doi.org/10.62683/SINARG2025.023

Research paper

THE ANALYSIS OF OPEN SPACES IN NEWLY BUILT APARTMENTS IN SERBIA – CASE STUDY: THE CITY OF NIŠ

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Abstract

The paper deals with the analysis of open spaces in newly built apartments in Serbia. The research was conducted as a case study of selected examples of newly built or under-construction apartments in the city of Niš. Considering the trends in residential construction from the post-socialist period to the present day, as well as the investor-driven focus on profit, which is a characteristic feature of so-called "investor architecture", highly prevalent in Serbia, the assumption is that open spaces within apartments are not given much importance. On the other hand, open spaces are crucial for a healthy life and comfort, so their functionality is of great significance. In this regard, the paper investigates the current state of open spaces within apartments in new constructions and possibilities for their improvement. The aim of this paper is to examine the size, shape, functionality, and positioning of open spaces through the analysis of selected newly built apartments, in order to assess their contribution to the overall quality of housing. The main scientific methods applied in the research are analysis, synthesis and comparison. The findings highlight the inadequate functionality of open spaces and underscore the necessity for regulatory and design interventions aimed at enhancing their quality and their role within residential environments.

Key words: *open spaces, newly built apartments, functionality, residential comfort*

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1. INTRODUCTION

Global urbanization is continuously increasing, leading to the rapid densification of cities [1], which in turn drives intensive construction activities and significantly impacts housing quality as well as shifts in residential typologies [2].

The process of urbanization is also evident in the Republic of Serbia, with a particularly notable increase in residential construction in its larger cities. According to data from the Statistical Office of the Republic of Serbia [3], the number of newly constructed apartments across the country has been steadily rising (Figure 1). The high demand for housing in urban areas has driven the accelerated development of multi-family residential buildings. In order to gain a clear understanding of what is currently being offered on the housing market and whether the quality of newly built apartments aligns with user needs, it is essential that construction be accompanied by research. Such research should examine the issue from multiple perspectives and guide future development, so as to avoid causing long-term harm to both the built environment and the urban ecosystem.

With the broader aim of examining the quality of newly built apartments in Serbia — and recognizing that the presence and quality of open spaces within residential units significantly influence overall housing quality — this study focuses specifically on assessing the quality of open spaces in new-built apartments. While the quality of open spaces alone does not provide a complete picture of overall apartment quality, it represents one of its key components, and was therefore selected as the central subject of this research. The study was conducted as a case study within the city of Niš, analyzing open spaces in a total of 45 apartments, categorized by size into groups of small, medium, and large apartments, defined for the purposes of the research. This is an indicative sample that may serve as a basis for broader conclusions in similar urban contexts across Serbia. The primary focus was placed on medium-sized apartments (50–60 m² — approximately the national average), while small (<50 m²) and large (>60 m²) apartments were included for comparative analysis.

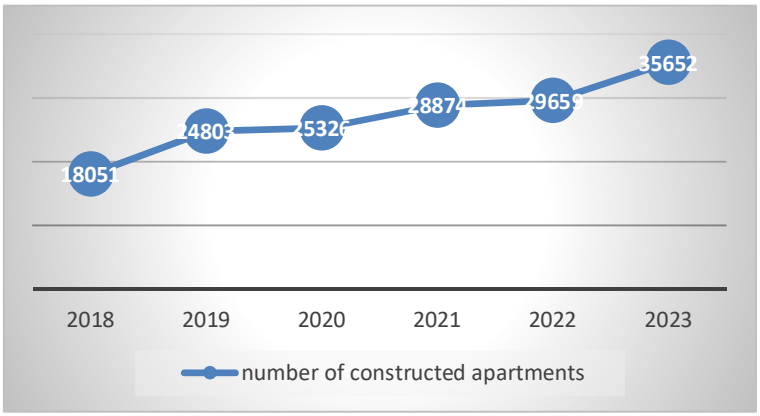

Figure 1 – Number of constructed residential units in the Republic of Serbia from 2018 to 2023, according to data from the Statistical Office of the Republic of Serbia [3]

The specific aim of this study is to examine the functionality of open spaces within apartments in multi-family residential buildings. In medium-sized apartments in Serbia, it is common to find undersized interior spaces, often as a result of efforts to incorporate the maximum possible number of bedrooms [4]. Furthermore, the current Regulation on Conditions and Standards for the Design of Residential Buildings and Apartments [5] does

not mandate the inclusion of open spaces as a required component within apartment units. Based on this context, this study is grounded in the hypothesis that open spaces in newly constructed apartments are considered secondary elements—insufficient in number, reduced in size, and often inadequately integrated into the overall functional organization and architectural design of residential units.

The methods applied in the research include analysis, comparison, synthesis, description, and observation. Initially, 45 newly built apartments from the city of Niš were selected and individually analyzed. The comparison of the obtained results (summarized in tabular form) allowed for the synthesis of the final findings, which are presented in the paper. The primary criteria for selecting apartments for analysis were apartment size and the diversity of functional layouts. The analyzed examples were taken from catalogs of apartments available on the official websites of the developers. Some of the apartments were completed, while others were still under construction but advertised for sale. Based on the available drawings, the selected apartments were uniformly sketched to facilitate better examination and analysis.

2. THE IMPORTANCE OF OPEN SPACES IN MULTI-FAMILY RESIDENTIAL BUILDINGS

Open spaces in an apartment are areas through which the apartment connects with nature and its surroundings. In multi-family residential buildings, the following types of open spaces can be identified within apartments (Figure 2): terrace (an open area of ground-floor apartments, a private garden at ground level, a kind of original type of private outdoor space [6]), balcony (an external space in the form of an elevated platform that extends as a cantilever beyond the building's main facade plane), loggia (an external space recessed within the building's main volume; one side is open, while the other three are enclosed), semi-loggia (a transitional form between a loggia and a balcony, which may be partially recessed and open on multiple sides), and roof terrace (flat roof terrace belonging to the apartment; rarely appears in small apartments). An additional type is the so-called french balcony (a glazed opening on the facade, the size of a full balcony door, but without a standing platform), although its function is somewhat different. Each type of open space within the apartment has its own advantages and disadvantages: a terrace is characterized by direct contact with the ground, greater spatial comfort, but often reduced privacy; a balcony offers greater openness to the surroundings, but also less privacy; a loggia has a high degree of privacy, is less exposed to weather conditions, but is less well-lit and affects the apartment's lighting; a semi-loggia has a higher degree of privacy than a balcony and better natural lighting than a loggia; a rooftop terrace has a high degree of privacy, good views, but is exposed to weather conditions.

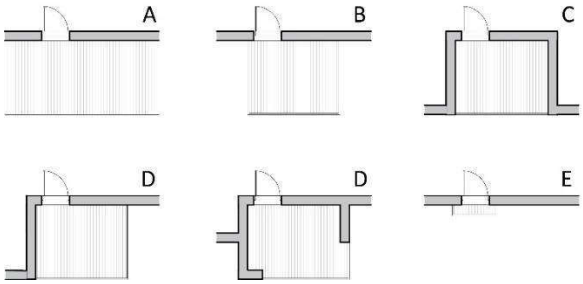

Figure 2 – A) Terrace, B) Balcony, C) Loggia, D) Semi-loggia, E) French balcony

As open spaces in apartments within multi-family residential buildings function as substitutes for the private gardens typical of single-family homes, their careful consideration and thoughtful integration are essential components of the architectural design process - open spaces within the apartments play a crucial role in multi-family residential buildings by providing private outdoor spaces for residents, improving their quality of life and enhancing the connection between indoor and outdoor environments. Such open spaces are places for rest and relaxation inside the apartment, social interaction and many other everyday activities. They are especially important in dense urban environments where access to green or open areas may be limited.

In discussing open spaces, Stamm-Teske W., Fischer K., and Haag T. [6] emphasize that the function of open spaces — although technically secondary — has become one of the central concerns in residential architecture. Due to their significant impact on the plastic articulation of the building as a whole, private outdoor spaces have evolved into key design drivers [6]. Consequently, a residential building designed without consideration for external spaces may be regarded as functionally obsolete. The renowned architect Neufert E. notes that the value of a dwelling increases when balconies or other types of open spaces are incorporated into the design [7]. According to Nestorović, every contemporary apartment should include at least one open-air space — this is a requirement of residential hygiene and a contributor to living comfort [8].

The COVID-19 pandemic further highlighted the value of open spaces within the apartment, as they became essential extensions of the living space. According to Carlos C. Duarte et al. [9] the importance of home balconies increased during the pandemic, demanding an update of its design features to accommodate the newly rediscovered activities with direct implications on its users' health and life quality. Evaluating the main design characteristics and associated uses that modern home balconies should incorporate, in light of how COVID-19 lockdowns have reshaped people's understanding and experience of home, they indicate that the perceived value of balconies has changed during the pandemic, suggesting that balconies are now expected to support a variety of activities — such as eating, reading, writing, using media, socializing, or simply relaxing, which were previously carried out in other spaces, highlighting that the shift in usage, has underscored the need for rethinking balcony dimensions and functions [9]. The experience of the pandemic could be seen as a call to reevaluate existing standards for apartment design.

3. CASE STUDY

Since the 2000s, and before, open spaces within apartments in Serbia have often been reduced to minimal areas under the influence of investor-driven architecture[4], i.e., market pressures and rationalization. The primary objective of this research is to analyze apartments currently available on the market and assess the quality of open spaces within apartments of average size in Serbia. According to the most recent data available on the official website of the Republic Statistical Office from 2023 [3], the average floor area of newly sold apartments in the Republic of Serbia was 55 m², in Belgrade, the average was 59 m², in Novi Sad it was 55 m², and in the two municipal areas of Niš, Mediana and Pantelej, the average area of newly sold apartments was 57 m² and 53 m², respectively [3]. Niš follows the national trend of increasing numbers of apartments on the market. Given that the situation in the housing sector in Niš is similar to that at the national level, the city of Niš was selected as the territorial scope for this study, with the reasonable assumption that the results obtained in this research could be largely applied to a broader geographic context. Therefore, focusing on the average size of apartments sold, this case study provides a more detailed analysis of newly built apartments in Niš within a size range close to the city and national averages — between 50 m² and 60 m². The study also includes apartments of smaller and larger sizes than the defined main category, with the aim of comparing specific parameters.

For the purposes of the case study, based on the primary criteria of size and diversity of functional layouts, 45 apartments were selected for analysis. Although the sample is not statistically representative, its selection enables an informed understanding of the prevailing spatial characteristics of newly constructed apartments at both local and national levels. The main analysis was conducted on 15 apartments ranging in size from 50 to 60 m² (Table 1).

[4] Investor-driven architecture refers to the practice of configuring residential spaces primarily according to market profitability, often at the expense of functionality, comfort, and sustainability.

Table 1. Analysis of open spaces in selected newly built apartments ranging from 50 to 60 m².

Apartment number	Location	Total floor area of the apartment (m2)	Number of open spaces	Size of open spaces (m2)	Type of open spaces	Open-to-total area ratio (%)	Shape of open spaces – approximate geometry	Dimensions of open spaces (m)	Dimensions ratio
01	*Vojvode Mišića*	53	1	4.03	loggia	7.60	rectangular	1.30*3.10	1:2.38
02	*Gornjomateje vačka*	53.5	1	4.60	semi-loggia	8.60	polygonal	1.80*2.50	1:1.39
03	*Vojvode Tankosića*	50	1	1.70	loggia	3.40	rectangular	1.05*1.74	1:1.66
04	*Vojvode Tankosića*	50	1	2.56	loggia	5.12	rectangular	1.53*1.80	1:1.18
05	*Vojvođanska*	60	2	2.83+ 2.32	semi-loggia / loggia	8.58	rectangular	1.68*1.71 1.18*1.89	1:1.02 1:1.60
06	*Bulevar Sv. Pantelejmona*	54	1	2.97	loggia	5.50	trapezoidal	1.17*2.20	1:1.88
07	*Lamartinova / Nobelova*	56	1	2.61	loggia	4.66	rectangular	1.47*1.70	1:1.16
08	*Zdravke Vučković*	57	1	4.47	loggia	7.84	rectangular	1.18*3.79	1:3.21
09	*Dubrovačka*	54.5	1	2.40	loggia	4.40	rectangular	1.20*2.02	1:1.68
10	*Matejevački put*	55.5	1	3.36	loggia	6.05	rectangular	1.40*2.40	1:71
11	*Gornjomateje vačka*	55	1	3.55	loggia	6.45	rectangular	1.20*2.94	1:2.45
12	*Blagoja Parovića*	55	1	5.48	balcony	9.96	rectangular	1.66*3.30	1:1.99
13	*Knjaževačka / Vase Pelagića*	54.5	1	6.00	loggia	11.01	rectangular	1.38*4.10	1:2.97
14	*Radoja Domanovića*	50	1	3.41	loggia	6.82	rectangular	1.38*2.48	1:1.80
15	*Borivoja Stevanovića*	60	1	4.56	loggia	7.60	rectangular	1.50*3.12	1:2.08

The analysis focuses on this group as it represents the most prevalent type of apartments on the market in Niš, as well as at the national level in the Republic of Serbia. According to their structure, the apartments in this analyzed group are two-bedroom and two-and-a-half-bedroom units[5] — either with a single master bedroom or with one master bedroom and one smaller single children's bedroom. The analysis identified the following parameters: the number of open spaces within the apartment, the size of the open spaces, the type of open spaces, the percentage of open spaces in relation to the total apartment area, the shape of the open spaces, the dimensions of the open spaces, and their interrelationship. Tables 2 and 3 present examples from a broader analysis (smaller and larger apartments compared

[5] Classification according to the current Regulation on the Conditions and Standards for the Design of Residential Buildings and Apartments in the Republic of Serbia

to the main analyzed category), which were used for comparison with the apartments that constitute the primary subject of the research.

Table 2. Analysis of open spaces in selected newly built apartments, smaller than 50 m².

Apartment number	Location	Total floor area of the apartment (m2)	Number of open spaces in the apartment	Size of open spaces (m2)	Type of open spaces	Open-to-total area ratio (%)	Shape of open spaces – approximate geometry
01	*Knjaževačka / Vase Pelagića*	42.8	1	3.16	loggia	7.38	rectangular
02	*Milentijeva*	42.48	1	5.46	loggia	12.85	rectangular
03	*Dubrovačka*	41.66	1	2.04	semi-loggia	4.90	rectangular
04	*Cvijiceva*	36.41	1	2.85	semi-loggia	7.83	rectangular
05	*Vase Pelagića*	44.37	1	4.12	loggia	9.28	rectangular
06	*Pane Đukića / Hadži Prodanova*	47.52	1	6.02	semi-loggia	12.67	polygonal
07	*Lamartinova / Nobelova*	39.54	1	2.36	loggia	5.97	rectangular
08	*Zdravke Vučković*	41.9	1	3.2	loggia	7.64	rectangular
09	*Cara Dušana*	42.8	1	3.08	loggia	7.20	rectangular
10	*Matejevački put*	45.39	1	5.05	loggia	11.13	rectangular
11	*Bulevar Nemanjića*	44.13	1	2.85	loggia	6.46	rectangular
12	*Vardarska / Novopazarska*	31.67	1	2.54	loggia	8.02	rectangular
13	*Mačvanska*	45	1	3.14	loggia	6.98	rectangular
14	*Dejana Dinića*	44.47	1	3.35	loggia	7.53	rectangular
15	*Gornjomatejevačka*	42.46	1	4.54	loggia	10.69	rectangular

Table 3. Analysis of open spaces in selected newly built apartments, larger than 60 m².

Apartment number	Location	Total floor area of the apartment (m2)	Number of open spaces in the apartment	Size of open spaces (m2)	Type of open spaces	Open-to-total area ratio (%)	Shape of open spaces – approximate geometry
01	*Knjaževačka / Vase Pelagića*	83.25	1	6	loggia	7.21	rectangular
02	*Milentijeva*	89.33	1	7.85	semi-loggia	8.79	polygonal
03	*Dubrovačka*	75.93	1	3.63	loggia	4.78	square
04	*Cvijiceva*	78.5	1	6.8	loggia	8.66	trapezoidal
05	*Vase Pelagića*	87.29	2	6.36 + 3.62	loggia / loggia	11.43	polygonal
06	*Pane Đukića / Hadži Prodanova*	68.95	1	11.94	semi-loggia	17.32	polygonal
07	*Lamartinova / Nobelova*	67.51	1	2.87	loggia	4.25	rectangular
08	*Zdravke Vučković*	96.6	1	7.9	semi-loggia	8.18	rectangular
09	*Cara Dušana*	70.37	1	7.26	loggia	10.32	rectangular
10	*Matejevački put*	75.51	1	4.35	loggia	5.76	rectangular
11	*Bulevar Nemanjića*	80.3	1	8.44	loggia	10.51	rectangular
12	*Vardarska / Novopazarska*	75.87	1	8.89	loggia	11.72	rectangular
13	*Mačvanska*	80	1	5.9	loggia	7.37	rectangular
14	*Dejana Dinića*	71.77	1	3.67	loggia	5.11	rectangular
15	*Zelengorska*	86.2	1	3.3	loggia	3.83	rectangular

4. DISCUSSION

Based on the conducted case study, the following conclusions have been drawn:

1) Medium-sized apartments (50-60 m²) predominantly have only one open space. This space is primarily connected to the living area and is usually accessible from the living room. In some cases, for apartments with single-sided orientation, it is possible to find an additional exit from the bedroom to the open space, allowing the open area to serve both the day and night zones simultaneously. Although it is desirable for both the day and night zones to have access to open spaces, combining them through a shared open area could compromise the privacy of the night zone. Ideally, an apartment should have at least two open spaces, separated by zones. Of the 15 analyzed examples from the medium-sized apartment group, only one apartment has two open spaces — one in the living area and one in the night area. In the group of smaller apartments (<50 m²), all units have only one open space, while in the group

of larger apartments (>60 m²), only one apartment also features two open spaces. The positioning and connection to other rooms in these groups of apartments are very similar to those in medium-sized apartments. Based on this, we can conclude that the number and position of open spaces in apartments in Niš do not necessarily depend on the size of the apartment. Researching the adaptability of balconies in multifamily housing design, Peters T. and Masoudinejad S. [10] emphasize the importance of the location and placement of the balconies in relation to the floorplan (indicating as an example the inability of the balconies that are accessible only from the bedroom to provide extensions of the living space).

2) Looking at the relationship between the sizes of open spaces in the apartments from the analysis (graph in Figure 3), it can be concluded that the sizes of open spaces in smaller apartments (below 50 m²) and medium-sized apartments (50-60 m²) are quite consistent. This may be the result of typical design solutions rather than the architect's original intent. The greatest variation in the size of open spaces is observed in larger apartments (over 60 m²). The average sizes of open spaces in small, medium, and large apartments from the case study are: 3.58 m², 3.79 m², and 6.58 m², respectively. The average sizes of open spaces in small and medium apartments are roughly the same, with a slight difference in favor of medium-sized apartments, while the size of open spaces is noticeably larger in larger apartments.

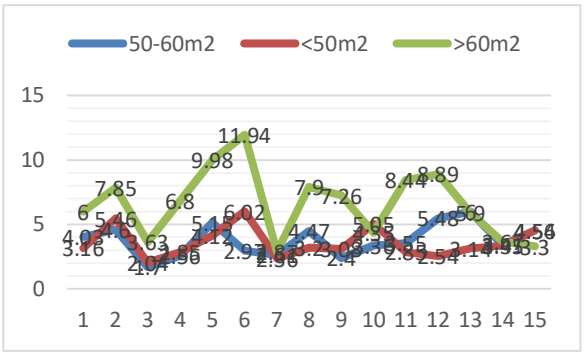

Figure 3 – Variations in the Area of Open Spaces in Apartments

3) The average percentage share of open spaces in relation to the total apartment area (Figure 4) for medium-sized apartments is around 6.9% for the analyzed apartments, while for smaller and larger apartments, this share is higher, with the examples from the extended analysis showing approximately 8.4% for smaller apartments and around 8.3% for larger apartments.

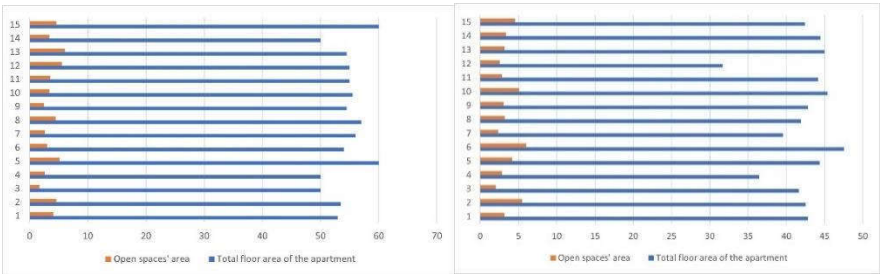

Figure 4 – Open spaces' area in relation to the total apartment area in: a) small apartments (50-60 m²), b) medium-sized apartments (<50 m²)

4) The area of a space is crucial for its proper functional organization – for a particular space to accommodate all necessary functions, it must primarily provide sufficient room for positioning the required furniture and equipment, their usage, and adequate circulation. However, the area of a space alone is not a sufficient parameter for determining its functionality. The dimensions of the open space also play a significant role in evaluating its functionality. An open space with the same area will not be equally functional if its dimensions (width and length) are disproportionate. Therefore, attention must be paid to the relationship between the width and length, as well as the geometry. According to Nestorović B. [8], the most favorable shape for open spaces is an elongated rectangle with the longer side facing the building. This shape allows for more favorable furniture arrangement, more efficient circulation, and less compromised room lighting. The width of the open space should not be less than 150 cm, as this would hinder movement around a table, which should be provided for [8]. In the analyzed apartments, with an area of 50-60 m², from the case study, the shape of the open space is rectangular or approximately rectangular in the majority of cases (13/15). However, only 1/3 of the analyzed apartments (5/15) meet the criterion of a minimum width of 150 cm, indicating a problem in space organization and functionality (Figure 5). If we consider Nojfert's recommendation to include space for flower beds (plantings) in the functional depth [7], we can conclude that none of the analyzed examples meet the criterion for adequate depth. In the analyzed examples of apartments with an area of 50-60 m², it is evident that little consideration was given to greenery in the design of the open spaces, and, if included, it might only be placed peripherally, along the longer side.
5) When discussing the sizing of common (shared) rooms in an apartment, the main factor considered is the number of users. The number of seating places in the living room and dining area is most commonly sized according to the pattern: number of users + 2 [11, 12], where the number of residents is increased by 2, to account for occasional visitors. Considering that the open space in an apartment is a space whose function includes socializing among residents (family) as well as interacting with visitors (friends), similar to a living room outdoors, it is logical that the dimensions of this space should follow the mentioned formula. Furthermore, which is particularly relevant after the pandemic, these spaces serve not only as areas for rest but also for work activities (e.g., working from home in a garden setting). The type of furniture most commonly planned for open spaces is a table with chairs or more comfortable furniture such as garden sets and lounge chairs. In this regard, when sizing the open space, it should be ensured that at least one garden set or table with chairs for household members and visitors is provided. Since the current regulation [5] does not specify a minimum area for open spaces in an apartment, the decision is left to the designer, often (or almost always) influenced by the requirements of the investor. In the analyzed examples, only 40% of the medium-sized apartments (6/15) have open spaces where seating for the number of users corresponding to the mentioned pattern n+2 can be arranged (in apartments 1, 2, 8, 12, 13, and 15 – see the Figure 6). However, it should be emphasized that, in all cases, movement around the table when users are seated is difficult because there is not enough width for circulation (Figure 6).

6) According to the case study, it can be concluded that, regardless of apartment size, the most common type of open space in newly built apartments in Niš is the loggia. Although the loggia has advantages in terms of protection from weather conditions, increased privacy, and better thermal insulation, caution should be exercised when applying this type, as it can lead to issues with sunlight penetration in the rooms adjacent to it. In current practice, it is common to find apartments where the living room, dining room, and kitchen are combined in a linear arrangement along the depth of the space, resulting in very deep areas that require adequate lighting. If an open space in the form of a loggia is attached to them, there is a risk of disrupting the lighting comfort of the apartment's day zone.

Research on the use of apartment balconies [13], revealed that developers and designers often associate balconies primarily with residents' leisure activities, which leads to their design being limited to minimal dimensions without considering the impact on usability and comfort, while, in reality, balconies serve many other functions related to everyday household tasks. Considering that the dimensions of open spaces in newly built apartments have been reduced to a minimum, often below the necessary minimum, it is concluded that these open spaces barely meet the most basic needs for outdoor living, while there is no space for other auxiliary activities and amenities that are significant for the user. In this regard, one of the conclusions of the paper is that the current regulation in the field of residential building design, which does not require open spaces in apartments as mandatory, should be improved. The proposal is to amend the regulation to require the mandatory design of at least one open space within the apartment and to define its minimum dimensions and area to ensure the minimum necessary functionality (proposal: minimum area of 3.5 m² and minimum width of 1.5 m). It is further recommended that the regulations incorporate typological guidelines, given their differing functions and limitations.

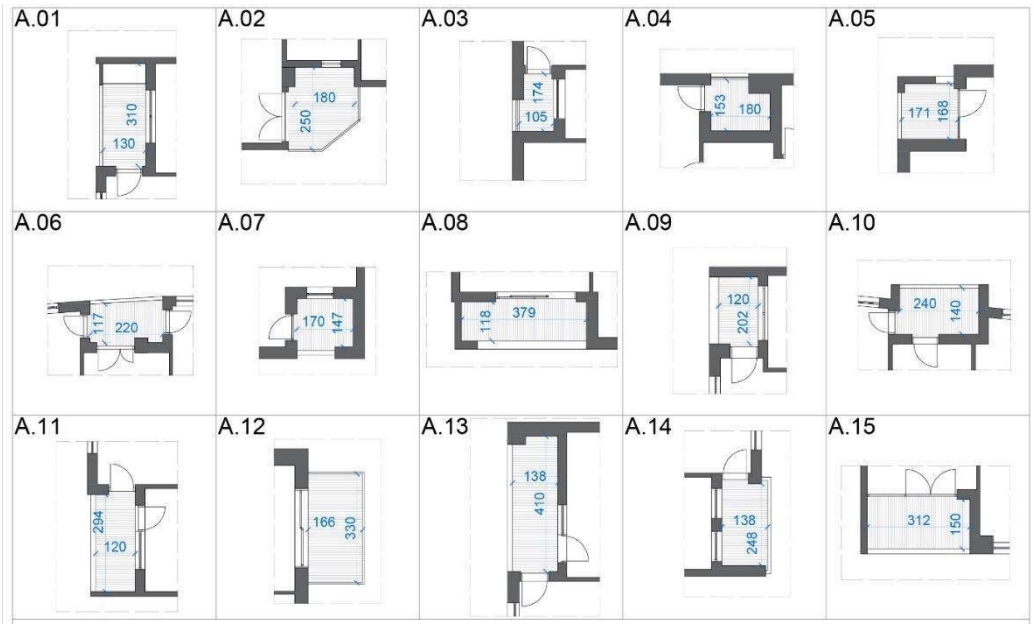

Figure 5 – Dimensions of open spaces from the case study (medium-sized apartments)

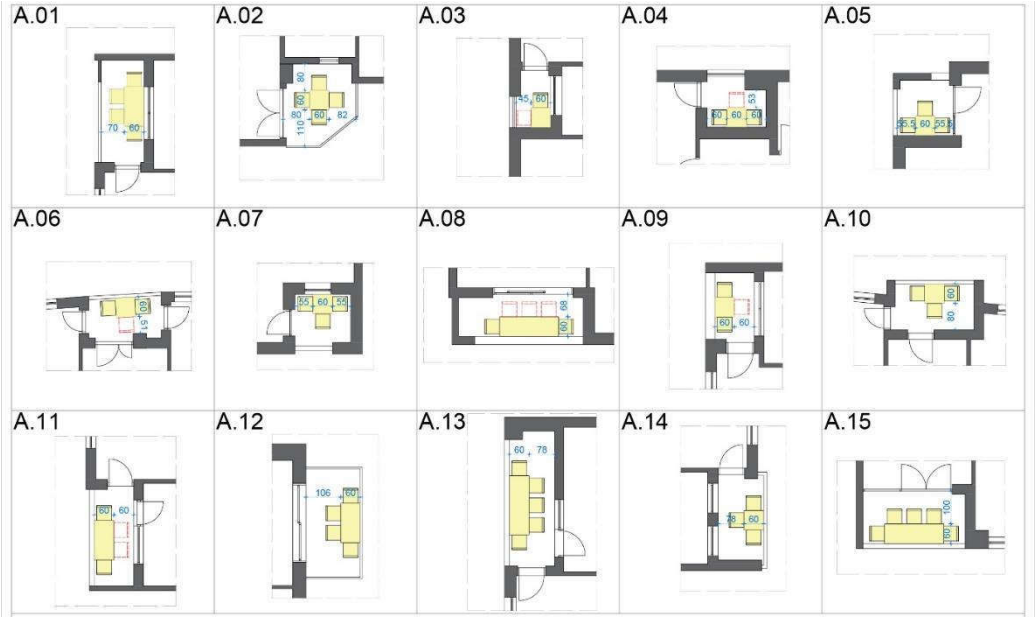

Figure 6 – Testing the possibility of seating users in open spaces from the case study (medium-sized apartments)

The second conclusion drawn from the research is that open spaces in an apartment should also be considered as green spaces, and sufficient space should be provided for the placement of greenery (in pots, planters), so that these areas can compensate for the lack of a yard and contribute to the creation of a more favorable microclimate and a more pleasant living environment. Considering that "investor architecture" is still prevalent in Niš, where the residential building project is primarily geared towards maximizing the investor's profit from the outset, without giving excessive consideration to the satisfaction of the end user, it is common for open spaces within the apartment to be marginalized. When determining the price of an apartment, open spaces are calculated in the same way as other spaces in the apartment — the total saleable area of the apartment includes the open space at 100% of its area. Due to the low purchasing power of residents, future buyers often opt for apartments where the open space area is reduced in favor of increasing the area of other rooms — such as the living room or bedrooms, leading to another factor that influences the existence and quality of open spaces in the apartment. This vicious circle, driven on one hand by the investor's desire for high profit and on the other by the users who, due to financial difficulties, are forced to lower their criteria when choosing their living spaces, is one of the key aspects defining the direction of housing construction in Niš and Serbia. This issue could be alleviated by introducing certain measures that would prioritize the users' needs. For example, the saleable area of open spaces within an apartment in Germany is calculated as ¼ to ½ of its area [14]. To satisfy both the investors' interests and encourage them to meet these requirements, certain incentives for investors could also be introduced, such as tax reductions for greening open spaces, etc.

5. CONCLUSION

The constant reduction of apartment size and the drive to maximize the number of units within a residential building have led to a decline in housing quality. Open spaces within an apartment are a crucial functional element that enhances the quality of living and impacts human health. This is especially important in densely built environments, where there is limited access to public green spaces near residential buildings. The recent experience stemming from the Covid pandemic further underscores the importance of open spaces within the apartment.

The research presented in this paper aimed to identify the quality of designed open spaces within newly built apartments in Serbia, with the goal of improving them and adapting them to the contemporary needs of users. The results of the study confirm the initial hypothesis that open spaces in newly constructed apartments in Niš are marginalized both functionally and spatially. They are present in minimal dimensions, often with inadequate proportions, limited functionality, and without a standardized architectural approach.

The findings indicate that open spaces are not given adequate attention during the design process, they are often non-functional or barely functional, fail to meet all the essential needs of users, and therefore require deeper analysis and a more thoughtful design approach, given their importance.

The key recommendations, aimed at enhancing the quality of open spaces within the apartments, emerging from the research include: introducing a requirement for the design of at least one open space per apartment; defining minimum standards for the area and width of open spaces; and redefining the method of calculating the saleable floor area in order to encourage the construction of such spaces.

Although the research is based on an indicative sample of apartments in the city of Niš, the results point to broader trends in residential construction practices across Serbia. Future studies should encompass a larger number of cities, including comparative analyses within a regional context, as well as qualitative methods (e.g., user satisfaction surveys), in order to gain a deeper understanding of residents' perceptions, usage patterns, and expectations regarding open spaces.

ACKNOWLEDGMENTS

This research was supported by the Ministry of Science, Technological Development and Innovation of the Republic of Serbia under the Agreement on the Implementation and Financing of Scientific Research Work of the NIO in 2025 - Registration number: 451-03-136/2025-03/ 200095 dated 04/02/2025.

REFERENCES

[1] Lehmann Steffen: **Sustainable urbanism: towards a framework for quality and optimal density?**, *Future Cities and Environment*, Volume 2:8, 2016. https://doi.org/10.1186/s40984-016-0021-3

[2] Meriläinen Sanna, Tervo Anne: **The changing typology of urban apartment buildings in Aurinkolahti**, *Buildings and Cities*, 6 (1), 2025., pp. 50–69. https://doi.org/10.5334/bc.484

[3] https://www.stat.gov.rs/sr-cyrl/, accessed 18th March 2025.

[4] Krstic Hristina, Stoiljković Branislava, Petković Nataša, Petrović Vladana: **Functional organization of medium-sized apartments in new construction in Serbia**, *International Conference Synergy of Architecture & Civil Engineering SINARG 2023*, Niš, pp. 388-401, 2023.
[5] **Pravilnika o uslovima i normativima za projektovanje stambenih zgrada i stanova**, Sl. Glasnik RS, br. 58/2012, 74/2015 i 82/2015.
[6] Stamm-Teske Walter, Fischer Katja, Haag Tobias: **Raumpilot Wohnen**, Kraemerverlag, Wüstenrot Stiftung, Ludwigsburg, 2012.
[7] Nojfert Ernst, **Arhitektonsko projektovanje**, Građevinska knjiga, Novi Sad, 2003.
[8] Nestorović Bogdan: **Stambene zgrade: Osnovi projektovanja**, Univerzitet u Beogradu, Naučna knjiga, 1962.
[9] Duarte Carlos C., Cortiços Nuno D., Stefańska Anna, Stefańska Aneta: **Home Balconies during the COVID-19 Pandemic: Future Architect's Preferences in Lisbon and Warsaw**. *Applied Sciences*, Vol. 13, No. 1, 298, 2023. https://doi.org/10.3390/app13010298
[10] Peters Terri, Masoudinejad Sepideh: **Balconies as adaptable spaces in apartment housing**. *Buildings and Cities*, 3(1), pp. 265–278, 2022. https://doi.org/10.5334/bc.191
[11] Jovanović Goran: **Uvod u arhitektonsko projektovanje**, Građevinsko-arhitektonski fakultet Univerziteta u Nišu, AGM Knjiga, 2015.
[12] Ilić Dušan: **Projektovanje stambenih zgrada 1, Organizacija stana**, Univerzitet u Nišu, 1991.
[13] Smektała Marta, Baborska-Narozny Magdalena: **The use of apartment balconies: context, design and social norms**. *Buildings and Cities*, 3(1), pp. 134–152, 2022. https://doi.org/10.5334/bc.193
[14] **Verordnung zur Berechnung der Wohnfläche (Wohnflächenverordnung - WoFlV),** https://www.gesetze-im-internet.de/woflv/BJNR234610003.html, accessed 30th April 2025.