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Research paper

THE PRINCIPLE OF RECESSING RESIDENTIAL SPACES INTO THE DEPTH OF THE APARTMENT AND ITS APPLICATION IN APARTMENT ORGANIZATION IN SERBIA

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Abstract

Natural lighting is a key factor in the organisation of residential space, influencing visual comfort, psychological well-being, and energy efficiency. This paper analyses spatial configurations of apartments in Serbia, focusing on the retreat of residential rooms, particularly kitchens, into interior zones lacking direct access to natural light. During the period of directed housing development, this principle was part of experimental architectural strategies aimed at spatial optimisation and flexibility. Today, however, it predominantly stems from investor-driven models prioritising economic profitability over housing quality. The research methodology involves a comparative analysis of floor plans from different periods, with special attention to lighting strategies for interior rooms. Findings highlight the dominance of layouts where kitchens are recessed behind dining and living spaces, often leading to reduced lighting and ventilation quality. The paper identifies architectural strategies, such as skylights, internal windows, and flexible partitions, to improve daylighting in compact residential units. The results contribute to understanding contemporary trends and propose guidelines for enhancing living quality in apartments where natural light is limited.

Key words: *apartment layout, design principles, Belgrade School of Housing, contemporary apartment, transitional apartment*

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1. INTRODUCTION

Natural lighting is a fundamental factor affecting the functionality, visual comfort, and energy efficiency of residential space, while also positively influencing psychological well-being, mood, and circadian rhythm regulation [1]. Contemporary architecture increasingly highlights natural light not only for energy efficiency but also for improving living quality. Different residential activities require varying daylight levels: living areas (living room, dining room, kitchen) demand abundant light, bedrooms and workspaces require controlled lighting, while auxiliary spaces (hallways, bathrooms) can function with reduced illumination, although natural light enhances spatial openness [2].

Contemporary housing construction in Serbia increasingly compromises lighting quality for economic viability. Investor-driven models, prioritising space maximisation and more units per floor, often withdraw kitchens, dining rooms, and even living rooms into interior zones without direct daylight, raising concerns about living quality [3].

The aim of this research is to investigate how the inward relocation of residential rooms affects natural lighting quality and living comfort. Furthermore, the study explores potential strategies for improving the illumination of these spaces through architectural solutions such as skylights, internal windows, reflective surfaces, and flexible partitions.

The research is based on the hypothesis that the principle of relocating residential rooms towards the inner zones of the apartment has been present in Serbia since the period of directed housing construction, where it was employed as an experimental design approach aimed at enhancing living quality. In contemporary housing, however, this principle predominantly appears as a consequence of an investor-oriented model, which prioritises economic efficiency at the expense of natural lighting and the quality of the living environment.

1.1. Review of existing research

Previous studies provide the theoretical framework for analysing the relationship between natural lighting and the spatial organisation of apartments, as well as trends in contemporary Serbian housing. Key directions include studies on the principles of lighting in architecture, the Belgrade School of Housing, spatial flexibility and optimisation, and the retreat of rooms into deeper zones.

Several authors highlight the fundamental role of natural lighting in shaping residential spaces: Guoqing et al. discuss the "light and darkness" conceptual system [4]; Kaheneko examines how spatial and façade design influence lighting optimisation [5]; Gill underlines the role of window placement in defining spatial atmosphere [6]; Kristl and Krainer focus on skylights with reflective surfaces [7]; Madsen introduces the concept of light zones [8]; Morales-Bravo and Navarrete-Fernandez connect improved lighting with emotional well-being during the pandemic [9]; Saadat et al. emphasise the traditional link between lighting, spatial layout, and culture [10]; while Wirz-Justice, Skene & Münch highlight its effect on circadian rhythms and quality of life [11].

Research on apartment organisation in Serbia documents historical evolution: from the early modern Belgrade salon-type apartment [12], to the "extended communication" concept in the late modern Belgrade apartment [13]. Marušić identifies ten key design principles from this era, including day-night zone separation and circular connection [14], while Čanak emphasises the regulatory contribution of Bajlon and IMS [15]. Milenija

Marušić stresses the importance of daylight in defining quality housing [16]. In the post-socialist period, Serbia's housing architecture was reshaped by neoliberalisation, leading to reduced quality, privatisation, and illegal construction [17]. Stoiljković analyses investor-driven housing for diminished spatial quality [18], while Petrović et al. highlight the marginal presence of high-quality housing [16] and later define a new organisational type featuring room retreat into interior zones [19].

Flexibility and optimisation are addressed by Alfirević & Simonović Alfirević through multi-layered spatial strategies [2], by Stoiljković et al. through circular economy principles [20], and by Biondić through rational layouts and multifunctional spaces [21]. Krstić et al. propose regulatory changes to improve flexibility in Niš apartments [22].

Regarding room retreat, Petrović et al. note that linear organisation in investor-driven housing leads to reduced daylight and ventilation [19]; Knežević warns that excessive building depth reduces housing quality [23]; Kondrat'eva & Volkov propose glass partitions and stained-glass solutions to compensate for interior depth [24]. Ovenden & McKelvie observe the dominance of open-plan layouts facilitating daylight but reducing flexibility, with secondary uses often relegated to bedrooms [25]. Đukić, Lojanica, and Antonić report severe shortcomings in natural lighting in new Belgrade residential projects [26].

Overall, a review of existing studies highlights a clear gap: while the importance of natural light and spatial organisation has been widely acknowledged, research explicitly linking the retreat of rooms into deeper zones with lighting issues in the Serbian housing context remains limited.

2. RESEARCH METHODOLOGY

The research methodology is based on the analysis of apartment floor plans collected from online sources, professional publications, and previous studies. The aim is to systematically examine characteristic spatial configurations in Serbia to investigate the retreat of residential rooms into interior zones and its impact on natural lighting.

In the first phase, floor plans illustrating various models of room positioning relative to façade openings and daylight access were selected, based on criteria including: a) the position of rooms relative to the façade, focusing on inward-set spaces; b) the placement and size of windows; c) applied lighting strategies for deeper zones; d) apartment typology.

Subsequently, a comparative analysis identified dominant patterns of spatial organisation and assessed their consequences for visual comfort. Possibilities for improving daylighting are addressed in the discussion and conclusion.

In the final phase, a systematic categorisation of spatial models and their daylighting characteristics was carried out, aiming to provide insights into existing design patterns and strategies for enhancing daylight comfort in contemporary residential architecture.

2.1 Theoretical framework: Lighting requirements of residential functions and their spatial positioning within the apartment

Optimal natural lighting in residential rooms depends on their orientation and façade openings, directly affecting daylight access and spatial comfort [27]. Stojiljković notes that room layout should align with sun exposure: south-facing façades receive most sunlight,

north-facing façades provide diffuse light, while eastern and western sides vary throughout the day [28].

During summer, sunlight strikes the southern façade at a steep angle, resulting in shallow interior penetration, while in winter, lower solar angles allow deeper light entry. The east façade is suitable for bedrooms and dining areas due to moderate morning light, while the west façade, prone to overheating, is recommended for secondary rooms. North-facing spaces benefit from stable diffuse light, ideal for work areas. In multi-family buildings with limited orientation, optimising light distribution becomes crucial [28].

Natural lighting influences the layout of rooms relative to building orientation and tract depth. Traditional apartments with rooms along the façade offer good lighting but require wider plots. Deeper residential tracts often push kitchens and secondary spaces inward, reducing daylight access [29]. Compact apartments (7–10 m depth) with single orientation allow only partial daylight access, necessitating compromises where living rooms and bedrooms are placed near façades, while kitchens, dining rooms, and bathrooms are pushed into less illuminated areas. The layout of rooms within an apartment largely depends on their specific requirements for natural lighting, which are determined based on the function of the space, frequency of use, and user needs. (Fig. 1)

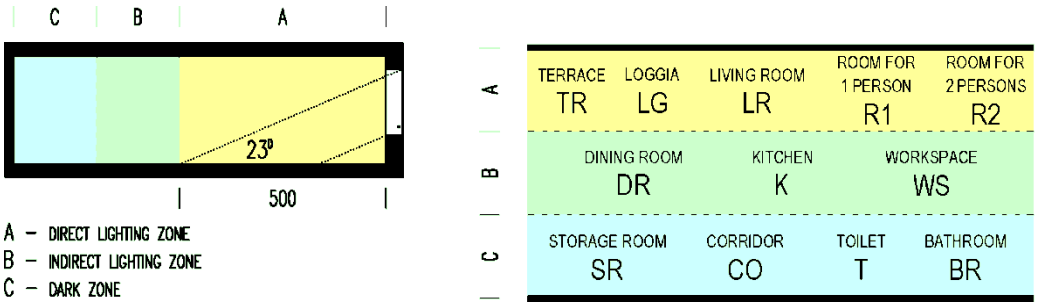

Figure 1. Positioning of rooms according to their need for natural light (Source: author's archive)

Rooms are grouped into three zones based on lighting needs (Table 1):

A) Direct lighting zone – includes living rooms, terraces (loggias), and bedrooms, requiring abundant daylight, ideally from south, east, or west. While terraces may benefit from shade, bedrooms benefit from morning light but require darkness for sleep.

B) Indirect lighting zone – covers dining rooms, kitchens, and workspaces, where indirect or stable northern light suffices for informal activities and computer work. Kitchens, however, need strong lighting for precision tasks.

C) Dark zone – consists of bathrooms, toilets, hallways, and storage rooms, typically located internally, relying on artificial lighting.

Table 1. Residential rooms categorised by their need for natural light (Source: author's archive)

Room Type	Most Common Activities in the Room	Lighting Requirements by Room Type		
		Need for Direct Natural Light	Acceptable with Indirect Natural Light	Acceptable without Natural Light
Terrace / Loggia	gymnastics, animal keeping, leisure, socializing, conversation, rest	✓ (desirable)	✓ (depending on orientation)	✗
Living Room	leisure, socializing, conversation, reading, watching media	✓	✓	✗
Bedroom	sleeping, rest, dressing, isolation, socializing, sexual activity, taking care of family members, gymnastics, storing clothes	✓ (for waking, dressing)	✓ (for resting)	✗
Study Room	reading, writing, socializing, computer work	✓	✓	✗
Dining Room	food serving, eating, socializing, conversation	✓	✓	✗
Kitchen	food preparation, food serving, dishwashing by hand or dishwasher, food storage, kitchen utensils storage, waste disposal	✓	✓(if well ventilated)	✗
Pantry	food storage, storage of objects, kitchen utensils storage, waste disposal, maintenance	✗	✓	✓
Bathroom	shaving and cosmetic care, washing, showering, hygiene, laundry by hand or machine	✗	✓	✓
Toilet	shaving and cosmetic care, hygiene, toilet use, washing, laundry by hand or machine	✗	✓	✓
Laundry room	laundry, ironing, storage of laundry and household items	✗	✓	✓
Hallway	movement, storage of various items: books, household appliances, dressing, undressing, maintenance	✗	✓	✓

This table outlines minimum daylighting requirements based on room function, frequency of use, and the nature of activities performed. Rooms listed as "acceptable without natural light" are not recommended to be windowless, but rather can function with appropriate artificial lighting. Natural light remains beneficial in all rooms for comfort, hygiene, and energy efficiency.

Natural lighting provides health, psychological, and energy-efficiency benefits superior to artificial sources [1]. Therefore, despite minimum illumination standards, natural daylight remains preferable wherever possible [30].

2.2 Analysis of characteristic examples of room withdrawal into the depth of the apartment in Serbia

The principle of withdrawing residential rooms deeper into the apartment has been present in Serbian architecture for several decades. Its early traces appear in the spatial concept of salon-style apartments, where a centrally positioned multifunctional room served as an antechamber and formal dining space. This spatial pattern, developed between the two World Wars in Belgrade and later adopted in other cities, became known as the "Belgrade apartment" through the works of architects such as B. Kojić, A. Medvedev, G. Samojlov, A. Sekulić, and M. Borisavljević [31, 13, 32].

After the Second World War, professors from the Faculty of Architecture in Belgrade (M. Bajlon, B. Milenković, and B. Aleksić) introduced the concept of an “extended circulation area” as a reinterpretation of the salon model, centrally positioned to accommodate a family dining table [13]. In spatially constrained apartments, this area served as an informal gathering space [33]. During the 1970s and 1980s, the influence of Alvar Aalto’s kitchen concept, introduced in the "Hansaviertel" residential complex (Berlin, 1957), became evident in Serbia [34]. Prior to this, dining rooms were usually directly lit and placed next to kitchens or living rooms [35]. Aalto’s design enabled the kitchen to be relocated behind the dining room, deeper into the apartment, using indirect lighting and thereby reducing building depth, aligning with the trend of compact apartment layouts during the era of directed residential construction [36]. (Fig. 2)

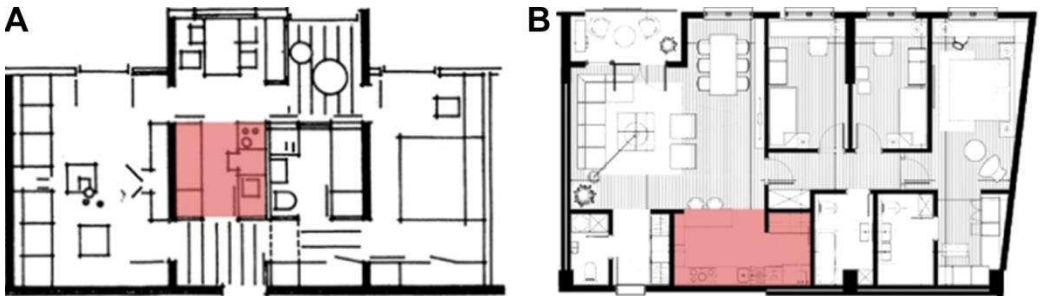

Figure 2. Characteristic examples of room recession in Serbia: a) the period of directed housing construction; b) contemporary example. (Source: author’s archive)

2.2.1 Examples from the period of directed housing construction (1960–1990)[3]

Numerous examples of multi-family housing in Serbia during the period of directed housing construction were based on the concept of linear arrangement of residential rooms along the façade, with the auxiliary rooms set back in a second row behind the residential ones. This layout enabled optimal daylight access and visual comfort within the apartment.[4]

A major breakthrough occurred with the residential building in Kralja Petra Street, Belgrade (Macura, 1957), where a dual-tract layout set the kitchen towards an internal light well. This model encouraged experimentation with spatial recession among Serbian architects [40]. The implementation of the Aalto kitchen significantly influenced this trend, particularly during directed housing construction. The Aalto concept enabled efficient layouts, improved lighting, and enhanced dining room flexibility, relying on direct illumination of dining spaces and indirect or artificial lighting for kitchens. This rationalised space use

[3] The period of "directed housing construction", during which the primary objective was to define the existential minimum in collective housing, while ensuring maximum spatial rationalisation and optimal functionality of flats, represents the most significant phase in the development of residential architecture in Yugoslavia [37, 38].

[4] Notable examples include: Block 2 (Petričić, 1963), Šumice estate (Mendelson, Carević, 1968), Blocks 45 and 70 (Šekerinski, 1970), Konjarnik (Ćirković, Jerotijević, Vrbić, 1976), Kijevo-Kneževac (Đokić, Čanak, 1976), Nova Galenika (Bakić, Bakić, 1978) in Belgrade, “Kablovi” and “Pivara” estates in Jagodina (Brašovan, Petrović, 1967), “Rasadnik” towers in Kruševac (Pejčinović, 1975), “Rudar” estate in Majdanpek (Stanković, Novaković, 1987), and Bulevar Oslobođenja building in Novi Sad (Jankov, 1967) [39].

and facilitated daily activities, especially in small and medium-sized apartments. Numerous examples in Serbia adopted this model, withdrawing kitchens behind dining areas.[5]

Beyond the Aalto kitchen concept, other innovative layouts emerged, such as placing the kitchen in front of the dining area, or more frequently, positioning the dining room behind the living room. This arrangement optimised kitchen lighting and ventilation, crucial due to its intensive daytime use. Direct natural light and air access enhanced work conditions, reduced moisture, and improved odour elimination. Conversely, recessing the dining area improved living room daylighting and visual openness, enabling a clearer functional division and greater flexibility.[6] (Table 2)

Table 2. Characteristic examples from the period of directed housing construction and the application of the principle of recessing rooms deeper into the apartment; Source: author's archive

Name of the Building or Complex	Recessing rooms deeper into the apartment				
	kitchen behind dining	dining behind kitchen	dining behind living	living behind dining	kitchen by skylight
Blocks 1 and 2, Belgrade (Petričić, 1963)			●		●
Block 21, Belgrade (Čanak, Lenarčić, Mitić, Petrović, 1965)	●				
Šumice estate, Belgrade (Mendelson, Carević, 1968)	●				
Banjica estate, Belgrade (Drinjaković, Karadžić, Stjepanović, 1971)	●				●
Julino Brdo estate, Belgrade (Lojanica, Cagić, Jovanović, 1971)	●				
Building O2, Kraljevo (Todorović, 1971)	●				
Vojvode Stepe Boulevard towers, Belgrade (Aleksić, Aleksić, 1973)			●		
Liman 3 towers, Novi Sad (Vučković, Komadina, Đerasimović, 1973)	●				
Blocks 61 and 62 (southern section), Belgrade (Marušić, Marušić, Miodragović, 1978)			●		●
Block 22, Belgrade (Janković, Karadžić, Stjepanović, 1974)	●				
Block 23, Belgrade (Janković, Karadžić, Stjepanović, 1974)	●				
Block 28, Belgrade (Arnautović, 1974)	●				
Block 30, Belgrade (Martinović, 1977)	●				
K1 and K3 buildings, Kraljevo (Gajčanin, 1977)	●				
C3 and C4 buildings, Kraljevo (Maričić, Dimitrijević, Simeunović, 1978)	●				
Blocks 61 and 62 (southern section), Belgrade (Marušić, Marušić, Miodragović, 1978)	●				
Novo naselje, Novi Sad (Milidragović, 1982)				●	
Block 19a, Belgrade (Lojanica, Cagić, Jovanović, Marić, 1982)			●		●
Cerak Vinogradi, Belgrade (Marušić, Marušić, Borovnica, 1985)		●			
Toplička mixed-use building, Užice (Mitrović, 1985)		●	●		
"United Nations" estate, Kruševac (Đorđević, Kovačević, 1986)	●				

[5] Notable examples include: Block 21 (Čanak, Lenarčić, Mitić, Petrović, 1965), Block 22 and 23 (Janković, Karadžić, Stjepanović, 1974), Block 28 (Arnautović, 1974), Block 30 (Martinović, 1977), Šumice estate (Mendelson, Carević, 1968), Banjica estate (Drinjaković, Karadžić, Stjepanović, 1971), Julino Brdo estate (Lojanica, Cagić, Jovanović, 1971), Blocks 61 and 62 (southern section) (Marušić, Marušić, Miodragović, 1978) in Belgrade, Building O2 (Todorović, 1971), K1 and K3 buildings (Gajčanin, 1977), C3 and C4 buildings (Maričić, Dimitrijević, Simeunović, 1978) in Kraljevo, Liman 3 towers (Vučković, Komadina, Đerasimović, 1973) in Novi Sad, and "United Nations" estate in Kruševac (Đorđević, Kovačević, 1986) [39].

[6] Notable examples include: Cerak Vinogradi (Marušić, Marušić, Borovnica, 1985), Blocks 1 and 2 (Petričić, 1963), Vojvode Stepe Boulevard towers (Aleksić, Aleksić, 1973), Blocks 61 and 62 (northern section) (Marušić, Marušić, 1974), Block 19a (Lojanica, Cagić, Jovanović, Marić, 1982) in Belgrade, and Toplička mixed-use building (Mitrović, 1985) in Užice. [39].

2.2.2 Examples from the post-2000 period

The early 21st century in Serbia marked the end of a prolonged political, economic, and social crisis, culminating in the 1990s. The transition from socialism to capitalism unfolded amid rising economic inequality and social polarisation. Private investors, often linked to political structures, assumed a dominant role in architectural production. Privatisation accelerated the degradation of the construction industry, with state-owned firms closing or being mismanaged. Although the state promoted housing development through privatisation and legalisation of informal construction, initial projections proved misguided [41, 42]. This period saw the emergence of the "transitional" apartment, an intermediate typology between socialist and contemporary housing, distinguished by the separation of day and night zones, grouping of bedrooms and bathrooms around a hallway (degažman), and the formation of an entrance corridor with a toilet. A pivotal change was the notable introduction of the open-plan concept, integrating the living room, dining area, and kitchen [43].

Over the past two decades, residential construction expanded significantly, particularly in Belgrade, Novi Sad, and Niš. This growth was dominated by "developer-led" construction, with investors exerting substantial influence over design, construction, and planning. This approach often prioritised private interests over societal needs and the public good [44]. Consequently, a new type of contemporary apartment emerged, tailored to market demands, maximising the number of rooms within minimal floor area, prioritising spatial efficiency over living quality. A study by V. Petrović, B. Stoiljković, N. Petković, and H. Krstić identified the following characteristics [3] (Fig. 3):

- Linear spatial development, often lacking a clear focus;
- Entrance position having little effect on the layout;
- Open-plan integration of living, dining, and kitchen areas;
- Kitchens typically recessed, without direct natural lighting or ventilation;
- Bedrooms arranged along corridors, reducing privacy;
- Excessively long circulation spaces due to poor organisation;
- Absence of auxiliary rooms and storage, even in larger apartments;
- Predominantly single-sided orientation of units.

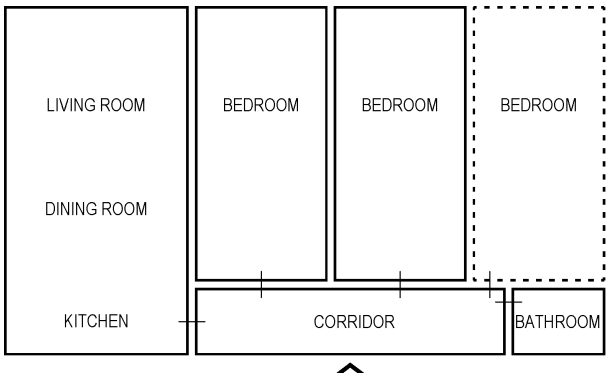

Figure 3. Diagram of the spatial and functional organisation of the contemporary apartment in Serbia (Source: [3])

The recessing of kitchens behind living and dining areas results in several adverse effects: increased dependence on artificial systems, odour retention, heat accumulation,

reduced external connection, and extended circulation spaces, diminishing functionality and flexibility. Additionally, kitchen noise disrupts activities within the open-plan area, while poor ventilation fosters moisture and hygiene issues. Loss of spatial hierarchy and intimacy further compromises living quality.

Table 3. Characteristic examples from the post-2000 period and the implementation of the principle of recessing rooms into the depth of the apartment (Source: authors' archive)

Name of the Building or Complex	Recessing rooms deeper into the apartment				
	kitchen behind dining	dining behind kitchen	dining behind living	living behind dining	kitchen by skylight
Residential building Suncity, Belgrade (Merin Group, 2017)	●		●		
Residential complex Cara Dušana, Belgrade (Bureau Cube Partners, 2018)	●		●		
Central Garden residential complex, Belgrade (Mašinoprojekt Kopring, 2018)	●		●		
Palace One residential complex, Belgrade (Koling, 2022)	●		●		
Keneddy Residence residential complex, Belgrade (Zabriskie, 2022)	●		●		
Kosa Quart residential complex, Belgrade (Energoprojekt, 2023)	●		●		
Savada residential complex, Belgrade (NeimarV, 2022)	●		●		
K District residential complex, Belgrade (3LHD, 2023)	●		●		
Novi Dorćol residential complex, Belgrade (Synthesis Inženjering PPI, 2023)	●		●		
Sakura residential complex, Belgrade (2023)	●		●		
Elixir Garden residential complex, Belgrade (2023)	●		●		
Skyline residential complex, Belgrade (Ami Moore, 2023)	●		●		
The One residential complex, Belgrade (Lotus architecti, 2024)	●		●		
Smartblock residential building, Pančevo (2023)	●		●		
Laguna Residence residential building, Novi Sad (2013)	●		●		
Sokolis residential complex, Kragujevac (2025)	●		●		●

Table 3 confirms the dominant trend of recessing kitchens and dining areas into deeper apartment zones, most commonly positioning kitchens behind living and dining spaces. This principle was consistently applied in all analysed buildings, demonstrating its widespread use. Instances of the dining area behind the kitchen are rare, and living rooms located internally are even rarer. These findings corroborate earlier observations of market-driven spatial optimisation and highlight the resulting negative impacts on natural lighting, ventilation, and functionality.

3. RESULTS AND ANALYSIS

The analysis of contemporary residential construction in Serbia has revealed a clear tendency to recess certain residential functions into the inner parts of the apartment, most commonly affecting the kitchen and dining zones. The most frequently applied configurations include positioning the kitchen behind the dining area, the kitchen behind both the dining area and living room, and, in less frequent cases, the living room placed behind the kitchen. These patterns were identified in the floor plans of the analysed apartments and confirm a trend toward surface rationalisation through linear spatial organisation. A kitchen positioned within the interior of the apartment often lacks direct

natural lighting and ventilation, while recessing the living room behind the kitchen adversely affects spatial perception and the quality of the living experience. The predominant pattern involves placing the kitchen in a shaded zone, whereas the loss of direct natural lighting in the dining area is less commonly observed in contemporary practice. These spatial configurations reflect current trends in residential construction, where surface optimisation is prioritised, frequently at the expense of adequate lighting and ventilation quality [3].

A comparison between apartments from the period of directed housing construction and contemporary examples reveals significant changes in spatial organisation. Apartments from the era of directed housing development were characterised by separate and clearly hierarchised residential rooms, typically with direct natural lighting, a central circulation core enabling functional distribution of spaces, and sufficient surface area allocated to auxiliary rooms [39]. In contrast, contemporary housing models increasingly involve rationalised layouts with reduced circulation areas and the integration of multiple functions into shared spaces, resulting in diminished privacy and compromises in lighting and overall functionality. A notable contribution to mitigating these effects is the implementation of the open-plan concept, which allows diffuse natural light to penetrate deeper into the apartment, thereby partially compensating for the loss of direct illumination in recessed spaces [2]. (Fig. 4)

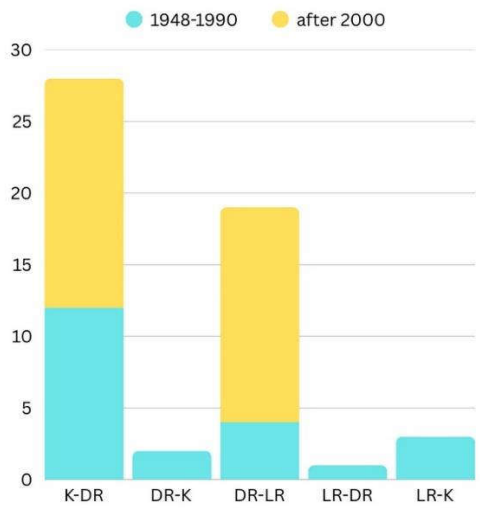

Figure 4. Prevalence of the Principle of Recessing Residential Rooms into the Interior of the Apartment in Serbia (K-kitchen, DR – dining room, LR – living room) (Source: Authors' archive)

The main problems and challenges concerning the lighting conditions in these apartments relate to the lack of natural light in recessed rooms, the reliance on artificial lighting which increases energy consumption, the absence of natural ventilation in interior-positioned kitchens, as well as potential negative psychological effects associated with reduced daylight exposure. The identified patterns suggest that spatial transformations are most often driven by investor-oriented logic, while alternative design strategies for lighting are marginalised or entirely omitted. These findings point to the need for innovative design approaches that can ensure improved lighting and ventilation in residential units, without compromising market demands and economic considerations in contemporary housing development.

4. DISCUSSION

The results of the analysis of spatial configurations in Serbian apartments indicate that the principle of recessing residential functions into the interior of the dwelling is not a contemporary construct, but rather has theoretical foundations in the experimental practices of the Belgrade School of Housing from the second half of the 20th century. During that period, this approach formed part of broader research into the flexibility of housing units and the optimisation of space within the context of mass housing construction. However, in current practice, the recession of rooms increasingly appears as a consequence of investor-driven rationalisation, in which economic profitability is prioritised over the quality of everyday life for users.

Previous research has emphasised the significance of natural daylight for the visual and psychological comfort of residents [1], while contemporary authors warn that the lack of daylight can lead to sleep disturbances, fatigue, reduced productivity, and impaired mental health. In this context, the study confirms that positioning rooms in the interior zones of the apartment has direct consequences for daylight comfort, energy needs, and the subjective perception of spatial quality. The main issues associated with recessed rooms manifest in reduced natural lighting and ventilation, resulting in increased reliance on artificial lighting, higher energy consumption, and a decline in residential quality.

Psychological aspects also play an important role, as spending time in spaces with limited daylight can induce feelings of confinement, isolation, and diminished comfort, especially for users who spend most of their time indoors. This highlights the necessity of integrating design solutions that enable the influx of natural light into deeper parts of the dwelling.

To mitigate the negative consequences of such spatial arrangements, the following strategies can be implemented in practice:

- **Use of light wells (skylights)** - enabling the entry of natural light into central areas of the apartment, thereby improving illumination in interior rooms. This solution is particularly effective in multi-storey buildings where vertical lighting is feasible;
- **Use of internal windows (transom lights)** - allowing daylight from one room (which has access to the façade) to penetrate into another room without direct natural lighting, thus improving the illumination of interior zones. This solution was frequently employed in earlier periods of housing construction and may be reintroduced in the contemporary context;
- **Light reflection** - the use of light-coloured materials, mirrors, and reflective surfaces can enhance the distribution of light in internal rooms. This approach is especially effective when combined with semi-transparent partitions or open-plan layouts;
- **Flexible partitions** - transparent and semi-transparent partitions (e.g., glass, polycarbonate) allow for the transmission of light while preserving visual and spatial openness without compromising functionality;
- **Spatial reorganisation** - designing apartment layouts in such a way that spaces with the highest daylight requirements (e.g., living room, study) are placed along the façade, while those with lower lighting demands (e.g., bathrooms, storage rooms) are located in the central areas of the dwelling.

By combining these strategies, it is possible to improve daylight comfort even in apartments where the spatial organisation of rooms is constrained by plot limitations, building typologies, or market requirements. In this way, design approaches that take into account the lighting needs of different spaces can contribute to an enhanced quality of living, while maintaining economic rationality.

5. CONCLUSION

The research clearly indicates a dominant trend in contemporary housing construction in Serbia: the recession of kitchens, dining areas, and occasionally living rooms into the interior zones of apartments. Although this practice may be justified by the need for spatial rationalisation, it most often results in a deterioration of essential housing qualities - primarily in terms of natural lighting, ventilation, and the psychological perception of space.

The study's hypothesis, that the principle of recessing residential rooms into the interior was previously employed as an experimental design strategy to enhance housing quality, whereas today it is primarily applied for economic reasons, has been confirmed through the analysis of spatial configurations. The results show that this principle now appears predominantly in its extreme form, as a consequence of an investor-driven approach, where maximum space efficiency is prioritised, often at the expense of natural light and the overall quality of the living environment.

Further research could focus on the quantitative analysis of the effects of various lighting strategies in interior rooms, as well as comparative studies between apartments with different organisational models. It would be particularly beneficial to explore the long-term impacts of such solutions on energy efficiency, housing-related health aspects, and users' perceptions of spatial quality.

Within the field of architectural practice, it is recommended to consider innovative approaches to lighting interior rooms, with increased integration of transparent and reflective elements. Apartment design should aim to balance spatial rationalisation with residential quality, whereby architects and investors are encouraged to seek sustainable models that do not compromise fundamental spatial standards. Additionally, the implementation of adaptable and flexible partition systems should be considered, as these allow for greater responsiveness to lighting conditions and enhance the functional versatility of interiors.

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