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Published in:
BUILDING RESEARCH AND INFORMATION

DOI:
[10.1080/09613218.2023.2191922](https://doi.org/10.1080/09613218.2023.2191922)

Published: 01/01/2023

Document Version
Publisher's PDF, also known as Version of record

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Please cite the original version:
Rashidfarokhi, A., & Danivska, V. (2023). Managing crises 'together': how can the built environment contribute to social resilience? *BUILDING RESEARCH AND INFORMATION*, 51(7), 747-763.
<https://doi.org/10.1080/09613218.2023.2191922>

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To cite this article: Anahita Rashidfarokhi & Vitalija Danivska (2023) Managing crises 'together': how can the built environment contribute to social resilience?, Building Research & Information, 51:7, 747-763, DOI: [10.1080/09613218.2023.2191922](https://doi.org/10.1080/09613218.2023.2191922)

To link to this article: <https://doi.org/10.1080/09613218.2023.2191922>



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Managing crises ‘together’: how can the built environment contribute to social resilience?

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ABSTRACT

The world is undergoing multiple crises that require resilience to withstand them. The built environment can significantly enhance or weaken society's (and individuals') resilience. However, understanding of resilience in the built environment is scattered and manifold – whilst the design of buildings primarily focuses on the restoration of buildings' physical characteristics, urban policies centre on the recovery of society. Scholars highlight the need for a holistic approach where different resilience concepts merge to improve the resilience of people and communities. For this, understanding the relationship between people and places is crucial. Thus, the aim of this paper is to deepen the understanding of the social resilience concept in relation to the built environment and how the built environment can enhance it. This is achieved through an extensive literature review, concept mapping and panel discussion. The built environment characteristics affecting individual and/or community resilience are identified, and a conceptual model is provided, attempting to visualize the relationship between the constructs. The paper's novelty lies in its multidisciplinary approach and integration of various social science knowledge in the context of the built environment. Furthermore, it emphasizes the built environment's role in supporting social resilience, which has been often overlooked previously.

ARTICLE HISTORY

Received 28 October 2022
Accepted 11 March 2023

KEYWORDS

Built environment; social resilience; social sustainability; wellbeing; crisis management

Introduction

A tangled and complex network of crises is causing change and uncertainty in society (Bostrom, 2019). In recent years, societies have experienced an increase in crisis-related losses caused by economic and energy crises, wars, pandemics and climate change, for example. Considering the significant societal implications of such crises, scholars have demonstrated how crucial it is to consider the concept of resilience. However, what often gets missed is the social dimensions of resilience, also known as social resilience. Definitions of social resilience imply that it relates to social entities, including individuals and communities, and their capacity to cope with, tolerate, absorb and adjust to different crises (see e.g. Duckers, 2017; Kwok et al., 2016; Saja et al., 2018).

The built environment plays a significant role in people's lives, shaping their behaviour, relations and experiences (Larsen, 2013). The performance of the built environment in supporting people's needs and institutions during and after crises is critical to

achieving social resilience goals (McAllister, 2016). The recent global pandemic demonstrated that the management of buildings is especially important due to the amount of time people spend inside and the effects buildings can have on people's health and wellbeing (see, e.g. Lipinski et al., 2020). The built environment can positively or negatively affect social resilience for example, through policies and regulations, public and private services, and socio-cultural life (Tähtinen et al., n.d.). However, the methodology and tools for actualizing the built environment's potential in this regard are not fully defined or understood in theory and practice (see e.g. McAllister, 2016).

Despite the enormous efforts to study the built environment's resilience amidst crises and their impacts (see e.g. Al-Malkawi & Pillai, 2013; Baen, 2003; Gupta et al., 2021; Keskin et al., 2017; Suk Kim, 2009), the focus has been mainly on one type of crisis or similar types of crises and their primary impacts. At the same time, the next-level impacts (secondary, tertiary, etc.) which usually have strong societal consequences are

ignored. Moreover, previous studies tend to emphasize the functional recovery of the constructed environment from crises, regardless of their significant social impacts on people. In line with academia, in practice, the built environment is typically planned and developed primarily to prevent property loss or save lives during acute crises, while the societal crisis impacts are limitedly considered, especially those that are slowly evolving and are more complex (e.g. political, cultural or social crises).

Nevertheless, to better cope with crises, there is a need for a holistic approach, where in addition to physical considerations of the built environment, the underlying social resilience elements are incorporated (see Jones et al., 2021). The need also arises from practitioners who are developing their own approaches (see, e.g. Puybaraud, 2022) suggesting that a theoretically sound model should be developed. To achieve this, Koliou et al. (2019) propose exploring the interconnections between the physical built environment, social resilience and community wellbeing as the first step. The dialectic relationship between people and places is a relevant perspective to better understand the role of the built environment in supporting social resilience, as it can demonstrate 'how people culturally construct meanings of places, how social relationships are practised in places and how places shape human behaviour' (Larsen, 2013).

Some studies have already investigated the relationship between the built environment and people (see e.g. Grum, 2018; Williams Goldhagen, 2017). These studies have found some limitations in the field, including the lack of common understanding on how to address people's characteristics in their relationship with the built environment (see e.g. Karakas & Yildiz, 2020) and the lack of knowledge of how the built environment can support those different characteristics and relationships in practice (see e.g. Rashidfarokhi et al., 2018).

This paper attempts to address these limitations and aims to integrate a variety of disciplinary knowledge to create a better understanding of the social resilience concept in the context of the built environment. To achieve this, first, the well-established theories that explain the relationship between people and places are reviewed and elements of social (people's) resilience are aggregated. Second, the built environment characteristics that can support social resilience are identified. Finally, social resilience elements and built environment characteristics are connected by using the aforementioned theories that explain the relationships between people and places through a conceptual model. Such a holistic understanding is the first step in developing

more proactive, responsive and effective policies and practices for the most challenging issues facing society, as Barham (2017) states.

The novelty of the paper lies in its multidisciplinary approach to conceptualizing social resilience by incorporating various social sciences disciplines at different levels in the context of the built environment. Furthermore, this paper summarizes previous research and highlights the significant role that the built environment has in supporting social resilience, which has been neglected in the literature.

Theoretical foundations

The purpose of this chapter is to provide an overview of the range of social resilience definitions and the concept's constituent elements at the individual and community levels through an extensive literature review and concept mapping. In addition, an in-depth overview of the extant theories is presented to explain the relationship between the constructs of the individual, community and the built environment.

Understanding social resilience

When addressing people's capabilities and capacities, the literature demonstrates that there is a two-way relationship between individuals and communities: individuals form communities, and communities shape individuals' perspectives on life and wellbeing. For example, Bennett and Windle (2015) argue that community and societal influences are as important as individual ones in promoting social resilience. Thus, social resilience should be understood on two levels – those of the individual and the community.

Individual resilience

Discussion on individual resilience often leads to the topic of wellbeing. Supporting wellbeing is the primary goal of adaptation or transformation in social resilience. Despite extensive research on the concept of wellbeing, the definition of wellbeing remains challenging (Dodge et al., 2012) and different approaches are found in the literature (see, e.g. Diener, 1984; Pollard & Lee, 2003). However, there is an agreement that an individual's ability to cope with change depends on their resources and qualities as well as the challenges faced (Dodge et al., 2012). In crises, individual resilience is strongly affected by mental/psychological health, stress-management skills and support from family and social networks. The common elements affecting individual wellbeing are described below:

- (1) *Socio-demographics*: Various socio-cultural factors, including age (Steptoe et al., 2015), gender (Esteban-Gonzalo et al., 2020), ethnicity (Dorsett et al., 2015), family status (Thomas et al., 2017), local culture (Hanel et al., 2020) and economy (Clark et al., 2008) affect the physical health, as well as individuals' ability to cope with stress, self-esteem, life satisfaction and wellbeing in general.
- (2) *Material living conditions*: These can be defined as an individual's income level and wealth (Killingsworth, 2021), employment possibilities and job satisfaction, housing, education (County Health Rankings, 2021; Guardiola & Guillen-Royo, 2015; Montano, 2021) and access to services (Kwon et al., 2019). As a result of material living conditions, individuals can meet their needs and pursue other goals, afford health care and housing, manage stress and make healthier choices, thus improving their wellbeing and health levels.
- (3) *Psychological traits*: Different personality traits have been identified as strong predictors for both subjective wellbeing (e.g. Steel et al., 2008) and mental health, as Kokko et al. (2013) claim, low levels of neuroticism and high levels of extroversion correlate with higher levels of positivity and thus psychological wellbeing.
- (4) *Physical and mental health*: Physical health is the absence of sickness and injury, whereas mental health is defined as being psychologically and emotionally healthy. Multiple components of an individual's lifestyle can affect physical health, including nutrition, sleep, exercise and the external environment. For example, poor indoor air quality can lead to various physical illnesses and might increase stress levels (Thomson, 2019). Increased stress levels can reduce sleep quality, which is associated with higher BMI, cardiovascular conditions and other pathologies as well as an individual's ability to learn and memorize things, for instance (Chow, 2020). Whilst physical activity can reduce stress levels (Sharma et al., 2006).
- (5) *Purpose of life/meaning*: This can be defined as having goals and achieving them, finding direction and meaning in life, spirituality and a sense of hope (e.g. Australian Unity, 2019). Purpose of life is associated with aspects such as better emotional regulation mechanisms, a more productive problem-solving approach towards stress and trauma (Schaefer et al., 2013), as well as better physical health (i.e. lower levels of various illnesses) and longevity (e.g. Friedman et al., 2007). It can directly contribute to a better psychological state and emotional wellbeing (e.g. Sahebazamani et al., 2013).
- (6) *Security*: The concept of security is a psycho-social construct where both personal and community security feelings are interconnected. Security is often a perceived feeling and depends on the environmental background and closely relates to the sense of control over one's own environment and certainty. For example, Wang et al. (2019) explain that individuals who have experienced different disasters are much more sensitive to any external environmental changes. Trust in others and the system can also be considered a part of security (e.g. Lindström & Giordano, 2016). Individuals who do not feel secure are more prone to anxiety and depression, which negatively affect their mental health and perceived life satisfaction (e.g. Maciuszek et al., 2019; Zheng et al., 2016).
- (7) *Connectedness*: This can be defined as the relationship with different entities, attachment to people and places, and a sense of belonging (Rose et al., 2019). Individual wellbeing is affected by relationships with other people such as family (Merz & Consedine, 2009) and by various community relationships (e.g. Andrews & Hicks, 2017). In addition, relationships with 'non-human entities' including pets, wildlife and nature in general have been considered significant, and can cause deep trauma when lost (Hosey & Melfi, 2014). An attachment can also be formed with places – known as a sense of place (e.g. Lager et al., 2012). The removal of certain spaces and relocation can, for example, lead to anxiety and reduce mental wellbeing (e.g. Lomas et al., 2021).

Community resilience

At the community level, resilience can be achieved if community members are connected and work together so that they can function and sustain critical systems, even under stress; adapt to changes in the physical, social, or economic environment; be self-sufficient in case of resource shortage and learn from past experiences (Arbon et al., 2016). In the authors' view, community resilience and social sustainability are intertwined. However, there is no common definition of social sustainability and different actors perceive and implement it in various ways depending on the context (Rashidfarokhi et al., 2018). For the context of this paper, the following definition is used: a process resulting in life-enhancing conditions within communities (McKenzie, 2004). Such a process should be supported by policies and institutions that ensure harmonious social relations, enhance social integration and improve living conditions for all groups (Holden, 2012). The two concepts

emphasize the shared and similar characteristics communities need to develop, and then employ them to prepare and respond to crises. The elements contributing to community resilience are described below:

- (1) *Socio-demographics*: This emphasizes the role of population dynamics for resilience. Age (Cutter et al., 2010); gender (Saja et al., 2019); socioeconomic status (Burton, 2015); health, historical profile and population with special needs (Rogers et al., 2012; Saja et al., 2019); educational level, occupation and skills (Homsy et al., 2019) and the size of the community (Capdevila et al., 2020) are determinants of the community's resilience level.
- (2) *Community competencies*: In this paper, these encompass indigenous local knowledge and understanding of disaster-prone areas, disaster risk preparedness and recovery measures (Kusumastuti et al., 2014; Sitas et al., 2016), experience and learning from previous events to prepare for future crises (Cutter, 2016; Leykin et al., 2016), traditional coping mechanisms/capacities to manage a crisis (Miller et al., 1999) and finally, the availability of information and communication systems, and the existence of reliable/trustworthy information sources and media (Adger et al., 2005).
- (3) *Equity and social inclusion*: Equity in this context is concerned with equal accessibility to critical services and resources, for instance, health care, education and social support (Berkes & Ross, 2013; Doorn, 2017), equity for genders, minorities, marginalized groups and generations in terms of experiences of crises, involvement in decision-making and life prospects (Pease, 2014; Saja et al., 2019; Vale, 2014), and the equal distribution of infrastructure, economic and social activities across geographical units within a region (Kanbur & Venables, 2005). Equity creates a basis for achieving social inclusion (DESA, 2009). Social inclusion is about ensuring that all the community members, especially, marginalized members, are included and that their resources, intellect, knowledge and skills are mobilized (de Lange & de Waal, 2013; Raco, 2007) to contribute to the collective design and implementation of the crisis management plans.
- (4) *Community capital*: This directly relates to social capital, defined as norms and values that can be imbued in networks to form collaborative efforts of public-private-people partnerships to enhance community resilience (e.g. Kaltenbrunner & Renzl, 2019; Melo Zurita et al., 2017). Flora and Flora (2013) described seven categories of community capital contributing to resilience, including cultural capital (community worldviews), human capital (education, skills, health, etc.), social capital (mutual trust, reciprocity), political capital (ability to create and enforce rules and regulations), financial capital (income, assets), built capital (infrastructure and technology) and natural capital (natural resources and ecosystem services).
- (5) *Social cohesion*: The concept in this context can be seen as the extent to which community members help each other and collaborate to prepare, respond and recover effectively (Townshend et al., 2015). Different dimensions, such as trust (Leykin et al., 2016); civic engagement, active community organizations and openness (Kwok et al., 2016; Paton & Irons, 2016), as well as connectedness between groups and associations (Saja et al., 2019) contribute to the coping level and response mechanisms of a community.
- (6) *Community participation*: This refers to the possibility of accessing and influencing decision-making through knowledge exchange, co-production and collective action (Arana & Wittek, 2016; Fagan-Watson & Burchell, 2016; Renschler et al., 2010; Sitas et al., 2016) to achieve empowerment and foster strong relationships (de Andrade & Szlafsztein, 2015). Political engagement and political advocacy (Renschler et al., 2010), involvement and communication strategy (Parson et al., 2016); and participation in public affairs, such as crisis preparedness programmes (Saja et al., 2019) are among the indicators of community participation in this context.
- (7) *Public health*: This focuses on physical, behavioural, social and environmental health and wellbeing at the community/social institute level (Barishansky & Mazurek, 2012; Ziglio et al., 2017), contributing to the prevention of epidemics, the spread of diseases and protection against physical injuries, promoting mental health and assuring the health care quality and accessibility in response to disasters (Khorram-Manesh, 2020). Public health can change harmful social and cultural norms by increasing public awareness and through public education (Khorram-Manesh, 2020), which results in fostering individual skills while promoting community flexibility and adaptability towards crises (Cheshire et al., 2015; Khorram-Manesh, 2020).

It is important to emphasize that individual and community levels do not necessarily follow a hierarchical relationship, rather they are closely interconnected and can influence each other. Thus, it is important to

understand the relationship between the two constructs better.

The relationship between people and places

Understanding social resilience in the built environment also requires looking into the relationship between people and places. The relationships between individuals, communities and places have been discussed in multiple theories from different (social) disciplines. Here, the most common approaches are introduced and used to help structure social resilience in the built environment framework for this research.

The relationship between the individual and the community

Two of the main psychological needs of a human being are the need to belong and the need to be accepted (Pardede et al., 2021). A sense of belonging refers to a person's need to relate to others and feel that others relate to that person (Kitchen et al., 2015). A sense of belonging has been considered as a dimension in broader theoretical concepts studied from the perspective of citizenship theory (being part of the collective 'we') and desired collective outcomes such as social integration (Painter, 2013). Painter (2013) also notes that a sense of belonging has been approached on different geographical scales – from the local community to the country levels. The sense of belonging closely relates to the concept of community attachment and can be categorized into four types: (1) a sense of belonging to the community, (2) the influence of individuals on the community, (3) the contribution of the community to meeting and satisfying personal needs of each member and (4) reflection of feelings towards the community and between members within the community (McMillan & Chavis, 1986). Studies on the sense of belonging and community attachment often include the term 'relatedness' as the connection to people, places and things in the form of a person's feelings toward their surroundings, a person's knowledge of the activities occurring in their living environment and the feelings of a person to remain or move out of their residing place (Gursoy & Rutherford, 2004). The concept of belonging has also been studied as a mental health aspect (e.g. Hagerty et al., 1996) which is even more important in crises (e.g. Wadood et al., 2020). An increased sense of belonging, thus, requires involvement, fit, interactions and the stability of relationships or social networks that are influenced by their surrounding environment (Brar-Josan, 2015).

The relationship between the community and the built environment

The theory of place attachment has been widely used to explain the relationship that is formed between people and places (Inalhan et al., 2021). The latest model considers three aspects: person, process and place as inter-related dimensions forming place attachment. A person (or a group) forms meanings associated with a place. This is a psychological process including emotions, behaviour and thoughts, as well as the physical and social characteristics of the place. Despite the lack of literature on the connections between the wellbeing of people and the built environment in times of crisis and resilience development, the existing literature emphasizes psychological aspects such as stress and place attachment as well as the importance of community (e.g. Duckers, 2017). The community aspect is also a component of the place attachment theory as a social construct of place, which depends more on the other people in a place rather than the physical place itself (Giuliani, 2003). Thus, the sense of community and community wellbeing become even more important in terms of crisis management and resilience development. For example, McCrea et al. (2016) explain that (community) wellbeing is driven first by social aspects, the level of services and facilities, and to some extent by the physical and environmental elements. Additionally, (community) resilience is built through processes of improving these aspects. Place attachment is based on people's past interactions and the potential for future interactions between people and their physical surroundings (Milligan, 2011). Physical space is the place to which a meaning is assigned and for which social interactions are set. The bonding of people to a place occurs through personal, group, or cultural processes, notably those related to social networks. Studies of the destruction of places, for example, through environmental disasters or slum clearance, have been used to illustrate the strong connection between a community and the specific place in which it resides. In their study, Burley et al. (2007) discovered that cross-generational social and economic ties inspired residents of bayou communities in Louisiana to advocate for wetland protection, because of their attachment to the unique landscape and culture. This attachment varies by community, in that it may be tied to specific sites such as unique ecosystems, cafés or parks, architectural styles, or historic development patterns.

The relationship between the individual and the built environment

This relationship can also be (at least partially) approached through the above-mentioned place

attachment theory. Place attachment in an individual context includes place identity and dependence on the place (Bricker & Kerstetter, 2000; Kyle et al., 2003). Additionally, this relationship can be studied through a person-environment fit (P-E fit) theory that defines this fit as a match between a person's characteristics and those of the environment (Kristof-Brown & Billberry, 2013). Even though the P-E fit theory is considered quite new, the principles of designing an environment suitable for humans have been used for over a century (Armitage & Hussein Nassor Amar, 2021), thus this theory helps to structure this relationship. The main idea is that the person affects the environment, and the environment affects the person, and this boils down to either the ability to adjust the environment (control of the environment) or adjust behaviour. P-E fit has been applied in different contexts. For instance, Waitsman (2012) found that a highly resilient person can adapt to the environment better. In another study, Kahana et al. (2003) argued that the characteristics of the person, the environment and the P-E fit are each important predictors of residential satisfaction among community-dwelling elders. They believe that understanding each of these three distinct, but interdependent factors could result in better prediction of life satisfaction and psychological wellbeing in residents' late life. Otherwise, a better fit between the environment and personal characteristics is needed. In this paper, it can be interpreted that the built environment should support the physical, mental and social needs of a person, enabling flexibility for the person to

adjust their environment for them to function well and feel good.

Method and data

This paper aims to integrate different aspects of disciplinary knowledge to bridge the gap in understanding social resilience in the context of the built environment. To address its aim, this study followed two main steps as seen in Figure 1.

Step I. Social resilience definitions and elements in the context of built environment: thematic literature review and concept mapping

First, a thematic literature review was conducted to explore the definitions and dimensions of social resilience at the individual and community levels within the context of the built environment. To identify the relevant literature, the authors used the Google Scholar database to search for relevant literature. For the individual level, keywords included individual resilience, individual wellbeing AND built environment. For the community level, keywords included social resilience, community resilience, social sustainability AND built environment. The collected literature materials included English peer-reviewed scientific papers, working papers, reports and assessment tools/frameworks with solid theoretical foundations. Once this phase was completed, titles and abstracts of the collected materials were screened, and the irrelevant ones were

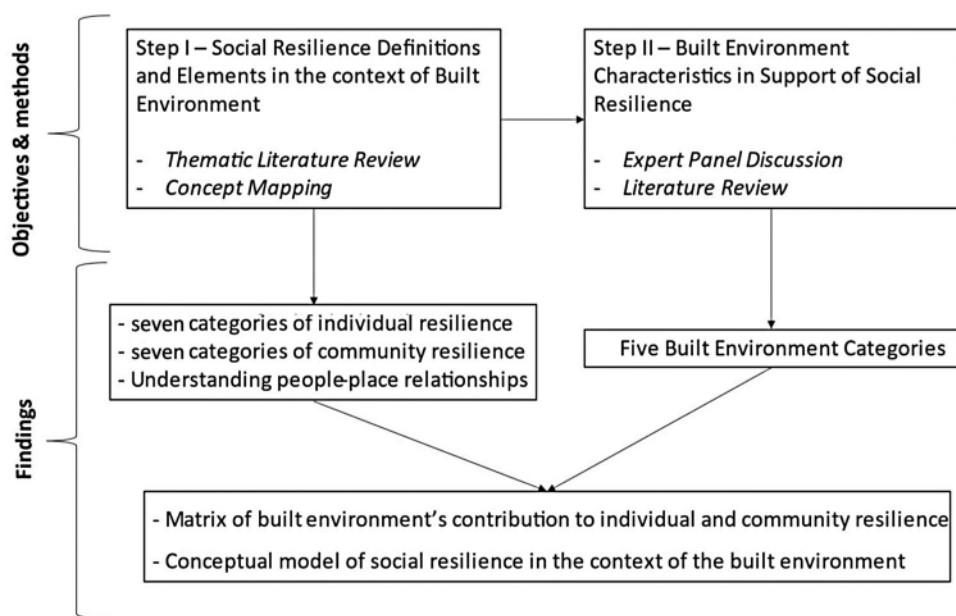


Figure 1. Outline of the study's strategy.

excluded because the social resilience aspect was only marginally considered. For the literature review, authors followed a data saturation approach and continued the literature review until insights started to repeat.

The authors used an inductive content analysis to process the collected materials. An inductive content analysis helps identifying themes emerging from the materials, where categories have yet to be determined (Mayring, 2000). The process began with organizing the collected documents through inductive coding in which authors reviewed the materials and made notes of the emerging codes from the text. The reading process was repeated several times. Afterwards, the authors transcribed all the emerging codes from the collected texts to the coding sheet.

Following the content analysis, a concept mapping technique was applied to determine the elements of social resilience in the built environment. Concept mapping is a suitable graphical method for knowledge integration (Borrego et al., 2009; Davies, 2011; Wang, 2020) and can facilitate a structured literature review, allowing researchers to identify the themes emerging in the literature (Conceição et al., 2017) and understand their complex interconnections. Considering social resilience on the two levels of individual and community, as discussed in the second section, two concept maps were drawn, one for each level. Following the concept mapping, the authors combined the elements that shared similar content and fell under mutual definitions by examining the content of the aspects identified through concept maps at individual and community levels.

During the process, it became clear that social resilience elements in the context of the built environment are rarely discussed on an individual level. Therefore, an additional review was necessary. After that, the identified social resilience elements were categorized into general dimensions that emerged from the concept maps to simplify and expand their applicability. To ensure the relevance of the identified elements and that all aspects and topics were covered, the authors discussed them with three more academics specialized in health and wellbeing, and crisis preparedness and response. They confirmed the authors' judgement.

Upon completion of this step, it became apparent that the majority of the collected documents elaborated on existing perspectives (e.g. wellbeing and social sustainability) and theories (e.g. sense of attachment, sense of place and P-E fit) and considered them as prerequisites for capacity building to cope with crises in cities, neighbourhoods, housing and communities. The second section presents the findings from the thematic literature review and concept maps.

Step II. Built environment characteristics in support of social resilience: panel discussions and literature review

Following the establishment of the theoretical foundation, the next step was to determine how the built environment can enhance individual and community resilience. Therefore, in this step, panel discussions were conducted to define crises and resilience solutions for the built environment. Considering the multidisciplinary nature of the study, the authors aimed to involve international scholars with strong academic knowledge and/or practical experience in the built environment context to get a broad range of perspectives into the discussion. The authors organized a workshop together with members of a research consortium that studies the role of real estate in crisis management and preparedness. The participants represented Finnish and international scholars in a wide range of scientific fields and areas of expertise, including, health and wellbeing, architecture, land use planning, real estate economics, futures studies and sustainability.

In total 20 scholars attended the workshop. During the workshop, authors presented the concept maps and strategy for identifying and categorizing individual and community resilience elements. Afterwards, the authors asked the scholars to come up with built environment characteristics that could support the identified aspects of social resilience both at the individual and community levels. All the proposed built environment characteristics were collected by the authors during the workshop and then validated through an extensive review of scientific journals, assessment tools, reports and case studies. The collected literature covered topics such as social resilience, health and wellbeing, and social sustainability in the planning, design, development, operation and management of cities, regions, neighbourhoods, buildings and infrastructure. The authors conducted a content analysis for each document to identify the built environment characteristics that contributed to individual and community resilience. The authors included all the characteristics that were identified from panel discussions or in the literature. Together 28 characteristics were identified in this phase. Then, the characteristics were categorized under five general groups based on their interconnections and similarities. Using the formed groups, the authors developed a matrix illustrating how the built environment characteristics contributed to different elements of individual and community resilience (presented in the second section). Section 'Results and discussion' describes the findings in detail.

The validity of the study lies in developing the results from an extensive review of the well-grounded literature and the justified development strategy that can be duplicated by other researchers. In total, over two hundred articles were fully reviewed for this study. To address the reliability, two researchers, scholars in wellbeing and social sustainability in the context of the built environment, conducted the analysis, discussed the findings with scholars in the relevant fields and compared them with the extant literature.

Results and discussion: the built environment's contribution to social resilience

This section introduces the results of the panel discussions and literature review identifying the built environment characteristics that support social resilience. The intersections between social resilience at individual and community levels and the built environment are visualized through a developed conceptual model.

The analysis revealed that the built environment can affect the resilience of individuals and communities in various ways (see Table 1). The built environment, for example, can strengthen an individual's capacities by supporting their physical health, reducing stress and increasing positive stimuli to manage crises better. In the community context, the built environment can help to strengthen connections and create a sense of community/place.

It is common for studies in other disciplines to address the built environment as a physical setting (surroundings) where their point of interest is located. For example, physical structures that facilitate social networks have been found to contribute significantly to day-to-day recovery activities in flood-impacted communities (Sherrard Sherraden & Fox, 1997). Furthermore, a social and geographical analysis of heatwave events illustrated the positive correlation between social and spatial exclusion and vulnerability of the elderly, the poor and ethnic or racial minorities in neighbourhoods (Klinenberg, 2002). In another study on heatwaves, the findings showed that living alone and not leaving home increased the death risk, while participation in group activities, and having friends or a pet can reduce vulnerability (Semenza et al., 1996).

The following paragraphs explain the categories from Table 1 in more detail.

- (1) *Urban form*: Land use, density and scale, the relative position of the neighbourhood and green areas affect both the wellbeing of individuals and the community's resilience (Ala-Mantila et al., 2017; Karuppannan & Sivam, 2011; Shekhar et al., 2019). For example, Talen (1999) notes that small-scale, well-defined neighbourhoods with clear boundaries and centres are more attractive and perceived more positively by people. Additionally, the housing mix and proximity to services and workplace improve the perception and feeling of the built environment (Karuppannan & Sivam, 2011; Talen, 1999). The availability, mix and design of the social infrastructure such as schools/day-care facilities, parks, play areas, shops, healthcare services, cultural and religious facilities and recreational and civic centres affect individuals and communities on various levels (Davern et al., 2017; Karuppannan & Sivam, 2011; McCrea et al., 2016).
- (2) *Movement and accessibility*: Suitable street design can increase pedestrian and cycling activity (Gerike et al., 2021) and support the needs of people with limited physical mobility (Mackett et al., 2008). Social resilience is enhanced by the availability of walkable areas and public transport networks (Davern et al., 2017; Leyden, 2003; Shekhar et al., 2019). The presence of an effective public transportation network and pedestrian-friendly neighbourhood facilitate access to spaces and services and increase equal opportunities (Hernandez, 2017), increase liveliness and enhance the neighbourhood's attractiveness (Baobeid et al., 2021). In addition, walkable, mixed-use neighbourhoods can encourage the development of social capital and place attachment through an increase in interactions (Leyden, 2003).
- (3) *Architecture and style*: Architectural solutions for buildings and spaces also play a significant role both at the individual and community levels. For example, the look and feel of an area that makes one neighbourhood distinct from another and encompasses a range of physical components of the built environment, architectural style, street width and layout, green spaces, etc., affect the perception of that area (Berkeley Group; Carpenter, 2013). The physical design increases community interaction which can lead to creating a sense of community (Talen, 1999). Physical design can also promote healthier habits for people and encourage movement (Nicoll, 2007). House distance to the street, parking lots, porches as well as house design and the proximity of dwellings and windows have been identified as the factors affecting community feeling (Hillier, 2008; Karuppannan & Sivam, 2011; Talen, 1999). Additionally, the flexibility of space and layout can affect how spaces can be

[illegible]

adapted, converted, or extended in the future (Berkeley Group).

- (4) *Technical infrastructure*: Infrastructure, technology and access to services such as water, air quality, wastewater management, solid waste management, etc. are necessary to sustain the basic needs and livelihoods of people (Alessandro et al., 2020; Berkeley Group, n.d.; International WELL Building Institute, 2021). Indoor air quality, as well as thermal, acoustic and visual comfort should be ensured as these affect the physical (e.g. various air-borne illnesses) and mental health (e.g. stress levels) of people inside the buildings (Al Horr et al., 2016; Alessandro et al., 2020). For example, Rohde et al. (2020) state that non-uniform artificial lighting (zoning, warmth), visual daylight cycles (direct sunlight, view, sky), shifting air movements, contact with nature, views of natural scenery, unrestrained activity and user influence (perceived and actual control) affect the wellbeing of individuals.
- (5) *Functionality and aesthetics*: Ergonomics (dimensions, shape, layout and functionality of spaces), fabric and materials (i.e. biophilic design), colour, decor/aesthetics and art and services (maintenance, cleanliness, decontamination) matter to both the wellbeing of individuals and the functionality and perception of communities (International WELL Building Institute, 2021).

The research findings from various disciplines demonstrated a list of characteristics from the built environment that in one way or another affect social resilience on the individual and/or community level. Table 1 reveals an uneven distribution of the built environment characteristics impacts on different attributes of social resilience. Physical and mental health and security on the individual level were the most commonly discussed elements that are affected by the built environment. Whilst public health, equity and social inclusion received the most attention on a community level. In some cases (such as psychological traits, the purpose of life, or community competencies) impacts or relationships are not mentioned at all. However, this is not surprising as those elements are related more to the people themselves and their relationships with the community around them.

By taking a closer look at the elements of social resilience, it becomes apparent that the social resilience elements are interconnected, and that by addressing one, it might be possible to influence the realization of others. Moreover, those elements can indirectly be affected by the built environment characteristics and create so-called secondary-level impacts. The

introduced theories demonstrate the relationship between the constructs and can help to foresee the secondary impacts, such as adjustment or creating meanings. These theories can also help to conceptualize the above-mentioned relationships, leading to social resilience in the built environment model (see Figure 2).

The model facilitates integrating social resilience into the built environment and explores the connection between individuals, communities and the built environment in relation to social resilience. Adopting an environmental quality perspective, the model focuses on how the built environment can enhance the capacity of individuals and communities by providing elements that can assist them in preparing for and coping with future crises. The relationship between the built environment and the community is developed through psychological processes of creating meaning for a place. In contrast, the relationship between the built environment and the individual is constructed through the ability to adjust the environment or individual behaviour to find a suitable fit for both. The built environment also plays a role in supporting the interactions and relationships between the individual and community and often provides stability and a platform that is needed to form those relationships. Thus, it can be understood that to create social resilience in the built environment, the physical and social characteristics of the built environment should address those needs of individuals and communities by creating meanings, allowing adjustment and flexibility but at the same time offering stability and continuation.

As previously discussed in this paper, the built environment has a much stronger role in terms of creating resilience than it is often understood. It can affect the physical and mental health of individuals, enhance the social sustainability of communities and create meaning as well as support interactions and relationships. The resilience of the built environment, therefore, must be considered from a broader perspective, including its capacity to support people and their resilience. Hence, understanding this relationship between the people and the built environment is necessary when planning and designing a resilient and sustainable built environment.

While the concept of resilience building is feasible and valuable in theory, it is important not to underestimate the required resources and risks involved in implementing them in practice. Building resilience and especially social resilience is often an intangible and costly process (see e.g. Hassler & Kohler, 2014; Rashidfarokhi et al., 2018). Even if the social resilience dimensions are considered as part of the planning or development of the built environment, the complexity

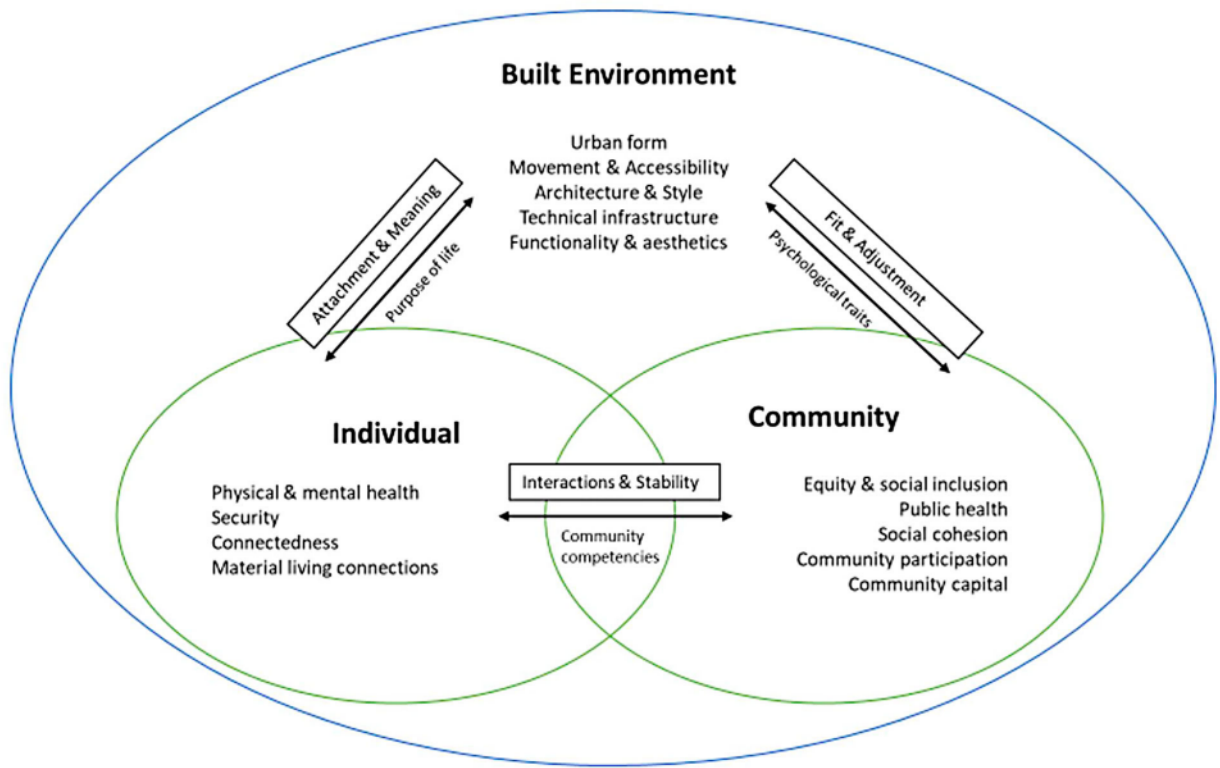


Figure 2. Conceptual model – social resilience in the built environment.

of the concept itself and uneven distribution of resources in resilience building could lead to increasing inequality in accessing resilience services and facilities (see e.g. Meerow et al., 2019). Therefore, perhaps in the worst-case scenario implementation of resilience can sometimes even become self-defeating (see e.g. Hassler & Kohler, 2014). To address this challenge, a kind of working contradiction may be considered in which a certain level of vulnerability in the built environment's resilience planning and -building is unavoidable.

Conclusions and implications

This paper aimed to deepen the understanding of the social resilience concept in relation to the built environment. By integrating multidisciplinary knowledge to define '*resilience of*' people, the paper also addressed the perspective of the built environment on '*resilience for*' people. This was achieved through an extensive literature review, concept mapping and panel discussion. Based on the research findings, it can be concluded that first, wellbeing and social sustainability attributes promote social resilience; second, people and the built environment have mutual influence and interrelations and should be seen as a network; and third, the built environment characteristics play a key role in

supporting or declining social resilience. The provided conceptual model should help to address societal consequences of the built environment's resilience amidst crises that are currently often overlooked in the built environment field.

The theoretical contribution of the paper lies in its multidisciplinary and holistic approach to conceptualizing social resilience in the built environment. The paper incorporates knowledge from various social sciences disciplines, addresses different societal levels (individual and community) and includes different built environment aspects (urban planning, architecture, real estate development and management). Even though the main contribution of the paper is theoretical advancement of knowledge, the findings of this study can also be valuable to practitioners. Through practical examples, the study goes beyond theoretical definitions to demonstrate how different built environment characteristics may affect individual and/or community resilience. Architects, urban planners, real estate developers and policymakers will be able to apply these scientifically proven recommendations to their planning, development and management practice to improve social resilience.

Although the findings of this paper were derived from well-grounded literature and scholars with practical experience in the field, the research findings have

some limitations. First, they lack the public and private actors' viewpoints. In the future, participatory processes should be designed to engage a diverse range of public and private actors to recognize the challenges in implementing the research findings and to facilitate the emergence of additional novelty and integrity in relation to the research findings. Second, the study findings are not empirically examined. Future empirical analysis should include different types of geo-specific populations, different hazard-specific scenarios and different scales of the built environment (i.e. building, neighbourhood and city levels). The empirical analysis allows the detection of the challenges and external factors associated with the feasibility and applicability of the research findings. Third, the current study has only used a qualitative and conceptual approach in defining social resilience and its elements in the context of the built environment. Future research is needed to develop quantifiable models addressing the complexity of social systems at multiple spatial and temporal scales. As such, this study serves as a starting point for further development of an integrated, multidimensional and adaptable framework that could then translate into policy and design guidelines for consistent operationalization.

In conclusion, this paper offers a series of recommendations for various built environment actors. For real estate practitioners, the key recommendations are (1) to holistically identify and select the feasible social resilience elements within individual property developments needed to respond to a wide range of relevant crisis impacts and (2) to take a co-creation approach in planning resilience-building actions at the property level by involving communities and future occupants to understand their interests and concerns, to elaborate what measures will be implemented, and to receive feedback on any shortcomings or challenges during the property use phase. This paper also suggests policy-makers (1) to provide holistic standards and guidelines to align the built environment design, development and management with the higher-level resilience-building and crisis management strategies and (2) to develop and test various resilience-building frameworks in democratic collaboration processes with different built environment stakeholders at different scales. Steps like these can facilitate the co-creation of processes and paths that increase resilience while preserving different forms of capital (e.g. social, cultural, natural and built) in societies.

Disclosure statement

No potential conflict of interest was reported by the author(s).

Funding

This work was supported by the Academy of Finland [grant number 339549].

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