# HOUSING SOLUTIONS FOR THE POST-PANDEMIC CITY: THE CASE OF LEZHA (ALBANIA)

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## Abstract

This article is part of studies on the theory of architecture and deals with the issues of the formal structure of housing in the period of the post-pandemic city.

For more than three years, we have been globally in a period of multiple changes and transformations that affect the various spheres of human activity, which directly affect the organization of the formal structure of housing.

The research gap that this investigation seeks to contribute to is related to the rigidity presented by the formal structure of housing at the moment in which the global lockdown was presented, as well as the needs presented to adapt the representation of housing to the new activities imposed by this transformative period. The main research question related to this study is interested to investigate how the multi-dimensional transformations that society has gone through in the last three years, have affected the formal structure of the existing housing and what could be the future housing schemes based on these needs.

The purpose of this paper is to research these changes in the formal structure of housing, due to the specific conditions of the post-pandemic city and to propose spatial solutions that match the needs of the current society.

The final objective is the proposal of innovative schemes for the organization of the living space on two different levels. The first level refers to the re-organization of the spaces of the formal structure of the existing evidenced typologies, under the new social needs generated by the major transformations, while the second level is related to the proposal of innovative schemes for the construction of new housing.

The methodology conducted during this study is based on the analysis of the consequent alterations of society during the pandemic and post-pandemic context, while emphasizing and understanding the impact they have had directly on housing. The specific case where the article is focused on investigating the relationship of the formal structure of housing with the city is positioned in the city of Lezha in Northern Western Albania where new functional and distributional schemes can be generated and serve as proper solutions in the actual context.

The expected results are a series of functional schemes and spatial models for housing, able to replenish the needs and requests that people have about the new formal housing structures and space, within the conditions of the post-pandemic period.

This study represents an interest and concrete usefulness, firstly for the academic community which are grasping the understanding of the changing society within their expertise, researchers, designers, and investors.

**Keywords**: Post-pandemic city, Public Space, Formal Housing Structure, Typology and Space, Schemes.

# 1 INTRODUCTION: URBAN MODELS AND PANDEMICS

The basic structure of the organization of cities for several centuries has presented a constant evolution with very small alterations until the end of the 19th century. Analyzing the book of Morini (1963), it becomes obvious that in more than three millennia the development of urban forms has presented a limited scale and calculated dimension via drawings. The analysis of the settlements listed in this publication clearly shows us that even though they were designed or built in different centuries, these settlements are designed and proportionate to the human scale. Although the book is concluded with modern architectural projects such as the city of Chandigarh by Corbusier, appears clear that even in this case the scale of the settlement matched the human dimension.

The biggest transformations that the urban settlement is subjected to, begin with the industrial period and with the serialized industrial city according to the metaphor of the "industrial production chain". This metaphor, according to Tafuri (1979), governed the production of the city from the smallest residential unit, which is the room, to the apartment, to the building, to the neighborhood and then to the city. This vision of the city produced in an industrial way for the industrial society is preceded by Tony Garnier's vision of "Cité Industrielle" published in 1917. In this visionary project of the French architect, the drawings represent the fusion of buildings with the landscape. The fusion of building with nature and landscape finds its peak in Frank Lloyd Wright's anti-urban vision (1932) for Broadacre City. The American architect's project, closely related to the endless space of this continent, gave each family a house located on plots of land so large that they would be impossible on the European continent.

Industrialization, centered on the railway transportation, had another urban model to display that is expressed with the linear city starting from the version of Arturo Soria y Matas (1882). The city model proposed by the Spanish engineer presents a linear scheme where the buildings are positioned along a central "axis" of unlimited length. This model will be Le Corbusier's project for the city of Zlin in the Czech Republic and an even more radical proposal theorized by the Russian architect Nikolay Milyutin in 1930 (Goldzamt 1977:183). This linear model is emphasized in this paragraph because we see below, even though at first sight it may lead to greater pollution or more diseases, it was noticed that there is a lower spread of the virus during Covid-19 Pandemic than any other city models. This fact perhaps explains the low number of infected and low deaths in Albania, because according to Kumaraku (2016), among the two urban models on which Albania is developing: the self- concentrated and the linear, the last one dominates the urban reality in these thirty years.

The use of the word city directly in the paragraphs of this article is due to exactly what this word reflects. After two centuries of constant growth of settlements, starting from the Industrial one to the Metropolis, Megalopolis, or Ecumenopolis, the city shows its deepest crisis in the world context, when affected by the situation during Covid-19. This crisis is different from the one expressed by Benevolo (2011) in his book "La Fine della Città", where the Italian architect theorizes the end of the city due to the morphology and loss of scale. The crisis with which the city appears to be dealing with after 2020, is not related to issues of form or scale, but to two other aspects such as that of security and health.

In the Albanian context, this crisis of the big city was preceded by the crisis caused by the earthquake of September 23 and November 26, 2019. The images of thousands of families, on one hand who were on the streets because they could not get into their apartments due to the uncertainty of the constructions accompanied by the impossibility to gather in spaces that can guarantee the safety of the community, and on the other hand the lockdown in apartments as a result of the situation caused by the pandemic, have in common the crisis that is currently investigating the contemporary residence, especially that with metropolitan dimensions.

The relationship between the shape of the city, the population, the density and the distribution of the Covid-19 virus has been analyzed by Salma Antar, Haoying, and Mahran Gamal (2021). In this paper, the authors emphasize the fact that there is a direct relationship between the spread of the virus and the three aspects mentioned. For example, Salma Antar *et al* (2021) point out that the spread of the virus is lowest in linear cities, average in square grid cities and highest in radial cities. About the density, unlike what can be asserted based on intuition or general opinion, the authors have stated that there is no direct relationship between the size of the city and the spread of the virus. Maybe the densest cities due to the number of populations and due to the greater circulation are hit faster, but the spread of the virus is the same in cities with high density as in those with low density.

## 2 ACTUAL CRISES AND TRANSFORMATIONS CONCERNING URBAN FORM

After the global crisis of 2020, settlements seem to be in an irreversible transformation. Major transformations affect the space where people gather and the way they interact or use space. Here the role of the square meters as a gathering point or a place where the urban space is contemplated becomes important and represents an issue that needs to be detailed in additional research. This role is essential, especially in a global panorama where social networks seem to be transformed into 'telematic squares' that can replace physical ones. These transformations highlighted by Leigh (2020) also affect the sphere of Urban Landscape.

Another important transformation is the one affecting financial exchanges. More and more it seems as if the big businesses that are going online are dominating the market economy by overshadowing the small businesses. At first glance, it seems that this transformation does not affect the physical space where people live, but the transformation of the space where products are exchanged from physical to virtual brings the end of small shops.

A very important transformation is the one that affects the transport of people and goods. During the pandemic, a series of activities went online, significantly reducing the transport of people. Also, most basic vital products are ordered online and delivered to homes via transport from large businesses. Online catalogues and technical specifications make it unnecessary to visit large stores by ordering online and having the product immediately at home.

Perhaps the most significant transformation is the one that affects the form of the home since the home is appearing more and more as a space that tends to contain all functions, whereas beyond the classic ones, the space for working/creating or even recreation.

At the level of the architectural space, another transformation is related to the world of work. Since the work is being increasingly assisted by computer tools and also because of the pandemic, it is being carried out more and more remotely. This has resulted in the office space not being fixed but becoming a mobile office that can be placed both inside the apartment and in other places that were previously unimaginable.

A transformation that is not directly related to the crisis caused by the pandemic situation, but to the IT development is related to the intelligent administration of the city. Public transport is the one where the influence of information technology can be clearly distinguished, starting from applications that inform about the organization to those that put private transport on the network with what is offered to the public, like Uber service.

Another shift during these changing years, is related to the division of the city into cells that often express the social differences of the residents who live in these spaces. For example, the city of Tirana is changing its image due to many reconstruction projects using two construction strategies. The first is that of Antipole (Kumaraku and Hoxha 2018) where focal-spot interventions can have a re-dazzling echo in a certain radius of the city, and the second is related to the construction of residential complexes appearing as pieces of a puzzle as big as that of the city.

All these transformations are necessarily reflected in the alterations of the space inhabited by humans. Here, with inhabited space, beyond the broad Heideggerian meaning, we understand the space of the dwelling organized in apartments.

## 3 POST PANDEMIC HOUSING PRINCIPLES AND COMPOSITION

Since the above transformations directly affect the formal structure of the collective housing, then we must list a series of general principles related with the composition of the form.

The first need that was emphasized during the pandemic period was for greater ventilation of the living space with the aim of air circulation and supply of apartments with clean air. During this period, it was noticed that apartments organized in "galleries" or those that did not have the possibility of double exposure had difficulty ventilating the spaces. For the best and most efficient ventilation, the apartments are suggested to have cross ventilation. In the scheme below (Fig. 1) where nine different types of apartments are listed, there is an opportunity for cross ventilation that is more efficient than the typologies in the "gallery" in recent times, due to the maximum use of circulation, widespread not only in buildings of the Lezha Region but also in those of other cities in Albania.

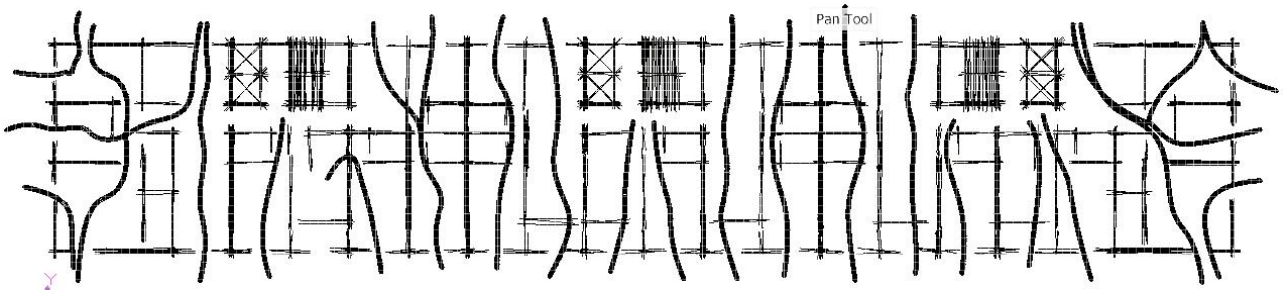


*Fig 1. Cross ventilation scheme. The figure shows the possibility for cross ventilation of all apartments. (Source: authors)*

The principle of reversibility in this paragraph is not seen as the reuse of architectural forms by moving them from one place to another, as could happen with the containers of Stadium 974 designed by Fenwick Iribarren Architects in Qatar for the FIFA22 world football championship. Here, reversibility does not mean the reuse of different materials, as is the case with "architetture spoglie". Reversibility in this paragraph is understood as the ability of the space to be transformed based on the needs of the users. Using a modular composition within a space that is determined by the interactions of these modules guarantees more freedom in the composition of the apartments. This freedom is provided by the use of the structure which, beyond the structural material, consists of a supporting frame that is repeated at intervals of 5.40 and 7.20 meters. The structure placed in this way guarantees more possibilities for the composition of the space during design process.

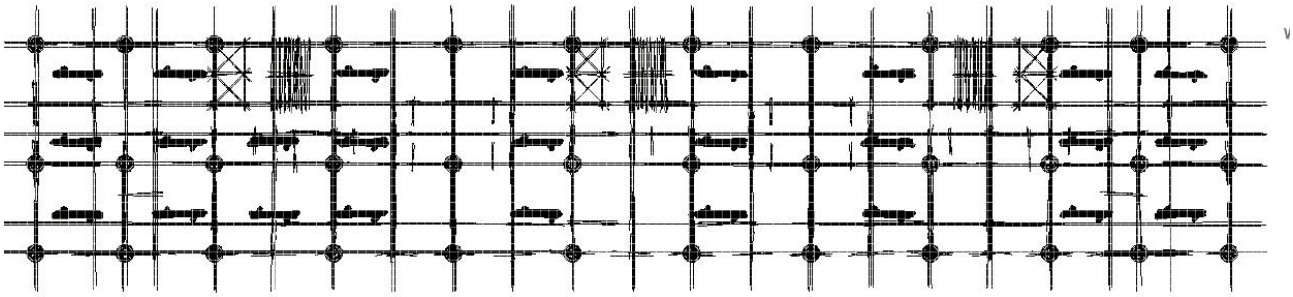

*Fig 2. The structure concerning modules. The figure shows the frames of the supporting structure with the direction of the supporting beams. The distance of 7.2m between supporting frames guarantees great compositional flexibility. (Source: authors)*

Low contact, an easy possibility for self-isolation and double entrance. The third principle is related to the small number of apartments per scale, which guarantees us the least contact between residents and the possibility of a space for self-isolation inside the apartments and that in some cases there is the possibility of contact with the space outside. Based on the composition of Unit 1 (Fig 3°), most of the apartments can be offered the possibility of having a self-isolation cell inside, where minimum services are guaranteed.

The flexibility of the composition of the geometry of the apartments is guaranteed by the repetition of the square-shaped basic module with 3.60 side dimension. A conglomerate unit is formed by the repetition of a minimum of 1.5-2 cells. This compound consists of a bedroom accompanied by a standard service space of 2.40 by 1.80m. The other part with dimensions of 1.20x1.80 m, and the remaining part of the module 3.60x1.80 m, is used for distribution. This Merge is reflected in fig 3.1, the basic unit from the repetition of which the geometry of the other apartments is formed. The total area of this base unit is approximately 26m2 and it accommodates one to two people inside.

By placing together two units according to scheme 2, a minimum family unit is formed with one room with sanitary services and the other unit can be used for a day facilities, with a kitchen and living room according to fig. 3.2. This scheme has a total area of approximately 52m2 and can accommodate two people inside.

The third unit consists of the union of three joint units. This compound can be used for people who live together, students, or family. It consists of two basic units for sleeping and a common space with a cooking area and a sitting area (Fig 3.3). The third unit has an approximate area of 78 m2, which can accommodate from 2 to 4 people.

ISBN: 978-605-72065-1-0

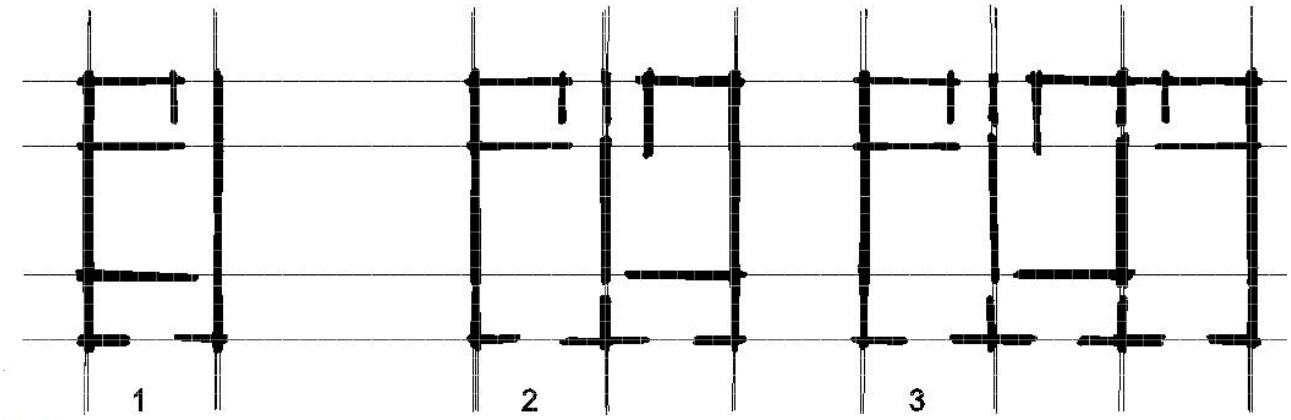


*Fig. 3. List of three initial units that are part of the overall composition. Unit 1 is approximately 26 m2; unit 2 is approximately 52 m2 and unit 3 is approximately 78 m2. (Source: authors)*

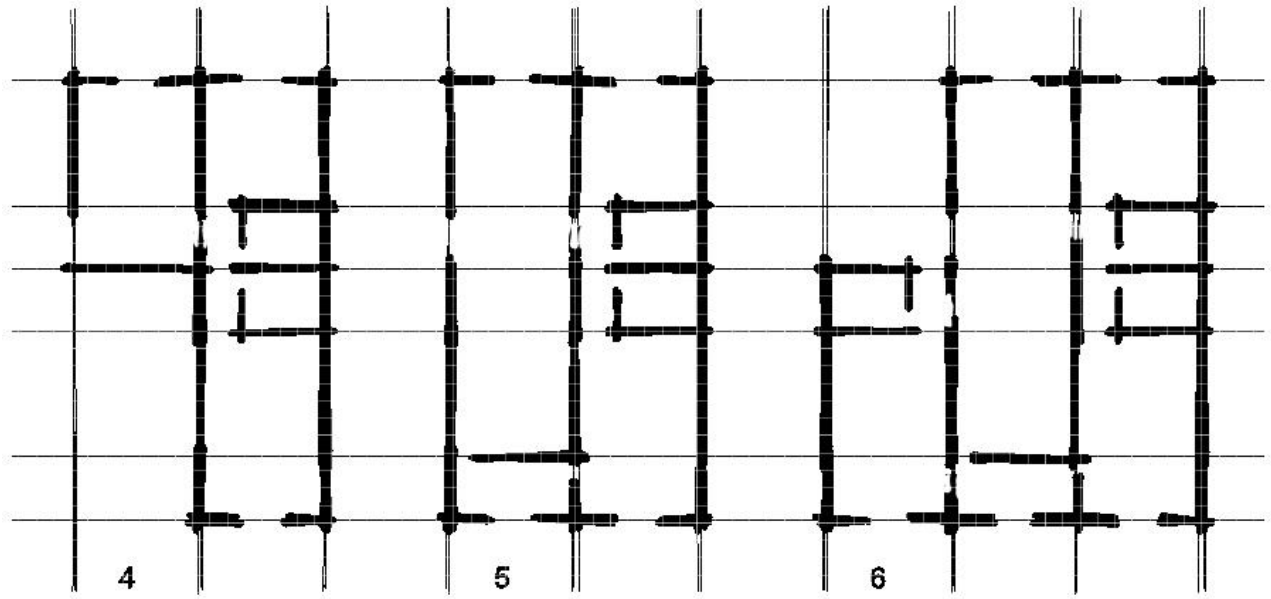


*Fig. 4. List of three units with double display and cross ventilation. Unit 4 approximately 64.8 m2; unit 5 approximately 90.70 m2; unit 6 approximately 116.5 m2. (Source: authors)*

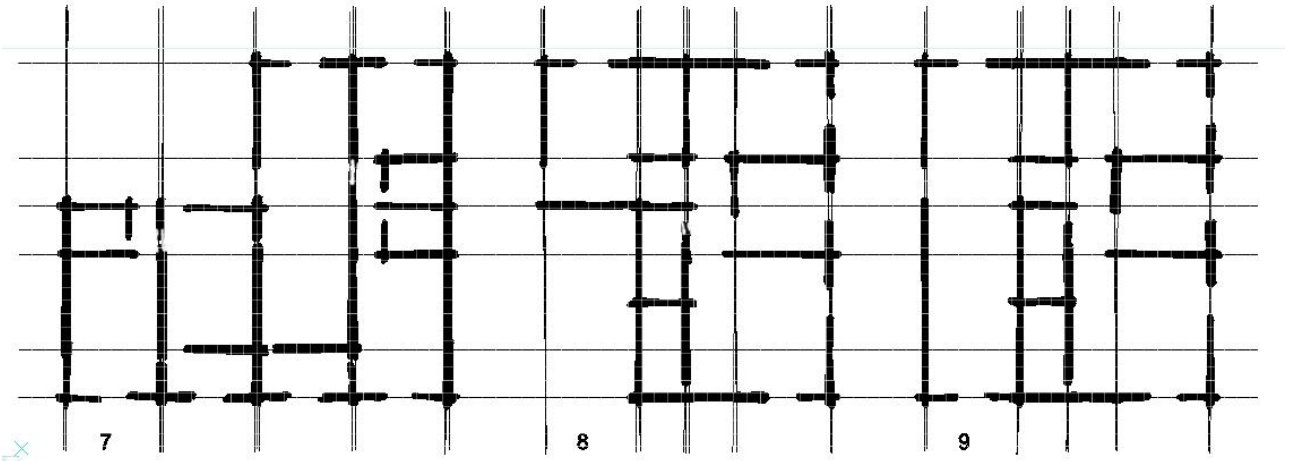


*Fig. 5. List of the three largest units. unit 7 with the largest surface with a surface of approximately 142 m2; unit 8 with triple exposure and 110m2 exterior surface; unit 9 with triple appearance with a total area of approximately 136 m2. (Source: authors)*

The other units shown in figure 4 are conceptualized with double ventilation, offering cross ventilation of all rooms (Fig. 1), these family units can accommodate from 3 to 6 people inside. The corresponding surfaces are scheme 4 approximately 64.8 m2; unit 5 approximately 90.70 m2; unit 6 approximately 116.5 m2.

The last three units according to fig. 5 are the largest units and can contain inside, beyond the living spaces, and also professional or recreation spaces. For example, scheme 7 can contain, in addition to housing, spaces for professional study or recreation. This is guaranteed by the repetition of basic units and the possibility of having different inputs. Unit eight and unit nine have a triple display towards the open space, offering better ventilation than the other units. These units can accommodate from 4-6 people, offering opportunities for other additional services.

All the schemes above are repeated according to a possible combination reflected in fig 6. These combinations are not the only ones, but they can be expanded and combined according to other models, even on other floors.

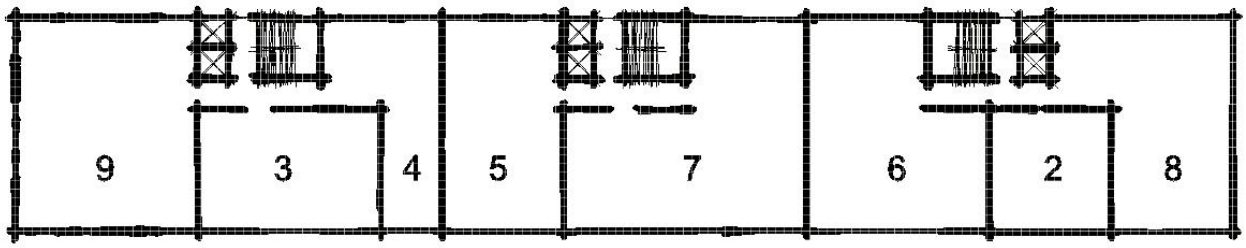


*Fig. 6. Possible composition of the abacus. (Source: authors)*

# 4 THE CASE OF LEZHA AND NEW TYPES OF HOUSING

## 4.1 Considered indicators of post-pandemic housing

The covid-19 pandemic revealed several issues worldwide not just related to health systems and problems, but also regarding the urban environment, residential areas, and quality of housing. This context, challenged the known concepts of public space and functions, public transportation but the main nucleus which was constrained to be adapted to a new way of living and orienting in the city, is the individual house.

Social Distancing, spreading of health issues as well as remote working from home, became the main drivers towards re-adapting and different use of the house's internal spaces. This situation, raised a great discussion among scholars and professionals towards resilient adaptions and new flexible housing models, which even after the emergency state, are expected not to be the same.

Since the pandemic took global measures, till now the challenges for flexibility within housing units, outdoor spaces or re-adaptation of spaces have challenged the professionals to address in a quantified set of tools the requirements of this new society.

The impact of Covid-19 on the interior and exterior housing design is unfolded in three main components: a) Public Space, b) Home Design, and c) Public Buildings and Services. (ElZein, Z and ElSemary, Y.

2022). During this research, the home design component, explored by ElZein and ElZemary with the concept of online working and studying, the flexible design solutions and access to open space or nature have been a guiding concepts during this research.

A wider observation of the complexity of architecture in post-pandemic housing has been undertaken, towards a new paradigm for housing solutions based on; the flexibility of spaces, self-sufficiency, design, and architectural interventions to meet the needs of changing society, and the specific requirements of the city of Lezha in housing.

## 4.2 Lezha Context and the need for New Housing Solutions

Lezha Region is located on the North-Western side of Albania. One of the oldest regions, with direct access to the Adriatic Sea and bounded by mountains on the eastern side is considered "home" of archeology, cultural and historical heritage, tourism, and agriculture. The region, and especially the main city “Lezha” location, is impacted by tangible other issues like climate change, floods, periodical forest fires, and high seismic activity, which imposes immediate measures to comprehend the actual needs for housing while taking into consideration the environmental aspects, to offer innovative housing models for the dynamic

future. By using architectural and technical tools, and rethinking the space design through context preconditions, the article aims to generate ideas simultaneously in the flexible embodiment of interior housing as well as through the reconceptualization of the public space, towards more resilient and sustainable buildings.

## 4.3 Methodology

The structure of this paper is formulated through the complementary parts which include: a) the theoretical research based on the literature review and identification of key composing concepts and modules; b) empirical analysis of challenges and alterations due to the post-pandemic context and a continually-evolving society, focusing on the direct impact of the housing space and architecture; c) exploring module and structure towards defined frames and geometrical flexibility; d) application of the generated core concepts on the linear house in the city of Lezha, as the essential part of this research after the identification of housing typologies in the chosen samples.

While the first three constitutive parts are elaborated in the above chapters of the paper, the methodology expands in the 4$^{th}$ part, in the concrete urban context of the city of Lezha, where a set of indicators is defined to interpret the challenges of the post-pandemic city towards new housing, taking in consideration the new social needs and ambitions for space dedicated not just for the base housing functions but including recreational space, working space and sport or leisure.

To identify and achieve an understanding of the housing typologies in the city of Lezha, an urban investigation has been conducted into the urban fabric of the city. Its changing morphology in the historical context by identifying the first organic development, the communist developmental phase of collective housing and the freer representation of housing after the regime's fall in the 1990s, has been analyzed through the representative samples of 200m x 200m. The samples are comprised by the inclusion of the most central and urbanized area of the city, the peripheral sites in the presence of the river, and the urbanized area near the sea.

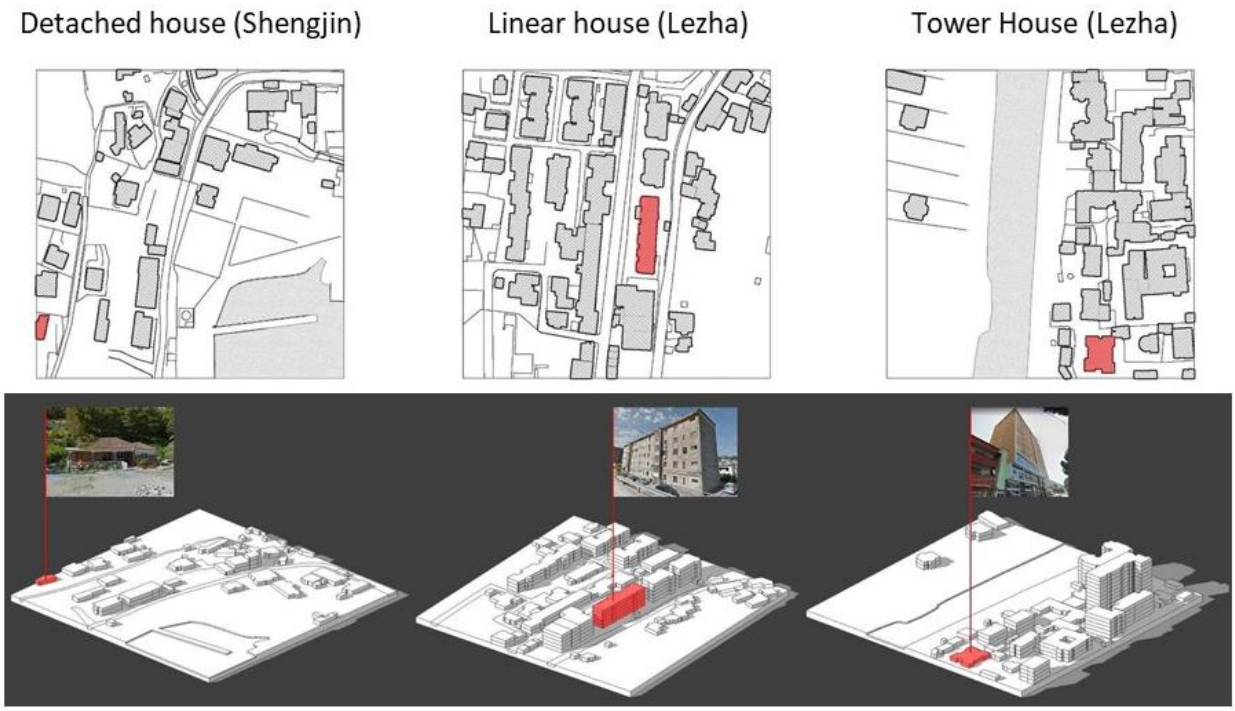


*Fig. 7. Housing Typologies In Lezha Region (Source: authors)*

During this investigation, the most representative typologies of housing located in the case study areas have been identified, considering the urban development throughout the history of Albania and Lezha region, which are also related to the three main phases of urban development.

In particular, the Communist period (1944-1990) has been considered a fundamental historic phase to subdivide urban development and the configuration of housing, represented by the collective housing in the form of “Linear House”, which consists of a specific proposal, part of the strategy of intervention and re-

adaptation of the Communist Lezha housing stock.

Since the 45-year communism period is one of the longest, the expanded contribution in housing which configures the urban fabric of the city (Thomai, G., Struga, F., Tallushi, N., & Mëzezi, I. 2021), the “Linear House” has been investigated on morphological and typological aspects including form, volume, facades, building technologies, etc.

In light of the data collected in the previous moments, possible intervention strategies for the post-pandemic society have been defined, specifically focused on defining: “the principles” for the adaptive reuse of the “linear buildings” stock, through the "Post Pandemic Housing Principles and Composition" generated on chapter 3, as a response for the flexible spaces required and changing lifestyle in the post-pandemic society.

## 4.4 Intervention Strategy on the “Linear Houses” as Post-Pandemic Housing Solution

The linear houses in Lezha, like in most Albanian cities, were part of the centralized urban development planned and executed by the communist governmental institutions. These collective buildings in Lezha contained generally three housing units for each store, in the representative 5 store building. The Linear House is extended horizontally, with a common staircase that allows access to each dwelling unit. The number of staircases is determined by the dimensions of the horizontal extension. The construction materials and techniques consist of reinforced concrete frame structures with panel structures that serve as an envelope, or perforated brickwork.

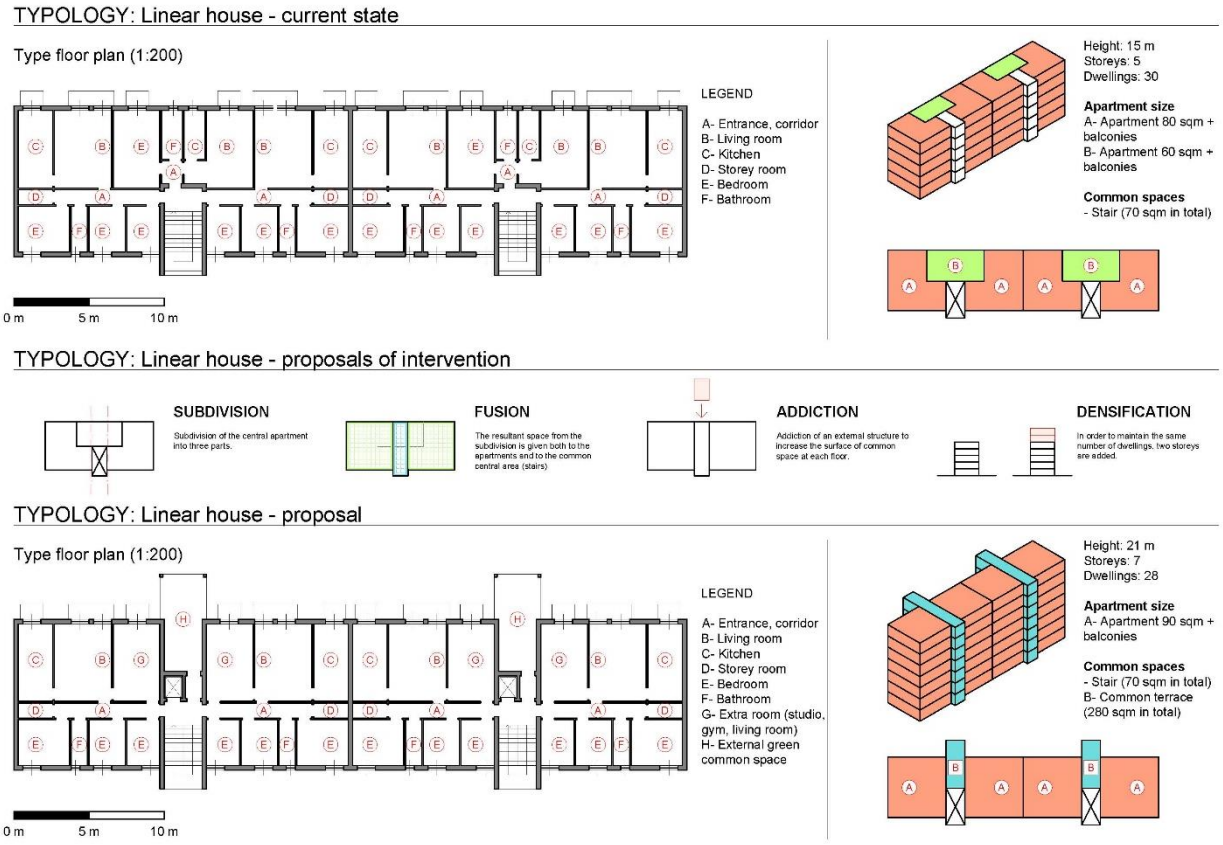


*Fig. 8. Linear Housing Typology Adaption Framework In Lezha Region (Source: authors, in the framework of* Research Project “*Spatial Proposals For The Post-Pandemic City. The Case Of Lezha)*

Critical measurements related to this housing typology are the lack of exterior green spaces. The architectural language used is based on simple forms, minimal facade openings, unused terraces and a lack of connection with the urban context. The interior spaces are considered small, rigid, and strictly-defined without the possibility of adaption towards more flexible contemporary spaces. Also, the presence of few interior common spaces, few cross ventilation for each apartment and the size of the dwellings in their totality and their configuration, is the starting point of experimenting with the proposed instruments of re-adaption through the four principles of interventions: a) ***subdivision***, b) ***addition***, c) ***fusion*** and d) ***densification***.

The ***subdivision*** is intended as an intervention step towards creating a common area by using the central apartment (from three of each store and entrance). Its division will lower the number of apartments but re-define them in a more spacious and flexible space for the remaining apartments. Through the ***Fusion*** Process, the resultant space is divided into both the remaining apartments and the common central area that consists of the staircase. This will ensure the reconfiguration of each housing unit, as well as each floor space, to reach the criteria for a new post-pandemic society. The ***Addition*** is extracted as a tool to augment the common space on each floor, by emphasizing and expanding the staircase block as a way to not just enlarge the common spaces, but also achieve the needed ventilation through the building. The possibility to open this corpus increases the natural contact with air, a requirement of the post-pandemic house which can also be converted to a common green space. To maintain the same number of dwellings preceding the intervention, an addition of two floors, with the new layout above mentioned, has been proposed through the process of ***Densification.***

## 5 CONCLUSIONS

Starting from the above analyses at the urban level and the level of the formal structure of the building, we can affirm that in the comparison of other urban models, the 'linear' one has presented the lowest level of infections and mortality from Covid-19. These evidences have increased the professional curiosity and persuasion that linear settlements are more suitable to face future pandemic situations.

As for the formal structure of the house, it must meet the needs of a society that is always in constant transformation. The visionary model is the one offered by Franco Purini in the book "La città uguale" (Petranzan M. Neri, G. 2005) where beyond the collective units of the "Supercubes" there are also individual dwellings where all vital activities are carried out, including here the depositing of vases with ashes of human bodies after death.

Concerning the collective housing analyzed in the third part of this article, it should be emphasized that it should be built on the principles of cross-ventilation, reversibility, minimum contact and flexibility of the formal structure of the apartment. The apartments listed above can offer a suitable environment able not only to cope with different pandemic situations but also to maintain manageable dimensions in times like these, by being a healthier space due to ventilation.

The role that architecture should play in the globalized city of the 21st century is highly correlated with the changing social needs and requirements of the post-pandemic world. While the housing concept has been evolving through history, along with proposals for new housing in a post-pandemic world, the necessity to re-adapt and re-conceptualize the existing housing stock has been presented with the same relevance. This is more evident in a city like Lezha, where more than half of the Housing stock consists of the communist heritage based on the simplicity of form, minimalist architecture and poor construction materials.

Based on the data generated by the research and the investigation conducted, the possible intervention strategies for the existing building stock in a post-pandemic society have been determined, through the principles of interventions in Linear Housing through the process of subdivision, addition, fusion, and densification.

The proposed Model includes the intervention in Linear Housing through the re-configuration of the layout on each floor by reducing the number of dwellings in order to use the resultant space from this reduction to create common areas. This common area is intended as a space for ventilation, recreation and green common space through its vertical expansion and on the sides by gaining more access to direct light. The expansion of the building to substitute the extracted space is proposed through the added structure on top of the building, which will conclude with the same number of apartments with larger indoor space and with a commune space to be used throughout all seasons.

## 6 ACKNOWLEDGEMENT

This research was co-financed by the Agjencia Kombëtare e Kërkimit Shkencor dhe Inovacionit (AKKSHI) / National Agency for Scientific Research and Innovation, within the framework of the National Research and Development Projects (PKKZH) for the period 2021-2023 and Polis University (U_POLIS). Title of the Research Project "*Spatial Proposals For The Post-Pandemic City. The Case Of Lezha.*

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