

Main Challenges of Post-Earthquake Renovation in the Case of Zagreb City Center

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Abstract. *This paper presents the results of a research on the problems and challenges of post-earthquake renovation in the inner city center of Zagreb, where mostly older, historical buildings are situated, which were severely damaged in the 2020 earthquake. Almost two years after the earthquake, political actors have not been able to make much progress regarding the post-earthquake renovation, which has caused discontent among vulnerable citizens. This paper presents the results of a qualitative analysis of semi-structured interviews with owners of damaged apartments and co-owners' representatives. The authors found two main issues with the post-earthquake renovation in Zagreb: 1) incomplete renovation and problems with the financing of repairs to damaged buildings, and 2) people moving out of the city center and city apartmanization. The results showed that the cost of damage repair in most cases was covered by the citizens themselves and that institutional help has been slow and bureaucratized. Also, the participation process regarding renovation has not been successful for the citizens and they are still dealing with similar problems as in the beginning of the renovation.*

Keywords. *Zagreb city center; post-earthquake renovation; apartment owners; citizen participation; qualitative analysis.*

Abstrak. *Makalah ini menyajikan hasil penelitian tentang masalah dan tantangan renovasi pascagempa di pusat kota Zagreb, di mana sebagian besar bangunan merupakan bangunan tua bersejarah, yang rusak parah akibat gempa 2020. Hampir dua tahun pascagempa, para aktor politik belum bisa membuat banyak kemajuan terkait renovasi pascagempa, yang menimbulkan ketidakpuasan di kalangan warga yang rentan. Makalah ini menyajikan hasil analisis kualitatif wawancara semi terstruktur dengan pemilik apartemen yang rusak dan perwakilan pemilik bersama. Penulis menemukan dua masalah utama dengan renovasi pasca gempa di Zagreb: 1) renovasi yang tidak lengkap dan masalah dengan pembiayaan perbaikan bangunan yang rusak, dan 2) orang yang pindah dari pusat kota dan apartemen kota. Hasil penelitian menunjukkan bahwa biaya perbaikan kerusakan dalam banyak kasus ditanggung oleh warga sendiri dan bantuan kelembagaan lambat dan birokratisasi. Selain itu, proses partisipasi warga terkait renovasi belum berhasil dan mereka masih menghadapi masalah yang sama seperti di awal renovasi..*

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Kata kunci. Pusat kota Zagreb; renovasi pasca gempa; pemilik apartment; partisipasi penduduk; analisis kualitatif.

Introduction to the Context of Post-Earthquake Renovation in Zagreb

This paper deals with the problems of renovation and reconstruction of Zagreb's city center following the earthquake (5.5 magnitude) that hit the Croatian capital and surrounding area on 22nd March 2020. It happened at 6:24 AM (local time), with an epicenter 7 km north of the Zagreb city center (Figure 1). The earthquake also affected parts of neighboring counties. According to data from the Ministry of Physical Planning, Construction and State Assets, the earthquake damaged 25 thousand buildings, both private and public. After the earthquake, more than six thousand buildings were unsuitable for use, permanently or temporarily, including kindergartens, primary and secondary schools, faculties, institutes, scientific and cultural institutions (Ministry of Physical Planning, Construction and State Assets, 2020).



Figure 1: The epicenter of the earthquake in relation to the Zagreb region and the Zagreb city core.

Source: Authors

Although the earthquake caused significant material damage, there were not many victims, especially in terms of casualties. Therefore, it cannot be compared with earthquakes in countries like Japan, Chile, United States of America (USA), Turkey, Italy (Comerio, 2014; Özerdem and Rufini, 2013; Ganapati, 2013), which had a great impact on people and their properties as well as the post-earthquake organization of life. As far as people were concerned, temporary housing (Wu and Lindell, 2004) was provided relatively quickly for those inhabitants who could no longer stay in their property. Moreover, the government opened the opportunity of financing rentals to house people whose residences were damaged in the earthquake.

Despite the moderate intensity of the earthquake (Comerio, 1998), its material consequences have been very significant for the future life of the residents in the historical city core. The consequences of the earthquake were mostly felt there, because it is located at only a few kilometers away from the epicenter. The historical core was severely damaged, due to the age of buildings, and the minimal initial seismic resistance of the buildings. Such resistance was determined after the earthquake by structural engineers, and the reason was a decades-long lack of maintenance of the housing stock and arbitrary reconstruction of the buildings. It also needs to be pointed out that Zagreb and the Zagreb area are located in a seismically active area (the last heavy earthquake struck Zagreb in 1880), which has long been disregarded during the construction of buildings (Kahle, 2020), until the first Regulations on Anti-seismic Construction were adopted. Their implementation began in the states of former Yugoslavia after the devastating earthquake in Skopje (the capital of North Macedonia) in 1964. The current European regulations, however, consider twice as strong seismic forces as specified in the initial regulations, so that only buildings constructed in Croatia after 1998 have a high level of anti-seismic resistance.

After the earthquake, the government did not have ready measures and policies that could help to adequately rehabilitate the damage after the earthquake. In fact, it was in serious problems due to the long process of passing – and soon after amending – the new Reconstruction Act (Act on the Reconstruction after Earthquakes, 2021), and programs and regulations that could speed up the renovation. Less than a year after the Zagreb earthquake, 50 km away, an even stronger series of earthquakes struck, the strongest measuring 6.2 on the Richter scale. The intention of the government was therefore to instigate post-earthquake renovation not just in Zagreb but also in its surrounding counties. That second series of earthquakes also caused further damage to buildings in Zagreb. The total damage of both earthquakes is estimated at 17 billion euros (1 euro = 1 USD, August 2022). At this moment, the bodies responsible for the post-earthquake renovation are the Ministry of Physical Planning, Construction and State Assets and the newly established Reconstruction Fund for the City of Zagreb, Krapina-Zagorje and Zagreb Counties.

Late 2020, Croatia was granted 683.7 million euros from the European Solidarity Fund (EUSF) for the restoration of the earthquake consequences on public infrastructure in Zagreb and neighboring areas. A prepayment of 88.9 million euros was done the same year (European Parliament, 2020). Originally, this allocation should have been used by Croatia by mid-June 2022. The fact that the state is in difficulties, and that there are problems with organizing and carrying out the renovation means that until now almost nothing of the aid has been utilized. Final beneficiaries received only 1% of the available funding (Marić, 2021). Early 2022, the government requested a deferment of the utilization of the EUSF funds and received a one-year extension. The main reason for not using the funds was the slow procedure of approving the final projects that could be financed with these funds. After the final amendments to the Reconstruction Act were passed, citizens could submit a request in eight categories of help. According to a recent call to do so, out of the total number of requests submitted to the responsible Ministry, only around 5% were granted (Galić, 2021). This disorientation in the post-earthquake renovation has made it inefficient, delayed, not focused enough, and postponed into the future. The renovation of Zagreb got stuck in between ‘temporary’ and ‘transitional’ solutions (Özerdem, and Rufini, 2013), where ‘temporary’ often becomes ‘decades-long’, while ‘transitional’ essentially implies an unfinished renovation process. This paper will present how far the renovation of objects (housing, public and commercial) and the social life of the local community (Clemente and Salvati, 2017) has been successful in Zagreb in a short-term and a long-term sense.

Theoretical Background

The period after a catastrophe is potentially characterized by confusion and conflicts of various stakeholders pressuring the government to take various measures. Previous research points to financial problems, ad-hoc decision making, poor coordination, insufficient care for the most impoverished victims, and efforts towards bringing the community back to the pre-catastrophe situation (Wu and Lindell, 2004). It has also been pointed out that the theory on renovation possibilities is far more advanced than the practice, since the authorities and, likewise, the citizens are not prepared for the situation of a large-scale catastrophe (Comerio, 2014). In the literature, the process known as post-earthquake recovery and reconstruction planning (PERR) focuses on numerous aspects of renovation, among which building residential objects takes precedence and is usually made a priority in planning (Johnson, 2007; Wu and Lindell, 2004). The restoration of infrastructure is one of the main challenges in post-earthquake renovation, for which there are most often no local plans or these are not sufficiently developed. Moreover, various factors hinder the post-earthquake renovation process, which are related to the possibility of using temporary housing, the economic power of the society, local building practices, and the existing disaster management system (Wu and Lindell, 2004).

The renovation problems are also related to the financial possibilities of citizens, i.e., their inability to finance a renovation due to objective reasons (poverty, inability to pay the insurance of buildings, etc.) because of which they cannot participate in the renovation of their apartments (Peacock and Girard, 1997). Post-earthquake renovation relies largely on information on when renovation funding will be available and in what ways citizens can rely on institutions in the short and long run. Post-disaster interventions can thus affect the occurrence of social inequality and injustice affecting the local communities, leading to social exclusion (Jonas and Vanclay, 2021). In the case of large-scale catastrophes, the importance of creating programs with a comprehensive purpose regarding employment, subsidies and loans, and reduced taxes is emphasized. Furthermore, the importance of real estate insurance is highlighted, following some examples showing that the lack of real estate insurance and the unpreparedness of citizens brings them in a situation where they have to use their personal savings and rely on public loans. In such a context, unrealistic expectations from the platform of policies prepared by the authorities also emerge (Comerio, 2014; Wu and Lindell, 2004). Due to the complexity of the process, some researchers have suggested not to use the term ‘recovery’ but rather concepts such as ‘renewal’, ‘regeneration’, and ‘reorganization’ (Bellwood et al., 2004; Comerio, 2014) to underline their mostly partial effect.

In practice, the goal of community recovery is often to bring the community back to pre-disaster levels as quickly as possible (Chang, 2010). Therefore, enhancements in post-earthquake construction and building renovation is a key step in increasing not only the resilience of the buildings themselves but also in increasing community resilience. Housing is a fundamental element of returning to everyday life and also a critical point in every renovation, because buildings are most often privately owned (Comerio, 2014) and therefore can be renovated in different ways. One of the fundamental principles of the PERR concept is ‘people first’ (Yang, Gao and Li, 2017, p. 1847), making community and citizen participation an important aspect of renovating any neighborhood (Clemente and Salvati, 2017; Özerdem and Rufini, 2013; Wu and Lindell, 2004). Local-level participation can help form more resilient communities, which will be better able to respond to disasters or to help renovate already damaged objects. The concept of disaster resilience can be defined simply as the capacity to rebound from disasters (Comerio, 2014; Mileti, 1999). Most authors agree that this is a complex multidimensional and nonlinear

(Chang, 2010) concept with social, economic, institutional, infrastructural, ecological, and community dimensions (Comerio, 2014).

Therefore, the way decisions are made after catastrophes is crucial for a successful return to normal life, because studies suggest that post-earthquake renovation is also a political event, where authorities navigate with different levels of efficiency (Jonas and Vanclay, 2021; Fois and Forino, 2014). In addressing the consequences of catastrophes, two approaches can be pointed out. First, assigning a major role to the government in financing, organization and coordination, and second, including citizen participation in the planning of the renovation. There are also mixed top-down and bottom-up approaches, with a prominent role for the state and public financing (Comerio, 2014). Models differ depending on how much they enable citizens to be included in the decision-making process. Nevertheless, people-focused approaches have precedence over approaches that make citizens passive in making decisions regarding their own future. Depending on the mentioned context, the government also has a bigger or smaller role in the renovation phase, so that for example in the USA the government does not have an active role in providing permanent housing; this is left to real estate owners and the market. The owners are forced to invest in real estate renovation through savings, loans and private insurance (Comerio, 1998; Ganapati, 2013). In Turkey, the situation is somewhat different; for example, the state had a far bigger role after the 1999 earthquake, thus creating a framework for international help (Ganapati, 2013). Housing recovery is often measured by the number of built housing units in a particular time period, however, other qualitative indicators are also seen as important, such as the land on which units are built, the question of who participates in their design and planning and how, and the level of people's satisfaction with the built housing units (Ganapati, 2013).

The aforementioned multidimensionality is difficult to achieve without citizens, who should participate and be called to participate in the renovation in order to successfully realize the participation process (Pearce, 2003; Jonas and Vanclay, 2021) as a bottom-up approach. It is often seen that top-down solutions are insufficient or even unsuccessful and rejected by citizens (Jonas and Vanclay, 2021; Fois and Forino, 2014). In the example of L'Aquila in Italy, we can see a rejection of top-down decisions by the inhabitants who, following the earthquake in 2009, decided to build an eco-village by themselves after they rejected the housing solution proposed by the government (Fois and Forino, 2014). The Italian example shows a multidimensional concept of deliberate and selfish exploitation of a local community in order to protect the interests of elites (according to Jonas and Vanclay, 2021). A similar situation happened after the Turkish Marmara earthquake in 1999, when residents refused to leave their homes due to a rehousing program, and organized resistance to the expropriation and relocation because the policy environment was increasingly dominated by neo-liberal economics and politics (Gibson and Gökşin, 2016). Thus, the state enabled and supported the primacy of market-led, profitable neighborhood redevelopment, which was reliant on a modernized version of the share of the construction process, now operating in a formalized housing market (Gibson and Gökşin, 2016). However, this excluded the interests of most tenants and victims and included only those who could cope with the housing market conditions.

The given examples suggest that post-earthquake renovation is a phase in which it is hard to compare various cases despite their similarity, because every state approaches renovation in a very specific way (Ganapati, 2013; Chang, 2010; Olshansky, 2005). Also, it has been seen that the return to the pre-catastrophe situation did not yield good results in many communities. Many facts were disregarded, such as the quality of construction or the social and economic context, and the participation process, which can significantly affect potential renovation (Ganapati, 2013). The central aim of renovation should be the overall wellbeing of the inhabitants, whereby it is important to regard their relation to the place based on three main elements, namely 'identity',

‘relationship’, and ‘history’ (Clemente and Salvati, 2017, p. 9). Therefore, the strengthening of local communities towards becoming resilient communities, unifying all three elements, is of particular interest.

The city center between post-earthquake and urban renovation

The process of urban renovation itself must also be observed in the context of the pronounced commercialization of spaces in post-socialist cities (Hirt, 2012; Stanilov, 2007; Svirčić Gotovac, Zlatar Gamberožić and Nikšić, 2021). Zagreb is a good example of the arising processes and changes, especially visible during the 2000s, both in the center and in the surrounding areas in the form of over-construction of residential and business buildings (rapid development of business and industrial zones, business towers, shopping malls, residential neighborhoods, partial residential construction in already realized neighborhoods, etc.), and the accompanying destruction and reduction of public and green surfaces (Čaldarović and Šarinić, 2008; Svirčić Gotovac, 2010; Zlatar, 2013; Svirčić Gotovac, Zlatar Gamberožić and Adamović, 2021). These changes were induced by the market value of space, since areas in the city center have become more attractive in the market after the privatization process (Tosics, 2005; Sýkora and Bouzarovski, 2012). In the narrower Zagreb city center, both in the socialist and post-socialist periods, there was no initiative for implementing comprehensive renovation of buildings and city blocks, despite their identity, cultural and architectural value. It is also important to explain the socialist context from which many problems were inherited, in which a large majority of the housing stock was socially owned. Tenants paid a preferential rent, while the building maintenance was in charge of the so-called municipal housing funds (Bežovan, 1987). When the selling of former socially owned apartments began in the early 1990s, in the process of ‘give-away privatization’ (Lux and Sunega, 2014), the state abandoned the maintenance of real estate whose former tenants had become owners. Along with the ownership, the tenants got the responsibility of maintaining the apartments. With the process of privatization of apartments, Croatia became one of the post-socialist countries with the highest share of private ownership of apartments and houses at almost 90% (Croatian Bureau of Statistics, 2017).

Often, the private apartments were not insured against earthquake damage, because it would require additional financial resources, and the reserves for regular maintenance of buildings were most often minimal, in accordance with legal provisions, which did not make it obligatory (Regulation on Building Maintenance, 1997; Šobak, 2020). The state and the city mostly took care of maintaining the publicly owned buildings, while the private housing stock was left to the care of the owners, despite the historical value of some of the real estate. Recently, particular calls from the authorities were focused more on subsidies intended for the renovation of facades, while the building characteristics (especially constructional) were not taken care of, nor were subsidies for such interventions offered. Thus, the historical core has become even more vulnerable to the consequences of earthquakes, since its building stock is older than a hundred years (built mostly in the late 19th and early 20th century), with a multiple-times obsolete constructional duration. Furthermore, these buildings have deteriorated because the building materials used have lost their technical properties, and for decades they have been unkempt and haphazardly reconstructed multiple times (Atalić, 2021). In some buildings, these reconstructions jeopardize their static stability. Some assessments of post-earthquake damage reach the value of new residential buildings, however, as such options are not envisioned in the law, it is impossible to begin demolition of buildings that are, for example, a cultural asset. Such circumstances place the buildings’ owners in an extremely unfavorable situation. They are unable to bear the costs of renovation, and even if they do have the financial resources for renovation, they will be investing in real estate that has long expired. In such a hindered and passive situation regarding the

maintenance of the housing stock, it is also important to engage the citizens themselves and encourage collaboration with them, because renovation depends mostly on their engagement.

In this context, it is important to stress and mainstream the issue of belonging to a place and remaining there to live, which sociology defines as acceptance of local identity and identifying with the community in which one lives. This concept also includes the 'sense of community' (Forrest and Kearns, 2001), which is especially important when an area is devastated by disasters such as an earthquake. This is visible in the rise of numerous civil initiatives on social networks (primarily Facebook), which were created to enable citizens to help each other with advice on the entire process of restoration (gathering documents, finding contractors, etc.). However, as even two years after the earthquake still no significant restoration efforts have been undertaken in the city core, several such virtual initiatives shifted to the real world and founded an NGO citizens' association under the recognizable name of SOS Zagreb in order to increase pressure on institutions that they believe are very inert and inefficient.

Methodological Framework

Considering that residents' expectations are an important part of the participation process, we explored their opinions about post-earthquake and urban renovation of the city center of Zagreb. Therefore, the core research questions asked in this study were: *Why did the post-earthquake renovation in Zagreb prove unsuccessful and took on the characteristics of necessary and partial reconstruction conducted only by the tenants? What are the long-term expectations from the post-earthquake renovation regarding social processes such as depopulation, gentrification and apartmanization of the city core?*

The study was conducted in September and October 2021 through semi-structured interviews using a face-to-face information gathering technique with apartment owners who live in the narrower Zagreb center. The sampling techniques included snowball and purposeful sampling. The sample was assembled by the snowball method (Johnson, 2014; Noy, 2008) because, among other issues, the primary building manager in Zagreb failed to provide us with information on co-owners' representatives on time.

By definition, a chain referral sample is created through a series of referents in a circle of people who know each other (Weiss, 1994) and purposeful sampling involves identifying and selecting individuals who are especially knowledgeable about or experienced with the phenomenon of interest (Cresswell and Plano Clark, 2011). Interviews were recorded with a Dictaphone and transcribed, and the data was analyzed in NVivo-12. Interviews were halted when exhaustion of data was achieved, as is the usual procedure with the snowball method. Ethical considerations included informing the participants about the purpose of the research and guaranteeing them confidentiality.

A purposeful sample of owners whose buildings were damaged was composed (Table 1). The basic enlistment criterion was ownership of an apartment and location of the street of residence in the city center. Further, the criterion for subdividing the apartment owners was whether individual owners served as representatives of all co-owners to the company managing the financial reserves of the building. The reason for this subdivision is that the position of co-owners' representative was created in the post-socialist period and is performed by one of the owners, who is empowered by the other owners of the real estate to serve as a communication and management link between the building manager and the owners. Following the earthquake, the co-owners' representatives had a deeper insight into the damages and restoration process than other owners. They were the ones contracting the construction work for the building renovation in agreement

with the building manager and controlled the dynamic of budget spending, so they were an invaluable source of information for the purposes of this study. It was equally important to hear owners of apartments who were directly affected, so that the sample's duality (co-owners and co-owners' representatives) was an added value that could capture the real situation and the problems faced in the renovation process.

Table 1. Structure of the sample (N = 27)

Co-owners and co-owners' representatives	N = 27
Men	12
Women	15
Average age	52
University degree	15
High school diploma	12
Employed	22
Retired	5
Owners	14
Co-owners' representatives	13

The coding of obtained data was conducted at three levels, which according to Richards (2015) include the descriptive, thematic and analytic levels. Building on the research questions (Elliot, 2018), the analysis resulted in the following codes: 1) *Incomplete renovation and the financing of repairs to damaged buildings*; 2) *The problem of people moving out of the city center and city apartmanization*. Table 2 presents the graphic analytic scheme of codes and subthemes (Table 2).

Table 2. Analytic and thematic codes

Incomplete renovation and the financing of repairs to damaged buildings	The problem of people moving out of the city center and city apartmanization
Smaller and necessary repairs on buildings (fast restoration)	Residents moving out
City and state aid for restoration of smaller damage	Abandonment of construction and post-earthquake renovation
Bureaucratization of the process of renovation co-financing	Conversion of the center to business and tourist area
Lack of finances in buildings' common reserves	Safety of staying in old buildings
Inability of taking out high loans	Buying safer real estate outside of the city center
Problems with building contractors	Emotional bonds with life in the city center
Discontent with building management companies	Measures to prevent people from moving out of the city center
	Urbanistic and culture-historical identity of the city

Results

1) Incomplete renovation and the financing of repairs to damaged buildings

This section deals with the financing of repairs during the building and apartment restoration process and it also examines which were the greatest difficulties the owners faced during that process. Furthermore, it encompasses the communication between the owners and co-owners' representatives with building managers as well as city and state institutions. According to the statements of the co-owners' representatives and owners, most of them (18 participants reported damage to structural parts of the building) did not succeed in restoring most of the damage incurred. An additional problem they faced was gathering the documents required for the refunding of short-term funds or applying for state financial assistance² with building restoration, as well as the greatest problem, the constant lack of available contractors.

- *When we started the restoration, the required documentation was not as comprehensive as it is now. For example, we did not need to file a constructional, structural or engineering study. Now it is mandatory. So we had to retroactively provide these documents in order to even apply for the funding. (Owner 3)*

Because of the high demand for construction projects, contractors have raised their prices and have been very slow in responding to inquiries about restoration. Certain owners started to question the competence of smaller firms that had no previous experience with post-earthquake restoration. Also, the perpetual labor shortage in the construction sector as well as the incompetence of individual contractors have contributed to the citizens' growing sense of powerlessness.

- *You are happy now if you manage to find someone willing to work, there is nobody who wants to. (Owner 4)*
- *There are these small contractors who do not know the first thing about earthquakes. (Owner 4)*

Besides that, as pointed out by most of the participants (18 of them reported significant damage to their buildings) a special problem in carrying out the restoration was the communication with co-owners' representatives and building managers. Most of the subjects found their work very unsatisfying, either due to delays or poor engagement (only 5 participants were satisfied with the work of the building managers, while 4 of them were not sufficiently informed). Additionally, often the owners within a single building are not in agreement about the restoration because any major building intervention requires the agreement of at least 51% of co-owners, which further slows down the restoration process. Individual co-owners' representatives pointed out another barrier in the process of communicating with the building managers because they were required to provide at least three contractor offers. This has proved to be very problematic due to the lack of available contractors.

- *The building manager was of no help and there was no chance of getting any contractor, anyone available: "Oops, you know corona... oops, we are so busy." They were not up*

² The Ministry of Physical Planning, Construction and State Assets will refund 80% of the funds invested by the owners.

to the situation, but I think they were not up to the job in general. (Co-owners' representative 8)

In this whole process, the owners were forced to rely primarily on their own funds, i.e., on the institution of common reserve funds,³ and if these were not sufficient to cover the restoration expenses, and they mostly were not, they had to take out commercial loans for the restoration expenses, which automatically raised the reserve funds' expenses. The Regulation on Building Maintenance defines a common reserve to be set up by the co-owners of multi-apartment buildings as a common fund of all co-owners of multi-family buildings to cover the costs of maintaining and improving the building and to repay loans (Regulation on Building Maintenance, 1997).

- *We cannot do everything. So far, we have covered the expense of the chimney assessment and the removal of that chimney. Before everything, we need to, and surely want to, strengthen the building. This is my impression of many buildings in the Zagreb center. We are not planning to do this because the cost is enormous. (Co-owners' representative 5)*
- *So, only the roof was funded from the common reserve funds. But for all the other works we had to take out a loan. Only when we had all the paperwork done, could we start the construction. (Owner 12)*

It became apparent that many owners did not make regular deposits to their common reserve fund, causing problems to other co-owners. Following the privatization of the housing stock in the early 1990s, some owners did not think that caring about the condition of the building was their responsibility. This led to completely new problems in the perception of communal property.

- *Part of them do not want to invest money into something that is not explicitly theirs. They see it as spending money for someone else, and not for themselves. That is why we cannot even get started. After we finally learned who we needed to employ and how we could pay for it, we encountered the problem that some owners did not want to pay for it, they thought it was too expensive and a waste of money because it was not investing into their own property. (Co-owners' representative 7)*
- *One of the problems is the institutions. Another are the building managers, whose role is apparently only to manage money and not to help resolve issues. The third problem are the neighbors, who come in all shapes and sizes. Most of them do not understand the concept of communal property. (Co-owners' representative 7)*

Some of the owners primarily complained about the behavior of individual owners who are stalling the restoration process to the level that their buildings are becoming potentially dangerous to live in and also for people passing by in the street and for the city as a whole. The other owners have tried complaining to city institutions and asking for help with problems regarding co-

³ The common reserve fund is managed by the co-owners of the building and by the building manager, who is jointly chosen by the co-owners. The co-owners pay the common reserve every month to an account opened for this purpose. The minimum common reserve amount mandatory for owners in multi-apartment buildings in Zagreb is 0.20 euros per square meter and many co-owners decide to pay the minimum amount into the common reserve fund.

ownership in the building, but the responsible institutions excused themselves, saying that this was not in their jurisdiction.

- *If the entire commission would come to look at the fourth floor, they would see what could fall onto the street at any moment. When I mention this to our manager, she replies: "Other buildings are the same." When I hear that sentence, "Other buildings are the same," I [say] that is wrong. (Owner 4)*

Some of the participants (5 participants) were content with the restoration's progress and the financial possibilities of the building because they acted in solidarity, as a community of co-owners, and thus they managed to complete the restoration in a short period of time. They also managed to get a refund from the state in the form of financial assistance aimed at temporary protection of earthquake-damaged buildings from the responsible Ministry.

- *For everything regarding the restoration of the roof and chimney, I already received a refund of those funds. (Co-owners' representative 5)*

This section shows that several crucial problems have been hindering the post-earthquake renovation process in Zagreb, which will continue to be the case in the future. The first is a problem of lacking funds in the common reserve funds and the inability of individual owners to co-finance the restoration by taking out loans. The buildings also have different ownership problems and individuals who refuse to participate in the restoration of a building as a co-owned property. Another problem is the obvious inefficacy of the building management companies, where most complaints are directed towards a company in Zagreb that manages the largest share of the housing stock. The third problem of the renovation process is the labor shortage in the construction sector as well as incompetence of certain contractors, which is slowing the process down and also increasing the discontent and uncertainty of the owners.

2) *The problem of people moving out of the city center and city apartmanization*

This section deals with the issue of people moving out of the city center after the earthquake and examines the attitudes of the participants on whether they would permanently move from the center or not, and what the reasons for their choice were. It is also concerned with demographic issues present in the city center and economic trends accompanying the buyout of dysfunctional buildings, which could stimulate an increase of the already present processes of apartmanization and touristification of the city center, or the homogenization of the residents' social structure. Seeing that there was a significant wave of permanent relocation after the earthquake, especially in the case of severely damaged apartments, most of the participants stressed that they would like to permanently move out of their apartments and the city center or that they were already planning to relocate to newer parts of the city. They no longer felt safe in their apartments and were looking for newer and better-constructed buildings.

- *Yes, we would like to move out of the center, into a better building. (Co-owners' representative 6)*

Besides those participants who were thinking about leaving, half of them did not want to leave, because they shared a 'sense of place' and a special connection to life in the city center. They put their hopes on the restoration and a return to normal life because they did not want to live anywhere else.

- *In the first outburst of rage and misery I thought of selling the apartment ... but that feeling lasted for five days ... This was my home where my parents lived, my sister and I ... it's easy to sell it anytime, I'm sentimental and I cannot imagine someone buying it for peanuts. (Owner 13)*

This goes to show that the issue of the devastated and aging city center will face additional demographic and socio-economic threats, because most of our participants expressed a worry that the city core will become empty and depopulated.

- *I think this is just another step towards turning the city center into a museum, an empty space where people just come and go, but no people live there. The same thing is happening at the seaside, in Split ... where the city core is becoming empty. (Owner 8)*

Many of the owners were worried that this process of depopulation will open up additional possibilities for economic investment and buy-outs of damaged apartments, escalating the repurposing of the city center from a residential area to a business and tourist area. Most of them agreed on the necessity of certain measures to stop the depopulation in order to lessen the negative changes to the city center area.

- *I don't know how it could be implemented, but they should make sure that the city is not made empty for the purpose of other goals, such as tourism, which would cause situations like we can see in other European cities that have lost the population in the city center. (Co-owners' representative 5)*
- *Yes, I agree, the measures helping with the apartment restoration are necessary so the people will move back in. (Owner 12)*

However, some of the participants did not agree and said it is impossible to influence the market and commercial processes that are causing the owners themselves to turn to tourism. If they would turn their property into apartments for rent, it could bring them additional income in a relatively short time.

- *What kind of measures are we talking about? What could you give to people to stop them from moving? How could you possibly prevent them? Also, when I come and tell them that I can give them about 1,000 euros of monthly profit for their apartment from renting it to tourists, what do you think will happen? I get that much with just 35 square meters; imagine how much you can get with 80 square meters? (Co-owners' representative 10)*

Most of the participants believed that new interventions in the city center are unnecessary because they would undermine its existing 'Austro-Hungarian' visual appearance, emphasized by the oldest buildings. Although they were aware that the current appearance of the city core is mostly derelict, they would prefer the reconstruction and investments into the 'old' visual appearance of the city over radical changes.

- *Just no distorting interventions. To keep the current visual but with buildings restored to a better condition. The condition before the quake was desperate. (Owner 5)*

From the cited statements in this section, the opinions of the owners point to complex processes already recognized in the city center, such as apartmanization and touristification of the city, as

well as demographic aging. Significantly obvious is the fear of the owners, amplified after the earthquake, that potential investors will buy out older, dysfunctional buildings and build interpolations that will distort the visual identity of the city. This opens additional questions of what the city center is supposed to look like, as well as the latent question of what the long-term effects of all this will be on the market prices of older real estate, which until now has been very expensive and sought after. The attitudes regarding depopulation and potential measures to keep owners from moving out from the center were very divided among the participants; some of them, who had the option, were planning to move out of the center, while others were condemned to live in their buildings as they were, averse to any change. It is also obvious that the wealthier among the owners took advantage of the apartmanization processes for financial gain. Nevertheless, other residents, who only lived in the area, were not able to participate in that process.

Discussion

The Zagreb earthquake was followed by a period of confusion (Wu and Lindell, 2004), and for a long period there was no adequate legal framework by which post-earthquake renovation was regulated. This is a characteristic of other countries as well, whose legislature is inappropriate for the social and economic circumstances in the moment of catastrophe (Comerio, 2014; Özerdem and Rufini, 2013). Obviously, the state and city authorities did not have a pre-impact recovery plan that would speed up the reconstruction of multi-family buildings after an earthquake (Wu and Lindell, 2004). Such a plan would also enable fast and purposeful investing of financial funds from the European Solidarity Fund, one of the main financial sources for the renovation of public purpose institutions. The government took six months after the Zagreb earthquake to pass the Reconstruction Act, only to realize after one year that it was hindering the renovation process, so that in autumn of 2021 the act was amended. According to the new act, owners of apartments in multi-family buildings were now allowed to receive subsidies for the repair of common elements of the building (chimneys, stairways, etc.), and for the repair and anti-seismic reinforcement of the building.

Research has shown that some owners do not have enough financial resources to participate in co-financing, and that the whole process of applying for subsidies is extremely bureaucratized (Özerdem and Rufini, 2013) and thus hindered. According to our research, the state-led structural and post-earthquake renovation will be implemented only by a small share of residents, who will take out additional loans in order to co-finance it. This will significantly burden their budget, which remains the reason why the greater share of them is unwilling or unable to choose this way of restoring their property. Moreover, it can be assumed that there will be an increasing gap between wealthier citizens, who are able to pursue a detailed renovation of their buildings, and the majority, who are not. Therefore, the majority of residents have opted for necessary and individual restoration, which was also the fastest. It is evident that the renovation of private real estate relies primarily on owners' personal savings and loans (Ganapati, 2013).

The participation process was ineffective and almost non-existent. The higher levels of government are operating on the principle of a top-down approach (Comerio, 2014), thus excluding the citizens from the decision-making process. On the local level, we can point out the absence of resilient communities (Clemente and Salvati, 2017) that are able to respond well to disasters such as earthquakes, which are necessary for the success of the post-earthquake recovery and reconstruction planning process (Johnson, 2007). By ignoring the existing community capacity (Bealt and Mansouri, 2018) or human capacity (Hough and Bilham, 2006), state and city institutions can lose the citizens' trust and their cooperation in the restoration process, causing

weaker restoration results, as has been the case in Zagreb. When the public is not involved in the disaster management process, it often, not surprisingly, challenges the decisions and actions of those in command (Pearce, 2003).

Besides that, the research revealed a new level of the problems, suggesting a non-comprehension of the nature of private and common property in multi-family buildings, and thus of the necessity of investing in them and in their maintenance. This situation has been partly inherited from the socialist system, in which the housing stock was taken care of through organized housing organizations (Bežovan, 1987) that did not require the participation of tenants in maintaining the buildings. Also, no comprehensive renovations of buildings were done, which thus became more and more derelict over time. Nevertheless, there are also visible problems among the owners themselves, hindering the renovation due to financial issues and bringing a lack of collaboration and communication among them. Difficulties with the efficiency of building management companies were also pointed out, because they are often inefficient and unavailable to address client requests. The fact that most buildings damaged in the earthquake were not insured further contributed to slowing down the renovation process (Wu and Lindell, 2004; Comerio, 1998).

According to the obtained results, it can be pointed out that citizens had much higher expectations from the state and city authorities in the financing and coordination of the complete renovation process. They expected the setting up of new standards of post-earthquake renovation, which did not happen. Moreover, their requests and needs were ignored (Gibson and Gökşin 2016; Bealt and Mansouri, 2018). The owners were almost completely excluded from the process of decision making on the post-earthquake and comprehensive renovation, and it can be argued that they were left passive and neglected in this process because neither the social nor the economic objectives of the renovation have been set clearly enough (Comerio, 2014; Yang, Gao and Li, 2017; Comerio, 1998).

It can surely be expected that in the future, differences between owners who are able to invest in their buildings and those who are not will become increasingly evident. This will affect their contentment with life in the city's center and will determine their further moves regarding moving out or selling their apartments. The already observed process of neoliberal treatment of the city space will probably continue and thereby the processes of apartmanization and commercialization. Decision makers in post-earthquake renovation should regard the sensitive and diverse social structure of the residents and create appropriate socio-economic policies (Comerio, 1998).

Conclusion

The existing problems of the narrower Zagreb city center imply that it is important to plan this specific area thoroughly and systematically. Along with everything else mentioned, the center, devastated by the earthquake, has become more sensitive to economic, urbanistic and social changes. The regeneration of the Zagreb city center has a special significance for the city's identity in the cultural and urbanistic sense. The key is the inclusion of citizens' opinions, i.e., their participation in the decision-making process regarding the ways and models of renewal, which is currently practiced only in a declarative way. Furthermore, such a systematic approach is desirable in order for the urban and post-earthquake renovation process to be better accepted and implemented by all actors. This approach could also be useful because it would include the residents in the process of preventing Zagreb from becoming yet another example of unsuccessful post-earthquake renovation.

This in-depth case study showed in detail the kind of analysis that could help scholars in this field to better understand the challenges, conflicts and different interests vested in the post-earthquake renovation process. Specifically, neighboring post-socialist countries can encounter these similar problems and scenarios when facing a natural disaster such as an earthquake, where there can be many challenges. This can primarily be observed in the sense of state policies and key actors; the interests of various private actors and stakeholders who can slow down or, as in the case of Zagreb, even stop post-earthquake reconstruction of a city, partly due to the unpreparedness of institutions for such a situation as well as due to the lacking of clear procedures and a legislative framework that citizens, professionals and authorities should follow in the case of disaster.

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