THE FUTURE PROSPECTS OF THE RESIDENTIAL TOWERS IN THE MACEDONIAN CITIES

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ABSTRACT

Vertical settlement forms have long existed in the historical development of Macedonian cities. Medieval towers in Kratovo, Kočani, Skopje, and many other cities demonstrate the oldest form of vertical extension. During the 19th century, this verticality transformed modestly into a tall Macedonian house, which Dušan Grabrijan recognised in Ohrid; however, it is also present in the multi-layeredness of the traditional houses in Veles. Later in the second half of the 20th century, vertical housing experienced its culmination when mass production of residential towers was made all over Macedonia, even at the level of small towns, such as in Sv. Nikole, Negotino, Makedonska Kamenica and many more. Today, residential towers are almost absent from the current development of Macedonian cities.

The primary intention of this research paper is to identify the residential tower as a clearly defined typology from a spatial and structural aspect. Additionally, it aims to demonstrate that it is wrong to consider residential towers as an inappropriate housing form in the city, which led to its building decline.

On the methodological level, this paper will examine the building trends of this typology through a chronological review of residential towers in every Macedonian city. Furthermore, after analysing the typology and structure of the selection of towers, we will define the possible model of development of the residential towers in Macedonian cities.

The research asserts that the city's development only partially utilizes residential towers. Instead, their absence in the modern context prevents them from being transformed into an innovative model for the city's growth. Transforming residential towers should be based on the idea that towers are not a universal design - but a specific option for growth resulting from careful consideration and evaluation of the context. Therefore, the residential tower should be understood as a necessary element of the city's socio-cultural identity, not as a privilege.

KEYWORDS _ *vertical settlement, historic towers, residential towers, prototype, prospect*

INTRODUCTION

In Macedonia, residential towers began to spring up in the second half of the 20th century. Even today, their silhouettes are an essential element in the image of cities. They express progress in construction technology and a desire to introduce a new typology for the city's settlement.

This paper aims, firstly, on a documentary level, to investigate this phenomenon in the entire territory of the Republic of North Macedonia; secondly, on a methodological level, to find ways to read the different phenomena of vertical structures in urban contexts and thirdly, on a spatial and program plan, to show possible models of new vertical structures in selected locations. In that sense, it archivally builds on the book Skopski Verticals (Ivanovski, Ivanovska-Deskova, and Deskov, 2018) - which mapped the high-rise (residential) construction in Skopje, as well as the projects worked on under the mentorship of Prof. Minas Bakalchev within the framework of the Architectural studies at the Faculty of Architecture (Petrova, 2020), which represent research on the spatial and programmatic potential of towers in specific urban contexts. (Bakalchev, Bakalcheva and Tasić, 2015)

The first part includes an overview of historical towers and residential towers from the second half of the 20th century, presented through three themes: chronology, typology and structure. This extensive review focused on the verticals outside Skopje, will open a series of questions about the chronological development and typological coverage of the towers in the entire territory of Macedonia. Furthermore, in the second part of the paper, with the presentation of two case studies working within the architectural studies framework, a model for developing possible prototypes of vertical forms will be presented.

RESEARCH FRAMEWORK AND METHODOLOGY

There is no universal definition for determining tall objects. Their classification is subjective and can be according to the number of stories, the height concerning the context, the proportion of the building, and the application of technologies relevant to high-rise buildings (CTBUH). In this research paper, towers are defined in terms of their context as spatial configurations that are significantly higher. This criteria establishes the thesis that urban verticals from different historical periods are equally worthy of study. Therefore, the research sample of towers includes historical towers (feudal and clock towers) and residential towers from the second half of the XX century.

The historical towers are urban vertical extensions whose development can be traced from the XIII century to the beginning of the XX century. Their height is not significantly high, but in a spatial and social sense, they are part of the vertical silhouette of the city. In the phenomena of medieval towns and traditional urban textures in the examples from Macedonia, historical towers are a constitutive part of urban creativity and the socio-cultural model of the community. They are created over a long time through the successive upgrading of the city and do not destroy the existing urban texture. Therefore, this model of high-rise buildings has an inclusive character in the city's image. The historical towers blend into the low-rise city fabric on an old city panorama of Kocani shown in Figure 1.

On the other hand, in the middle of the 20th century, modern doctrine connected the extension in the vertical with substituting the capacity concerning the horizontal plan in response to the housing crises after WW2. This statement made the emergence of the new vertical structures exclusive in the morphological sense, followed by social exclusivity. Residential towers from the second half of the twentieth century appear exclusive in a new composite or collective form, excluding the city's existing structure. This exclusivity is evident in the appearance of the residential tower built in the 1960s in Kocani, shown in Figure 2.

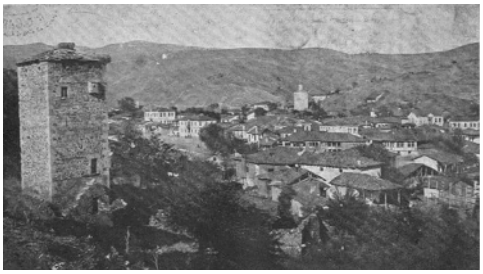


Figure 1: Historical towers in Kocani, dating from the XIV century;
Figure 2: Residential tower in Kocani, built in the 1960s

The paper's research has been carried out through several stages of gathering and processing information to identify all historical and residential towers outside Skopje. The first phase is a re-reading of the city skyline of all thirty-three cities in Macedonia (excluding Skopje) as places of potentially located towers. After the initial re-reading, eighteen Macedonian cities were recognized where historical and residential towers are located. The cities in which historical and residential towers are located are shown in Figure 3 and Figure 4. After this phase, the next step consisted of mapping the urban fabric of the cities where a tower is located to list the total built fund of historical and residential towers in Macedonian cities.

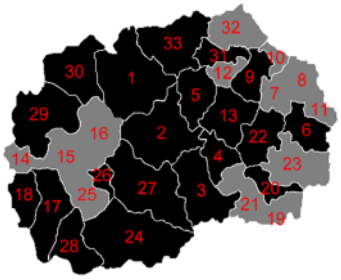


Figure 3

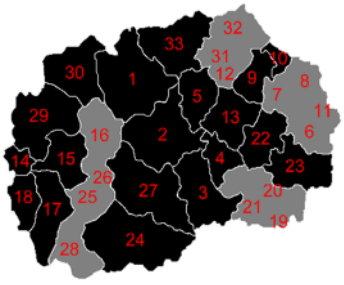


Figure 4

Macedonian cities:

1. Skopje	18. Struga
2. Veles	19. Bogdanci
3. Kavadarci	20. Valandovo
4. Negotino	21. Gevgelija
5. St. Nikole	22. Radovish
6. Berovo	23. Strumica
7. Vinica	24. Bitola
8. Delchevo	25. Demir hisar
9. Kochani	26. Krushevo
10. M. Kamenica	27. Prilep
11. Pehcevo	28. Resen
12. Probishtip	29. Gostivar
13. Shtip	30. Tetovo
14. Debar	31. Kratovo
15. Kichevo	32. Kriva palanka
16. M. Brod	33. Kumanovo
17. Ohrid	

Figure 3: Macedonian cities with historic towers;
Figure 4: Macedonian cities with residential towers - 20th century

Initially, the towers of all the cities are systematized only by their shape, surface and floor height. This footprint-level data will be the subject of a chronological review. Next, additional research on the mapped towers has been carried out on an archival plan by collecting available technical and photo documentation. With the provided material from this phase, twenty-nine towers have been digitized with elaborated floor plans, sections through stairs and axonometric drawings. This collection of towers will be the basis for an analytical study of the towers from a typological and constructive point of view.

CHRONOLOGICAL ANALYSIS

Historical towers

Although once more numerous, historical towers are still present in almost all Macedonian cities (Cholovic, 2008), of these, it is significant to single out two specific cases of towers, in the form of urban megastructures, in Kratovo and Kočani. In Kratovo, at the beginning of the 20th century, there were twelve towers, of which only six are preserved today. In Kočani, of the four towers placed at the corners of an imaginary quadrangle around the town bazaar, only two are present today.

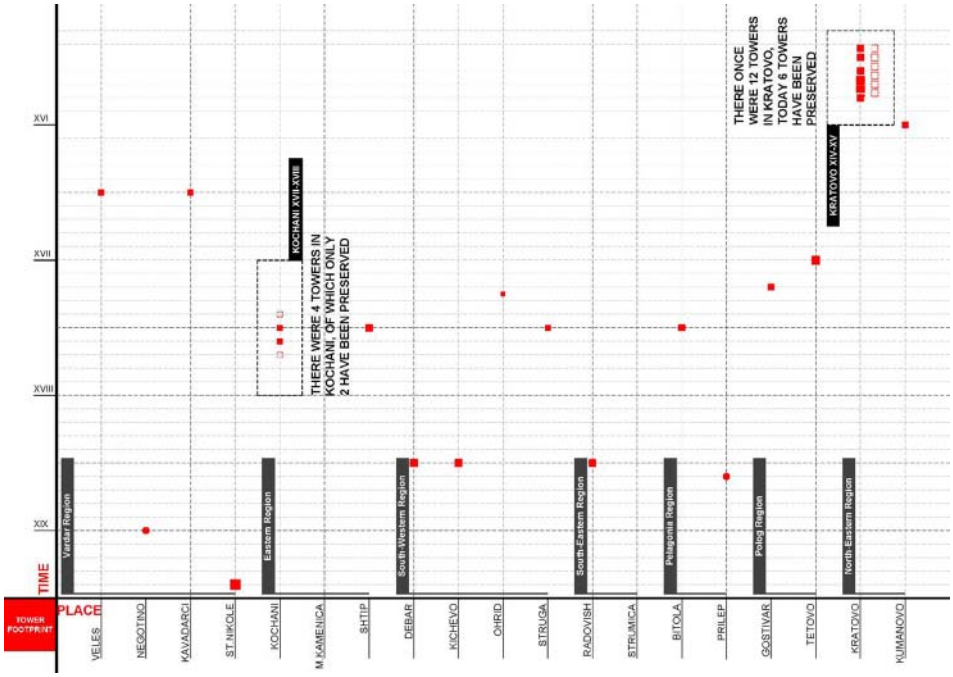


Figure 5: Diagram of the construction of historical towers by place and time

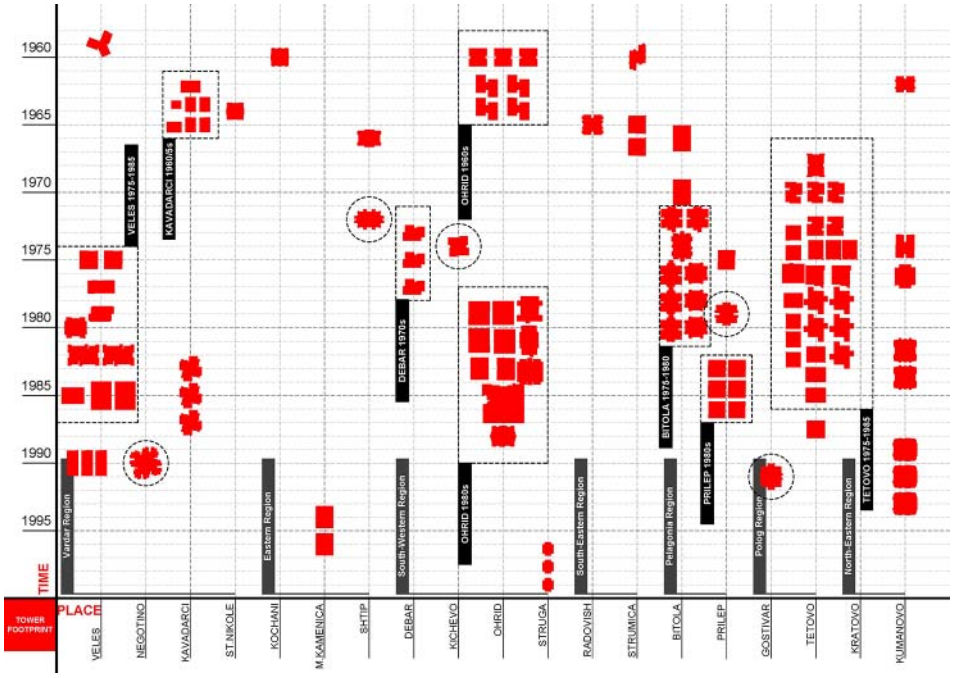


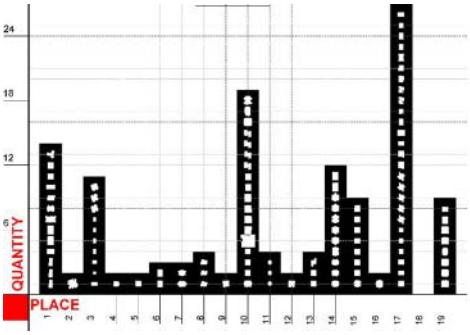
Figure 6: Diagram of the construction of residential towers from the second half of the 20th century according to place and time

The construction of the historical towers is traced from the 14th century to the 19th century, just before the introduction of the new typologies for the collective settlement of the city and the modern technologies of the construction of residential buildings from the 20th century. The chronological development of the historical towers is shown in Figure 5 in correlation to place (city) and time (century).

Residential towers from the second half of the 20th century

Later in the second half of the 20th century, vertical housing experienced its climax with the massive construction of residential towers throughout Macedonia, even at the level of small towns, such as in **Sveti Nikole, Negotino, Makedonska Kamenica** and many others.

In Figure 6 a diagram/map of the construction of residential towers systemised by place and time shows the temporal and spatial distribution of the mapped towers across Macedonian cities. In the beginning, they appear as isolated spatial sequences at the city level, such as the towers from the sixties in **Veles, Sveti Nikole, Kočani, Shtip, Strumica** and **Kumanovo**, while in **Ohrid**, a process of the planned construction of residential towers in progress is evident. During the seventies, fragmented residential towers erupted from certain city textures, still present today as vital spatial benchmarks. Such is the case with the second tower in **Shtip** (1972), the first and only tower in **Kichevo** (1974) and the highest tower in **Prilep** (1979). Apart from them, in this period, towers can be seen as a repetition in **Debar** and after some spatial intervention in **Prilep** and **Kumanovo**. The entire remaining building stock during almost two decades from 1970 to 1985 was the subject of planned and mass construction of residential towers. These activities can be defined as clusters of intensities in the diagram shown, within the framework of the following cities: **Tetovo** with the highest rate of construction, **Ohrid**, **Veles**, **Kavadarci**, **Bitola** through the repetition of characteristic towers and **Prilep** with a new settlement of tall free-standing buildings. Of all the cities, only **Kumanovo** has an evenly distributed intensity of construction of residential towers. In the following period from the beginning of the nineties, the towers from **Negotino** (1991) and **Gostivar** (1991) are characteristic, redefining the city's image and are the last spatial benchmarks of this character. As a final stage, the group of high-rise buildings from **Makedonska Kamenica** and **Struga** closes this chapter on constructing residential towers in the 20th century.



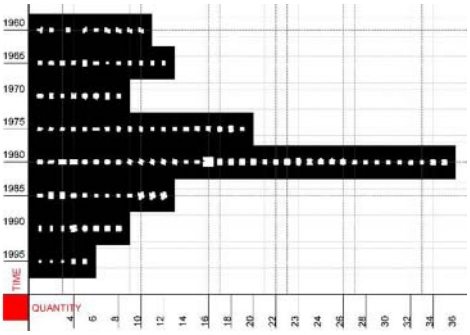


Figure 7: Diagram of intensity of residential towers; **Figure 8:** Diagram of intensity of residential towers

Figure 7, a diagram correlating with quantity and place, shows the intensity of residential tower construction by regions and cities. The most built city is **Tetovo**, and therefore the **Polog Region**. Next is the **Southwestern Region** in second place with the most significant built-up area in **Ohrid**, after that is the **Pelagonian Region** headed by **Bitola**, then the **Vardar Region** with the most towers in **Veles**, in penultimate place is the **Eastern Region** with an even distribution of towers in **Shtip** and **Makedonska Kamenica** and finally the **Southeastern Region** with three towers in **Strumica** and **Radovish**. This diagram records six cities with only one tower **Negotino**, **St.Nikole, Kočani, Kichevo,** and **Gostivar**.

From the next Diagram in Figure 8, which shows the intensity of construction over the years, it is only confirmed that the period of the eighties was the most active for the construction of residential towers, after which the representation of the towers dropped drastically.

Furthermore, through a narrower selection of eleven historical and eighteen residential towers from most Macedonian cities, for which technical documentation is available, a more detailed analysis was made from a typological and structural aspect.

TYPOLOGY ANALYSIS

The residential towers of the second half of the 20th unlike the historical towers, which result from a careful reading of the existing texture, built a new urban composition in the abandoned city exclusively. The conducted analysis indicates that their urban integration changes following the identified periods. In Figure 9 the urban position of the towers is shown; therefore, the towers from 1960 to 1965 represent group formations connected by a linear annexe, while the residential towers from 1975 to 1980 are independent solitaires or groups of verticals placed in a row. Examining the shape of the base of the residential floor in Figure 10, we can conclude that during the sixties, the shape depended on the relationship of the residential contents with the stair core, while later in the period from 1975 to 1980, this spatial complexity is reduced only to secondary facade indentations and shipments.

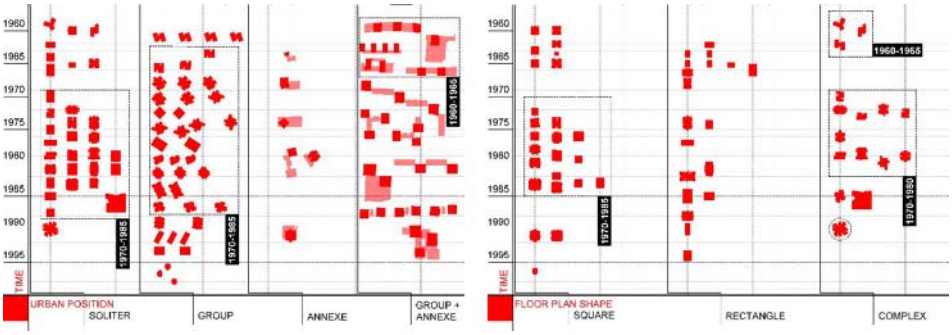


Figure 9: Diagram of type of residential towers' urban position in relation to time;
Figure 10: Diagram of type of residential towers' floor plan shape in relation to time

ANALYSIS OF THE CONSTRUCTION

Historical towers have remained the same in solving construction systems over a long period of four centuries. The load-bearing vertical elements are always the stone walls of the historical towers, which, from the middle of the 17th century, can be found upgraded with a wooden construction at the top.

Residential towers from the second half of the 20th century are subject to rigid construction systems. Due to the low availability of data from the original project documentation, the construction system of some of the investigated residential towers from the second half of the 20th century was determined through photo documentation and on-site inspection. Regarding load-bearing vertical elements, the most numerous are the mixed systems consisting of columns and canvases. In them, the canvases are mainly used to secure the openings of the elevators, and less often, they are found as elements to ensure horizontal displacements. Then, skeletal systems are located in the earlier stages of construction, when the storey is lower. The most rare are the towers designed in a massive system consisting only of load-bearing canvases. In these buildings, the rectangular shape of the structural module and their higher storey is noticeable.

Regarding the modular organization of the residential floors, the diagram in Figure 11 shows the use of different variants for the number of modular divisions and their rhythm in the defined construction system. More precisely, through a chronological review of the research sample, it is noted that the established division of the residential into three modules in one direction (room – stairs – room) and n-modules in other direction (n-fold room) became more complicated from the end of the sixties until the beginning of the nineties, when again in the nineties this division returns to the scene. From the diagram, we can conclude that the most used division of modules is 3 x 4 and 3 x 3, and as the towers are more and more divided in their expression, exceptions are also found.

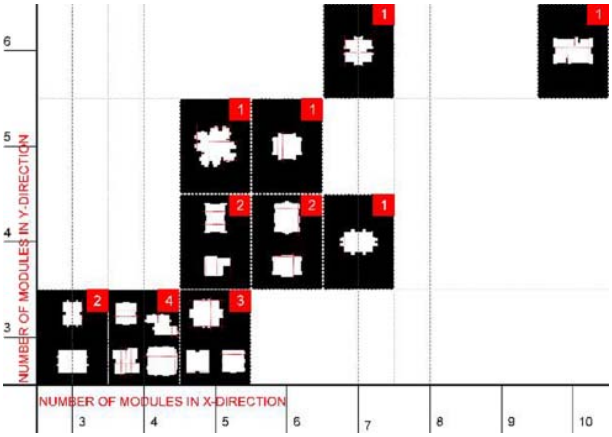


Figure 11: Diagram of the design-constructive modulation scheme

In the case of towers whose construction system is defined by the primary division of 3 x n-fold room modules, the difference in the dimensions of the used construction module over the years is expressed. More specifically, the rectangular design-constructive module of 230 cm x 720 cm in the residential tower in Ohrid from 1960 was transformed into a square with 670 cm x 670 cm in the residential tower in Gostivar from 1991. So, the historical development of the constructive module has seen numerous transformations to unite the modules and proportionately equalize the system dimensions. These variations on the dimensions and proportions of the construction module are classified in Figure 12. In the diagram shown, the most represented modules are 300 cm x 400 cm (four times), 300 cm x 500 cm (three times) and 600 cm x 600 cm (three times).

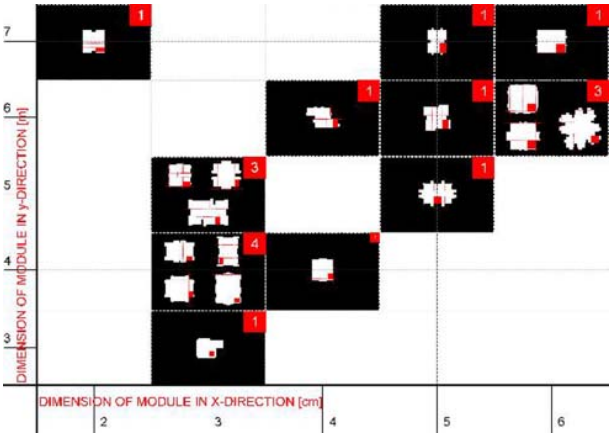


Figure 12: Diagram of the dimension and proportion of the constructive module

The residential towers from the second half of the 20th century are a modern reform of the spatial-social model of city settlement. However, the city's current development no longer uses its spatial capacities and thus does not allow them to evolve further. Transforming residential towers should be based on the idea that towers are not a universal model – but a specific growth typology that can emerge from careful consideration and evaluation of context. Therefore, two case studies are presented in which towers are drivers of the city's growth process. The idea is to combine the typo-morphological characteristics of historical towers with modern construction technologies and thus define new vertical prototypes for inhabiting the city.

POSSIBLE PROTOTYPES OF THE NEW VERTICAL FORMS:

Case study 1: New "New neighborhood"

The concept of transformation through upgrading with residential verticals has been applied in the project of upgrading Novo Maalo (translated in English - New neighborhood) (Petrova, 2020). In Figure 13 the concept of upgrade is shown. The urban fragment of low-rise residential buildings is complemented by a group of new prototype high-rise buildings - micro-towers. Vertical growth is based on the principle that a community of high-rise buildings complements each block (Petrova, Mihajlovska. 2022). The upgrade is applied to each residential island (urban block) by placing one to three residential verticals. Their position depends on the morphological characteristics of the block. The analysis of the existing plot texture indicates two groups of buildings: large houses with a dimension of ten meters by ten meters and tiny houses with a dimension of five meters by five meters. The shape of the tiny houses will be the basis for developing the new vertical prototype of a high-rise - a micro-tower. These micro-towers retain the dimension of tiny houses and are placed exclusively in their place. Thus, the minimal base of towers requires an innovative design approach in sync with modern building technologies. Therefore, micro-towers represent a new model of social-spatial organization in height. Their position follows the traditional patterns of the staggered texture, so they inclusively provide a vertical extension of the settlement.

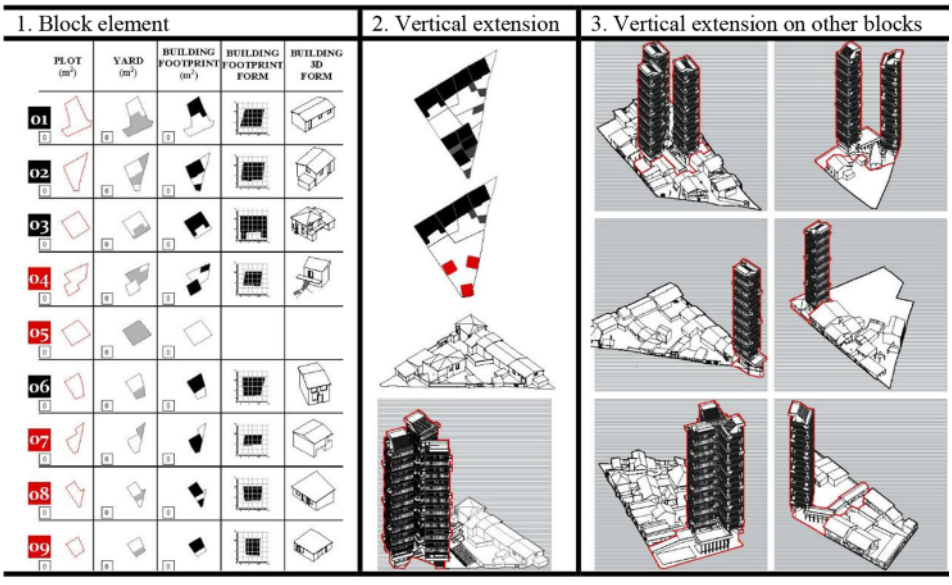


Figure 13: The existing context of Novo Maalo as a base for vertical upgrading trough micro-towers

Case study 2: House on Vasil Glavinov Street No. 7A

The next project is located in a block subject to constant transformations, visible in the ridge's uneven heights and the urban island's undefined identity (Petrova, 2020). The new building is an integral part of the block and its landmark, shown in Figure 14, due to its spatial embodiment in a residential vertical. This height of the building will allow the inclusion of the unused roofs of the surrounding buildings in one integral whole, accessible through the tower house. This vertical project is a theme of an urban landmark and a landmark that will grow into a prototype of a new way of housing. The project is designed as a home for eight households. The vertical extension of the house reflects an organization of the foundation that unites a social mix. The social mix is mapped in Figure 15 as a diagram of room usage.

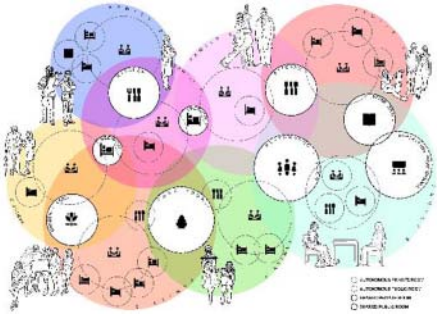
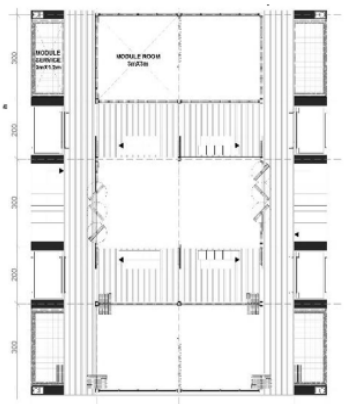


Figure 14: The new vertical as a landmark; **Figure 15:** Social mix – eight households

Because of this, the solution implies an innovative approach to satisfy the flexible privacy of spatial capacities. First of all, the tower is structured like a scaffold – shown in Figure 16 as a system of movable walls and modular rooms. The contents are classified into two types of spatial modules (Module Service - 3 X 1.2 m and Module Room - 3 X 3 m). They, in combination with movable walls, define the building. These walls partition part of the corridors for private use or completely enclose the space for individual use. So, at one moment, the foundation on any level can be completely open, and at another moment, it can be divided into several homes and rooms for private use. With this technology of operation, the tower allows easy sharing of the same rooms by several families, while the flow is not hindered at any moment.



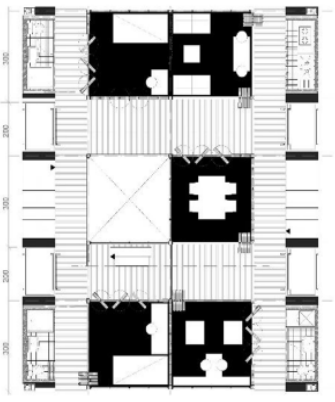


Figure 16: The system of the tower as an innovative scheme consisted od movable walls and modular rooms

So, the tower house can be experienced as a flow of activities through a scaffolding in constant transformation, which resembles the very pattern of the unfinished block.

CONCLUSION

Residential towers from the second half of the 20th century are an evident spatial-social phenomenon within Macedonian cities. They represent a new way of living, new spatial models and new construction technology, so the towers promote the new architectural typology and urban morphology as part of the modernization of Macedonian cities. However, seen in an integral chronological and spatial trace, we can position them more clearly concerning the continuity and discontinuity of the emergence of the vertical forms of settlement of the cities. In the integral timeline followed by the research, we can single out three primary periods that refer to three categories or typologies of vertical structures.

The first typology refers to the historical towers, which arise from the existing urban texture in the form of particular vertical outbursts. The construction of the historical towers can be traced from the 14th century to the 19th century, and are always part of the historical fragments of the city. The second typology refers to residential towers from the second half of the 20th century, often opposed to the urban texture, redefining and replacing it with new spatial patterns. Such behaviour stems from the ideological plan to overcome the old dependencies on the old spatial orders and the physical attributes of the new objects (base, volume, construction) concerning the existing texture. This period began modestly, in the sixties, in several Macedonian cities: Ohrid, Kumanovo, Kočani, and Kavadarci. Later, from 1975 to 1980, he continued with the massive construction of towers in Tetovo, Bitola, Veles and Ohrid. The period of construction of residential towers closes in the nineties with the solitary spatial interventions in Negotino, Gostivar and Makedonska Kamenica. In this way, residential towers are increasingly perceived as an architectural heritage from the recent past. The third typology refers to the possible vertical structures from the investigated cases. They represent a return to the principles of historical towers concerning the urban situation, careful cleaning of the urban texture but with the introduction of new construction technologies and sensitivity to the new pluralistic context and new socio-cultural situations.

Throughout the three periods, the continuity and discontinuity of the forms of vertical settlement can be seen. Suppose the historical towers are part of the historical image of the cities. In that case, the residential towers from the second half of the twentieth century are increasingly perceived as artefacts from the recent past, part of the modernization and violent transformation of the Macedonian cities. The possible contemporary vertical structures developed through the investigated cases bring us back to the integral potentials of this typology as city-building but also responsible spatial and social mechanisms.

REFERENCES

- Bakalchev, Bakalcheva and Tasić. 2015. *Forgetting the City: Tactics of Transformation of the City in Motion.* Skopje: Open Urban Studies and Demography Journal.
- Cholovic. 2008. *Clock towers in the Republic of Macedonia*. Skopje: National Conservation Center-Skopje.
- CTBUH. *Height Criteria for Measuring & Defining Tall Buildings.* The Council on Tall Buildings and Urban Habitat (CTBUH).
- Ivanovski, Ivanovska-Deskova, and Deskov. 2018. *Skopje's' Verticals*. Skopje: Museum of City of Skopje.
- Petrova, Mihajlovska. 2022. "Living among the clouds: From tower to texture." *Structures and Architecture A Viable Urban Perspective*, Vol. 2: 481-482.
- Petrova. 2020. "Future Habitat Model." *ORIS*, no. 123: 124-131.
- Petrova. 2020. *From neighbourhood community form to new collective community*. Skopje: Ss. Cyril and Methodius", Skopje, Faculty of Architecture, Skopje. Unpublished master thesis.