Politecnico di Milano
Scuola di Architettura Urbanistica
Ingegneria delle Costruzioni

Laurea Magistrale Architettura
Anno Accademico 2018/2019

Master Thesis

Millennial Dwellers: Rethinking flexibility in contemporary housing models

Mentor:

Prof. Cino Paolo Zucchi

Student:

Nađa Ninković

871332 / 10550765

july, 2019

Millennial Dwellers

Rethinking Flexibility in
Contemporary
Housing Models

Nađa S. Ninković

POLITECNICO
MILANO 1863

for my family.

Table of Contents

Table of Figures

Abstract

The house - an elementary particle of the material culture of a society - represents a constantly evolving design theme, which is continuously being affected by an almost immeasurable number of factors. Today there is a widespread feeling that the housing typologies derived from the interaction between design practices and the market are no longer able to accommodate the rapid evolutions of our lifestyles and the new needs they generate. Society is increasingly asking for environments and spaces suitable for the way we live today and will live in the near future in synchrony with socio-economic phenomena on a global scale. By focusing on the younger group of current and future residents - the so-called "millennials" - we can see that their continuous reinvention of lifestyles poorly adapts to the housing typologies inherited from the "functionalist" research of the last century, where the environments of the house were defined by a specific function. The issue of flexibility, partly studied in the second post-war period, has now become one of key elements at various project scales.

The aim of this thesis is to integrate two often distinct approaches - the first one of "bottom up" design starting from new needs and the second one of an accommodation's ability to evolve over time - in order to better understand what constitutes the ideal home for an inhabitant of the new millennium. The multidisciplinary nature of the research combines theoretical and practical data on the fundamental problems of housing in recent history, current market economics and the typological redefinition of existing models through a flexible project. Based on the "rent culture" as a growing phenomenon with respect to home ownership, the new types are based on semi-permanent housing units of different sizes, with different levels of privacy and destined for different periods of use. The design experiment focuses on four distinct user groups - millennials in vital phases characterised by different needs - and examines ways to achieve an optimal habitat by incorporating different types of flexibility. The section of the thesis that deals with the design dimension does not therefore intend - as in many researches of the past - to produce a paradigm or general model to be reproduced in many copies, but to reflect on the need to recombine known elements and spaces in new configurations capable of responding to always new stimuli and needs for a "contemporary living".

Abstract

L'abitazione - particella elementare della cultura materiale di una società- rappresenta un tema progettuale in continua evoluzione, che interagisce continuamente con un numero di fattori quasi incommensurabile. Esiste oggi un sensazione diffusa che le tipologie abitative prodotte dall'interazione tra pratiche progettuali e mercato non siano più in grado di accogliere le evoluzioni rapide dei nostri modi di vita e i nuovi bisogni da essi generati. La società richiede con sempre maggiore insistenza ambienti e spazi adatti a come viviamo oggi e a come vivremo nel futuro prossimo in sincronia con fenomeni socioeconomici di scala ormai globale. Focalizzando l'attenzione sul gruppo più giovane di residenti attuali e futuri - i cosiddetti "millennials" - possiamo vedere quando la loro continua reinvenzione dei modi di abitare male si adatta alle tipologie abitative ereditate dalla ricerca "funzionalista" del secolo scorso, dove gli ambienti della casa erano definiti da una funzione specifica. Il tema della flessibilità, in parte studiato nel secondo dopoguerra, è diventato oggi uno degli elementi cardine a varie scale del progetto.

L'obiettivo di queste tesi è quello di integrare due approcci spesso distinti - quello della progettazione "bottom up" a partire dai nuovi bisogni e quello della capacità di un alloggio di evolversi nel tempo - allo scopo di comprendere meglio cosa costituisca la casa ideale per un abitante del nuovo millennio. La natura multidisciplinare della ricerca combina dati teorici e pratici sui problemi fondamentali dell'edilizia abitativa della storia recente, dell'economia del mercato attuale e della ridefinizione tipologica dei modelli esistenti attraverso un progetto flessibile. Basandosi sulla "cultura dell'affitto" come fenomeno in crescita rispetto alla proprietà della casa, le nuove tipologie si basano su unità abitative semi-permanenti di dimensioni diverse, con diversi livelli di privacy e destinate a periodi di utilizzo diversi. L'esperimento di progettazione si concentra su quattro gruppi di utenti distinti - millennials in fasi vitali contraddistinte da esigenze diverse - ed esamina i modi per ottenere un habitat ottimale incorporando diversi tipi di flessibilità. La sezione della tesi che affronta la dimensione progettuale non intende quindi - come in molte ricerche del passato - produrre un paradigma o modello generale da riprodurre in molte copie, ma riflettere sulla necessità di ricombinare elementi e spazi conosciuti in configurazioni inedite, capaci di rispondere agli stimoli e bisogni sempre nuovi di un "abitare contemporaneo".

"This is how space begins, with words only, signs traced on the blank page. To describe space: to name it, to trace it, like those portolano-makers who saturated the coastlines with the names of harbours, the names of capes, the names of inlets, until in the end the land was only separated from the sea by a continuous ribbon of text. Is the aleph, that place in Borges from which the entire world is visible simultaneously, anything other than an alphabet?"

Georges Perec
Species of Spaces and Other Pieces
1974

Introduction

The inevitability of change that is deeply embedded in all aspects of the global society has often been a starting point for many revolutionary acts leading to innovation and overall progress. **Throughout the course of history, people have been confronted with various challenges and difficulties that forced them to rethink the established principles.** Historically, the said changes would often come without a warning, forcing them to act almost intuitively, causing the ability of adaptation to evolve into an intrinsic feature of human nature. Narrowing the scope of attention to the built environment, the succession of trends that defines architectural progress has simultaneously been shaping the human behaviour. At this particular moment in time, the society has reached a point of advancement that enables more systematic approach in dealing with contemporary issues. That being said, by acknowledging the inefficiency of the present standards followed by the impartial observation of the viable solutions, it is possible to come up with a series of inventions that constitute a new, more efficient standard.

With life being only a succession of transformations[1], the ever-changing lifestyle that defines all generations has always been a particular topic of discussion. The complexity of the term is derived from the impacts it has on various aspects of human environment. In this specific research, the focus will be on the immediate surrounding and understanding the changes occurring in the contemporary housing models. At the moment, **the most interesting focus group for numerous real-estate market researchers are the millennials**. They have come of age during a time of technological change, globalisation and economic disruption which has given them a different set of behaviours and experiences than their parents. They have shown different attitudes towards ownership that have helped spawn what's being called a "sharing economy". However, since their presence is still fresh and slightly mysterious, the way their "on-demand lifestyle" preferences affect the concept of housing from an architectural point of view is also a bit vague.

1 Eugene Viollet Le Duc, *The Habitations of Man in All Ages*, trans. by Benjamin Bucknall (Boston, MA: James R. Osgood and Company, 1876),160.

By acknowledging the inefficiency of the present standards followed by the impartial observation of the viable solutions, it is possible to come up with a series of inventions that constitute a new, more efficient standard.

The challenge of capturing the impermanence of their nature is an essential step in successful design of their habitat. As stated in the foreword of the book *ConsumAuthors - The New Generational Nuclei (ConsumAutori - I nuovi nuclei generazionali, 2016)* by Francesco Morace, millennials are described as mature and aware individuals able to bend consumption to their own constellation of values, tastes and preferences. Therefore, the power of subjectivity as an unavoidable mechanism of self-realization defines the given social context and needs to be analysed in a relational nature at every level.

Adapting the dwelling premises to the new generation lifestyle should not be only based on one's needs at one particular moment but over the course of time, **introducing the notion of flexibility as a response to the inevitable changes that follow each period of life.** Those changes automatically generate a need for modification of the space one inhabits. Modifications are both physical and functional, thus, in order for a home to work, it has to be able to successfully withstand them - it needs to be flexible. Flexible housing is consequently a relevant part of future housing provision as it offers the freedom and possibility for a dweller to redefine space according to his needs in a simple and inexpensive way. According to N. J. Habraken (*Variations - systematic design of supports*, 1976), the need for identification and recognition as determining one's place in society of one's time is a very basic need that has tended to be neglected in our functional age. **The ability of an individual dweller to actively participate in the design process redefines dwelling as a result of two spheres of responsibility and decision making, where the dweller becomes a recognisable force.** Acknowledging both architectural and sociological aspects, the purpose of this research is to confront the notions of flexibility from the last century with the ever-changing needs and slightly erratic lifestyle of the new generations. The synthesis of the two essential components that constitute a dwelling should result in development of new, hybrid typologies of flexible contemporary housing.

Flexible housing is a relevant part of future housing provision since it offers the freedom and the possibility for a dweller to redefine space according to his needs in a simple and inexpensive way.

"Although we cheerfully speak about the environment of an organism or a population, we know well there is no such thing. A population of individuals lives in a range of environments, narrow or wide as the case may be; and adaptability is just as much a matter of being adapted to environment which differ from place to place as to environments which change from time to time".

Peter Brian Medawar
The Future of Man
1960

1 House as a Morphology

The need for a shelter, a safe place, a personal sanctuary, has been present since the very beginning of civilisation.

1.1 Comprehensive Trajectory of Progress

The everlasting interest in residential architecture has resulted in quiet meticulous development of the research field, contributing to its complexity and multidisciplinary nature. **The inherent bond between a man and its nearest surrounding has forced the society to constantly look for more optimal solutions.** The need for a shelter, a safe place, a personal sanctuary, has been present since the very beginning of civilisation. Following the thoughts of Viollet le Duc and Eugene Emmanuel *(Histoire de l'habitation humaine*, 1876), every created being has its aptitudes, its instincts: some make themselves nests: others burrow in the ground or build dwellings; some flock together, some live apart, distrustful of their kind: all have their prey, and seek to provide against the attacks of their enemies. (fig. 1) The undeniable importance of human habitat is portrayed in the vast number of analyses defining its every aspect, from its origin till the present moment. Therefore, it is safe to say that it's almost impossible to take into consideration all the available information regarding the topic and condense it within confined scope of a single Master Thesis. Instead, a more efficient and less deviating way of conducting a fruitful research is by simply acknowledging the broadness of the infinite data collected and preserved over time while focusing on the concisely defined hypothesis and its pertinent context.

Considering the dwelling as an organic part of a larger environment, as a vital organ in a living creature, the size of domain to be controlled is reversely proportioned to its controllability.[2] In narrowing down the field of analysis to a reasonable scope of aspects to be examined, it is essential to keep in mind the initial premise. The ephemeral nature of the social conditions that are shaping today's housing models interferes with functionalist attempts to follow a clear pattern of changes in lifestyle and immediately propose adequate modifications in design. **Oblivious presumption of calculated clarity as the secret to a comfortable house has been creating an illusion of control that comes from standardisation.** In fact, believing in a pragmatic recipe that goes beyond utility is just as deceiving as pure accidentism.[3]

2 Serge Chermayeff, Christopher Alexander, *Community And Privacy: Toward a New Architecture of Humanism* (Garden City, NY: Doubleday & Company, 1963), 135.

3 Jozef Frank, *Writings: Volume 2* (Published Writings 1931-1965), 373.

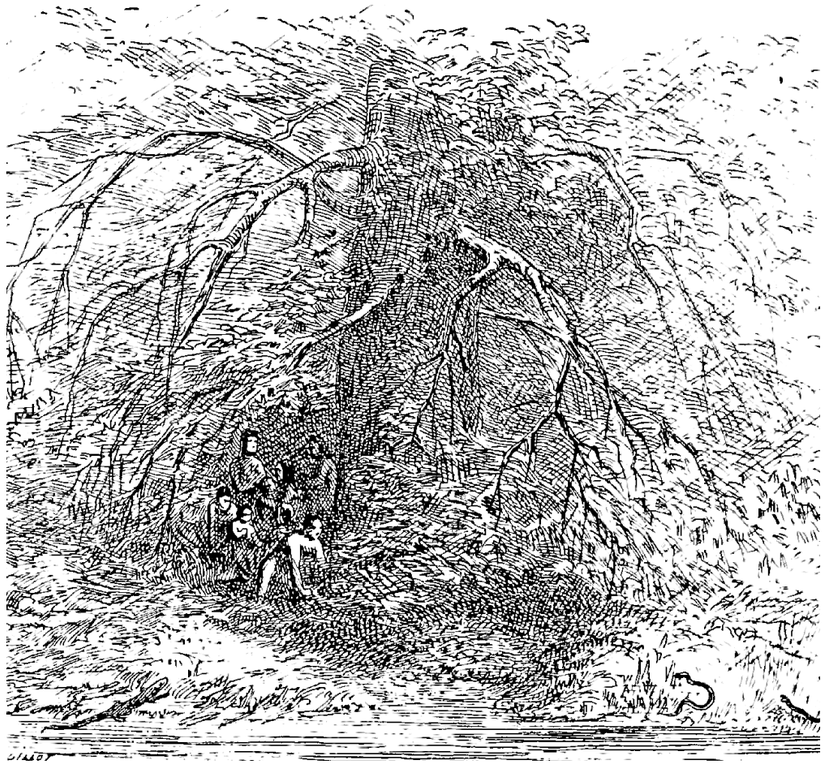


Figure 1. *The First Shelter* (Eugene Viollet Le Duc, 1876)

The idea is effortlessly verified in style development genesis proposed by Jozef Frank (Rooms and Furnishings, *Writings - Volume 2*, 1931-1965): "Styles have always developed in the same fashion; in the beginning they are expressed in strict and simple terms, within a narrow framework of rules; but because of this, they soon become monotonous and wearisome, for little variation was possible. People desired variety, and while changes in principle were not a necessity, one achieved this variation by means of decoration and constructive trifles that in the end degenerated to such a degree that the validity of the original conception could come into question. Then one turned again to new forms of simplicity that symbolised the ideas of the new epoch." Consequently, **an architect should avoid alleviating the burden of decision by leaning on correctness derived from logically structured design problems.**

Figure 2. *Members of Team 10* (Otterlo Meeting, 1959)

Before focusing on one specific design problem caused by the needs of a contemporary dweller, it is necessary to understand the inherited premises of a larger context. **In dealing with the phenomena of change, designers of the past century relied on using their architecture to communicate the social relationships of a modern society.** The goal was to enable citizens, users and inhabitants to shape their ways of life as they themselves preferred, as well as to stimulate cultural values. In this way, the inevitable transformations were slightly less unexpected and more controlled. Notions of interrelation and reciprocity were particularly relevant in the 1960s, when Jaap Bakema and the other members of the Team 10 (fig. 2) started developing the idea of "Open society", an architectural and urban initiative that focused on the "hidden potential of our new social structure of society, as the new reality of a changed social pattern, following emancipation through, among other things, technological progress, which brought with it the extension of everybody's right to be responsible for his own way of life."[4] The core of the movement was based within Bakema's idea of democracy that celebrates everybody's right to full life, and architecture was the way to provide it. Therefore, embracing the uncertainty that follows every kind of advancement in today's society represents the basis of creating environments of great quality, defined by their ability to respond and adapt to externalities. If properly understood, a change becomes a catalyst of good design that exceeds the limits of immediate context.

4 Dirk Van Den Heuvel, *Jaap Bakema and the Open Society* (Archis, 2018), 247.

Housing itself could be described as a dynamic social and spatial morphology that has been defining the primary surrounding of a man for ages. **Following the evolution of society, a dwelling unit has been correspondingly prone to transformation and constant redefinition.** The recurring need for invention doesn't aim solely at satisfying the imposed utilitarian demands, but also ideological symbols that relate to a certain style. The dwelling has become essentially a cell in a complex organism - and must be seen as such if it is to correspond to either old or new realities. If man's habitat is not to become a malignant cancer it must be given a form reflecting its new function.[5] This being said, it is necessary to acknowledge the endless number of relations that derive as a direct consequence of complexity that constitutes the field of housing and use it as a general framework for the research that concentrates on a specific portion of it. **Focusing on the time scope of the current decade with a field of reference that includes the past century, the idea of an optimal housing for a modern man can be systematically explored leaving minimal space for ambiguity.**

Embracing the uncertainty that follows every kind of advancement in today's society represents the basis of creating environments of great quality, defined by their ability to respond and adapt to externalities.

5 Serge Chermayeff, Christopher Alexander, *Community And Privacy: Toward a New Architecture of Humanism* (Garden City, NY: Doubleday & Company, 1963), 64.

1.2 Deficiency of the Present Standard

Designed environments will be successful only if they respond to the most crucial pressures of time.[6] Learning from the past in terms of impartial observation of historical references and potentially applicable methods that were proven successful at some point in time represents a solid starting point of program definition. However, simply referring to well-known cases, no matter how successful, could never be enough for proposing a design solution suitable for a specific context. Considering the form as an ordered expression of a need that is inseparable from the external conditions that generate it, explicit definition of the forces at work provides clarity in understanding the specific program. According to Alexander and Chermayeff, forces have a characteristic pattern, and the good form is in equilibrium with that pattern.[7] **Stating the design problem needs to be done in a way that is precise enough to become the starting point of the design itself.** Therefore, defining the needs of a dweller at one specific point in time requires thorough examination of circumstances that are fundamental to that time.

6 Serge Chermayeff, Christopher Alexander, *Community And Privacy: Toward a New Architecture of Humanism* (Garden City, NY: Doubleday & Company, 1963), 105.

7 Serge Chermayeff, Christopher Alexander, *Community And Privacy: Toward a New Architecture of Humanism* (Garden City, NY: Doubleday & Company, 1963), 108.

Form is an ordered expression of a need that is that is inseparable from the external conditions that generate it.

"We've decided to convert the dungeon into studio apartments, so kill all the prisoners."

Figure 3. *New Yorker Cartoon* (David Sipress, 2012)

1.2.1 External Forces of Impact

Limiting the temporal context of research to the new millennium sheds light on some of the burning issues the society has been dealing with for the past two decades. One of the most important events that helped define fluctuations of all markets, including housing, is the financial crisis in 2008. (fig. 3) Despite the chronological distance of more than ten years, the consequences are still strong enough to consider it a defining point of the millennium. The partial global economic recovery hasn't been steady enough to secure adequate and affordable housing for everyone, with particularly serious effect on city dwellers. As urban populations grow, the housing gap will widen, exacerbating inequality and threatening the traditional view of cities as reliable drivers of economic growth.[8] Paradoxically, **constant degradation of living conditions hasn't affected the increasing preference of urban forms of housing for dwellers of all ages.** This phenomenon has triggered economic rise of cities which create many new jobs, and in turn increase the number of households and their average income. Consequently, more jobs and people with high incomes create more demand for urban floor space which is scarcely attainable within dense environments. Reaching a dead-end, many prosperous cities are conveniently switching towards increase of housing prices as an unavoidable side-effect of their economic success.[9] UN Special Reporter for Adequate Housing, Leilani Farha, emphasises the severity of the situation by claiming that "**housing has lost its social function and is seen instead as a vehicle for wealth and asset growth. It has become a financial commodity, robbed of its connection to community, dignity and the idea of home.**"[10]

As urban populations grow, the housing gap will widen, exacerbating inequality and threatening the traditional view of cities as reliable drivers of economic growth.

8 *The Crisis in Affordable Housing Is a Problem for Cities Everywhere* (https://www.wri.org/blog/2017/10/crisis-affordable-housing-problem-cities-everywhere, 2017)

9 Wendell Cox and Hugh Pavletich, *15th Annual Demographia International Housing Affordability Survey: 2019*

10 *'Shameful': What's driving the global housing crisis?* (https://www.aljazeera.com/programmes/talktojazeera/2018/11/driving-global-housing-crisis-181103062407206.html, 2018)

Severely unaffordable urban containment areas force prospective dwellers to approach the subject with extreme diligence, making the quest for a flat one of the biggest challenges a modern man must face.

Current situation at the global level has been a subject of many research studies that aim at providing housing affordability to various demographic groups. **15th Annual Demographia International Housing Affordability Survey from 2019 defines affordable housing market of metropolitan areas as a market that doesn't trigger housing bubbles and cause housing prices to exceed three times gross annual household earnings.**[11] Even though the research unveils that there has been significant progress in the reduction of poverty around the world, first in the high-income world and now in other nations, there are serious threats emerging in some urban areas of the high-income world. Much higher house prices are especially affecting the middle-income households that are currently facing intensifying economic challenges. In conclusion, the survey unmistakably shows considerable escalation of house prices in many parts of the world, with highest increase in metropolitan markets.

The discouraging data that labels urban containment areas as "severely unaffordable" forces prospective dwellers to approach the subject with extreme diligence, making the quest for a flat rise to become one of the biggest challenges a modern man must face. In light of that, "silent emergency", as The Guardian article defined the dwelling situation in Europe[12], has become a burning topic for many organisations and real-estate agencies, encouraging their involvement in proposing various ways of diminishing its negative aspects. The most successful ones share subtle variations of the same general idea that John F.C. Turner and Robert Fichter promoted in the 1970s: "**If housing is perceived as functions of what housing does in the lives of its users - of the roles which the process plays in their life history - and not in the material qualities of physical products, then the material worth of the objects and the manned of their production are entirely dependent on their highly variable uses**".[13]

11 Wendell Cox and Hugh Pavletich, *15th Annual Demographia International Housing Affordability Survey: 2019*

12 *'Damning report exposes Europe's escalating housing crisis* (https://www.theguardian.com/world/2015/nov/19/damning-report-exposes-europes-escalating-housing-crisis, 2015)

13 John F. C. Turner, *Freedom to Build: Dweller Control of the Housing Process* (MacMillan Publishing Company, 1972), 152.

1.2.2 Global Response Framework

Unavoidable aftermath of the crisis has forced contemporary architects to reconsider the reasoning behind attitudes of prospective dwellers in order to satisfy their needs in the most efficient way. An interesting analogy between the economic crisis of 1970s and the current one offers useful insight on the ways of reducing its negative effects. Forty years ago, architects were focused on finding new ways of building cities through users' participation, advocacy planning and renewal. Reintroducing Bakema and his Team 10, it's the very idea of the Open Society that was essential for defining guidelines of revolutionised housing models. The idea of the open society evolved around the relationship of the individual toward the larger whole, be it neighbourhood, the city, society itself, or what Bakema called "total space". **Architecture then was to enable the individual to become aware of his or her relationship to this larger whole, while the open society should be so generous and tolerant as to allow for the individual's self-realisation.**[14] Enhancing the role of a potential resident in the decision-making process provides both sides with a dose of assurance, reducing the chance of misunderstanding and overall dissatisfaction. Learning from this experience, a series of manuals and guidebooks carefully curated by architects and sociologists has been made available for public use, with one mutual goal of providing everyone with an opportunity to find an optimal home.

One of the most distinguished practices that pays special attention to creating welcoming places for people is a UK-based office specialised in residential design - Mæ Architects. Described as creativity-led and community-led, they claim to be "drawing on the DNA of the neighbourhood"[15], with the aim of turning challenging spatial and social situations into architecture with a distinct identity.

14 Dirk Van Den Heuvel, *Jaap Bakema and the Open Society* (Archis, 2018), 256.

15 Mæ Architects (https://www.mae.co.uk/practice)

A well-designed home should not only make one's life more enjoyable in the short term, but also less stressful in the long term.

In collaboration with CABE (The Commission for Architecture and the Built Environment), Mæ Architects created a number of helpful guides for obtaining an optimal home, relying on a number of studies about economic and social aspects that define today's housing market. *"What home buyers want: Attitudes and decision making among consumers"* is their most comprehensive and straightforward publication that rethinks the absolute role of the designer and tempers it by involving the user as well. The Chief Executive of CABE, Richard Simmons, believes that **consumer choice being limited by land supply should not become an excuse for ignoring the fact that people want well-designed homes and neighbourhoods with real character and sense of place.** Even though a direct match between stated consumer preferences and supply does not guarantee successful and viable housing, the home shouldn't be considered as another consumer durable. The users' manual recognises change as the defining element of the current era leading to the assumption that an ordinary home will be lived in by a succession of inhabitants and all of these will have different lifestyles and priorities. **If a home is designed in a way to precisely fit the needs of its first occupiers, chances are that it won't match those of the next.** Guiding the design in accordance with changing lifestyles is based not only on variations of individual behaviour of the resident, but also cultural, technological and demographic change. Within reasonable limits, an optimal home should be capable of adapting to those varying circumstances.

The adaptability of a home is considered to be one of the most wanted features at today's market. It's an unfortunate fact that due to the price increase, homes are inevitably getting smaller. Therefore, prospective dwellers are not looking at the rooms in a traditional way anymore, but instead are focusing on the versatility of the space. **The key question is no longer "How many?" but "How flexible?"**. Can rooms be put to a variety of uses? Are the living and dining rooms interchangeable? Can a bedroom become a study? Can the front room become an office? Is there room in the garage for a work bench or bench press as well as your car?

According to Alex Ely, the author of *"The home buyer's guide: What to look and ask for when buying a home"* - another useful editorial compiled in association with Mæ Architects, houses have been perceived as such unwieldy properties that people often feel imprisoned rather than housed in them. He argues that a well-designed home should not only make one's life more enjoyable in the short term, but also less stressful in the long term. External appearance is rated very low on the list of new home buyers' priorities, but a desire for personalisation is still present, with an overall unpopularity of houses that look like featureless boxes. **Adding some sort of detail or specific feature that can be controlled by the dweller himself emphasises the degree of richness of the architecture, instead of style.** Therefore, a modern architecture that is not minimalist and is rich in detail would be acceptable. Regarding the outdoor spaces that are intrinsic to an optimal home, there is a strong preference towards having the ability to access private or semi-private green areas. As urban living becomes more popular some new developments are including well designed and highly planted gardens. **If a dweller has to compromise on the number of rooms he can afford, a small garden can become a valuable outdoor room.**[16]

Slightly vague and highly explanatory nature of previously described input requires serious level of multidisciplinary understanding of the matter, which at some point becomes too overwhelming for the average user. This concern was recognised by CABE, encouraging it to create "Building for Life", the national standard for well-designed homes and neighbourhoods. The scope of the said establishment includes a precise clarification of the most relevant aspects that need to be considered in search for an optimal home.

16 Alex Ely, *The home buyer's guide: What to look and ask for when buying a new home* (Blackdog Publishing, 2004), 91.

With the outdoor spaces being intrinsic to an optimal home, there is a strong preference towards having the ability to access private or semi-private green areas. As urban living becomes more popular some new developments are including well designed and highly planted gardens.

A short compendium that concentrates on the very essence of the issue, "*Delivering Great Places to Live: 20 questions you need to answer*", offers concise insight in what defines a suitable dwelling. The main topics are divided in four sectors:

1. **Environment and Community**
2. **Character**
3. **Streets, Parking, Pedestrianisation**
4. **Design and Construction**

Each of them poses five relevant questions that should be the most crucial ones to answer. The scope of this thesis, however, is focused mostly on the Design and Construction aspect which sheds light on the burning issues regarding the architecture of the building itself that a dweller needs to have in mind.

1. Does the building exhibit architectural quality? It's about being fit for purpose, durable, well built and pleasing to the mind and the eye. Good architecture works well for its intended use. Housing design should be well thought through and cater for the residents' needs. Details need to be considered as an important part of the building and not as an add-on.

2. Do internal spaces and layout allow for adaptation, conversion or extension? A well-designed home will need to take account of changing demands and lifestyles of the future by providing flexible internal layouts and allowing for cost effective alterations. Housing should be able to respond to changing social, technological and economic solutions.

3. Has the scheme made use of advances in construction or technology that enhance its performance, quality and attractiveness? Advanced building technology can contribute to the environmental performance of a home, reduce defects in construction, improve health and safety on site, and increase overall efficiency.

4. Do buildings or spaces outperform statutory minima, such as building regulations? Good space standards contribute to the long-term flexibility and future proofing (able to accommodate changing lifestyle demands) of a home.[17]

17 Building For Life, *Delivering great places to live: 20 questions you need to answer* (Commission for architecture and the Built environment, 2008), 6.

Understanding the impact of the housing crisis at the global level sets solids base for identifying a general pattern of forces that is essential for defining a specific design problem. Comprehensive compilation of preferences and aspirations that portray housing needs and expectations of an average modern dweller represents a unique framework of data that can be applied universally. With direct reference to this framework, it is possible to focus on a particular user group with the aim of proposing the most suitable design solutions. Capturing the essential features of the larger group - the society in general, enables further and more detailed observation of the smaller one - the millennials.

Comprehensive compilation of preferences and aspirations that portray housing needs and expectations of an average modern dweller represents a unique framework of data that can be applied universally.

1.2.3 Particular Influence Implications

The consequences of crisis are most apparent among the group of people who have come of age in the moment of its culmination. Negative impacts that are still quite intense forced this generation of young people to rethink their perception of economic prosperity and security. Ongoing problems such as exploding costs and rising numbers of young adults that are forced to live with their parents, have made great economic and social impacts on traditional lifestyles. **"Europe needs to look at better ways of developing and providing housing that helps young people, regardless of class or income, to have a decent place to live**" according to Greg Foster, the manager of Habitat for Humanity, a nonprofit organization that helps people in your community and around the world build or improve a place they can call home.

Some of the suggested directions for dealing with the issue were innovative funding and lending options, better use of modern building technologies that would help reduce energy costs and make buildings more resilient, as well as **new housing policies that would help encourage social integration**. The innovative approach has resulted in redefining the fundamentals of traditional housing models and proposing concepts such as **"co-living"**.

Ongoing problems such as exploding costs and rising numbers of young adults that are forced to live with their parents, have made great economic and social impacts on traditional lifestyles.

This platitude basically stands for a type of housing that is shared by two or more people who are not related, mostly used by the young professionals in cities who may be more digitally connected yet feel lonelier than ever. **The idea is being actively explored and tested on many platforms, from independent organisations to specialised co-living companies, all with the same goal of creating a balance between convenience and flexibility, and stability that encourages longer-term commitment.** IKEA's Lab for testing prototypes and ideas for better and more sustainable ways of living, Space10, is one of the leaders in this field. These topics are globally recognised as extremely important, with emphasis of co-living as a potential solution.

Salone del Mobile 2018 in Milano hosted a number of thought-provoking exhibitions that addressed some of these burning questions. With the spotlight being on furniture, there have also been a few interesting installations that went past the limits of interior design and endeavoured to attract public attention to more comprehensive issues. "*MINI Living - Built by All*", the third installation created by MINI for Salone del Mobile, was inspired by a democratic concept jointly implemented by citizens and architects, which speaks about our modern selves and demonstrates that visionary ideas often stem from mingling rather than individuals in isolation.

With its democratic nature that responds to the challenges of contemporary metropolitan areas, the installation aimed to create a context that enhances well-being and humanity through crossing paths, which are devised to be experienced at different times and from different viewpoints. The need for larger living space as one of the most frequent adversities of a modern man, is tackled by introducing the concept of coexisting. Different areas coexist in a single setting, with the result of environments that fit together in a "jigsaw of lights and colours." The word **communal** being the mantra of the exhibition itinerary, the proposal suggested that encounters couldn't be avoided in spaces like **Communal Amphitheatre, Communal Kitchen, Communal Garden and Communal Gym.** (fig. 4)

Figure 4. *Communal Gym* (MINI Living - Built by All, 2018)

The theme of residency for students and young professionals can be a strong lever for the development of the residential real estate sector and, in a broader sense, for the national university sphere.

"Today's real estate market standards seem to be struggling to meet the needs of individuals," said Oke Hauser, the MINI Living Creative Lead, explaining the approach underlying the project. "Our installation 'MINI Living - Built by All' transforms people into proactive creators, and puts them back at the heart of the original design process. We firmly believe that **the quality of space is determined by the extent to which people identify with their homes.**" This relatively new dimension of design focuses on the individual, their own character and skills. The project is an innovative housing concept that redesigns space and therefore the communities, starting from within, in order to meet the needs of contemporary lifestyles. In a way, this installation is a tribute to the "sharing society", taking the spotlight off the 'starchitects'.[18]

The obvious rising interest in millennials' tendencies regarding housing choices prompted a number of surveys that recognised them as relevant factors in market formation. In Italy, for example, a research conducted in 2018 by the real-estate agency Re/Max Italia, showed that 33.7% of all home buyers and 35.6% of renters belong to the generation of millennials. (fig. 5) The results also revealed their affinities towards buying two-bedroom apartments (66.2%) and renting both two-bedroom and one-bedroom apartments (respectively 51.0% and 42.4%), in any case furnished (49.6%). (fig. 6) This data was convincing enough for many real-estate agencies to acknowledge millennials as a market defining force. Scenari Immobiliari and Camplus conducted a research (*il Primo Osservatorio*)[19] on the new forms of housing for students, young people and workers. **The market of professionally managed residences, intended for a temporary lease, can rely on a potential demand from "young professionals", young people who change their homes for temporary jobs and all those students who do not live in student dorms**, leading up to a number of almost 800.000 people. It has become clear that the offer of rental homes, for students, recent graduates, young professionals, seasonal workers, etc., is still limited. The market at the country level is very fragmented and mostly small owners are the ones generating that offer. This makes it even more difficult to quantify the number of apartments and lodging places in this sector: at the moment, it is estimated that there are around 20.000 accommodations of this kind in Italy.

18 *MINI Living - Built by All* (https://fuorisalone.it/2018/en/events/1210/MINI-Living-Built-by-All, 2018)

19 Scenari Immobiliari, *Primo Osservatorio sulle nuove forme di residenza per studenti, giovani e lavoratori* (https://www.scenari-immobiliari.it/shop/primo-osservatorio-sulle-nuove-forme-di-residenza-per-studenti-giovani-e-lavoratori/, 2018)

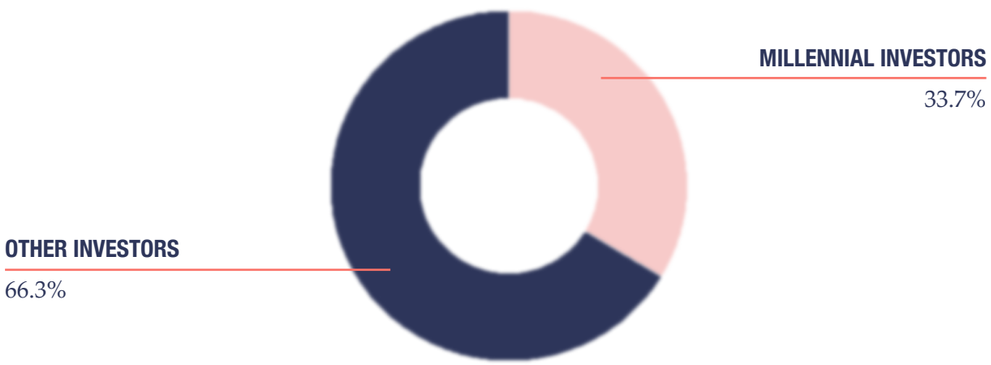


Figure 5. *Quanti sono I clienti Millennials che vogliono acquistare casa?* (Re/Max Italia, 2018)

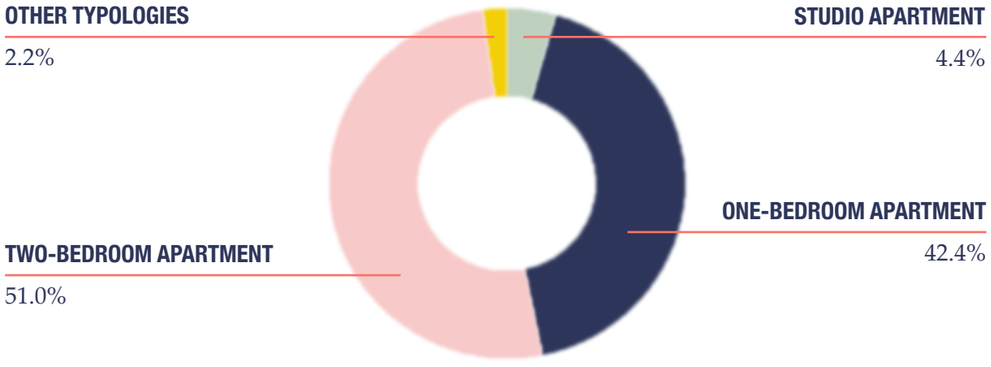


Figure 6. *Tipologia immobiliare richiesta* (Re/Max Italia, 2018)

According to Francesca Zirnstein, Director General fo Scenari Immobiliari, "the theme of residency for students and young professionals can be a strong lever for the development of the residential real estate sector and, in a broader sense, for the national university sphere. Currently, in Italy, this sector is experiencing an important phase of expansion and evolution, also considering the characteristics and propensities of the examined topic. Let's not forget that in our country we have witnessed, in recent years, the lack of development of the managed residential industry, with a consequent fragmentation of the properties and the development of architecture aimed at the realization of housing that belongs to the sale sector and is appointed directly to families."[20] **The structured management of properties for rental use, such as university residences and apartments for workers, can constitute an important market segment, whose key to success lies in a 360° offer, which includes a property in good condition and complementary services such as laundry, payment of utilities, as well as spaces for recreation and socialisation.**

Overall, the rental market for young professionals in big Italian cities is a potential user pool of about 60.000 people every year, a figure to which are added another 120.000 young people under thirty-five with temporary working relationships that in the last year have been affected from changes of residence. The shift of attention triggered by the rising influence of millennials is leading to various development of "instant architecture" with one single aim of bringing profit to the investors, which creates a need for an intervention in terms of rational and detailed design proposals of housing models that fulfil their basic needs.

20 Scenari Immobiliari, *In Italia mercato potenziale degli studentati da 50mila posti letto* (https://www.scenari-immobiliari.it/2018/11/13/in-italia-mercato-potenziale-degli-studentati-da-50mila-posti-letto/, 2018)

In spite of all the struggle that younger generations have been experiencing in the past decade, they are undeniably the ones dictating current and future consumer trends, making them one the most attractive user groups. **The trend of "everything millennial" has been captivating the public's attention, both consciously and unconsciously.** There has been a certain marginal interest for what the new generation is up to, regarding almost every aspect of life. When it comes to new technologies, fashion trends or simply innovations in lifestyle, millennials are the first ones to give it a try, while the older generations silently observe and learn from their failure or follow up on their success. **Since the mankind has developed an insatiable appetite for the half-heard and barely seen,**[21] millennials could be considered as guinea pigs of modern society, which makes their every thought, statement or action a subject of examination for everyone else, with housing trends being no exception.

The shift of attention triggered by the rising influence of millennials is leading to various development of "instant architecture" with one single aim of bringing profit to the investors, which creates a need for an intervention in terms of rational and detailed design proposals of housing models that fulfill their basic needs.

21 Serge Chermayeff, Christopher Alexander, *Community And Privacy: Toward a New Architecture of Humanism* (Garden City, NY: Doubleday & Company, 1963), 95.

"We are out of practice, we're out of sight;
On the edge of nobody's empire.
And if we live by books and we live by hope;
Does that make us targets for gunfire?"

Belle and Sebastian
Nobody's Empire
2015

2 Millennials as Provocateurs of Innovation

2.1 Pop-culture Glorification

Capturing the elusive nature of the millennials might seem as a relatively difficult task for someone wasn't raised surrounded by the same stimuli. Their prime time is now, but the notion of "now" has somehow been stretched out from late capitalism to post-internet, with social media forcing compulsive repetition of modes that embody the "self". **Epitomising the saying "it takes one to know one", German performance artist Anne Imhof displayed the essence of the new generations in *"Faust"*,** her fashion-infused piece at 2017 Venice Art Biennale. Described as an "artist of the real"[22], Imhof combined performance with painting, sculpture, installation, and architecture with the intention of showing a fragment of everything from Berlin hipsterism to death drive of adolescence. The dynamic performance is coordinated by smartphone texts between Imhof and the performers, with their screens intentionally glowing in a darkened space of the exhibition, emphasising them as contemporary tools for forming an identity.

Naming the performance *"Faust"* (translated as fist in German), Imhof refers to both resistance and solidarity of the new generational wave taking the stage. She is consistent in her oblique symbolism which is injected into the scenery itself: the running sink, the fire house, glass and steel walls, ceiling and floors that transform the building into the semiotics of international style of modernism—another failed utopia. According to Justin Polera, an art critic for Dansk Magazine, the choice of the performers was consciously curated to embody the "adolescence in all its violence, passion and raw sexuality". (fig. 7) They are categorised as **monospecific, "young and beautiful", "heroin chic", "Berghain", "the lost generation" or the vague term "hipster", yet on a deeper under-the-skin level they are all an ecosystem of millions of symbiotic species, histories and contingencies.** Polera also sheds light on a condition of psychological estrangement caused by the unbridgeable gap between the imagined and the actual selves, which perfectly portrays the millennials' ultimate obsession with the subjective "self". Somehow, Imhof managed to concisely transmit the ever-changing spirit of the new generation in all its turbulence and potential absurdity.

22 *Review: Anne Imhof's "Faust" at Venice Biennale* (http://www.danskmagazine.com/attention/review-anne-imhofs-faust-at-venice-biennale/, 2017)

Figure 7. *Faust exhibition detail* (Anne Imhof, 2017)

Their prime time is now, but the notion of "now" has somehow been stretched out from late capitalism to post-internet, with social media forcing compulsive repetition of modes that embody the "self".

2.2 Sociological Denotation

However staggering it may appear, pinpointing the basics of a millennial lifestyle is actually a systematic process that can be approached like any other sociological hypothesis. **The first step is precisely determining who exactly constitutes the observed group.** There have been many arguments on who belongs to the millennial generation, with some source stating that it's only the people born in the new millennial, and some others claiming it's the people born in the nineties, before the millennial shift. In any case, it is impossible to pinpoint with certainty which exact generations could be also called Gen Y, so this research will focus on more constant subjects - sociologically established generational groups, based on members' age instead of year of birth. With temporal relativity being the only potential issue, there are no other differences caused by the shift of criteria. According to the Karl Mannheim, a famous 20th century sociologist who studied the concept of generations, people who belong to the same generation don't have only their age as a common feature but also the socio-cultural context during the adolescence, which is known as life stage most receptive to social phenomena.

People who belong to the same generation don't have only their age as a common feature but also the socio-cultural context during the adolescence, which is known as life stage most receptive to social phenomena.

This generational and phenomenological approach is essential to interpret a context ruled by the power of subjectivity, defined by Massimiliano Valerii an Francesco Maietta as mature and conscious, perceived in a relational nature at any level as unavoidable mechanism of self-realization. It is necessary to establish a clear classification which serves as a vital interpretative tool to predict the dynamics of changes in future, aiming at new, happy growth. According to them, "following the era of the erosion of social and cultural ties operating as boulders of containment for individual freedom, **we are now in an era of relationships between people and communities, which facilitates and completes individual freedom, becoming a multiplier of the strength of the individual.**" Therefore, the generational nuclei approach is vital for understanding how society works, both in fragments and as a whole.

Francesco Morace, the author of "*ConsumAuthors - The New Generational Nuclei*", compares age nuclei to those found in atoms, defining them as "structural dimensions held together by their positive charge which releases a binding energy". **They are identified through ethno-anthropological observation and produced an enormous amount of attractive energy towards both their own generation and others, with a power that shapes future values and behaviour.** Based on this premise, Morace conducted research on sixteen generational nuclei and their expression through the objects they own and use, with reference in three contrasting dimensions - relationships, objects and emotions.[23]

23 Francesco Morace, *ConsumAuthors - The New Generational Nuclei* (Bocconi University Press, EGEA, 2017), 14.

Morace sheds light on the "magic and richness of mixing social dynamics" between people, objects and emotions, in terms of both human and material culture which is distributed in intriguing ways through various generations. **He divides the society into four categories of generational nuclei, each being characterised by a strong similarity in thinking and acting in the current social context: pre-adults, young adults, mature adults and long-lived adults.** Each category includes four nuclei spread over the period of twenty years. The young adults category is the most complementary to the millennials' age range, hence it represents the focal point of the sociological part of this thesis. It consists of four groups covering the range from twenty-year-olds to forty-year-olds: **CreActives (20-25), ProActives (25-30), ProFamilies (30-35) and ProTasters (35-40).**[24] Members of each group are studied from the consumer's point of view, with the aim of defining their distinctive features, capturing ways of thinking and possibly predicting their future preferences. The final result is a set of strategic guidelines on how to propose the optimal product to specific social group.

24 Francesco Morace, *ConsumAuthors - The New Generational Nuclei* (Bocconi University Press, EGEA, 2017), 58.

Magic and richness of mixing social dynamics between people, objects and emotions, is essential part of both human and material culture which is distributed in intriguing ways through various generations.

CreActives are attracted to the world of materials, environments defined by sounds and lights, they cherish the "material alchemy", proposing new ways of using and interpreting them while shaping their living environments.

As Morace claims, **CreActives** as the youngest of millennials (20-25 years old) are defined as defenders of an implicit and hidden post-capitalism, without the need for emotional support and protection of an adult generation. They are able to explore and experiment individually and together with their peers, giving off creativity, cosmopolitanism, originality and high self-esteem. **Their broad-mindedness makes them open to testing everything between virtual opportunities and concrete experiences, making them "the kids of streaming" - a vital flow that drags everything, good and bad**. CreActives are attracted to the world of materials, environments defined by sounds and lights, they cherish the "material alchemy", proposing new ways of using and interpreting them while shaping their living environments.

ProActives (25-30 years old) express a strong need to re-process the world and surrounding contexts in a unique and creative way, using technology as an integrated platform. They are permanently in touch with outside world in order to build a professional career path, since they're the first ones to face problems created by the financial crisis. They are the revolutionary generation that shapes their own experience with their friends and bases it on virtual communication. **Known as "the google generation", they share everything: homes, holidays, bikes, cars and moments of togetherness.** That has made them function well in groups - they tend to create "millennial families" with three or four people who they choose in waves.

ProActives are the generation that shapes their experience with their friends and bases it on virtual communication. They tend to create "millennial families" with three or four people who they choose in waves.

Self-involvement of Pro-Families is most obviously perceived in their obsession with healthy lifestyle and treating their bodies as temples while relying on the excellence of "made to measure" services.

Millennials in their thirties are the first ones to define their social identity with reference to their roots and unlike the younger millennials, they care about social status. **ProFamilies** (30-35 years) are perceived as immature and NEET (Not Engaged in Education, Employment and Training), with appearance being the essential factor in their life decisions. They feel unique and from that stems the desire to try everything, to expand and exasperate rules imposed by previous generations. **Combining their innate values with the need for modernity stimulates them to revisit types of traditional products able to support new dynamics of everyday life**. They have also developed obsession with healthy lifestyle and treating their bodies as temples while relying on the excellence of "made to measure" services.

The oldest group of millennials is known for their pronounced sensorial refinement - **ProTasters** are transforming the hedonism of the 1980s into a source of discovering their potential by means of "little everyday things". The contrast between nature, culture and technology is transformed into a balanced expression of harmony in their search for a never superficial beauty. Of all millennial nuclei, **they are the ones giving biggest significance to creating an ideal home environment as home to them is a microcosm that reflects their deepest taste.** Oriented towards the creation of an actual "brand" of home, carefully studied and articulated, they express a magical alchemic ability of combining the well-being and personal care with sensitivity oriented towards ethics and aesthetics.

The contrast between nature, culture and technology is transformed into a balanced expression of harmony in Protasters' search for a never superficial beauty.

The aim of the research conducted by Morace was to capture the elusive nature of new generations by examining their behaviour in order to predict their future tendencies and aspirations in all aspects of life. He based it on two fundamental premises[25]:

1st premise: emotional proximity of objects amplifies our profound relationship with others with life's experiences and contexts, allowing us to cherish happy, shared moments

2nd premise: alternative to traditional community and social hierarchy - millennials represent a collective of individuals capable of a large number of healthy, positive relationships with both people and objects.

Relying on the results of this study, with all its specificities, it is possible to assume what kind of living environment is optimal for the new generations. Targeting their preferences and avoiding sources of discomfort, **design of the ideal millennial home should start from setting basic fundamentals flexible enough to respond to possible demands and changes that may occur in terms of both physical and emotional needs of young dwellers**. Recently, there have been several attempts to create a millennial-approved home, and even though they successfully captured their current lifestyle, somehow there have been oversights in thoroughness and detailed apprehension of changes and hence lack in adaptability which is the most eminent feature of the new generations.

25 Francesco Morace, *ConsumAuthors - The New Generational Nuclei* (Bocconi University Press, EGEA, 2017), 16.

3 Futuristic Concepts as Speculative Attempts

Considering the volatile nature of new generations, their ability to adapt to different environments shouldn't be questioned. Living in the era of semi-permanence, millennials have become used to quickly changing their jobs, flats, coffee spots, Le Labo scents, Spotify mixes, etc. The concept of "favourite" disappeared in their early adolescence, as a consequence of desperate need to fit in an ephemeral society. This resulted in almost fantastic shift of priorities that directly affects the decisions they make regarding housing choices. **The metamorphosis trait that describes these young people has developed enough for them to be able to live in the same building as a 92-year-old lady, with the only difference in the vinyl records they own** (although with hipsterism reaching its peak, this is also questionable). However, the fact that global economic conditions have forced millennials to toughen up and become more adaptive due to almost existential reasons, shouldn't serve as a justification for taking advantage of their particular situation and intentionally making them settle for the lowest dwelling standards. **It is up to architects, especially striving ones, to understand their living needs and propose optimal design that corresponds to their behaviour, tendencies and most importantly - budget.** This being said, the most logical way to deal with the particularity of their nature is to acknowledge it as a design principle. Due to the constant technological advancements that are intrinsic to the modern society, the traditional perception of human needs has changed accordingly. Nowadays, a basic smart-phone is able to successfully replace a number of different objects that were commonly used and even considered irreplaceable in the last century. In an over-crowded society, the biggest advantage of technological progress is the possibility to reduce the number of items used and the space they occupy.

Figure 8. *Interior of a Live-in Van* (UK, 2018)

Regarding the elements of housing, this idea is easily perceived in various attempts to minimise the living space and deduct it to its essence. Going back a few decades, this was not the case since there was almost no need for spatial optimisation in terms of size, except in some specific cases where the conditions required it, like boat cabins. **The idea of minimising a living unit today, mostly imposed by the housing crisis, required a modern dweller to rethink what truly constitutes a home.** For example, Hannah, a college student from UK that couldn't afford to pay rent without working full-time decided to make the best use of what she already had.[26] She redesigned her van and transformed it into a fully functioning living unit that includes a double bed, a stove, a sink and water on tap. (fig. 8) Additionally, the van also has a standing head space and an area to walk around in. This unconventional way of creating a minimal efficient home might seem too extreme, but the popularity of "homes on wheels" that follows the same principle is undeniable. Campers and customised vans are especially favoured among the new nature-loving, "wanderlust" generations that spend their weekends trying to literally recreate the covers of folk-indie albums.

26 *This student saves thousands on rent by living in a van* (http://studentlifeguide.co.uk/lifestyle/this-student-saves-1000s-a-year-on-rent-by-living-in-a-van/, 2018)

Figure 9. *Interior of HC1 van* (Happier Camper, 2019)

Although this trend is usually associated with US culture, **there is a surprisingly increasing number of European millennials spending weekends in their vans, looking for the most instagram-worthy fragment of German, French or Scandinavian intact landscape scenography.** Following up on this phenomena, an LA-based company called *Happier Camper*, developed a series of trailer models that efficiently respond to the weekend needs of millennials for a reasonable amount of money.[27] The latest model, HC1, is a retro-modern tiny trailer with a LEGO-like modular interior. (fig. 9) Designed for off-grid use, this solar-powered camper features an adorable round-edged vintage shell reminiscent of the two-tone VW vans. The modular system allows users to swap out furniture components and create a variety of living spaces, from a five-person bedroom to a kitchen, in a matter of minutes. Reflecting on all of these contemporary examples, the approach that focuses on minimising the living space as a response to various external conditions found its way in different aspects of everyday life, sometimes becoming the main design concept for an entire building or even housing block.

27 *Happier Camper HC1* (https://happiercamper.com)

The approach that focuses on minimising living space as a response to various external conditions is a valuable approach that found its way in different aspects of everyday life, sometimes becoming the main design concept for an entire building or even housing block.

The roots of minimal unit approach in residential architecture date back to the initial theories of metabolism as a revolutionary design alternative established in Japan.

The roots of minimal unit approach in residential architecture date back to the initial theories of metabolism as a revolutionary design alternative established in Japan. The word metabolism describes the process of maintaining living cells which young Japanese architects after World War II used to describe their beliefs about how buildings and cities should be designed, emulating a living being. The post-war reconstruction of Japan's cities spawned new ideas about the future of urban design and public spaces. **Metabolist architects and designers believed that cities and buildings are not static entities, but are ever-changing, organic with a "metabolism."**[28] Metabolically designed architecture is built around a spine-like infrastructure with prefabricated, replaceable cell-like parts—easily attached and readily removable when their lifespan is over.

Architect **Kisho Kurokawa** was very innovative in his creation of the *Nakagin Capsule Tower* in 1972, which was the first architecture design based on a capsule. (fig. 10) The module was created with the intention of housing traveling businessmen that worked in central Tokyo during the week. **It was a prototype for architecture of sustainability and recycling, as each module can be plugged in to the central core and replaced or exchanged when necessary.** Each capsule measures 4 x 2.5 meters, permitting enough room for one person to live comfortably. The interior space of each module can be manipulated by connecting the capsule to other capsules.[29] Even though the Nakagin Tower ended up being a not so successful experimental attempt to solve the housing problem, it served as a reference for the entire concept of capsule hotels, first in Japan and then in the other parts of the world as well. (fig. 11)

28 *AD Classics: Nakagin Capsule Tower / Kisho Kurokawa* (https://www.archdaily.com/110745/ad-classics-nakagin-capsule-tower-kisho-kurokawa, 2011)

29 *AD Classics: Nakagin Capsule Tower / Kisho Kurokawa* (https://www.archdaily.com/110745/ad-classics-nakagin-capsule-tower-kisho-kurokawa, 2011)

Figure 10. *Interior of a capsule in Nakagin Tower* (Kisho Kurokawa, 1972)

Figure 11. *Interior of a capsule in Tokyo Ginza Bay Hotel* (Japan, 2015)

Apart from the minimal unit in terms of size and compactness, **the topic of spatial optimisation has often been revisited as a potential solution for the housing crisis.** Its variations in different scales have been tested in a number ways through means of semi-permanent exhibitions and furniture installations. For example, **Verner Panton's** design for a *Multi-functional Living Unit* from 1966 is one of the **first experiments in which the identity of a residential space is questioned by involving using the upper section of the room for living purposes, too.**[30] (fig. 12) The experimental project was exhibited in a Stuttgart furniture store and was widely publicised by the "*Schöner Wohnen*" magazine, but its determinative nature was somehow too rigid to allow mass production. Thus, it is necessary to acknowledge the limitations of functional design and recognise the point where it crosses the line of efficiency.

30 *Multi-functional living unit* (https://www.verner-panton.com/furniture/archive/20/index.html, 1966)

It is necessary to acknowledge the limitations of functional design and recognise the point where it crosses the line of efficiency.

Figure 12. *Multi-functional Living Unit* (Verner Panton, 1966)

Figure 13. *Short-term residential unit* (Dogma, 2016)

Architecture office Dogma designed the months room, where a two-storey module suggests a new approach to short-term residencies.

The British Pavilion for the *Venice Architecture Biennale in 2016* posed a controversial question of redesigning home ownership instead of homes, which resulted in proposing five futuristic models of the home. The exhibition is broken up into five sections, all proposing a different approach to housing. **Each room addresses domestic life through different periods of time: hours, days, months, years and decades. The aim was to show how the standard British house is no longer suited to the needs and lifestyles of the majority.** The first room, dedicated to hours, focuses on the sharing model. Featuring a huge transparent wardrobe filled with items ranging from vacuum cleaners to clothing and artworks, the room questions what items people would be willing to share. The room also contains modular daybeds that could be tailored to different activities, based on the fact that the bed has overtaken the sofa as the statistically most-used item of furniture in the home. Architecture office Dogma designed the months room, where a two-storey module suggests a new approach to short-term residencies (fig. 13), while the years room, by architect Julia King, shows a house with very few utilities pre-installed, forming the basis of a custom mortgage product. **The final room, looking at decades, was designed by architecture studio Hesselbrand. Divided up into areas rather than rooms – light and dark, wet and dry, soft and hard – it proposes a home with the flexibility to accommodate all types and ages.**[31] The whole concept was more of a rebellious act against the real-estate market's view on ideal homes being the most profitable ones.

31 *British Pavilion calls for architects to redesign home ownership rather than houses* (https://www.dezeen.com/2016/05/26/home-economics-british-pavilion-venice-architecture-biennale-2016-uk-housing, 2016)

Figure 14. *Millennial Living Room* (On Life - Millennials at Home, 2018)

The On Life concept aims at satisfying the new needs of living, through multi-sensory and immersive solutions able to recreate a highly performing, technological setting that meets the implicit needs in today's and tomorrow's lifestyles.

At 2018 Salone del Mobile in Milano, Elle Decor Italia presented the exhibition *"On Life - Millennials at Home"* which **rethinks the dwelling spaces based on the living preferences of the new generations.** The concept aims at satisfying the new needs of living, through multi-sensory and immersive solutions able to recreate a highly performing, technological setting that meets the implicit needs in today's and tomorrow's lifestyles. The subject of initial exploration were generations of ages between twenty and forty years and their relationship with society and the world in general, where technology has an almost physiological role.

Targeting millennials, their natural disillusioned relationship with the digital world and their state of being constantly online, **On Life exhibition shows where the analog reality of furnishings and objects intersects with interactive digital experiences. It discovers young residents' living scenarios, green tendencies and the generational passage from physical and mental nomadism to stable new forms of residence.** (fig. 14) Theoretical premises regarding potential dwellers stem from Morace's book *ConsumAuthors*, making four generational nuclei of young adults and their needs the main subjects of exploration. The landscape part of the exhibition was designed by Marco Bay who relied on "**using indoor greenery to highlight the different ages, based on lifestyle, from younger people, busy travellers, continually on the go, who grow small plants to the more sedentary adult generation, who aspire to having tree-like plants within the four walls of their home.**"[32] Apart from the highly detailed exhibition areas inside Palazzo Bovara, the project also includes a very rich landscape installation in the form of a dense forest of subtropical plants. Strange Garden is a wonderful display that evokes distant worlds, thanks to the harmony of leaves and textures. It is an oasis for relaxing with generous comfy outdoor chairs and tables, offering visitors to take a break surrounded by greenery.

32 *Elle Decor Italia, OnLife: Millennials at Home* (https://www.elledecor.com/it/best-of/a20694083/preview-onlife-millennials-at-home-elle-decor-italia-eng/, 2018)

"Functionalism stresses function to the point where, because each function has a specially assigned place within dominated space, the very possibility of multi-functionality is eliminated."

Henry Lefebvre
The Production of Space
1974

Along with all the other recent attempts that are based on functional reconsideration of living spaces, On Life exhibition is based on the principles of custom design with the specific target group of potential residents. **The ad hoc functionalism as a design approach focuses on creating living environments that directly respond to specific needs and it represents the theoretical axiom of numerous futuristic attempts to design a well-responding home.**

A number of utopian examples from the last century show that speculations and predictions about future lifestyles have always been an intriguing topic for architects. The futuristic proposals were mostly done in the form of theoretical research and, less often, as exhibitions and installations. **One of the most well-known examples of ad hoc residential design is a product of post-war enthusiasm for controlled environments**. A scenographic mock-up at full scale of a living unit for a childless couple, set twenty-five years in the future, *House of the Future*, was designed by **Alison and Peter Smithson**, and was installed at the Daily Mail Ideal Home Exhibition in London and Edinburgh in 1956. Designed around a courtyard garden that supplied natural lighting and private outdoor space, there were few windows on the exterior walls allowing the houses to be placed directly side-by-side.

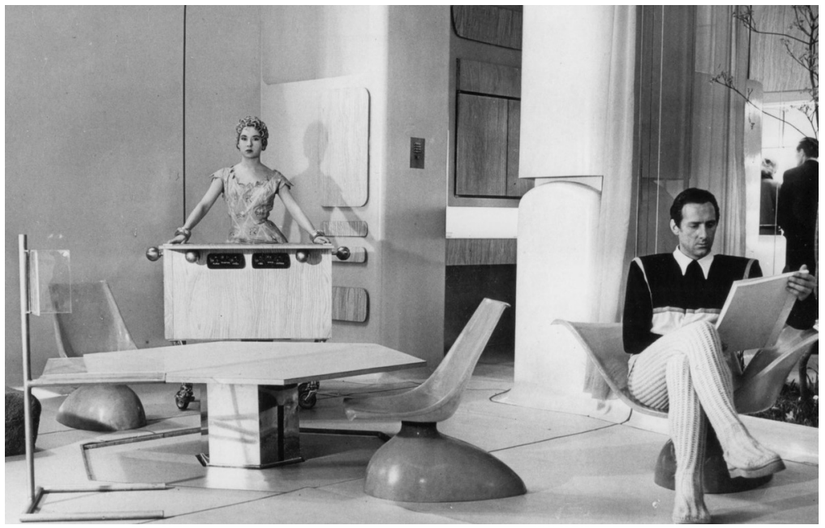


Figure 15. *Living room of The House of the Future* (Alison and Peter Smithson, 1956)

33 Jurjer Zeinstra, *Houses of the Future: 25 years of Critical Reflection on Architecture* (OASE 75, 2008), 203–214.

The line between commodity and fiction is deliberately blurred: flanked by existing pieces such as the "Tellaloud' loud-speaking phone" manufactured by Winston Electronics Ltd., various modern kitchen equipment and an Arteluce lamp from 1953, imagined devices such as after-shower body air-driers and telephone message recorders are exhibited in the house. (fig. 15) The House of the Future was never intended for actual production but for theoretical discussion.[33] Despite not being an actual architectural project, but a simulation - it was envisioned as a speculation on a future lifestyle with automated housework that also predicted broadcasting of the image and sound to Mars. **The notion of speculation as the biggest soft spot of design is a particularly important argument that suggests the inefficiency of adhocism.**

The houses represent a temporal component drawn by hypothetic situations during various stages of the user's life, something quite new in architectural scene obsessed with the type, with a closed and perfect tendency.

Another neofuturistic reference that treats a house as a mechanism was developed by the avant-garde architectural group Archigram. In 1967, the British group (as guest at the Youth Biennale in Paris that year) introduced the project *"Control and Choice"*, **a housing that is liberated from the dictatorship of the designer by creating an open system in which the user can evaluate and choose how to configure his/her home depending on the way of life at each time.** The houses present a temporal component drawn by hypothetic situations during various stages of the user's life, something quite new in architectural scene obsessed with the type, with a closed and perfect tendency. One of the most famous attempts is *Suitaloon,* a speculative design for a personal, individual and portable dwelling unit which may be 'worn' for transport and unpacked for occupation. (fig. 16) **This inflatable suit or living envelope, readily available at any time or anywhere, is based on minimal dwelling concept where the components and the support systems are reduced to basic necessities.** Each suit has a plug serving functions similar to a key. This plug allows one to connect to another Suitaloon or leave own house or pack to be collected upon return.[34]

Figure 16. *Suitaloon dwelling unit* (Archigram, 1967)

34 Jurjer Zeinstra, *Houses of the Future: 25 years of Critical Reflection on Architecture* (OASE 75, 2008), 223.

Following up on the idea of designing a house that instantly and literally responds to the actions of its users, in 1970 **Arata Isozaki designed the "*Responsive House*", a house prototype sensitive to changes, in attempt to understand how much a house can be modified by the use of the inhabitants and the changing conditions of their environment.** (fig. 17) According to Isozaki, the main idea behind the design was exploration of the possibility to restructure the space and domain of use to respond to the inhabitant's intention, and whether this relationship be realised by simple devices. **Peter Cook, one of the founders of Archigram, emphasised the impact of technology in residential design, referring to a dwelling as an assembly, a conglomeration of systems, organisations and technical apparatus that permit the choice of one response out of a number of alternatives, with the aim of exploiting different natures of the physical limitation of a piece of hardware against the unlimited atmospheric power of an ephemeral medium.**

Cook also believed that the determination of an environment doesn't need to be left solely in the hands of the designer of the building - it can be turned over to the user. The indication of participatory design in this case loosens the strict limitations that are the base of ad hoc functionalism and therefore is more likely to lead to an optimal dwelling.

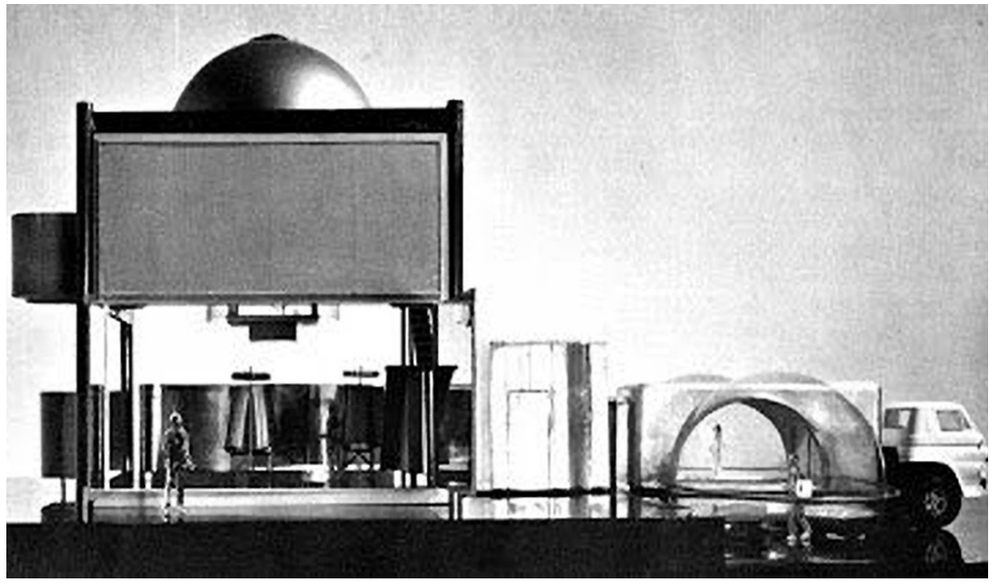


Figure 17. *Responsive House* (Arata Isozaki, 1970)

"I am not averse to generalising the notion of "modern" to designate a certain way of life, rather than making it purely a synonym of 'contemporary'. There are moments and places in history to which 'we moderns' could return without too greatly disturbing the harmony of those times, without seeming objects infinitely curious and conspicuous... creatures shocking, dissonant, and unassimilable."

Paul Valéry
An Anthology
1977

In theory, the purely functional approach in housing design may seem as an appropriate way to address the specificity of the new generation of dwellers and respond to every aspect of their distinct lifestyle with customised space. However, **the direct relation between cause and consequence as a design method loses its strength when the cause is prone to variations.** Since the target group of potential residents is characterised as "easily bored", it is necessary to provide them with spaces of possibilities, encouraging their signature need for constant change. Therefore, the essential issue with ad hoc principle lies within the inevitable limitations it imposes. **Flexibility in housing is characterised by the broad range of possibilities of adjusting to changing needs and patterns, both social and technological.** Changing needs may be personal, practical and technological, while changing patterns are always demographic, economic or environmental.[35] The main feature of a flexible house is its ability to respond to the volatility of the dwelling - being direct in its construction and generic in its space, it is able to tolerate the change while keeping its identity.

Determination of an environment doesn't need to be left solely in the hands of the designer of the building - it can be turned over to the user.

35 Jeremy Till, Tatjana Schneider, *Flexible housing* (Taylor & Francis Ltd, 2007 - Kindle edition), 79.

4 Notion of Flexibility as Design Determinant

4.1 Theoretical Interpretation

Although the term flexibility mostly refers to issues of form and technique, while the issues regarding the use of space are appointed to adaptability, in this thesis they will be examined together, joined under a unique term of flexibility. Therefore, flexibility in this case is defined as the **final product of the design of a dwelling with the aim of being used in a variety of ways through room organization and designation and patterns of circulation**, but it also refers to **alterations of building's physical elements at different scales.** According to Jeremy Till and Tatiana Schneider who addressed the ambiguity of flexible housing, there have been three key drivers of its development: the first, in the 1920s, arose out of the need for European social housing programs to provide mass housing; the second driver, starting in the 1930s and 1940s and continuing to the present day, derived from of a belief that prefabrication and emerging technologies could and should provide solutions to mass housing provision; and the third - a renewed interest in flexible housing as a means of providing user choice, led by the move towards participation and user involvement in the 1960s and 1970s.[36] The very first notions of flexibility that date back to the 1920s, were envisioned by Ernest May and the magazine *Das Neue Frankfurt* which he founded in 1926.

In 1929, he organised CIAM Frankfurt Conference entitled *Die Wohnung für das Existenzminimum (The Substance Dwelling)*, with the architectural program linked to an interpretation of the dynamic spirit of the new epoch and flexibility as one of the responses. As Marcel Breuer wrote in *Das Neue Frankfurt:* **"Because the outside world of today affects us in the most intense and disparate ways, our way of life is changing more rapidly than in previous times. It goes without saying that our surroundings will undergo corresponding changes. This leads us to layouts, spaces and buildings of which every part can be altered, which are flexible, and which can be combined in different fashions"**.

36 Jeremy Till, Tatjana Schneider, *Flexible housing* (Taylor & Francis Ltd, 2007 - Kindle edition), 538.

Flexible housing could be also considered as a response to Le Corbusier's astounding argument that minimum housing standards are somehow an appeal to scientific certainty to overcome customs of tradition. In light of that, Le Corbusier produced a series of designs based on day/night scenarios since 1928 (*Maison Loucheur*), setting a base for addressing different needs within the same space. In this case, the flexibility is achieved with the use of architectural elements able to unfold and fold when needed, superimposing different functions (e.g. a daily living room becomes a bedroom in evening). **Another way of making a space flexible, a much simpler one, relies on the concept of ambiguity - by providing rooms with undetermined functions.** These two approaches define two basic lines of thought - the active and the passive flexibility. However, both of them share the same intention from the sociological point of view, inviting potential residents to take part in the design phase of their future habitats.

Friedrick Kiesler's *Endless House* project that epitomised the notion of maximum flexibility by proposing complete spatial vagueness serves as appropriate formalistic introduction to the whole concept. Kiesler was a strong believer in an elastic spatial concept, one that must be capable of providing an optimum response to the varying social concerns and uses of its occupants. He established new areas of design based on theoretical concepts and ideas concerning the relationship among space, people, objects and concepts, known as "correalism" or "continuity". The initial shape of the Endless House shows a flattened spheroid, which became a basis for his *Manifesto of Correalism*. **As Kiesler once argued, "all ends meet in the endless as they meet in life. Life's rhythms are cyclical. All ends of living meet during twenty-four hours, during a week, a lifetime.** They touch one another with the kiss of time. They shake hands, stay, say goodbye, return through the same or other doors, come and go through multi-links, secretive or obvious, or through the whims of memory."

Elastic spatial concept must be capable of providing an optimum response to the varying social concerns and uses of its occupants.

The models of the Endless House show flowing transitions through spaces, with internal stairs, interiority and exteriority, and continuous surfaces.[37] (fig. 18) The idea of space as a free entity that doesn't necessarily conform to traditional beliefs in terms of both physical and metaphysical identity is a valid aspect of understanding the innate meaning of spatial flexibility. However, Endless House also serves as a reminder of ambiguity as another product of flexible design - Kiesler's sketches work well to maintain the visions he discusses, but as soon as he begins to make "rigid" the non-rigid lines and surfaces he loses sight of what he is after.

37 *AD Classics: Endless House / Friedrick Kiesler* (https://www.archdaily.com/126651/ad-classics-endless-house-friedrick-kiesler, 2011)

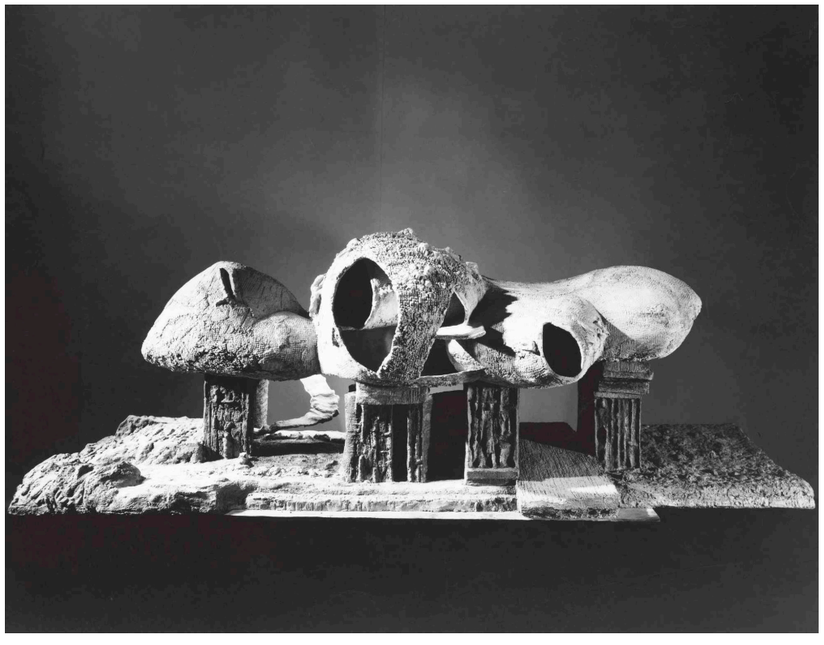


Figure 18. *Endless House model* (Friedrick Kiesler, 1950)

In order to understand the ways in which flexibility could be applied in creating an optimal habitat for millennial, it is essential to consider different aspects of the concept and their application. This is achieved by systematic research of the most relevant case studies that reflect a particular design methodology. None of the case studies was explicitly conceived as primary model of flexibility, yet they all contain a gesture that indicates it, both subtly and transparently. Therefore, in order to properly tackle the analysed theoretical premises and adapt them to the existing context, it is necessary to sense the tactile manoeuvres and recognise them in practice. As Adrian Forty argues in *"Words and Buildings: a Vocabulary of Modern Architecture"*, flexibility is a means of allowing architects the illusion of projecting their control over the building over time. This illusion is not strictly reserved for the designer, but also a common dweller, a silent audience waiting for a chance to be heard.[38] Flexibility in housing that is driven by users' participation is based on useful external insight that enables architects to come up with less utopian and more feasible solutions for an optimal dwelling unit. **The most important reason for providing future residents with the opportunity to take part in designing their own homes is the notion of change that unavoidably presents itself after every life stage.**

38 Jeremy Till, Tatjana Schneider, *Flexible housing* (Taylor & Francis Ltd, 2007 - Kindle edition), 147.

Flexibility is a means of allowing architects the illusion of projecting their control over the building over time. This illusion is not strictly reserved for the designer, but also a common dweller, a silent audience waiting for a chance to be heard.

In *"Identity and the Life Cycle"* by Erik Erikson, a summary of life stages is given as a description of the sequence of phases a person must pass through as he matures and each of them is characterised by a specific developmental task - a successful resolution of some life conflict that must be achieved in order for a person to move wholeheartedly forward to the next phase. In his scheme, Erikson determined eight stages out of which stages five, six and seven are corresponding to Morace's definition of the millennials age range.

"**stage 5. identity vs. identity diffusion:** youth, adolescence; relationship to peers and "outgroups" and the search for models of adult life; the search for continuity one one own's character against confusion and doubt; a moratorium; a time to find and ally oneself with creeds and programs of the worlds.

stage 6. intimacy vs. isolation: young adults, partners in friendship, sex, work; the struggle to commit oneself concretely in relations with others; to lose and find oneself in another, against isolation and the avoidance of others.

stage 7. generativity vs. stagnation: adults, the relationship between a person and the division of labor, and the creation of a shared household; the struggle to establish and guide, to create, against the failure to do so, and the feelings of stagnation."[39]

The impact of transitioning from one stage to another would also be visible in affiliations with friends, neighbours, relatives and other associates, affecting not only the number of rooms in the house but also the character of space they define.

39 Christopher Alexander, Murray Silverstein, Sara Ishikawa, *A Pattern Language* (Oxford University Press, 1977), 142.

In case of a single dwelling unit, the notion of flexibility is achieved through a series of intervention that mostly concern interior design. Within this context, **the biggest value of flexible design is reflected in giving responsibility and controlled power to the user in the process of decision making, as a revolutionary step towards creating a suitable habitat for a modern man.** The relatively new concept of participation and user choice was first introduced by the Dutch architect N. John Habraken in 1961 *"Supports: an alternative to mass housing"*. His interpretation of user participation was based on the "empowerment of the user in the design and inhabitation of their dwelling".

Figure 19. *De Drager / A film about Architect John Habraken* (Sonja Lüthi, Marc Schwarz, 2013)

Fifteen years later, Habraken, in his book *"Variations - systematic design of supports"*, went more into detail of this topic, approaching it from the point of view of spatial flexibility. Through the same concept of supports, he questioned **the idea of a dwelling being a "product designed like any other commodity", and defined it as a final result of a process that includes the user and his decisions within a framework larger than simply rearranging the furniture.** (fig. 19) This implied that there are at least two participants making decisions independently and sequentially - the designer, providing the infrastructure and the resident - creating an optimal dwelling using an independent decision making process. The two separate design processes operating independently required coordination and communication in both design and construction phase, and above all - "a continuous exercise of value judgments at all levels". **Habraken justified the residents' involvement in the design phase by their very own need for identification.** Even though his research took place more than fifty years ago, the basic desire of a random person to be recognised is thriving in the new millennium as well, perhaps more vigorously than ever. Self-expression through buildings and especially homes has remained the main intention behind the need for personalised environments. **The second reason for reintroduction of user participation Habraken puts behind changes in lifestyle, caused by intercultural interaction, technological advancements and emerging of new ideas about mankind and society.** Conveniently, things haven't changed.

Self-expression through buildings and especially homes has remained the main intention behind the need for personalised environments.

From the sociological point of view, user participation was considered as democratisation and decentralisation of the planning process which led French architects Luc and Xavier Arsène-Henry to establish its three basic principles:

1. Everyone should be able to fit out his home as he wishes, including the right to make mistakes as part of that freedom.

2. Each person ought to be able to express himself as a function of his choices. His home should be open to personalisation.

3. Each resident should be able, in his home, to make a creative act by organising his space, based on the context within which he finds himself. Even being a co-author brings a measure of satisfaction.[40]

This being said, pioneering examples of single-family houses and apartment units that embody some form of flexibility serve as a direct reference and offer a valuable framework for a successful development of contemporary housing models.

40 Jeremy Till, Tatjana Schneider, *Flexible housing* (Taylor & Francis Ltd, 2007 - Kindle edition), 663.

4.2 Empirical Classification

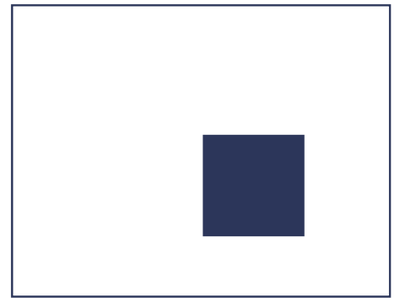
Understanding the notion of flexibility in housing models requires clear definition of spatial and functional elements that constitute it. Through detailed observation of pioneering examples of residential architecture that embody some form of flexibility, it is possible to distinguish its implementation in practice. Diligent research of numerous housing projects whose design reflects the ability of transformation resulted in identification of four main types of flexibility: **Free Space, Dynamic Partition, An Extra Room, Functional Polyvalence.**

With direct reference in both iconic and contemporary examples, this classification aims at simplifying the broad and sometimes vague understanding of flexible design. **Finally, the empirically derived typology should serve as a valuable framework for a successful development of innovative housing proposals.**

"While the functionalist looks for the maximum possible adjustment to a goal as specific as possible, the rationalist is looking for the greatest change of compliance to the largest number of necessities. (…) Nothing more understandable for the rationalist to put an emphasis on form. Form is born with the establishment of human relationships. The lonely man, isolated in the midst of nature, has no formal problem. (…) The question of form arises together with the union of more individuals, and form is the condition which makes possible men living together."

Adolf Behne
Der Moderne Zweckbau
1923

Free Space



There is a thin line between maximum flexibility and plain pointlessness of a certain space which needs to be carefully defined from an architectural point of view.

The easiest way of achieving spatial flexibility is by liberating it from any kind of determination. However, this statement may lead to a misconception that an empty box is the most flexible space possible, while in reality it is just an empty box. Therefore, there is a thin line between maximum flexibility and plain pointlessness of a certain space which needs to be carefully defined from an architectural point of view. **The Free Space flexibility is based on the type of an open floor plan with minimum physical divisions.**

One of the most famous examples that reflects these qualities is **Philip Johnson's** *Glass House.* With a completely open plan, the only fixed structure inside the house is a cylinder brick structure with the entrance to the bathroom on one side and a fireplace on the other side. (fig. 20) All the other divisions are done in a discrete way with low cabinets and bookshelves, making the house a single open room.[41] (fig. 21) The notion of flexibility in this case is reflected in the possibility to define and redefine space using non-permanent elements. Since The Glass House is an architectural masterpiece that is designed and built in specific physical and sociological context, it is almost impossible to recreate its design principles in contemporary environment, especially in case of social housing where the efficiency is the main goal.

41 *AD Classics: The Glass House / Philip Johnson* (https://www.archdaily.com/60259/ad-classics-the-glass-house-philip-johnson, 2010)

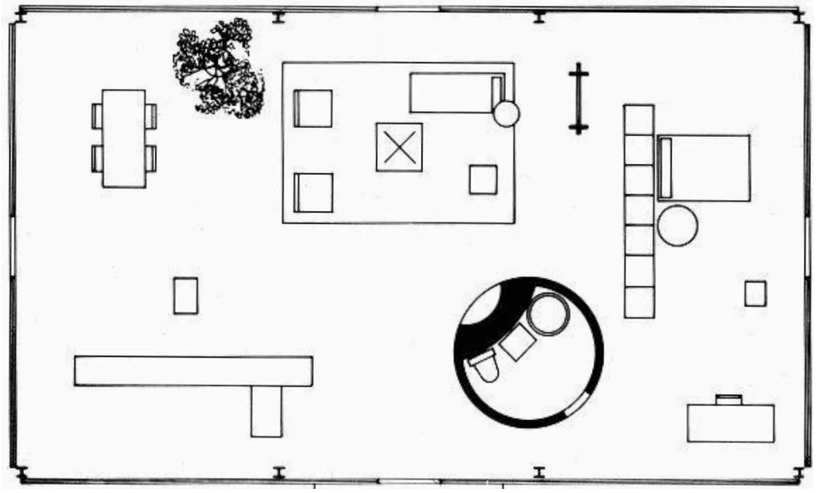


Figure 20. *Glass House floor plan* (Philip Johnson, 1949)

Figure 21. *Glass House interior* (Philip Johnson, 1949)

Flexibility as **Free Space**

The use of materiality, light and transparency in an open plan help define the identity of Maison de Verre.

Despite the spatial limitations in terms of size and orientation which are common for today's urban environment, architects have found a way of achieving almost the same amount of flexibility through increasingly popular typology of lofts. The open plan is vertically split in two levels, with a gallery and a double-height space being the only fixed elements. Even though lofts are usually seen as examples of spatial optimisation and efficiency, in case of *Maison de Verre (House of Glass)* **by Pierre Chareau and Bernard Bijvoet**, loft became an epitome of grandeur design with transforming abilities of a free plan and omnipresent lightweight materials.[42] The use of materiality, light and transparency in an open plan help define its identity. (fig. 22)

42 *AD Classics: Maison de Verre / Pierre Chareau + Bernard Bijvoet* (https://www.archdaily.com/248077/ad-classics-maison-de-verre-pierre-chareau-bernard-bijvoet, 2012)

Figure 22. Maison de Verre interior (Pierre Chareau, Bernard Bijvoet, 1932)

In last few decades, **the loft model has been frequently revisited by many architects in search of revolutionary proposal that would respond to the conditions imposed by the global housing crisis.** It served as the leading design gesture in residential refurbishments of old industrial buildings in sought-after areas of New York City, becoming an almost iconic typology of contemporary housing all around the world. *Tribeca loft* conversion by **Fearon Hay Architects** portrays the elegance and simplicity of minimal interventions that result in a high-quality space. (fig. 23) The design strategy was to provide the required division of space with minimum interference with the existing structure and maximum perception of the overall volume. (fig 24.) The insertion of steel framed, glazed volumes with raised timber floors provides elevated sleeping platforms within the loft space. The glazed volumes are accompanied by blank, white, volumes containing bathing, service and scullery functions. These service components are arranged in a linear sequence in the centre of the space. Both of these insertions are carefully placed amongst the existing structural elements of columns, beams and corbels, freeing the structure and the perimeter of the loft from division.[43]

43 *Tribeca Loft / Fearon Hay Architects* (https://www.archdaily.com/80697/tribeca-loft-fearon-hay-architects, 2010)

The design strategy of Tribeca loft conversion was to provide the required division of space with minimum interference with the existing structure and maximum perception of the overall volume.

Flexibility as **Free Space**

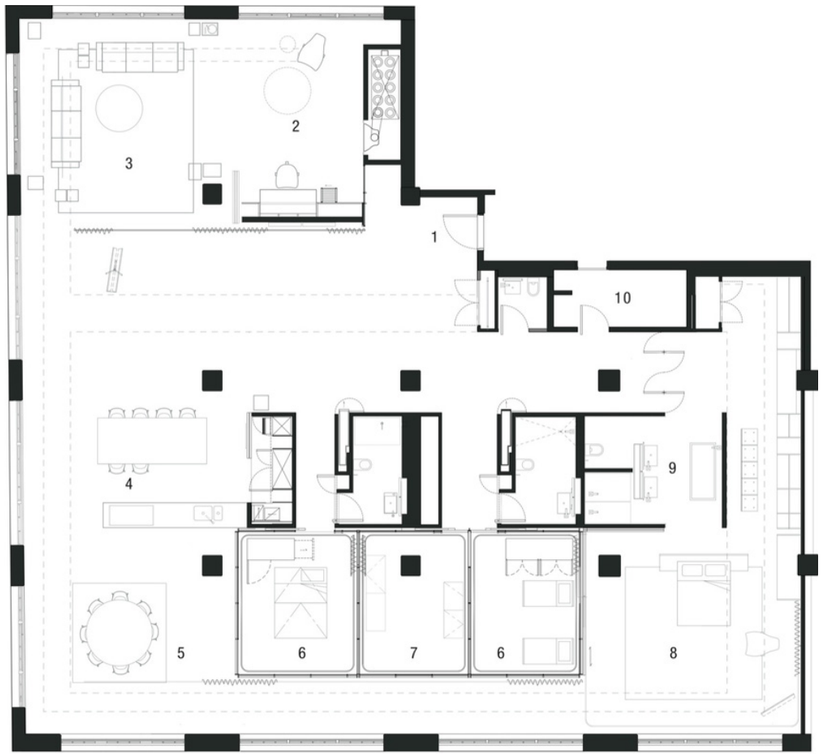


Figure 23. *Tribeca Loft floor plan* (Fearon Hay Architects, 2009)

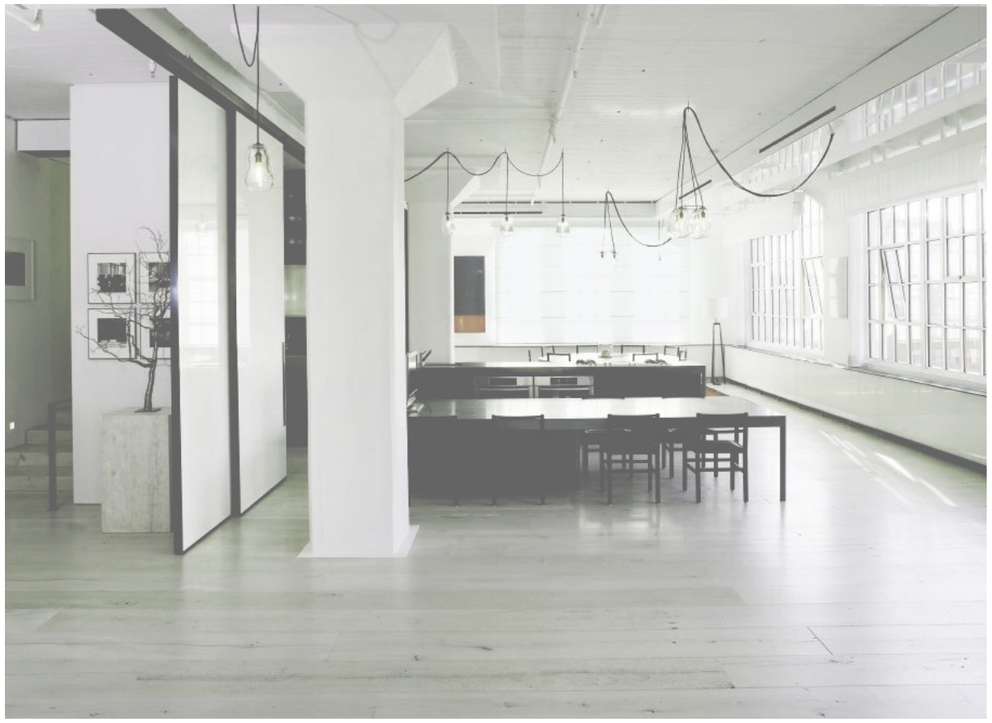


Figure 24. *Tribeca Loft interior* (Fearon Hay Architects, 2009)

Flexibility as **Free Space**

Once again, the flexibility of space derives from its impermanence in terms of physical division. This premise served as a starting point for a slightly controversial approach developed by a Dutch architect **Marc Koehler**. His revolutionary design movement represents one of the most recent and technologically most advanced attempts to redefine the traditional perception of a dwelling unit. *Superlofts* is an innovative DIY home company that goes further than offering well-designed lofts, it provides potential users with the freedom to personalise their "raw space", both interior and exterior. (fig. 25)

Figure 25. *Superloft interior* (Marc Koehler Architects, 2016)

Technically, the concept is based on separating permanent support structure from the temporary infills (undeniable Habraken influence), **using a flexible framework that adapts to changing cycles of use and maintenance.** (fig. 26) The Superlofts approach starts from the existing potential of Free Space and explores its possibilities for achieving the flexible home suitable for the current era of economic, social and financial variability.[44] (fig. 27) With its multidisciplinary attitude of acknowledging both physical and metaphysical aspects of a home, **the concept epitomises the right direction of housing design development.**

44 *Superlofts: Projects* (https://superlofts.co/en/projecten/, 2017)

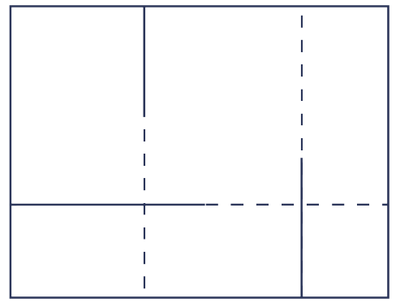
Figure 26. *Superloft floor plan* (Marc Koehler Architects, 2016)

Flexibility as **Free Space**

The Superlofts approach starts from the existing potential of Free Space and explores its possibilities for achieving the flexible home suitable for the current era of economic, social and financial variability.

Figure 27. *Superloft gallery* (Marc Koehler Architects, 2016)

Dynamic Partition



Since the level of flexibility of a certain space is directly proportional to the degree of its indeterminacy, the more permanent physical elements it includes, the smaller become the possibilities for its change. In order to preserve the potential of spatial reconfiguration while still proposing some kind of organization, the dividing elements need to be dynamic enough to guarantee the notion of flexibility. **One of the earliest housing concepts that is based on the use of Dynamic Partition is a traditional Japanese house.** Usually, the plan is organised as a series of interconnected spaces that can be joined or divided by means of sliding partition walls. (fig. 28) **The predefined openness of the plan as well as the frame construction suggest that the functional and social changes can be dealt with easily, both on a daily and longer term basis.**[45]

In case of traditional Japanese house, the flexibility mostly depends on the active participation of the users who are given the opportunity to constantly define and redefine their living space. (fig. 29) However, the simplicity of the concept is undermined by the poor acoustic insulation of the lightweight partitions and superimposed need for minimal furniture (tatami mats), which makes it hardly applicable on the design of homes for western consumerists.

45 Jeremy Till, Tatjana Schneider, *Flexible housing* (Taylor & Francis Ltd, 2007 - Kindle edition), 1395.

In order to preserve the potential of spatial reconfiguration while still proposing some kind of organization, the dividing elements need to be dynamic enough to guarantee the notion of flexibility.

Flexibility as **Dynamic Partition**

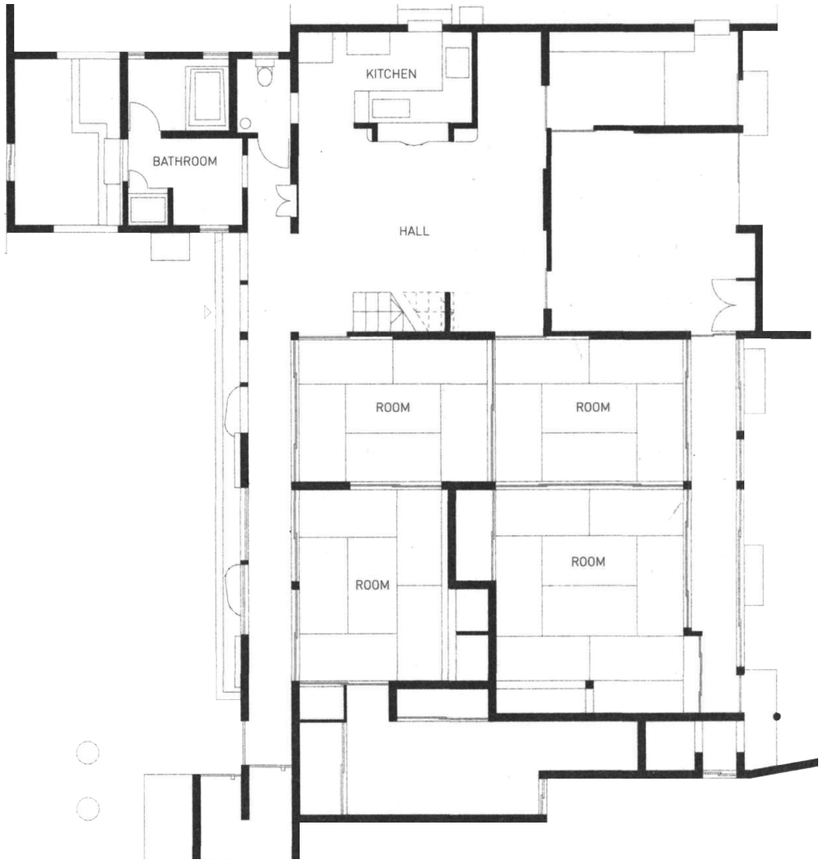


Figure 28. *Traditional Japanese House floor plan* (Kazuhiko + Kaoru Obayashi, 1850)

The flexibility of traditional Japanese house mostly depends on the active participation of the users who are given the opportunity to constantly define and redefine their living space.

Figure 29. *Traditional Japanese House interior* (Kazuhiko + Kaoru Obayashi, 1850)

A bit more complex, but at the same time less flexible project that is culturally closer to a common urban dweller of today is the *Schröder Huis* **by Gerrit Rietveld.** Among other qualities that make this building an architectural heritage, **one of its most notable features is unexpected socio-spatial hierarchy. The notion of flexibility in this case starts from the absence of hierarchy in the floor plan.** The ground floor of the house is divided in a functionally conventional way into a transformable kitchen/dining/living area, studio space and a reading room, while the first floor is a single continuous open space (during the day) that can be divided into bedrooms using hinged movable screens (during the night).[46] (fig. 30)

46 Jeremy Till, Tatjana Schneider, *Flexible housing* (Taylor & Francis Ltd, 2007 - Kindle edition), 1431.

Figure 30. *Schröder Huis interior* (Gerrit Rietveld, 1925)

Flexibility as ***Dynamic Partition***

The first floor of Schröder Huis is a single continuous open space (during the day) that can be divided into bedrooms using hinged movable screens (during the night).

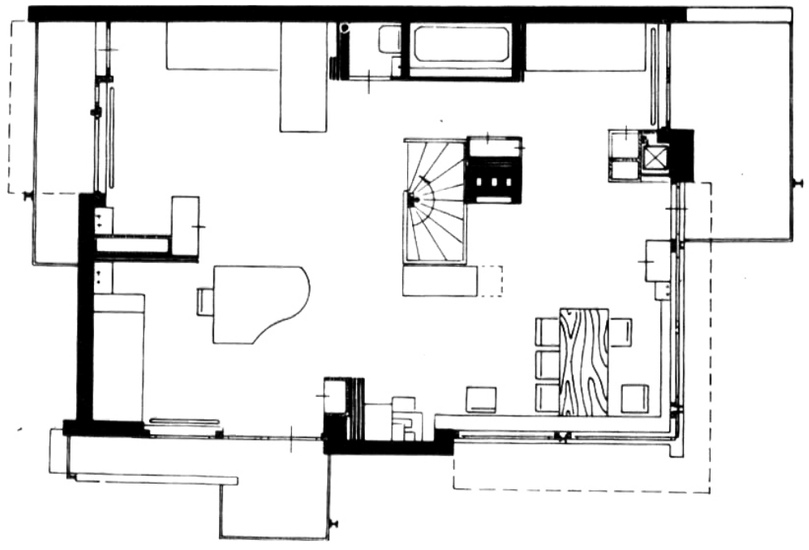


Figure 31. *Schröder Huis ground floor plan* (Gerrit Rietveld, 1925)

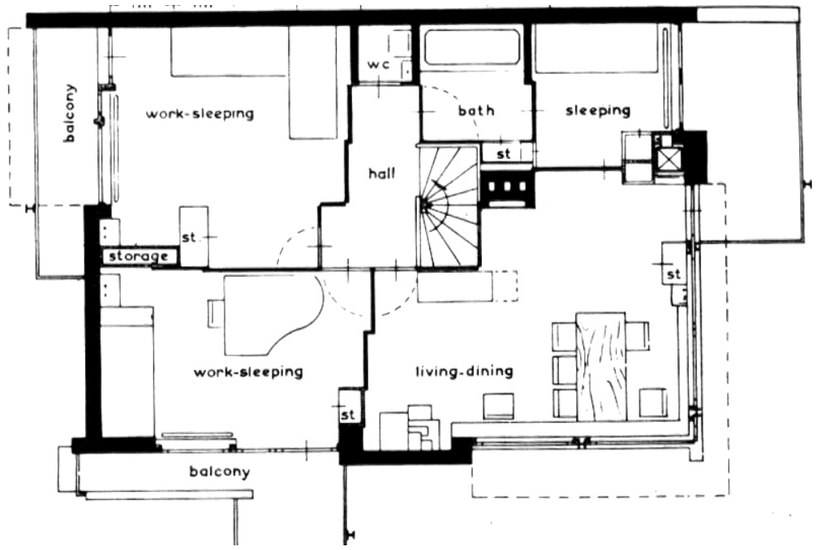


Figure 32. *Schröder Huis first floor plan* (Gerrit Rietveld, 1925)

The Dynamic Partition of the Schröder Huis resulted in **creating a unique space with the ability to be formed by the everyday choice of residents** who have the power of repetitively dissolving it and assembling it. (fig. 31, 32)

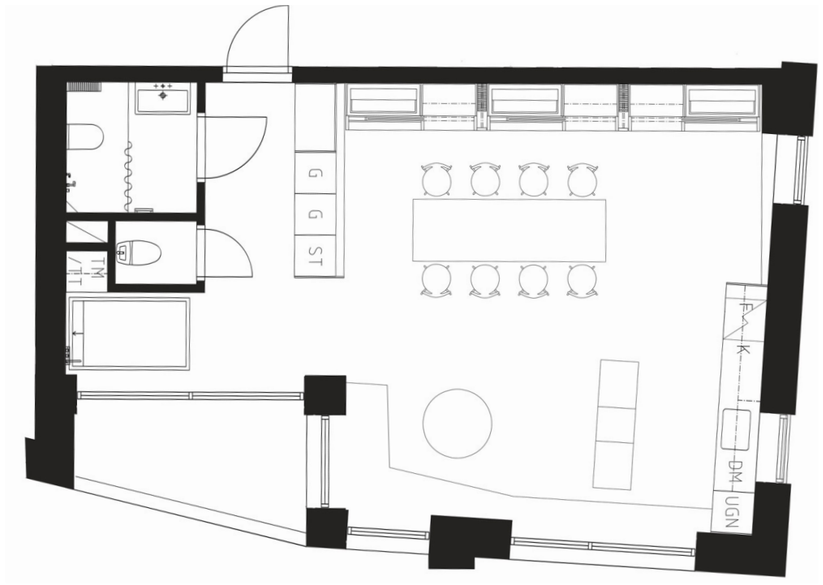


Figure 33. *Drömlägenheten floor plan - first variation* (White Arkitekter, 2017)

Flexibility as ***Dynamic Partition***

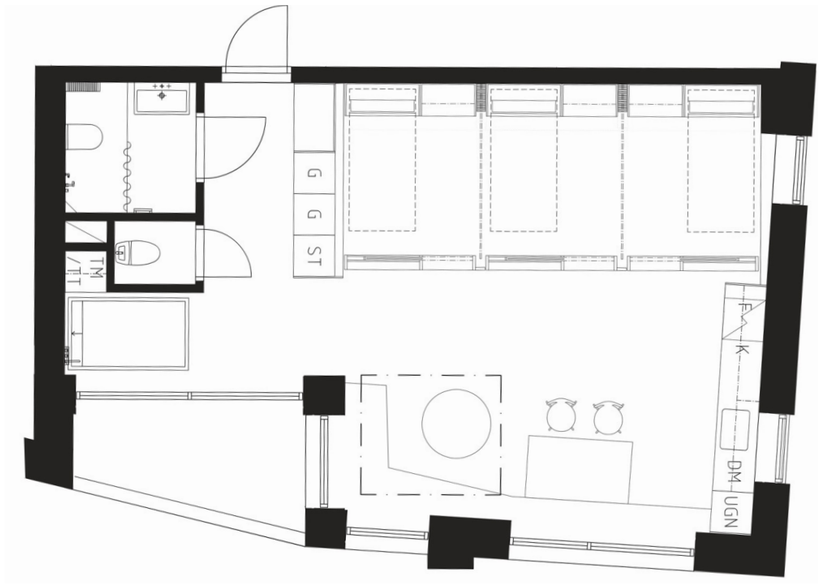


Figure 34. *Drömlägenheten floor plan - second variation* (White Arkitekter, 2017)

A more recent application of movable partitions in housing design was developed by Swedish firm **White Arkitekter** in their project for *Drömlägenheten (The Dream Home)*. The concept of a home as "a universal dwelling concept" that could house a variety of potential residents with differing needs was envisioned as an open plan apartment with central space that can be used as a living and dining area, as a kitchen or as bedrooms.[47] (fig. 33, 34) **Using partitions that are hanged from runners in the ceiling on one side of the room, the living room transforms into three small bedrooms along one side.**

47 *Reconfigurable apartment allows residents to transform their living spaces* (https://www.dezeen.com/2018/02/15/video-white-arkitekter-dream-home-reconfigurable-apartment-movie/, 2018)

Apart from the movable partitions, there is also a double bed hidden in the ceiling of the main room, which can be lowered to turn the remaining living space into a master bedroom. (fig. 35, 36) In this case, **Dynamic Partition includes also custom furniture design which is the next step in the complex development of a home envisioned to suit the changing needs of its residents.**

Drömlägenheten was envisioned as an open plan apartment with central space that can be used as a living and dining area, as a kitchen or as bedrooms.

Flexibility as ***Dynamic Partition***

Figure 35. *Drömlägenheten interior - first variation* (White Arkitekter, 2017)

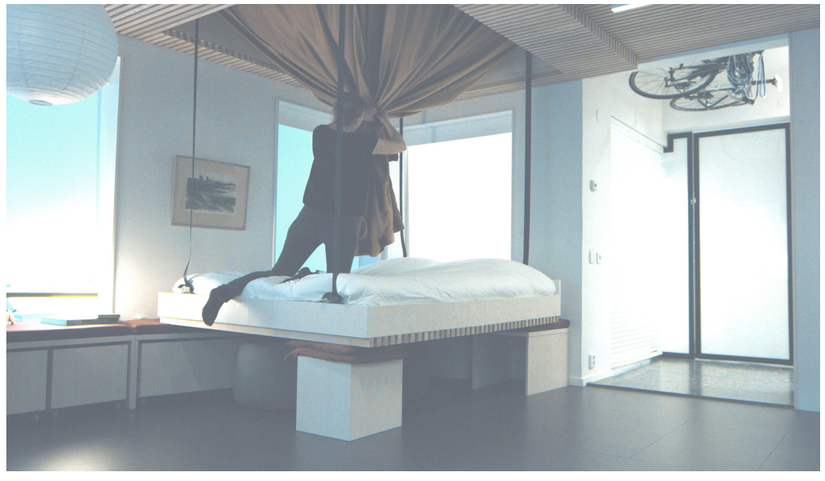
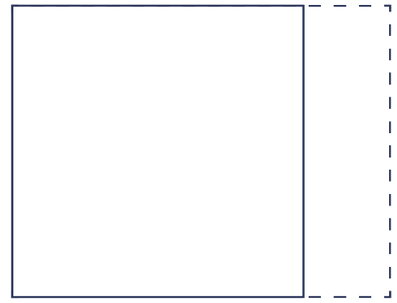


Figure 36. *Drömlägenheten interior - second variation* (White Arkitekter, 2017)

An Extra Room



When the need for more space arises, the program and the structure of a housing unit need to be flexible enough to allow potential additions to the existing surface.

Despite the obvious advantages of the possibility to redesign home in order to adapt to new conditions and lifestyle changes, this type of flexibility becomes insufficient when the need for more space arises. In that case, the program and the structure of a housing unit need to be flexible enough to allow potential additions to the existing surface. **An Extra Room type of flexibility predicts those additions in the early design phase and liberates the floor plan from the traditional rigidness.**

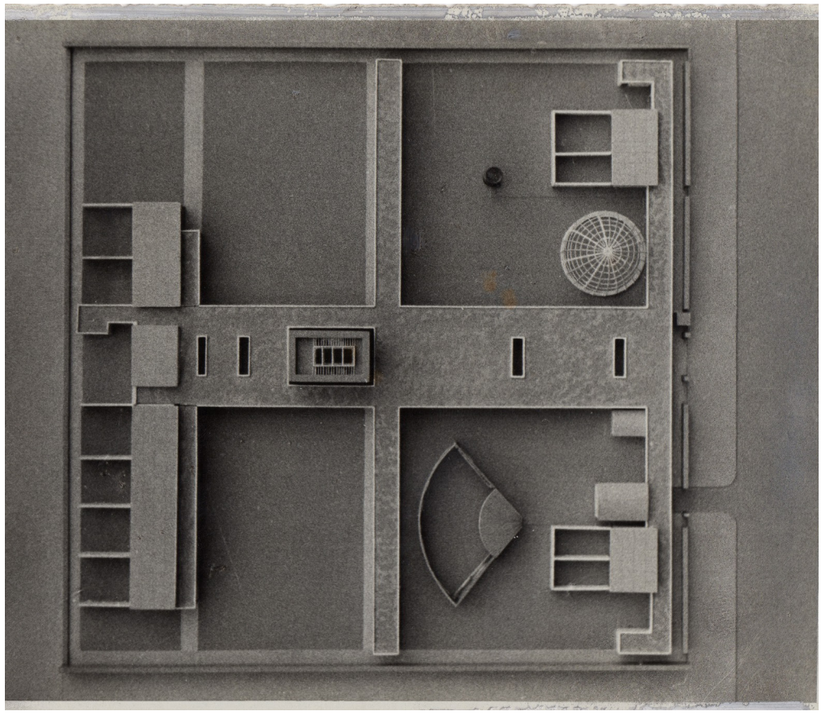


Figure 37. *Casa Cristiana physical model* (Cesare Cattaneo, 1942)

However, this kind of intervention is more complex than pulling a bed out of the wall and requires more detailed elaboration very early, making it less commonly applied in real projects. One of the first experiments that tested the possibility of home expansion is *Casa Famiglia per la Famiglia Cristiana (Casa Cristiana)* **by Cesare Cattaneo**. Although it stayed at the level of theoretical proposal, it was considered one of Cattaneo's most ambitious projects. **The concept of Casa Cristiana predicts four alternative solutions, developed according to the different classes of family membership and a program in time and space**. (fig. 37) Common features of the four design hypotheses are the centripetal articulation of the building organism, **the growth of the house with the increase of family members**, the family room, the boundary wall, the entrance stone, meticulous search for a almost absolute sobriety and the essential character of individual spaces.[48] (fig. 38)

48 *Archivio Cattaneo: Casa Famiglia per la famiglia cristiana*, 1942 (https://www.cesarecattaneo.com/casa-famiglia-per-la-famiglia-cristiana-1942/)

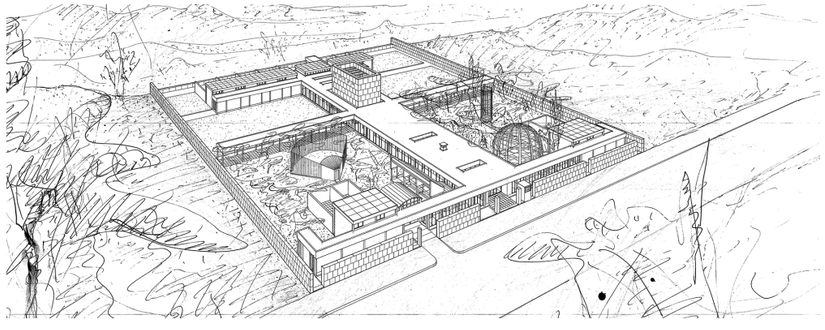


Figure 38. *Casa Cristiana perspective drawing* (Cesare Cattaneo, 1942)

Figure 39. *PREVI Low Cost Housing aerial view* (James Sterling, 1969)

Flexibility as **An Extra Room**

In case of **James Sterling's** *PREVI Low Cost Housing* project, An Extra Room is a result of subsequent growth of the initially proposed minimum cell and its development according to the desires of future inhabitants. (fig. 39) **The diagram of the house growth shows, according to self-construction phases, the process of a house for four people until completing a house on the ground floor for eight people or more.** (fig. 40) Incorporating time as a project element enabled a more considerate design of a flexible home that would allow smooth modifications in the future.[49]

49 *PREVI Low Cost Housing (I)* (http://www.hiddenarchitecture.net/2018/03/previ-low-cost-housing-i.html, 2018)

An Extra Room in PREVI Low Cost Housing project is a result of subsequent growth of the initially proposed minimum cell and its development according to the desires of future inhabitants.

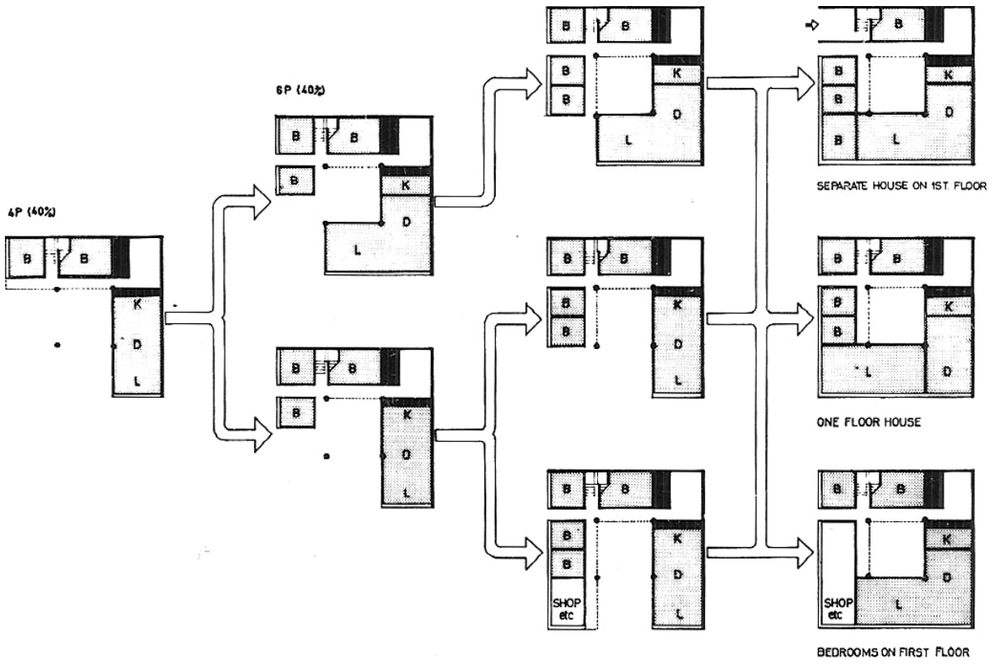


Figure 40. *PREVI Low Cost Housing diagram of house growth* (James Sterling, 1969)

Figure 41. *Quinta Malagueira exterior* (Álvaro Siza, 1997)

Another project that embraced the principle of residential cells is *Quinta Malagueira (Malagueira Residential District)* **by Álvaro Siza.** (fig. 41) The cell or "evolutionary organism" as Siza refers to it, enables potential growth of the housing units as a response to varying needs of users. It consists of two rooms with services (kitchen, bathroom, restroom) and a practicable roof terrace. **The expansion of the cell takes place using the levelling surface as a basis for new volumes, partially or totally occupying the available surface.** [50] The maximum foreseeable increase is three additional rooms. (fig. 42, 43)

50 *Typology and Participation: The Architecture of Alvaro Siza* (https://www.artforum.com/print/201603/typology-and-participation-the-architecture-of-alvaro-siza-58115, 2016)

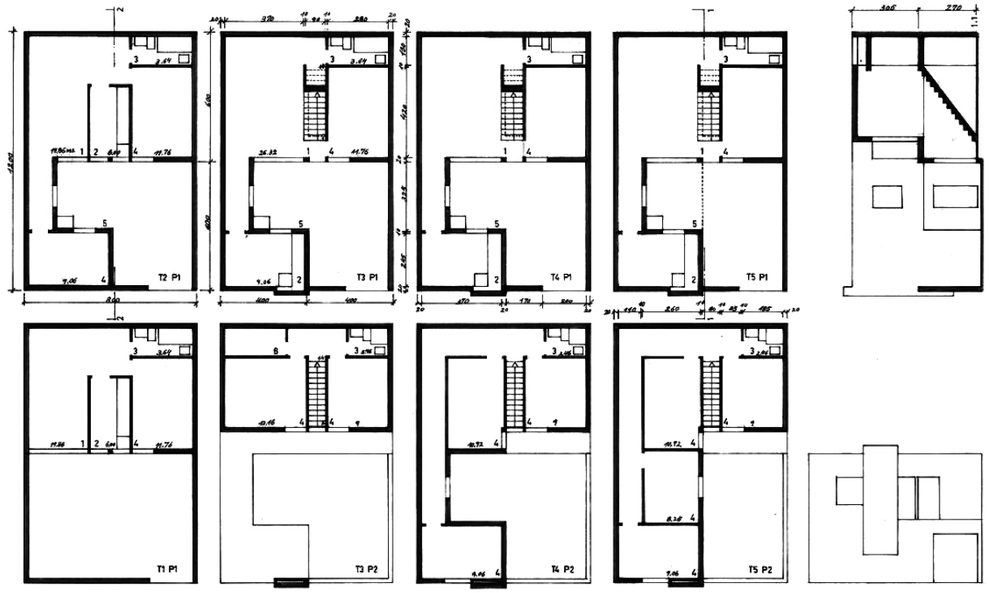


Figure 42. *Quinta Malagueira floor plan evolution - type 1* (Álvaro Siza, 1997)

The cell or "evolutionary organism" of Quinta Malagueira enables potential growth of the housing units as a response to varying needs of users.

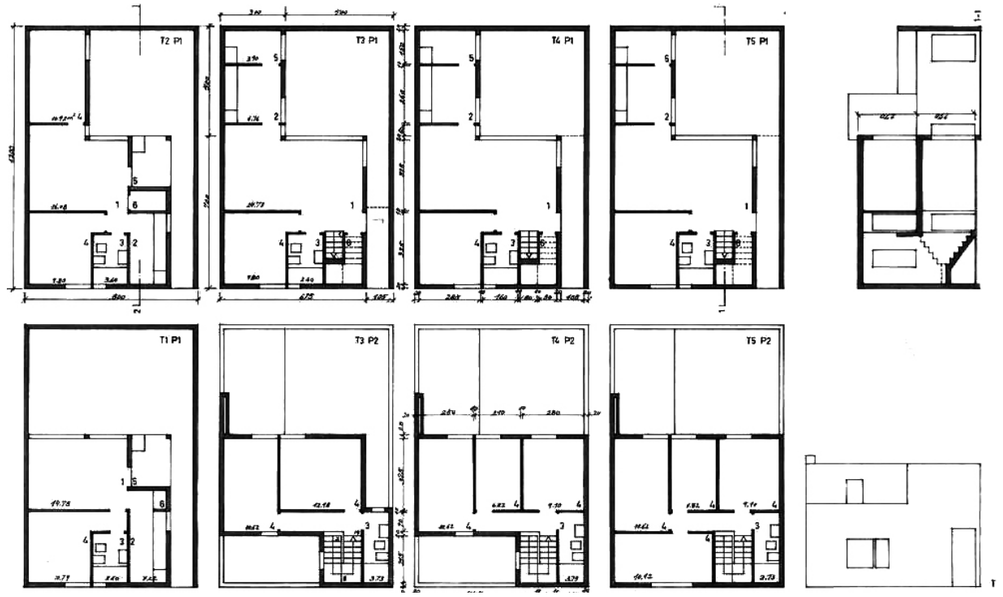


Figure 43. *Quinta Malagueira floor plan evolution - type 2* (Álvaro Siza, 1997)

In the recent decades, due to many economical and sociological constraints, An Extra Room is usually perceived at a smaller scale - as an addition to a single dwelling unit. One of the most famous examples in the recent decades emphasises the potential of an unfinished home. **Alejandro Aravena's proposal for** *Villa Verde* is based on two-level houses with one half pre-designed and the other half empty and supposed to be filled by the residents. (fig. 44) The vision was to create a typology that would work best for the dweller himself who is provided with a manual covering possible ways to expand using standard building materials.[51] **An Extra Room in this case serves as a predetermined framework of opportunity that is able to respond to the changing needs of dwellers at any point in the future.** (fig. 45, 46)

51 *Half A House Builds A Whole Community: Elemental's Controversial Social Housing* (https://www.archdaily.com/797779/half-a-house-builds-a-whole-community-elementals-controversial-social-housing, 2016)

Aravena's vision was to create a typology that would work best for the dweller himself who is provided with a manual covering possible ways to expand using standard building materials.

Flexibility as **An Extra Room**

Figure 44. *Villa Verde exterior* (Alejandro Aravena, 2010)

Figure 45. *Villa Verde ground floor plan transformation* (Alejandro Aravena, 2010)

Flexibility as ***An Extra Room***

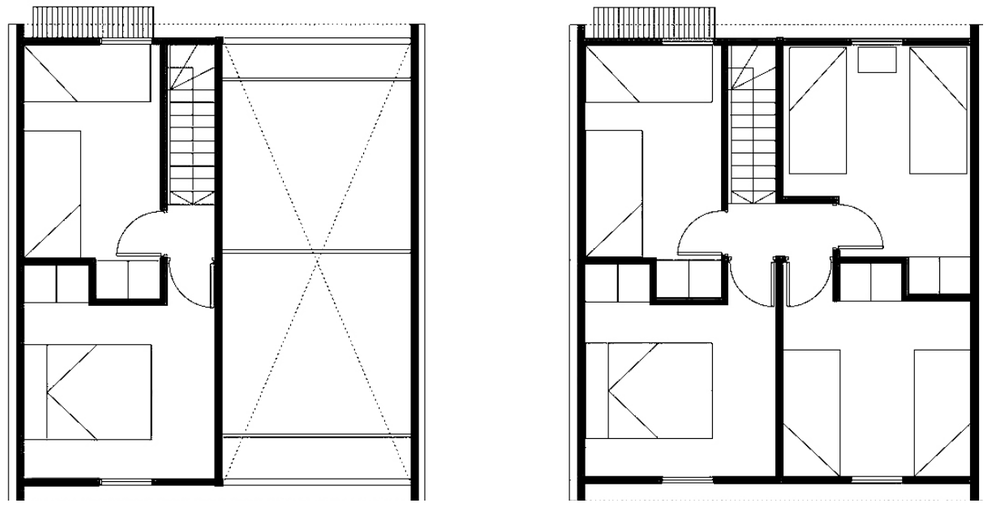


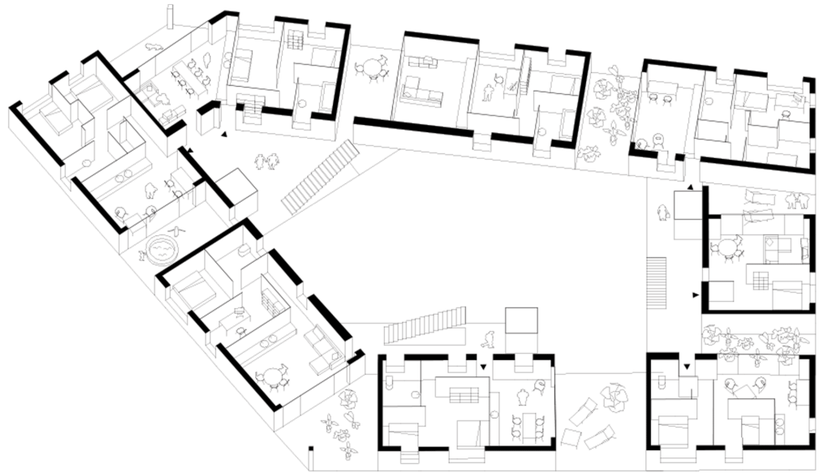
Figure 46. *Villa Verde first floor plan transformation* (Alejandro Aravena, 2010)

Predicting An Extra Room Outdoors is the most common way of defining a framework for possible extensions within a rigid housing block.

Previously described examples of An Extra Room are mostly results of a radical gesture influenced by specific external conditions. In an ordinary context, this idea might not be as strong but offers equal potential to improve living conditions, just in a subtler way. Predicting An Extra Room Outdoors is the most common way of defining a framework for possible extensions within a rigid housing block. *Carré Lumière* **by LAN Architects** epitomised the notion of a **hybrid housing based on considering An Extra Room Outdoors as an intermediary form of inhabiting that combines the need for privacy with the enjoyment of sociability.**

Figure 47. *Carré Lumière interior* (LAN Architects, 2015)

Flexibility as An Extra Room Outdoors



52 *Reinventing collective housing: Carré Lumière in Bègles, by LAN architecture* (https://www.bmiaa.com/reinventing-collective-dwelling-carre-lumiere-in-begles-by-lan-architecture/, 2015)

Figure 48. *Carré Lumière axonometric drawing* (LAN Architects, 2015)

Envisioned as a semi-unfinished project, "a form in movement", the design includes a number of voids, empty spaces after every few apartments to be filled according to specific needs. (fig. 47) Each apartment also includes **winter garden** that can be transformed into an interior space in order to increase its living area. (fig. 48) **In response to the growth of a family, inhabitants can add a room within the framework that has already been constructed and remove it once the kids have left home.**[52] An Extra Room Outdoors here is a sophisticated element that encourages flexibility within different levels of privacy, establishing a new model of housing that considers the needs of both a single dweller and a community.

Flexibility as ***An Extra Room*** *Outdoors*

Design led by flexibility of An Extra Room in any form or size ensures the final product is a dwelling that evolves with its occupants in the quickest and most efficient way.

Figure 49. *Grand Parc Housing Block interior* (Lacaton&Vassal, 2016)

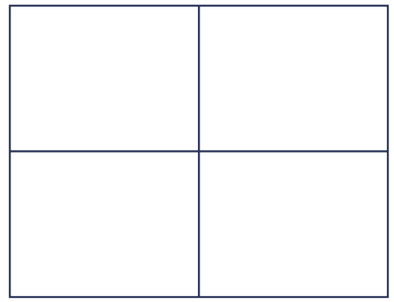
Figure 50. *Tour Bois le Prêtre interior* (Lacaton&Vassal, 2011)

The same idea was implemented in the design of *Grand Parc Housing Block* in Bordeaux, with **winter gardens providing every apartment with a chance to live outside while being at home.**[53] (fig. 49) Design led by flexibility of An Extra Room in any form or size ensures the final product is a dwelling that evolves with its occupants in the quickest and most efficient way. **The concept of multi-functional winter gardens is the simplest way of achieving the flexibility in the form of An Extra Room Outdoors.** It was thoroughly researched by the French office **Lacaton&Vassal** through a series of projects that envision it as an integral part of a dwelling.

In case of *Tour Bois le Prêtre*, the refurbishment of a housing block included a generous extension of the apartments through a self-supporting structure of horizontal strips attached to every floor, creating closable terraces and balconies. (fig. 50)

53 *Transformation de 530 logements* (https://www.lacatonvassal.com/index.php?idp=80, 2016)

Functional Polyvalence



The ultimate notion of flexibility goes beyond the tangible aspect of a dwelling unit. Flexible living space is defined by its possibility of transformation through physical and metaphysical elements. The physical elements such as movable partitions, custom-designed furniture or multifunctional terraces provide a specific framework for a limited number of possible interventions. On the other hand, the flexibility is also an epitome of metaphysical independence proposing almost countless possible arrangements (Free Space). Somewhere in between these two extreme perceptions of flexibility is the most complex approach that embodies and reconciles the qualities of both. **Functional Polyvalence as a type of flexibility is defined by the capacity to not just take up unforeseen applications but to actually incite them**.

Functional Polyvalence greatly relies on controlled user participation that provides them with the specific freedom of decision making in accordance with a set of rules defined in the design phase. According to **Habraken, the idea of a flexible home is based on proposing a number of variations which are simple enough for the resident to visualise all options for change that are open to him.** One of the several support systems he proposed in *Variations* as practical examples of a flexibility, the *Longitudinal Support System*, reflects the notion of Functional Polyvalence through the possibility of early implementation of different layouts in each dwelling. (fig. 51) In general, this kind of a support system is defined by load-bearing walls parallel to the length of the facade and partitions running perpendicularly, forming 1290cm wide dwelling units.[54]

54 NJ Habraken, J Th Boekholt, PJM Dinjens, AP Thijssen, *Variations - the systematic design of supports* (MIT, Cambridge, Mass, 1976), 160.

Flexible living space is defined by its possibility of transformation through physical and metaphysical elements.

Flexibility as ***Functional Polyvalence***

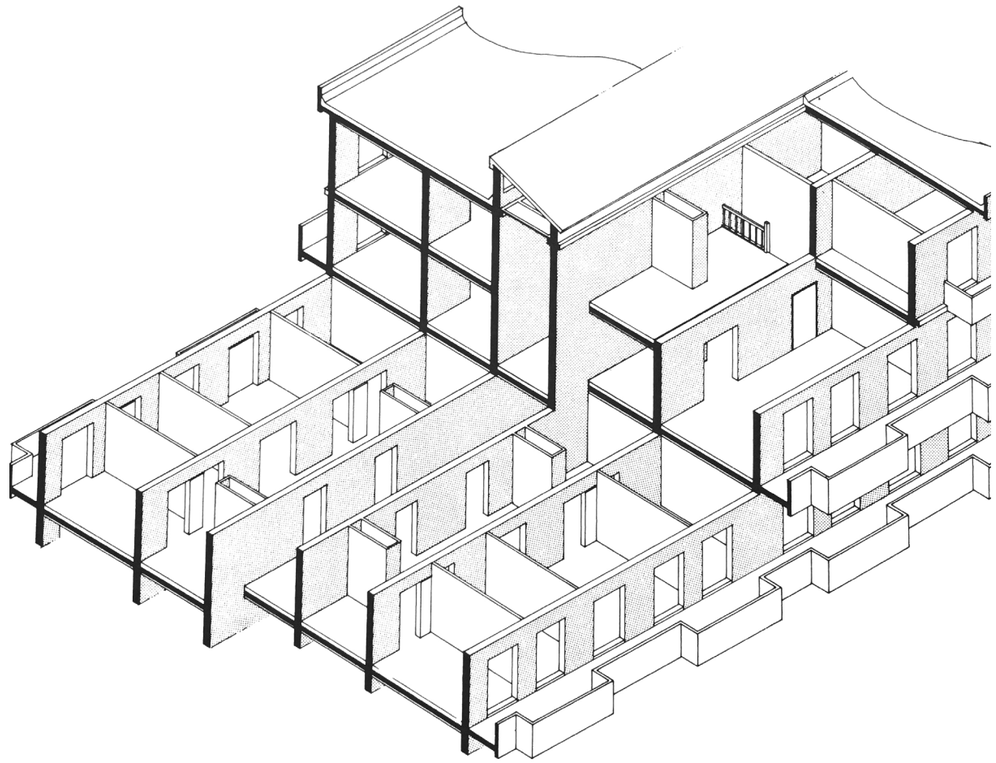


Figure 51. *Longitudinal Support System axonometric drawing* (N. J. Habraken, 1976)

Habraken's Longitudinal Support System, reflects the notion of Functional Polyvalence through the possibility of early implementation of different layouts in each dwelling.

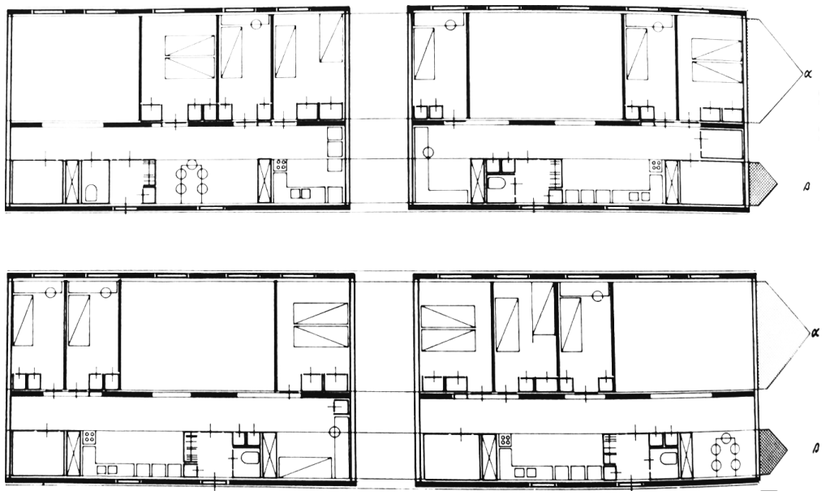


Figure 52. *Longitudinal Support System floor plan variations* (N. J. Habraken, 1976)

In terms of flexibility, **the system allows alternating positions of living rooms and bedrooms in one part and kitchen, bathroom and single bedrooms in the other.** Theoretically, Habraken developed in detail four possible layouts, with the aim of emphasising the importance of early consideration of flexibility as an intrinsic part of design. (fig. 52)

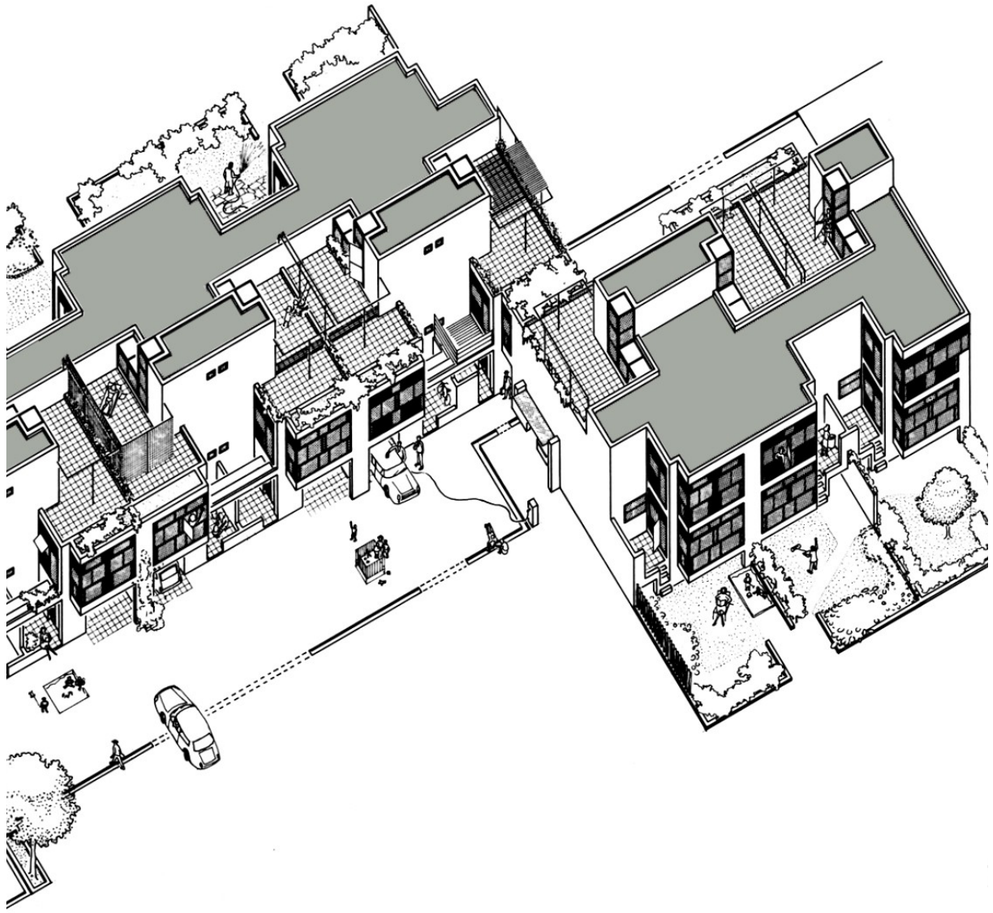


Figure 53. *Diagoon Houses axonometric drawing* (Herman Hertzberger, 1970)

Functional Polyvalence as a type of flexibility was the main idea that guided the design of **Herman Hertzberger's** *Diagoon Houses.* (fig. 53) Key component of the project is the structural frame that Hertzberger considers as "half-product", something that everyone can complete according to his own needs and desires. **In terms of spatial arrangement, there are two fixed cores containing staircase and services, with several half-story levels attached**. A typical plan is divided in three areas, with the first one containing the entrance, a work room, storage and a garage. Moving up half a storey, the kitchen is the fixed point but the space around it is left free for interpretation and personal preference on how the living/dining room should look like. The third level contains bathroom as the focus point and the space around it could be divided into bedrooms or left open. (fig. 54)

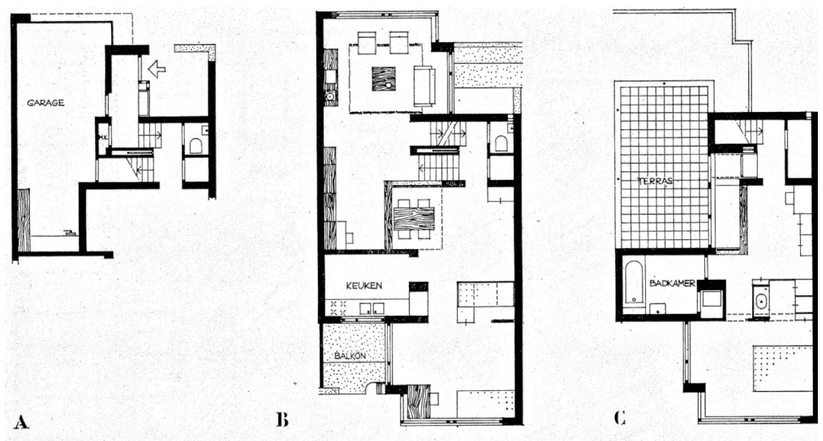


Figure 54. *Diagoon Houses typical floor plans* (Herman Hertzberger, 1970)

Key component of Diagoon Houses project is the structural frame that Hertzberger considers as "half-product", something that everyone can complete according to his own needs and desires.

55 Jeremy Till ,Tatjana Schneider, Flexible housing (Taylor & Francis Ltd, 2007 - Kindle edition), 1898.

Figure 55. *Diagoon Houses floor plan variations* (Herman Hertzberger, 1970)

The biggest quality of these houses lies in the thoroughly explored and easily comprehensible alternatives on how the dwellings could be conceived. (fig. 55) Even though it is up to occupants themselves to decide what to do with the space they would live in, the essential part of the design is the initial framework and concisely defined indications of possible spatial arrangements.[55] **The Diagoon houses represent the outstanding example of putting into practice the idea of Functional Polyvalence, as a capacity to generate pertinent solutions for each new situation as it arises.**

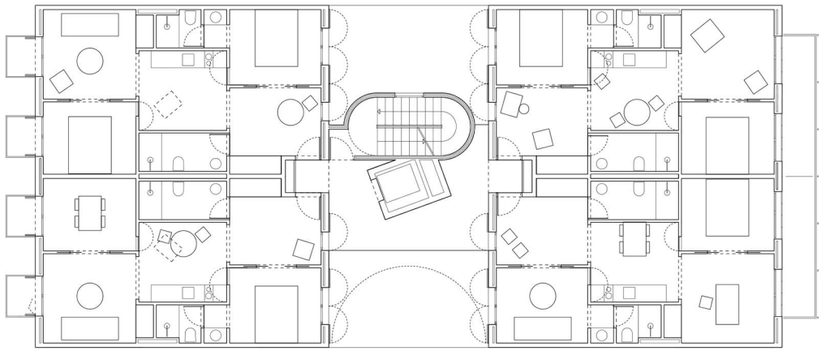


Figure 56. *110 rooms typical floor plan* (MAIO Architects, 2016)

In the last few years, the concept of Functional Polyvalence is regaining popularity mostly due to the housing crisis and a generated need for more efficient types of dwelling. **MAIO Architects did a slightly controversial and borderline philosophical project for a twenty-two-unit apartment building envisioned to be both "generic (that is, a discreet armature for living) and diffuse (whereby program is unmoored from the floor plan)."**[56] The housing block called *110 rooms* is designed as a system of rooms that can be used as desired. As there is no predetermined program or functional hierarchy, the rooms are more or less interchangeable between dwelling units. The initial floor plan is divided into four apartments, each one containing five rooms that are connected among themselves, which excludes the need for a corridor. (fig. 56) A kitchenette is placed in the middle room and serves as the center of the apartment and a point of reference for the other rooms without predefined function. **Functional Polyvalence in this case is based on an empty room as a tool for achieving maximum flexibility with respect to the previously established framework of possibilities.** (fig. 57)

56 *The Kitchenless Home: This Architect Wants to Revolutionize Homes—by Getting Rid of Kitchens* (https://www.metropolismag.com/architecture/anna-puigjaner-kitchenless-home/, 2018)

Flexibility as ***Functional Polyvalence***

The housing block called 110 rooms is designed as a system of rooms that can be used as desired and are interchangeable between dwelling units.

Figure 57. *110 rooms collage of activities* (MAIO Architects, 2016)

"The dwelling must be considered an organic part of the larger environments, the house is part of the urban anatomy in the way that a vital organ is part of a living creature. (…) For all kinds of control, it is roughly true that the smaller the domain to be controlled, the more controllable it is. (…) Each kind of control has a natural hierarchy associated with it. The room makes a natural break point in the physical hierarchy; it is a proper unit of control."

Christopher Alexander
Serge Chermayeff
Community and Privacy
1965

4.3 Envoi

Upon thoroughly analysing some of the most relevant housing projects that portray a specific type of flexibility, a few essential conclusions can be drawn. **Flexibility itself isn't exclusively a matter of physical variability of the space, functional polyvalence or user participation. In fact, it is about challenging substantial principles that constitute an optimal living environment.** Sociologically, it is based on the simple act of acknowledging the user as a factor in decision making process, during all phases - design, construction and use. From the architectural point of view, it is possible to establish the methodology and accurately define the technical guidelines in the design of a flexible home, but that is not enough to make a dwelling the optimal solution for its potential residents. **Since the subject of this research are millennials, it is necessary to refer to their needs, habits and lifestyle in general and accordingly readjust the design premises.** Housing is volatile, subject to a whole range of cyclic, non-cyclic and trend changes, and if it is not able to respond to these changes it becomes at best unsatisfactory, at worst obsolescent.[57]

57 Hugo Priemus, *Flexible housing: fundamentals and background* (Open House International 18, 1993), 19.

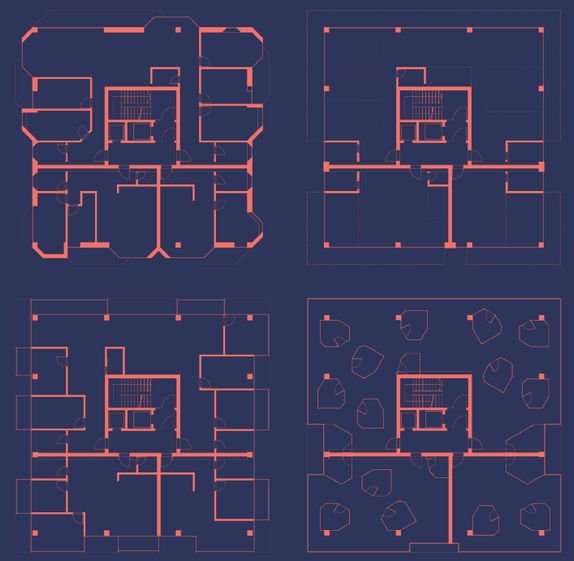
Housing is volatile, subject to a whole range of cyclic, non-cyclic and trend changes, and if it is not able to respond to these changes it becomes at best unsatisfactory, at worst obsolescent.

“I find, first of all, that I pass from state to state”.

Henri Bergson
Creative Evolution
1911

5 Experimental Typology as Optimal Design Proposal

Following the thorough theoretical research that resulted in successful justification of flexibility as irreplaceable component of housing design that successfully responds to current socio-economic conditions, the elements of flexible design are tested within actual floor plans. The design experiment is based on **generating different types of housing models within the same structural layout** that consists of **three residential units with different sizes: 60sqm, 80sqm and 200sqm.** The chosen three sizes of apartments serve as unique testing fields for the most popular forms of contemporary housing: one-bedroom and two-bedroom apartments, and the more controversial form of semi-collective living: five-bedroom apartments. Focusing on four target groups of millennial dwellers, **the residential units are developed as four different types of apartments**, starting from a rigid but generous traditional apartment, followed by more innovative spaces defined by semi-permanent physical elements and finally reaching the futuristic spatial response to bare living necessities of a modern dweller. **Combined together within a unique building, different types form a unique experimental and borderline bricolage residential tower that illustrates all the variations that might occur.**



5.1 Contextual Support

The experimental nature of the design proposal aims at defining clear principles that could be applied anywhere instead of being site-specific. However, the quality of a residential tower is not solely based on the typical floor plans - it also includes specific starting, connecting and ending points. Therefore, it was necessary to define its connection with the public ground floor, semi-private distribution and function of the rooftop. Given the remarkable height of the tower, the chosen testing context is **Cascina Merlata Housing District** - a dense settlement of high volumes alternating with communal gardens placed in the suburbs of Milano, Italy. (fig. 58) More specifically, **the position of the experimental tower and adjoining ground floor spaces corresponds to the position of two residential towers designed by CZA**, following the goal of creating a landmark visible from the nearby motorway. (fig. 59) The paths between the public entrances innervate the collective spaces of the complex, creating a cluster structure governed by a larger tree-lined internal square. (fig. 60) The central space lends itself to hosting collective events on the occasion of the Expo, but it also offers a possibility of more peaceful everyday use.[58] **Placing the experimental tower in this specific context challenges its ability to face realistic conditions of actual use and validates its potential to be applied in practice.**

58 CZA Cino Zucchi Architetti, *Il masterplan per il nuovo quartiere di housing sociale a Cascina Merlata propone un insediamento denso di volumi alti alternati a giardini comuni* (http://www.ordinearchitetti.mi.it/it/mappe/milanochecambia/edificio/1955-edifici-3-4/13-cascina-merlata, 2013)

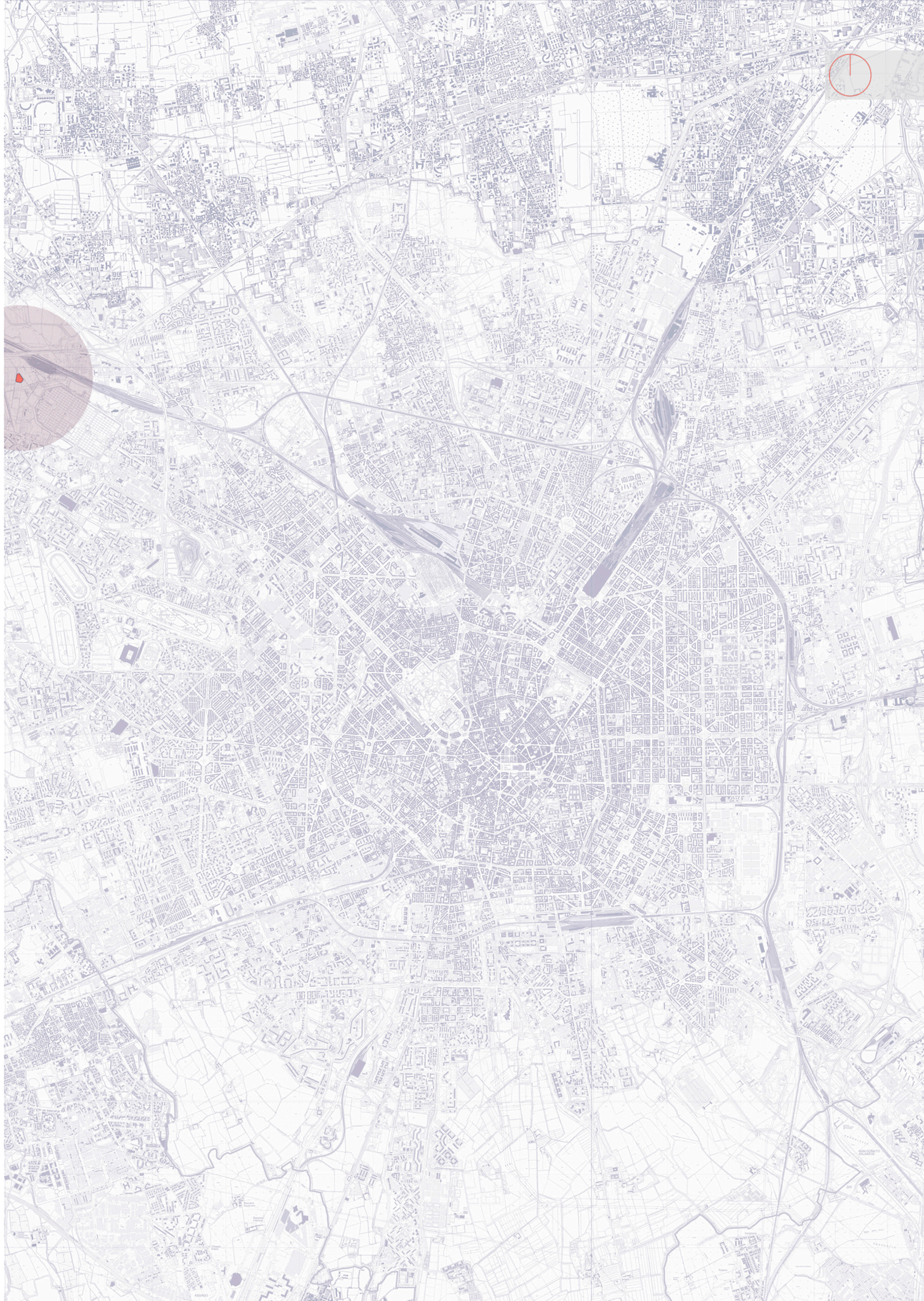


Figure 58. *Cascina Merlata Housing District geographical position*

Figure 59. *Cascina Merlata Housing District ground floor plan* (CZA, 2011)

Figure 60. *Cascina Merlata Housing District exterior view* (CZA, 2011)

5.2 Fusion Tower

Contextual insertion of the experimental tower required a slight redefinition of the original Cascina Merlata Housing District site plan. (fig. 61) **The Fusion Tower consists of four types of dwelling floor plans (four levels per type), four different intercepting semi-private levels corresponding to each type, a green rooftop and a multi-level ground floor.** Apart from the main type of flexibility related to the function of housing, there is also experimentation with flexible design of communal levels. Structurally identical, the semi-private floor plans host a variety of additional functions aiming to satisfy everyday needs of millennial dwellers. That being said, **flexibility is perceived in creative exploitation of their open-space potential, transforming each of the levels into a specific oasis of interest.** Formalistic integration of the tower within the context was done in a gestural way, respecting the original designation of public spaces inside the block but also enriching the site by providing additional content. (fig. 62)

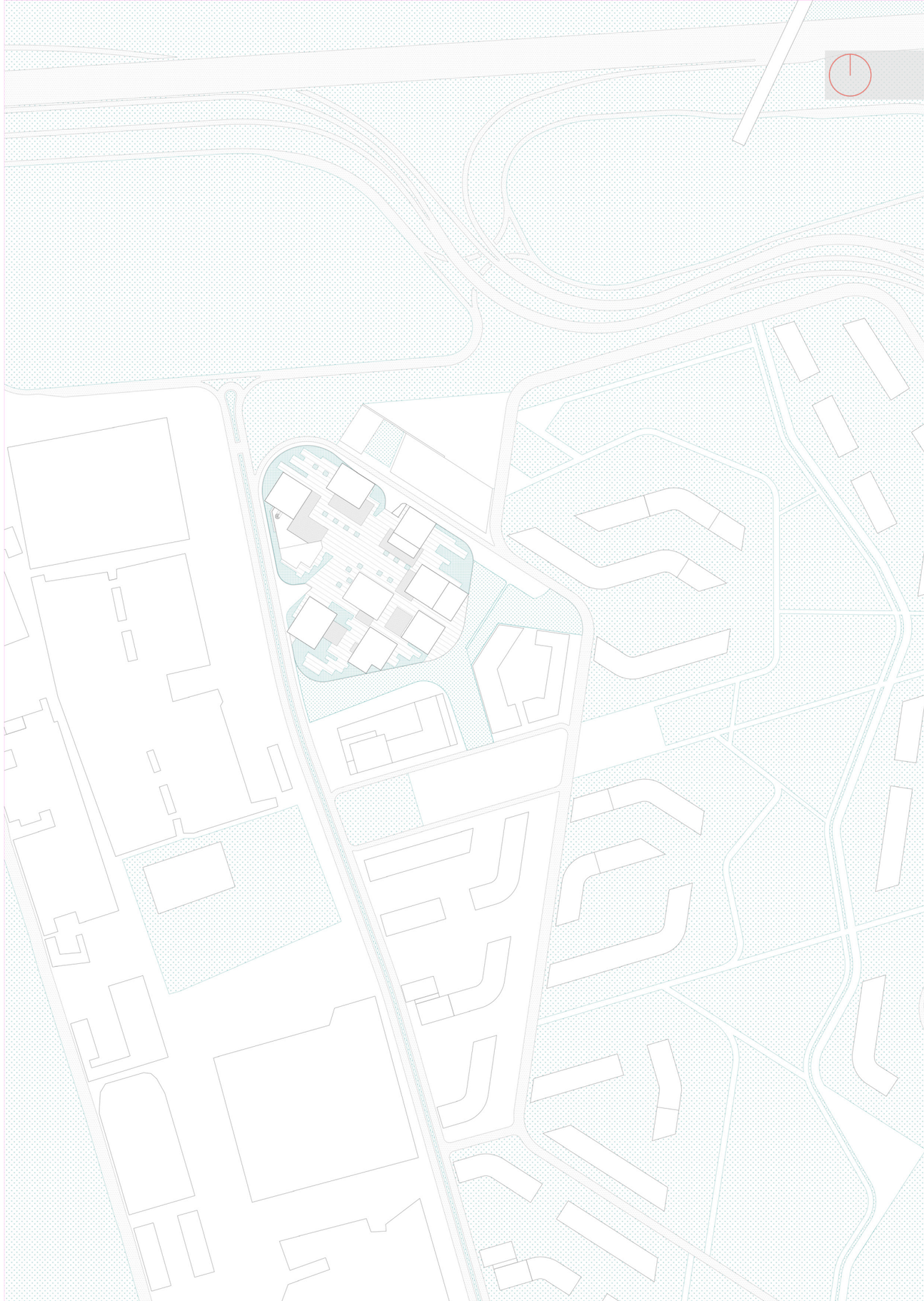
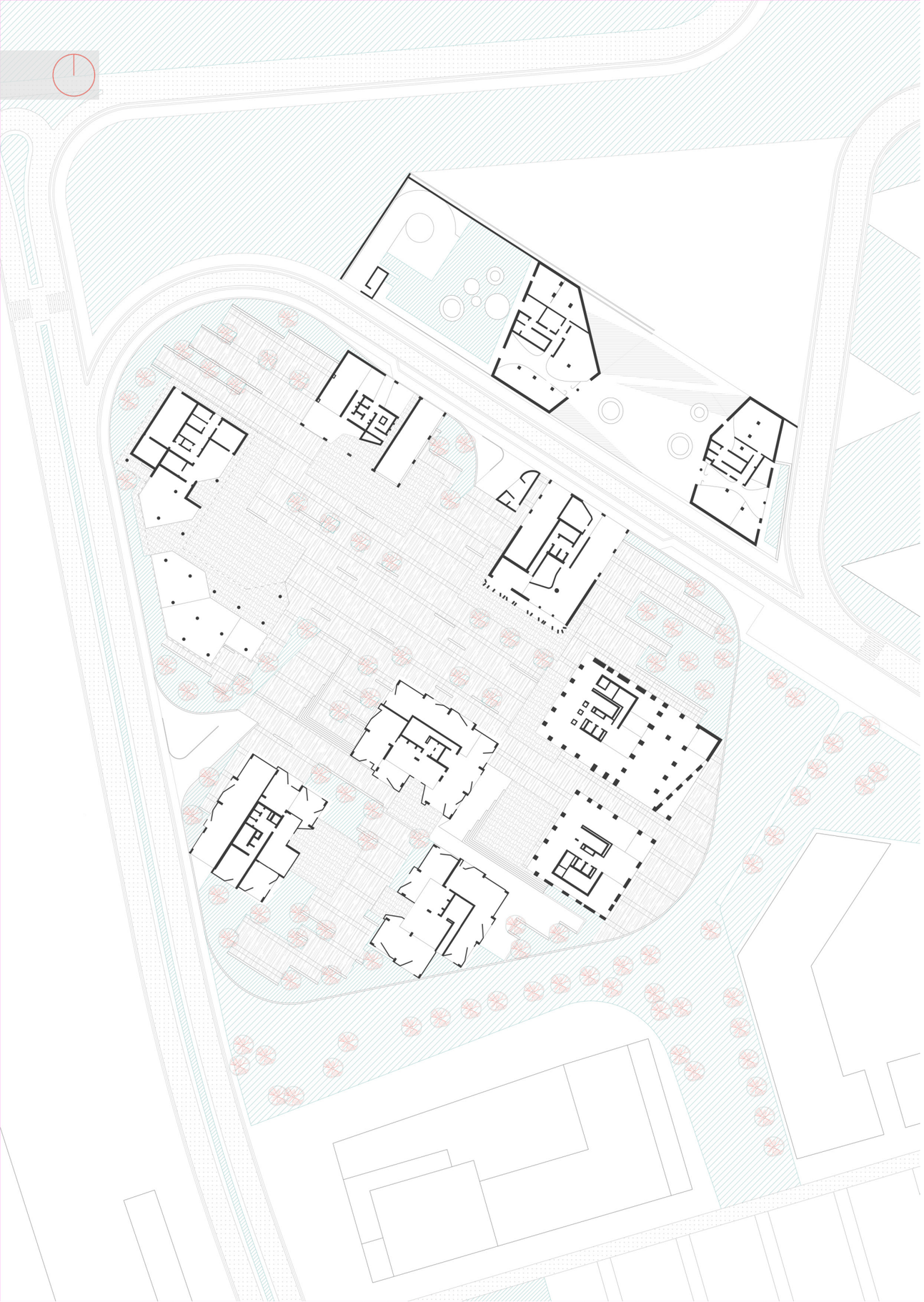


Figure 61. *Fusion Tower site plan* (Milano, 2019)



Given the fact that millennials are known as the “cycling generation”, the importance of providing them with adequate bike-related services was the design driver in ground floor plan definition. Apart from the regular semi-private entrance area with reception and necessary service spaces, **the ground floor level of Fusion tower includes two separate bicycle garages and a bicycle repair shop placed underneath stepping roof terraces**. (fig. 63) The garages have different levels of privacy - the semi-public one is accessible from the entrance lobby of the tower, while the other one is accessible from the open space inside the block.

Figure 62. *Cascina Merlata redefined ground floor plan*

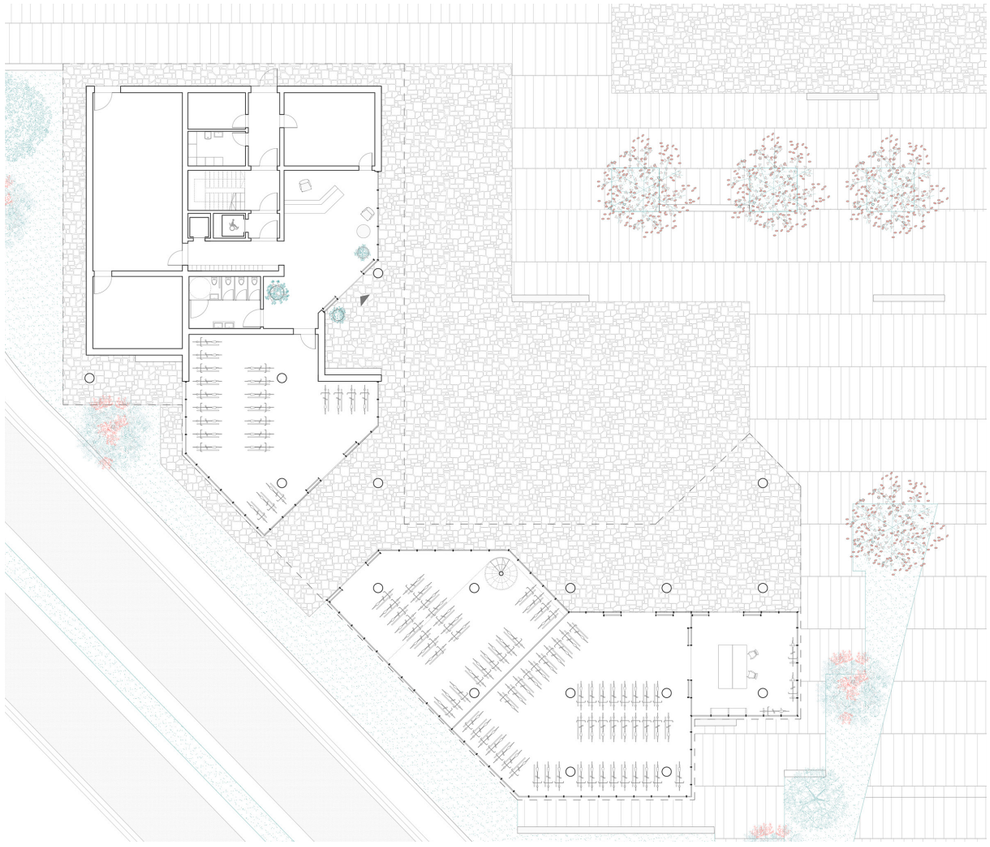


Figure 63. *Fusion Tower ground floor plan (level 0)*

Figure 64. *Fusion Tower Communal Floor Plan Type 1 (level 1)*

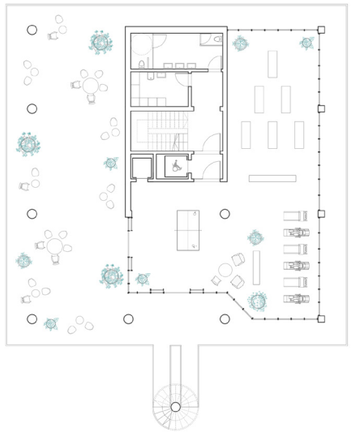


Figure 65. *Communal Floor Plan Type 2 (level 6)*

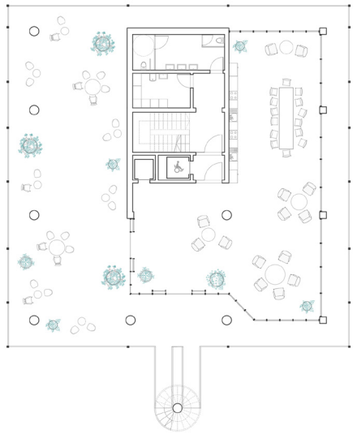


Figure 66. *Communal Floor Plan Type 3 (level 11)*

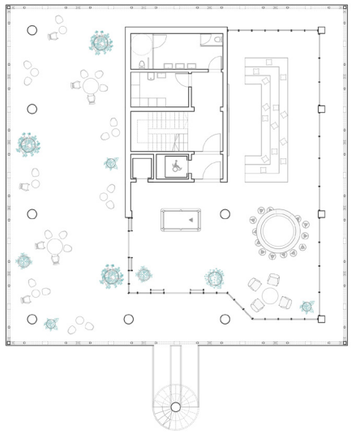


Figure 67. *Communal Floor Plan Type 4 (level 16)*

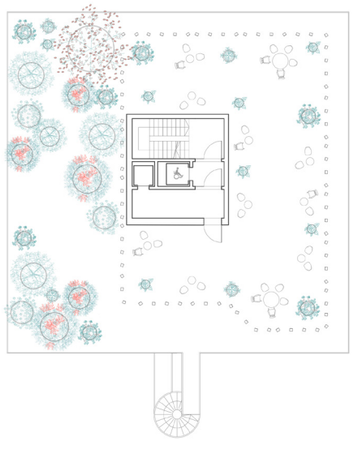


Figure 68. *Green Rooftop Plan (level 21)*

The public garage consists of two levels with direct access to the lower roof terrace, while the higher roof terrace is reserved for the residents of the tower and represents an extension to the **first communal level**. (fig. 64) Following the tendencies of millennials to do everything together, the **Type 1 communal floor plan includes a flexible co-working area with the adjoining terrace.** Four floors up (level 6), the **second communal level** targets the healthy life-style of millennials. Apart from the terrace that is the same on all levels, the **Type 2 communal floor plan includes a flexible gym with quiet area for yoga and pilates.** (fig. 65) Millennial joy of sharing not only a meal but the whole cooking experience and making it a sort of a unique ritual has increased the popularity of shared kitchens and dining areas. Therefore, the **third communal level** represents a response to these aspirations and **Type 3 communal floor plan includes a flexible kitchen and dining area.** (fig. 66) The introvert nature of millennials and their obsession with streaming has resulted in global popularization of "netflix and chill" culture. Although the true comfort lies in binge-watching alone, **the fourth communal floor** experiments with providing the residents with a possibility to watch the latest season together with their peers, on a much bigger screen. Thus, **the Type 4 communal floor plan includes a modification of a home theater and adjoining entertainment content.** (fig. 67) Finally, **the last level of the Fusion Tower is not just another Milanese green rooftop, but also a unique swallow sanctuary**, with the spiritual aim of providing these magnificent creatures with adequate homes and simultaneously enriching the overall biodiversity of the site. (fig. 68) All communal levels are connected with external fire-escape staircase that follows the trajectory of utmost versatility in spatial and sensorial composition of the Fusion tower. (fig. 69)

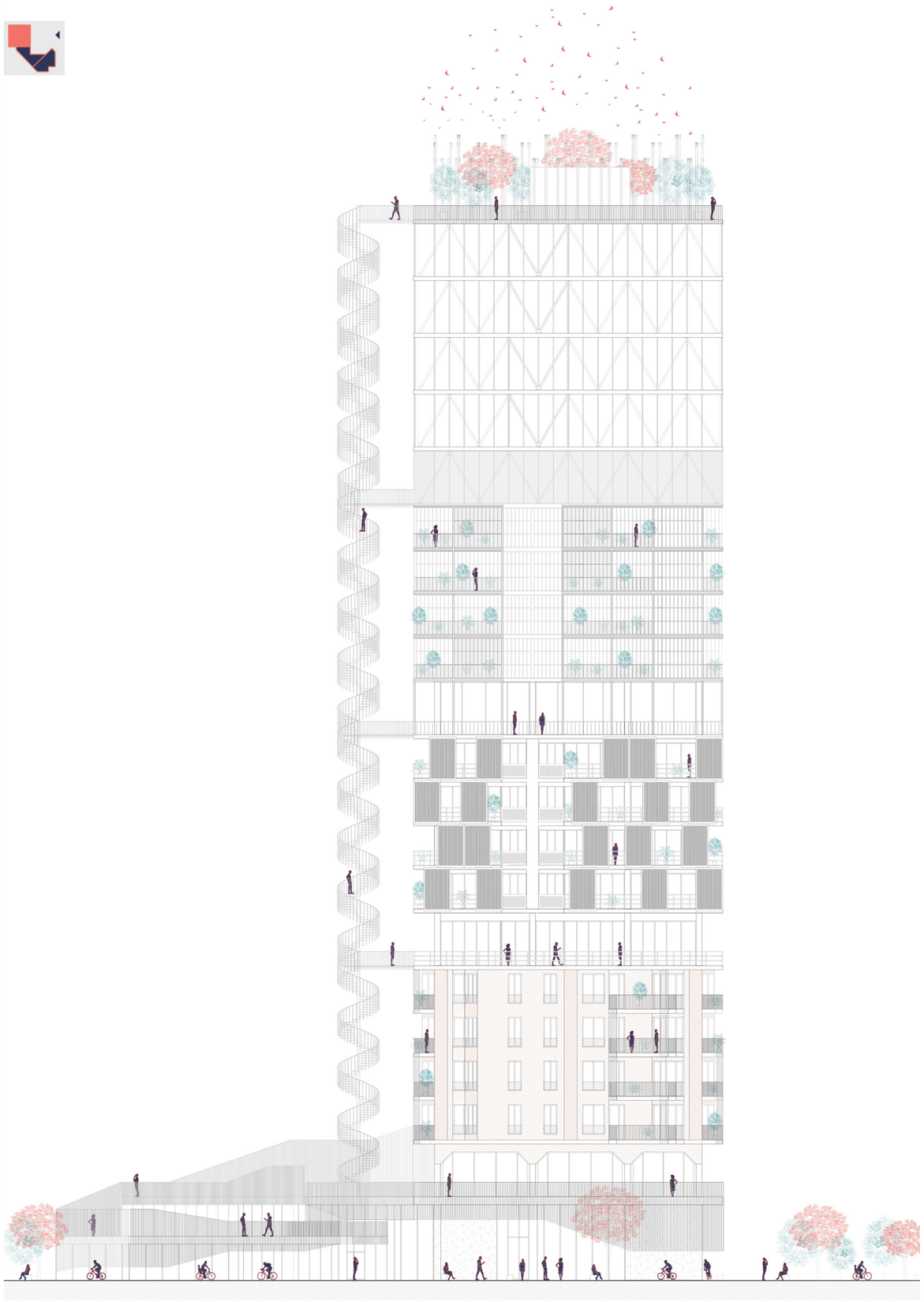
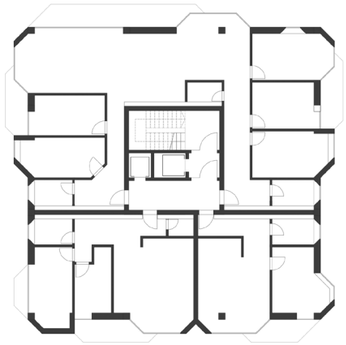


Figure 69. *Fusion Tower South-East Facade*

Type 1



5.2.1 Type 1 - The Coziness of Familiar

The first type of housing floor plans, the traditional one, serves as a referring criterion for the other types. It represents a standard solution for a common and slightly luxurious typology of apartment units with reference to well-known examples of Milanese projects from the twentieth century. With its ceremonial hallways and bow windows, The Coziness of Familiar doesn't portray any lifestyle innovation but instead aims at showing how most of older millennials still live or wish to live nowadays. (fig. 70, 71)

Type 1 - The Coziness of Familiar

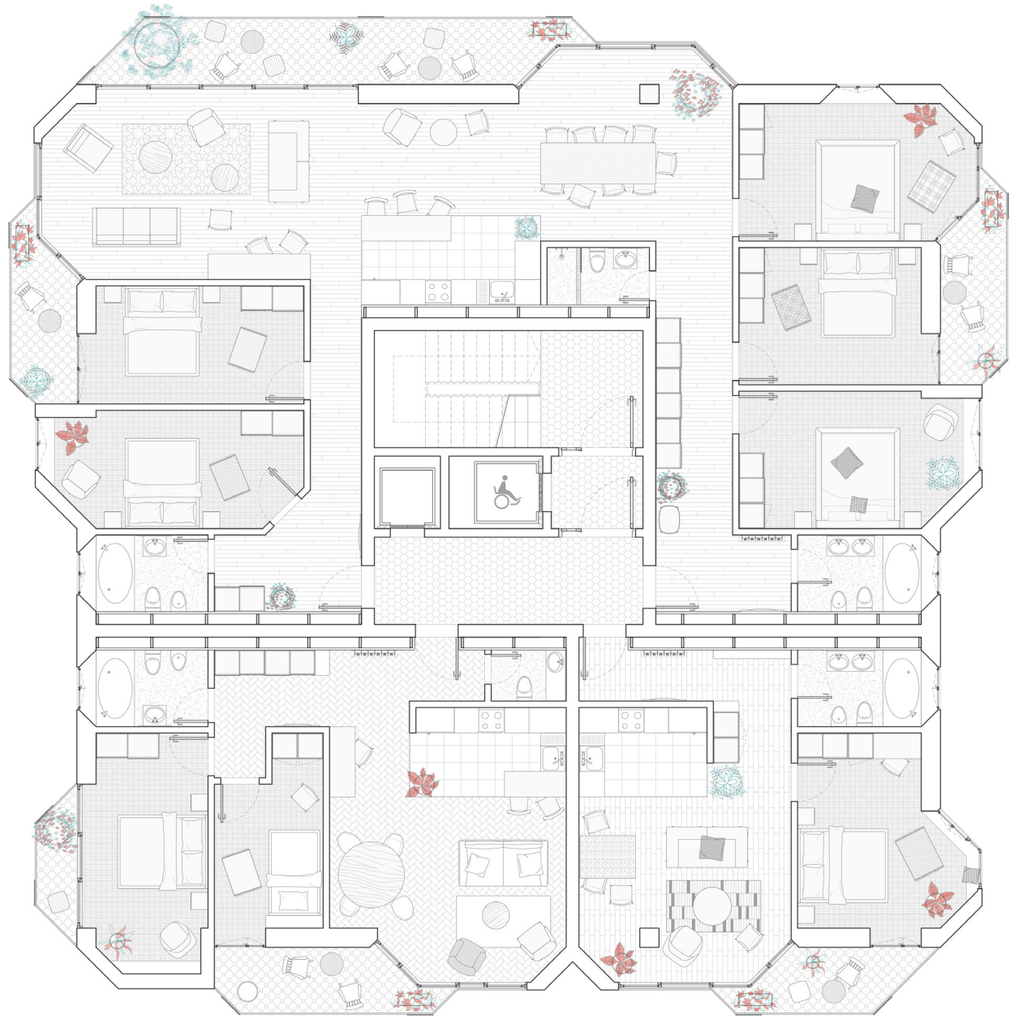


Figure 70. *Type 1 - Dwelling Units Floor Plan (levels 2-5)*

Type 1 - ***The Coziness of Familiar***

trajectory of sensorial aspirations











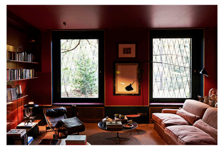






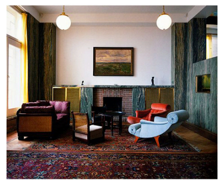










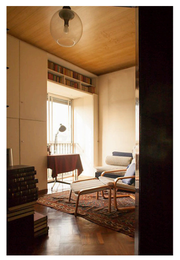
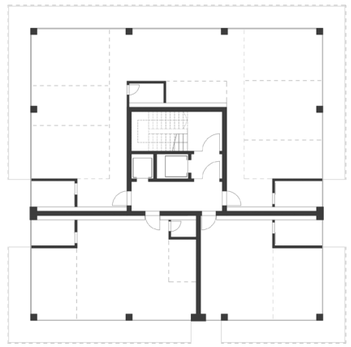




Figure 71. *Type 1 - A Bedroom*

Type 2



5.2.2 Type 2 - The Lightness of Ephemeral

The second type of housing floor plans embraces flexibility in the most common way. By using movable partitions as room separators, "Murphy" beds, folding sofa beds, etc., these floor plans provide the residents with the possibility of creating different day and night scenarios. The Lightness of Ephemeral explores the potential of flexibility on a daily basis, making it a semi-permanent habitat for millennials who invented the concept of "couch-surfing". (fig. 72-75)

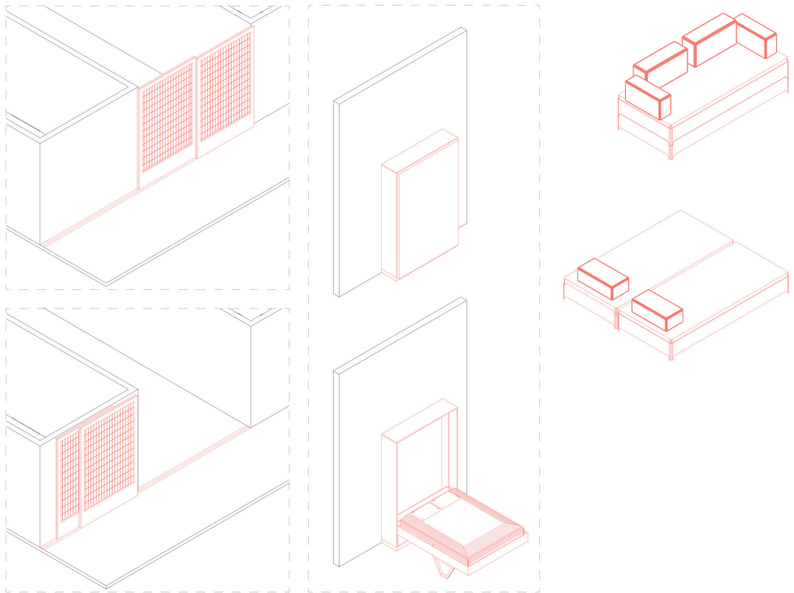


Figure 72. *Type 2 - The Notion of Flexibility*

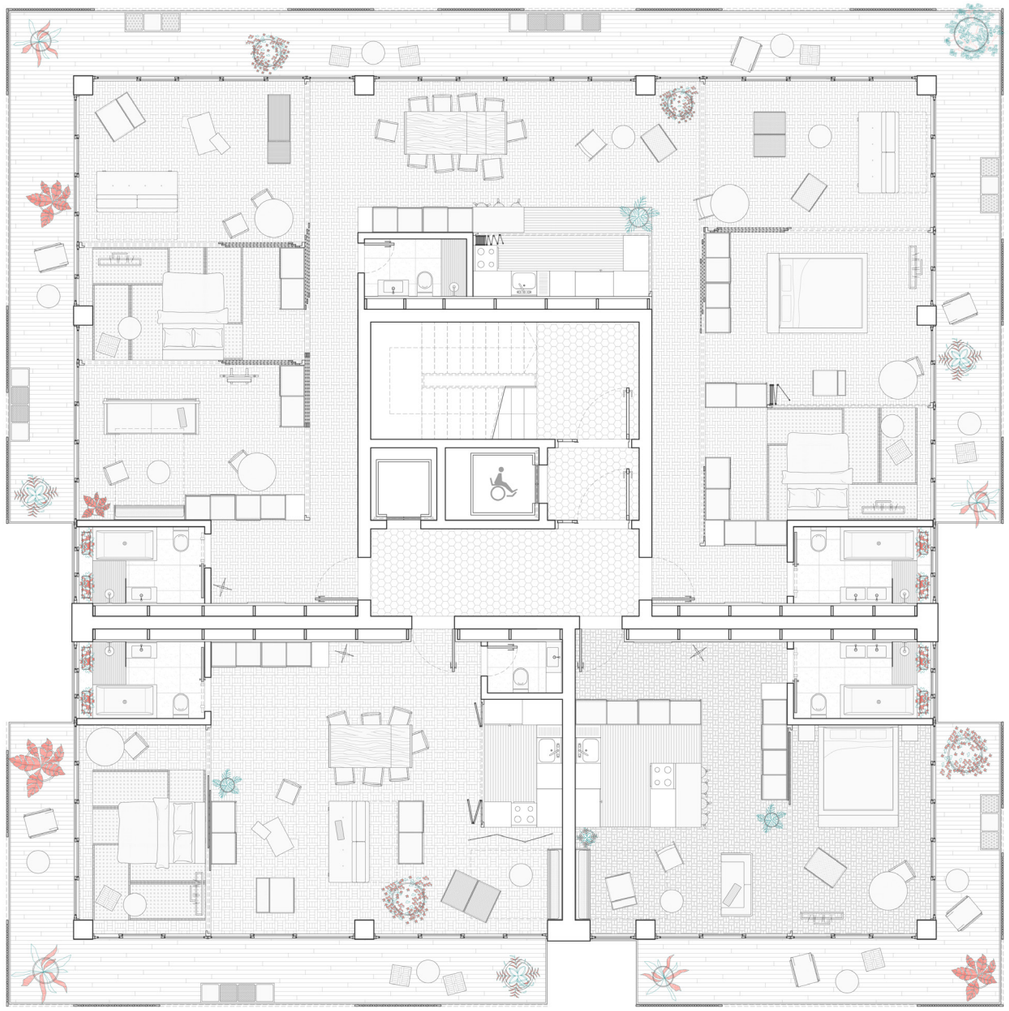


Figure 73. *Type 2 - Dwelling Units Floor Plan, variation 1 (levels 7-8)*

a few hours later...

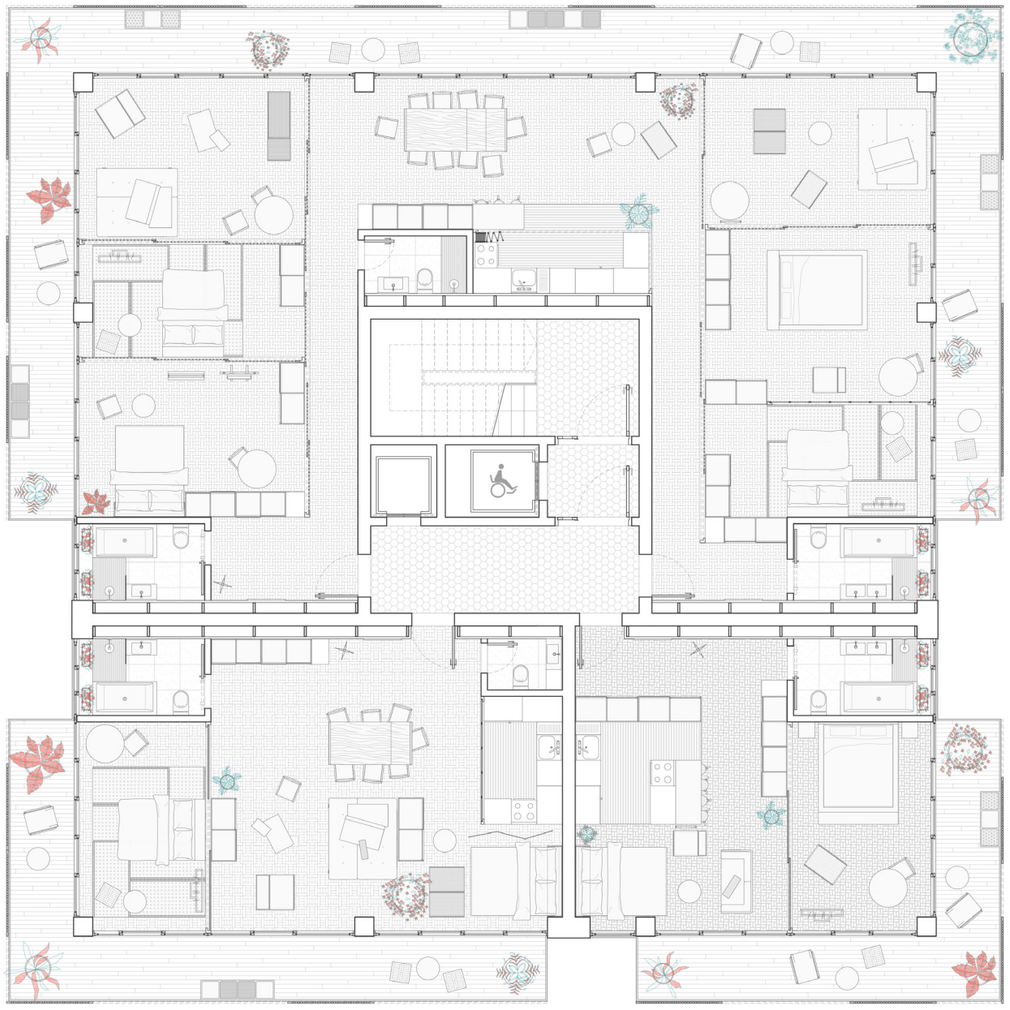


Figure 74. *Type 2 - Dwelling Units Floor Plan, variation 2 (levels 9-10)*

Type 2 - ***The Lightness of Ephemeral***

trajectory
of sensorial
aspirations

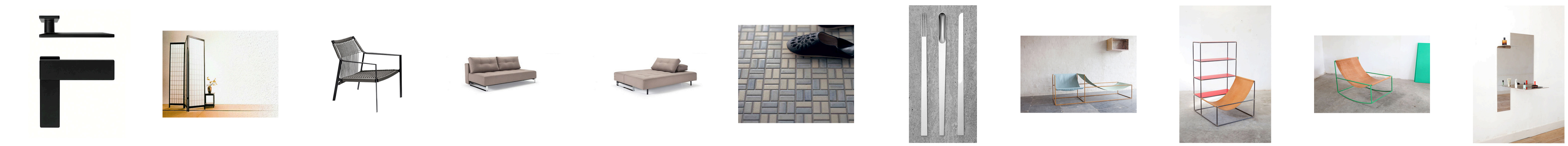
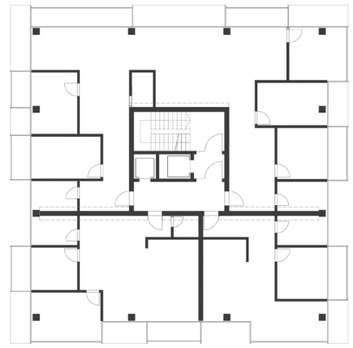


Figure 75. *Type 2 - A Bathroom*

Type 3



5.2.3 Type 3 - The Vivacity of Seasonal

The third type of housing floor plan challenges flexibility of the building elements. Following the concepts of kinetic facade, the use of semi-permanent movable panels enables efficient room expansion. By transforming summer balconies into closed winter gardens, the natural habitat is preserved over the year, capturing the essence of millennials' biophilia. The Vivacity of Seasonal channels flexible design that adapts to yearly changes, preserving the balance of millennial sanctuary. (fig. 76-79)

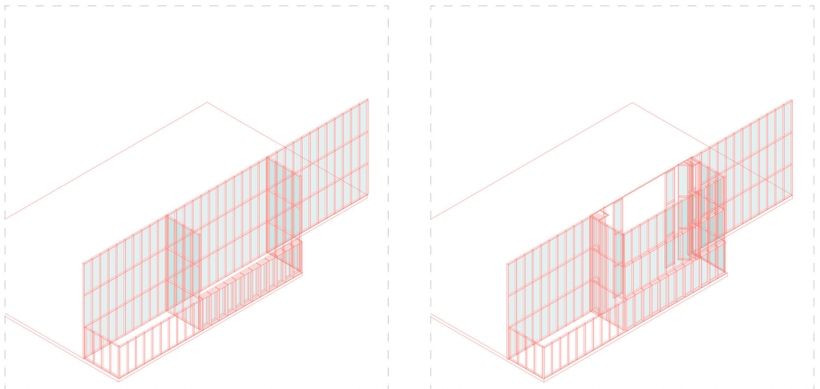


Figure 76. *Type 3 - The Notion of Flexibility*

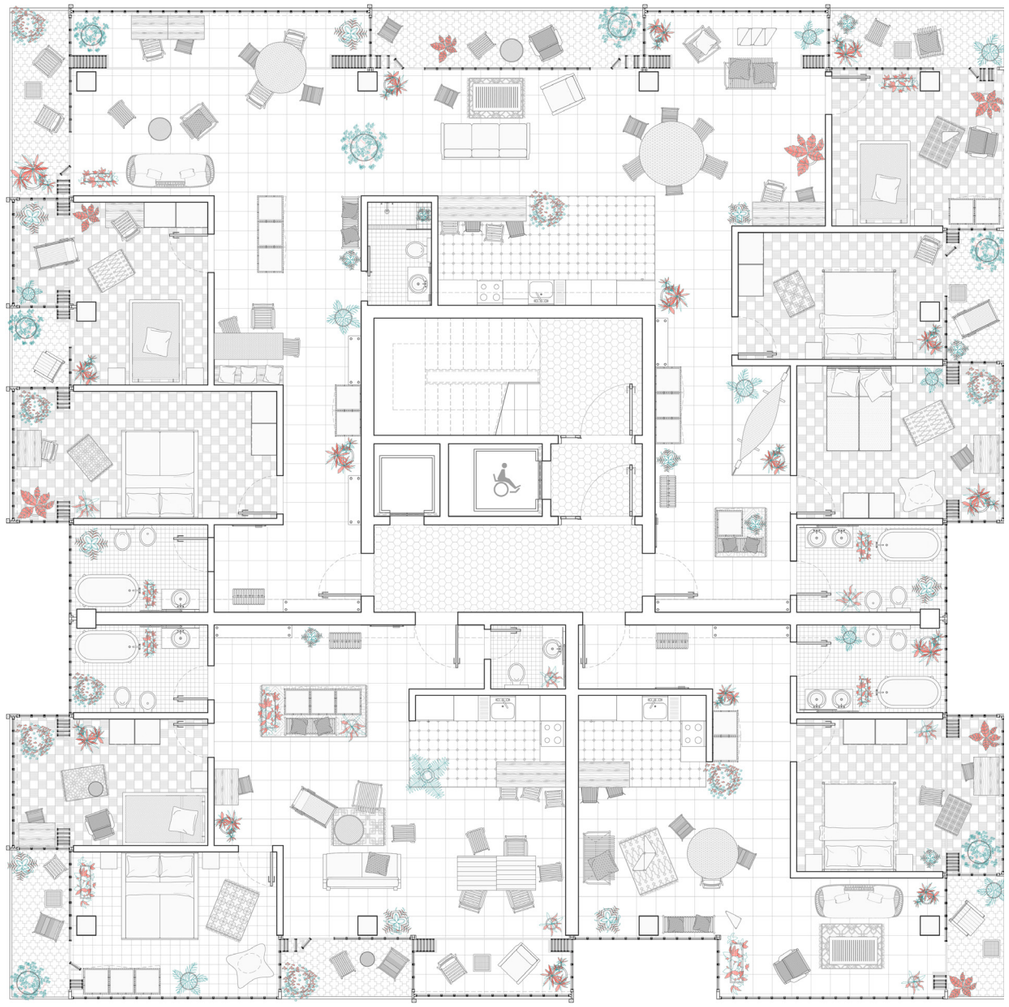


Figure 77. *Type 3 - Dwelling Units Floor Plan, variation 1 (levels 12-13)*

a few months later...

Type 3 - The Vivacity of Seasonal

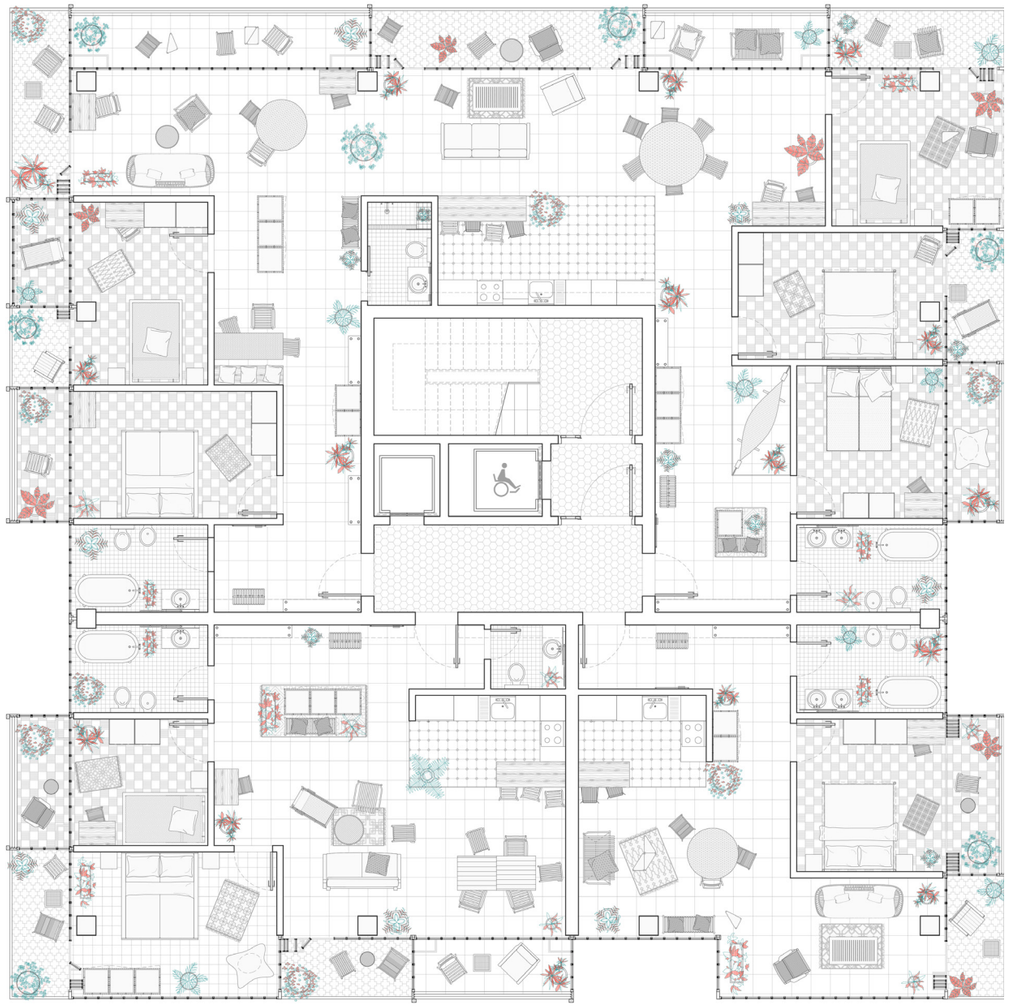


Figure 78. *Type 3 - Dwelling Units Floor Plan, variation 2 (levels 14-15)*

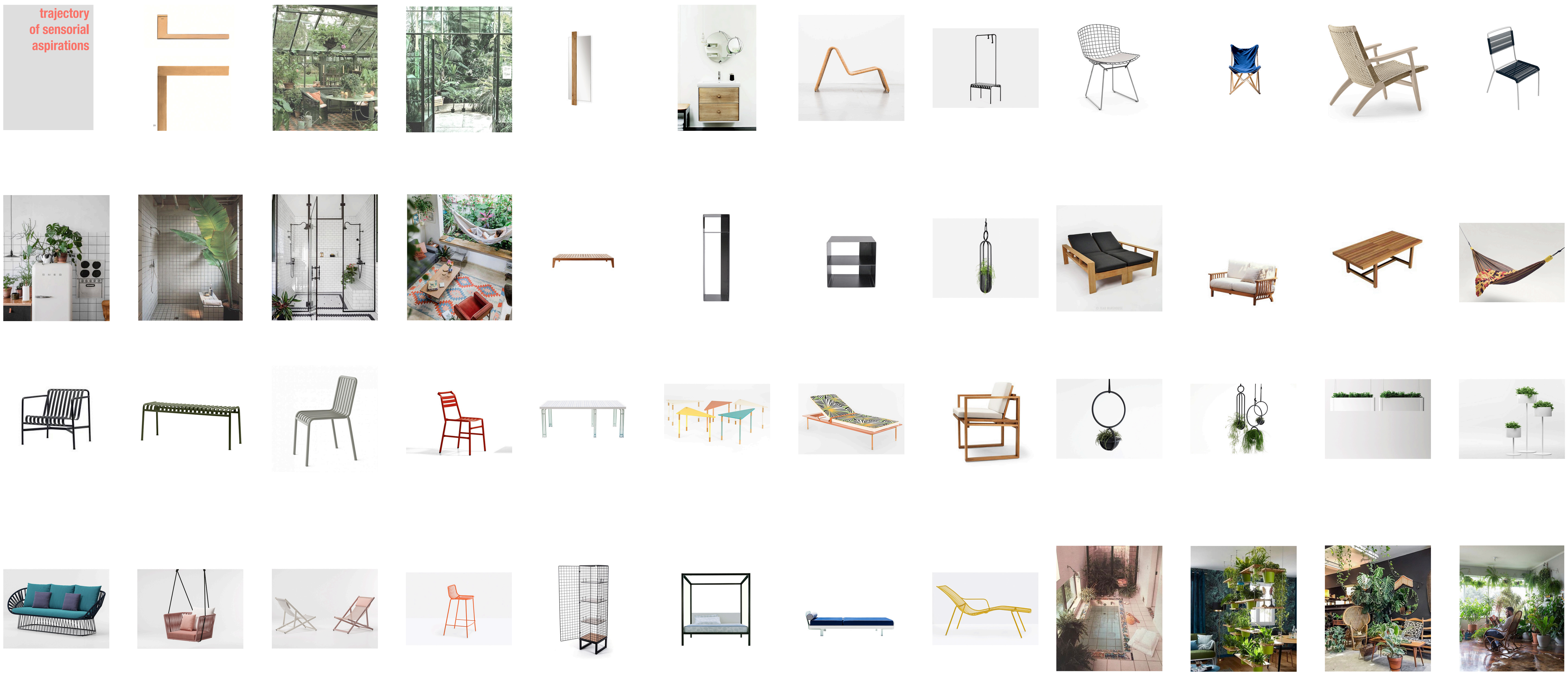
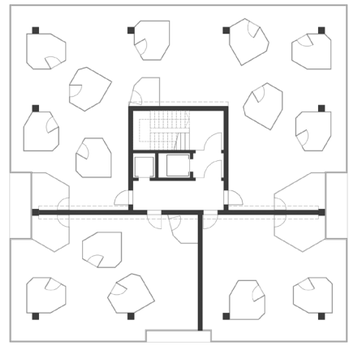

trajectory
of sensorial
aspirations

Figure 79. *Type 3 - A Winter Balcony*

Type 4



5.2.4 Type 4 - The Sanctity of Personal

The fourth type of housing floor plan truly experiments with the minimal spatial requirements to satisfy the needs of a modern dweller. Proposing a reinvention of a loft, the concept is based on movable single-person sleep&work units *("Heptaboxes")* composed with LEED translucent panels that can serve as projection screens. Channeling their introvert nature, the Sanctity of Personal gives the millennials exactly what they need - a choice to be less or more sociable. The units can be rearranged around the double height open plan, creating the in-between spaces of different size, privacy and character. The living area is literally a hallway that can be instantly redefined. (fig. 80-83)

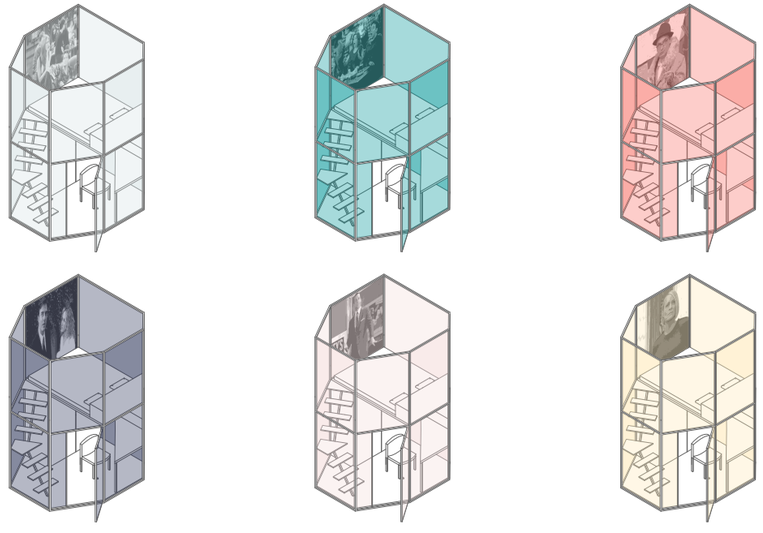


Figure 80. *Type 4 - The Notion of Flexibility*

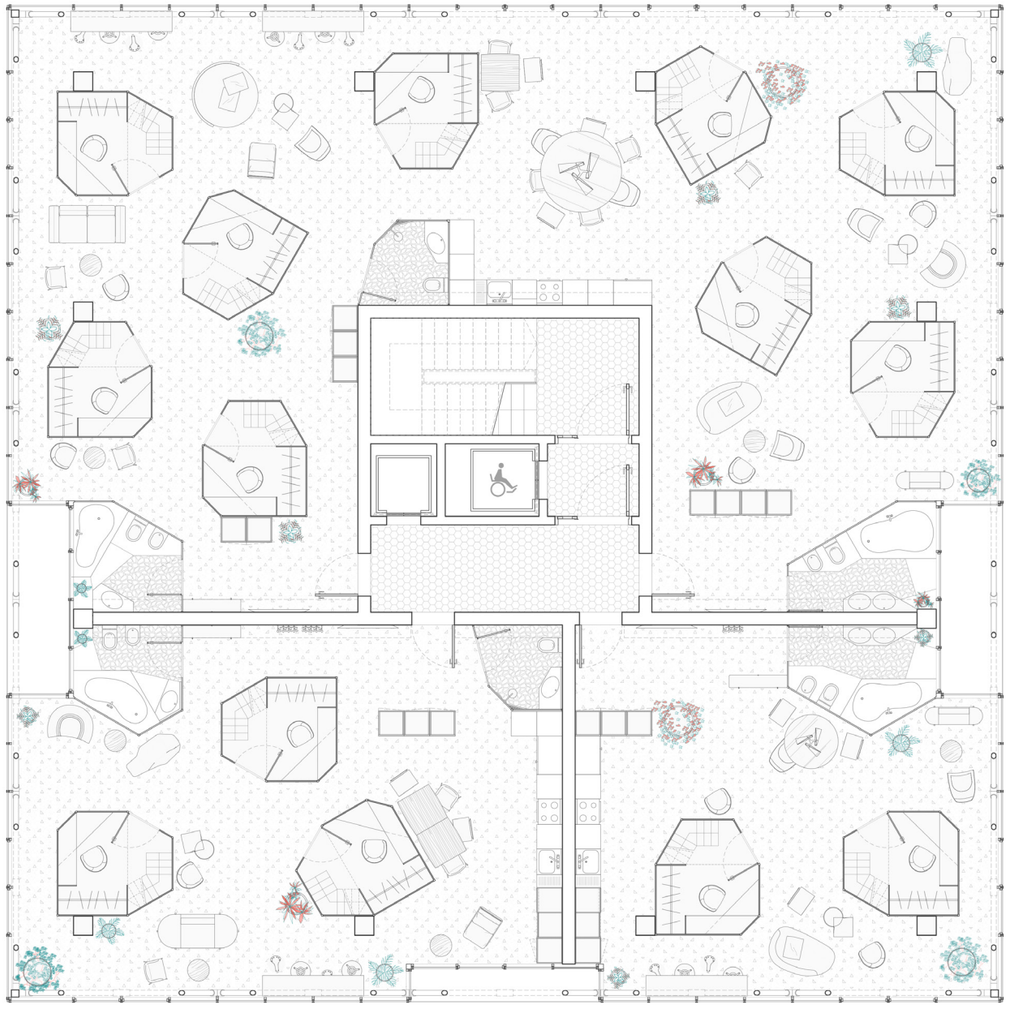


Figure 81. *Type 4 - Dwelling Units Floor Plan, variation 1 (levels 17-18)*

a few days later...

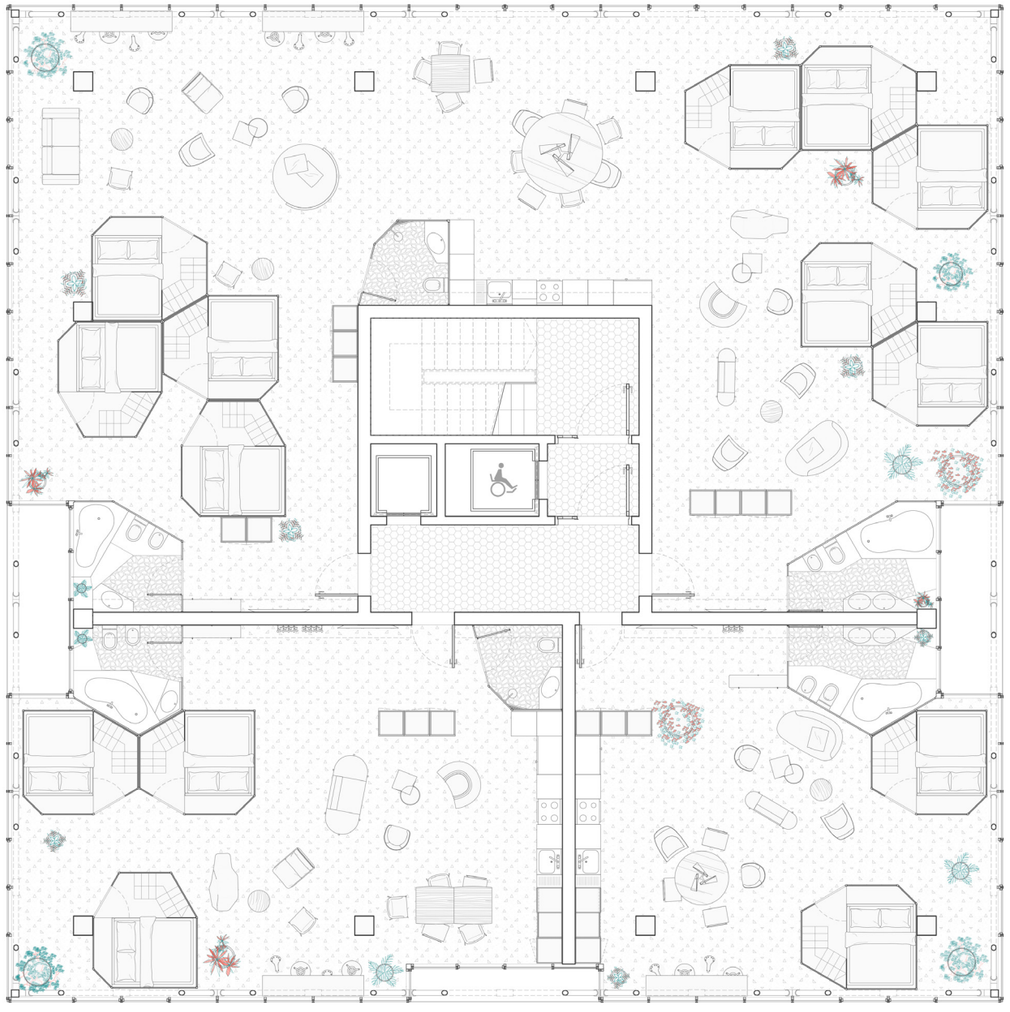


Figure 82. *Type 4 - Dwelling Units Floor Plan, variation 2 (levels 19-20)*

Type 4 - ***The Sanctity of Personal***

trajectory
of sensorial
aspirations

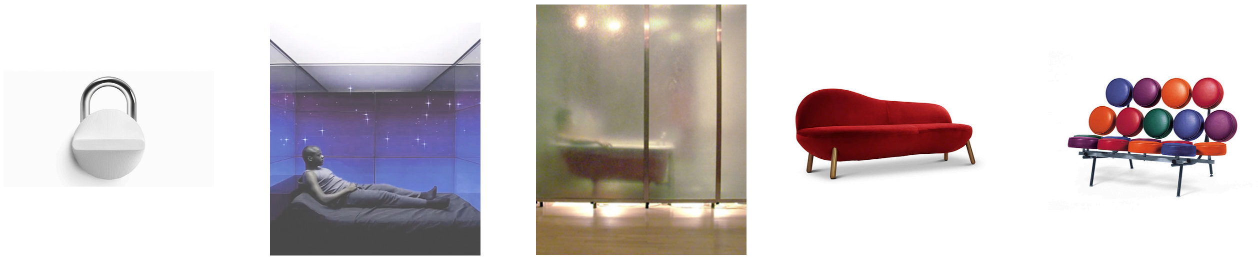
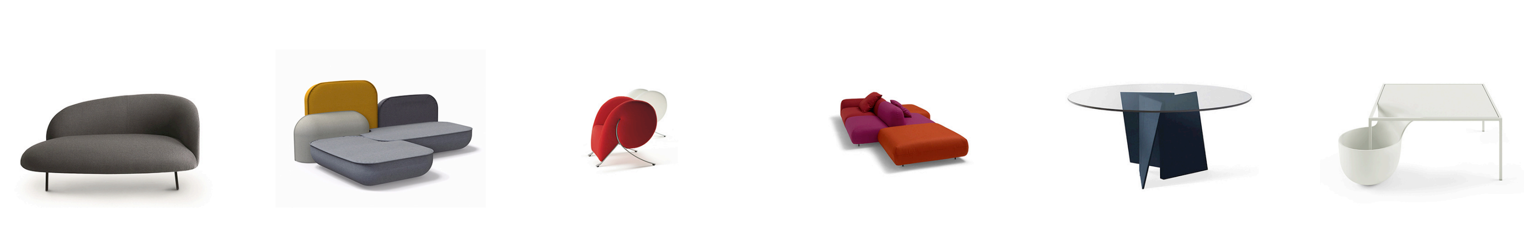



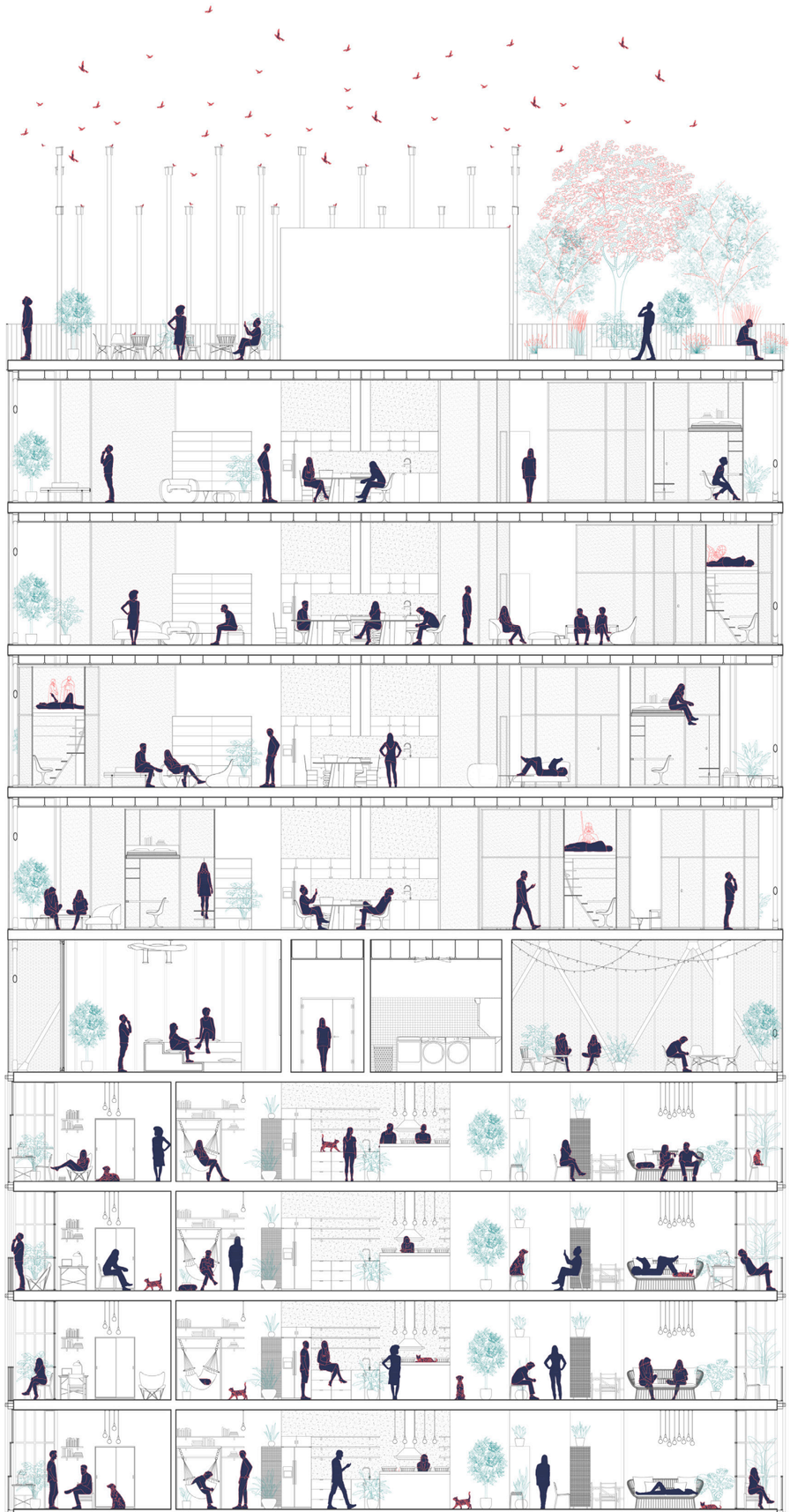




Figure 83. *Type 4 - A Living Room*

Conclusion

Trying to understand the complexity and impermanence of the current housing trends represents a great struggle for all participating sides (dwellers, investors and architects). Ironically, in an era where everything is transparent, available and effortlessly reached, there has been a major communication gap that leads to constant misunderstanding of what a modern home should represent. Even though it is impossible to target every single user and custom-design their home, there is a general idea about the direction in which contemporary housing trends are leaning. Taking in consideration all the socio-economical conditions that are restraining any kind of revolutionary innovation, the most viable solution to the global issue is, as per usual, the simplest one: flexibility. Referring to all aspects of it, flexibility successfully absorbs all the external hits by transforming them into something else, instead of collapsing in front of them, as traditional rigidness does. A metamorphosing society that changes so quickly and reinvents itself on a daily basis (fig. 84), requires a housing model that does the same - effortlessly. All the gestures that could be perceived as notions of flexibility aim at reaching the same quality of life as in traditional housing typologies, but in a different manner. Believing that something that worked well for fifty years will continue to do so in the next fifty years negates the progressive nature of the society and leads to poor results and ultimate dissatisfaction. Therefore, the first step in dealing with the notion of rapid change is not fighting it but embracing it and letting it be the design driver. In times when “temporary” and “disposable” are key-words of the society, one should resist becoming ephemeral and instead strive to evolve with every transformation. The same could be stated for contemporary housing models: focusing on the inevitability of change as a possibility for improvement leads to a much more thoughtful design that allows painless modifications and contributes to overall satisfaction. In the end, flexibility aims at defending the integrity of the design without letting it self-destruct.



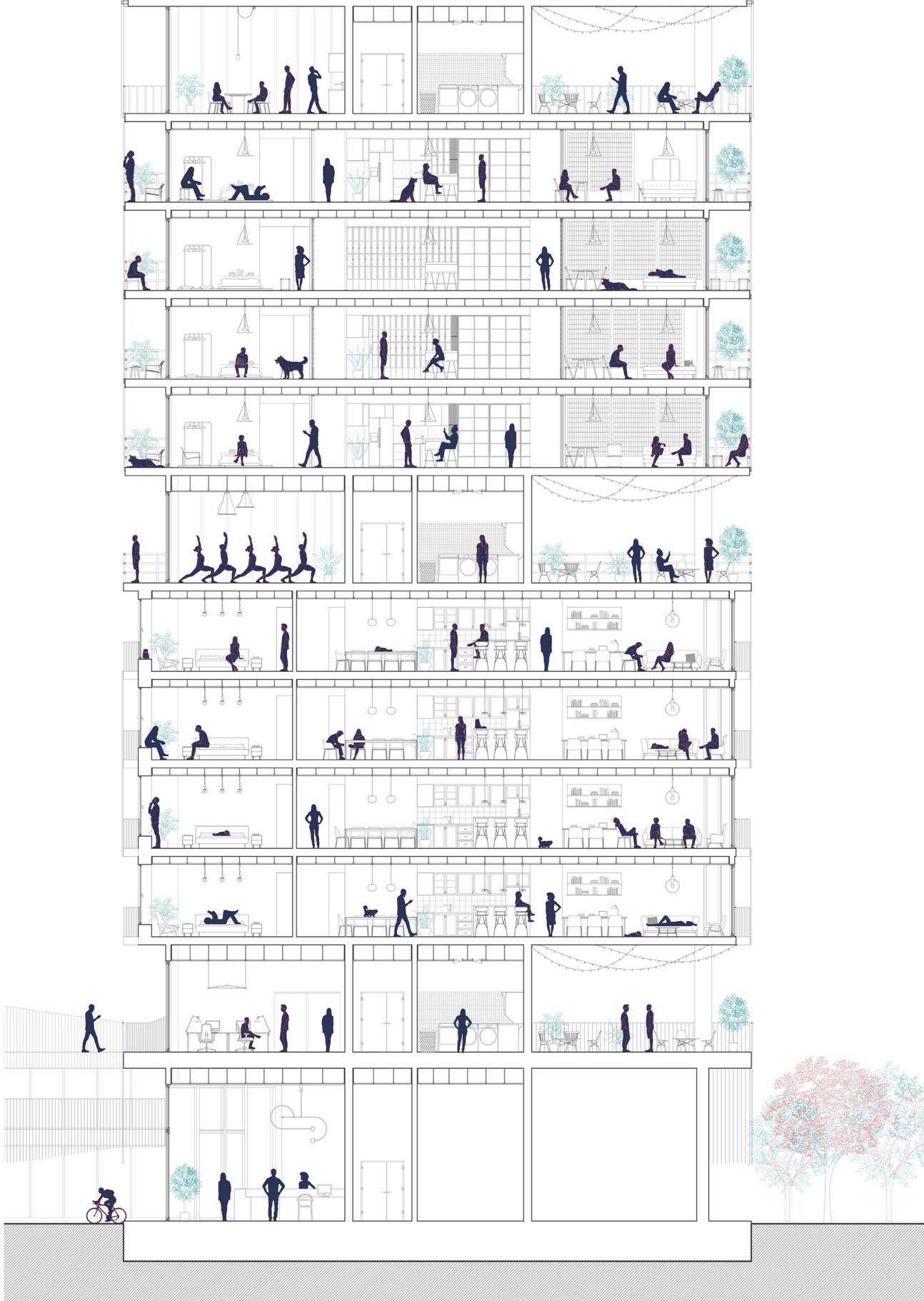


Figure 84. *Fusion Tower section*

Bibliography

1 Eugene Viollet Le Duc, *The Habitations of Man in All Ages*, trans. by Benjamin Bucknall (Boston, MA: James R. Osgood and Company, 1876), 160.

2 Serge Chermayeff, Christopher Alexander, *Community And Privacy: Toward a New Architecture of Humanism* (Garden City, NY: Doubleday & Company, 1963), 135.

3 Jozef Frank, *Writings: Volume 2* (Published Writings 1931-1965), 373.

4 Dirk Van Den Heuvel, *Jaap Bakema and the Open Society* (Archis, 2018), 247.

5 Serge Chermayeff, Christopher Alexander, *Community And Privacy: Toward a New Architecture of Humanism* (Garden City, NY: Doubleday & Company, 1963), 64.

6 Serge Chermayeff, Christopher Alexander, *Community And Privacy: Toward a New Architecture of Humanism* (Garden City, NY: Doubleday & Company, 1963), 105.

7 Serge Chermayeff, Christopher Alexander, *Community And Privacy: Toward a New Architecture of Humanism* (Garden City, NY: Doubleday & Company, 1963), 108.

8 T*he Crisis in Affordable Housing Is a Problem for Cities Everywhere* (https://www.wri.org/blog/2017/10/crisis-affordable-housing-problem-cities-everywhere, 2017)

9 Wendell Cox and Hugh Pavletich, *15th Annual Demographia International Housing Affordability Survey: 2019*

10 *'Shameful': What's driving the global housing crisis?* (https://www.aljazeera.com/programmes/talktojazeera/2018/11/driving-global-housing-crisis-181103062407206.html, 2018)

11 Wendell Cox and Hugh Pavletich, *15th Annual Demographia International Housing Affordability Survey: 2019*

12 *Damning report exposes Europe's escalating housing crisis* (https://www.theguardian.com/world/2015/nov/19/damning-report-exposes-europes-escalating-housing-crisis, 2015)

13 John F. C. Turner, *Freedom to Build: Dweller Control of the Housing Process* (MacMillan Publishing Company, 1972), 152.

14 Dirk Van Den Heuvel, *Jaap Bakema and the Open Society* (Archis, 2018), 256.

15 *Mæ Architects* (https://www.mae.co.uk/practice)

16 Alex Ely, *The home buyer's guide: What to look and ask for when buying a new home* (Blackdog Publishing, 2004), 91.

17 Building For Life, *Delivering great places to live: 20 questions you need to answer* (Commission for architecture and the Built environment, 2008)

18 *MINI Living - Built by All* (https://fuorisalone.it/2018/en/events/1210/MINI-Living-Built-by-All, 2018)

19 Scenari Immobiliari, *Primo Osservatorio sulle nuove forme di residenza per studenti, giovani e lavoratori* (https://www.scenari-immobiliari.it/shop/primo-osservatorio-sulle-nuove-forme-di-residenza-per-studenti-giovani-e-lavoratori/, 2018)

20 Scenari Immobiliari, *In Italia mercato potenziale degli studentati da 50mila posti letto* (https://www.scenari-immobiliari.it/2018/11/13/in-italia-mercato-potenziale-degli-studentati-da-50mila-posti-letto/, 2018)

21 Serge Chermayeff, Christopher Alexander, *Community And Privacy: Toward a New Architecture of Humanism* (Garden City, NY: Doubleday & Company, 1963), 95.

22 *Review: Anne Imhof's 'Faust' at Venice Biennale* (http://www.danskmagazine.com/attention/review-anne-imhofs-faust-at-venice-biennale/, 2017)

23 Francesco Morace, *ConsumAuthors - The New Generational Nuclei* (Bocconi University Press, EGEA, 2017), 14.

24 Francesco Morace, *ConsumAuthors - The New Generational Nuclei* (Bocconi University Press, EGEA, 2017), 58.

25 Francesco Morace, *ConsumAuthors - The New Generational Nuclei* (Bocconi University Press, EGEA, 2017), 16.

26 *This student saves thousands on rent by living in a van* (http://studentlifeguide.co.uk/lifestyle/this-student-saves-1000s-a-year-on-rent-by-living-in-a-van/, 2018)

27 *Happier Camper HC1* (https://happiercamper.com)

28 *AD Classics: Nakagin Capsule Tower / Kisho Kurokawa* (https://www.archdaily.com/110745/ad-classics-nakagin-capsule-tower-kisho-kurokawa , 2011)

29 *AD Classics: Nakagin Capsule Tower / Kisho Kurokawa* (https://www.archdaily.com/110745/ad-classics-nakagin-capsule-tower-kisho-kurokawa , 2011)

30 *Multi-functional living unit* (https://www.verner-panton.com/furniture/archive/20/index.html, 1966)

31 *British Pavilion calls for architects to redesign home ownership rather than houses* (https://www.dezeen.com/2016/05/26/home-economics-british-pavilion-venice-architecture-biennale-2016-uk-housing/, 2016)

32 Elle Decor Italia, *OnLife: Millennials at Home* (https://www.elledecor.com/it/best-of/a20694083/preview-onlife-millennials-at-home-elle-decor-italia-eng/, 2018)

33 Jurjer Zeinstra, *Houses of the Future: 25 years of Critical Reflection on Architecture* (OASE 75, 2008), 203–214.

34 Jurjer Zeinstra, *Houses of the Future: 25 years of Critical Reflection on Architecture* (OASE 75, 2008), 223.

35 Jeremy Till ,Tatjana Schneider, *Flexible housing* (Taylor & Francis Ltd, 2007 - Kindle edition), 79.

36 Jeremy Till ,Tatjana Schneider, *Flexible housing* (Taylor & Francis Ltd, 2007 - Kindle edition), 538.

37 *AD Classics: Endless House / Friedrick Kiesler* (https://www.archdaily.com/126651/ad-classics-endless-house-friedrick-kiesler, 2011)

38 Jeremy Till ,Tatjana Schneider, *Flexible housing* (Taylor & Francis Ltd, 2007 - Kindle edition), 147.

39 Christopher Alexander, Murray Silverstein, Sara Ishikawa, *A Pattern Language* (Oxford University Press, 1977), 142.

40 Jeremy Till ,Tatjana Schneider, *Flexible housing* (Taylor & Francis Ltd, 2007 - Kindle edition), 663.

41 *AD Classics: The Glass House / Philip Johnson* (https://www.archdaily.com/60259/ad-classics-the-glass-house-philip-johnson, 2010)

42 *AD Classics: Maison de Verre / Pierre Chareau + Bernard Bijvoet* (https://www.archdaily.com/248077/ad-classics-maison-de-verre-pierre-chareau-bernard-bijvoet, 2012)

43 *Tribeca Loft / Fearon Hay Architects* (https://www.archdaily.com/80697/tribeca-loft-fearon-hay-architects, 2010)

44 *Superlofts: Projects* (https://superlofts.co/en/projecten/, 2017)

45 Jeremy Till ,Tatjana Schneider, *Flexible housing* (Taylor & Francis Ltd, 2007 - Kindle edition), 1395.

46 Jeremy Till ,Tatjana Schneider, *Flexible housing* (Taylor & Francis Ltd, 2007 - Kindle edition), 1431.

47 *Reconfigurable apartment allows residents to transform their living spaces* (https://www.dezeen.com/2018/02/15/video-white-arkitekter-dream-home-reconfigurable-apartment-movie/, 2018)

48 *Archivio Cattaneo: Casa Famiglia per la famiglia cristiana, 1942* (https://www.cesarecattaneo.com/casa-famiglia-per-la-famiglia-cristiana-1942/)

49 *PREVI Low Cost Housing (I)* (http://www.hiddenarchitecture.net/2018/03/previ-low-cost-housing-i.html, 2018)

50 *Typology and Participation: The Architecture of Alvaro Siza* (https://www.artforum.com/print/201603/typology-and-participation-the-architecture-of-alvaro-siza-58115, 2016)

51 *Half A House Builds A Whole Community: Elemental's Controversial Social Housing* (https://www.archdaily.com/797779/half-a-house-builds-a-whole-community-elementals-controversial-social-housing, 2016)

52 *Reinventing collective housing: Carré Lumière in Bègles, by LAN architecture* (https://www.bmiaa.com/reinventing-collective-dwelling-carre-lumiere-in-begles-by-lan-architecture/, 2015)

53 *Transformation de 530 logements* (https://www.lacatonvassal.com/index.php?idp=80, 2016)

54 NJ Habraken, J Th Boekholt, PJM Dinjens, AP Thijssen, *Variations - the systematic design of supports* (MIT, Cambridge, MasS, 1976), 160.

55 Jeremy Till ,Tatjana Schneider, *Flexible housing* (Taylor & Francis Ltd, 2007 - Kindle edition), 1898.

56 *The Kitchenless Home: This Architect Wants to Revolutionize Homes—by Getting Rid of Kitchens* (http://www.metropolismag.com/architecture/anna-puigjaner-kitchenless-home/, 2018)

57 Hugo Priemus, *Flexible housing: fundamentals and background* (Open House International 18, 1993), 19.

58 CZA Cino Zucchi Architetti, *Il masterplan per il nuovo quartiere di housing sociale a Cascina Merlata propone un insediamento denso di volumi alti alternati a giardini comuni* (http://www.ordinearchitetti.mi.it/it/mappe/milanochecambia/edificio/1955-edifici-3-4/13-cascina-merlata, 2013)

"A poem is never finished, only abandoned".

Paul Valéry

july, 2019