

40

Review paper I Прегледни научни рад
DOI 10.7251/STP2215409P
ISSN 2566-4484



Nataša Petković Grozdanović, University of Niš, natasapetkovic83@gmail.com

Branislava Stoilković, University of Niš, branislava.stoilkovic@gaf.ni.ac.rs

Slaviša Kondić, University of Niš, slavisa.kondic@gaf.ni.ac.rs

Katarina Medar, University of Niš, katarinamedar@gmail.com

SPATIAL ARRANGEMENT OF MULTIFAMILY SOCIAL HOUSING – KEY CRITERIA RELEVANT FOR THE QUALITY OF HOUSING

Abstract

In order to ensure the sustainability of social housing, the living conditions should meet basic biological needs [demands], but they should also have a stimulating effect on the psycho-social development of the users. The focus of the research is on identification and definition of the physical and spatial criteria that are essential for the quality and sustainability of this type of housing in order to distinguish the dwelling layouts [housing models] that can be considered appropriate for the specific requirements of social housing,

Keywords: housing quality, internal space, multifamily housing, social housing, spatial criteria

ПРОСТОРНА ОРГАНИЗАЦИЈА АРХИТЕКТОНСКОГ СКЛОПА ВИШЕПОРОДИЧНИХ ОБЈЕКТА СОЦИЈАЛНОГ СТАНОВАЊА – КЉУЧНИ КРИТЕРИЈУМИ РЕЛЕВАНТИ ЗА КВАЛИТЕТ СТАНОВАЊА

Сажетак

Да би се обезбедила одрживост социјалног становања, услови становања у објектима овог типа треба да задовоље не само основне биолошке потребе, већ да делују стимулативно и подстицајно на психо-социјални развој корисника. Како би се од великог броја различитих стамбених образаца издвојили они који се по својим карактеристикама могу сматрати одговарајућим за специфичне захтеве социјалног становања, фокус истраживања је на идентификацији и дефинисању просторно-физичких чиниоца који су од суштинског значаја за квалитет и одрживост овог типа становања.

Кључне ријечи: квалитет становања, организација архитектонског склопа, социјално становање, просторни критеријуми

1. INTRODUCTION

The character of an apartment building internal space – how it is planned, developed and organized – is a determinant that directly defines the quality of people's daily life, safety and well-being [1]. Therefore, it is not surprising that considerations in contemporary social housing practice are increasingly focused on the improvement of relations between spatial and social aspects of this type of housing. The integrated dual approach aims to support the social development of its users through the implementation of physical measures, in order to ensure the global progress.

The subject of this research is the improvement and innovation of the architectural methodology for planning and design of multifamily social housing, with a focus on spatial characteristics, organization and layout of the overall internal space. The aim of such research is to improve the housing qualities in this type of facilities – physical, as long well as social ones.

The overall internal space, observed as a spatial level in the process of architectural design, has been taken as the subject of the research, given its poor representation in the scientific and professional frameworks for the development of multifamily social housing. Namely, architectural researches conducted upon the quality of social housing are mainly based on the aspects of the unit's quality. Very little attention has been paid to the analysis of the spatial organization of the overall layout of the internal building space. Since “apartments get their true meaning and value only in the relations with the whole” [2], they cannot be physically and functionally observed as isolated elements and thus cannot be designed independently from the building to which they belong.

2. SPECIFIC REQUIREMENTS OF MULTIFAMILY SOCIAL HOUSING AND THEIR RELATIONS TO THE BUILDING SPATIAL ORGANIZATION

Bearing in mind the specificities of social housing users and circumstances of using of this type of facilities, the organization of the internal space of multifamily (apartment) building should respond to the increased needs for: *privacy* [3] [4] [5], *socialization* [4] [5] [6] and *user affiliation* [4] [5] [6]. Each of these needs will be examined in greater detail through the relationship between the physical environment and its impact on the quality of social housing.

Privacy. "As a social beings, humans need interactions, but as individuals and sensible beings we want to decide, when and under which conditions we want to do it" [7]. In terms of privacy, individual family housing provides far greater comfort, since tenants also possess “their own piece of land” [8].

However, in the case of social housing, the multi-family housing schemes are more often applicable, as they are more economically efficient. In multifamily social housing, in most of the cases, the users have authority only upon their apartment.

In order to improve the quality of this type of housing, it is necessary to implement architectural and design measures that would improve privacy. The basic measures are reflected in the *limitation of the number of apartment units per floor* and *manner of the organization of communication space*, which both can greatly contribute to the improvement of privacy [3] [8].

Security. The reduced level of security within the residential areas intended for multi-family social housing is to some extent related to the way of the spatial organization of the building space [3] [9] [5] [10]. As a basic security problem, Newman [3] refers to their weak "defensibility" caused by inadequate architectural and design methodology. As key elements in the organization of the building assembly Newman [3] quotes the choice of typology and the organization and layout of the internal common space. The use of residential typologies characterized by high-rise housing schemes affects the availability and publicity of residential space [3]. Such spatial and social framework favors the emergence of petty crime and vandalism.

In terms of security requirements, a design approach should allow the development of certain psycho-social relationships [2]. Residential buildings need to be designed in such a way that they do not require a special psychological or physical preparation for the users to use it – they should provide easy usage [7]. The number of tenants directly affects the level of security [3]. Therefore, *limiting the number of tenants or apartment units in the building* is very important. Creating perceptual connections to the environment also influences the issue of security. The way the building is organized - *the position and distance of the apartments in relation to the cores of vertical communications and the level of publicity of horizontal communications on the floor can influence the development of favorable psycho-social conditions and give a sense of security to the users* [2] [3] [7].

Socialization. Humans are both individual and social beings and consequently the housing as a human function possesses both physical and social components. For this reason, the spatial layout of social housing must support the socialization of users through the possibility of social interactions [10] [11] [12]. An individual's willingness to engage in social interactions is primarily influenced by the fulfillment of privacy and security requirements [2]. The well-known physical environment and the perception of who may be encountered provide favorable conditions for establishing mutual contacts between the tenants in the immediate housing vicinity and improve the possibility of their socialization. In addition to the willingness to establish social contacts, in the physical sense the *space should also be organized and equipped to allow informal gatherings, through the planning of the facility intended for common activities. These spaces can be planned and designed as outdoor areas, but they also need to be planned within the building itself* [5]. As users of social housing are characterized by a very broad demographic background, their needs and preferences regarding the physical character of these spaces can significantly vary from case to case. For these reasons, the shared common areas should be developing as polyvalent space that provides the opportunity for multifunctional use [5]. As users' needs may change over time these spaces need to be conceptualized as flexible [10]. The ability of a space to transform according to the specific needs, as well as to be personalized, results in a high level of its usage value. These areas should be intended not only for social housing tenants but also for residents from the surrounding area, in order to enhance the inclusion and integration of social housing users within a narrower and wider social milieu.

User affiliation. The presence of features that will support the development of social interactions among residents greatly contributes to the social inclusion and the sense of belonging [13]. When planning facilities for social housing, it is necessary to introduce *features that will enable meetings and informal gatherings* [2] [4] [5] [7]. Allowing different demographic profiles of users to participate in shared activities influences cognition and acceptance of diversity and thus facilitates their integration into narrower and wider community [14]. In addition to the tenants themselves, it is desirable that neighbors from the immediate area also use these features. Mixing different economic strata contributes to the prevention of fears and prejudices in wealthier neighbors, but also enhances the life chances of the poorer through a "positive role model" - thus encouraging interaction and fellowship among neighbors.

The sense of belonging of the users also depends on the extent to which they are able to fulfill their cultural needs. For example, for some categories, housing in single-family homes is closer to their tradition, while others are characterized by the multi-generational living. Also there are those whose housing requirements are largely related to the specificity of the lifestyle (such as Roma) [4]. Cultural differences not only affect differences in preferences when it comes to the type of housing, but also in the way of spatial organization of the immediate housing environment [6]. The development of *different physical patterns of apartments and varieties in terms of their size and spatial organization* enables the satisfaction of various socio-cultural needs and thus affects the tenants' dignity and sense of belonging.

3. SPATIAL CRITERIA RELEVANT FOR THE INTERNAL SPACE ORGANIZATION OF MULTIFAMILY SOCIAL HOUSING – GUIDELINES WITH ILLUSTRATIONS

The analysis of the spatial-functional and social framework of social housing indicated that the fulfillment of certain specific requirements, which are related to this type of housing (privacy, security, socialization and users affiliation) may be influenced by the way of the spatial organization of the building assembly. The systematization of the findings resulted in the definition of key spatial criteria, crucial for the quality of multifamily social housing: 1) building design, 2) organization of the internal communication space, 3) distribution of different apartment unit types, 4) flexibility of the space and 5) shared interactional areas.

In the continuation of the paper each of the defined criteria will be analyzed in detail and accompanied by relevant examples (which characterized the high level of achieved quality according to each of the criteria) with graphical illustrations.

3.1. BUILDING DESIGN

The spatial organization of a building design, intended for social housing, has proved to be extremely important for the quality of this type of facilities. The building height, its capacity, the floor spatial arrangement are all elements that greatly influence privacy, security, sense of belonging and

development of inter-personal relationships [3] and can therefore be considered as crucial for the development of social housing.

Building capacity. In order to provide the necessary social conditions for the unobstructed use of facilities intended for social housing, it is primarily necessary to limit the number of housing units per building. From the standpoint of social housing, the capacity per building should be between 20 to 25 apartment units [3].

Building height. Although the use of multi-story buildings affects the economical sustainability of social housing, the increase of the building height is justified only to a limited extent. Namely, the increase in the number of floors reflects in some shortcomings regarding the residential quality [10]. Analyzing the impact of the height, Newman [3] states that increasing the number of floors causes alienation from the terrain, reduces the accessibility to the surrounding common facilities, decreases intensity of their use and diminishes the housing quality. For the development of social housing he recommends the use of low residential structures – up to ground floor and 4 upper floors, in exceptional cases up to 6 upper floors.

Number of apartment units per floor. Limiting the number of apartment units per floor decreases the number of occupants, which increases the privacy and security of the residential space and allows easier identification with the place of residence. However, this type of housing is conditioned by the high demand due to the housing shortage. In an effort to provide as many apartments as possible, the planning of this type of facilities is often characterized by the high capacities, which results in the implementation of the floor schemes with a large number of apartment units per floor. On the other hand – regarding the improvement of social integration, security, privacy and a sense of belonging, housing schemes with a large number of apartments per floor have proven to be inefficient.

1 and 2 apartments per floor schemes, although ensuring the highest quality, are considered cost-ineffective for social housing construction. Therefore, modern concepts of multi-family social housing are generally based on plans with 3, 4 or 5 apartments per floor. 3 apartments per floor schemes are the most practical because of their proximity to the vertical communication core. This setting provides the shortest path to the entrance of the apartments, which improves the security of the premises while reduces the number of occupants per floor and increases privacy [5] [8]. In a design with 4 and 5 apartments per floor, security and privacy issues are somewhat reduced as the distance from the vertical core to the unit increases, as does the number of occupants per floor, but these circumstances have no significant effect on the reduction of the residential quality [5] [8].



Spatial organization of the typical floor plan Organization of one of the segments of the floor plan

Figure 1. *Building assembly - Residential complex in Block 32, Belgrade / MITarh (2007), Belgrade, Serbia,¹*

It is very important to point out that schemes with a larger number of apartment units per floor, while being the most economically viable (because by increasing the number of units per floor a more favorable ratio of housing areas to the gross area is obtained), due to the accompanying negative factors are not recommended for the development of social housing [3]. If the capacities of the site intended for social housing are such to enable the development of significant housing stock, segmentation of the building structure into a larger number of segments is required (Figure 1).

¹ Source: http://www.mitarh.rs/index.php?p=project&project_id=46

3.2. ORGANIZATION OF THE INTERNAL COMMUNICATION SPACE

In terms of planning and design of horizontal communication space, the separation of unit access space on the floor from the vertical core should be implemented wherever is possible. In this way the common space in front of apartment's entrances is intended only for the residents of that specific floor, which significantly improves its character (from public to semi-private) and security.

Also, some organizational schemes of the horizontal communication space are more suitable than others. From the security aspects, gallery and atrium [layouts] have proven to be the most effective since their potential to support social integration and promote a sense of belonging. The advantage of applying the gallery/atrium typology is largely based on their social qualities. These spaces provide greater opportunities for development of social interactions and strengthen neighborly relationships [5] [8]. The gallery access is identified with the image of the street as a common space that encourages contacts. The gallery is attractive as a pedestrian walkway, as an outdoor apartment area suitable for flower-growing and urban agriculture, as a place to sit, rest, or interact with neighbors, and because of the close proximity to the residential units and as a convenient playground space for children [8].

The subsidized housing for young scientists of the University of Belgrade, in the block 32 in New Belgrade, is an example of an atrium building, with glazed gallery access, facing the inner courtyard (except to the southwest, where the gallery extends to the outside) (Figure 2). Orienting the galleries towards the atrium improves the visibility of the surrounding space and intensifies the visual contacts between users, which has a beneficial effect on the security and social interactions. The gallery is divided into 4 segments, so that one segment with the common vertical communication serves 6 apartments per floor. The galleries are well lit and naturally ventilated, and are designed with sufficient width to accommodate some additional activities – leisure, flower growing, children playing and etc.

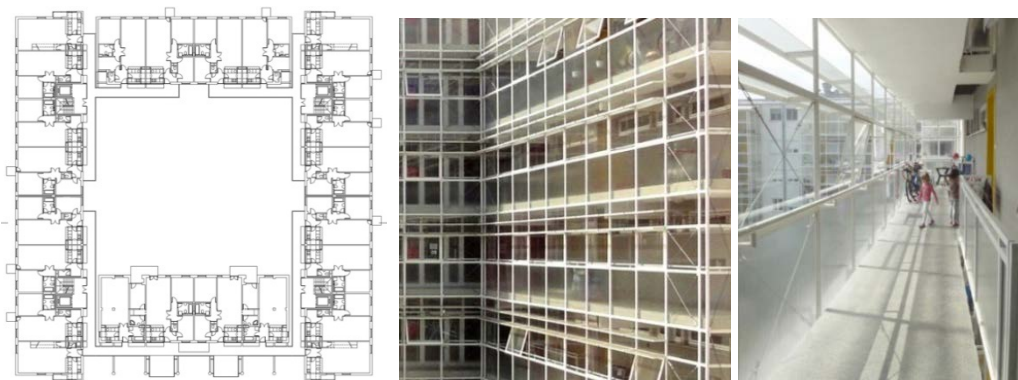


Figure 2. *Organization of the internal communication space - Residential complex in Block 32, Belgrade / MITarh (2007), Belgrade, Serbia* ²

3.3. DISTRIBUTION OF DIFFERENT APARTMENT UNITS TYPES

Different types of apartment units are suitable for different groups of social housing users (singles, developing families, multi-member, multi-generational households, people with disabilities...). By offering a wider range of unit types a large number of different needs can be met. The diversity of apartment units is also necessary in terms of social stability, as demographic complexity promotes social diversity and thus provides a more socially stable environment [15].

This indicates that the planning and construction of multi-family social housing requires the application of various housing unit types, regarding their size, organization and spatial arrangement. As for some households, due to their size or cultural habits, living in single-family homes is more acceptable, whenever it is feasible some units on the ground floor should be designed as house-like apartments – 1) by adding the private entrances and front or back gardens, and/or 2) by developing the housing space with split levels.

One of the significant advantages of the Via Verde social housing in New York is precisely the wide range of apartment units, in terms of their sizes, organizations and arrangements (Figure 3). The lower residential structures, located in the inner part of the plot, are designed to resemble row houses, with access through the associated front garden. The larger, two-level apartments are located within the middle segment of the multi-family building. These apartments are planned as duplexes, with

² Source: http://www.mitarh.rs/index.php?p=project&project_id=46

living and dining area on the access floor and sleeping on the floor located above (or below). The end part of the complex is formed as a residential tower, with single floor apartments of different types, ranging from studios to four-bedroom apartments.



Figure 3. Distribution of different apartment units' types Via Verde / Grimshaw & Dattner Architects (2012), New York, USA³

3.4. FLEXIBILITY

In order to enable the adequate housing conditions for different user profiles and to ensure the sustainability of social housing, organization of the internal space should allow some changes of spatial arrangement. This is very important given that the social housing facilities are publicly owned and that there are no restrictions which would prevent changes of the overall internal space layout. Changes may relate to the modification in terms of: 1) space usage (conversion of non-residential to residential space or vice versa) or 2) units size. Multiple possibilities in the usage of available space capacities, in a way that meets the most diverse needs, affect the efficiency of social housing, improve its quality and economic cost-effectiveness and extend its lifespan. This concept is achieved through the planning of a flexible architectural structure, which supports the introduction of certain changes of the spatial organization and use of the building, thus providing for a higher degree of its variability. Variability is reflected in the possibilities of changing the residential space: 1) at the expense of the surrounding space (increasing the area of the apartment unit by merging two smaller ones, forming two smaller units from one larger, etc.) and/or 2) upgrading the architectural structure.

³ Source: <https://www.archdaily.com/468660/via-verde-dattner-architects-grimshaw-architects>

Some studies indicate that the basic precondition for achieving a high degree of flexibility is the "elasticity" of space [16] [17] [18], which is achieved by: 1) applying a column-beam structural system and 2) grouping technical-installation into cores. The application of such structural system reduces the number of structural elements, thereby influences the development of polyvalent and open residential space [19] and enhances the possibility to customize residential space in terms of the size and organization. In addition, grouping the technical-installation into blocks, within single zones, provides a plenty of free space and thus affects its variability [19].



Figure 4. *Flexibility of internal space - Proposition for social housing Dr. Ivan Ribar Belgrade /Marušić D, Marušić M. (2011) Belgrade, Serbia*⁴

The potential of the flexible internal space organization can be seen in the example of a competition proposal for Dr. Ivan Ribar social housing estate in Belgrade (Figure 4). Due to the utilization of a column-beam structure (with 360cm grid) and linear formation of installation blocks, the development of various apartments' types was possible. By adding a half-module, the basic one-room apartment can be transformed into an apartment with an additional half-room, or by adding the whole module to an apartment with an additional room. By combining (half)modules, it is possible to upgrade apartments in terms of their spatial arrangement (whether in terms of introduction of new units regarding their spatial arrangement or of the change in the percentage representation of existing ones).

⁴ Source: <http://stanovanje.yolasite.com/katalog-stanova.php>

3.5. SHARED INTERACTIONAL AREAS

As has been emphasized before, the existence of space which could support the development of social interactions among social housing users is of great importance for the quality and sustainability of this type of housing. Common spaces are usually planned as shared outdoor spaces. However, in cases where free unbuilt space on the plot is insufficient (due to the application of a high occupancy rates, significant parking areas and etc.) their alternative should be pursued in the development of shared common spaces within the buildings themselves.

It is necessary to provide at least one common space intended for use and gathering of tenants, with a standard of 0.5m² per user. It is necessary to develop these spaces as interactive and to plan them with increased heights and with flexible spatial organizations, to serve different purposes [5]. In order to increase security, it is best to locate them on the ground floor or first floor of residential buildings, but in such a way that they do not disturb the surrounding residential space. These areas may be planned as indoor or outdoor.



Figure 5. Shared indoor interactional areas - 60 Richmond Housing Cooperative/ Teeple Architects (2010), Toronto, Canada⁵

The disadvantage due to the high occupancy rate at the 60 Richmond Housing in Toronto is reduced by the introduction of common facilities within the building (Figure 5). On the first floor, for the purpose of tenants gathering and leisure, a larger indoor common space is formed, equipped with a small kitchen and toilets. The quality and usage intensity of this space is enhanced by the addition of a large, green terrace, oriented towards the street and the inner atrium. In addition to the first floor common area, on the sixth-floor is introduced the common open terrace, primarily intended for urban agriculture for the needs of the tenants themselves.

In the case of Via Verde in New York, the lack of high occupancy rate has been overcome by the development of common areas upon the building rooftop. In order to maximize the outdoor living, the flat rooftops are planned and designed as a walkable space, with an idea to create an alternative common area – a kind of “rooftop promenade” (Figure 6). In order to make this space easily visible and accessible, not only to the tenants but also to the neighbors from the immediate environment, the building volume is divided into cascades. The introduction of a wide staircase to the roof terrace of the first cascade allows its direct connection with the terrain, while further the system of stairs and ramps leads visitors to the roof terraces on the higher cascades. Each roof terrace is unique in character, designed as a space for rest, sitting, recreation, gardening, agriculture and etc. The

⁵ Source: <https://www.archdaily.com/85762/60-richmond-housing-cooperative-teeple-architects>

“promenade” is connected with a common indoor multifunctional space located on the third floor and with a recreation space on the last floor.



Figure 6. Shared outdoor interactional areas - Via Verde / Dattner+Grimshaw (2012), New York, USA ⁶

4. CONCLUSION

Housing conditions meeting the complex needs of different individuals have a beneficial effect on their proper psychosocial development and positive social action. Implementation of the specific spatial design is especially important in the field of social housing, since in such wider context it can be used as a corrective to certain negative social phenomena, which are expected within these types of facilities and so it can support their sustainability.

The criteria defined in this paper for the spatial development of internal space in social housing is a set of desirable measures aimed at improving the housing standards. Five criteria defined in the paper: 1) building assembly, 2) organization of the internal communication space, 3) distribution of different apartment unit types, 4) flexibility of the space and 5) shared interactional areas forms a certain model that can be used for the development of social housing. This model is primarily an important tool for architects engaged in the design of social housing and for those involved in architectural and urban development of specific locations allocated for this purpose. Although in economic terms the introduction of such criteria implies somewhat greater initial investment, its application provides significant social benefits. First, the need for relocation is reduced - which improves the efficiency of the operation of social housing. Secondly, the negative social aspects of social housing are reduced – which makes these new developments in social housing act as certain correctives of the overall social development. Consequently, the application of this model has a positive effect on the sustainability of social housing.

LITERATURE

- [1] Čolić Damjanović V. M. (2015), Unapređenje modela socijalnog stanovanja u Beogradu u okviru novih paradigmi planiranja i projektovanja, doktorska disertacija, Arhitektonski fakultet, Univerzitet u Beogradu
- [2] Marušić, D., (1999) Sveska 1-10, Arhitektonski fakultet Beograd
- [3] Newman O. (1996), Creating Defensible Space, Institute for Community Design Analysis, U.S. Department of Housing and Urban Development, Office of Policy Development and Research
- [4] UN, (2006), Uputstva o socijalnom stanovanju-Principi i primeri, Ujedinjene Nacije, Ekonomska komisija za Evropu, Ženeva
- [5] Levitt D, Levitt B. (2010), The housing design handbook, Routledge, Taylor & Francis Group
- [6] Milić V. (2006), Urbanistički aspekti socijalnog stanovanja, Arhitektonski fakultet, Univerzitet u Beogradu
- [7] Ilić D. (1983), Stan i porodica, Gradina

⁶ Source: <https://www.archdaily.com/468660/via-verde-dattner-architects-grimshaw-architects>

- [8] Stoiljković B. (2015), Primena koncepta individualizacije u stambenoj arhitekturi u kontekstu unapređenja višeporodičnog stanovanja, doktorska disertacija, Građevinsko-arhitektonski fakultet, Univerzitet u Nišu
- [9] Bramley G, Power S. (2009), Urban form and social sustainability: the role of density and housing type, *Environment and Planning B: Planning and Design*, 36, pp.30–48.
- [10] Dinić Branković M. ,MitkovićP., (2019), Urbana funkcija stanovanje, Univerzitet u Nišu – Građevinsko-arhitektonski fakultet
- [11] Gehl J. (1987), *Life between buildings: using public space*, New York: Van Nostrand Reinhold Comapny
- [12] Bridge G. (2002), *The neighbourhood and social networks*, CNR Paper 4. ESRC Centre for Neighbourhood Research, Bristol
- [13] Henning C, Lieberg M. (1996), Strong ties or weak ties? Neighbourhood networks in a new perspective, *Scandinavian Housing & Planning Research*, 13, pp.3–26.
- [14] Cattell N, Dines N, Gesler W, Curtis S. (2008), Mingling, observing, and lingering: Everyday public spaces and their implications for well-being and social relations, *Health Place*, 14, pp.544–561
- [15] Reeves P. (2005), *Introduction to social housing*, Elsevir
- [16] Rabeneck A, Sheppard D, Town P. (1974), Housing: Flexibility/Adaptability? *Architectural Design*, 44, pp.76–90.
- [17] Groák S. (1992), *The Idea Of Building: Thought And Action In The Design And Production Of Buildings*, London: E&FN
- [18] Jovanović G, Keković A. (2008), Fleksibilna organizacija sklopa sprata i prostora stana kod zgrada dubokog trakta, *Zbornik radova Drugog internacionalnog naučnog skupa "Građevinarstvo-nauka i praksa" Žabljak 03-07. mart 2008.godine*, Univerzitet Crne Gore – Građevinski fakultet, Knjiga 1, pp.579–585.
- [19] Živković M, Jovanović G. (2012), A method of evaluating the degree of housing unit flexibility in multi-family housing, *Facta Univeritatis. Series: Architecture and Civil Engineering*, 10(1), pp.17–32.