



The socio-spatial roles of public space as an enabler for community resilience

Sahar Asadollahi Asl Zarkhah¹ · Maurice Harteveld¹ · Machiel van Dorst¹ · Deepti Adlakha¹

Received: 20 March 2024 / Accepted: 10 April 2025
© The Author(s) 2025

Abstract

Public spaces have a significant impact on social interactions and community dynamics, particularly during times of disruption and change. This study investigates the role of public space in fostering community resilience. It introduces a conceptual framework to identify the attributes and characteristics of public space that support or hinder the social environment, in the context of community resilience. Through an interdisciplinary narrative literature review, the research examines how social dynamics—particularly communal interactions and activities—are influenced by spatial features and how these contribute to a community's adaptive capacity during crises. The findings highlight that public spaces act as vital community infrastructure, facilitating community networks and fostering connections between people and place, all of which are key components of community resilience. As such, the research highlights the importance of recognizing various spaces within the public domain with these attributes, while emphasizing the significance of diverse public spaces to nurture communities and support their resilience. More so, by integrating public spaces into broader networks, the study suggests that fostering belonging, identification, and reinforcing essential structures enhance community resilience, transcending the role of conventional public spaces concepts.

Keywords Public space · Social environment · Communities · Community resilience

Introduction

Urbanization is reshaping public life by influencing social interactions and community dynamics through factors such as density and diversity. These shifts underscore the significance of social infrastructures in fostering cohesion within urban settings and highlight the critical role of public space networks in cities (Florida 2017; Klinenberg 2018). However, rapid urbanization also amplifies uncertainty and increases vulnerability to crises such as natural hazards and displacement in densely populated areas (UNDP 2018; Chirisa and Mabeza 2019; European Commission 2019).

Adapting to these rapid, crisis-driven changes is essential for urban communities. Public spaces, as vital elements of the built environment, have significant socio-spatial roles in supporting resilience at the community level. Resilience in this context refers to a community's capacity to endure,

adapt, and thrive amidst challenges, embodying both the ability to “bounce back” and “bounce forward” following a crisis (Richardson 1980; Lamson 1982).

Despite growing attention to community resilience, existing research often overlooks the role of built environments, particularly public spaces, as critical components for sustaining social networks and environments. Most studies emphasize theoretical discussions rather than practical frameworks, leaving a gap in understanding the interplay between public space qualities and community resilience (Matarrita-Cascante et al. 2017). This paper aims to address this knowledge gap by exploring how public spaces influence community resilience. It investigates the types and qualities of public spaces that foster durable social relationships, contribute to adaptive capacity, and enhance resilience against future challenges.

Public spaces serve as hubs for social interaction, identity formation, and mutual support, making them essential in reducing risks faced by urban communities. Their design and integration into urban environments can strengthen local identity, enhance social connections, and provide critical infrastructure during crises (Madanipour 2014).

✉ Sahar Asadollahi Asl Zarkhah
s.asadollahiaslzarkhah@tudelft.nl

¹ Department of Urbanism, TU Delft, Delft, The Netherlands



Therefore, understanding their role in community resilience is paramount.

This paper examines the socio-spatial conditions under which public spaces contribute to resilience. It identifies key attributes—community networks, people-place connections, and community infrastructure—that emerge as significant when studying resilience in urban settings. Through this lens, the study seeks to clarify and model the relationship between public space quality and the social environment to better facilitate community resilience. This means that the community not only recovers but also improves and becomes more resilient to future challenges (Manyena et al., 2011). It focuses on the role of public space in enhancing the resilience of communities within the human system, which also includes the ability to adapt and transform. Hence, acknowledges that community resilience is not static, nor merely given. (Patel et al. 2017). Especially in the context of strategic plan-making and design, crafting initiatives for enhanced community resilience is a social endeavor that commences with fostering networks and collaboration among individuals to safeguard valued aspects within their community (Lerch 2017).

The emphasis is on community resilience resulting from a social undertaking within a spatial context, highlighting the importance of interconnectivity between people and spaces. Metrics used to measure resilience levels often rely on comparative studies involving communities, locations, and the aftermath of unexpected and significant events (Saja et al. 2018). Still, the socio-spatial conditions, and consequently, the role public spaces play in community resilience, are rarely centered in research. This perspective is guided by the general understanding that community networks, people-place connections, and community infrastructure are prominent attributes that distinctly emerge when studying community resilience in the face of change events (Cutter et al. 2008; Elliott et al. 2010; Magis 2010; Reser and Swim, 2011; Wilson 2012; Maclean et al. 2014; Patel et al. 2017). In other words, the analysis of these three attributes in public space leads to a better understanding of how public spaces contribute to community resilience through their social and spatial interconnectivity, and thus which public spaces, in particular, play a significant role.

This paper examines, through a literature review, the relationship between the qualities of public space and the social environment in fostering community formation, which in turn contributes to community resilience. However, specific built environment qualities that support the formation and sustainability of communities, particularly within the context of community resilience, remain unclear. Addressing this knowledge gap, the paper raises the key question: How can the relationship between the quality of public spaces and the social environment be clarified to better facilitate community resilience?

Research approach

This paper seeks to identify the capabilities within public spaces associated with their responsiveness and characteristics by considering the interrelationship of social and spatial factors that influence community resilience. The paper emphasizes the significance of public spaces in shaping the quality of the social environment and their role in fostering community resilience. To accomplish this objective, the study draws insights from various disciplinary and interdisciplinary perspectives to attain a comprehensive understanding of public spaces in relation to the social environment. This goal includes the consideration of the distinct attributes of different public spaces.

Therefore, this article represents a narrative literature review to identify and analyze the multiplicity of interdisciplinary viewpoints on the contribution of public space to community resilience. Within its delineation by academic literature, the review has considered literature across disciplinary boundaries of fields, including urban studies, urban community studies, urban sociology, urban ethnography/anthropology, and design disciplines such as urban design, environmental design, landscape architecture, and interior architecture. This narrative literature review emphasizes that concepts should evolve beyond disciplinary boundaries, allowing for the exploration of merging viewpoints and the diversification of distinctions that contribute to critical expression (Spivak 2003). By engaging with key authors across a broad range of fields—each contributing paradigmatic shifts relevant to contemporary thought—this review aims to explore intertextuality as a theme within the narrative literature, emphasizing critical analysis of the literature to highlight the theoretical and contextual insights that shape our understanding of the topic (Rother 2007).

The review explores the socio-spatial dimensions of public space and their roles in fostering resilient communities by particularly zooming in on the appropriation as well as the parallel emergence of ideas. For this, we used closely related navigating conceptions including “public space”, “public places”, or “public interiors” on the one hand, and “community resilience”, “social resilience”, and “resilience” combined with “community” on the other. Subsequently, as part of our narrative literature review, we qualitatively assessed key studies to identify nuanced relationships and themes. This is supported by a search strategy that leveraged multiple academic databases, including Web of Science, Scopus, and Google Scholar. Furthermore, a grey literature review on public space and community resilience assessed diverse materials like magazines, newsletters, reports, policy documents, urban plans, and websites in similar ways, aiming to spot



ongoing programs, policies, initiatives, and relevant locations that strengthen community resilience and give insight in the relations between the role or form of public space and the social environment facilitating community resilience. This latter review assists in obtaining and relating the diverse range of perspectives and insights, unravelling the attributes and traits of public space that contribute to community resilience, and ultimately coming to a conceptual framework for general theoretical understanding and specific application as presented in this paper.

Public space: interdisciplinary advocacy for community life

The significance of public space and its role in urban life is addressed in literature across various disciplines and by scholars with diverse viewpoints. Public space within the city is broadly considered to refer to areas of the urban environment associated with public meanings and functions. Being “public” implies belonging to or being accessible to the people and relates to or impacts a nation, state, or community (Harteveld 2014). As emphasized in Lofland’s work (2017), the concept of public space generally centers on the connection between the public and space, and more specifically, as seen in the works of Madanipour (2003) and Kent (2019), on the dynamics between community and place. Such understandings are aligned with recognizing that public spaces are essential for framing social life in cities as places where socio-spatial transformations have become observable (Zukin 1995; Harteveld 2014).

The distinction between public and private space is often recognized as blurred, with various spaces existing between these two categories. This understanding is commonly referenced in scholarly discussions, particularly in the years just before the 1990s. For example, Lofland (1989) has described the concept of ‘third place,’ which refers to places that are neither fully public nor private, but rather serve as social gathering places for communities. Similarly, Oldenburg (1989) has argued that there are ‘third places,’ which are informal public gathering places such as cafes, coffee shops, bookstores, bars, hair salons, and other hangouts at the heart of a community. This concept resonates in Bhabha’s (1994) work, where “third spaces” represent space of negotiation, cultural interaction, and hybridity, and in Soja’s (1996) application of this notion to overcome the binary understanding of spaces as either a physical material world or places of meaning. In a similar line, Solà-Morales (1992) proposed the idea of “collective spaces”—collective commons important for communities, alongside the grand design of public spaces.

In parallel, and more from a planning perspective, the concept of “privately owned public spaces” has been

introduced to describe spaces similarly relevant for socializing, such as arcades, atria, plazas, and concourses, which serve as public amenities. These spaces are open to the public but owned and maintained by private individuals or corporations (Kayden 2000). This understanding of public space, shifting the focus from publicly owned to publicly used places, while highlighting that design efforts in urbanization are not limited to specific types of spaces, namely outdoors. A holistic approach to urban design is proposed, one that acknowledges the interconnectedness of all public spaces in shaping the broader social environment, particularly in relation to communities. Subsequently, the question of difference in habitation – how communities inhabit their urban living environment, with an eye on diversity as seen in informal eating and small bars by Attiwill – underlines a fundamental interrelation between the spatial environment and experience. By referring to Soja, she continues to define spaces as subject to change, domains of experiences and interactions, in contrast to seeing space as static architectural objects only, being permanent, thus supporting a plea for third spaces implicitly (Attiwill 2021). Establishing connections between different lines of reasoning serves as a foundation for reviewing literature that contributes to the development of an interdisciplinary framework, which can inform the design of public spaces for communities.

Public space: facilitating community resilience

The recent crises, such as COVID-19, climate-related disasters, and social inequality, have highlighted the significance of public spaces in supporting communities during times of stress. This underscores the importance of studying public spaces in facilitating community resilience. In this context, a broader range of public spaces plays a significant role in the daily life and experience of communities and should be recognized as key places where communities’ ability to bounce back and forward is helped. In line with the broader definition, public spaces are perceived to play integral roles in the daily lives of various communities, transcending distinctions between public and private entities.

Community gathering spaces, which hold significance for communities and their members, support them during various forms of stress (individual, social, and environmental). These spaces are crucial to what is termed “community resilience.” In general, this approach to resilience focuses on the ability of communities to tolerate, absorb, cope with, and adjust to various environmental and social threats at community levels.

Community resilience adapts the concept of resilience as originated in ecology, describing the ability of ecosystems to absorb changes and disturbances while maintaining core



functions and relationships (Holling 1973). Resilience has since been broadened and integrated into various disciplines, including the study of socio-ecological systems. Social-ecological resilience in a broader sense is defined as the ability of complex socio-ecological systems to change, adapt, and transform in response to stresses and strains (Davoudi et al. 2012).

This underscores the interconnectedness of social and ecological components and their collective capacity for adaptive change, highlighting that resilience is not limited to economic and environmental factors, but also society and culture. Moreover, resilience involves more than just preparedness for sudden disruptions or isolated events; it requires long-term strategies aimed at mitigating and adapting to both socio-economic and environmental challenges (Mehmood 2016).

Urban resilience emphasizes the ability of urban areas to maintain or rapidly return to desired functions in the face of disturbances, adapt to change, and transform systems that limit current or future adaptive capacity (Meeadow et al. 2016). This urban-focused resilience framework addresses the unique challenges and complexities of urban environments.

A key component of urban resilience is the ability to respond to sudden, unanticipated disruptions. Equally important, however, is its role in guiding responses to more gradual, foreseeable transformations. Resilience offers a valuable framework for navigating long-term challenges, such as deindustrialization and urban shrinkage, by helping cities anticipate and adapt to these predictable shifts (Vale 2014).

Social-ecological resilience has gained attention within urban studies. Within the broader discourse on resilience, the importance of social resilience has also become more prominent (Sherrieb et al. 2010; Moser and Stein 2011; Satterthwaite 2011; Walker and Salt 2012). While social resilience is a people-centered concept that encompasses individuals, households, communities, and societal levels, community resilience specifically emphasizes the community aspect. This study focuses on community resilience and acknowledges its overlap with social resilience, especially when the discussion pertains to communities.

When it comes to community resilience, there is significant variation in definitions and approaches, as highlighted by Doff (2017), who conducted structured literature research on the topic. This underscores the complexity of the concept and its applications. This complexity is reflected in the understanding that community resilience involves a community's ability to rely on strong, trust-based relationships and networks to identify risks, prevent negative outcomes such as radicalization, and recover through learning and adaptability. It encompasses the mobilization of local resources that enable communities to thrive in the face of change, uncertainty, and unpredictability. Additionally, this resilience includes

the capacity to cope with and adjust to social, political, and environmental stresses, using these resources not only to overcome adversity but also to embrace new opportunities. At its core, community resilience is defined by collective efficacy—the ability of community members to take action, respond to threats, and learn from challenges to strengthen their community (Magis 2010; Dalgaard-Nielsen and Schack 2016; Waters 2016; Wickes et al. 2017).

Consequently, community resilience as a specialized aspect of social resilience that specifically addresses the dynamics within communities, is the key to the conceptual framework specifically related to the capacities and resources of its members as collective actors (Keck and Sakdapolrak 2013; Maclean et al. 2014; Saja et al. 2018). Public spaces play a significant role in community resilience, as communities are dynamic components of social-urban and socio-ecological systems. (Longstaff et al. 2010). Various definitions of community as found in the literature emphasize the significance of social connections, shared values, and a sense of belonging in the formation of such a community. Additionally, definitions recognize the role of physical and spatial elements in shaping social relationships within the community. This highlights the dynamic and multidimensional nature of communities, which involves both social and spatial dimensions (Castells 1983; McMillan and Chavis 1986; Pretty 2003; Blokland 2017). Accordingly, researchers have paid increasing attention to community resilience in social and urban development (Chaskin 2008; Cutter et al. 2008; Maguire and Cartwright, 2008; Berkes and Ross 2013). This brings community resilience close to the design of public spaces in terms of facilitating networks, thus social connections, physical gathering spaces, and places of belonging.

The study underlying this paper is grounded in a review of the theoretical bases and frameworks suggested for investigating community resilience in the face of crises-driven changes by Maclean et al. (2014). Their comprehensive study underpins the definition of community resilience as a branch of social resilience (Kulig et al. 2005; Norris et al. 2008; Magis 2010; Buikstra et al. 2010; Berkes and Ross 2013). From the point of designing public spaces, it particularly defines three attributes reoccurring in the frameworks, which “match well to both the wider literature on social aspects of development” as well as “the emerging literature on community resilience” (Maclean et al. 2014) and which are explicitly spatialized: community networks, people-place connections, and community infrastructure (Fig. 1).

Community networks facilitated by public spaces

Public spaces play a crucial role in facilitating community networks, serving as places where community members





Fig. 1 Attributes of community resilience enabled by public spaces (created by the authors, 2022)

collaborate with other groups and organizations. These spaces support the formation of networks both within and between communities, which are essential for accessing resources and establishing processes during a crisis (Berkes and Ross 2013; Linnell 2014; Ley, 2019). It is important to evaluate public spaces for their ability to accommodate and support these interactions. In comprehending this necessity for community resilience, the concept of a sense of community becomes evident. Concepts like a sense of community or belonging stem from the recognition that they are essential prerequisites for fostering community resilience. Indeed, before a community can develop resilience, it must first establish a cohesive sense of identity. Public spaces play a role in this process by providing platforms for social interaction, collective activities, and the cultivation of shared experiences. By fostering a sense of community and belonging through design, public spaces lay the foundation upon which community resilience can be built. Individuals need a “sense of belongingness, fellowship, ‘we-ness,’ identity, etc., experienced in the context of a [geographically based] collective” (Buckner 1988, p.773), before networking or connecting with others.

Geographical space is added as a factor of importance to the research of Cartwright and Zander (1968), who have argued that various social-environmental factors determine how strongly group members experience this sense of community, such as group size, having common goals, well-defined membership principles, collective values, and potential external threats. Spatial factors and social-environmental factors relate substantively and extent to the sense of community. Building upon the initial empirical discoveries of Chavis and Wandersman, the qualities of the physical environment and the social environment in urban settings

are a driving force for engagement and community advancement. (McMillan and Chavis 1986; Chavis and Wandersman 1990). According to Francis et al, (2012) public spaces are important settings for enhancing such a sense of community. Various communities, ranging from those ingrained in neighborhood organizations, professional associations, civic institutions like churches, etc., employ processes to enhance the quality of community life, thus community involvement and networks. Since the 1970s, active involvement in such communities has been regarded as a significant approach to enhancing the quality of the physical environment (Yates 1973; Morris and Hess 1975; Yin 1975; Mayer 1984; Chavis and Wandersman 1990).

Yet, community building and development are embedded within the context of each community's physical and social environment. McMillan and Chavis, (1986) have argued that there is a reciprocal relationship between a sense of community, thus being part of the larger community network, and how much community members believe they can influence their immediate environment. Therefore, cultivating a sense of community can contribute to the development of both individuals within the community and the community itself.

Neighborhood-focused community organizations are closely tied to the attributes of the public spaces. In other words, there are substantive relationships between the qualities of the physical environment, the social environment (e.g., social interaction and sense of belonging), and residential satisfaction (Rohe 1985; Weidemann and Anderson 1985).

The notion that the physical environment, especially public spaces within a particular geographic area, can facilitate the attitudes and behaviors of its residents, thereby contributing to a sense of community (Kingston et al. 1999), is intricately connected to a more profound comprehension of designing public space. In cultivating community connections, the significance of strategically locating public spaces is underscored by theorists within the urban design tradition. According to the conventional perspective, public spaces, like pedestrian and natural areas, play a crucial role in fostering social interaction as a foundation for a sense of community (Talen 2000; Lund 2002; Bow and Buys 2003; Kim and Kaplan 2004). Whereas interaction facilitated by the use of the physical environment is linked to a sense of community (Brower 1980), highlighting the role of physical aspects in facilitating community resilience.

These places, referred to as public spaces or spaces for public use, include a diverse range that is conducive to social interaction and facilitates incidental social contact, including privately owned spaces that are open to the public and accessible (Carmona et al. 2003; Fugmann et al. 2017). By contributing to the development of a sense of community, these spaces support the establishment and growth of community networks. For example, libraries can play a pivotal



role in cultivating community resilience. Serving as a center within the community, libraries offer spaces for community networking, access to computer terminals, training services, or simply serve as a place for people to connect (Bajjaly 1999).

To enhance community resilience, the (re)design of all public spaces relevant to communities should be viewed as a deliberate response to accommodate the needs of community networks, integrating these spaces within larger networks of social environment.

Public spaces as community infrastructures

Public spaces serve as indispensable community infrastructures. Indeed, infrastructures, encompassing basic facilities, services, and installations, are essential for the proper functioning of a community. Even small-scale structures hold critical importance. In line with response and recovery approaches to community infrastructures, redesigning, revitalizing, and enhancing public spaces becomes a fundamental element in constructing socially integrated urban environments (Bagnall et al. 2023). Community access road networks, along with other connective infrastructure, and, notably, common urban spaces, must be integrated into plans to foster community resilience (GFDRR, 2014). Communities require well-designed public spaces that nurture a vibrant sense of community. Schools, vocational institutes, organizations, and clubs have historically garnered public recognition and governmental support for their roles as community centers. For more than a century, governments have urged these institutions to provide opportunities for community members to enhance their preparation for responsible citizenship (e.g., Jackson 1918).

The premise is that for social networks to thrive, there must be opportunities for them to form and develop. Public spaces provide a physical setting where people can gather, interact, and build relationships, which are essential for fostering community networks (Lofland 1989; Oldenburg 1989; Bhabha 1994; et seq). Thus, whereas the ability of public spaces to facilitate social interactions plays a crucial role in strengthening community resilience, the offering of places for people to connect and collaborate helps communities better withstand challenges and adapt to changing circumstances.

In contemporary times, this role has expanded to encompass the provision of various spaces for community gatherings and sharing, ranging from tool libraries, and community kitchens, to swap meets (PPG Buffalo 2021). Community infrastructures now encompass diverse environments, including abandoned buildings, public libraries, and community gardens, whether located in parks or vacant city lots (Cooper 2017, p. 268–269). Building on this perspective, it includes designing public spaces like cafes, coffee shops,

and community centers, as well as public spaces like community gardens or temporarily appropriated spaces within neighborhoods. In a broader definition, where in public spaces transcend a dichotomous relation with private space and are recognized as existing both inside and outside buildings, interiors as well as exteriors play integral roles in the daily lives of both larger and smaller communities.

Place attachment cultivated through public spaces

Public spaces play a crucial role in fostering connections between individuals and the places they inhabit, contributing to the development of place attachment which enhances the significance and meaning attributed to these spaces (Mantey 2015). In the realm of human geography, Ted Relph introduced a phenomenological perspective on places within urban contexts. According to Relph, emotional bonds are intensified when communities establish a meaningful relationship with a particular place. This connection reinforces the identity of both individuals and the collective, fostering the sharing of communal beliefs and values through interpersonal engagements (Relph 1976). Using a place-based approach, community resilience is primarily associated with the state or quality of the design of public spaces, functioning as environments that encourage social interactions.

Phenomena like collective actions and the informal use of public spaces through temporary appropriation are closely tied to the concept of community resilience. The focus on community resilience emphasizes a community's ability to respond and adapt to challenges, with particular attention given to the role of liminal zones—transitional spaces that blur the boundaries between private and public realms. These liminal zones become critical in fostering resilience, as they often enable informal interactions and collective practices that strengthen communal bonds and adaptive capacities (Turner 1974; Melis et al. 2020). Therefore, strengthening community resilience through the enhancement of people–place connections involves implementing interventions that allow for informal and spontaneous events, even if they are temporary, creating opportunities for communities to gather, engage, and build resilience in everyday spaces.

In this context, informal use primarily pertains to the spontaneous undertaking of unplanned activities in public spaces as part of urban practices. The regular engagement of communities in these activities leads to appropriation (Rodríguez 2014). Essentially, communal engagement with public space—regardless of its initial intent—for a brief period to partake in individual or collective activities is crucial for cultivating connections between people and places. This is due to the ability of people to rearrange and redefine urban space according to their preferences and desires. Lara-Hernandez et al. (2020, p. 65) propose an interpretation of



temporal appropriation as “the interaction between citizens and their city expressed through certain kinds of activities occurring in public spaces.” Ultimately, this interplay between social activities and spatial dynamics reinforces the community’s capacity to respond collectively to crises, ensuring that residents feel supported and connected in both everyday situations and times of need.

This aligns closely with Oldenburg’s aforementioned observations concerning community places. These informal gathering places cultivate socially binding connections that form the foundation of community life (Oldenburg 1989). Architects and urban designers also underscore the significance of such places (de Solà-Morales 1992; Carr et al. 1992). According to Hayden’s perspective, urban spaces should meet standards of amenity and safety to create inclusive environments. Modest yet practical enhancements in urban design can be linked to broader concepts aimed at cultivating connections that bridge the gap between the private and public spheres of life. By thoughtfully designing these transitional spaces in various environments, communities can promote social interaction and accessibility, ultimately enriching the urban experience for all residents (Hayden, 1984).

This perspective is endorsed and broadened by various disciplines, exemplified by established community gardens, spontaneously appropriated no man’s land, to courtyards functioning as living rooms (Armstrong, 2000; Groth & Corijn, 2005; Amin, 2009). The United Nations Human Settlement Programme places particular emphasis on the concept that “public space provides a ‘living room’ that allows for social interaction and encourages identification and feelings of belonging along with the associated social and economic benefits for vulnerable communities in dense living environments” (Habitat, 2015).

Facilitating community resilience requires a thoughtful approach to the (re)design of all public spaces that hold significance for communities. These spaces are essential to the social environment, serving as vital nodes of interaction, connection, and identity within and between communities. By prioritizing this essence in design, it is possible to strengthen the response-related capacities that foster place-based human relationships. Ultimately, enhancing the significance of public spaces cultivates a deeper sense of belonging and ownership among community members, empowering them to respond collaboratively to challenges and changes within their environment.

To summarize, the conceptual framework introduced in this study highlights how public spaces can facilitate and contribute to community resilience. The adopted three attributes: community networks, community infrastructure, and place attachment, assist in examining in what ways socio-spatial environments, as manifested in public space, collectively contribute to the resilience of communities.

Community networks, representing the social ties among individuals and communities, are crucial for enhancing collective action and support. Public spaces play a vital role in facilitating the formation of these networks and promoting a sense of belonging. They provide important platforms for organizing partnerships within and between communities, enabling effective processes and access to necessary resources during challenging times. Additionally, these networks foster a sense of community and encourage active participation, further strengthening community resilience.

Community infrastructure encompasses the spatial aspects of public spaces that facilitate these interactions. The physical characteristics of public spaces, such as their design and accessibility, have a significant impact on social interaction and the relationships among community members, thereby strengthening community bonds. By recognizing the importance of public spaces and incorporating them into the (re)design process, communities can enhance their resilience within broader support networks. Furthermore, public spaces serve as critical community infrastructure, providing necessary facilities and services for effective community functioning.

Place attachment emerges as an outcome of the two previously discussed elements: community networks, which represent the social ties among individuals (people), and community infrastructure, which encompasses the physical spaces that facilitate these interactions (space). The human experience of this social and spatial environment defines the place of attachment. Public spaces play a crucial role in fostering these connections, allowing for meaningful relationships between people and the places they inhabit. Informal use and temporary appropriation of public spaces by communities encourage casual, spontaneous events, empowering them to shape urban spaces according to their needs and desires.

By examining the interplay between these attributes, the framework elucidates how public spaces enable community resilience. This understanding underscores the significance of nurturing social ties, investing in spatial infrastructure, and fostering place attachment to the environments people inhabit, ultimately facilitating a more resilient community.

Conclusions

In this paper, we examined the relationship between public spaces and the quality of the social environment in facilitating community resilience. We used a conceptual framework, we explored the complex interplay between public spaces, their role in social interaction, and contribution to community resilience. The literature review and the framework demonstrate the intricate interconnections between social and spatial factors in shaping community resilience. Social



factors refer to relationships, interactions, and social dynamics within a community, while spatial factors pertain to the physical attributes of public spaces in which these social processes unfold.

The capacity of communities to adapt and respond to crisis-induced changes is essential for their resilience. The framework developed in this study emphasizes the importance of community networks, people-place connections, and community infrastructure. The framework serves as a guide for researchers and designers, helping them enhance community resilience by identifying and addressing key factors that influence the performance of public spaces. Public spaces are shown to play a pivotal role in shaping the quality of the social environment and contributing to community resilience. They actively support the creation, facilitation, and strengthening of community networks and people-place connections, which are not only vital for community resilience but also form integral parts of community infrastructure.

Future research should continue to investigate the impact and performance of public spaces on community resilience, particularly during crises. The research focused on public space in general, including formal public spaces (e.g., parks), informal meeting spaces, and indoor public environments. However, a more specific focus is recommended for future research to deepen our understanding of public space dynamics within the context of social interactions and community resilience. A logical next step would be to concentrate on types of public spaces where communities already play a significant role, as opposed to formal spaces managed by a single actor, such as the government. For example, neighborhood centers managed by and for residents, with minimal governmental presence, could provide valuable insights into the strength and independence of social networks. This approach could shift the focus from the influence of formal actors to the intrinsic resilience-building potential within communities themselves.

Data availability Not applicable.

Open Access This article is licensed under a Creative Commons Attribution 4.0 International License, which permits use, sharing, adaptation, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons licence, and indicate if changes were made. The images or other third party material in this article are included in the article's Creative Commons licence, unless indicated otherwise in a credit line to the material. If material is not included in the article's Creative Commons licence and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder. To view a copy of this licence, visit <http://creativecommons.org/licenses/by/4.0/>.

References

Amin, A. (Ed.). 2009. *The social economy: International perspectives on economic solidarity*. Bloomsbury Publishing.

Armstrong, D. 2000. A survey of community gardens in upstate New York: Implications for health promotion and community development. *Health & place*, 6(4):319–327.

Attiwill, S. 2021. Interior Designing in the Urban Environment: Practices for the 21st Century. In *Handbook of Research on Methodologies for Design and Production Practices in Interior Architecture*, ed. A. C. Smith. IGI Global.

Bagnall, A. M., K. Southby, R. Jones, A. Pennington, J. South, and R. Corcoran. 2023. *Systematic review of community infrastructure (place and space) to boost social relations and community wellbeing: Five year refresh*. London: What Works Centre for Wellbeing.

Bajjaly, S. T. 1999. *The community networking handbook*. Chicago: American Library Association.

Berkes, F., and H. Ross. 2013. Community resilience: Toward an integrated approach. *Society & Natural Resources* 26 (1): 5–20.

Bhabha, H. K. 1994. *The location of culture*. London: Routledge.

Blokland, T. 2017. *Community as urban practice*. London: John Wiley & Sons.

Bow, V. and Buys, E. Sense of community and place attachment: The natural environment plays a vital role in developing a sense of community. In: *Social Change in the 21st Century 2003 Conference Refereed Proceedings*, pp. 1–18. Brisbane: Centre for Social Change Research, School of Humanities and Human Services QUT, 2003

Brower, S. N. 1980. Territory in urban settings. In *Environment and Culture*, ed. M. G. Wilkinson, 179–207. New York: Springer.

Buckner, J. C. 1988. The development of an instrument to measure neighborhood cohesion. *American Journal of Community Psychology* 16 (6): 771–791. <https://doi.org/10.1007/BF00930892>.

PPG Buffalo. (2021). Tool library edits. Retrieved from https://ppgbuffalo.org/files/documents/housing_neighborhoods/tool_library_-_ edits_feb2021.pdf

Buikstra, E., H. Ross, C. A. King, P. G. Baker, D. Hegney, K. McLauchlan, and C. Rogers-Clark. 2010. The components of resilience—Perceptions of an Australian rural community. *Journal of Community Psychology* 38 (8): 975–991.

Carmona, M., T. Heath, T. Oc, and S. Tiesdell. 2003. *Urban spaces - public places: The dimensions of urban design*. Oxford: Architectural Press.

Carr, S., M. Francis, L. G. Rivlin, and A. M. Stone. 1992. *Public space*. Cambridge: Cambridge University Press.

Cartwright, D., and A. Zander. 1968. *Group Dynamics*. New York: Harper & Row.

Castells, M. 1983. Crisis, planning, and the quality of life: Managing the new historical relationships between space and society. *Environment and Planning D: Society & Space* 1 (1): 3–21.

Chaskin, R. J. 2008. Resilience, community, and resilient communities: Conditioning contexts and collective action. *Child Care in Practice* 14 (1): 65–74.

Chavis, D. M., and A. Wandersman. 1990. Sense of community in the urban environment: A catalyst for participation and community development. *American Journal of Community Psychology* 18 (1): 55–81.

Chirisa, I., and C. Mabenza. 2019. *Community Resilience under the impact of urbanisation and climate change: Cases and experiences from Zimbabwe*. Bamenda: Langaa Rpcig.

Commission, E. 2019. *Urban Resilience Handbook*. Brussels: European Commission.

Cooper, S. 2017. *Participatory evaluation in youth and community work: Theory and practice*. London: Routledge.



Cutter, S. L., et al. 2008. A place-based model for understanding community resilience to natural disasters. *Global Environmental Change* 18 (4): 598–606.

Dalgaard-Nielsen, A., and P. Schack. 2016. Community resilience to militant Islamism: Who and what? An explorative study of resilience in three Danish communities. *Democracy and Security* 12 (4): 309–327.

Davoudi, S., K. Shaw, L. J. Haider, A. E. Quinlan, G. D. Peterson, C. Wilkinson, H. Fünfgeld, D. McEvoy, L. Porter, and S. Davoudi. 2012. Resilience: A bridging concept or a dead end? *Planning Theory & Practice* 13 (2): 299–333.

de Sola-Morales, M. 1992. Openbare en collectieve ruimte. De verstedelijking van het privédomein als nieuwe uitdaging. *Oase* 33:3–8.

Doff, W. (2017) 'Veerkracht van Lokale Gemeenschappen: De Literatuur op Een Rij'. Available at: https://www.veldacademie.nl/img/Document/e73c/e73cd683e34e-40f1-8ce5-41d185a6661b/Veerkracht%20van%20lokale%20gemeenschappen_literatuur_onderzoek_DEF.pdf.

Elliott, E., et al. 2010. Resilience to social stress coincides with functional DNA methylation of the Crf gene in adult mice. *Nature Neuroscience* 13 (11): 1351–1353.

Florida, R. 2017. *The new urban crisis: How our cities are increasing inequality, deepening segregation, and failing the middle class—and what we can do about it*. London: Hachette UK.

Francis, J., B. Giles-Corti, L. Wood, and M. Knuiman. 2012. Creating sense of community: The role of public space. *Journal of Environmental Psychology* 32 (4): 401–409.

Fugmann, F., D. Karow-Kluge, K. Selle, and T. Kuder. 2017. *Öffentliche Räume in stadtgesellschaftlich vielfältigen Quartieren, Nutzung, Wahrnehmung und Bedeutung*. Berlin: Springer.

Global Facility for Disaster Reduction and Recovery. 2014. *Annual Report 2014*. Washington, DC: The World Bank.

Groth, J., and E. Corijn. 2005. Reclaiming urbanity: Indeterminate spaces, informal actors and urban agenda setting. *Urban studies* 42 (3): 503–526.

Habitat, U.N. 2015. *Global public space toolkit from global principles to local policies and practice*. Nairobi: United Nations Human Settlements Programme (UN-Habitat).

Harteveld, M. (2014) *Interior Public Space: On the Mazes in the Network of an Urbanist*. Delft University of Technology. Available at: <https://books.google.nl/books?id=a8cQoAEACAAJ>.

Holling, C. S. 1973. Resilience and stability of ecological systems. *Annual Review of Ecology and Systematics* 4:1–23.

Jackson, H.E. (1918) *A Community Center: What It Is and How to Organize It*. Bulletin No. 11. Bureau of Education, Department of the Interior.

Kayden, J. S. 2000. *Privately owned public space: The New York City experience*. New York: John Wiley & Sons.

Keck, M., and P. Sakdapolrak. 2013. What is social resilience? Lessons learned and ways forward. *Erdkunde* 67 (1): 5–19.

Kent, E. 2019. Leading urban change with people powered public spaces: The history, and new directions, of the placemaking movement. *The Journal of Public Space* 4 (1): 127–134.

Kim, J., and R. Kaplan. 2004. Physical and psychological factors in sense of community: New urbanist Kentlands and nearby Orchard Village. *Environment and Behavior* 36 (3): 313–340.

Kingston, S., R. Mitchell, P. Florin, and J. Stevenson. 1999. Sense of community in neighborhoods as a multi-level construct. *Journal of Community Psychology* 27 (6): 681–694.

Klinenberg, E. 2018. *Palaces for the people: How social infrastructure can help fight inequality, polarization, and the decline of civic life*. New York: Crown.

Kulig, J. C., D. Edge, and J. Guernsey. 2005. Community resiliency and health status: What are the links? *Journal of Rural and Community Development* 3 (3): 76–94.

Lamson, C. (1982) *Community Resilience: Some Lessons from Ecological Systems Theory for Resource and Community Development*. MSc thesis, Dalhousie University, Halifax, NS.

Lara-Hernandez, J. A., C. M. Coulter, and A. Melis. 2020. Temporary appropriation and urban informality: Exploring the subtle distinction. *Cities* 99 : 102626.

Lerch, D. 2017. *The community resilience reader: Essential resources for an era of upheaval*. Washington, DC: Island Press.

Ley, A. 2019. Community resilience and placemaking through trans-local networking. *The Journal of Public Space* 4 (2): 165–178.

Linnell, M. 2014. Citizen response in crisis: Individual and collective efforts to enhance community resilience. *Human Technology* 10 (1): 1–18.

Lofland, L. H. 1989. Social life in the public realm: A review. *Journal of Contemporary Ethnography* 17 (4): 453–482.

Lofland, L. H. 2017. *The Public Realm: Exploring the City's Quintessential Social Territory*. Routledge.

Longstaff, P. H., et al. 2010. Building resilient communities: A preliminary framework for assessment. *Homeland Security Affairs* 6 (3): 1–23.

Lund, H. 2002. Pedestrian environments and sense of community. *Journal of Planning Education and Research* 21 (3): 301–312.

Maclean, K., M. Cuthill, and H. Ross. 2014. Six attributes of social resilience. *Journal of Environmental Planning and Management* 57 (1): 144–156.

Madanipour, A. 2003. *Public and Private Spaces of the City*. Routledge.

Madanipour, A. 2014. *Urban Design*. Springer: Space and Society.

Magis, K. 2010. Community resilience: An indicator of social sustainability. *Society & Natural Resources* 23 (5): 401–416. <https://doi.org/10.1080/08941920903305674>.

Mantey, D. 2015. The role of public spaces in creating place attachment (example of Zaszcze, Warsaw housing estate). *Miscellanea Geographica* 19 (3): 36–42.

Manyena, B., et al. 2011. Disaster resilience: A bounce back or bounce forward ability? *Local Environment*. 16:417.

Matarrita-Cascante, D., B. Trejos, H. Qin, D. Joo, and S. Debner. 2017. Conceptualizing community resilience: Revisiting conceptual distinctions. *Community Development* 48 (1): 105–123.

Mayer, N., Neighborhood organizations and community development: Making revitalization work. *No Title*, 1984.

McMillan, D. W., and D. M. Chavis. 1986. Sense of community: A definition and theory. *Journal of Community Psychology* 14 (1): 6–23.

Meerow, S., J. P. Newell, and M. Stults. 2016. Defining urban resilience: A review. *Landscape and Urban Planning* 147:38–49.

Mehmood, A. 2016. Of resilient places: Planning for urban resilience. *European Planning Studies* 24 (2): 407–419.

Melis, A., J. Lara-Hernandez, and J. Thompson. 2020. *Temporary Appropriation in Cities*. Springer.

Morris, D. J., and Hess, K. Neighborhood power: The new localism. *No Title* (1975).

Moser, C., and A. Stein. 2011. Implementing urban participatory climate change adaptation appraisals: A methodological guideline. *Environment and Urbanization* 23 (2): 463–485.

Norris, F. H., S. P. Stevens, B. Pfefferbaum, K. F. Wyche, and R. L. Pfefferbaum. 2008. Community resilience as a metaphor, theory, set of capacities, and strategy for disaster readiness. *American Journal of Community Psychology* 41:127–150.

Oldenburg, R., The Great Good Place: Cafés, Coffee Shops, Community Centers, Beauty Parlors, General Stores, Bars, Hangouts, and How They Get You Through the Day. *No Title* (1989).

Patel, S. S., M. B. Rogers, R. Amlôt, and G. J. Rubin. 2017. 'What do we mean by "community resilience"? A systematic literature review of how it is defined in the literature.' *PLoS Currents*.



<https://doi.org/10.1371/currents.dis.db775aff25efc5ac4f0660ad9c9f7db2>.

Pretty, J. 2003. Social capital and the collective management of resources. *Science* 302 (5652): 1912–1914.

Ralph, E. 1976. *Place and placelessness*. London: Pion.

Richardson, J. L. 1980. The organismic community: Resilience of an embattled ecological concept. *BioScience* 30 (7): 465–471.

Rodríguez, J. M. F. La importancia y la apropiación de los espacios públicos en las ciudades. *Paakat: Revista de Tecnología y Sociedad* (2014).

Rohe, W. H. 1985. *Planning with Neighborhoods*. University of North Carolina Press.

Rother, E. T. 2007. Systematic literature review X narrative review. *Acta Paulista De Enfermagem* 20:v–vi.

Saja, A. A., M. Teo, A. Goonetilleke, and A. M. Ziyath. 2018. An inclusive and adaptive framework for measuring social resilience to disasters. *International Journal of Disaster Risk Reduction* 28:862–873.

Satterthwaite, D. 2011. How urban societies can adapt to resource shortage and climate change. *Philosophical Transactions of the Royal Society a: Mathematical, Physical and Engineering Sciences* 369 (1942): 1762–1783.

Sherrieb, K., F. H. Norris, and S. Galea. 2010. Measuring capacities for community resilience. *Social Indicators Research* 99:227–247.

Soja, E. W. 1996. Thirdspace: Journeys to Los Angeles and other Real-and-Imagined Places. *Capital & Class* 22 (1): 137–139.

Spivak, G. C. 2003. *Death of a Discipline*. Columbia University Press.

Talen, E. 2000. Measuring the public realm: A preliminary assessment of the link between public space and sense of community. *Journal of Architectural and Planning Research* 17:344–360.

Turner, V. 1974. Liminal to liminoid, in play, flow, and ritual: An essay in comparative symbology. *Rice Institute Pamphlet-Rice University Studies*. <https://doi.org/10.5555/1983189935>.

UNDP (2018) *Urbanization and Development: Emerging Futures*.

Vale, L. J. 2014. The politics of resilient cities: Whose resilience and whose city? *Building Research and Information* 42 (2): 191–201.

Walker, B., and D. Salt. 2012. *Resilience Thinking: Sustaining Ecosystems and People in a Changing World*. Island Press.

Waters, M. C. 2016. Life after Hurricane Katrina: The resilience in survivors of Katrina (RISK) project. *Sociological Forum* 31 (1): 750–769.

Weidemann, S., and J. R. Anderson. 1985. *A conceptual framework for residential satisfaction*. Springer, USA, Boston, MA: Home Environments.

Wickes, R., C. Britt, and L. Broidy. 2017. The resilience of neighborhood social processes: A case study of the 2011 Brisbane flood. *Social Science Research* 62:96–119.

Wilson, G. 2012. *Community Resilience and Environmental Transitions*. Routledge.

Yates, D. 1973. *Neighborhood democracy: The politics and impacts of decentralization*. Lexington, Mass.; Toronto: DC Heath.

Yin, R. K. 1975. *Goals for citizen involvement: Some possibilities and some evidence*. Rand.

Zukin, S. 1995. *The Cultures of Cities*. Wiley-Blackwell.

Publisher's Note Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

