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THE APPLICATION OF SOCIAL INDICATORS IN THE ANALYSIS OF ZADAR'S HOUSING STANDARD

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ABSTRACT
The application of social indicators in the analysis of Zadar's housing standard
This paper analyses the characteristics of the housing stock in the urban area of Zadar on the basis of social indicators. The theoretical framework of the paper encompasses a systematic review of the existing theoretical knowledge and empirical research on social indicators, as well as their application in studies of housing standards, the conceptual development of terms and the advancement of scientific cognition with regard to social indicators related to housing issues. The 39 variables available from the 2011 Census led to the formation of 9 social indicators. Said indicators have been displayed as representatives of the "external" characteristics of the housing standard, and later on categorized into composite indicators for further comparison. Areas with extremely low or high variations in housing standards were identified by means of comparison of the indicators. The second part of the paper presents the results of the survey conducted on the basis of 17 composite variables, which were formed with regard to two indicators. In addition to descriptive statistics, variance analysis and chi-squared tests were also used in order to identify the differences between housing quality zones with respect to Category A and Category B fit-outs, the results of which significantly contribute to the understanding of the housing standard. The spatial framework of the study is the settlement of Zadar, which is divided into 41 spatial statistical units, 22 local committees and 3 housing quality zones.

KEY WORDS
social indicators, housing standard, Zadar.

1.Introduction

Housing standard analyses are conducted at different times depending on the country's development. Thus, most annual surveys are conducted very often in underdeveloped and developing countries, as opposed to developed countries that carry out such surveys barely ever since they have achieved an appropriate housing standard. As a rule, the basic starting point for the analysis of the housing standard are the variables from which social indicators are formed as a means for monitoring and evaluating the progress, stagnation or setbacks of certain factors of the housing standard. In social surveys, the housing standard is analysed by means of social indicators that include official data from the relevant offices, institutions and establishments. Many authors believe that the synergy of objective and subjective indicators affects the accuracy of results in housing quality studies (Šiljeg et al. 2018; Šiljeg et al. 2016).

In 1954, the UN stated that the standard represents the desired state of affairs, that is, the level that an individual has yet to reach, and that the term *standard* does not include subjective evaluations of people, but only social indicators. Accordingly, housing standards are derived from the cultural level of human achievement, and as such should combine the features of traditional practice with the economy and rationality of modern technology (UN 1994). According to Bežovan (2005), the housing standard is defined as the physical indicator of the housing stock, square footage, number of rooms, building age, fit-out category and housing tenure and ownership with regard to demographic indicators, whereas the apartment represents the highest material and symbolic value of each household. Most authors state that the housing standard comprises certain physical indicators, which are different in underdeveloped countries, developing countries and developed countries.

In order to meet the minimum housing standard, each housing unit should be provided with primary and secondary conditions (Cat A and Cat B fit-out). Category A fit-out in developing countries, including Croatia, refers to the existence of plumbing, electrical wiring, sewer line and gas line, heating, as well as telephone installations, and cable or satellite TV. Category B fit-out refers to various technical appliances, such as small household appliances (microwave, toaster, etc.), internet connection, cell phone, air conditioning, computer etc. There is very little information available on the housing standard in Croatia prior to the beginning of World War II. Until the 1980s, the topic was largely addressed by authors only in the context of the process of urbanization, illegal construction and social segregation (Čaldarević 1975). G. Bežovan (2013) wrote about the changes in housing tenures from 1991 to 2011. He analysed selected indicators of the housing standard (number of rooms, square footage, average number of persons per apartment, number of rooms per household member, etc.).

He compared the analysed indicators with the data concerning other EU countries and found that the housing standard measured by the number of rooms per household member was comparable to that of certain transition member states of the EU, while still significantly lower than the old standards of the primary EU member states. In dealing with housing, there have been examples of reliance on conceptual and theoretical frameworks borrowed from social sciences. For example, Kemeny (1992) cites the concept of the housing classes of Rex and Moore (1967), and the attempt by Saunders and Williams (1988) to put more focus on households and social processes associated with the use of home when considering housing (Miletić 2012).

Housing and the housing standard have been explained through several different theories: the positivist theory relies on the fact that the physical improvement of the housing unit depends on economic status, and that the government should participate in ensuring that adequate housing is available to each individual (Soliman 2004). It is this positivist theory that relies most heavily on the "objective" approach to housing standard valuation, while the residential mobility theory assumes that the housing value of a dwelling depends not only on the factors of the housing standard but also on the technical and social equipment of the housing stock (Šiljeg et al. 2018). The housing standard in the settlement of Zadar has not been thoroughly studied and explained by any author so far, so the contribution of this paper is to understand the housing needs and problems of the inhabitants of the city of Zadar.

Systematic collection of social indicators began as early as 1929 in the United States. The first period of the development of the social indicator system actually began in 1960 with the publishing of *Towards a Social Report.* The second period of development and application of social indicator system began in 1990, and was stimulated by the application of research at different spatial levels. Numerous authors (Knox 1975; Lewis 1968; Cutter 1985) have pointed out in their papers the inconsistencies of research at the national level, emphasizing the need to include such indicators pertaining to the local level. Croatia was no exception – the Statistical Yearbook of the Federal Republic of Croatia began to be published in 1971, and it also collected data on certain social indicators (Podgorelec 2008). According to the UN documents, "Social indicators can be defined as statistical measures that usefully reflect important social conditions and that facilitate the process of assessing those conditions and their evolution". According to Smith, social indicators are measures of state and change over time that can be normatively expressed. They primarily measure quantity, and are often considered more valuable and reliable than subjective indicators, since they are easier to evaluate (Meadows 1998).

1.1. Methodology and spatial framework of the study

The spatial framework of the study is the settlement of Zadar, which, according to the Census 2011, has 71,471 inhabitants, and is divided into 22 local committees, 41 spatial statistical units and three housing quality zones (according to Šiljeg 2016). The housing quality zones were categorized on the basis of the housing quality index determined by virtue of the Jenks Natural Breaks Classification in GIS (Šiljeg 2016).

This paper includes the statistical analysis of social indicators, the selection of which depended on the available census data. The selected indicators were formed on the basis of variables from the Census of Population, Households and Dwellings 2011; the indicators were further explained and presented at 41 spatial statistical unit levels. The paper includes 9 objective indicators and 39 variables. After analysing the social indicators, a sample survey was conducted on 701 respondents (1% of the city population) by the previously defined housing quality zones according to Šiljeg, 2016 (Figure 1) on the basis of two specific indicators: Category A and Category B fit-out indicators of the housing units and 17 selected variables.

The survey was necessary because the official Census 2011 does not contain data on the Cat A fit-outs of dwellings at neither the level of the spatial statistical unit nor the zone, but solely with regard to the level of the settlement, and no data on the Cat B fit-outs whatsoever. The collected data were statistically analysed using the variance analysis method and the chi-squared test to determine differences in the housing quality of respective zones with regard to Cat A and Cat B fit-outs. The results of the variance analysis have been compared with the results obtained on the basis of social indicators and represented cartographically.

The list of social indicators with associated variables: Population structure indicator by age (share of population from 0 to 14, from 15 to 64, share of population aged 65 and over), Educational structure indicator (share of population aged 15 and over without any primary education, without a completed primary education, and with a completed primary education, share of population aged 15 and over with a high school diploma, share of population aged 15 and over with a university degree, master's degree or PhD), Economic structure indicator (share of employed population, unemployed population aged 15 and over, retired population, share of pupils and students), Household structure indicator (share of households with 1 member, with 2 members, with 3 and 4 members, share of households with 5 or more members), Indicator of housing stock use (share of permanent housing,rental dwellings, business properties),

Housing population indicator (share of occupied dwellings, share of other housing units, share of collective dwellings), Number of rooms of occupied housing stock indicator (share of 1-room occupied dwellings, of 2-room occupied dwellings, of 3/4-room occupied dwellings, share of occupied dwellings with 5 or more rooms), Housing stock fit-out category indicator (share of dwellings without toilets, without bathrooms, without a kitchen, without a sewer line, without plumbing, without electrical wiring, share of dwellings without a gas line), Housing stock age indicator (share of dwellings built before 1919, built between 1920 and 1945, built between 1946 and 1960, built between 1961 and 1970, built between 1971 and 1980, built between 1981 and 1990, built between 1991 and 2005, built since 2006 and later) .

List of indicators devised from the survey with related variables: Category A fit-out indicator (plumbing, electrical wiring, sewer line, gas line, central heating, small-scale heating, other forms of heating, telephone installations, cable TV, satellite TV), Category B fit-out indicator (air conditioning, dishwasher, tumble dryer, refrigerator, freezer, computer, Internet connection).

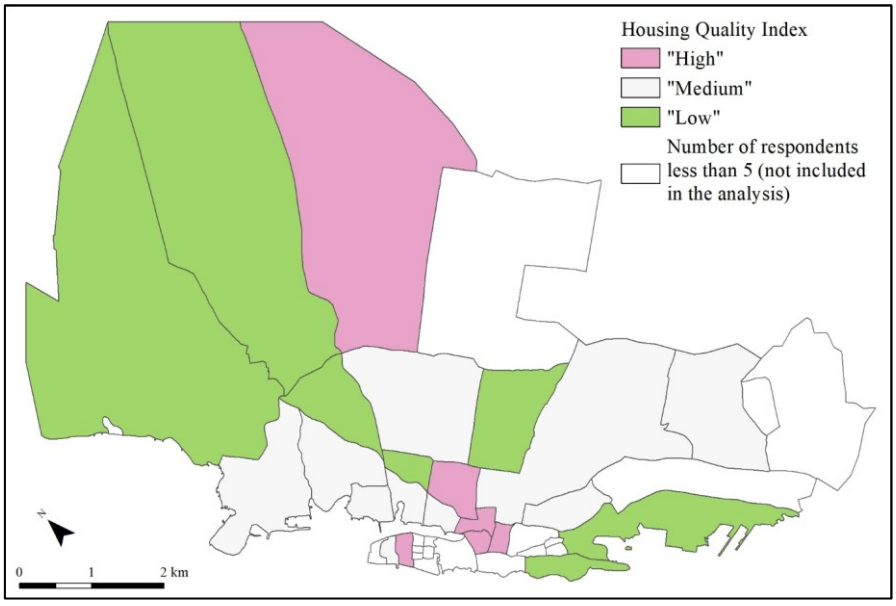

Figure 1. The illustration of housing quality zones based on the housing quality index (Šiljeg, 2016)

2. Results and Discussion

2.1. The analysis of variables within the framework of social indicators

The basic descriptive data on Zadar according to the Census 2011 in order to give an insight into the general state of housing issues at the city-wide level with respect to the developed indicators. According to the age structure, the group of residents between 15 and 64 years of age (67.56%) is predominant, while the number of those under 14 (15.94%) and older than 65 years (16.50%) is almost completely equal. The economic structure indicator at the city level shows that there is a highest percentage of employed persons (42.26%), retired persons (27.16%), pupils and students (10.75%), and the lowest percentage of unemployed persons older than 15 (8.71%). Population structure by age is an important indicator in housing standard surveys because different age groups have different housing needs and therefore evaluate their housing standard differently.

The analysis of statistical data shows that the largest population occupies Ploča (28.2%), the recently-built part of the settlement with predominantly stand-alone houses. Most of the residents with higher education live in spatial statistical units closer to the city centre, and this is where Jazine comes first. When comparing the educational and economic structure in relation to spatial statistical units, it can be established that the two categories are not dependent on each other, that is, the majority of educated population lives in the Poluotok-Jazine SSU (48.8), as well as in the spatial statistical units of Brodarica 1 (30.2%), Jazine 2 (32.8%), Voštarnica 1 (31.4%), Višnjik-Maslina (31.5%), Arbanasi (33.9%) and Poluotok (35.8%).

In terms of economic structure indicators, the highest rate of retired population lives in the spatial statistical units of Poluotok 3 (37.5%), Poluotok-Jazine (39.1%), Brodarica 1 (39.3%) and Diklo 1 (42.6%). By virtue of comparison of the age structure and the largest share of old population, we can draw a conclusion that the same spatial statistical units have the largest share of old population (Brodarica 1 44%, Diklo 1 42% Poluotok-Jazine 39%, Poluotok 3 32%). On the other hand, the variable showing the share of pupils and students compared to the age structure indicates that the Novi Bokanjac SSU has the largest share of pupils and students and a large share of young population (20%).

The Novi Bokanjac spatial statistical unit stands out as an area in Zadar with an extremely favourable demographic structure. It is in this very part of the city that there is a large share of adults, young population, multi-member families, etc. The household structure indicator in housing standard analyses is truly interesting because one-member or multi-member households have different housing needs, which is directly reflected in a standard that has been rising since

the second half of the 20th century (Bežovan 2005). Research conducted by foreign scientists (Padleey et. al. 2018) has oftentimes proven the hypothesis that single-member households have a better standard because of the sufficient square footage and other housing needs. In case of Zadar, the Novi Bokanjac SSU (16%) has the highest rate of households with 5 or more members, with a large share of young population. This percentage is extremely high considering that the share of multi-member families (5 or more members) at the city level is 9.8%. On the other hand, the largest share of one-member families lives across the entire Poluotok.

Since there's a largest share of three-member (26.8%) and four-member households (26.2%) it is safe to make an assumption that their housing needs are the highest in terms of number of rooms, square footage, fit-outs, accessibility, location and the like. The average square footage is not singled out as a separate indicator, it is important to mention which spatial statistical units come first with regard to it. Most countries do not have a strict definition of how many squares are needed per person (Germany, Portugal, the Netherlands) but most often it is somewhere between 14 and 17 m² per person in European countries (e.g. Lithuania and Hungary: 14-15 m², Italy: 17 m²) (WTO 2006).

Figure 2 displays all spatial statistical units in Zadar and the average square footage of the dwellings. Maximum average value category ranges from 90.01 to 110.75 m², dominating in the following spatial statistical units: Novi Bokanjac, Stari Bokanjac, Puntamika, Ploča, Arbanasi 2, Dračevac 1, Dračevac 2, Bili Brig, Arbanasi 3. Said spatial statistical units are the largest in terms of housing units because they are parts of the city with predominantly stand-alone houses, so it makes sense that the square footage be higher. Among the listed SSUs, the only one that stands out is Bili Brig, which has mixed housing units (both apartments and stand-alone houses), where dwellings are generally pretty large (60 square meters or more).

The housing population indicator included three variables: share of occupied dwellings, share of other housing units and share of collective dwellings. Although the city-wide population rate is very high (99.87%), in some SSUs there are uninhabited housing units. This mainly refers to unfinished housing units (stand-alone houses) in predominantly peripheral parts of the city (Bokanjac, Dračevac, Ricina, Arbanasi), or areas where housing units serve exclusively for rental purposes, i.e. where permanent occupancy has not been recorded (e.g. Poluotok). The spatial statistical units of Stanovi-Bili Brig (4,134) and Smiljevac-Crvene kuće (3,520) have the largest number of occupied dwellings with the largest share of population, be it inhabited stand-alone houses or apartments.

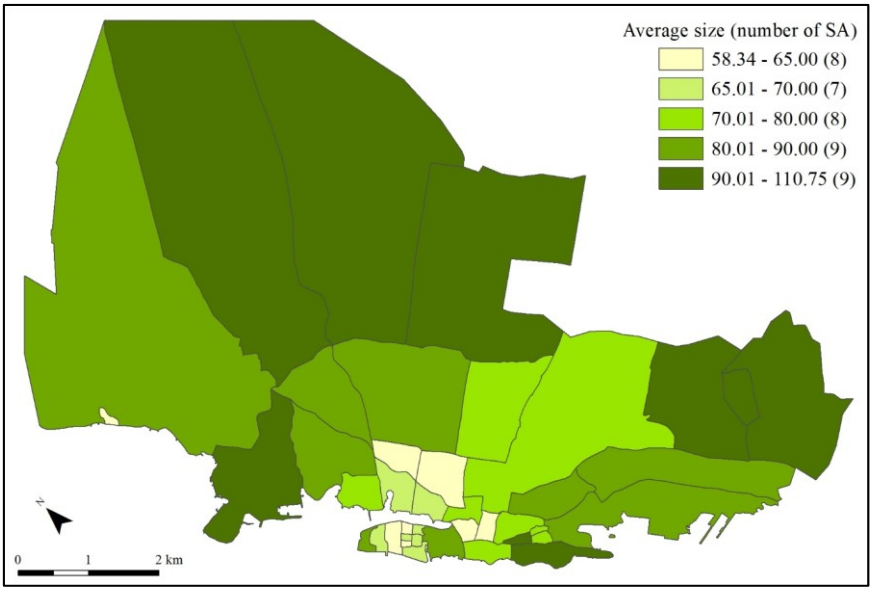

Figure 2. Average square footage of dwellings by spatial statistical units/area.

The number of rooms of a housing stock, along with its square footage, makes for the best indicator of the housing standard, especially since it affects further housing construction if there is not enough space (Joyce et. al. 2017). Since most dwellings in Zadar have three or four rooms (60.33%), and also the majority of three- or four-member families, the presented information can be an indicator of a good housing standard. Compared to the Croatian average, dominated by one- and two-bedroom housing stocks (45.6%), it can be said that the situation in Zadar is above average in terms of the number of rooms per dwelling.

In Zadar the peak concentration of one- and two-bedroom apartments rose in the area of the SSUs of Stanovi-Bili Brig and Smiljevac-Crvene kuće, where there is a largest number of housing units. The map shows the highest average values consequential to the discrepancy between classes. Dwellings with 3 and 4 rooms dominate the spatial statistical units in which the construction of stand-alone houses is assumed, so for that alone the square footage of housing units is larger, as is the number of rooms and other territory within the housing unit. That is why the SSUs of Brodarica 2 (22%) and Maslina (23%) stand out with highest percentage of 4-room dwellings; by way of explanation, spatial statistical units with the highest number of 3-room dwellings are Brodarica 2 (41%), Maslina (47%). Smiljevac-Crvene kuće (42%), Stanovi-Bili Brig (45%), Višnjik (41%) and Ričina (49%) (Figure 3). These values are relatively high considering that the percentage of 3-bedroom dwellings at the city level is 42%, while the percentage of 4-bedroom dwellings at the city level is 18%.

However, more rooms do not necessarily imply a better housing standard. One of the reasons for this may be the age and dilapidation of the dwelling.

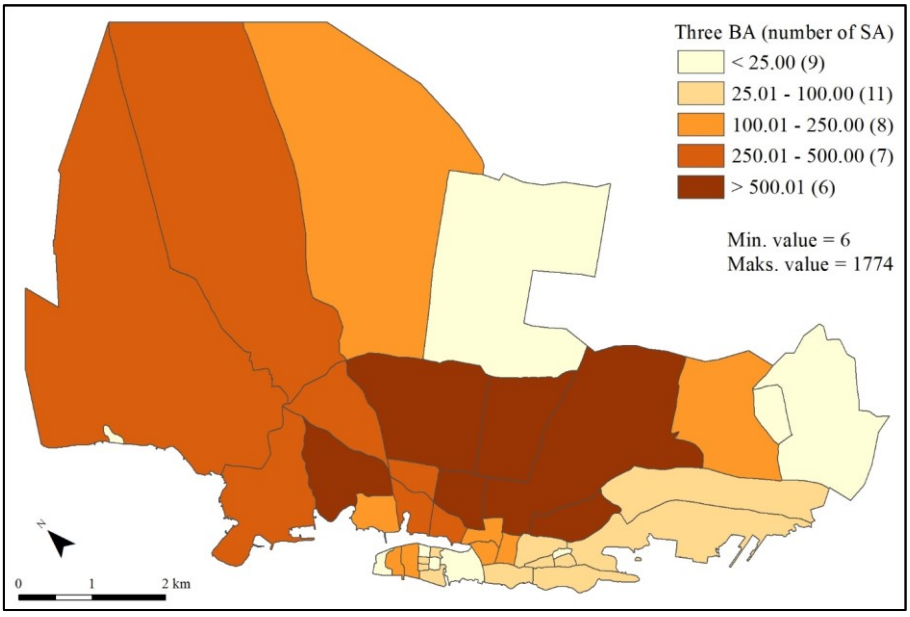

Figure 3. 3-room dwellings spatial statistical units/area.

If one looks at the average number of rooms per member, it is important to note that at the level of the Republic of Croatia, Zadar County (hand in hand with Sisak-Moslavina County) comes first. That is to say, Zadar's households have 1.4 rooms per family member. On the other hand, as many as 22% of Zadar's population cites lack of space as one of the leading housing problems, which is higher than Croatia's average of 20%. If all counties of the Republic of Croatia are taken into account, then Zadar is ranked eighth in terms of lack of necessary housing space. Lack of housing space is an important guideline for future housing policies. Therefore, numerous international comparative studies address the housing standard and related housing policy issues (Hedman 1993).

The housing stock fit-out category is one of the indicators of the housing standard. Generally, it can be said that this category ranks high, i.e. 100% of housing units in all spatial statistical units have electrical wiring, while the main shortcoming is the lack of gas lines, with as much as 98% of housing units without a gas line. The reason for this is the rough terrain which is far from ideal when it comes to the implementation of gas lines, although the installation of the latter is planned according to the strategic development document of the City of Zadar under the name of *Development Strategies*. Also, all housing units are

equipped with a toilet, bathroom and kitchen, meaning that the Cat A fit-out requirements were fully met.

The housing stock age indicator shows that most units were built between 1961 and 1970 (23.40%), that is, only 6.10% of the units were built before 1919 and only 5.35% after 2006. These data indicate a very small number of extremely old dwellings and even fewer newly constructed buildings. Since the majority of Zadar's housing stock was built in the 1960s and 1970s, it is a fact that the prevailing buildings are over 50 years old, which need major renovation. Figure 4 shows the housing stock aged from 1919 to 1945, with particular emphasis on the Voštarnica and Jazine 1 spatial statistical units. These are the SSUs that were developed and settled after Poluotok's capacity was filled, during what could also be called the second phase in the development of the city. It is important to note that these spatial statistical units have the oldest population as well as the largest share of adults.

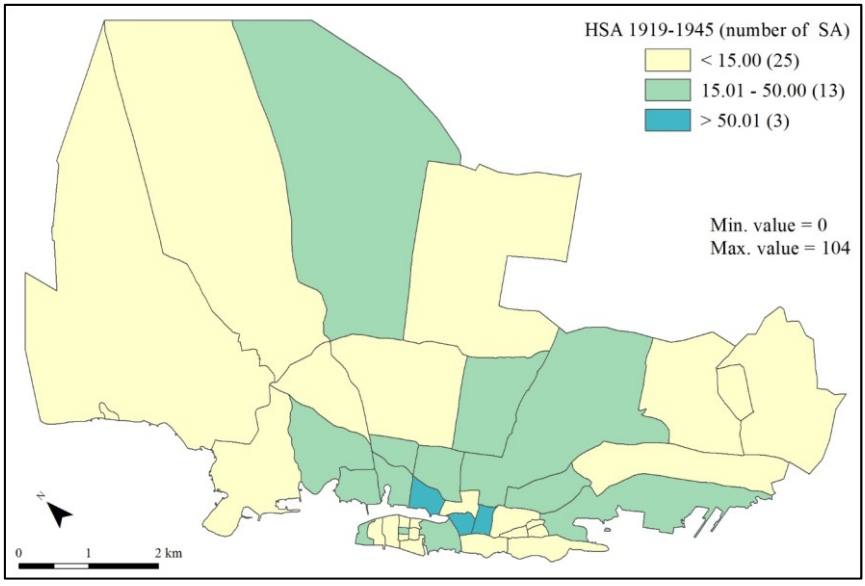

Figure 4. Housing stock age 1919−1945 by spatial statistical units/area

The largest number of housing units in Zadar was built during the 1960s and 1970s (23.40%) in spatial statistical units of Peninsula 1 (50%), Peninsula 2 (48%) and Voštarnica 1 (48%). It is an area of mixed housing units and high residential density. The first modern buildings (e.g. the Puntamika) were constructed on this very site, so it can be said that Zadar represents a fine combination of historical and modern construction. Historical construction is significant for the area of Poluotok and Voštarnica, while the "modernity" visible in the construction of housing units is ever more evident towards the outskirts of

the city. The main shortcoming of this area might be the lack of aesthetics, since the housing units are objects with different facade colours, so often the colours of certain buildings are "not pleasing to the eye" (e.g. bright red). The construction continued in the 1970s and 1980s, mostly in the same area as in the 1960s, with an expansion into the eastern parts of the city. In addition to Maslina, Stanovi and Višnjik, the construction was intensified in the area of Smiljevac, Crvene kuće and Gaženica. This is where the first instance of uncontrolled construction was noted, and it was especially prominent in the eastern part of the city. The largest number of buildings per spatial statistical unit were built in the period from 1981 to 1990, where, in addition to the above mentioned SSUs, the number of constructed facilities increased in the Brodarica spatial statistical unit as well. In the period between 2001 and 2005, the largest share of the housing stock was built in the Smiljevac-Crvene kuće spatial statistical unit, amounting to 368 newly constructed housing units. After 2006, the biggest increase in construction could be noted in Maslina and Višnjik spatial statistical units. The preconditions for the future expansion of the city are now limited to the marginal parts, since other spatial statistical units are almost fully constructed. Hence the assumption that the next Census will contain the largest number of new housing units located in SSUs of Novi Bokanjac and Stari Bokanjac.

2.2. Variance analysis based on variables formed into indicators of Cat A and Cat B fit-outs

When it comes to the variables related to Category A fit-out of the housing units, most of the differences between the parts of the city are not significant (Table 1). Participants from different zones have been shown to live in equally equipped housing units when it comes to plumbing, electrical wiring (the chi-square could not even be calculated for this variable as all participants answered that there was electrical wiring in their housing unit) and telephone installations, central heating, cable television and satellite dish, therefore this data has confirmed the results obtained from the Census 2011. However, it turned out that there is a difference regarding sewer lines (Table 1). Participants from low housing quality zones were more likely to not have sewer lines, and those from medium and high quality housing zones would almost always have them. Parts of the city with low housing quality and no sewer lines are, as a rule, spatial statistical units on the outskirts of the city, unlike those closer to the centre where the sewer system is way more developed. A significant difference was also noticed with respect to gas lines, with more frequent lack of the latter in homes of respondents living in low or high housing quality zones, and a negligible lack in those living in the medium housing quality zones.

The rationale for this information with respect to the Census 2011 data is the change in the terrain situation of certain spatial statistical units after the publishing of the Census. Participants from the low housing quality zones are

more likely to have small-scale heating than those from the medium and high housing quality zones. Other forms of heating are more often present in homes of respondents from high housing quality zones and more often than not absent from homes of respondents from other parts of the city (Table 1).

In the composite variable of the Category A fit-out indicator of housing units, the variance analysis did not discover any significant differences between the three zones (Table 3), which means that Category A fit-out requirements were met at all levels, from spatial statistical units all the way up to the entire settlement. When it comes to the individual parts of the city, i.e. spatial statistical units, the highest Cat A fit-out indicator was noticed in the statistical circles of Brodarica 1 and Voštarnica 2, and the lowest in SSUs of Ploča and Vidikovac.

Table 1. Results of chi-squared tests for measuring differences between housing quality zones in variables related to the Category A fit-out indicator of housing units.

Variable	Categories	frequencies			*DOF*	χ^2
		LHQ	MHQ	HHQ		
Plumbing	Yes	205	373	99	2	2.295
	No	1	0	0		
Electrical wiring	Yes	206	373	99		
	No	0	0	0		
Sewer lines	Yes	155	329	95	2	**28.248
	No	51	44	4		
Gas lines	Yes	25	85	5	2	**22.369
	No	181	288	94		
Heating – central (hot water boiler or communal boiler)	Yes	43	76	15	2	1.576
	No	163	297	84		
Heating – small scale	Yes	46	45	3	2	**23.105
	No	160	328	96		
Other forms of heating	Yes	161	297	90	2	*7.790
	No	45	76	9		
Telephone installations	Yes	183	324	88	2	0.618
	No	23	49	11		
Cable TV	Yes	106	194	45	2	1.384
	No	100	179	54		
Satellite dish	Yes	73	151	32	2	2.895
	No	206	373	99		

LHQ = low housing quality; MHQ = middle housing quality; HHQ = high housing quality; *DOF* = degrees of freedom; $\chi 2$ = chi-square; * $p \leq .05$; ** $p < .001$

The analysis of Category B fit-out by housing quality zones in the city of Zadar pointed to large similarities with regard to the variables. That is, the only significant differences with reference to the tumble dryer and refrigerator.

Other appliances and services – air conditioning, dishwasher, washing machine, freezer, computer and internet connection were proven to be equally present in all three zones. The tumble dryer is more commonly found in the medium housing quality area, and less frequently in other zones of the city. Although a significant discrepancy has been observed in relation to the refrigerator variable, such a result is likely an artefact of too many fields with a theoretical frequency of less than 5 (50%) that artificially increases the statistical significance of the chi-squared test (Table 2). In addition, the test cannot be repeated because there are only two response categories (yes/no) and excluding the response "no", which occurs only six times, would leave only one category. Therefore, it would be best to consider this result non-significant. When it comes to the composite variable of the Category B fit-out indicator of the housing unit, variance analysis did not detect any significant difference between the three zones of the city of Zadar (Table 3). The analysis of the data at the level of spatial statistical units has shown that Puntamika, Stari Bokanjac and Brodarica 1 have the highest Category B fit-out indicator and Jazine 1 and 2 the lowest.

Table 2. Results of chi-squared tests for testing differences between housing quality zones in variables related to the housing indicator of the Category B fit-out of the housing unit.

Variable	Categories	frequencies			*DOF*	χ^2
		LHQ	MHQ	HHQ		
Air conditioning	Yes	149	279	73	2	0.421
	No	57	94	26		
Dishwasher	Yes	101	179	38	2	3.436
	No	105	194	61		
Washing machine	Yes	201	360	97	2	0.869
	No	5	13	2		
Tumble dryer	Yes	17	61	6	2	**12.302
	No	189	312	93		
Refrigerator	Yes	206	370	96	2	*7.062
	No	0	3	3		
Freezer	Yes	102	216	54	2	3.781
	No	104	157	45		
Computer	Yes	165	319	84	2	2.972
	No	41	54	15		
Internet connection	Yes	170	311	83	2	0.134
	No	36	61	16		

LHQ = low housing quality; MHQ = middle housing quality; HHQ = high housing quality; *DOF* = degrees of freedom; $\chi 2$ = chi-square; * $p \leq .05$; ** $p < .01$

The lowest Category B fit-out indicator is most prevalent in the spatial statistical units inhabited by predominantly older population, which probably does not possess all of the possible Category B fit-outs. Upon comparing the data with social indicators, it is clear that in the case of Cat A fit-out there is no difference

in terms of educational structure, economic activity, building age and number of rooms. Cat B fit-out ranks higher in respondents with higher education and respondents who are employed. Higher values of the variables have also been observed in respondents who live in newer buildings and who have more rooms (three- and four-bedroom apartments).

Table 3. Results of variance analysis for testing differences in composite variables regarding Cat A and Cat B fit-out indicators in different housing quality zones.

Variable	Categories	*AM*	*SD*	*DOF*	*F*	*Scheffe*
Category A fit-out indicator of the housing unit	LHQ	5.840	1.205	2	2.541	
	MHQ	6.024	1.277			
	HHQ	5.768	1.028			
Category B fit-out indicator of the housing unit	LHQ	5.393	1.510	2	2.146	
	MHQ	5.617	1.468			
	HHQ	5.364	1.328			

LHQ = low housing quality; MHQ = middle housing quality; HHQ = high housing quality; *AM* = arithmetic mean; *SD* = standard deviation; *DOF* = degrees of freedom; *F* = F-ratio; *Scheffe* = Scheffe post hoc tests; * $p < .05$.

3. Conclusion

The housing standard analysis on the basis of social indicators by means of variance analysis regarding Category A and Category B fit-out indicators has confirmed that the housing standard in the settlement of Zadar is above average. With almost 100% occupied dwellings, households with 3 and 4 members prevail, and the facilities are predominantly intended for permanent housing. The smallest share of permanent housing has been noted in tourist spatial statistical units (Diklo), most of them in the SSU of Dračevac on the outskirts of the city. When it comes to the number of rooms indicator, 3- and 4- room dwellings are predominant and the housing units are well-equipped. Most housing units were built in the 1960s and 1970s, which is also considered to be the second phase of the city's development. The building age of housing units decreases from the centre towards the outskirts of the city, i.e. the majority of the oldest buildings are located in the centre (spatial statistical units of Poluotok), while newer buildings with more rooms prevail in the housing units of the outskirts of the city. In addition, the parts of the city with the oldest buildings have the smallest share of population (Poluotok), while the younger population prefers construction sites on the outskirts of the city (Ploča). If the number of squares of a dwelling unit is taken as an indicator of the housing standard, it can be said that generally the square footage grows from the centre towards the periphery, because there are also differences regarding types of housing units, i.e. the

number of stand-alone houses is higher on the outskirts of the city while the number of apartments is higher in the centre. The number of rooms (per member) can be taken into account as an indicator of a good housing standard. In this case it amounts to 1.4, which makes Zadar stand out among other Croatian settlements. Variance analysis of the Category A fit-out indicator among spatial statistical units is not significant and ranks pretty high, which is correlated with the Census 2011 data. The only exception is the sewer line variable whose lowest values were recorded in peripheral SSUs, which slightly lowers the overall housing standard.

The variance analysis of the Category B fit-out indicates that the only significant difference with regard to the tumble dryer variable has to do with young and mature adult residents who live on the outskirts of the city and are in the possession of the aforementioned appliance, compared to retired persons who live in the city centre and do not deem it necessary, stating that the lack thereof does not impair their housing standard. This paper has discovered that the settlement of Zadar has a high housing standard, and that smaller differences are correlated with the one-person household variable enjoying a better housing standard than the multi-member family household, as well as the age structure variable indicating that older residents have a better housing standard (partly due to lower needs, especially regarding Cat B fit-out) who live closer to the city centre. The main shortcoming is the absence of sewer lines in zones with a large number of multi-member families, younger and mature age groups and larger and newer housing units.

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