

BY
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IN PARTIAL FULFILLMENT OF THE REQUIREMENTS
FOR
THE DEGREE OF MASTER OF SCIENCE
IN
ARCHITECTURE

JUNE, 2024

Approval sheet of the Thesis

This is to certify that we have read this thesis entitled **"Flexibility as a tool to redesign polyvalent spaces: case of "Zogu I Zi" Apartment in Tirana"** and that in our opinion it is fully adequate, in scope and quality, as a thesis for the degree of Master of Science.

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DECLARATION

I hereby declare that all information in this document has been obtained and presented in accordance with academic rules and ethical conduct. I also declare that, as required by these rules and conduct, I have fully cited and referenced all material and results that are not original to this work.

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ABSTRACT

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The world is evolving rapidly, and these changes significantly impact our environment. Studies indicate that people spend the vast majority of their time indoors, whether at home or in cars, leaving only a small fraction of their life spent outdoors—comparable to just a few hours each week. Buildings play a more integral role in our lives than we often realize, affecting our well-being, emotions, and ideas. As technology advances, it is essential to leverage it to make life more efficient. To protect our environment while enhancing user comfort and well-being, we must consider factors such as physical lifespan, efficiency, flexibility, comfort, safety, and security of buildings. Many buildings are demolished not due to structural deterioration but because they no longer meet user needs. Modularity is crucial, allowing spaces to adapt easily to changing requirements with the assistance of technology that controls various aspects like lighting and temperature.

The primary goal of this thesis is to analyze and structure methods for enhancing the flexibility of buildings. By focusing on modularity and adaptability, the aim is to extend the functional lifespan of structures, ensuring they remain relevant and useful to their occupants over time.

This research will prioritize modularity and adaptability to propose flexible prototypes that exemplify innovative approaches to design, construction, and technology integration. By studying and implementing these methods, the thesis seeks to demonstrate how spaces can be divided and adapted as needed, supported by technology to control various environmental factors efficiently.

In conclusion, buildings should be more than static structures; they should function as living systems. By promoting efficiency through advanced technology and innovative design, buildings can better meet the evolving needs of their users,

ultimately enhancing both comfort and sustainability. This thesis aims to provide a framework for such adaptable and modular building designs, contributing to more resilient and user-centric environments.

Keywords: *Flexibility, Adaptability Smart Technologies, Smart Decisions, Smart Solutions*

ABSTRAKT

FLEKSIBILITETI SI NJË MJET PËR TË RIFORMATUAR HAPËSIRAT POLIVALENTE: RASTI I APARTAMENTEVE “ZOGU I ZI” NË TIRANË

Harapi, Selda

Master Shkencor, Departamenti i Arkitekturës

Udhëheqesi: Assoc. Prof. Dr. Odeta Manahasa

Bota po evoluon me shpejtësi dhe këto ndryshime kanë një ndikim të rëndësishëm në mjedisin tonë. Studimet tregojnë se njerëzit kalojnë pjesën më të madhe të kohës së tyre brenda, qoftë në shtëpi apo në makina, duke lënë vetëm një pjesë shumë të vogël të jetës së tyre jashtë e krahasueshme me vetëm disa orë në javë. Ndërtesat luajnë një rol më integral në jetën tonë sesa shpesh e kuptojmë, duke ndikuar në mirëqenien, emocionet dhe idetë tona. Me përparimin e teknologjisë, është thelbësore të përdorim atë për të bërë jetën më efikase. Për të mbrojtur mjedisin tonë ndërsa përmirësojmë komoditetin dhe mirëqenien e përdoruesve, duhet të konsiderojmë faktorë si jetëgjatësia fizike, efikasiteti, fleksibiliteti, komoditeti, siguria dhe mbrojtja e ndërtesave. Shumë ndërtesa shemben jo për shkak të dëmtimit strukturor, por sepse ato nuk i plotësojnë më nevojat e përdoruesve. Modulariteti është thelbësor, duke lejuar hapësirat të përshtaten lehtësisht me kërkesat që ndryshojnë, me ndihmën e teknologjisë që kontrollon aspekte të ndryshme si ndriçimi dhe temperatura.

Qëllimi kryesor i kësaj teme është të analizojë dhe strukturojë metodat për përmirësimin e fleksibilitetit të ndërtesave. Duke u fokusuar në modularitet dhe përshtatshmëri, synimi është të zgjasë jetëgjatësinë funksionale të strukturave, duke siguruar që ato të mbeten relevante dhe të dobishme për banorët e tyre me kalimin e kohës.

Kërkimi do të prioritetizojë modularitetin dhe përshtatshmërinë për të propozuar prototipe fleksibël që ilustrojnë qasje inovative në dizajn, ndërtim dhe integrim të teknologjisë. Duke studiuar dhe zbatuar këto metoda, tema synon të demonstrojë se si hapësirat mund të ndahen dhe përshtaten sipas nevojës, të mbështetura nga teknologjia për të kontrolluar në mënyrë efikase faktorët mjedisorë

të ndryshëm.

Në përfundim, ndërtesat duhet të jenë më shumë se struktura statike; ato duhet të funksionojnë si sisteme të gjalla. Duke promovuar efikasitetin përmes teknologjisë së avancuar dhe dizajnit inovativ, ndërtesat mund të plotësojnë më mirë nevojat e evoluara të përdoruesve të tyre, duke përmirësuar përfundimisht si komoditetin ashtu edhe qëndrueshmërinë. Kjo temë synon të ofrojë një kornizë për dizajnet e ndërtesave të përshtatshme dhe modulare, duke kontribuar në mjedise më të qëndrueshme dhe të orientuara drejt përdoruesve.

Fjalë kyçe: *Fleksibilitet, Adaptueshmëri, Teknologji të Zgjuara, Vendime të Zgjuara, Zgjidhje të Zgjuara*

I dedicate this work to my lovely family and my beloved ones, who offered me unconditional love and support!
Sincerely thank you!

ACKNOWLEDGEMENTS

I am deeply grateful to all those who have contributed to the completion of this thesis on flexible building design. I am indebted to Professor Anna Yunitsyna for guiding and helping me understand flexible building and my supervisor, Odeta Manahasa, for their guidance, support, and invaluable insights throughout the research process. Their expertise has been instrumental in shaping the direction of this thesis. I extend my heartfelt thanks to the numerous authors and researchers whose work formed the foundation of this study. Their contributions have enriched my understanding and inspired new avenues of exploration. I am deeply grateful to the individuals and organizations who generously shared their knowledge and experiences through interviews and questionnaires. Your insights have been instrumental in shaping the practical aspects of this research.

I would also like to thank my family and friends for their unwavering support and encouragement throughout this journey. Your belief in me has been a constant source of strength and motivation.

Finally, I express my gratitude to the readers of this thesis. It is my sincere hope that the insights and findings presented here will contribute to the advancement of flexible building design and the creation of more sustainable, responsive, and user-centric building environments.

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INTRODUCTION

1.1 Problem Statement

One of the major issues in architecture today is how to prolong the functional life of existing buildings in a time of fast-changing user behavior and technological developments. Many buildings are considered for demolition although they are still structurally sound, due to the fact that they no longer offer the efficiency, flexibility, comfort, safety, or sustainability that are today demanded from buildings (Brand, 1994). Thus, the static nature of architecture in contrast to the dynamic behavior of the users creates a conflict that needs to be resolved by increasing the modularity and adaptability of buildings. To solve this conflict and to increase the functional life-span of existing buildings, the challenge lies in applying advanced technologies that allow buildings to be (re)configured whenever needed in the future, thus increasing the value and usefulness of the space through time (Kronenburg, 2007). Therefore, this research will analyze and structure ways to increase the adaptability of buildings in order to maintain their functional value until the end of their functional life-span. This will enable existing buildings to compete with new (types of) buildings in terms of user demands and architectural performance (Lechner, 2014). To reach this goal, the research questions that will be addressed in this thesis are: What strategies can be applied to increase the adaptability of existing buildings? What are the technological boundaries and possibilities for adaptability in existing buildings (United Nations Environment Programme, 2009)? Which solutions to increase adaptability are most promising and how do they influence the different levels of architectural design?

1.2 Thesis Aim and Objectives

The main goal of this study is to achieve an innovative prototype adaptable for an apartment in Tirana, Albania, using the resident's feedback and latest theories available on the subject. Therefore, this thesis proposes an active involvement with the residents and studying their views to achieve a better understanding of their requirements and preferences (Brand, 1994). After an analytical study and synthesis, the researchers will condensate the information into three different flexible modules for apartments, each one adapted to the specific needs of the residents within it (Kronenburg, 2007).

Additionally, this study aims to contribute to the future design due to the dynamic character of the urban environment. By including features and solutions for adaptation to future changes, these prototypes may be maintained over time while social trends and technical innovations evolve (Lechner, 2014). In addition, an attempt will be made to research in such a way that the modules obtained are scalable and replicable in other urban contexts and spatial arrangements (United Nations Environment Programme, 2009).

In the long run, this study intends to give a new dimension to the residential function in Tirana, by transforming the apartment into a flexible and responsive system, capable of responding to the needs and expectations of residents. By proposing design solutions, supported by residents' feedback and latest theories on the subject, these adaptable modules may contribute to a paradigm shift in order to create more sustainable, adequate, and habitable communities (Kronenburg, 2007; United Nations Environment Programme, 2009).

1.3 Scope of works

This thesis will cover a wide range of topics to improve the adaptability and functionality of apartments in Tirana, Albania. We will start with a spatial analysis of the existing apartments to identify the constraints and opportunities. A questionnaire will be given to the residents to capture their experiences, needs, and preferences about their current living situation (Brand, 1994). The results of the

questionnaire will show the main issues such as lack of space, disorganization, and the need for extra rooms or storage solutions.

Based on these results, we will develop innovative, flexible housing prototypes for the residents of this complex building. These prototypes will integrate cutting-edge technologies and design principles to create living spaces that can evolve with user behavior and technological advancements (Kronenburg, 2007). The solutions will be modular to allow reconfiguration over time to maintain the value of the apartments and resident satisfaction (Lechner, 2014).

Moreover, the study will produce scalable and replicable design modules that can be applied to different urban contexts and housing typologies. By addressing the dynamic nature of the urban environment, the research will contribute to creating more sustainable, adequate, and habitable communities (United Nations Environment Programme, 2009). The final goal is to provide practical guidelines and flexible housing solutions that will improve the immediate living conditions of the residents and ensure long-term adaptability and resilience of the apartments in Tirana and beyond.

1.4 Methodology

The research methodology of this paper can be divided into two parts, theoretical and practical. Theoretical part reviews information about housing design and flexibility from basic definitions to well-known theories and applications. Moreover, influential elements on flexibility and modularity are examined, followed by methods of changing them and applications which will be used in the practical part. While the practical part works on selected case studies to be examined, and analyzes them in different types and spatial configurations. In addition to distributing a questionnaire to the residents of the selected case studies in order to get a closer look to their living experiences. Finally, the outcome of both parts and their sub steps will be used to propose new prototypes for polyvalent spaces. (Figure 1)

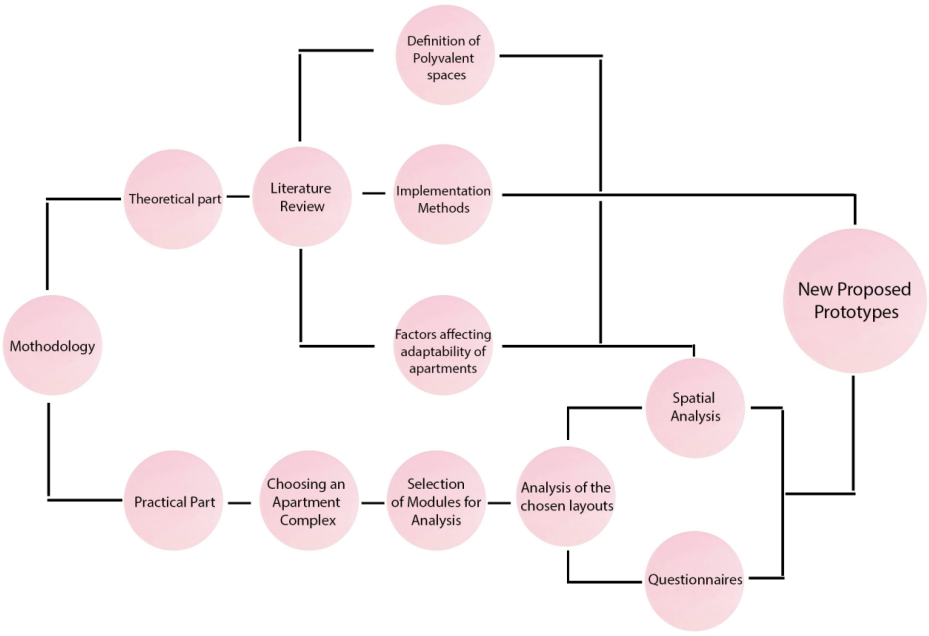

Figure 1. Diagram explaining methodology of the thesis

1.4.1. Theoretical Part

Firstly, literature review is adopted in order to clarify the reason why housing is important to study and what the current situation about apartment design is. More importantly, flexibility as a key concept in housing is explored in this review, including all its benefits for architects and inhabitants living in apartments. Then, the main techniques for realizing the flexible housing are investigated, based on two important theories: Open Building, on which the roots of adaptable housing are built; Polyvalence, famous for its principles which ensure the future transformations within apartments. Both theories are supported by case studies from all over the world, which are very useful and practical to learn about their applications and effectiveness in real life. Those case studies are then analyzed from both theoretical and spatial points of view. The processes in which design ideas are formed are investigated, as well as how they are translated into spatial compositions in real apartments. At the same time, technical and spatial limitations of apartment housing are also taken into consideration.

The other important part of the methodology is to learn about the elements affecting the flexibility of apartments. Those elements, which are always considered in design process of apartments, can be consciously adjusted in order to improve the

future performance of a dwelling. All of them are listed and explained in detail, since they are the grounds for the spatial analysis in the applied part of this thesis. Some of them are also illustrated as examples to show their effects and help understanding them. The knowledge of these concepts are essential in order to understand how flexibility works and which are the strategies, which can be adopted in order to improve the flexibility of apartments an important aim of this thesis for the chosen samples.

1.4.2. Selection of Samples of Study

For this thesis, it is important to do a proper spatial analysis of the existing apartments in order to develop good future strategies. For starting this process, it is important to choose some proper samples of apartment blocks. Tirana is the best option for this process. Tirana as a city with its bigger population and variety of houses offers a great number of apartments with different layouts. Therefore, after some consideration, it was decided to analyze three types of apartments layouts; one bedroom, two bedrooms and three bedrooms' apartments. Each one has its particular problems and opportunities to understand the importance of spatial organization and its potential for adaptation. By analyzing these scenarios, it is expected to have a broad image of the existing apartment conditions and its possibilities for improvements. After a proper spatial analysis and considering the apartment layouts, their efficiency, space utilization and users' needs, it is expected to develop some strategies to improve the flexibility and functionality of the apartments. This study will be the base for the development of some solutions and prototypes of flexible apartments, which could respond to the needs of the future residents in a Tirana and other cities and they are taken in order to study the actual condition of the apartments in Tirana.

1.4.3. Analysis of Selected Case Studies

In order to analyze the current situation of the selected apartment blocks, each housing unit undergoes a systematic spatial analysis, based on the flexibility factors

described in the theoretical research. These include the structural composition of the apartment block, the location of the technical installations, the geometric composition of the apartment schemes, the sizes of the apartments, their respective orientations and the position of the entrances. Each of these parameters are systematically evaluated and compared to an ideal type of flexibility. The housing quality is assessed by combining the resident's questionnaire with the spatial analysis in each apartment. Comparing the answers of the inhabitants with the results of the spatial analysis and implementation to standards, allows for a better understanding of the reality of each apartment. If the results of the spatial analysis and the answers of the residents coincide, this confirms that there is a direct relationship between the spatial configuration and the quality of life and satisfaction of the residents. On the other hand, if they diverge, it gives the opportunity to identify which aspects can be improved and which should be further developed. Thus, it becomes clear which requirements are closer to being achieved; the regulatory standards or the resident's preferences. This feedback loop is continuously applied throughout the whole study and evaluation process. The next chapter will discuss the results of the current study and present the levels of housing flexibility identified.

Following this step, the next stage will focus on the development of new apartment prototypes in the existing housing block. These prototypes will be developed considering the existing structural composition, and incorporating the principles of a flexible apartment configuration. All the parameters that affect the flexibility should be carefully considered in order to redefine the apartments and meet the requirements and preferences of the residents. By following this iterative and holistic approach, it is expected to optimize the functionality and versatility of the apartments and consequently the quality of life of the residents of the selected apartment blocks. The next chapter discusses the results of the current study and presents the identified levels of housing flexibility.

1.4.4. Questionnaire

The purpose of the questionnaire in this thesis is to collect data from real residents to establish what they need in their apartment. After analyzing the

apartment, itself the changes should be in order to fulfill the needs of their owners. The main purpose of this questionnaire is that with every question the apartment units are divided and categorize in groups so different typologies are taken in considerations. The questionnaire took place in an apartment building in Tirana “Zogu Zi" neighborhood. Firstly, the questionnaire was conducted face to face with the residents which they were collaborative. This survey was approached as a case study for their apartment and at one point they did think about these issues and were happy to answer. It took three days to ask everyone because most of them were as work during the day on different hours depending on the job. The survey was made of 80 people; each floor has the minimum of 5 apartments. The people answering were of both genders and different age groups, mostly adults and seniors. The habitants of this apartment building are mostly families and students. The questionnaire was design to be with 9 multiple choices and one last open question. The questionnaire was constructed to gather information from the inhabitants of the apartment building according to their current situation of the apartment and how satisfied were they and what they think for the future of their apartment.

Question 1 gathers information for the habitants living in each unit. This is an important step for the purpose of the thesis considering that the idea is to fulfill the habitants need and wishes. Knowing what each resident wants makes it easy but at the same time hard (considering that everyone has their own requests and priorities)

Question 2 aims to gain general information according the typology of the apartment. This helps to divide them in groups and later analyze and take the best and the most challenging ones to focus. This question is related to the first one because the same apartment in different floor has different habitants therefore the needs and priorities change.

Question 3 defines if the habitants are pleased with the number of bedrooms they have. Depending on the answers of the first question the need of the bedrooms’ changes. With this question we establish if any family members sleep in the living room or if they need their own dedicated space. The bedroom is an important personal space and the most used one because it’s also commonly used as a working space.

Question 4 & 5 gathers information on the most used space of the house and also how much time the habitants spend inside. The answers to these questions vary from person to person depending on where they are comfortable in and on their own

preferences depending of the activities they are performing.

Question 6 & 7 gathers information on personal preferences that it helps on choosing the right modules and proposing the most accurate approach to fulfill the aims of this thesis.

Question 8 helps to understand the way to approach and understand better the character of the apartment and if the habitants are happy or if it's another thing taken into consideration. Depending on the answer the approach would be different, using different techniques and the right colors the space can appear brighter but it can also be the opposite scenario.

Question 9 it's an open question to understand better each resident. With this question we understand their priorities and struggles they are facing every day. To this question there were many answers but to sum them up

1.5 Organization of the Thesis

The thesis goes into the concept and practice of flexible housing in Albania, it addresses the housing problems of Albania in a structured way. Chapter 1 "Introduction" is the foundation chapter where the housing problems of Albania are identified and described. These problems set the scene for the thesis overall goal and objectives which is to see how flexible building principles can solve these problems. The scope of the thesis is wide covering all aspects of flexible housing to give a full picture of its benefits and applications in Albania.

In Chapter 2 "Literature Review" the thesis reviews the existing literature on flexible buildings. It covers topics such as building materials for flexible design, meeting individual housing needs and the definitions of adaptability and flexibility in architectural context. The chapter also presents global case studies including social housing projects in Iquitos, Peru and innovative residential designs from Japan and Italy. These case studies are the references to understand the various applications and successes of flexible housing solutions worldwide.

Chapter 3 "Analysis" is the core of the thesis, presents the results from the case studies. It looks into different aspects such as spatial planning, technical services, apartment plan geometry, unit size, functionality and entrance placement.

These will show how flexible housing can optimize space, improve living standards and accommodate different household needs.

Chapter 4 “Proposal for Flexible Housing Implementation” is the action part of the thesis where concrete prototypes and design solutions are presented for the Albanian context. This chapter proposes specific design for flexible apartments to bridge the gap between theory and practice. It shows how flexible housing can be a solution for Albania’s housing problems, providing sustainable and adaptable living environments that can change with socio-economic and environmental conditions.

And finally Chapter 5 “Conclusion” summarizes the main findings of the thesis. It shows the impact of flexible housing for Albania’s housing problems and its role in socio-economic resilience and environmental sustainability. The chapter ends with suggestions for further research to develop and spread flexible housing solutions in urban and rural areas of Albania.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

Albanian housing is facing challenges due to the many different family structures and changing needs, so the apartments are inflexible and residents have to modify the spaces themselves. Young couples, primary buyers, are limited by budget and neighborhood preferences, so it's hard to prioritize the essentials. In the past housing was a multi-unit building built during the communist era, speed and cost efficiency was more important than design or individual needs. New buildings have better materials and insulation but many old buildings lack thermal performance. Despite the progress, the demand for housing especially in Tirana is increasing, so the construction boom is happening. Residents can't modify their spaces according to their changing needs; they move to new apartments or build houses. Flexibility in architecture is key buildings should be able to adapt to the changing user needs over time. Concepts like adaptability and transformability improve the living conditions, reduce the modification costs and increase the adaptability. As Albania is urbanizing, flexible and adaptable housing solutions are becoming more important.

2.1.1 Housing problems in Albania

In Albania, we have a variation of families. When designing apartments, architects try to offer a home for all of them. But what about when the family structure and needs change? The flexibility in apartments is very important but almost nonexistent (Brand, 1994). There are so many questions when buying a house or apartment, and if they want to invest for a long period of time, they have to consider and plan almost everything.

Taking into consideration different scenarios, young couples are the main ones that consider buying an apartment. Before buying anything, they make a buying plan that limits their options; the neighborhood they want to live in and the amount

of money they are able to afford. As a consequence, their options immediately drop. As if that wasn't enough, they have to make a list of spaces that are important, willing to negotiate, and don't need, also as they call it, "luxurious" (Altax, 2024). Depending on their needs and their priorities, some want a dedicated space for their work and when they have a child, they turn it into a bedroom. Others want a guest room that is transformed into a studio because the needs and priorities change (Kronenburg, 2007).

The need for flexibility is undeniable. Even if the space doesn't offer it, individuals find ways to fulfill their needs. They tear down a wall that divides two spaces so they have the opportunity to make a new bedroom, studio, etc. Every family and individual wants to be able to modify their own space according to their current needs without worrying about future needs (United Nations Environment Programme, 2009).

2.1.2 Analyzing the Housing Units implemented in Albania

Buildings in Albania are mostly based on multi-units, considering it was favored in the time of communism. New solutions were used in the modern era; load-bearing brick constructions, prefabricated constructions to lower costs and save time. Buildings weren't built based on innovative ideas, design solutions, or implementing the needs of the individuals into them. The slogan back then was: "Let's build quickly, good, and cheap" (United Nations Environment Programme, 2009). The classification of residential building typology in Albania includes many factors, and the main ones are by construction period and dwelling type. For the first, residential buildings are categorized by the construction period, which allows viewing the architectural and historical period that each building belongs to (Brand, 1994). In the second classification, residential buildings are divided into four different types: detached houses, semi-detached houses, row (or terraced) houses, and multi-apartment blocks (Building Classification in Albania Based on National Design Codes, 2022). Detached houses are free-standing structures with no direct neighbors, apart from those living in separate detached or semi-detached houses. Semi-detached houses share a wall with another person's home. Row or terraced houses usually consist of attached units and are often in rows of two, three, or more

connected houses with each house having walls on both sides with narrow strips of land in the middle, allowing for more housing on a smaller land area. Multi-apartment blocks are residential buildings constructed as high as seven to eight floors with multiple apartments or houses within one building (Kronenburg, 2007). Each residential building typology, apart from indicating the architectural style of the period, also shows how the housing needs and lifestyle of the Albanian residents have changed over time (Brand, 1994; United Nations Development Programme, 2019).

2.1.3 Building Materials

Albanian houses can also be categorized by the type of construction, which changed over time. Mostly, stone, hollow and full brick, and concrete make the main difference in the construction of buildings. Before the 1990s, full or hollow brick was the common type of construction without any thermal insulation (United Nations Environment Programme, 2009). After 2003, building norms and standards were applied gradually during the transition period. Thermal insulation was the most neglected part in the construction of houses. Concrete columns and slabs were not insulated, which affected the energy performance of buildings (Brand, 1994).

Windows and glazed materials also changed over time. Single-glazed windows were common from the 1960s-1990s, providing very little or no protection as insulation (Lechner, 2014). Unlike single-glazed, double-glazed windows with aluminum frames became typical after the 1990s. In the last five to ten years, there is a growing trend to replace old windows with double-glazed or low-emissivity PVC windows, or wooden-framed double-glazed windows. This process is ongoing to improve the thermal performance of Albanian houses and promote sustainable construction (Kronenburg, 2007).

2.1.4 Requests and fulfillment of individual needs

The housing market is an important aspect of the economy, and during the last years, Albania, especially Tirana, has experienced a large number of

constructions (United Nations Environment Programme, 2009). Demands have increased, and the number of buildings and residential compounds has also increased. Apartments offered fulfill the needs of different individuals because they offer a variety of apartment types (Kronenburg, 2007). As years pass, requests are becoming more inevitable. The need to be able to modify their own space according to their current needs is getting stronger. And that's the reason why most people give up finding an apartment and decide to build a house, but not everyone can (Brand, 1994). Those who can't afford a house often find themselves in a search for a new apartment because their needs have changed, and now the apartment is too small (Lechner, 2014).

2.1.5 Definition of a flexible building

The idea of flexibility in architecture refers to the potential of a building to adapt to the changing needs of its users and thus evolve in time (Brand, 1994). There are many different terms associated with this idea, each referring to slightly different modes of providing and altering built space to meet changing functions and spatial demands (Duffy, 1998). For example, adaptability refers to the potential of building elements and spaces to be used for multiple activities, without any irreversible modifications to the building (Schneider & Till, 2007). In contrast, transformability is the capacity of spaces, both interior and exterior, to change shape and configuration. This may be achieved without major additions or alterations in construction (Groák, 1992). Finally, convertibility refers to the irreversible modification of a building's use, through construction, to convert it to some other use (Friedman, 2002).

A final and vital concept that relates to the design of flexible buildings is that of comfort (Leaman & Bordass, 1999). A comfortable building is one that provides a comfortable built environment for its occupants. Thermal comfort, indoor air quality, and noise are examples of some of the physical aspects of the built environment that influence occupant comfort (Nicol & Humphreys, 2002). In addition, occupant comfort is determined in part by personal factors including age, sex, and physical and mental health (Fanger, 1970). By considering both flexibility and comfort, architects and builders can design buildings that provide not just suitable

environments from a functional standpoint, but also promote occupant comfort and satisfaction (Evans & McCoy, 1998).

2.1.6 Benefits of Flexible buildings

Buildings that are adaptable and flexible bring a number of benefits. We save a lot in upgrading and maintaining flexible buildings. Since 2001, it was clear that when a building was designed for flexibility, the cost and time were reduced compared to other building designs (Brand, 1994). After some research, it was concluded that by offering reusable spaces, the building owner may be able to increase the adaptability of new and existing buildings by minimizing the financial cost of change (Kronenburg, 2007).

The need for change in a building is increasing every day while consumer requirements are rising. Some of these needs are well understood and taken into consideration. Considering the diversity of families, buildings must follow (Lechner, 2014). New needs emerge as time passes; for this reason, we should focus on designing homes that will accommodate the needs of the owner now and later as they age and their needs change (United Nations Environment Programme, 2009).

2.1.7 Polyvalent building

Polyvalent buildings are a new kind of architectural object, never before experienced by individuals in their daily lives (Kronenburg, 2007). A polyvalent space is a flexible and adaptable space. The concept of a polyvalent object offers an easy and convenient solution to many of the problems that occur in the design of any type of building (Brand, 1994). Changes of function can easily be carried out in polyvalent spaces without any structural or infrastructural interventions. It is therefore crucial to consider how polyvalent forms are able to contain different activities without generating univocal spatial conditions (Lechner, 2014). Starting from the basic activities that must be contained in any home (sleep, gather, eat, cook, bathe, work), it is possible to generate different kinds of solutions able to maximize the polyvalence and therefore the usability of any designed home. A highly

polyvalent apartment, which contains all the activities of the inhabitants without being specialized in any of them, is the goal of this approach. Through the implementation of polyvalent design principles, a new era of housing characterized by adaptability and unpredictability may emerge, fundamentally reshaping our relationship with the built environment (United Nations Environment Programme, 2009).

2.1.8 Definition of adaptability and flexibility

Flexible architecture is the ability of space to change and adapt to different needs and situations. A flexible home is designed to be versatile and the architectural concept is thought from the beginning, because multi-purpose rooms can respond to various uses. For example, architects must consider things like changes in family size, the people's profession, their life phase, financial status, and how spaces are used during the day and night (Brand, 1994; Schneider & Till, 2007).

Instead, adaptable refers to the internal capacity of change, non-physical aspects, to reconfigure spaces to fit new situations. And the accessible as part of adaptable, is about creating inclusive and easy to use spaces for people of all ages, abilities, and needs (Lifetime Homes, 2009) Finally, performance-based buildings highlight the need for adaptable structures to maintain functionality and appropriateness over time, focusing on problems concerning planning, programming, and user satisfaction (Slaughter, 2001; Blakstad, 2001). Adaptable and flexible buildings have the advantage that future modifications can be accomplished at modest cost and effort. By adapting spaces that evolve and change over time, architects can simplify the accommodation of future needs and preferences. Therefore, saving time, money, and materials, because this adaptation can be done with two types of flexibility: "In-Build" adaptability, in other words, spaces and rooms designed to fit different social uses, and physical adaptability inside the building, with structures that can be modified when necessary (Groák, 1992).

The main argument of this document is to highlight the necessity of thinking the architectural project in the long term. Identifying the need for flexibility and adaptability, architects can design buildings that respond to their needs and remain

useful and relevant as society and circumstances change (Duffy, 1998).

2.1.9 Flexible furniture

When talking about furniture, I would like to divide them into two groups by functions. Flexible furniture that has 2-3 uses allows you to have less furniture and in some way gives you more conditions and possibilities. The second group is space-saving furniture that changes the whole sense of the space.

To feel really at home in your own house is the most important, giving you a sense of comfort, belonging, and personalization. But getting the most out of your living space is often a tricky thing, and this is where flexible furniture comes in. Furniture is much more than just an accessory; it is much more than its functional use and an important part of our everyday life. As Carl A. Eckleman, professor of Wood Science, says, "furniture is one of mankind's most prized possessions. It's a place to relax, rest, eat, and protect cherished contents, and it has both functional and emotional appeal" (Eckleman, 2003).

Furniture is in fact taking up a lot of the apartment's space, around 50% of the total floor (Figure 2). This shows how big a role furniture has in making the mood and possibilities in the apartments. From giving you the basic seating and storage to affecting the whole look of the apartment, it has a great influence on the residents' everyday life and feeling. Furniture is much more than just an accessory; it is much more than its functional use and an important part of our everyday life. So why not use furniture that can help you to have more space? To have flexible furniture that can help you to adapt the room for other functions when the occasion changes?

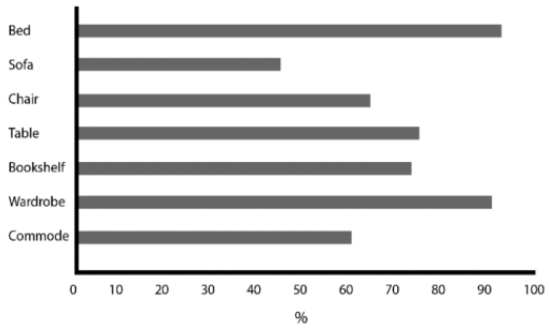

Figure 2. Furniture space occupation (Eckleman, 2003).

Overall, flexible furniture can be seen as a tool that enables residents to make the most of their surroundings to meet their dynamic needs and wants. Adaptable designs and modular arrangements allow individuals to shape their environment to meet their requirements at any given moment in time. Therefore, flexible furniture can allow people to feel more in control of their personal environment, which in turn can make any given space truly feel like home. If this is the case, then furniture in the domestic environment becomes much more than its physical stature; instead, it becomes an outlet for the occupant to express their individuality and comfort (Schneider & Till, 2007).

Figure 3. Multifunctional furniture (Brand, 1994).

While the demands have increased and small apartments are becoming very popular, so has the variety of flexible space savings furniture. Multifunctional furniture's are very popular and really helps the space and the needs of the people. (*Figure 3*)

Figure 4. Multifunctional furniture 2 (Brand, 1994).

Transformable spaces seamlessly adapt to accommodate varying needs and functions within a single environment. This is achieved using special furniture. (*Figure 4*) Walls can contain different functions, for example, opening a door to find

a bed or a wardrobe installed inside the wall (Brand, 1994).

Does flexibility in construction cost money or save us money and work? According to research, flexibility in construction saves money. It costs less to apply flexibility beforehand compared to the cost of handling unexpected changes and needs (Slaughter, 2001). It is also considered that flexibility brings more costs, causing delays in projects. Considering the lifespan of the buildings, flexibility is the best solution for long-term projects (Blakstad, 2001).

Flexibility in construction is as important as flexibility in design. Transparency in a building, the minimum connections, and dependencies areas have with each other makes the building more open to changes. Modularization, combining parts, joints, and add-ons gives us the choice and the opportunity to add or remove parts of the module, which is the building itself (Friedman, 2002).

2.1.10 Moving walls

Another solution to make apartments more flexible is using moving walls. Moving partitions can be placed in each apartment to rearrange the interior according to one's needs and preferences. They can be either a part of the building process or added to an already existing space. Moving walls make the apartments much more adaptable and flexible; they can be used in open-concept rooms as well. With just a couple of moves, a big multifunctional space can be divided into two smaller separate rooms or, on the contrary, joined together to create a larger area (Schneider & Till, 2007). Let’s make our apartments fluid and flexible by placing the idea of moving walls inside!

Figure 5. Moving Wall (Groák, 1992)

The partitions can be divided into two major categories: Firstly, they can be used to subdivide the apartment area and to provide privacy if desired. (Groák, 1992) (*Figure 5*) A family usually wants an open floor plan including the kitchen, sitting, and playing area during daily use of the flat. But if there are guests or family members joining, the flexibility to subdivide a specific zone very quickly and to provide a more private atmosphere is very useful.

Secondly, you can use the moving walls to hide something or to create a new room within the flat. In combination with variable furniture like folding or Murphy beds, the parents can easily provide their children a separate bedroom during the night (Brand, 1994) (*Figure 7*) During the day, the partitions are moved back to integrate the zone into the overall area and to maximize the flat's usable space and its functionality (Brand, 1994) (*Figure 6*)

So in summary the moving walls enable the residents to adapt the living space to their needs and activities and to provide a more practical and comfortable atmosphere within their home.

Figure 6. Moving Wall during day (Brand, 1994)

Figure 7. Moving Wall during night (Brand, 1994)

2.1.11 Small Apartments

Minimum space standards in residential design are no longer relevant today. The main reason behind this change in attitude towards space standards is the problem of overcrowding and the need for smaller apartments in cities as a practical solution. Smaller apartments may provide cheaper housing to a wider sector of society, but the lack of space standards may have unwanted side effects. Insufficient space may cause distress, physical discomfort, and even sickness among residents who have to endure cramped and cluttered living conditions (Evans et al., 2000). Small apartments are also inflexible in the sense that they cannot easily accommodate the changing requirements of a growing family, either in terms of layout or functional efficiency. In contrast to larger homes where changes in space can be made through movable partitions or flexible design features, any modification to the layout of a small apartment usually involves expensive and inconvenient construction work (Schneider & Till, 2007). The lack of this physical flexibility directly affects the residents' capacity to enhance their quality of life through individualization and efficient use of available space. In addition to this, the restricted nature of apartment living may even encourage anti-social behavior as people have to endure poor privacy and lack of space for social or recreational activities (Gifford, 2007).

Figure 8. Analyzing movements in floor plans (Lifetime Homes, 2009)

In light of these considerations, the reevaluation and reinforcement of minimum space standards in residential design are essential to safeguarding the health, comfort, and social cohesion of urban dwellers in the face of rapid urbanization and densification. When designing a two-person bedroom, adhering to

minimum space standards is crucial to ensure occupants' comfort and well-being. According to established guidelines, the minimum recommended size for such a bedroom is 10 square meters (Lifetime Homes, 2009) (*Figure 8*). The rectangular shape 2.8 x 2.9 m offers several advantages, including enhanced flexibility in floor plan layout to accommodate essential furniture pieces while still allowing room for additional furnishings or personalization. By adopting this approach, designers can strike a balance between meeting basic spatial requirements and providing occupants with the freedom to customize their living environment to suit their preferences and lifestyle. This optimal size and shape not only ensure practicality and comfort but also contribute to a sense of spaciousness and ease within the bedroom, promoting relaxation and restorative sleep for its inhabitants (Lawson, 1995).

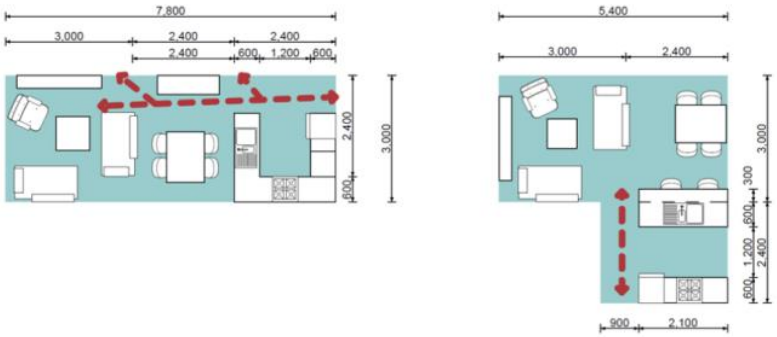

Figure 9. Analyzing movements in floor plans (Lifetime Homes, 2009)

How to design small apartments is one of the biggest challenges architects face nowadays in the urban environment. Most of the time, small floor plans make it almost impossible to have clear circulation around the room, limiting not only the size and quantity of furniture that can fit in but also the users' versatility to use the available space (Lifetime Homes, 2009) (*Figure 9*). In order to overcome these difficulties, we must respect the minimum standards based on the number of occupants per apartment: 40 square meters for studio apartments, 50 square meters for one-bedroom apartments (2 persons), 75 square meters for two-bedroom apartments (4 persons), and 100 square meters for three-bedroom apartments (6 persons) (Lifetime Homes, 2009).

In order to save time and to be able to live in small apartments, people will need to invent new solutions or order new furniture which can move or slide and change its form. For example, a cabinet can be hidden in the floor, or a bed can be a shelf in a stairway (Friedman, 2002). Architects will have to find new ways to

measure small apartment layouts. They will need to analyze every centimeter of the useful surface of the apartment to determine how the useful area could be used and what kind of activities could be performed in that small apartment. There are many tips for interior designing of small apartments, but the main keys are: to use the space in an optimal way, to include as many elements as possible which can fulfill the function of two or more elements, to reduce wasted space, and to create a small world within the apartment (Schneider & Till, 2007). Small apartments, micro apartments, and studio apartments can be pleasant and comfortable if they are well planned and cleverly designed. Everything depends on the interior design and on how the architect thinks about optimizing the useful area of the apartment. In the end, it all comes down to smart design and practicality to get the most out of a small apartment interior design.

2.2 Case Study

2.2.1. Social Houses for Iquitos, Peru

The "Build to Grow" social housing competition in Iquitos, Peru, showed new ways of thinking about urban development through adaptable housing. The winning project by Rafael Arana Parodi, Carlos Suasnabar Martínez, Amed Aguilar Chunga, and Santiago Nieto Valladares remains social housing with flexibility and sustainability in mind (Arquitectura Viva, 2020). Located in the Belen district on a 3.7-hectare plot, the project proposed 120 incremental homes that residents can modify and expand according to their needs and financial capacity. This way, a community-centric environment with public spaces is integrated, promoting social interaction and a sense of belonging among the residents. The one-floor modules in the "Build to Grow" project are the basic units designed for flexibility and expansion. Each module has a solid core with essential services like social area, kitchen, and bathroom with water, drainage, and electricity (Parodi et al., 2020). The modules have a cross-circulation layout that allows expansion in all directions within a defined urban footprint. The design is modular and economic without

compromising on quality so residents can customize their homes with different finishes and layouts. Public spaces within the housing layout provide community recreational areas scaled for community use, ensuring safety and social cohesion in the neighborhood (Parodi et al., 2020).

Figure 10. One floor modules (Parodi et al., 2020).

Figure 11. Two floor modules (Parodi et al., 2020).

In addition to one-floor modules, the "Build to Grow" competition included two-floor modules for larger families or changing needs. These two-floor modules follow the same principles of flexibility and sustainability as the one-floor designs (*Figure 10*) (Parodi et al., 2020). The two floors have the same core nucleus but with more living space on top, suitable for different family situations and lifestyles. They have rooftop air collectors to manage sunlight and rain, and are part of a larger urban fabric with a single architectural language, providing scalable housing in Iquitos (Parodi et al., 2020). (*Figure 11*)

The housing module concept (*Figure 12*) centers around a core made of high-quality materials that provide essential services, including the kitchen, bathroom, living, and dining areas (Figure 11) (Parodi et al., 2020). This central nucleus is the heart of the home, designed to maximize efficiency and convenience by consolidating vital functions within a robust and aesthetically pleasing framework.

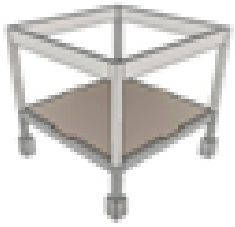

Figure 12. Nucleus

The housing module concept centers around a core made of high-quality materials that houses essential services. All these functions are placed in this central nucleus due to the fact that they house the water network and drainage network, as well as the general electrical network, allowing the efficient and centralized management of general services and utilities (Parodi et al., 2020) (*Figure 13)* By doing so, an organized and integrated layout is generated, which provides flexibility and adaptability for the growth and evolution of the plant in function of the demands of production and locations of equipment.

Figure 13. Nucleus Planning (Parodi et al., 2020).

This core is supplemented by a wooden structure that will eventually house the remaining rooms, resulting in a cohesive and efficient layout (*Figure 14*) (Parodi et al., 2020) that allows for easy future expansion and adaptability.

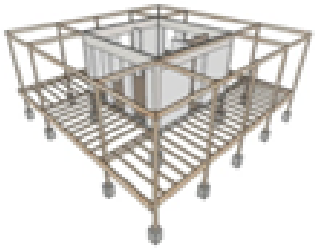

Figure 14. Wooden Structural Module (Parodi et al., 2020).

The nucleus of the housing module features cross circulation, allowing the house to expand on all four sides. This modular and flexible process allows stages of construction, enabling the owner to decide the use and type of materials to be used for the finish (Parodi et al., 2020) (*Figure 15*) this also allows the house to grow and change with the occupants' needs and desires.

Figure 15. Wooden Structure Planning (Parodi et al., 2020).

To protect against heavy rainfall, the roof has been strategically angled to shed the water in efficient ways to prevent the accumulation of water (Parodi et al., 2020).(*Figure 16*) All the entries and openings of the house are under the protected terraces that provide cover from sun, rain, and wind. This not only creates protection for the structure but also enhances the quality of life for the occupants, making the house easy and comfortable to live in regardless of the weather conditions.

Figure 16. Wooden Roof Structure (Parodi et al., 2020).

The final outcome is a breathtaking, simplistic, and transformable home that provides shelter but also allows its users to manipulate their environment to fit their needs (Parodi et al., 2020). (*Figure 17*) The transformable house offers its users a versatile and multifunctional space that grows with its user. With its sleek appearance and adaptive nature, it provides a space that is not mundane but instead, gives the user a sense of autonomy and freedom. Allowing the user to personalize and alter their space creates a sense of ownership and pride in a compact space that can evolve to fit the user and their family's needs. (Parodi et al., 2020).

Figure 17. Finished Flexible House (Parodi et al., 2020).

2.2.2. Flexible house in rural Japan

Sliding doors within Japanese traditional architecture separate spaces but also define them. Multi-functional rooms define their function when needed by closing and opening them. Here is the best example of a flexible house. In this case only the main services are fixed and everything else is flexible. (Broek, 1956) (*Figure 18*)

Figure 18. Floor Plan Diagram (Broek, 1956)

Dutch architect J.H. van den Broek argued that floor plan arrangement should be made more efficient by incorporating folding furniture and sliding doors. (Broek, 1956) (*Figure 19*)

The spaces can be smaller without losing comfort and giving people more possibilities to well-use the space they have.

Figure 19. Floor Plan Diagram (Broek, 1956)

In the following figure we can see the different arrangements depending on the number of people and how many bedrooms they need. This opportunity is given by a sequence of sliding doors that separate the living/ dining/ bedroom space, giving the owners a chance to fulfill their need to change and adapt. (Broek, 1956) (*Figure 20*)

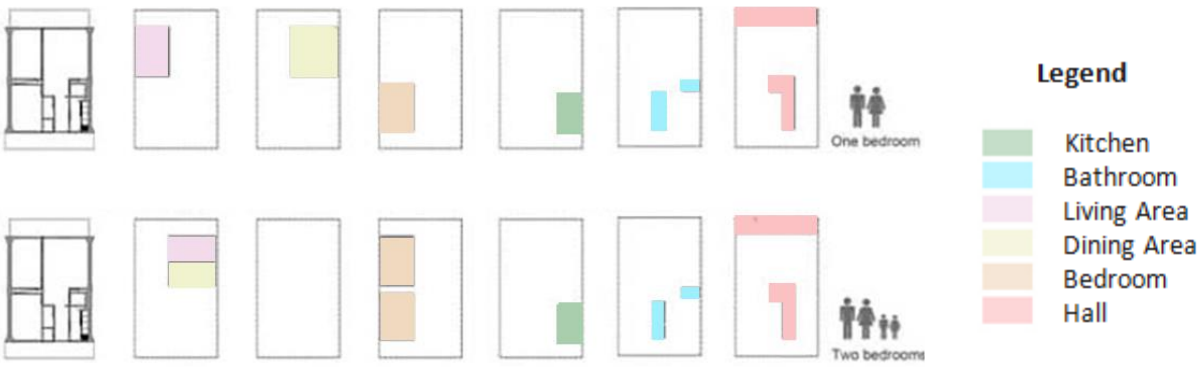

Figure 20. Module based on the family dynamic (Broek, 1956)

The architect proposes a day and night use depending on the different function a space can offer. In both projects the bathroom and kitchen are considered as static spaces. In other words, they are placed as fixed-feature spaces. The living/dining and bedroom work as multifunction spaces. By the usage of sliding

doors, walls and flexible elements we can play with these spaces. (Broek, 1956). (*Figure 21*)

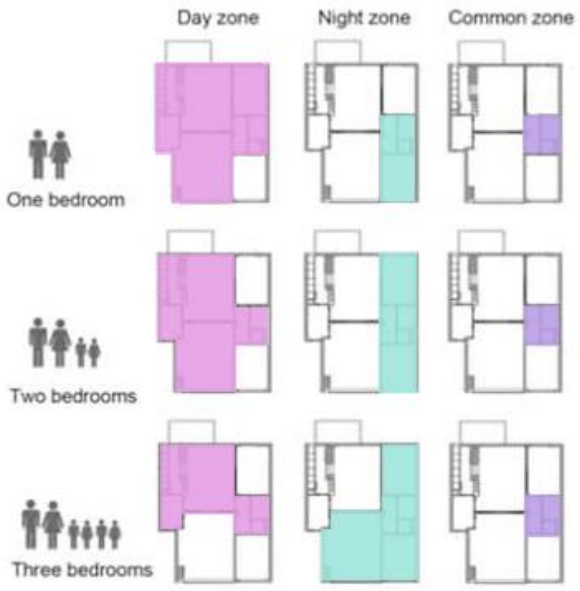

Figure 21. Module based on the family dynamic on different time zones (Broek, 1956)

2.2.3. Batipin Flat / Milan, Italy

This little apartment from 2012 is a very well thought design of only 28 sqm. The main living space is simple and clean, with plenty of free floor area and therefore plenty of flexibility for its use. By designing the "active" walls, like the bed shown as part of the furniture, the living space gets all the flexibility it needs for its different possible uses from day to night, just by the need of its user. There is no excess, but also no lack in this design. The main living zone is, due to its clear and open space, very easy to move around in, even for more people, like for example during a party. The bathroom and kitchen are placed simple and functional and get their light from the patio and the living/ bedroom, both for aesthetic and functional reasons. (Studio wok 2015) (*Figure 22*)

Figure 22. Real Photo. (Studio wok 2015)

The 4 plans above show the floor plans and the functionality of this apartment for the different timescale. Each of the 4 plans shows the space configuration and distribution for each of the different usages. During the course of the day this apartment changes its layout and functionality accordingly to the needs of its users. From the morning to the evening the need for flexibility is fully met by this interior design. The plans above show the different moments where the apartment is needed to be useful and flexible. (*Figure 23*) The annotations are kept clear to underline the function of the furniture and fixtures and their precise location for optimized functionality and comfort. (Studio wok 2015)

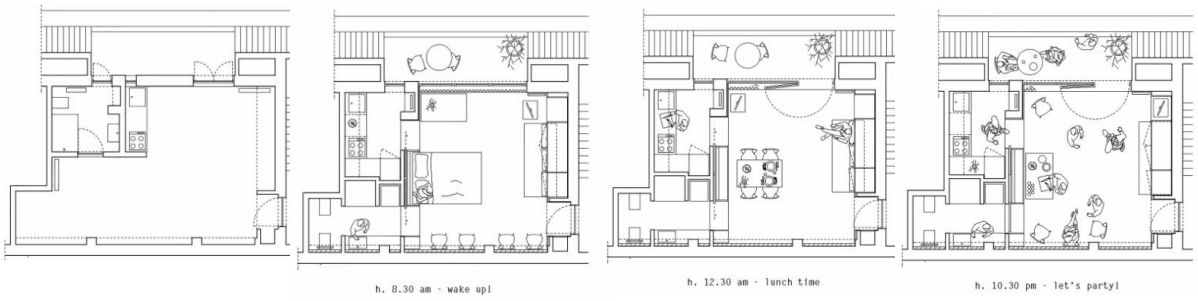

Figure 23. Module dynamic on different time zones (Studio wok 2015)

2.2.4. Small Studio Apartment /Atoma/Milan

In 2020, we remodeled a building that was constructed at the beginning of the 20th century. The apartment had a bad composition of space with bathroom in the middle dividing the room and preventing daylight from coming into the room. (Gradnja.me 2021) (*Figure 24*)

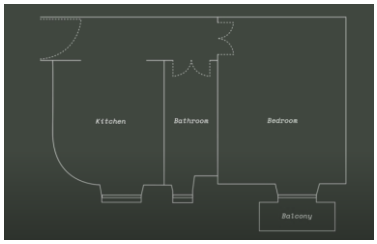

Figure 24. Existing Plan (Gradnja.me 2021)

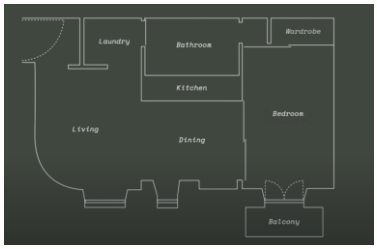

Figure 25. Adapted Plan (Gradnja.me 2021)

The concept was to create an open space, move bathroom and laundry to the darkest area of the apartment and remove the bathroom in the middle to create a flow from one space to another. When you open the door, you get this huge impression with three different areas; living room, dining and kitchen. (Gradnja.me 2021) (Figure 25) The kitchen provides all necessary features and floating shelves as well as plenty of storage for any kind of kitchen tools. The dining area can be separated from the living room with curtains and the bedroom is accessed through a wooden sliding door. There is also a small seating area around the balcony which can be separated with curtains. The bathroom has two exits, one from the living room and one from the bedroom. The bathroom is designed with two sliding doors instead of one door and a wall to make better use of the space in the bathroom. With this innovative concept, we not only improve the functionality of the apartment but also rejuvenate the old building. (*Figure 26*)

Figure 26. Real Photo of the Apartment (Gradnja.me 2021)

2.3 Lesson Learned

Research in Albania shows that many apartments are not flexible and not adapting to the residents' changing needs. This inflexibility comes from the fast and cheap construction methods that prioritize short term occupancy over long term adaptability. As a result, families find themselves in spaces that no longer fit their changing lives and are unhappy and their quality of life is downgraded. We need a paradigm shift in architecture, flexibility and user centered solutions that can adapt to the residents.

Using flexible materials and design elements like movable walls and multi-functional furniture is a practical solution to make living spaces more adaptable. These innovations allow residents to reconfigure their homes as their circumstances change without the need of expensive renovations or relocations. For example, movable walls can turn a big room into multiple smaller rooms or vice versa according to the family's needs. Multi-functional furniture can serve multiple purposes and maximize the use of limited space and reduce clutter. This solution saves costs and improves the quality of life of the residents by giving them a space that can grow with them.

The success of modular and expandable housing solutions as seen in the "Build to Grow" project in Peru shows that these solutions work. This project shows how modular design can facilitate social interaction and sustainability, resilient and adaptable communities. By learning from these examples and applying their principles in new housing developments architects and urban planners can create versatile homes that can accommodate the diverse and changing needs of the occupants. By prioritizing flexibility and adaptability in housing design we fix the current problems and open the way for more sustainable and resident centered urban living.

CHAPTER 3

CASE STUDY "*ZOGU I ZI*" APARTMENT

3.1 Selected Case Study

Modern urban settlements like Tirana have witnessed an explosion in the number of newly built apartment buildings, which has brought about an inevitable trend: in choosing a future home, potential residents value location and price over the actual accommodations. Location and price are understandable choices for the demands of a vibrant capital like Tirana: naturally, people would want to live in the center or prestigious neighborhoods, as close as possible to services, jobs, and cultural offerings. The price per square meter for apartments depends directly on the location and prestige of the building, creating a socioeconomic ranking of residents depending on how much money they make.

For this reason, people with higher purchasing power usually tend to settle in more prestigious neighborhoods, where the real estate offer consists of more expensive housing, and those with limited financial means are forced to look for homes in outlying areas, where the cost of housing is more affordable. As residents in Tirana select their place of residence according to their income and lifestyle, neighborhoods are segregated by income levels. "*Zogu Zi*" apartments are a good Case Study. Offering various options and a good location, they are appealing to middle class families.

The *"Zogu Zi"* complex is located in a privileged position, equidistant from the city center and the main communication routes; this characteristic makes the complex especially appealing to low-income families, who are looking for cheap and well-located accommodations. Furthermore, the complex proposes a wide variety of layouts, from one-bedroom to three-bedroom apartments, thus satisfying different types of households. However, one must underline that even though this variety of types allows a choice, the inflexibility of the apartment designs makes it difficult to meet possible future needs, without preplanning or the need to move to another apartment.

Concluding, the "*Zogu Zi*" apartment building is a good case study in the real

estate market of Tirana. It represents an example of the tendencies that govern the choice of the residents in terms of location, price and the typologies of the apartments. The good location and the great variety of the types that are offered to accommodate every possible household in the apartments of "*Zogu Zi*", make this house an example of the tendencies that characterize the urban tissue of Tirana. (*Figure 27*) In this context, the demand for a comfortable apartment to reside is related to its accessibility, to its cost and to the possibility to adapt in the future the apartment as the needs of the residents. "*Zogu Zi*" serves as a good example in the real estate market of Tirana.

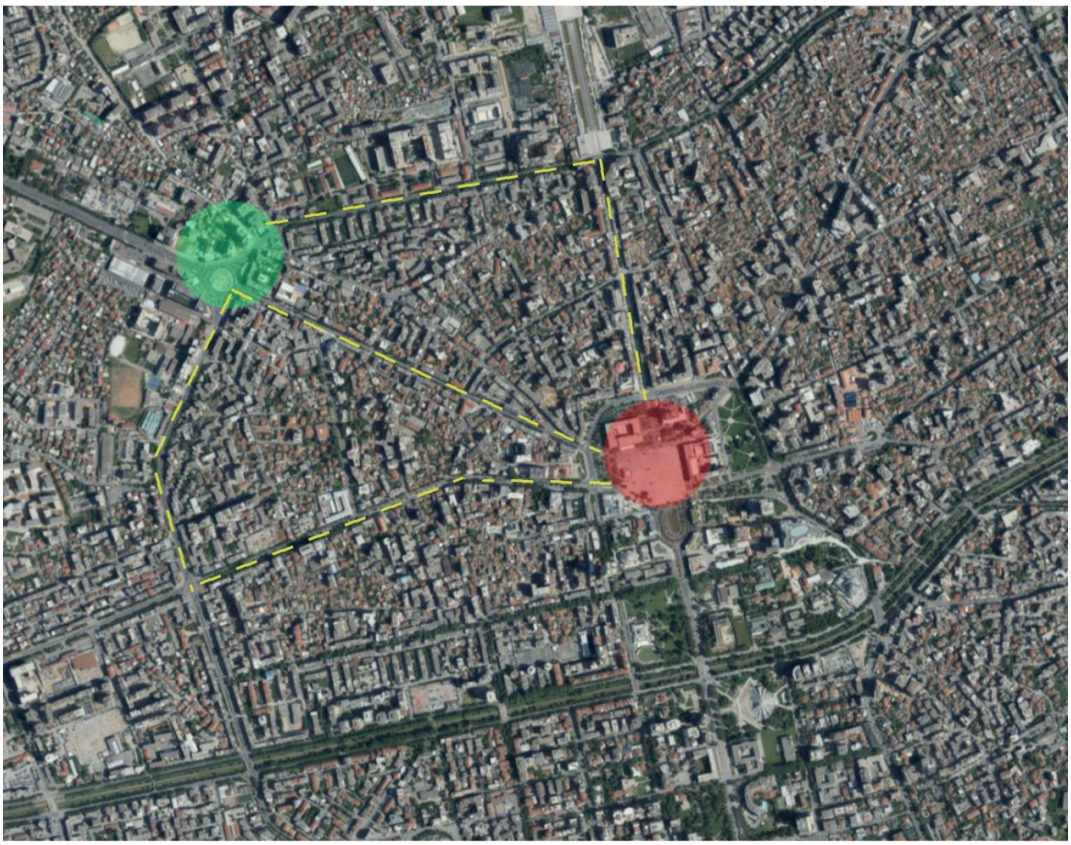

Figure 27. Orthophoto of chosen case studies and relation to city center (Geoportal of the Agency of Spatial Information of Albania, 2018)

3.2 Case Study "*Zogu I Zi*"

The case study is located in the north-west of Tirana, specifically in the "*Zogu Zi*" neighborhood, which is known for its blend of residential and mixed-use buildings. This neighborhood is positioned 1.4 kilometers from the city center, near the Ring Center, making it a strategically located area with easy access to central amenities. The building chosen for this study, illustrated in is part of a larger complex of housing blocks. It is situated in one of the most densely populated areas of "*Zogu Zi*", highlighting its significance within the neighborhood.

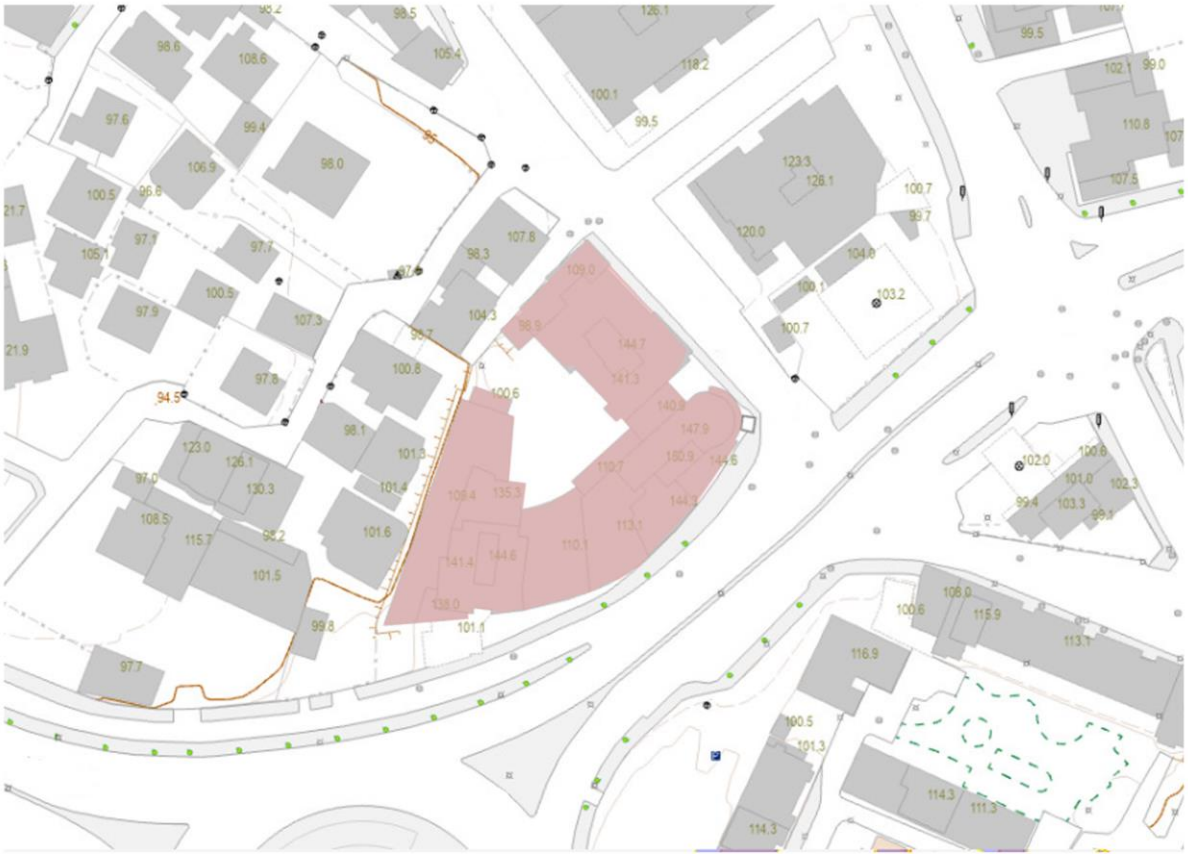

Figure 28. Map of site Zogu I Zi area

The case study as showed in (Figure 27) is situated in the north-west of Tirana in a neighborhood known as "Zogu Zi" which combines residential and mixed-use buildings. "Zogu Zi" neighborhood is located 1.4 kilometers from the city center and in the vicinity of the Ring Center. Therefore, it constitutes an important area with great accessibility to the city center and facilities.

The building selected for this case study as showed in (Figure 28), is part of a bigger group of blocks. It is located in one of the densest areas of this neighborhood which makes it an important part of “Zogu Zi”. This building has 14 levels and each level has a typical plan. Each level consists of five apartments that vary in type to meet the needs of various families and individuals. Precisely, in each level there are two apartments of one-bedroom (1+1 typology), two apartments of two- bedrooms (2+1 typology) and one apartment of three- bedrooms (3+1 typology). (Figure 29) Therefore, the total number of apartments in this building is 80 and the total surface area covered by the whole complex is 2,400 m². The first two levels of the building are used as commercial spaces which add retail and service facilities to the residential complex.

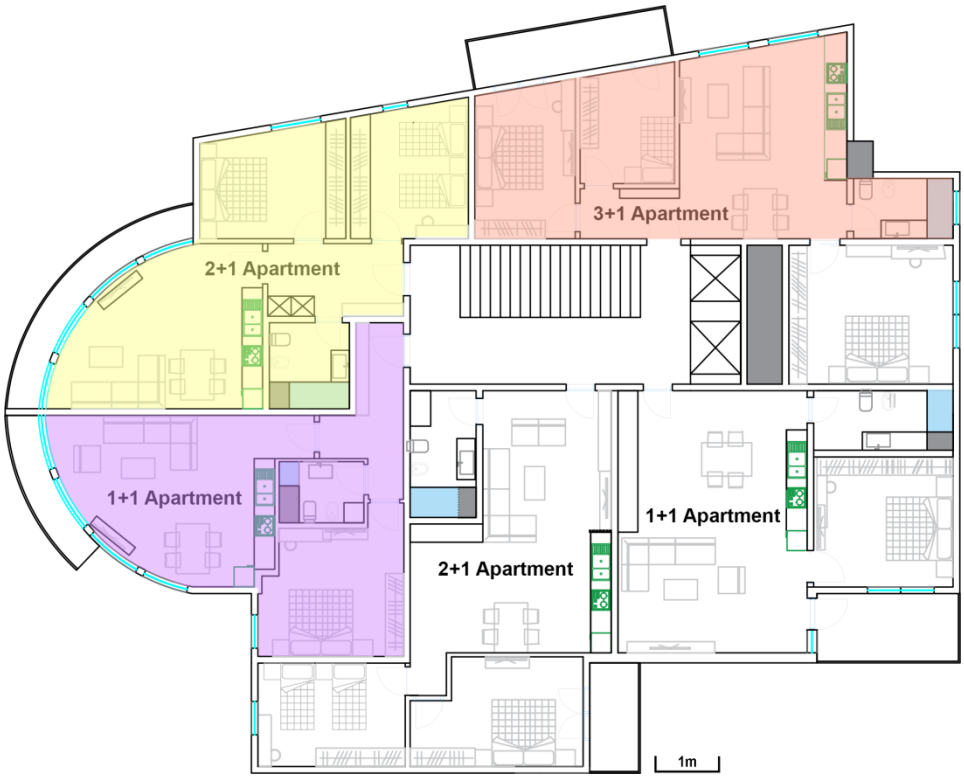

Figure 29. Building Apartment Plan

3.3 Spatial Analysis

In order for an apartment to be flexible it is necessary that it responds to a series of requirements and principles that must be respected during its configuration. We refer to polyvalence and open building as fundamental principles in a flexible apartment. The application of these principles is finally reflected in the composition of spaces of the apartment. The spaces properties gather all the residential characteristics of the apartment: they refer to the structure of the apartment building, of the apartment itself, the arrangement of the technical rooms, closed and open spaces, the dimensions, the lighting and other elements that give the necessary character to the unit. Achieving the initial design concept requires these properties to be planned, modified, and utilized with a view towards potential future flexibility.

These principles were identified in earlier chapters and are crucial for both the initial design of the apartment and its capacity for future flexibility. The apartments in both case studies analyzed in this thesis are evaluated based on these variables and their degree of flexibility. Understanding the current state of these variables is essential to modify and edit them to achieve a potential degree of flexibility wherever possible. The factors are analyzed step by step, as outlined in Chapter 2.

3.4 Solution of Technical Services

As important as the structure itself, the technical services make the space changeable. These services consist mainly of technical installations and utility cores for wet rooms. The location of these services is very important because it determines the location of activities and spaces like bathrooms, toilets, and kitchens that need to be located nearby to have access to the technical installations. The placement of the technical services regarding the structure can improve the future possibilities of the interchangeability. Regarding the polyvalence concept, the location of the technical services in the middle of the housing unit can be very advantageous. This central location can gain circulation and give a high level of flexibility to the space.

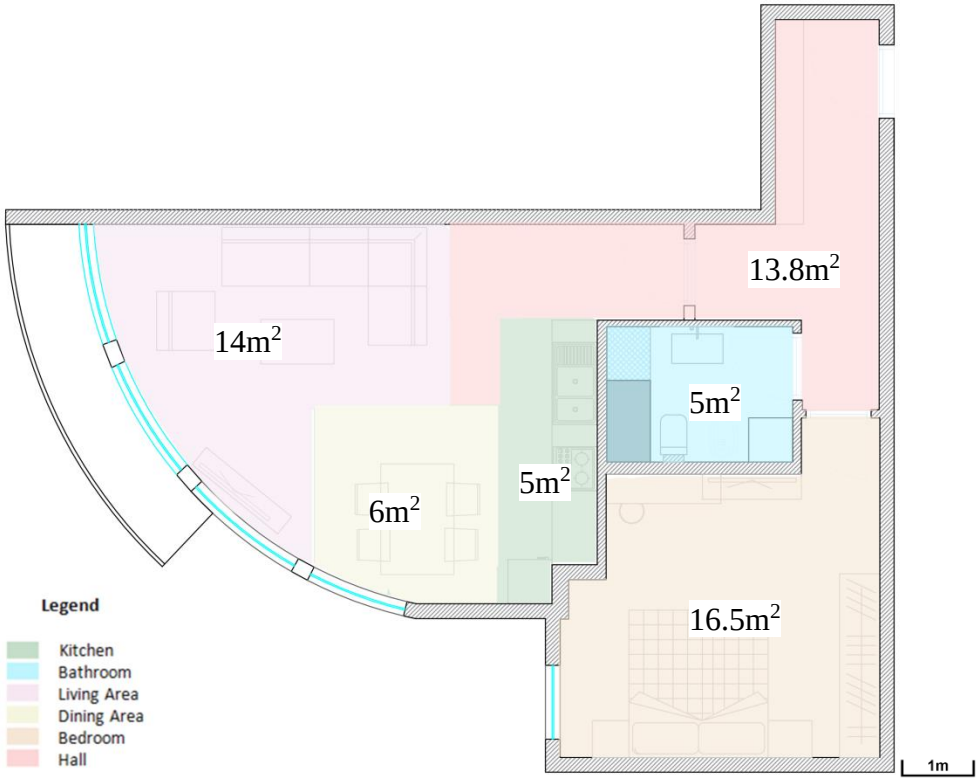

Figure 30. Function Diagram Apartment 1+1

The first example included a unit with centrally located technical services, which demonstrates the right application of the polyvalent principle. (Figure 30) By locating the kitchen and lavatory in the middle, utility connections were arranged efficiently while creating an axial core for other activities. As a result, this axial core offered a flexible and adaptable plan that could easily be readjusted to fit the immediate environment. The combination of privacy and accessibility made it possible to position living spaces, sleeping areas as well as additional functional facilities strategically. In addition, centralized technical services were provided so that utility runs could be reduced in length thus curbing costs and making maintenance easier to handle. This design ably depicted some of the merits associated with central cores thereby reinforcing the thesis's case for greater flexibility and space efficiency.

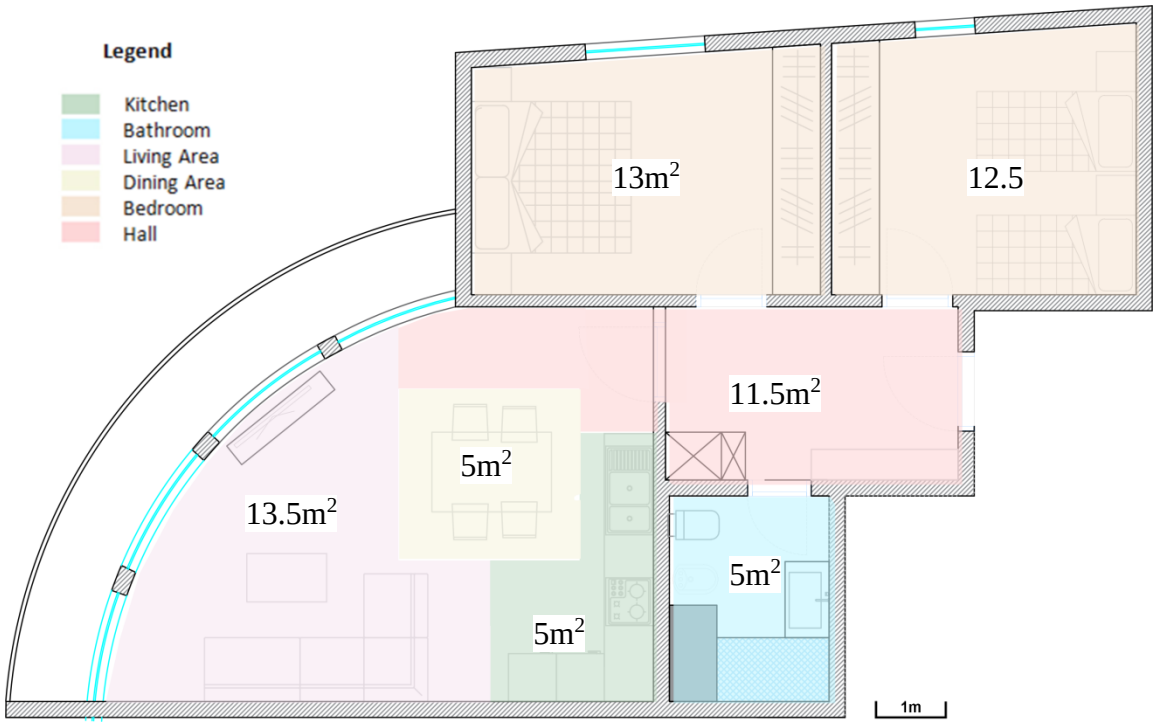

Figure 31. Function Diagram Apartment 2+1

The technical services in the apartment block were in the corner of the second apartment unit. (Figure 31) This particular arrangement presented the designer with an interesting challenge: he was able to place the other facilities at the end of the unit what could also be used as living rooms, bedrooms or other activities. One of the questions that has remained unanswered in the course of the last few years is how this layout in the periphery affects the provision of the window and the natural light to the peripheral spaces. On the other hand, this condition had brought one major disadvantage in terms of flexibility and space-saving strategies. Besides, the remote position necessitated complicated installations according to the longer utility lines, and it could be a factor in the difficulty of future additions to the unit in terms of both cost and space. However, this layout was the very example of how different service placements can be the setting for different spatial relations altering the usability of a flat.

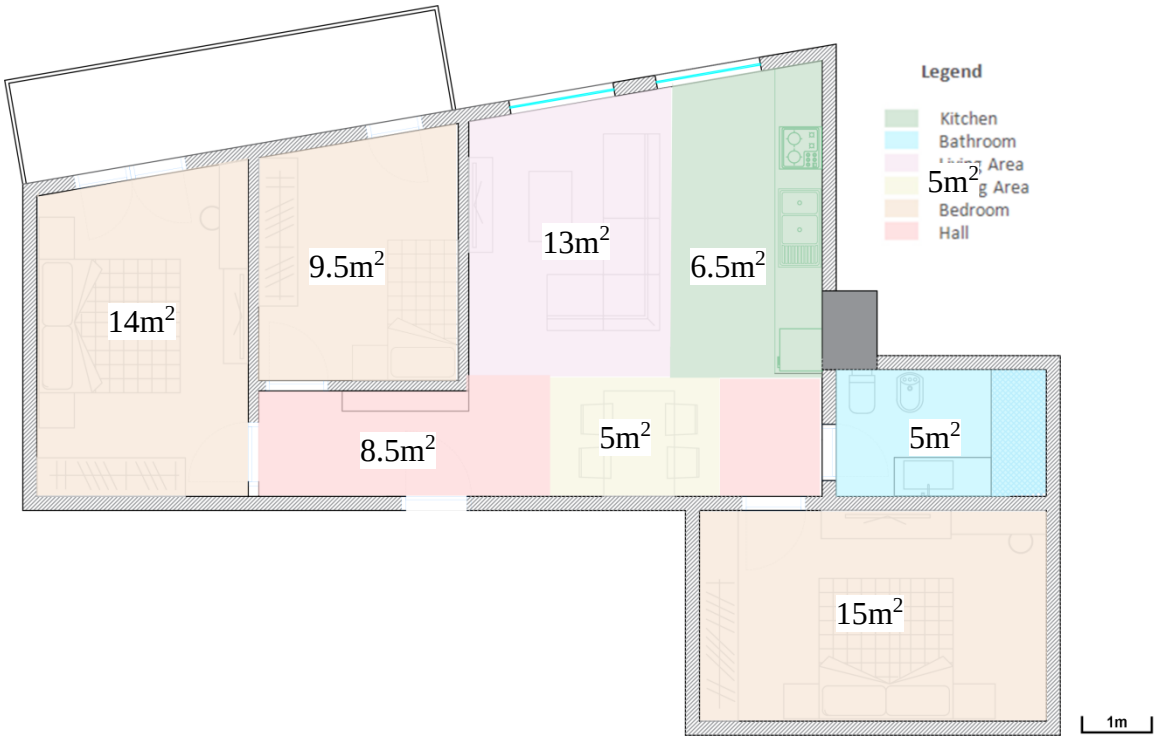

Figure 32. Function Diagram Apartment 3+1

Like in Figure 31, the third prototype was built with the technology services in the corner area. (Figure 32) Specified positions led to the proper division of the given area because the common central parts can be used for group activities whereas the uncrowned outskirts can be identified for personal areas that may contain bedrooms or private through the corollary of flexibility and utility infrastructure. The spatial organization as such was a result of that, while it was the same as what was for the first example, but here, the same setup faced challenges when it came to infrastructure and flexibility. Despite the fact that the space was at the corner which was probably a drawback the appearance of space development showed that compactness and zoning brought forth the idea of usability and flexibility of the space for the users. The spatial coordination was too ambitious and risky if applied to this specific actual physical location if the next prospective occupants left the current building. This situation can occur because its rigidity limits the introduction of any dramatic changes in the spatial organization which in turn may require elaborate modifications in the utility systems. These challenges, notwithstanding, were met with this design, and the lessons learnt were on the one

side the trade-offs between services' placements but on the other importance of making housing design flexible, as well.

Overall, these case studies emphasized the importance of strategic placement of technical services. While corner placements offered certain benefits, the centralized core, as exemplified in (Figure 30) provided the most flexibility and efficiency. By centralizing services, the design not only facilitated easier access to utilities but also maximized the potential for adaptable and versatile living spaces, supporting the core objectives of this thesis.

In the analyzed case studies, the locations of the technical services were in the center. The aim of the polyvalent principle is to gather services in the center to collect multiple functions, like kitchens and toilets, in one location because they both need access to the water supply. Which has studied in the paper the case studies chosen are well designed. By placing these services in the center, both activities can be placed next to each other and the free space can be used for other activities to be arranged.

In the samples of the apartments, one of the apartment units had the technical services located in the center. (Figure 30) Two of the apartment units had the technical services located in the corner. (Figure 31) (Figure 32) This arrangement gave options for the layout of living rooms, bedrooms and other activities. The best situation is to have a central core for the technical services.

3.5 Geometry of the Apartment Plan

The geometric composition of an apartment plan plays a very important role in its flexibility. A small and balanced geometric composition such as a square or rectangular apartment plan is particularly effective in increasing the flexibility of the apartment. This is because any future rearrangement and interchangeability of rooms can easily be implemented in such apartment plans in order to increase or decrease the number and sizes of rooms, which usually vary over time. An apartment plan with an extended, uneven or asymmetric geometric composition on the contrary obstructs any future changes and flexibility. Uneven apartment plans also restrict the

locations of rooms and facilities and their interchangeability and rearrangement.

(Figure 33) displays an apartment with a stretched and the geometric composition of concert of irregular objects. The layout is short, with different angels and angles, and sticking out things, which causes the space with different shapes to exist. This non-uniformity is the main factor of the stiffness of the apartment. This design can only contain parts (like walls, columns) where they were and with sizes that were there because of their dependent on the structure which requires not to destroy or to place it in the wrong place. Therefore, it is hard to create new rooms or swap them according to the ever-changing requirements of the residents. As an example, a rounded passage or a cornered living area might hinder the possibility of change without moving the walls around, which will be a significant change. This figure presents different problems related to long and uneven geometric layouts that impede the adaptation of the living area in a flexible and convenient way.

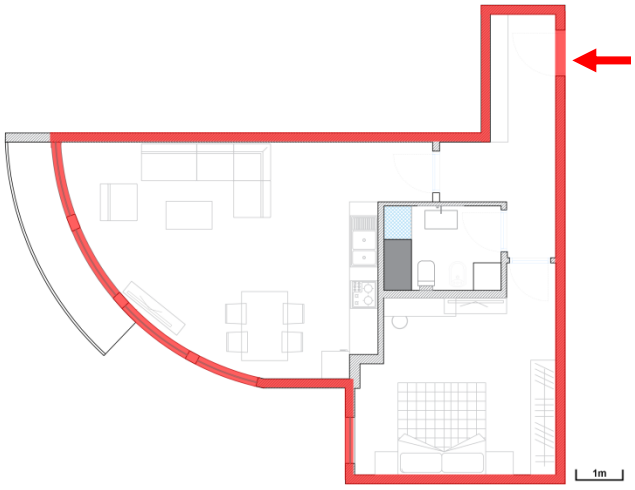

Figure 33. Example of uneven geometry taken from case study Apartment 1+1

Apartment buildings have typical arched and cantilevered shapes in their structure, and (*Figure 34*) represents the limited possibilities. Instead of standard, basically linear apartment layouts, corridors having curved and angular walls rather than just flat ones, make segmented and uneven spaces. These elements of architecture result in the formation of significant spatial rigidities, hence, it becomes difficult for the future to bring in some changes. The exact location of amenities and rooms as the result of these shapes poses obstacles to the apartment layout being

altered. An example could be that the location of a kitchen or bathroom along an arched wall might be the reason why there are few options for expansion or relocation. This diagram does not, however, feature the inability of flat packages to accommodate private changing atmospheres.

Figure 34. Example of uneven geometry taken from case study Apartment 2+1

Seen in (*Figure 35*), the room consists of a compressed geometrical layout, even the hexagon is regular with a rectangular format. This plan is a representation of the theory of small, regular figures to make the apartment a living suit which is adaptable. The simple and well-balanced nature of a rectangular layout opens the door for easier future maybes and redo's. Here, in layout, rooms can be broadened or reduced, and facilities can be located with minimal effort. The uniformity of geometry they expect the impersonality of spaces which in turn will give lease to the apartment to evolve as need dictated. For instance, a sitting room is easily turned into an additional bedroom or bureau that the dwellers may need to. This illustration stresses a relatively simpler, rectangular geometric arrangement that is amongst the key features that result in a multifunctional and pliable liveliest area.

Figure 35. Example of compact geometry taken from case study Apartment 3+1

Generally speaking, extended and uneven geometric apartment compositions tend to restrict flexibility by producing spatial rigidities, while, small and regular geometric apartment compositions provide more possibilities for flexibility. The study recommends that the layout of apartments should be small and regular rectangular in order to accommodate future changes and provide flexibility. This type of layout supports desired functional structures and allows for the necessary adjustments so that the apartment units can easily evolve over time to meet the changing needs of the occupants. High level of flexibility in apartment layouts can therefore be closely linked to the use of small and regular geometric compositions, in addition to other sustaining elements.

3.6 Size of the Apartment and Its Units

An apartment should be carefully planned taking into account space of the whole apartment, its individual units, and the height of the spaces. Different types of apartments, e.g., 1+1 (one bedroom and one living room), 2+1 (two bedrooms and one living room), and 3+1 (three bedrooms and one living room) require repurposed final ideas to be able to address demands of the residents. The study covered the analysis of the apartments in terms of the problems or needs of citizens. The question was if the layouts conform to the established rules for room sizes. This more of the design and space arrangement of apartments with the standards ensuring that the homes are spacious enough to cater to the residents' basic needs, providing a comfortable environment and functionality. The square of individual rooms was analyzed to ensure the convenience of residents and to meet their basic needs. The below figures show the activities during day and night for each apartment. (*Figure 36*), (*Figure 37*), (*Figure 38*)

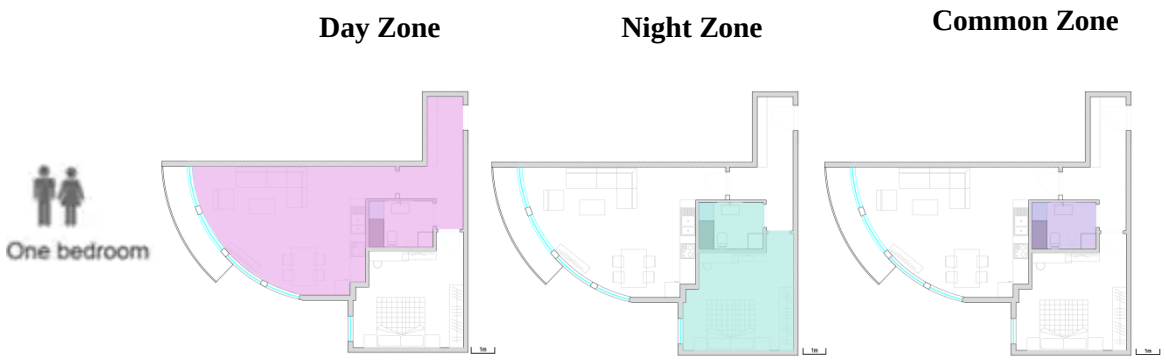

Figure 36. Apartment zones 1+1based on the family dynamic on different time zones

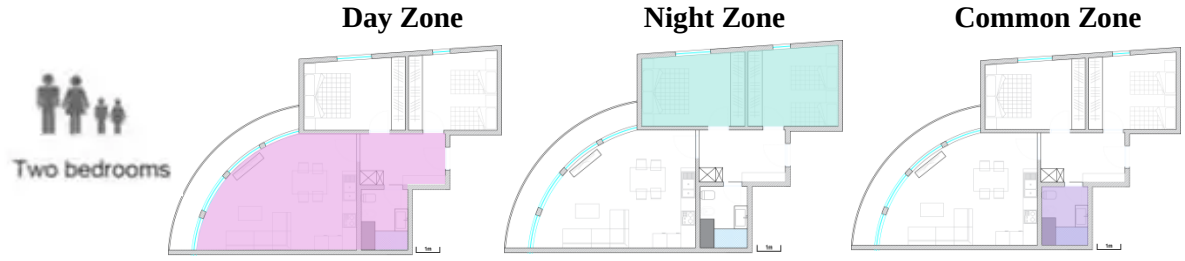

*Figure 37.*Apartment zones 2+1based on the family dynamic on different time zones

Figure 38. Apartment zones 3+1based on the family dynamic on different time zones

First of all, I have to say that the area of the living room is too small and does not become the target for the multi-purpose area of the central building. In a house, the living room is the most utilized place, it is the one to be used first as a family activity hub, a place where people can socialize and relax. The reason the living rooms are not utilized to the fullest is the fact that they are not efficient for relaxation and not comfortable as a central space is. On the other hand, bedrooms have been built well bigger than the standard size of the apartments that are required where the residents will have more space to do different things. When the bed is

augmented with an additional area, it comes with one more possibility to speak that the apartment area distribution is somehow changed so that this comfort is possible. This entails that proper space allotment has to be made placing emphasis on the expansion of the living room modules and the retention of bedroom sizes. The pictures demonstrate the activities in the living rooms and bedrooms during the day thereby spatial optimization are shown to be a way of meeting the needs of the residents better.

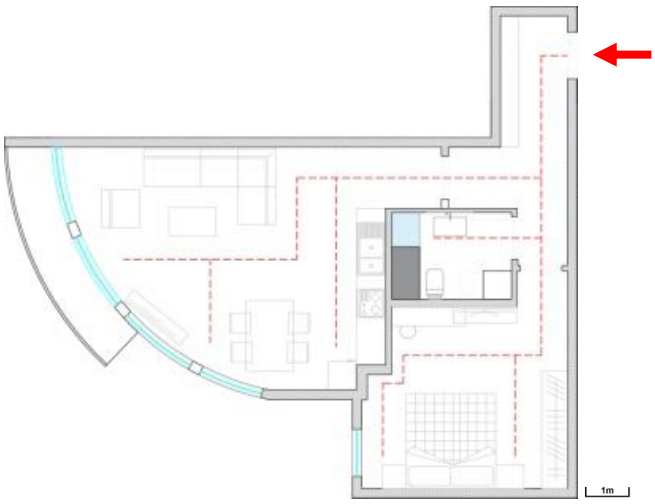

Figure 39. Diagram of the circulation Apartment 1+1

In 1+1 apartments, corridors and circulation areas connect different parts of the living space (bedroom, living room, kitchen, bathroom) together. These pathways provide accessibility and movement throughout the apartment. But when these circulation areas are bigger than standard, it affects the overall functionality and livable space of the apartment. More spacious corridors may seem like a good thing at first, but from a practical point of view, every extra square meter of corridor means less space for lounging, dining or storage. In compact living spaces like 1+1 apartments where every square meter counts for comfort and functionality, oversized circulation spaces can reduce the overall livable area. So while more circulation space can be good for the initial look of an apartment layout, you need to balance that with enough living and functional spaces. Efficient design that minimizes circulation space and keeps accessibility is the key to 1+1 apartments usability and comfort. This way residents can have the convenience of moving between rooms easily and the comfort of a used living space. (Figure 39)

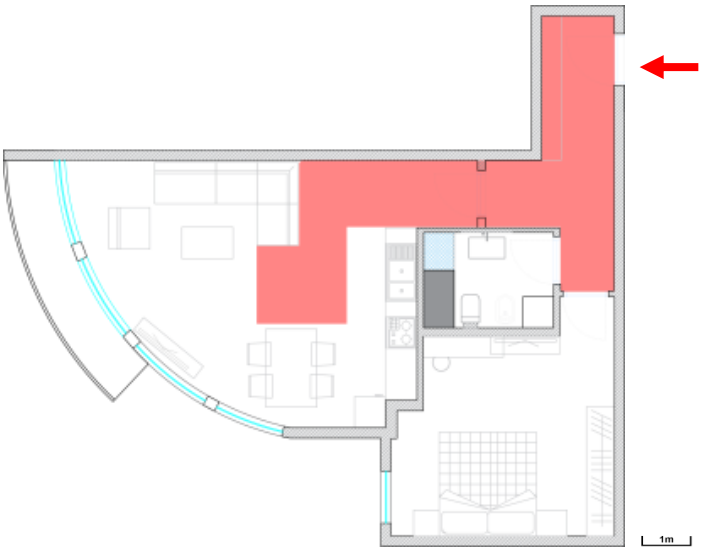

Figure 40. Diagram of the inhabitable area Apartment 1+1

In a 1+1 apartment where space is already limited the oversized corridors reduce the net living area for the living room and bedroom so the functionality of these essential living spaces is limited. This means valuable space is wasted. (Figure 40) shows this problem in the apartment layout, we need to allocate space more efficiently.

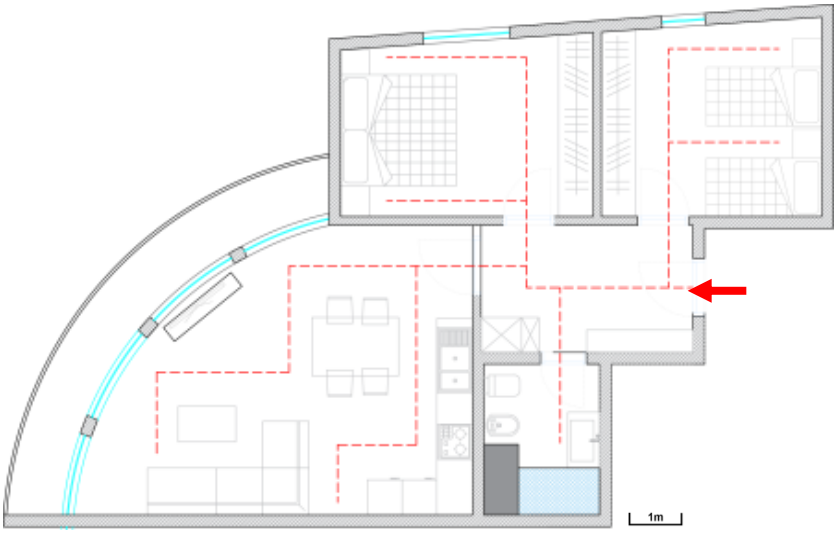

Figure 41. Diagram of the circulation Apartment 2+1

The 2+1 apartment typology also has a well thought out grid of circulation areas, but just like the 1+1 typology the corridors in 2+1 apartments are often bigger

than standard and take up a lot of the total area. (Figure 41) While this might be better for flow and accessibility it comes at the cost of reducing the habitable space for other important functions. In a 2+1 apartment the extra space given to corridors can lead to smaller living rooms, bedrooms and kitchens and ultimately affect the overall functionality and livability of the apartment.

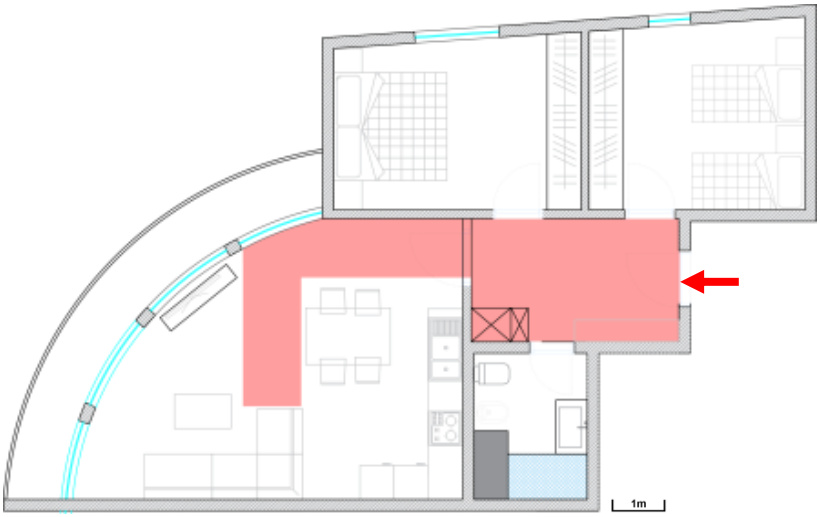

Figure 42. Diagram of the inhabitable area Apartment 2+1

The comparison in (Figure 42) shows the habitable area, circulation area and storage space in these apartments. It highlights the need to optimize the size of the circulation areas so more space is given to the rooms that directly affect the residents' living experience

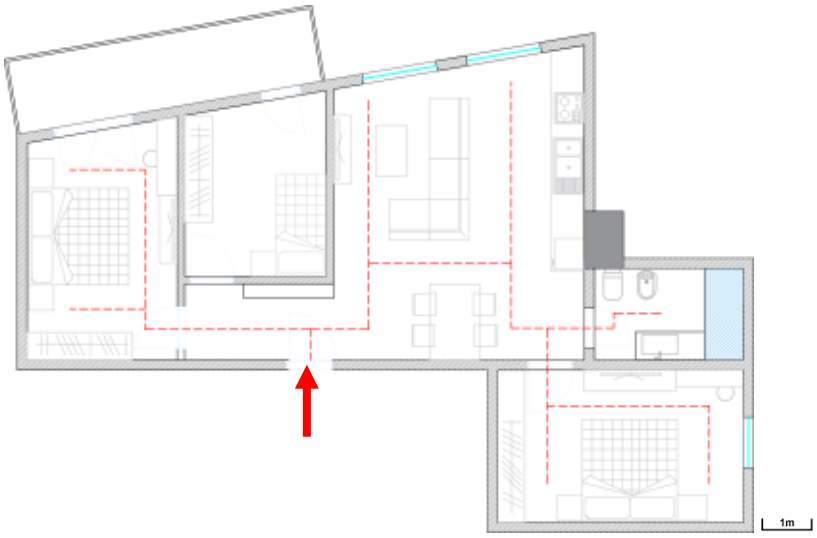

Figure 43. Diagram of the circulation Apartment 3+1

The circulation areas or corridors are generally above the standard size and sometimes very far from the recommended size. (Figure 43) Although it may seem that more space for circulation is better, this is not a desirable feature because the bigger the corridor the more area is taken from the total habitable area of the apartment. This means that the percentage of the circulation area in the total area decreases the net usable area for other necessary functions and finally affects the livability of the apartment.

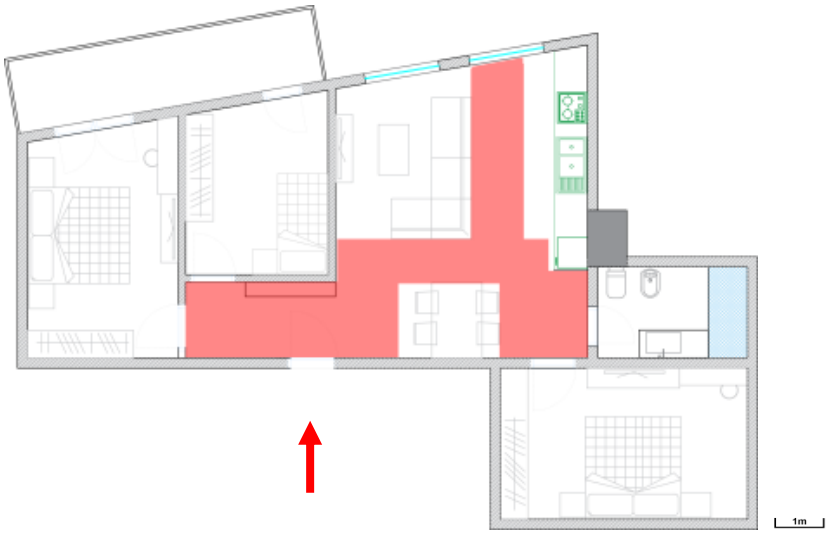

Figure 44. Diagram of the inhabitable area Apartment 3+1

Thus, it is very crucial that the sizes of the rooms meet the standard in order to provide convenient and functional spaces to meet needs and preferences of the residents. (Figure 44) shows the comparison between the habitable area, the area of corridors and the storage area for each apartment.

3.7 Functionality of apartment units

There are numerous problems with the existing apartments which suggest they are not fit to live in for much longer. The overall volume of the apartments along with the distribution of space is very problematic. Most of the apartments have at least one room with an abnormal size which affects the rest of the layout. The only

one apartment 3+1 which comes out positive is the compact apartment, which has a much better distribution of space. The size of rooms must comply with standards in order to create different types of layouts with appropriate furniture for each room activity. Furniture needs to fit in the room, and each type of furniture has a certain required area to maneuver and to function for its specific activity.

First there are the bedrooms, master bedroom and children bedroom. Most of the master bedrooms are shown in (Figure 45) in typical layouts for this type of rooms. However most of them fail to meet the required standards in terms of dimensions and furniture placement. The available space for furniture is either too small or it does not allow comfortable maneuvering. Some layouts spend too much space in certain areas putting all the furniture on one side, while others try to fit as much as possible in the given area.

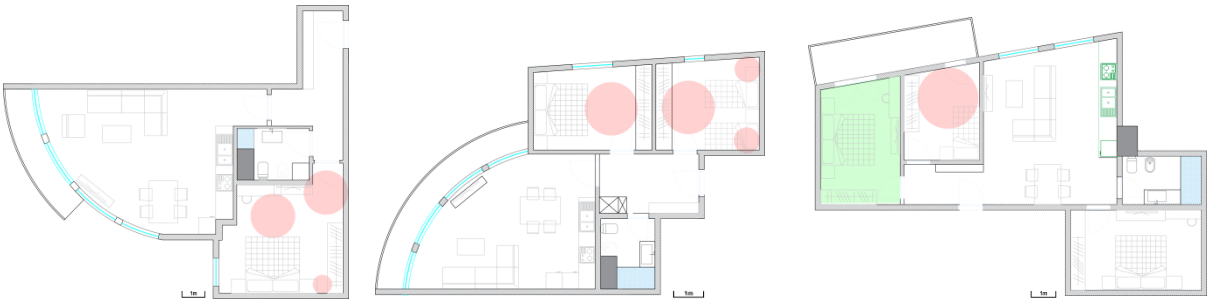

Figure 45. Configuration examples of bedrooms, taken from case studies

The children's bedrooms are bad designed as shown in (Figure 45). Most of the layouts for these rooms concentrate on the fact that they are meant for two occupants; however, the space available is not enough to accommodate all the required furniture for this room type such as two beds, two desks and proper storage. This is either because the size of the room is too small or the available space for each type of furniture is not enough for it to function properly.

The kitchens are also affected by these space problems. Most of the layouts for the combined dining rooms, kitchens and living rooms treat the whole area as one huge space. This poses major problems in terms of making sure each activity has the appropriate required area. The circulation area within the kitchen as shown in (Figure 46), is most of the times ignored which leads to very uncomfortable layouts. The dining table being a multi-use space due to its location in this combined area

ends up being too small for its activity and users. Following standards is a must in these cases in order to avoid such problems and to make sure the given space can be actually used comfortably and functionally.

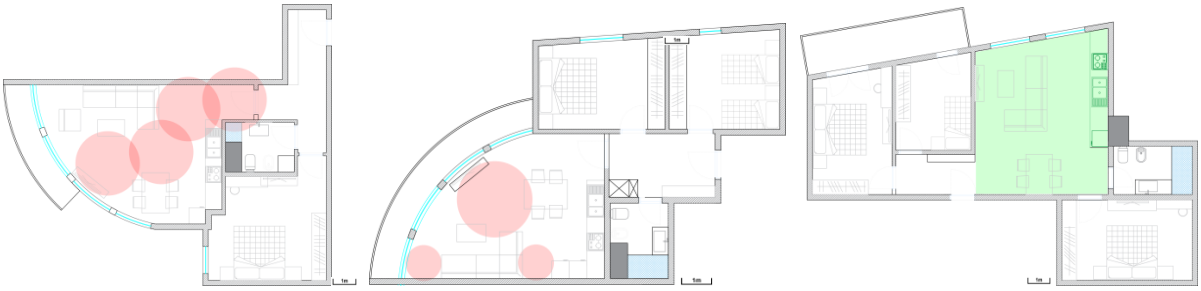

Figure 46. Configuration examples of kitchens, taken from case studies

The wet spaces such as the bathrooms also present problems within the apartments. *(Figure 47).* Their geometry is most of the times far from complying with the standards and it seems to be determined by the overall lack of space in the apartment rather than by ergonomic principles. The spaces that are created are uncomfortable and impractical.

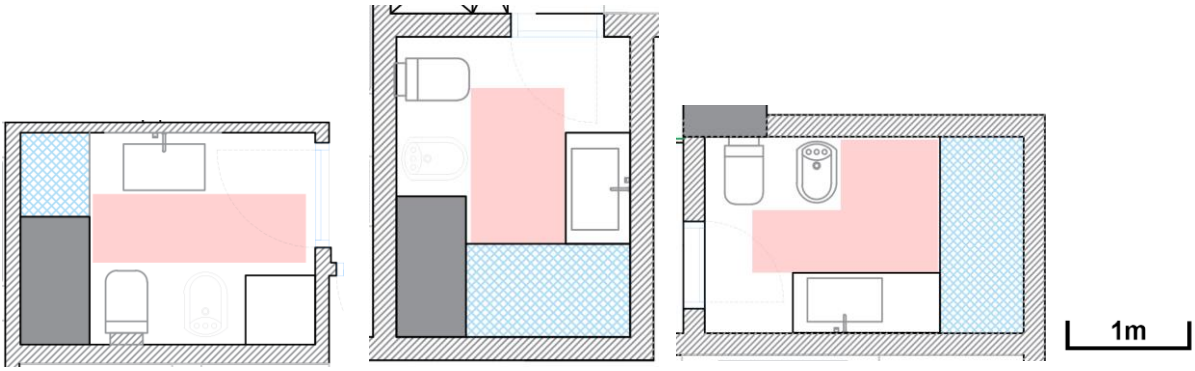

Figure 47. Configuration examples of bathrooms, taken from case studies

Overall, the comparison of the apartment sizes with the standards shows that the future flexibility is hindered by the way these spaces are arranged at the moment. If the space is adequate or even generous and it allows for future adjustments to meet the changing needs. However, if the apartment dimensions do not comply with the standards, then the space cannot offer even the minimum required comfort and functionality. Even with a well-designed geometry, a small space cannot offer the user the appropriate comfort and maneuverability. Bigger spaces would have made

the apartments more adaptable to the future changing needs over time, but the Albanian Housing Standards are not respected in any of the samples analyzed and the spaces created are uncomfortable and impractical to meet the residents' needs throughout their life span.

3.8 Position of the entrances

The general organization of an apartment and the location of its different spaces are strongly conditioned by the layout of the entrance. Entries can be classified into two basic categories: central, when it is located in the center of the apartment, and peripheral, when it is placed on one of the sides. *(Figure 48)* A central entrance tends to provide a more open plan. *(Figure 49*) In the examples of housing blocks studied, we can find both types of entrance.

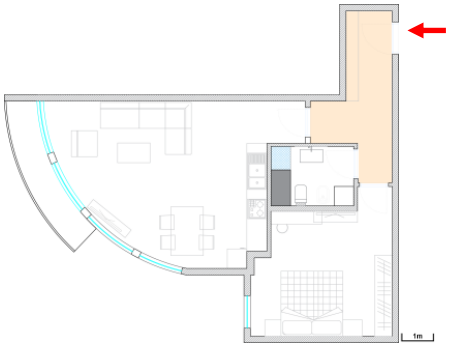

Figure 48. Examples of peripheral entrance, taken from case studies

The spatial distribution of the samples studied, considering all the variables that influence flexibility, shows that not all the factors are conducive to the flexible future of these apartments. The structure of the apartments' buildings is very positive. But the technical installations are arranged in an opposite way to flexibility. As they are irreversible elements, they strongly condition the future of the apartments.

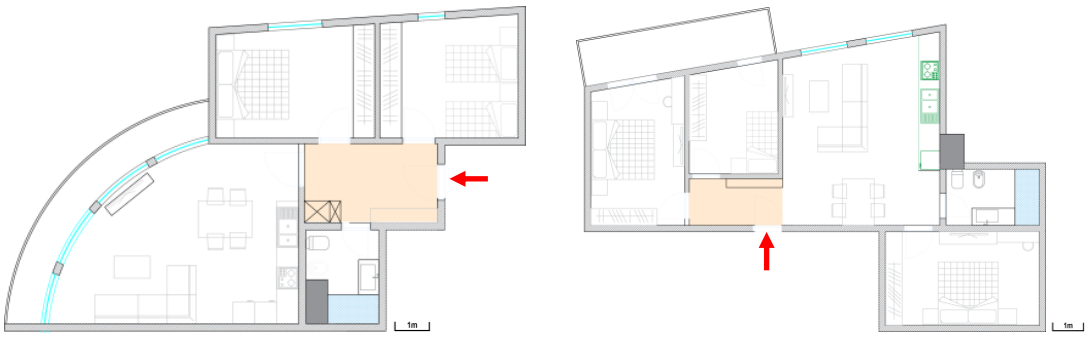

Figure 49. Examples of central entrances, taken from case studies

The other factors, such as plan geometry, location of entrances and openness of the apartment, have an opposite effect. In some apartments they are positive elements, in others not. But the most serious problem is that these positive factors are conditioned by the poor size of the apartments. The sizes don´t accomplish the standard ranges. And this is a serious problem, because they don´t provide neither a comfortable present, nor a flexible future.

In general, some design factors like the location of entrances, the geometry of the plan, etc., provide a potential flexibility, but the lack of size of the apartments is the main drawback. As they don´t meet the conventional ranges, they don´t provide both comfortable present and flexible future. And this is one of the most important limitations that need to be solved in the near future.

3.9 Results from Questionnaire

The questionnaire is the second part of this apartment study. The spatial analysis is needed and important as it deals with the physical and conceptual layout of the apartments, but the questionnaire is necessary to get a different perspective of the actual residents. The aim of the questionnaire was to collect data of people actually living in the apartments in order to compare their actual experience. It was filled out by the residents of the apartments and aimed to find out if they are barely adequate, or if they are over-sized or if they just got used to it over time. The

questionnaire results show if the residents of the apartments see any issue with the situation as it is now. It is a completely different approach to the study and gives very valuable insights.

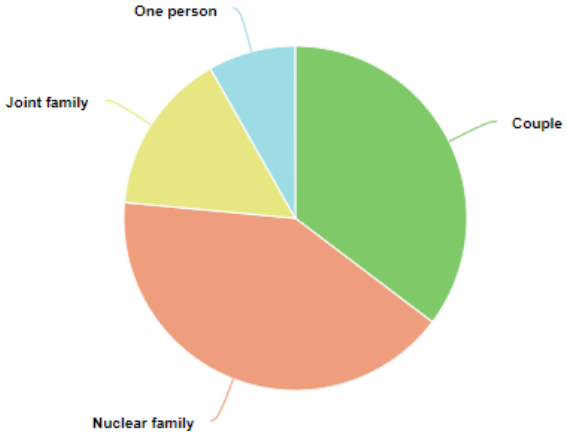

Figure 50. Graph of results of question 1 (What category does your family falls under?

Gathering data on the number of residents in each apartment is crucial for the objectives of this research. (Figure 50) The primary focus of this study is to understand and address the preferences and requirements of the residents.Top of FormBottom of Form By identifying the wants and needs of each resident, the research will be able to adapt its results according to those desires. This step is not easy because each resident has different wants and needs. Finding a balance between all those wants and needs is not a simple sum, it is a complex operation that requires time and effort to satisfy the needs of all the residents. There is no way to know what each resident wants without asking for it. Otherwise, the apartments will be just a generic type of housing without any particular feature that identifies with the residents.

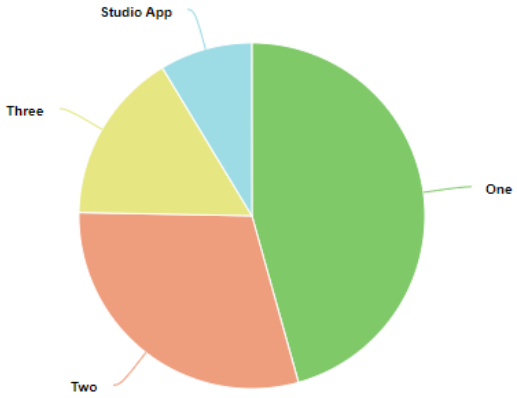

Figure 51. Graph of results of question 2 (What type apartment you have?)

The second inquiry seeks to gather comprehensive data on the typology of each apartment. (Figure 51) This information holds significance as it allows for categorizing apartments into groups, enabling an analysis of their strengths and weaknesses. Furthermore, it is important to note that Question 2 correlates with the preceding inquiry, as apartments of the same typology can house diverse residents on various floors, each with unique needs and preferences. With the knowledge of the apartment typology, it is possible to analyze if the layout and design influence in the user's satisfaction or not and in what aspect. In this way, the analysis of each apartment will consider the needs of all residents that live in the same typology but in different floors, as well as residents that live in near apartments with different typology.

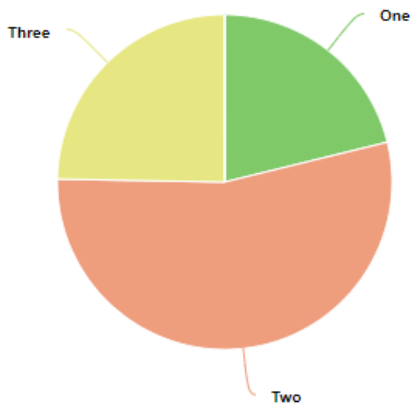

Figure 52. Graph of results of question 3 (How many bedrooms do you need?)

Understanding their contentment level regarding the available living space is essential for ensuring their comfort and well-being. Answers to this question will depend on information obtained in Question 1, as number of bedrooms required depends on quantity of occupants and their needs. (Figure 52) This question will tell us if any members of the family are sleeping in the same room and need of any additional dedicated sleep spaces. Bedrooms serve as personal retreats and are often used as home offices.

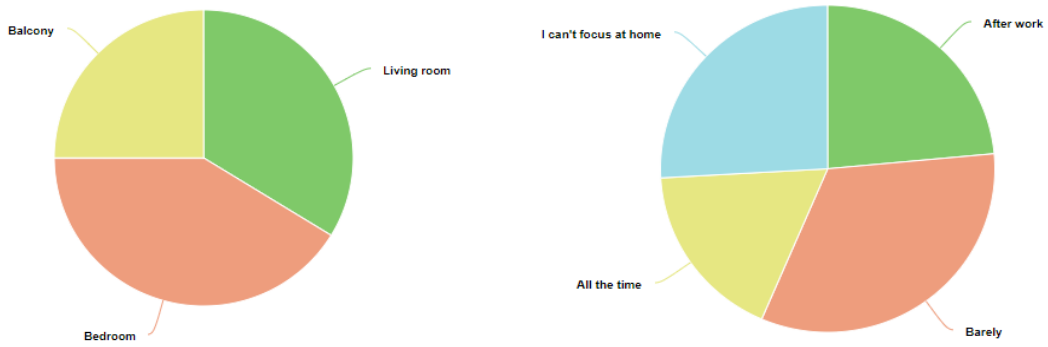

Figure 53. Graph of results of question 4 (Which part of the apartment do you spend more time?) Graph of results of question 5 (How many hours do you spend at home during the day?)

The objectives of Questions 4 and 5 are to understand which room/space is used more and the time occupants spent in their apartments. (Figure 53) Answers to these questions can be different from one person to another, as each one feels comfortable and spends time at home in a different way. The time spent within the apartment and the spaces used most often depend on the routine and lifestyle of each resident. Moreover, without knowing the amount of time spent at home, it is impossible to determine how crucial and important the most frequently used spaces are for the residents. Results from these questions allow understanding how the apartment should be designed in order to meet the needs and the habits of each resident. The apartment should be optimized to create the most comfortable and functional spaces within the areas used most often.

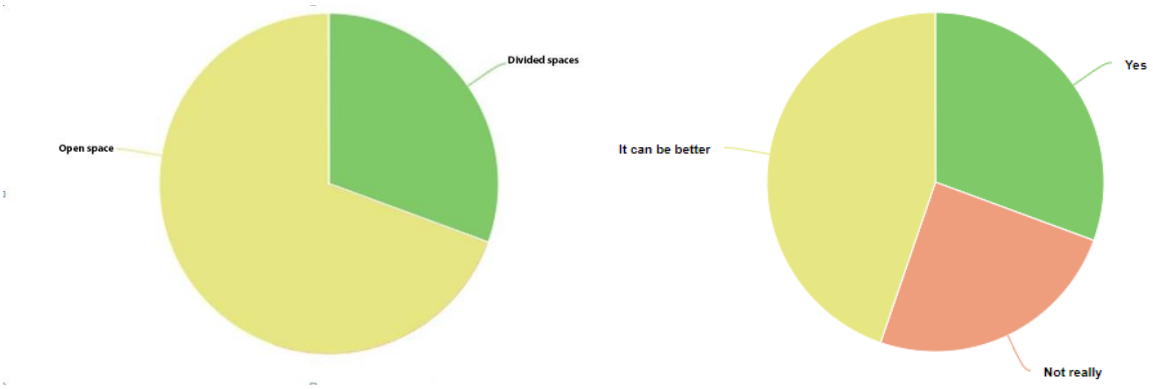

Figure 54. Graph of results of question 6 (What type of concept would you like for your apartment?) . Graph of results of question 7 (Do you need more storage space?

The research includes inquiries designed to uncover residents' preferences and guide the selection of appropriate modules to achieve the thesis goals effectively. This information gathered from questions 6 and 7 will help choose modules and suggest the most accurate ways to achieve the goals of this thesis. *(Figure 54)* It is important to know individual needs and preferences when designing for each resident. This way the designer can create the best solution considering residents' lifestyles and their way of thinking. Maybe residents' expectations are not always functional, but emotional. Maybe their lifestyle is different than expected and needs to be considered in the design process. Preferences should be based on residents' lifestyle, which in turn should guide the entire design process. Residents seek in their apartments. Maybe it is time to think about housing which is not only functional or emotionally satisfying, but also provides intellectual comfort. This thesis may not answer these questions, but hopefully will raise awareness of the importance of considering residents' expectations and preferences in the design of apartment spaces.

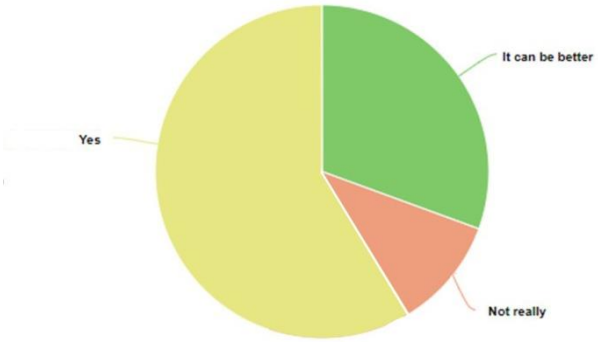

Figure 55. Graph of results of question 8 (Are you happy with the natural light entering in your apartment?)

It's important to understand the way to approach and understand better the character of the apartment and if the habitants are happy or if it's another thing taken into consideration. (Figure 55) Depending on the answer the approach would be different, using different techniques and the right colors the space can appear brighter but it can also be the opposite scenario.

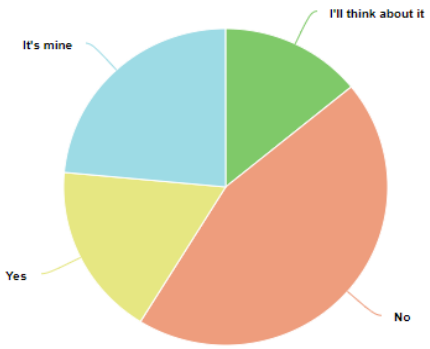

Figure 56. Graph of results of question 9 (Did you ever think to buy the apartment you are renting?)

Exploring residents' feelings toward their current home, the research seeks to understand whether they view it as a permanent residence or are contemplating moving elsewhere. It helps understand their immediate needs, whether they own or rent the apartment. This insight allows for tailored recommendations to improve daily life, catering to both long-term homeowners and renters. (Figure 56)

Question 10 it's an open question to understand better each resident. With this question we understand their priorities and struggles they are facing every day. To this question there were many answers but to sum them up

•18 residents stated that they needed a working space.

•25 residents stated that they needed an extra bedroom. They were families that each one of them wanted their own room but there were also families with a member sleeping in the living area on the couch. In the second scenario they stated that they needed an extra bedroom or even a personal space intertwined into the living room.

•26 residents stated that they needed extra space for storage.

•28 residents stated that the apartment had potential but wasn't well organized. This answer was given from the students/ families renting these units.

Finally, the results of the questionnaire are presented as an addition to the findings of the spatial analysis. In the case studies there are many residents who are not satisfied with the current situation in their apartments. For example, residents complain about there not being enough rooms and personal spaces ad that it is difficult to arrange the furniture they wish for in their apartments. All these problems show that there are severe issues in the apartment blocks. Combining the findings of the spatial analysis and the questionnaire it becomes clear that the size of the apartments and its spaces is the root of the problem leading to the overall

dissatisfaction of the residents. The problems regarding the size also affect other variables and hinder the application of the new principles, which in the end effects the satisfaction of the residents. Moreover, all participants of the questionnaire said that they definitely want to move out of their apartments, even if they have lived there for only a short period of time. These issues show that the apartment blocks face severe problems and that flexibility can help to overcome some of those. Therefore, the identified problems should be addressed to create flexibility and increase the satisfaction of the residents. New strategies and principles could help to achieve a completely new perception of flexibility and its possibilities.

CHAPTER 4

PROPOSAL FOR FLEXIBLE HOUSING IMPLEMENTATION

4.1 Proposal for the Prototypes

The analysis of the current situation of the apartment buildings from the sample has shown some remarkable problems. The space analysis and the interviews with the residents showed that these apartments do not even offer a comfortable use, let alone a flexible one in their present state. The proposals for change given by the residents emphasize this situation and point to the need of some intervention in the way these apartments are designed and conceived. It is important to notice that the changes to be looked for are not only related to the introduction of flexibility, but to improve the quality of the apartments in general.

The results from the questionnaire and the space analysis pointed out some relevant aspects concerning the existing blocks. Even though each apartment has its own particular problems, some general issues were identified. The small size of the apartments and some bad geometries are among the most important. These two aspects also influence the location and opening of the entrances of the apartments, which are another constraint to their flexibility. The structural system of the blocks, the technical installations and the enclosures are permanent and cannot be changed. So, the intervention should be directed to the interior of the apartments, looking for a better arrangement of the layouts and the introduction of the flexible modules and the intelligent devices.

A more compact geometry allows in general a more static organization, where functions can be combined, reformulated and isolated when necessary. The apartments that reach or surpass the minimum conventional sizes, besides offering a more comfortable use, allow the necessary changes in the future. To introduce flexibility in the apartments are applied several theories and principles, the Polyvalence concept being the key to the new proposals. According to the Polyvalence the biggest potential for flexibility of an apartment lies in a high percentage of interchangeability between the activities or rooms. Interchangeability means that an apartment used by a couple can later be adapted to the needs of a young family, and vice-versa, when the functions change in the course of the time.

If the apartments have compact layouts, two aspect and central entrances, their quality can be improved and their flexibility increased. The Polyvalence principles show that some activities should be kept fixed in order to allow a higher interchangeability. Knowing these needs, the spaces are restructured to take advantage of the whole apartment's potential.

The structure is modified to suit the new layouts, allowing future changes and adaptations. The proposed arrangements keep the existing circulation cores and improve the communication between the apartments, allowing better furniture arrangements and optimized use of the available space.

4.2 Apartment prototypes

To see how these solutions work we have created new apartment prototypes. These prototypes follow the principles already mentioned and show different configurations and uses and are more flexible. There are 3 types: 1+1 apartment, 2+1 apartment and 3+1 apartment, each for a specific resident and scenario.

The 1+1 apartment with its space efficiency and adaptable design can be transformed to suit the changing needs of its inhabitants. The 2+1 apartment shows how design can make life easier and more comfortable even in a more complex layout. The 3+1 apartment with its large floor area and well thought out structure shows how design can create a living space that evolves with the residents.

These prototypes show how the proposed changes make the apartments more adaptable and better overall. By applying principles like Polyvalence, compactness and strategic placement of fixed elements these new designs are more versatile and living spaces. Intelligent devices, multifunctional storage and moveable furniture make it even more flexible so the apartments can accommodate the different and changing needs of the residents over time.

4.3 Apartment 1 proposal

The first apartment prototype is a 1+1 with 74.5 m² of usable area. Despite the constraints of a side entrance and an irregular shape, this is quite adaptable. (Figure 57)

To show this adaptability we present two scenarios that implement our analysis of flexible furniture solutions considering the different needs of the residents. These scenarios show how the apartment can adapt to the changing needs of its inhabitants over time. With multifunctional furniture, modular storage systems and movable walls the space can be transformed to accommodate different activities and lifestyles. Whether the residents need more workspace, a guest area or more storage the design can adapt to these changing needs and increase functionality and comfort.

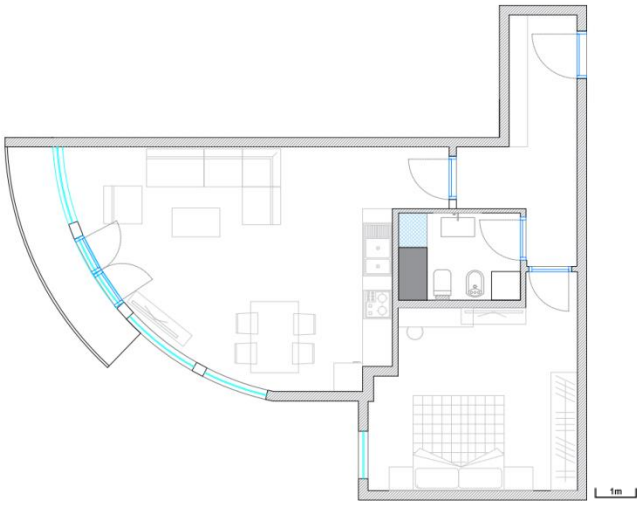

Figure 57. Existing Furniture Plan Apartment 1+1

In the first scenario the apartment is designed for a couple who are having their first child. The main focus is on the big bedroom which is the heart of the apartment. The bedroom is designed to have plenty of circulation space and to accommodate a crib or other baby furniture so the couple can have their own space and prepare for future family growth. For example, the bedroom is designed so a flexible crib can be placed without blocking the way, so it's convenient and safe. The room is also designed to be reconfigurable so the family can create more space when needed. The living room is also very adaptable with the ability to add play areas for the baby or extra storage as required. We achieved this with

multifunctional furniture, movable walls and panels and extra storage. This way the apartment can transform to the family's needs, a comfortable and flexible living space. (Figure 58

Figure 58. First option Furniture Plan Apartment 1+1

To make the apartment more comfortable and functional, furniture placement and built-in storage has been used. Multifunctional storage units act as room dividers so you can create separate areas within the open-plan living space without any permanent changes. This way the apartment will be functional and comfortable as you transition into parenthood and the family grows. For example, dining space can double as partitions, creating a cozy living area and a play zone for the child. Also the elongated façade is used to create storage solutions and workstations when needed. This way you can have more storage without sacrificing living areas. Flexible tables and chairs to create workstations that adapt to your needs and preferences. This way you make the most of the space and the apartment. This maximizes the use of space and keeps it open and airy. The design can be easily reconfigured to adapt to the family's changing needs so the apartment will continue to be practical and pleasant to live in over time.

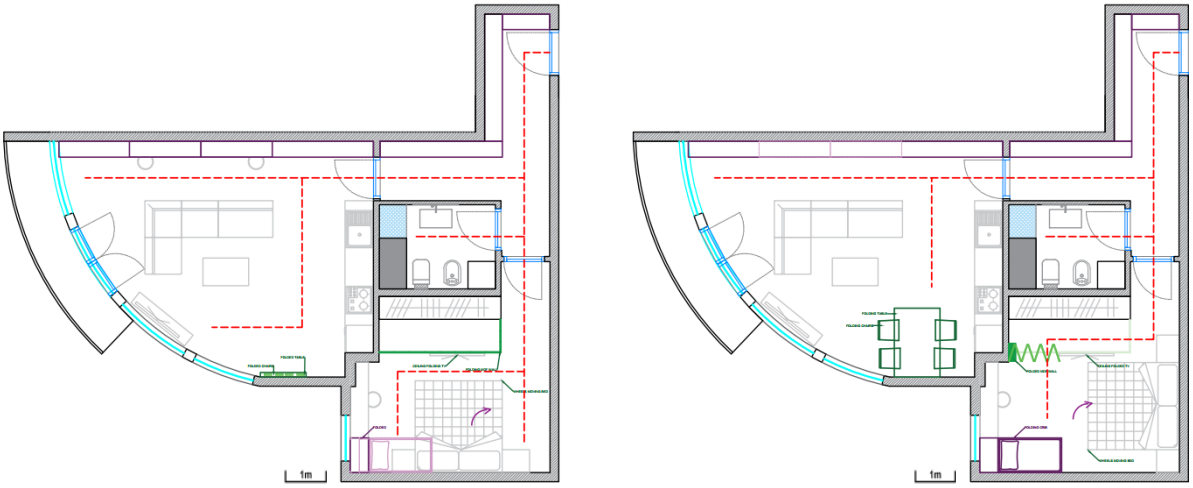

Figure 59. Diagram of the circulation of the new Apartment 1+1 first option Furniture Plan

Scenario One the space is well organized and the paths are clear. Straight paths and defined spaces make it functional and beautiful. The entrance leads into a corridor that connects all the main areas of the apartment with maximum flow. (Figure 59)

The bedroom is at one end of the corridor for privacy and quiet and the living area at the other end for socializing and family activities. The open plan living and dining areas are next to the kitchen to form a social hub that is inviting and practical. (Figure 60) By aligning these spaces along a linear path each room is accessible without disrupting the flow. This way the apartment can be used for relaxing and dining and working and playing without compromising the overall sense of order and harmony.

Figure 60. Function Diagram of the new Apartment 1+1 first option Furniture Plan

In the second scenario the apartment is adapted to include a second small bedroom for a kid, showing how it can evolve with the family's needs (Figure 61). The three facades of the apartment, each with plenty of natural light, make it flexible as you can place different functions in different areas without losing daylight or ventilation – essential for a healthy and pleasant living space.

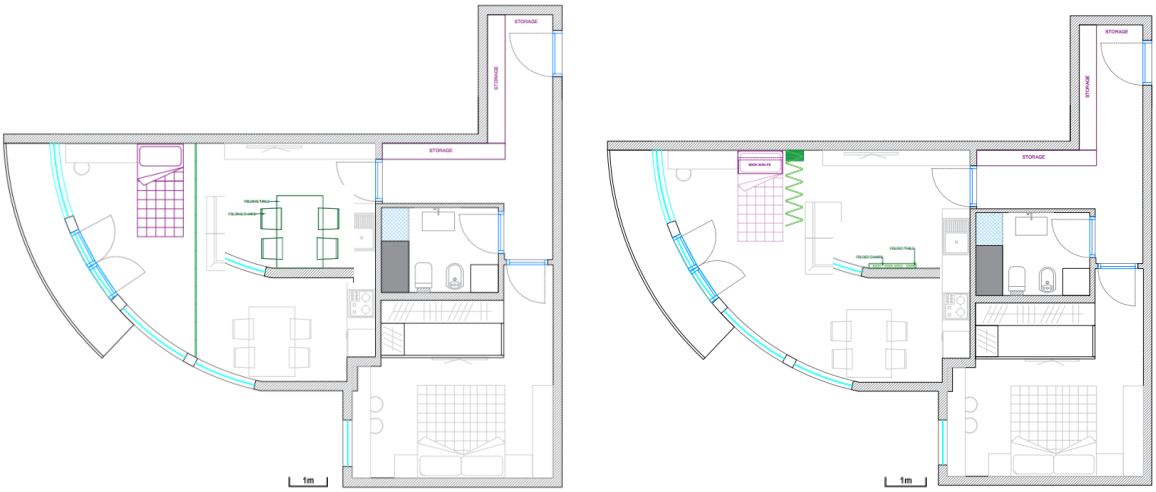

Figure 61. Second option Furniture Plan Apartment 1+1

For example, the living room can be reconfigured as a playroom, study area or even an extra bedroom. This is done with movable partitions that can be adjusted as needed. These partitions allow the space to be changed easily so the apartment can adapt to different needs without permanent changes. At night or when more space is needed during the day the extra room can stay open and integrated with the rest of the living area so daily life isn't disrupted. If more space is needed the bed and other furniture in the extra room can be cleverly hidden within a wall unit. This way the occupants have more freedom and space during the day and a more flexible and functional living space. This scenario uses multifunctional furniture, movable walls and panels to be flexible. With these the apartment can change with the family's needs and be a dynamic and functional living space. (Figure 63)

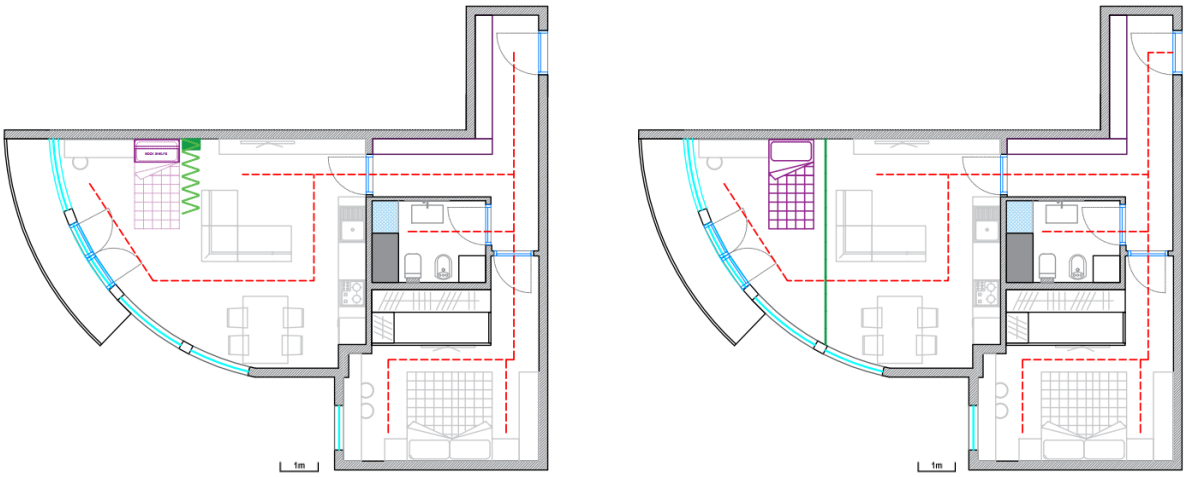

Figure 62. Diagram of the circulation of the new Apartment 1+1 second option Furniture Plan

In this scenario the space is well organized and the paths are clear. Straight paths and defined spaces make it functional and beautiful. The entrance leads into a corridor that connects all the main areas of the apartment with maximum flow. (Figure 62)

This apartment may not be super flexible but smart tech and design can really help. Multipurpose storage solutions can make the most of the space, so you don't need big furniture and clutter. Examples are built in shelving units that can be storage and display, and under bed storage in the bedroom to keep the space neat.

Residents asked for storage points to save time and space and we have addressed that in the design. For example, there is concealed storage in the hallway and living areas so you can access everyday items without compromising on aesthetics. (Figure 63)

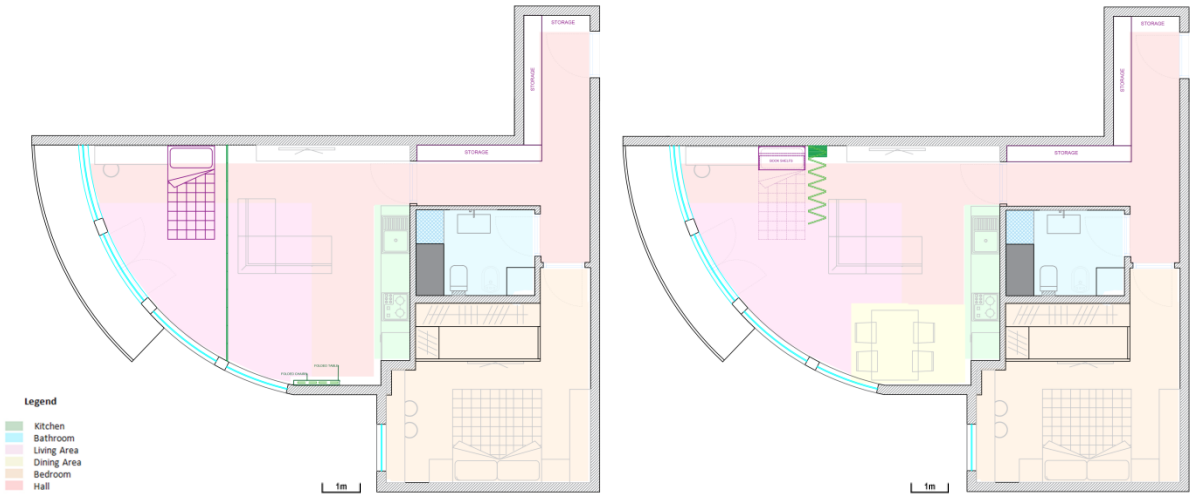

Figure 63. Function Diagram of the new Apartment 1+1 second option Furniture Plan

The bathroom is a fixed element in both scenarios and is located next to the kitchen to use the existing plumbing infrastructure. This is shown in blue on the layout, to minimize renovation costs and to make the most of the space. The bathroom is next to the kitchen so there is a continuous flow of plumbing and it will be easier to alter in the future. Movable furniture and partitions shown in orange give flexibility by allowing different room configurations. These include foldable tables, retractable room dividers and mobile shelving units that can be moved to suit changing needs.

This 1+1 apartment is an example of how design and planning can turn a basic apartment into a dynamic home. By combining smart composition, storage points and movable furniture the apartment can grow with its inhabitants. So long term satisfaction and functionality, the apartment is a sustainable and versatile living space for its residents.

4.4 Apartment 2 proposal

The second apartment is 2+1 layout, 83.5 m2. There are 2 central technical areas so there are designated spaces in the apartment for utilities or services, placed for convenience. Despite some difficulties like irregular apartment shape and entrance placement, the apartment has a lot of room for optimization in terms of organization and space usage. The irregular shape is a challenge for furniture placement and flow but also an opportunity for creative solutions that can improve functionality and looks. The flexibility of the apartment can be achieved by arranging the furniture in a thoughtful way to maximize the space and flow. Storage units and multifunctional furniture can help to reduce the clutter and make the space feel bigger. Rethinking the layout can also open up opportunities to create separate areas for different activities and make the apartment more livable.

In general, the second apartment may have some initial limitations but the 2+1 layout and central technical areas is a good base to turn the space into an organized and functional living space with the right design. (Figure 64)

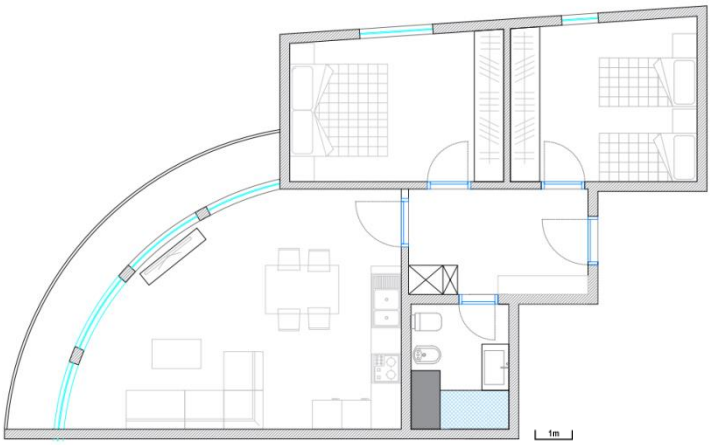

Figure 64. Existing Furniture Plan Apartment 2+1

In the first scenario the apartment has been designed for a couple whose kids have flown the nest. This is shown in (Figure 65) and focuses on increasing spaces and storage areas for the occupants. One of the main changes is to add workspaces to the apartment. This could be a home office, hobbies or creative pursuits to suit the couple's new lifestyle and interests. By incorporating these spaces into the apartment design we achieve functionality and efficiency without sacrificing comfort or style. And the design also increases storage solutions throughout the apartment. This houses the couple's stuff and organization and tidiness. Built in storage units cleverly hidden in each room maximize the usable space and keep the space clean and clutter free. The apartment makes the most of its three facades with openings which gives it so much more flexibility. The openings bring in natural light and ventilation throughout the interior making the space feel light and airy. Natural light not only looks good but also saves energy and is better for the indoor environment. And the layout allows for different uses in the apartment. Whether for entertaining, hobbies or just relaxing the design allows for different activities while still feeling open and flexible. This flexibility means the apartment can grow with the couple's changing needs and wants over time.

In summary the apartment has been designed for the occupants. By adding work and storage areas, natural light and ventilation and versatility of use the apartment is a comfortable and livable space for the couple. It's not just for daily living but for years to come.

Figure 65. First option Furniture Plan Apartment 2+1

In this case, while the apartment may not initially appear very flexible, thoughtful implementations can significantly enhance its functionality and adaptability to the needs of its inhabitants. By strategically placing storage units that double as room dividers or incorporating built-in storage solutions, the apartment can maintain an open and spacious feel while providing ample storage. These changes ensure that each area of the apartment serves multiple purposes, allowing for a more efficient and organized living environment. Furthermore, the use of space-saving furniture, such as fold-away beds and expandable tables, can provide additional flexibility. Moreover, by integrating storage solutions into these flexible furniture pieces, such as ottomans with hidden compartments or wall-mounted shelves that can be adjusted in height, residents can maximize storage capacity without sacrificing floor space. This approach not only enhances the functionality of the apartment but also allows residents to create versatile living environments that adapt to their changing needs throughout the day. It emphasizes the importance of thoughtful design and practical solutions in maximizing usable living space, even in layouts with larger circulation areas. By combining efficient circulation planning with adaptable furniture choices, residents can strike a balance between accessibility and livability in their compact living spaces. (Figure 66)

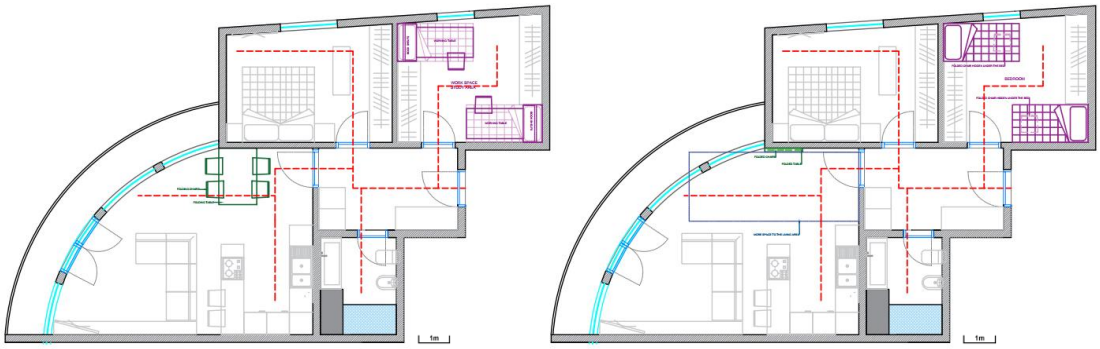

Figure 66. Diagram of the circulation of the new Apartment 2+1 first option Furniture Plan

In this prototype, the inhabitants consider that, in addition to this efficient storage, the establishments of work areas within the bedroom, as well as the delimitation of spaces for future uses, are important demands. The bathroom space, shown in blue in the plan, is a fixed element located next to the kitchen in both situations. This location was chosen to take advantage of the existing plumbing installations, thus reducing the costs of reform. The orange color show furniture and partitions that, although they occupy space, their mobility allows the creation of different spaces. These multifunctional and movable elements increase the degree of flexibility of the apartment, allowing it to easily adapt to the various needs of its users and to be transformed over time.

This 2+1 apartment can be easily reformed to become a model of smart design, transforming it from a simple apartment into a true home that, little by little, meets the needs of its inhabitants. (Figure 67)

Fiaure 67. Function Diagram of the new Apartment 2+1 first option Furniture Plan

In the second scenario the master bedroom has been designed to allow for plenty of space to move around even with kid's furniture in. This also allows for easy movement and access within the bedroom area. One of the design principles in this apartment is to separate private and public spaces. By having the bedrooms on one side and living areas on the other side, it separates the private and public functions. This separates privacy and also creates a quiet space from external noise so you can live peacefully. The spaces within the apartment are further defined through the use of built-in storage and multi-functional furniture. For example, in the living room, the built-in shelving is storage for various items and display for decorative objects or books. This integrated approach minimizes the need for big furniture pieces so it maximizes the floor space and creates a clutter free environment. Built-in storage is not limited to the living room; it's throughout the apartment to maximize functionality in every area. In the bedrooms, built-in wardrobes and shelving is storage for clothes, personal items and toys so the rooms are organized and visually clean. This design approach looks good and makes the spaces more functional and comfortable for the residents. And multi-functional furniture makes the living areas more versatile. For example, the modular seating in the living room can be reconfigured to accommodate different activities or gatherings so it's flexible and adaptable for daily use. (Figure 68)

In summary, the design of the apartment is a balance of form and function. By separating the rooms, integrated built-in storage and multi-functional furniture, the apartment is space efficient and has clear private retreats and public living areas. This makes living and a home organized and cozy.

Figure 68. Second option Furniture Plan Apartment 1+1

This apartment is optimized by having straight paths and clear zones, functionality and flow is improved. The entrance which was a constraint is reconfigured to lead into a central corridor that gives access to all main rooms without any turns and smooth flow. This central corridor is the backbone of the apartment; it connects the master bedroom, the kids' room and the living areas seamlessly. The apartment has straight lines and clear zones to maximize functionality and flow. It gives the main occupants direct access to the master bedroom so they have privacy and convenience. It links to the kid room so you can keep an eye on the little ones. And it extends into the living areas so you can flow from relaxation to dining to socializing. This design allows for separate zones within the apartment while having one overall look. Each area is intentionally connected to the central corridor so you get a balance of function and comfort. (Figure 69)

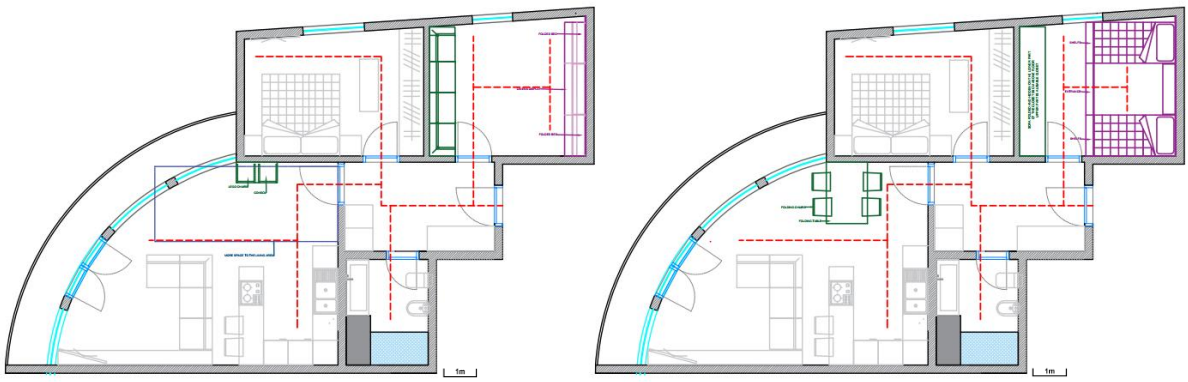

Figure 69. Diagram of the circulation of the new Apartment 2+1 second option Furniture Plan

The apartment has been designed to be functional and timeless. By locating the main technical areas like the kitchen and bathroom to use existing plumbing the renovation saved cost and complexity. Plus, this layout allows for seamless flow and accessibility from every corner of the apartment for everyone to use. The placement of the bathroom deserves a special mention as it has access without compromising on privacy and caters to the whole household. This thoughtful approach shows the apartment is all about space and flow. Plus, the apartment is adaptable over time through purposeful furniture placement and integrated storage solutions that define different zones. For example, the kids' bedroom can turn into a cinema room, a relaxation space or a play area for kids with movable walls and multi-functional furniture. This apartment is about immediate use and long term livability. The

central technical areas, space efficient layout and versatile design make it work for the family now and into the future. For daily use or future changes this home is proof that good design is functional and timeless. (Figure 70)

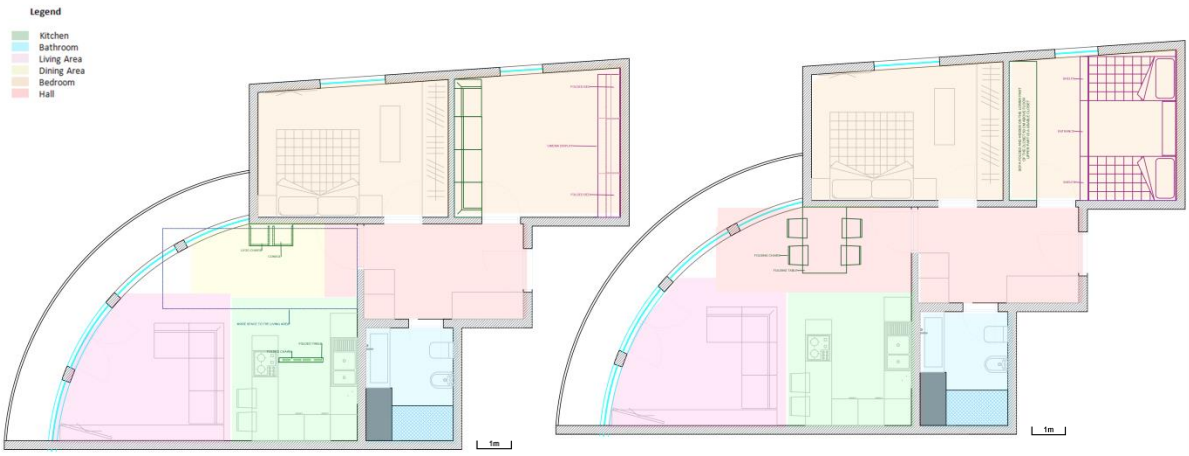

Figure 70. Function Diagram of the new Apartment 2+1 second option Furniture Plan

4.5 Apartment 3 proposal

The third apartment is a 3+1 with 90m2, with a smart layout and two technical rooms in a corner. (Figure 71) This clever design not only saves space but also makes it adaptable for all needs. The central entrance and compact shape of the apartment is the key to its organization and utilization. Every square meter is used and you have all the space to arrange it as you like. And the layout of the apartment facilitates movement and functionality, a smooth transition from one room to another. This cohesion also improves navigation in the apartment and the living. In short, the third apartment is practical and adaptable. With central entrance, space optimization and technical services in the right place, it's a base for organized living and customizable functionality. For daily living or evolving needs, this is a balanced solution for usability and living.

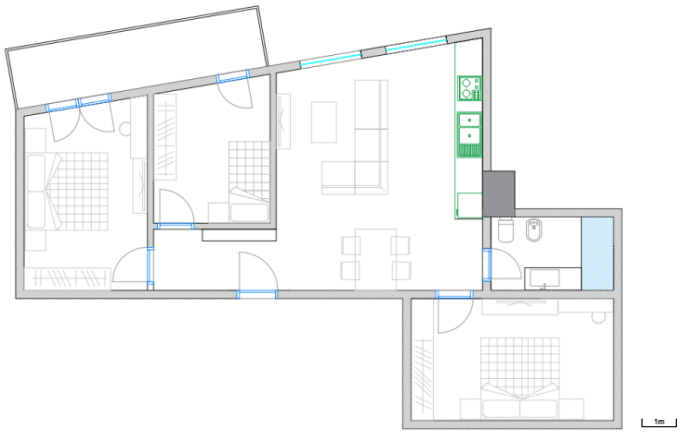

Figure 71. Existing Furniture Plan Apartment 3+1

Here are two scenarios to show how versatile the apartment is. In the first scenario, the apartment fits a family with kids. The big bedroom has plenty of circulation space so each family member has their own privacy and room to grow. This layout combines functionality with comfort and meets the different needs of a growing family. Also the bedroom can be converted into a main kids' bedroom, a guest room or a functional workspace with the use of multifunctional furniture. This way the space can evolve as the family needs change over time and provides practical solutions without compromising on style or efficiency. The apartment is designed to be a harmonious living space where every area serves more than one purpose. Whether it's a cozy sanctuary for kids, hosting guests comfortably or a productive workspace, the apartment has adaptable solutions for daily living.

The apartment is versatile by adapting to different lifestyles and needs. From a growing family to flexible spaces for different uses, the design prioritizes both functionality and comfort. (Figure 72)

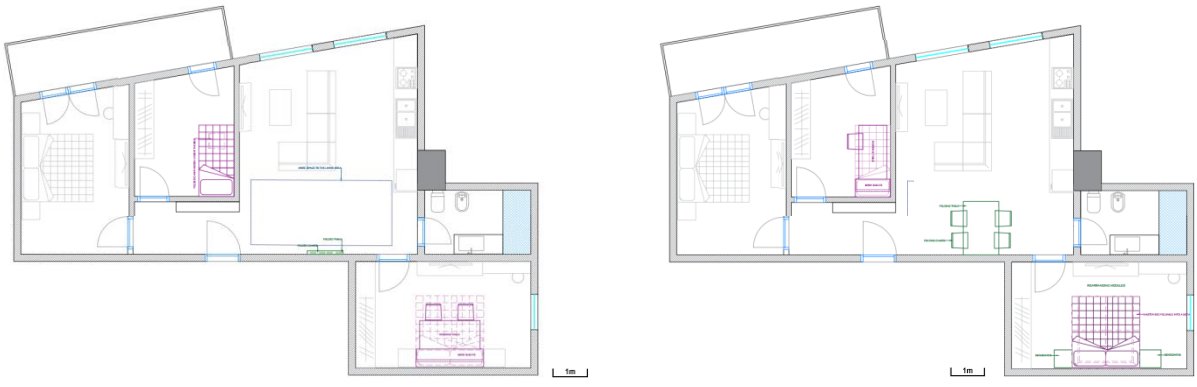

Figure 72. First option Furniture Plan Apartment 3+1

The spacious bedroom in this apartment offers ample circulation space, personal areas, and room for future growth, making it highly functional and comfortable for a growing family. This layout is designed to cater to the evolving needs of its occupants, providing a harmonious balance between privacy and shared living spaces. In summary, this apartment exemplifies practicality and thoughtful design. With its spacious bedroom, well-defined living areas, and optimized circulation paths, it provides a versatile living space that supports the needs of a growing family while promoting ease of movement and functionality throughout. (Figure 73)

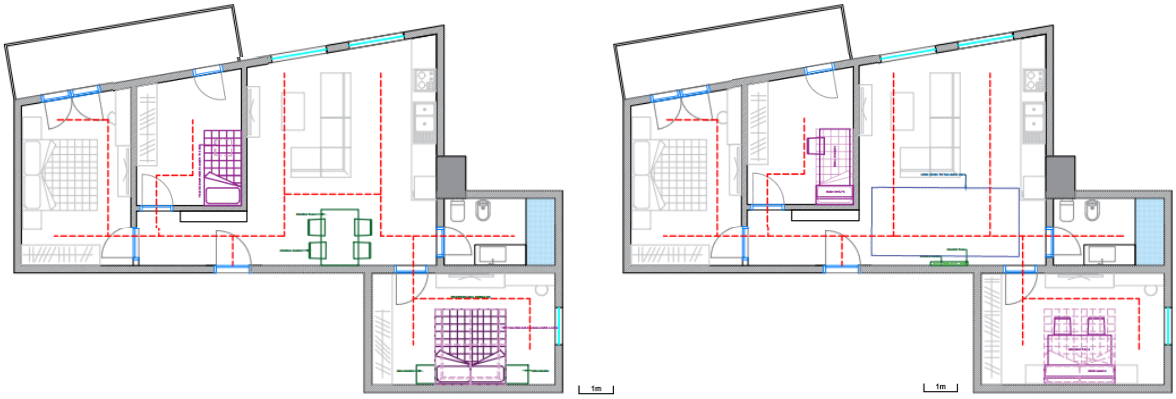

Figure 73. Diagram of the circulation of the new Apartment 3+1 first option Furniture Plan

In this design the apartment layout is functional and comfortable for a family. The big bedrooms have plenty of circulation space and personal areas so each family member has their own room. One of the bedrooms in this layout can be converted into a main kid's bedroom, guest room or functional workspace with multifunctional furniture solutions. This is achieved with clever design and furniture choices that use space without compromising on style and comfort. And the apartment's layout is also flexible to accommodate changing family dynamics and lifestyle over time. Whether it's a cozy space for kids to play and study, hosting guests or a productive home office, the apartment has solutions for daily living. In summary, this is practical and adaptable. With its clever layout and versatile bedrooms, the apartment is functional and comfortable for a growing family. (Figure 74)

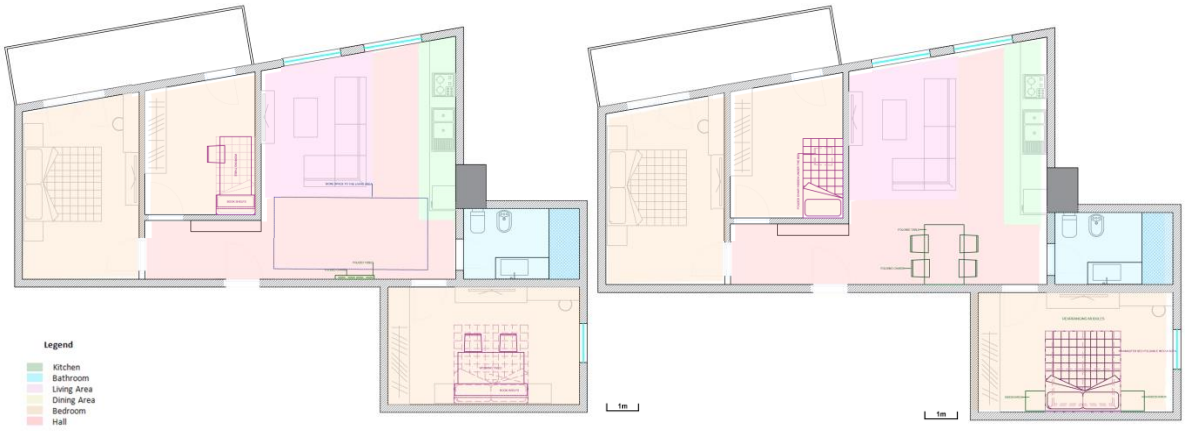

Figure 74. Function Diagram of the new Apartment 3+1 first option Furniture Plan

In the second scenario is all about creating functional workspaces and storage solutions. The apartment proves it can evolve with the changing needs of its occupants and be a living space that continues to work for them over time. This scenario shows the apartment's flexibility despite having two facades which brings in natural light and ventilation but limits some of the layout options compared to units with more facades. But the design is thoughtful and makes the most of the space with adaptable solutions for the couple's changing lifestyle. And the fact it can have functional workspaces and extra storage shows its versatility and practicality. By reconfiguring rooms and using multi-functional furniture the layout makes the most of the space without compromising on comfort or style. This apartment is adaptable and well designed. From a growing family to a couple's retreat it can evolve with the changing needs of its occupants. Despite the design considerations like facade access the apartment offers a bespoke living experience that puts functionality and comfort first for its occupants. (Figure 75)

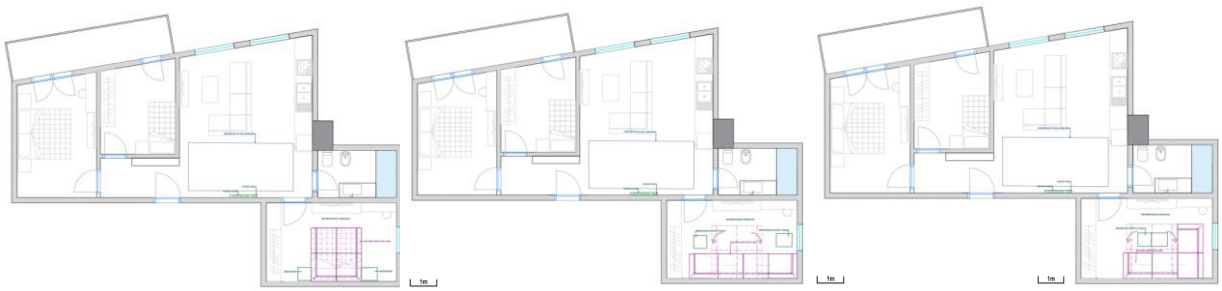

Figure 75. Second option Furniture Plan Apartment 3+1

Residents in this prototype have said they want a multi-functional living space where one bedroom can be used for multiple purposes. This flexibility allows the room to be a cinema room, guest bedroom, living or relaxing area or workspace as needed. This flexibility makes the most of the space and means the apartment can cater for different activities and lifestyles over time. The fixed bathroom is highlighted in blue on the plan and is located next to the kitchen in both scenarios. This is intentional to make the most of the plumbing and service connections and to centralize the essential services and make daily routines more efficient. Residents have easy access to both the kitchen and bathroom so it's a seamless transition between cooking, dining and personal care areas. The circulation within the apartment is functional and efficient. The layout is designed to flow logically between rooms so it's easy to move around and maximize usability. This considered design means residents can move through the space without bumping into things.

This prototype apartment is designed to cater for the diverse and changing needs of its residents. The multi-functional spaces, strategic services and well planned circulation paths make the apartment more functional and livable. It's a flexible and comfortable space that adapts to different activities and future requirements. (Figure 76)

Figure 76. Diagram of the circulation of the new Apartment 3+1 second option Furniture Plan

By placing the bathroom and kitchen in the center, the layout is more efficient and convenient for the residents, easy to access and use. Plus, the apartment has adaptive furniture and partitions in orange which are modular and can be moved around to create different configurations. These flexible elements make the apartment more adaptable and can transform from a living space to a home. Whether you need to adjust the layout for guests, home office or a cozy relaxation area, the movable multifunctional furniture makes it easy to switch between purposes. By making thoughtful design decisions and strategic placements; this apartment

becomes a living space that adapts to the changing needs of its residents. The layout is designed to be functional and comfortable and beautiful. This holistic approach makes the spaces fluid and adaptable for different lifestyles and activities. (Figure 77)

In short, the design of this 3+1 apartment is all about versatility and practicality. With strategic infrastructure and flexible furniture solutions, it's a personalized space that will remain functional and inviting over time. This forward thinking approach makes it usable and adaptable to the changing preferences and lifestyles of its occupants, a home for the long term.

Figure 77. Function Diagram of the new Apartment 3+1 second option Furniture Plan

CHAPTER 5

CONCLUSIONS

5.1 Conclusion

The need for change has been, is and will be among us. It’s a universal phenomenon, and we should consider it more often. Flexibility should be considered in a quality spatial organization over an extended period of time, rather than just thinking of the present use. Using flexibility in buildings is a brilliant solution considering economic and environmental benefits. People arrange and rearrange spaces based on their spatial and economic need while we have less waste because the refurbishment, obsolescence, and demolition of flexible designs require less material energy and labor.

This thesis proposes the idea of flexible furniture and modules shows how they can work and contribute to housing design and suggests how they could be incorporated in new and existing schemes. The most important aspect to consider is flexibility and the importance of research in housing design. For a long time, domestic architecture was considered unimportant in comparison to what many academics considered "real architecture". During the last decades, the interest in academic research about residences has increased. Nowadays, we consider houses not as the product of a-tactic architecture but as a process that unfolds in time. The recognition of houses as a process allows us to acknowledge that housing design should respond to the changing needs of its inhabitants. People pass through different life stages and their homes must be flexible and habitable throughout these stages. The life cycle of apartments, apartment blocks and houses should thus last as long as the life cycle of their inhabitants. Ideas such as flexibility, polyvalence and flexible housing have been developed from this recognition.

Expanding and growing cities often face problems in housing design due to the fast population growth. The city of Tirana, the Albanian capital, is an example of this situation. It is a very dense and growing city every day. The housing market in Tirana considers the population growth as a demand for housing blocks. Thus, almost every day a new complex or a single apartment block is built in each

neighborhood, in every empty spot available. But the question is, do the people really need all these new buildings or the housing market builds for its own sake and not for the people? Studies show that many of the new buildings are built because usually people tend to move out after a short while and look for new apartments. This is because their apartments don't respond to their needs anymore. This happens because of the bad design of the housing blocks. The apartments are considered as products in today's designs with a very limited usability throughout time. What cities such as Tirana require are flexible houses and apartments, with principles that allow the people to spend longer life cycles in the same place and personalize their spaces much better.

The idea of flexible housing has its origin in the works of some famous architects from the modern era; however, it has not been adequately defined and researched until the last decades. The main advantages of a flexible housing design are social, economic and ecological. In terms of social comfort, it allows individuals to remain in the same housing for extended periods, promoting the feeling of belonging and stability of a community. From the economic point of view, the flexibility of the housing avoids unnecessary expenses from the continuous purchase of new apartments and the constant changing of residences. Regarding sustainability, flexible housing reduces the demand for new constructions that occupy the existing stock, regenerating old or unoccupied blocks.

The main object of this thesis is the existing building, the polyvalence and the factors that determine the order of flexibility of an apartment. Each one of them is equally important and the level of flexibility can be improved in terms of housing quality. For the purpose of analyzing the current status in Tirana, existing cases of apartment blocks were studied according to these determining factors. The samples were chosen after the classification of the main zones according to the sale prices of the apartments, taking in consideration three apartment typologies.

5.2 Recommendations for future research

This study has shown how the elements, concepts and factors of flexible housing could be applied to the present housing design. Flexible housing is a new term which has been introduced in this century, and it has many advantages in socially, economically and environmentally. There are many theories about the explanation of flexibility, in which some of them have been studied in this thesis. Also there are different case studies about the implementation of flexibility in which some have been examined. As it is a new term, it is difficult for everyone to accept it, so it is better to explain it clearly not only for its benefits but also for its effects on housing design. It should be explained that flexibility is not a subordinated or complementary way of home design, but it is a revolution in domestic architecture. It is an all-embracing notion which should not only dominate the design process but go further. Because its aim is to fulfill users' requirement not only for present but also for their life span.

In this study, many case studies were analyzed to learn about flexibility, but the result was that most of the flexibility instances were seen in two-story houses, lofts or row houses. On the other hand, multistory buildings which are the most preferred typology of housing in many countries, including Albania, offered fewer examples of flexible housing. It is important to apply the concept of flexible housing to this typology of domestic buildings since the housing market mostly offers this type of structures. If the study focuses only on single housing unit, it may create an idea that apartment blocks cannot be sustained by theories such as open building and polyvalence, although this thesis has demonstrated ways to make them flexible.

The other suggestion for further study is to explain the economic benefits of flexible housing more. Although flexibility offers many undefeated advantages such as social sustainability, adaptability and future-proof; only a few studies have examined its economic benefits. Among the studies, Svenstam (2004) has shown the profitability of flexible houses in economically. Svenstam classified flexible housing as adaptable and reversible housing, and examined the cost-benefit analysis of each group of house through case studies.

APPENDIX 1

QUESTIONNAIRE

1. What category does your family falls under?
   a. Standard family (Parents and children)
   b. Joint family (Standard family and family members)
   c. Couple
   d. One person

2. What type apartment you have?
   a. 1+1
   b. 2+1
   c. 3+1
   d. Studio apartment

3. How many bedrooms do you need ?
   a. One
   b. Two
   c. Three

4. Which part of the apartment do you spend more time?
   a. Living room
   b. Bedroom
   c. Balcony

5. How many hours do you spend at home during the day?
   a. 2-3 hours
   b. 4-5 hours
   c. More than 5 hours

6. What type of concept would you like for your apartment?
   a. Open space
   b. Divided specific spaces

7. Do you need more storage space?
    a. Yes
    b. No

8. Are you happy with the natural light entering in your apartment?
    a. Yes
    b. No
    c. It can be better

9. Did you ever think to buy the apartment you are renting?
    a. Now that you're mentioning it
    b. No, it's not practical for me
    c. Yes, I even talked to the owner
    d. I am the owner

10. What do you think it's missing from your current apartment?

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