Journal of Mediterranean Cities

2023, Volume 3, Number 1, pages 31–42

Spatial-Functional Organization of a Contemporary Apartment in Serbia

* Dr. **Vladana Petrović**[1], Dr. **Branislava Stoiljković**[2], Dr. **Nataša Petković**[3], Dr. **Hristina Krstić**[4]
Faculty of Civil Engineering and Architecture, Niš, University of Niš, Serbia [1,2,3,4]
E-mail[1]*: vladana.stankovic@gaf.ni.ac.rs, E-mail*[2]*: branislava.stoiljkovic@gaf.ni.ac.rs, E-mail*[3]*: natasa.petkovic@gaf.ni.ac.rs*
E-mail[4]*: hristina.krstic@gaf.ni.ac.rs*

A B S T R A C T

The expansion of residential construction has marked the last twenty years in Serbia. Contemporary housing construction is popularly called "investor construction", and it is based on the investor's influence on achieving the greatest possible capacity in relation to the area of the plot, the largest possible area for sale, as many apartments as possible per floor, the largest possible dimensions of the building on the plot, and the largest possible number of rooms within the smallest possible total square footage. The research's aim is to discover how the aforementioned effects manifest themselves in the spatial-functional organization of the units. The analysis is performed on the case studies of residential construction in the largest urban areas of Belgrade, Novi Sad, and Nis. The findings of this research show that different authors repeat the same functional organization regardless of the location where they are constructed.

A R T I C L E I N F O:

Article History

Received: June 18 2023

Revised: September 17 2023

Accepted: September 30 2023

Available online: Oct. 08 2023

Keywords:

contemporary apatment, spatial-functional organization, housing unit development, housing

JOURNAL OF MEDITERRANEAN CITIES (2023), 3(1), 31-42
https://doi.org/10.38027/mediterranean-cities_vol3no1_3

www.mediterranean-cities.com

1. Introduction

The housing construction in Serbia has experienced a significant expansion in the last twenty years. Most apartments have been built in the three largest cities in Serbia: Belgrade, Novi Sad, and Niš. The construction period that took place is called "investor building", and, on a broader level, "investor urbanism". As the name says, the influence of a private investor who funds the construction is involved in the design, construction processes and urban design. This way of construction is a way of conducting an urban policy that often enables the implementation of all the material interests of investors without regard to the real needs of the population and at the expense of the public interest and the real needs of citizens. The aforementioned influences also indirectly impacted the housing organization. As a result, a certain type of organization of a contemporary apartment emerged, which reached the satisfaction of the basic requirements of the market. In practice, these requirements include as many rooms in the

Corresponding Author:
Dr Vladana Petrović
Faculty of Civil Engineering and Architecture, Niš, University of Niš, Serbia
E-mail: vladana.stankovic@gaf.ni.ac.rs, arch.vladanapetrovic@gmail.com, s.vladana@gmail.com

How to cite this article:
Petrović, V., Stoiljković, B., Petković, N., & Krstić, H. (2023). SPATIAL-FUNCTIONAL ORGANIZATION OF A CONTEMPORARY APARTMENT IN SERBIA. Journal of Mediterranean Cities, 3(1), 31-42.
https://doi.org/10.38027/mediterranean-cities_vol3no1_3

apartment and as few square meters as possible, while at the level of a residential building, as many apartments on the first floor as possible, or as many square meters for sale. The aim of this study is to observe, that is, to accept certain typological characteristics of a contemporary apartment through the analysis of spatial organization. The paper will investigate the typology of housing based on a case study in Serbia's three major cities: Belgrade, Novi Sad and Niš. Depending on the selected case studies, it will be examined if spatial similarities occur in the modern apartments envisaged in the places listed and designed by different authors. The research of the housing organization will be based on the analysis of examples of new construction in the mentioned cities. The aim of the work is to draw conclusions on the modern spatial and functional organization of the housing unit and adopt a characteristic housing scheme. The paper is structured into six chapters. In the first chapter, introductory considerations on the topic are given; in the second chapter, an analysis of social and housing conditions in Serbia is given. In the third chapter, the methodology for the analysis of urban and architectural factors in the mentioned cities is given. In the fourth chapter, an analysis of the spatial-functional organization of the residential unit was done through selected case studies; in the fifth chapter, the results are discussed based on selected case studies and, in the sixth chapter, the conclusions of the research are reviewed; and the seventh chapter presents a review of the literature.

2. Analysis of housing conditions in Serbia

"During the period of socialism in Serbia the construction of apartments was completely controlled by the state. In addition to being rational and economical, multi-family housing was seen as the ideologically desirable form of housing" (Stoiljković, 2020). "At the end of the last century, the state rejected the system of financing public subsidized housing construction and the housing sector was abruptly and completely left to market forces"(Stoiljković, 2020). New housing conditions in Serbia appeared in the first decade of the 21st century. Changes in the social and political system led to the state withdrawing from the housing sector, the development of illegal construction and, the upgrading of existing residential buildings (Petković-Grozdanović, 2017). The changes in society that occurred in 2012, created different conditions for housing construction, primarily leading to the emergence of new private investors whose main goal is the highest possible income from the sale of residential space. This impact is called investor construction, and on a broader level, it is called investor urbanism. Regarded as a contemporary social change, this impact is regarded as negative since it affects the process of direct collapse of all forms of urban and architectural development (Lojanica, 2019). According to the definition, investor urbanism is a way of conducting urban policy that often enables the implementation of all (material) interests of investors, to the detriment of the public interest and the real needs of citizens (Petrović, Rašković, 2011). Looking through the context of social conditions, the investor has become the most important factor in the process of the creation of architecture while the architect is required to realize the "ideas of the investor" that range from the functionality of the base, through form and architectural style to the choice of materials and color of the object (Jovanović, 2007). The residential normative managed by the designer under the influence of a private investor is a financial normative and refers to the net square of the building sold by the investor, with cause-and-effect links between the gross construction square and the net square that resulted from it. "The former minimum of the apartment has become the optimum and the maximum together, which has become the normative foundation of design standards. (Petrović, 2017). Although the conditions at the site are "primary in the conceptualization of the conceptual solution and undoubtedly affect the architectural design, both in terms of form and in terms of function (Krstić, 2019). In the case of investor construction, they become completely neglected, which leads to the conclusion that all influential factors are reduced to only one influential factor, and that is the requirement of the investor, which is reduced to the greatest possibility of construction of the surface (Petrović, 2021). In the last five years, private investors have built the most residential homes. According to the latest statistics, 28874 apartments were completed in the Republic of Serbia in 2021, with a total area of 2,161,492 m2. It has reached a maximum in the number of

apartments built in the last ten years, with a tendency to increase this number in 2022 and 2023 (The Federal Bureau of Statistics).

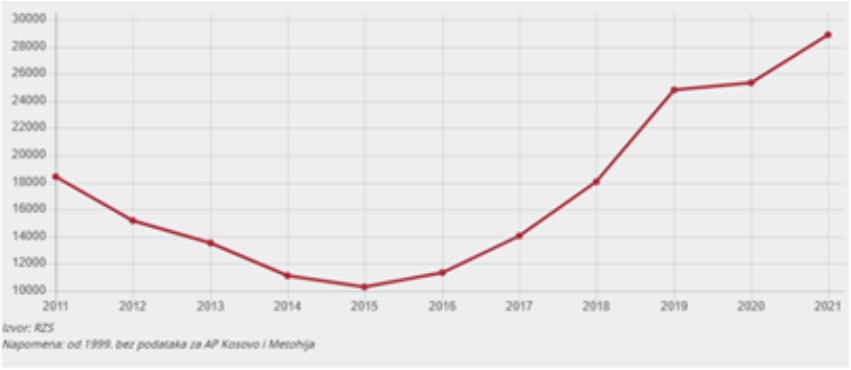


Figure 1. Number of completed apartments in the Republic of Serbia by year (Source: The Federal Bureau of Statistics, accessed 21.3.2023)

During the past twenty years, the development of residential buildings in Serbia can be traced in three directions. The first development direction refers to the creation of new residential neighborhoods in central or peripheral localities by public or private investors. These buildings were purposefully constructed, taking into account the requirements of the users and creating open spaces with the anticipated number of parking spaces, resulting in a certain level of housing quality. An example of investor construction is the residential complex "K district" (Figure 2), which belongs to the first direction of residential construction and is a large block built in the center of Belgrade. This violation blocks the view of the Kalemegdan Fortress and has sparked controversy and criticism from locals and urban planners who argue that preserving the historical and cultural significance of landmarks should be a priority in urban development.

Figure 2. Residential complex "K DISTIRKT"(2022), Belgrade (Source: https://kdistrict.rs/index.html#stanovi/ accessed 21.2.2023.)

Another form of residential construction is developed in the suburbs of cities by private investors. It is characterized by residential lamella construction and high population densities. This type of housing

does not provide shared areas such as playgrounds for children or parks for the community. Parking is limited to the space on the plot and, as a rule, is regulated spontaneously. These residential buildings, shown in Figure 3, are an example of this construction style. They are situated on Somborski Boulevard in Niš.

Figure 3. Residential area on Somborski Boulevard, Niš
(Source: By Author)

The third type of modern investor construction is an adaptation of single-family homes and/or low-story buildings that also entails improving and increasing their dimensions (Živković, 2017). Existing single-family homes are being replaced with brand-new multi-story buildings during this type of construction. There are many issues with this kind of construction. First of all, population density rises markedly, but housing quality frequently deteriorates, city center streets are destroyed, urban views are ruined, open spaces with greenery are lost, and significant parking issues are brought about. In most instances, such buildings' overall aesthetics are diminished. The situation has slowly changed in recent years as a result of the construction of individual structures that, due to their form and design features, significantly improve the aesthetic quality of contemporary residential structures.

Figure 4. Residential building, Takovska Street 14. Novi Sad
(Source: Takovska - Novogradnja Novi Sad, Sajmište - Prodaja Novogradnje Novi Sad | City Expert, accessed 26.4.2023.)

3. The spatial-functional organization of the housing unit

The new conditions created in the construction of residential buildings have had an impact on all spatial levels of the building. As seen through the design process, the investor's request became the only aspect to which the architect had to respond. According to this aspect, "the larger the area to be sold, the more apartments on the floor, the larger the size of the building on the plot, and, most importantly, the larger the number of rooms within the minimum possible total square footage" (Petrović, Rašković, 2011). The fundamental standards for designing an apartment, according to G. Jovanovic, "are reduced to the investor's subjective assessment of which apartment type and size will sell best on the market." The investor's primary concern is making a profit, and the planning measure is now a private plot (Jovanović, 2007). According to the mentioned requirements and the Rulebook on conditions and norms for the design of residential buildings and apartments ("Official Gazette of the RS", no. 58/2012, 74/2015, and 82/2015), the minimum surface areas of the structure of the apartments are defined in Table 1. As well as the minimum areas of residential premises Table 2. Although functional and minimal dimensions are necessary for human functioning, it happens frequently that these dimensions are not adhered to, which results in undersized rooms. The result of that is that the apartment cannot be functionally organized. There may be more rooms than permitted by the regulations within the apartment, depending on the square footage in question.

Table 1. Minimum area of the apartment according to the structure of the apartment (Source: Rule book on conditions and norms for design of residential buildings and apartments ("Official Gazette of RS", no. 58/2012, 74/2015 and 82/2015))

MINIMUM AREA OF THE APARTMENT ACCORDING TO THE STRUCTURE OF THE APARTMENT		
1.	**Studio apartment**	**26,00 m²**
2.	**One bedroom apartment** (living room for sleeping 2 persons)	**30,00 m²**
3.	**One bedroom apartment** (living room for sleeping 2 persons + 1 bedroom for sleeping 1 person)	**40,00 m²**
4.	**Two bedroom apartment** (living room for sleeping 2 persons + 1 bedroom for sleeping 2 persons)	**48,00 m²**
5.	**Two-bedroom apartment** (living room for sleeping 2 persons + 1 bedroom for sleeping 2 persons + 1 bedroom for sleeping 1 person)	**56,00 m²**
6.	**Three bedroom apartment** (living room for sleeping 2 persons + 2 bedroom for sleeping 2 persons)	**64,00 m²**
7.	**Three-bedroom apartment** (living room for sleeping 2 persons + 2 bedroom for sleeping 2 persons + 1 bedroom for sleeping 1 person)	**77,00 m²**
8.	**Four bedroom apartment** (living room for sleeping 2 persons + 3 bedroom for sleeping 2 persons)	**86,00 m²**
9.	**Four-bedroom apartment** (living room for sleeping 2 persons + 3 bedroom for sleeping 2 persons + 1 bedroom for sleeping 1 person)	**97,00 m²**

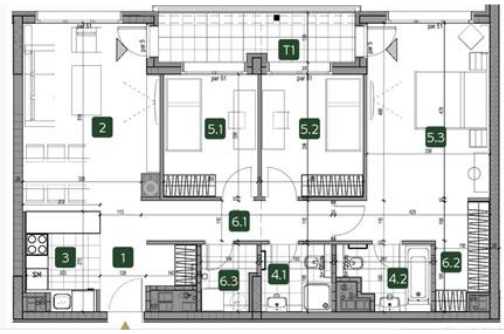
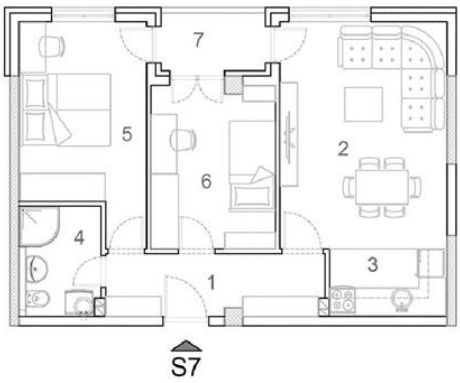
Table 2. Minimum area of rooms in the apartment
(Source: Rule book on conditions and norms for design of residential buildings and apartments ("Official Gazette of RS", no. 58/2012, 74/2015 and 82/2015))

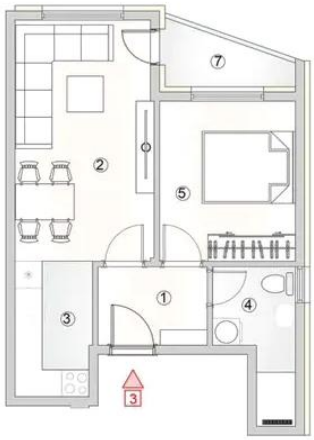
	MINIMUM AREA OF ROOMS IN THE APARTMENT	
1.	Living room	16,00 m^2
2.	Room for two persons	11,00 m^2
3.	Single room	7,00 m^2
4.	A place to eat lunch	4,00 m^2
5.	Food preparation area (kitchen)	4,00 m^2
6.	Closet storage	0,50 m^2
7.	Bathroom	3,00 m^2
8.	Toilet (special room)	1,30 m^2

4. A case study of contemporary housing unit organization

Six residential unit examples were chosen for the case study, two of which were designed in Belgrade, two in Novi Sad, and two in Niš. The case studies are representative examples of apartments with various building types and square, residential typologies and created by different authors. Selected projects are chosen from a large number of analysed examples using the classification and comparison method. Typological analysis has been performed on the basis of the adopted parameters and significant criteria for the spatial-functional organization of the residential unit. Representative examples were examined using the case study approach. A synthesis of pertinent information was found by examining the contents that were available, changes, and various housing unit design concepts.

Table 3. Case studies of spatially-functional organization of housing units
(Source of photos and floor plans: https://cityexpert.rs/a/novogradnja, accessed 18.4.2023)

	TYPOLOGY	FLOOR PLAN	INDOOR SURFACE AREA (M2)	
A	**THE DUKE'S GATES**		Entrance hall	4.03m²
			Kitchen	3.94m²
			Bathroom	3.38m²
			Bathroom	3.79m²
			Living-dining room	20.38m²
			Bedroom	8.67m²
			Bedroom	9.40m²
			Master bedroom	20.38m²
			Corridor	5.58m²
			Wardrobe	3.21m²
	Condominium		laundry room	2.58m²
			Terrace	7.21m2
	Belgrade, Voždovac		**Total area 92.52 m²**	
B	**LIMAN 4**		Entrance hall	8.72m2
			Kitchen	6.85m2
			Bathroom	5.46m2
			Living room	18.77m2
			Bedroom	12.74m2
			Bedroom	13.25m2
			Terrace	5.44m2
	Zatvoreni kompleks sa zelenim površinama i dečijim igralištima		**Total area 71.21 m2**	
	Novi Sad, Telep, Liman 4			
C	**RESIDENTIAL AND COMMERCIAL BUILDING PANTELEJ**		Entrancehall	6.66m²
			Living-dining room	18.58m²
			Kitchen	3.90m²
			Bathroom	4.38m²
			Bedroom	12.18m²
			Bedroom	9.88m²
			Terrace	2.96m²
	Residential and commercial building		**Total area 58.54 m²**	
	Niš, Pantelej			

D	**TELEP HOME**  Interpolacija Telep, Novi Sad		Entrance hall	5.92 m^2
			WC	3.06m^2
			Bathroom	3.82m^2
			Corridor	3.35m^2
			Kitchen	6.06m^2
			Utility	1.62m^2
			Living-dining room	17.30m^2
			Bedroom	12.51m^2
			Bedroom	8.19m^2
			Terrace	5.46m^2
			Total area 67.28 m^2	
E	**RESIDENTAL BUILDING IN ČUKARICA**  Slobodnostojeći objekat Čukarica, Beograd		Entrance hall	4.07m^2
			Bathroom	4.69m^2
			Kitchen	5.17m^2
			Living-dining room	20.53m^2
			Bedroom	11.09m^2
			Terrace	3.66m^2
			Total area 49.20 m^2	
F	**NEW BUILDING NIŠ**  Slobodnostojeći objekat Trošarina, Niš		Entrance hall	4.22m^2
			Living-dining room	16.50m^2
			Kitchen	5.07m^2
			Bathroom	4.75m^2
			Bedroom	10.70m^2
			Terrace	2.90m^2
			Total area 44.14 m^2	

5. Discussion

The analysis of case studies is processed through Tables 3 and 4.

Table 4. Shows a comparative analysis of the areas prescribed by the Rulebook and the projected areas in the presented case studies. The problem that occurs in apartments C, D, and F is the area of the living room, which is smaller than the permitted dimensions. Another way to look at these situations is to say that combining the living room and dining room results in a reduction in surface area. Apartment F has an undersized bedroom as well as a total area that is smaller than the prescribed minimum area, which refers to the structure of a two-room apartment. Additionally, the kitchens in apartments A and C are inadequately sized.

Table 4. Comparative analysis of case studies and the areas prescribed in the Rulebook on conditions and norms for design of residential buildings and apartments regulations

MINIMUM AREA OF ROOMS IN THE APARTMENT		A	B	C	D	E	F
Living room	16,00 m2	16.38 m2	14.77 m2	14.58 m^2	13.30m^2	22.53 m^2	12.50 m^2
Room for two persons	11,00 m^2	15.58 m^2 20.38 m^2	13.25 m^2 12.74 m^2	12.18m^2	12.51 m^2	11.09 m^2	10.70 m^2
Single room	7,00 m^2	9.40	x	9.88 m^2	8.19 m^2	x	x
Dining room/ A place to eat lunch	4,00 m^2	4,00 m^2	4,00 m^2	4,00 m^2	4,00 m^2	4,00 m^2	4,00 m^2
Kitchen Food preparation area	4,00 m^2	3.94 m^2	6.85m^2	3.90m^2	6.06m^2	5.17 m^2	5.07 m^2
Entrance hall	4,00 m^2	4.03 m^2	8.72 m^2	6.66m^2	5.92 m^2	4.07 m^2	4.22 m^2
Closet storage	0,50 m^2	2.58 m^2	x	x	1.62 m^2	x	x
Bathroom	3,00 m^2	3.38 m^2 3.79 m^2	5.46m^2	4.38m^2	3.82 m^2	4.69 m^2	4.75 m^2
Toilet (special room	1,30 m^2	x	x	x	3.06 m^2	x	x
Terrace	Is not definition	7.01 m^2	5.44 m^2	2.96 m^2	5.46 m^2	3.66 m^2	2.90 m^2
Corridor	Is not definition	3.21	x	x	3.35 m^2	x	x
DOES THE APARTMENT FULFILL THE MINIMUM AREA REQUIREMENT		**YES 92.52 m^2** (86.00m2)	**YES 71.21 m^2** (64.00 m2)	**YES 58.54 m^2** (56.00m2)	**YES 67.28 m^2** (56.00m2)	**YES 49.20 m^2** (48.00 m^2)	NO 44.14 m^2 (48.00 m^2)

Based on the selected case study examples shown in (**Table 3**) and numerous other examples of modern housing organization, as well as analysis of the same, the following typological characteristics of a modern apartment have been observed:

1. The apartment organization scheme develops linearly, very often without a spatial focus;
2. The position of the entrance does not affect the linear development of the organizational scheme;
3. The living area is characterized by an open space organization plan, based on the integration of the living room, dining room and kitchen;
4. As a rule, the kitchen is positioned in the farthest part of the living space. It is often designed without direct lighting and ventilation;
5. The living room and dining room often lose their dimensionality within the open plan;
6. The use of a strict, functional area into zones for day and night ends;
7. Bedrooms are positioned along linear communication; the existence of internal communications is lost, which conditions the reduced intimacy of bedrooms;

8. The physical size of spatial elements increases linearly within the same design manner;
9. Communications often develop without increasing use value; in a large number of cases there are too long communications, resulting from inadequate organization of space;
10. Absence of auxiliary rooms and storage space even in apartments with a larger structure;
11. The most common is the one-sided orientation of the residential unit;
12. Open spaces are undersized or absent.

6. Conclusion

The last two decades in Serbia have been marked by major turbulence and changes in the social and political system. Residential construction was one of the aspects of society that was affected by the changes. The state, which had previously been the sole investor in housing construction, was replaced by private investors. These changes have resulted in investor interest becoming the most important influence, placing itself above broader social interest. The main objective is monetary gain, which entails maximizing the use of the available space without taking into account the needs of the user population. The direct investment effect changed how the staff unit was organized as well. A contemporary apartment is set up according to a specific housing pattern plan that satisfies market demands. Based on numerous examined examples and selected case studies, it is possible to develop a typical scheme for the organization of a contemporary apartment, as shown in

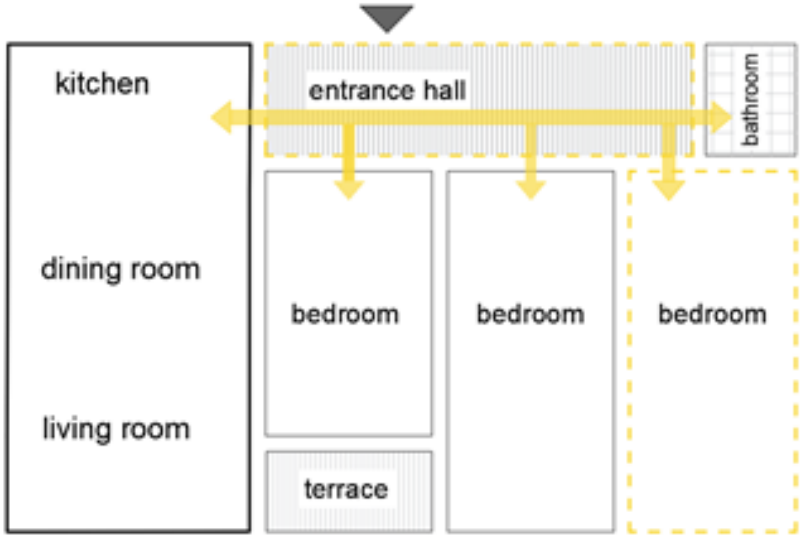


Figure 5. Scheme of the spatially-functional organization of the contemporary apartment (Source: By Author)

According to the presented scheme and previously analyzed case studies, the spatial-functional pattern of a contemporary apartment implies a linear organization without setting a spatial weight. The rooms are "lowered" along the communication, which also represents the entrance zone of the apartment. An open plan is formed where the living room, dining room, and kitchen come together. The kitchen is based on the organization of a working kitchen, often without natural lighting and ventilation. Apartments in larger structures physically increase linearly according to the same design principle. The central position of the entrance hall allows access to the bedrooms, which leads to the loss of internal communications. The apartments are mostly one-sided oriented and almost "as a rule" designed without a pantry. Open areas are very often sub-dimensioned or not designed in apartments in smaller structures. The appearance of certain spatial and functional differences in the residential organization mainly stems from the irregular shape of the plot.

Data availability statement
The original contributions presented in the study are included in the article/supplementary material, further inquiries can be directed to the corresponding author/s.

Ethics statements
Studies involving animal subjects: No animal studies are presented in this manuscript.
Studies involving human subjects: No human studies are presented in this manuscript.
Inclusion of identifiable human data: No potentially identifiable human images or data is presented in this study.

Conflict of Interests
The author declares no conflict of interest.

References

Jovanović G. (2007). Istraživanje uzajamnog odnosa organizacije stana i organizacije sklopa tipskog sprata stambenih zgrada (Research on the mutual relationship between the organization of the apartment and the organization of the assembly of the typical floor of residential buildings). 36. Doctoral dissertation, Faculty of Civil Engineering and Architecture, University of Niš.

Krstić, H. R. (2019). Istraživanje strukture arhitektonskog prostora u domenu stanovanja-koncept prostor u prostoru (Research on the structure of architectural space in the domain of housing - the concept of space in space). Doctoral dissertation, Faculty of Civil Engineering and Architecture, University of Niš. https://nardus.mpn.gov.rs/handle/123456789/11677

Lojanica V. (2019). Arhitektonska organizacija prostora. Stanovanje, tematske celine (Architectural organization of space Housing - thematic units). 257. Faculty of Architecture. University of Belgrade, Belgrade.

Petković-Grozdanović, N., Stoiljković, B., Jovanović, G., Mitković, P., & Keković, A. (2017). The spatial comfort of social housing units in the post-socialist period in Serbia in relation to the applicable architectural norms. 88-95, Cities, 62. ISSN 0264-2751, https://doi.org/10.1016/j.cities.2016.12.014.

Petrović, B. and Rašković, I. (2011). Tradicija-Tranzicija (Tradition – transition). 56. Belgrade: University Faculty of Architecture in Belgrade: Orion Art: IAUS.

Petrović, V. (2021). Razvoj i tipologije višeporodičnog stanovanja Niša od 1918. do danas (Development and typologies of multi-family housing in Niš from 1918 to the present). 157-159. Doctoral dissertation, Faculty of Civil Engineering and Architecture, University of Niš. https://nardus.mpn.gov.rs/handle/123456789/20874

Petrović, V., Keković, A., Petković-Grozdanović, N., Stanimirović, M., Petrović, M. (2017). The contemporary moment of housing architecture on a global scale - HOUSING 15. Architecture and urban planning 44, 55-61, ISSN 0354 – 6055. https://doi.org/10.5937/a-u0-12664

Rule book on conditions and norms for design of residential buildings and apartments ("Official Gazette of RS", no. 58/2012, 74/2015 and 82/2015) https://www.paragraf.rs/propisi/pravilnik_o_uslovima_i_normativima_za_projektovanje_stambenih_zgrada_i_stanova.html (accessed 29.4.2023)

Stoiljković, B., Petković Grozdanović, N. & Stanković, V. (2020). Could house-like apartments improve the residential quality of a city? The case of Niš, Serbia. 375–396, Journal of Housing and the Built Environment 35. https://doi.org/10.1007/s10901-019-096877

The Federal Bureau of Statistics https://www.stat.gov.rs/sr-latn/oblasti/gradjevinarstvo/stanovi/ (accessed 26.4.2023.)

Živković, M. B. (2017). Definisanje i primena metode vrednovanja fleksibilnosti prostorne organizacije stana u višeporodičnim stambenim objektima (Defining and applying the method of evaluating the flexibility of the spatial organization of the apartment in multi-family residential buildings). 118. Doctoral dissertation, University in Nis. https://nardus.mpn.gov.rs/handle/123456789/9435 Editore.