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INCREASING ADAPTABILITY THROUGH ARCHITECTURAL DESIGN

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ABSTRACT

Since the advent of modernism's living machines and industrial revolution's mass housing, realizing the essentiality of adaptive architecture, architects have been experimenting and developing methods to create flexible architecture that can respond to changing needs. This paper sums up design approaches that relativley did last longer in architectural history. In which can be counted as: Open Plan, Industrialization and Prefabrication, Functional Uncertainty, Open Building and User Participation Design Approache. In order to design spaces that is inherently flexible and adaptable, it is beneficial to look back over the different methods experienced in the past centuries. However, it is not a necessity for us to reproduce the same spaces and tarred with the same brush. But rather than that developing or maybe mixing these design approaches. It can be said that there is no one truth or one right design approach to beleive in to accomplish flexibility, yet, it is important for the architect to choose the right method or maybe to mix methods that would be suitable for the place, people and time period designed for.

Keywords: User Needs, Architectural Design Approaches, Felxibility, Adaptability.

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UYARLANABİLİRLİK KAPASİTESİNİ ARTTIRAN MİMARİ TASARIM YAKLAŞIMLARI

ÖZET

Modernizmin yaşam makinelerinin ve sanayi devriminin toplu konutlarının ortaya çıkmasından bu yana, uyarlanabilir mimarinin gerekliliğini fark eden mimarlar, değişen ihtiyaçlara cevap verebilecek esnek mimari yaratmak için çeşitli yaklaşımlar deneyip geliştirimiştir. Bu makale, mimarlık tarihinde görece daha uzun süre dayanan tasarım yaklaşımları özetlenmektedir. Bunlar, Açık Plan, Sanayileşme ve Prefabrikasyon, Fonksiyonel Belirsizlik, Açık Yapı ve Kullanıcı Katılımlı Tasarım Yaklaşımı olarak kısaca sayılabilir. Yapısı gereği esnek ve uyarlanabilir mekanlar yaratmak adına, geçmiş yüzyıllarda geliştirilen farklı yöntemlere bakmakta fayda vardır. Ancak aynı yöntemler izlememiz ve aynı deneylerden tekrar geçmemiz yerine bu tasarım yaklaşımlarını geliştirmek veya belki karıştırmak daha doğru olacaktır. Esnekliği sağlamak için inanılacak tek bir doğru veya izlenecek tek bir tasarım yaklaşımı olmadığı söylenebilir. Tasarlanan çağın, coğrafi konumun ve sosyal kesimin dikkate alınmasıyla birlikte mimarın doğru yöntemi seçmesi veya çeşitli yaklaşımları birleştirmesi önem arz etmektedir.

Anahtar Kelimeleri: Kullanıcı Gereksinimleri, Mimari Tasarım Yaklaşımları, Esneklik, Uyarlanabilirlik.

INTRODUCTION

In the research of flexibility in residential space design, Along with the singular examples of free plan schemes that brings the individual to the forefront, and with the mass production taking place in modern architecture, modernist architects started diversifying in multiple houses production. And with the possibilities provided by prefabrication techniques, modernist architects worked on making interventions related to flexibility after the design of a single housing unit in multiple housing productions such as adding/removing or enlarging/reducing this unit in a certain system. (Hasgül, 2018).

The first examples of flexible design belong to Le Corbusier. Corbusier has designed functional and aesthetically flexible residences. The ideas of "free plan" (plan libre) and "free facade" (façade libre) put forward by Corbusier in the 20th century are directly related to the flexible design principle (İslamoğlu, 2016). The freedom

that is meant here adopts an approach that aims to separate the elements that used to be closely connected to each other and to free them from dependence on each other. the plan corresponds to the façade, the construction, even the plans of the lower and upper floors; it aims to free the façade from the plan and construction, the construction from the spatial setup and the window from its dependence on the walls. In fact, it aims to free the garden from the soil, the house from the settlement, the settlement from the city, the pedestrian path from the highway, and so on, from being dependent on each other, from being conditioned by each other (Bilgin, 1999). Maison Domino is the first reinforced concrete skeleton system designed in line with these principles in 1914 (İslamoğlu, & Usta, 2018).

John Habraken, Herman Hertzberger and Wesley Jones are among the most considerable architects who have sought flexible and adaptable built environment design since the era of modernism. In addition, the leading architects of modernity such as Gropius, Aalto, Friedman, Rohe and Le Corbusier have produced different adaptable plan schemes.

The Fun Palace, proposed by architect Cedric Price and theater critic John Littlewood in the 1960s, was a project with flexibility as a leading architectural and technological experiment in post-World War II England. Price and Littlewood's proposal included flexible, technological, and temporary spaces. Although it was not built, it influenced the urban understanding and architectural orientations of the period. It is seen that many different architects, influenced by Price, propose flexible spaces, from the Archigram group's proposals of the city with flexible spaces that move, change, and walk to the interrogations of Team 10 about functionalism in the context of strict boundaries between scales and functions, and individual and social freedoms damaged by these rigid boundaries. Undoubtedly, the spirit of the age is moving away from the imposition of functionalism by seeking different spatial solutions (Yazıcıoğlu Halu, 2019).

According to Kronenburg (2007) -who is another proponent of flexibility in architecture-, flexible buildings are the ones that intend to respond to changing situations in their use, operation, or location. This is architecture that adapts rather than stagnates; responds to change rather than rejects it; is motive rather than static. It is a design form that is by its essence cross-disciplinary and multi-functional and consequently, is frequently innovative and expressive of contemporary design issues.

By revealing its basis and the factors that are determining its development, the value and relevancy of flexible architecture to contemporary problems associated with technological, social and economic change can be revealed. (Kronenburg, 2007).

Kronenburg (2007), has listed the flexible architectural approaches into 4 subheadings:

1. Adaptable Architecture: A house that can adapt to growing families and is able to change rooms number.
2. Transformable Architecture: A building that changes functions due to social changes.
3. Mobile Architecture: Unlike Forty and Koolhas, Kronenburg spoke of architecture that can be moved. In this category, he mentioned functions that are not tied to a specific location, such as the military, hospitals, charities, concerts, and markets.
4. Interactive Architecture: Here he talked about a high-tech architecture that senses the need for change and automatically responds.

Furthemore, Flexible architectural approaches, categorized by Forty (2000) based on Koolhaas's (1995) article, are fundamentally similar to Kronenburg's categorization, except for the interesting last category "political strategy".

1. Spatial Abundance: Since the pre-20th century modern buildings were not constructed with functional determinism, Forty (2000) attributed the large and excess spaces to spatial abundance, that is, leaving extra spaces as a way of providing flexibility. (Yazıcıoğlu Halu, 2019).
2. Flexibility provided by technical means: Lightweight prefabricated building elements that can be movable with the help of fixed mechanisms in the space, which became widespread in the pre-1950 period, or the flexibility provided by the mobility created by the help of positioning the installation independently from the building elements.
3. Political Strategy: Here Forty referred to Lefebvre's theory. According to Lefebvre, architects are equated with rigid and dominant spaces and this situation limited their opportunities. Utilization is a political weapon to be drawn against architecture.

“Sovereignty can only be achieved by resisting the space acquired, by claiming the freedom of use and by experiencing the flexibility and multifunctionality of the space by the user.” (Forty, 2004)

Flexible Architectural Design Approaches

1. Minimal Space/Open Plan Approach

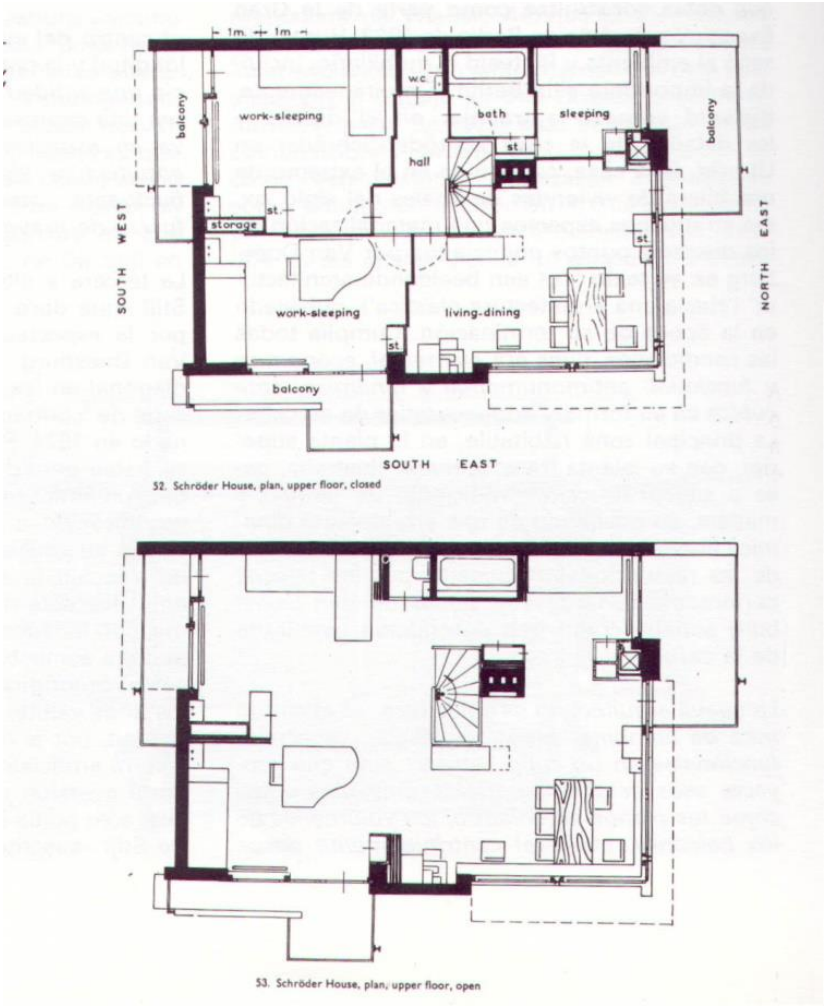
Following the first world war this appraoch spread throughout the west as a result of the urgent need to produce small, affordable and tolerable housing. In the early 1930s, architects such as Van den Broek and Heinrich Leppla and Mart Stam started to explore the real usage cycle of a dwelling. Broek and Leppla analyzed the actual usage of the fixed areas of a residence used by different family structures, first as “daily/nightly” and then as “now/future” and an overlap of the two. According to Stam, who made a similar study; In particular, the house plan must be designed in such a way that it allows for the reorganization and grouping of the dwelling according to the needs and desires of the particular time of the day, no longer being static and fixed.

In this approach it is believed that floor plans should produce designs that allow for mobility and a variety of usages. Here the word flexible is used in its superficial sense; With movements such as folding and unfolding the architectural elements, the same room is transformed into different forms at different times following needs. Foldable beds, foldable seats, etc., which were used in ships and trains in the first place, then became widespread in home use. In short, despite its physical smallness, the building can offer the user plenty of space with amenities such as sliding wall panels and folding furniture.

On the other hand, according to Habraken, it is not necessary to use movable elements in spaces with open plan schemes. Open plans, which is presented as a type of support in the open building design approach, are an unfinished product and completed by the user. However, it should be able to work in different scenarios invented by the architect during design process. At an early stage it seems like an unfinished field, as time goes on and as it gets used it will look like it's complete, but there will never be a "final result".

It is usually cited as an example that Gerrit Rietveld's "Schröder House" can be used to describe this approach. However, according to Schneider and Till (2007),

the weak point of this project is that the space's shape and limitations are under the



architect's desision. (Figure 1)

Figure 1: First Floor Plan of Schröder House, Open and Closed (Url-1)

Apart from being one of the iconic projects of modernity, Schröder House has sought maximum flexibility in a minimal space. Unlike the traditional Dutch house, where the rooms are accessed through corridors, this house does not have a hierarchical arrangement of rooms in the floor plan. The upper floor is an open space and can be divided into four separate rooms with sliding panels when needed. Sliding and folding panels are the main elements of the building and they determine its architecture. According to Schneider and Till (2007), among all the seminal houses of the twentieth century, Schröder House was the project that influenced architects the most among flexible projects.

However, the fact that the house was tailored to a very specific set of requirements made its flexibility questionable. Therefore, it has been difficult to draw general principles from the project. However, the stamp left by modernity in the design of the house is obvious, it cannot be said that there is no room for the personal taste and psychological choices of the user. In addition, according to Schneider and Till (2007), while trying to achieve a flexible design by using complex sliding walls, folding screens and movable cabinets, it has been forgotten that all these possibilities will become unnecessary for new users who wont know how to use this complexity (Schneider & Till, 2007).

Although the most prominent example of this approach in the context of housing is the Schröder House, it would be useful to mention urban scale examples of the open plan approach such as Yona Friedman's Spatial City.

Wachsmann drew attention to the importance of prefabrication due to the immigration and housing needs as a result of the Second World War. Wachsmann's ideas influenced Friedman and later the Metabolist group. (Frampton et al., 2011).

Friedman emphasized these irregular structures, in which individuals can create the form they want with the materials they want, as the 'socialization' of the space frame system, and stated that the trial and error method can be applied in the Spatial City project and that the practitioner will be the user. The urban planner and architects in the project are actually users. It is an open-ended megastructure project and has no specific plan or facade. Therefore, Friedman stated that the Spatial City project cannot be planned in advance, it can only be realized (Iaac, 2012). However, he did many drawings and sketches of the project in order to express his ideas (Çetin & Ceylan Baba, 2020). (Figure 2)

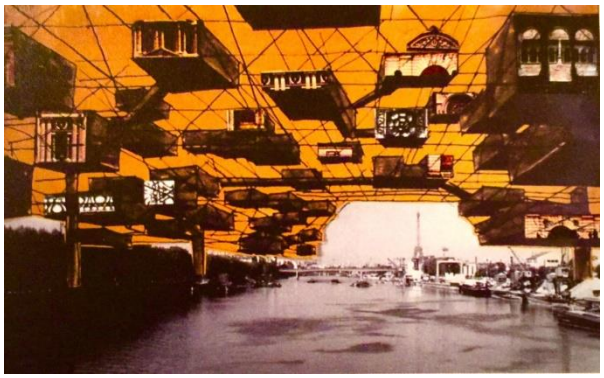


Figure 2: The Spatial City, Friedman. (Url- 2)

The spatial city can be applied over existing cities, as well as rural areas, even on the water surface, without the need for demolition by raising it from the earthen ground. In this way, Friedman thinks that the horizontal expansion of the city and its spread to rural areas will be prevented. It has planned to be able to use the soil for agricultural activities without harming the natural environment if it is implemented in rural areas, and thus a self-sufficient sustainable city.

Friedman's Spatial City is a general containment system, proposing an empty "space" without a specific floor or ceiling. A minimal space-frame structure can only be thought of as an anti-gravity device to hang volumes freely imagined by the user. A structure without a floor, wall, roof, or pre-designed containers or shapes.

The Spatial City project was criticized by Constant Nieuwenhuys, a member of the Situationist group. Constant stated that the concept of the city should no longer hold on to the settlements left over from the industrial revolution, and that the concept of the city without borders, which supports the nomadic lifestyle, should be adopted. He argued that the Spatial City did not fit into the mass culture, and therefore it was insufficient for the project to transform the city socially, practically, culturally and technically. Constant stated that the new city should be independent of the rhythm of the existing city by offering a new social life. Friedman, on the other hand, touched on the role of the designer while criticizing Constant's project, New Babylon. Friedman spoke of how utopian it was to hope to find someone capable of projecting the different modes of use that exist in the city but cannot be identified. He emphasized that these usage modes can change from person to person or over time, and it is impossible to know them in advance and design accordingly. He also

grounded the Spatial City project in this context (Çetin & Ceylan Baba, 2020). (Figure 3)

Figure 3: Yona Friedman's Spatial City at the Shanghai Museum of Modern Art (Url-3)

This approach of flexible architecture is suitable for daily and short-term changes or temporary situations. In the case of the pandemic period, dwellings were converted to work environmentd durint the daytime, or hospitals were used for testing or vaccination in areas normally allocated for different functions. Areas can easily be transformed thanks to this approach.

The Open Plan approach can be Briefed as following: the plan is free of divisive elements, and the spaces are completely free and open to each other in a way that can respond to all kinds of needs. It is important to note that although it is similar in name with the Open Building (OB) approach, it differs in content.

2. Industrialization and Prefabrication in Architecture

The usage of prefabrication technique in architecture started with the aim of meeting the most basic needs of humanity, and after the war, it was seen as an ideal solution to produce prefabricated houses while trying to provide shelter to societies with as little effort and process as possible. It created new production techniques, new materials, and new industrial expertise that could be lined up in prefabrication

to rationalize home construction during the war (Fisher, 2014). Later, with the changing needs of societies, the transformation of functions in buildings became a necessity, leading architects to use this technique in flexible designs.

With the industrial revoloution causing a huge city migration, architecture started to be standerdized trying to meet the increasing housing needs. A systematic mass production of buildings was considered key to war-time and post-war construction, and standardization of building components seemed the best way to meet housing demands of the periods (Jung, 2008). However, this standerdization dragged architects into creating 'typicallity' in design, rigid and unresponsive spaces. The September 1942 issue of Architectural Forum, "The New House 194X," exemplifi ed this thinking. The journal invited thirty three architectural fi rms to present their ideas on standardization and systemization of a housing production, one of which was by SOM, ironically entitled "Flexible Space." While most of the other proposals were practical and useful, SOM focused on a fairly abstract idea of space. The goal was to construct a formula of spatial organization in which a building was conceived as a collection of disassembled parts and dividable functions. "Flexible Space" prefi gured the idea of mass customization. The firm stated that "every family is different" and "every family changes," arguing that the formulas could meet diverse demands of various families (Jung, 2008).

Techniques such as modular architecture and prefabrication were used in this approach, which almost turned a problems cause into it's cure. It can be said that the presumed economy of prefabricated and industrial products can offer a wide range of options to the future users. According to Gropius, standardizing the components of a single house is an opportunity to provide the greatest possible variation in the floor plan. This approach of flexible architecture is ideal for relatively long-term changes. With its modularity, the building will be able to adapt easily by attaching and removing parts in cases of a changing in the family structure or a complete change of the user. furthemore, this approach is likely to be suitable for an after war/disaster life, thanks to both rapid production and various possibilities offered by the end product. Skidmore, Owings and Merrill explained their Flexible Space project published in "The New House 194X" as follows: "Structural elements are the vocabulary, the relationship between is grammar and the final expression of the field can be considered as a composition" (Figure 4)

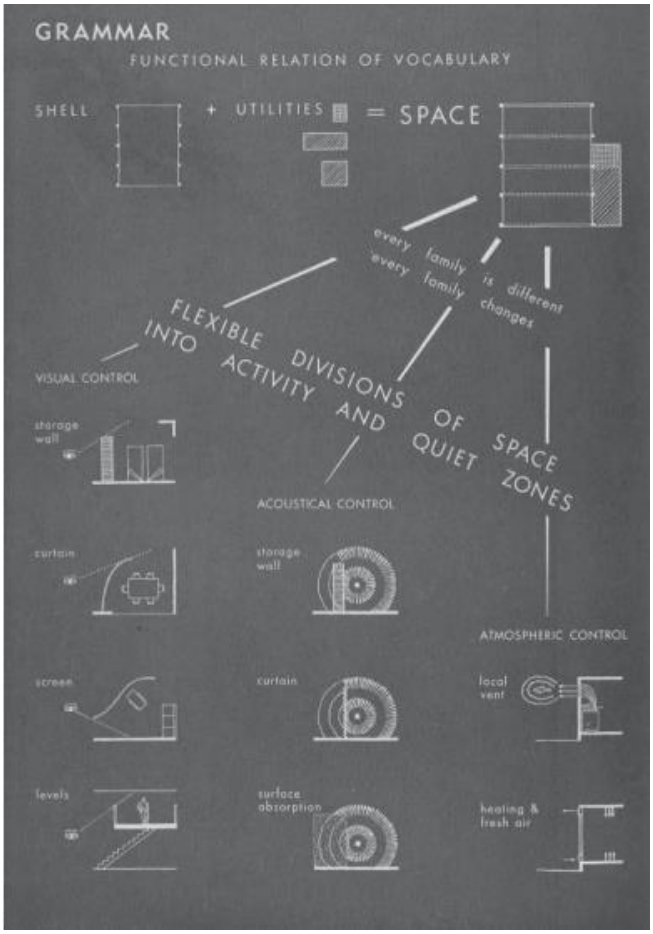


Figure 4: The New House 194X - Flexible Space, Skidmore, Owings and Merrill (SOM), Grammar (Jung, 2008)

Prefabrication technology has been used at different scales to produce flexible designs. It is aimed to produce spaces with endless options like as if in a lego game by producing buildings from prefabricated components resembling lego pieces, as well as to provide lightness to movable building elements in interior spaces. Mosh Safdie's Habitat 67 project, in which prefabricated parts are connected, comes to mind in this context. (Figure 6) However, the use cases of the prefabrication technique for flexibility remained mostly theoretical.

Figure 5: Habitat 67, Mosh Safdie (Url-4)

However, this excess of architectural intent did not lead to many built examples of housing which was inherently flexible both at point of design and over the long term (Schneider & Till, 2007). This technically-set agenda is more focused on issues such as market demands and rapid construction, rather than longe-term flexibility. As it is with industrial products, ensuring the immediate satisfaction of the customer in the short-term demands of the real estate market precedes any thought about how the customer will use the product in the long run. Here, with the experimental projects of the 20th century, we encounter a clear warning that technique alone is not enough to create flexibility.

The architectural movement that should be mentioned in this context is the Metabolism, which uses the prefabrication technique for flexibility. It is a modern architectural movement that originated in Japan and dates back to the late 1950s and 1970s. Although it faded 25 years after its creation, one of the most recent interactions with metabolism was Rem Koolhaas and Hans Ulrich Obrist's Book of Project Japan: Metabolism Talks, published in 2009. The Metabolist movement, with a group of young Japanese architects at its head, turned towards a more mobile, dynamic and adaptable architecture for the urban future during the post-war reconstruction of Japan after the living machines era of modernism.

Metabolist architects and designers believe that cities and buildings are not static entities, but are constantly changing and organic like metabolism. It is thought that buildings that accommodate post-war population growth have a limited lifespan and must be designed and built to be able to change. These ideas first came to light at the "World Design Conference" in 1960. The ideal scheme of metabolic structure is derived from an analogy with biology and nature: Vertical circulation and serving functions, such as a tree, core, will be housed in a "trunk"-like mega-structure to which prefabricated living capsules will be added, which can be replaced when needed.

The most famous project of this movement, Kurokawa's Nakagin Capsule Tower, was created to house traveling businessmen who work in central Tokyo during the week. The technology developed by Kurokawa is built interchangeably, allowing each unit to be mounted to the concrete core with 4 high-tensile bolts. However, none were changed during the building's lifetime. Each capsule measures 4 x 2.5 meters and provides enough space for a person to live comfortably. In addition, the inner area and capsule of each module can be manipulated by connecting to other capsules, depending on necessities.

The interior of the capsule is designed flexibly with the use of movable and folding furniture. The bed can be folded and turned into a seating element as needed, or it can be lifted completely to the level of the wall (Figure 7). The work table, kitchen equipment and coffee table can be opened and folded in the same way. Users, however, preferred to use furniture of their own choice (Figure 8).

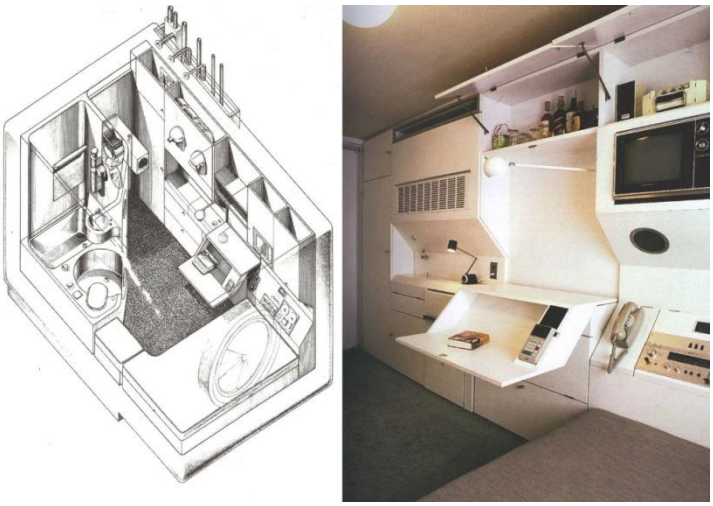


Figure 6: Nakagin Capsule Tower, Interior (Url-5)

Figure 7: Nakagin Capsule Tower, User Preference for Indoors (Url-5)

Therefore, personal preferences tried to fit into the narrow space of the capsule questioned the flexibility of the project. It can be said that the level of flexibility in the project does not go beyond the ability to attach and remove prefabricated capsules.

3. Functional Uncertainty (Loose Fit Approach)

The 1960s were the years when mathematical precision was questioned, it was argued that there could more than a single truth, and the invisible behind reality began to be discovered. In order to know the world in the light of brand new possibilities, we can talk about the perceptual uncertainty that reveals itself as a possibility beyond the stereotypes of ordinary knowledge (Yenice, 2019). One of the precautions taken against change and time by architects like Alexander, Turner and Habraken, was to free the plan scheme from molds, excessive clarity and monofunctionality.

Inspired by the uncertainty of the future, this approach advocates designing architectural spaces to suit various needs and uses without assuming a function. Shcneider and Till (2007) presented dining rooms in London as a counterexample to functional ambiguity. This room, shaped according to the rectangularity of the dining table, with two entrances on one wall side, which made it one of the rarely used and often derelict rooms of the Londonian house. The design of mass housing bedrooms to be shaped according to the size of the bed is similar issue, users who force different kind of functions are not satisfied with the results. Yürekli (1983) proposed a general concept that encompasses uncertainty, flexibility and adaptability in his associate professorship thesis. Uncertainty; It means not being certain, being temporary, not being specific to any situation - being general- (Yürekli, 1983).

Since the considered as a very typical example (especially its shape and usage possibilities with its circulation area), room shape, room equipment and layout, neutral qualities of window openings, without the need for the use of any mechanical equipment, can be used for indoor activities at a high level. Allowing you to choose different locations. In my opinion, the traditional "qualities of the spaces are determined depending on the location, form, equipment and the characteristics of the limiting elements, their specialization - expressing any function - will depend on these features. The traditional "Turkish House" plan form, which is Turkish House" with these features constitutes an instructive and guiding advanced example (Yürekli, 1983).

4. Open Building (OB)

In 1962 John Habraken published his book *Supports: an alternative to mass housing.* According to Habraken, the main problem of residential architecture is that it is built for people, who will never have the slightest chance to make basic decisions about their living environment. Against the idea of a house as a consumer, repetitive and finished product, Habraken proposes the concept of house as a process. A dwelling is understood as the relationship of the dweller with his environment, a natural relation based on the acts of our daily lives and it is deeply rooted in the foundations of our existence (Setién, 2014).

Components logic has always been considered as a non-prefabricated, flexibility and adaptability approach. John Habraken advocated a dynamic architecture that shapes daily life and allows for change. It divides the building into support and fill. Creating a clear distinction between the two, Habraken emphasized that this distinction is not only technical, but more importantly, it focuses on the interaction of personal abilities. The support is part of the public space and is permanent in the building, while the filling is personal and interchangeable. There are many successful examples of this "Open Building" theory of Habraken, which has attracted the attention of architects. Its main purpose is the user's participation in the design and freedom of choice. According to Habraken's approach, the role of the architect is not to design the space, but to design a carrier system in which the space can be placed (Islamoglu, & Usta, 2018).

It is possible to liken this system to a product in which the architect and the user have a one-to-one relationship; The client can specify the desired fine and coarse to the architect among endless options. On the contrary, it is the ready catalog house offered to the user. However, the open building system proposed by Habraken creates spaces as flexible as the house designed specifically for the user, and as accessible to the middle social segment as the typical house.

What is unique about Habraken's interpretation of building design is that the support or infill system is not just a technique. Rather than proposing a finished product, Habraken has proposed a process. It empowered the user in the design of his own house and included the user in decision making. There are three basic beliefs on which this thought is based:

1. Everyone should be able to shape their own house according to their wishes.

2. Everyone should be able to express themselves as a function of their own choices.

3. Everyone should be able to take creative actions by organizing their own space.

Under the term Open Building for the construction of the environment, advocated by the Dutch Foundation for Architectural Research (S.A.R.) under the directorship of Habraken, and later developed with international groups, comes a number of different, but interrelated, principles. These:

1. Most commonly: Different levels of intervention to the built environment, such as those expressed as "support and infill" or "urban design and architecture".

2. Users can also make design decisions. More generally, making the design process one with multiple participants of different types, including professionals.

4. The idea that the interface between technical systems can allow one system to be replaced by another that performs the same function. (Like different filling systems applied in the same base building)

5. Acceptance and understanding of the idea that the built environment is in constant transformation and change.

6. The product of an ongoing, never-ending design process in which the built environment is transformed piece by piece.

Infrastructure types and open building:

1. Infrastructure as skeleton: the internal partitions of each house, as well as the façade, are not part of the infrastructure, giving the architect a great freedom in the design of each house. Hence, an infrastructure as skeleton is a construction able to accommodate houses which can be constructed, modified and demolished without affecting each other; in other words, we are talking about autonomous houses in a high-rise building (Setién, 2014).
2. Infrastructure as envelope: In this second scenario, the external enclosure becomes part of the infrastructure, acting as a common element representative of the whole building. This is the case for instance of the speculati-

ve office buildings which have operated for decades on the basis of these two construction phases (Setién, 2014).

3. Infrastructure as services: In this third situation, the services (kitchen and bathrooms), become part of the infrastructural system along with the facade, access and structure. That is to say, the position of the services is fixed in the floor plan and therefore not controlled by the user (Setién, 2014).
4. Infrastructures with open space: In this case, the infrastructural system has an open available space that can be appropriated by the user over time, providing more flexibility in use. This open space is not common to all the building infrastructures, but its consideration is relevant to the study, since it allows the possibility of extension of the house (Setién, 2014).

Here, affecting architectural history, a war has been waged so that the user can act freely in their own home, office or school as long as they do not violate peoples' rights or harm structures in the surrounding areas.

5. User Participation

Situations where the user can express his views about the living space are called user-participated approaches. In this process, the architect plays the role of guiding the design and reflecting the needs of the users to the design by easing the role of decision maker. The consultant participates in the process of meeting directly with the owner of the building and takes an active role in shaping a residence suitable for the end user (Okutan, 2020).

A number of different ideas and approaches have been developed, including workshops, consultations and the establishment of communication offices in the neighbourhood, with the ways in which architectural projects involve future users in the design process. Sometimes the self-build option is offered to involve users not only in the design of their own residences, but also in their construction. While their methods differ, the participating architects served the common goal of enabling users to take control of their residences, allowing their creative input, without reducing the role of the architect to just a technical facilitator.

Sanoff (1999) attributes the success of user-involved experiences to the fact that users living there have a much more acute environmental awareness than architects and other professionals. Sanoff (1999) defines the design process formed by the gathering of common users as enhancing community relations, the user's right to have a say, and the opportunity to intervene in the decisions to be made about the built environment, and in this way, the built environment becomes perceived as embraced rather than anonymized.

According to Kırcı (2013) The event that caused the awareness of users to be consulted was the big explosion that occurred in 1968 when a woman opened a gas oven and struck a match on the 18th floor of a tower block called Ronan Point in London. As a result of the explosion, four residential users lost their lives and the tower apartment block was destroyed. This disaster has inflamed the debates that the era of large tower apartments, which still feel like strangers to users, has come to an end and that it is necessary to return to small-scale residences (Kırcı, 2013).

In response to these developments, instead of the requirements such as ease of construction and speed, known as "social architecture", a concept of architecture has evolved which takes into account the real needs of the people, and the potential users of the building are now being consulted. The potential users of the buildings consulted felt they were part of the business. As Sanoff points out, another benefit of the idea of public participation in the concept and planning stages is that users can engage with use and building management after the construction process. The sense of personal responsibility created during this design process has turned into an advantage that sustains user participation. From an economic point of view, a large amount of savings has been achieved from the budget. Since consulting the user during the architectural design process seems to be a solution to reduce problems, this approach has been tried with various methods (Kırcı, 2013).

Belgian architect Lucien Kroll, one of the pioneers of the participation movement of the 1970s, is best known for his Maison Médical student accommodation at the University of Louvain. The design process of this physical model, which was developed in intense consultation with the students and the users of the building, has become a record of history. In the end, each part of the building has a fragmented appearance as it is handed over to a separate team of architects within the office. Kroll's method of separating the overall frame of the building, including the struc-

tural structure, from the infill allowed him to create a highly customized architecture similar to that of John Habraken. (Figure 9)

Figure 8: Lucien Kroll, Maison Medical (Url-6)

A well-known example of involvement is Ralph Erskine's (1914-2005) social housing project Byker Wall. The Newcastle Upon Tyne Center was built between 1969 and 1975 to house workers in the shipyards and factories along the River Tyne. Erskine set up a community office in a disused funeral parlor in the neighborhood and implemented an open-door policy, inviting local residents to come and share their views. This spawned a dialogue on topics ranging from vandalism to leaky pipes and the design of the final project. As a pilot project, Janet Square was built in 1972 with the participation of 47 families who volunteered. Their input also served to highlight the complex relationships and hierarchies among Byker residents, which were reflected in the final design. Because Erskine's grassroots approach to participation required a long-term commitment from the architect, the architect had to reside in the local neighborhood for the duration of the project. Byker Wall is a successful example that has been fully accepted by the people living in it, as they shared their ideas during the construction (Kırcı, 2013).

Flexibility and tolerance for user participation vary throughout the life cycle of a building. During pre-production, all projects are flexible. User-participated projects

are custom-made with an architect-user relationship. There are examples where user participation has been implemented in the production process, but this can be tricky. However, since the user generally makes design decisions considering his current needs, it can negatively affect the flexibility of the building in the usage process. It can be said that the challenge lies in providing flexibility in the post-production phase and leaving a tolerance for user participation.

CONCLUSION

Restricted architecture began to be discomfort or dicrease in being desirable when the user's demands or wishes changes. And it goes on getting worse untill it reaches the abandonment level, Eventually, a society meets an insufficient number of buildings according to its needs as much buildings reach this level. Consequently, it also affects the country's economy and the construction industry. On the contrary, by incorporating adaptability into the building program, the building can be used more effectively even in changing conditions, without sacrificing comfort. from this perspective, Adaptability is an important aspect of sustainable architecture.

Since the advent of modernism's living machines and industrial revolution's mass housing, realizing the essentiality of adaptive architecture, architects have been experimenting and developing methods to create flexible architecture that can respond to changing needs. This paper sums up design approaches that relativley did last longer in architectural history.

Taking a closer look at today's architecture, and the fact that most of the needs of urban houses and offices are being met with rigid and unrisponsive multi-storey buildings it can be said that an architect today is tasked with stopping the madness of producing countless restricted buildings and housing projects that serve solely the goals of merchant's gain. and to save architecture from going through the same cycle of restricted and soon abanded designs it had been on the 20th century.

In order to design spaces that is inherently flexible and adaptable, it is beneficial to look back over the different methods experienced in the past centuries. However, it is not a necessity for us to reproduce the same spaces and tarred with the same brush. But rather than that developing or maybe mixing these design approaches. It can be said that there is no one truth or one right design approach to beleive in to accomplish flexibility, yet, it is important for the architect to choose the right met-

hod or maybe to mix methods that would be suitable for the place, people and time period designed for.

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