

**Designing for happiness, building for resilience
A systematic review of key factors for cities**

Sobhaninia, Saeideh; Samavati, Sahar; Aldrich, Daniel P.

DOI

[10.1080/19463138.2024.2412664](https://doi.org/10.1080/19463138.2024.2412664)

Publication date

2024

Document Version

Final published version

Published in

International Journal of Urban Sustainable Development

Citation (APA)

Sobhaninia, S., Samavati, S., & Aldrich, D. P. (2024). Designing for happiness, building for resilience: A systematic review of key factors for cities. *International Journal of Urban Sustainable Development*, 16(1), 360-378. <https://doi.org/10.1080/19463138.2024.2412664>

Important note

To cite this publication, please use the final published version (if applicable).
Please check the document version above.

Copyright

Other than for strictly personal use, it is not permitted to download, forward or distribute the text or part of it, without the consent of the author(s) and/or copyright holder(s), unless the work is under an open content license such as Creative Commons.

Takedown policy

Please contact us and provide details if you believe this document breaches copyrights.
We will remove access to the work immediately and investigate your claim.



Designing for happiness, building for resilience: a systematic review of key factors for cities

Saeideh Sobhaninia, Sahar Samavati & Daniel P. Aldrich

To cite this article: Saeideh Sobhaninia, Sahar Samavati & Daniel P. Aldrich (2024) Designing for happiness, building for resilience: a systematic review of key factors for cities, International Journal of Urban Sustainable Development, 16:1, 360-378, DOI: [10.1080/19463138.2024.2412664](https://doi.org/10.1080/19463138.2024.2412664)

To link to this article: <https://doi.org/10.1080/19463138.2024.2412664>



© 2024 The Author(s). Published by Informa UK Limited, trading as Taylor & Francis Group.



Published online: 05 Oct 2024.



Submit your article to this journal [↗](#)



Article views: 352



View related articles [↗](#)



View Crossmark data [↗](#)

Designing for happiness, building for resilience: a systematic review of key factors for cities

Saeideh Sobhaninia^a, Sahar Samavati^b and Daniel P. Aldrich^c

^aSchool of Geographical Sciences and Urban Planning, Arizona State University, Phoenix, AZ, USA; ^bFaculty of Industrial Design Engineering, Delft University of Technology, Delft, Netherlands; ^cPolitical Science and Policy School, Northeastern University, Boston, MA, USA

ABSTRACT

Cities today face the dual challenge of increasing vulnerability to disruptions and a growing demand for improved quality of life. By prioritising happiness and resilience, cities can create sustainable environments that promote health, social cohesion, and adaptability to various stresses and withstand economic, social, and environmental shocks while fostering the well-being, inclusivity, and quality of life of all residents. This study aims to understand what indicators most impact urban resilience and happiness through a systematic literature review. Our analysis uncovered that factors with a dual impact on improving urban resilience and happiness fit into the following categories: individual, social, socio-economic, environmental, infrastructural, technological, resource-based, place-based, urban planning, and housing-related. This study provided a comprehensive understanding of how urban design and policies can enhance both resilience and happiness in cities. Policymakers and planners can adapt and use the identified indicators and strategies to enhance citizens' happiness and create a resilient community in various contexts and under diverse stressors.

ARTICLE HISTORY

Received 29 July 2024

Accepted 30 September 2024



KEYWORDS

Happiness; urban happiness; resilience; urban resilience; systematic review

1. Introduction

Rapidly increasing urbanisation brings major challenges to the health, liveability, and quality of life of citizens in cities, especially as climate change consequences accelerate. Examples of recent disasters in urban spaces include the 1995 heat wave in Chicago, the 2011 triple disasters in Japanese cities in Tohoku, the 2017 floods in Mumbai, the 2021 Marshall Fires in Colorado, and the April 2024 Taiwan earthquake (Klinenberg 2002; Aldrich 2019). Cities must meet the present needs of society to ensure that individuals and communities have positive experiences, feel safe and comfortable, and have collective resilience against future shocks. Resilience here reflects the ability to withstand fast or gradual changes and bounce forward in the gravest of circumstances, showing coping and adaptive capability

when changes are against you (Sobhaninia 2023, 2024a). At the same time, researchers have underlined the critical importance of happiness, that is, the ability to handle stressors and shocks with mental equanimity (Samavati 2022; Veenhoven 2022). Urban happiness and residents' happiness are closely intertwined, as the design, infrastructure, and social dynamics of a city significantly influence the well-being, satisfaction, and quality of life of its inhabitants. Cities play a fundamental role in shaping residents' happiness (Samavati and Desmet 2022; Samavati et al. 2024). Urban happiness can be defined as the combined impact of various qualities of the cities that determine residents' happiness (Samavati and Desmet 2022). It is a multifaceted concept that encompasses a positive perception of a place by its inhabitants and represents a quantitative measure of the overall satisfaction and

CONTACT Saeideh Sobhaninia  ssobhan@clemsun.edu  School of Geographical Sciences and Urban Planning, Arizona State University, 2931 Madison Vistas Drive, Phoenix, AZ 85016, USA

© 2024 The Author(s). Published by Informa UK Limited, trading as Taylor & Francis Group.

This is an Open Access article distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/4.0/>), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited. The terms on which this article has been published allow the posting of the Accepted Manuscript in a repository by the author(s) or with their consent.

quality of life of citizens in a specific geographic area (Sepe 2016; Liao et al. 2022).

Practitioners and scholars alike have begun to recognise the significance of resilient and happy cities in academic studies and conferences, highlighting their significance in urban planning and development. The idea of happiness in urban environments has attracted growing interest due to its significant role in the overall well-being of city residents (Battistoni et al. 2023). For instance, the World Health Organization addressed this topic in 2014 by exploring how to create and measure happiness and resilience in cities (Kamel Boulos et al. 2015). In addition, the 17 Sustainable Development Goals (SDGs), particularly Goal 11 of the United Nations 2030 Agenda, emphasise the creation of a better future through resilient, inclusive, sustainable, and safe cities and settlements (Battistoni et al. 2023). The Intergovernmental Panel on Climate Change (IPCC) in 2018 highlighted that cities, as the current dominant settlement forms, must undergo major changes to be able to address the challenges following the 1.5° Celsius increase in global temperature (IPCC Change PC 2018; McGrath 2018). The UN has also urged practitioners to include happiness in development policy for over a decade (United Nations 2011).

Creating cities that are both resilient and happy remains a critical goal for societies around the world. Resilience ensures that cities can withstand and recover from adverse events like environmental disasters, climate change impacts, and economic shocks, protecting lives, property, and infrastructure (Aldrich 2012; Sobhaninia 2024b). Happy cities, on the other hand, prioritise the well-being of their inhabitants by increasing social connections, providing access to green spaces and other social infrastructure facilities, and improving physical and mental health (Fraser et al. 2022). When cities are both resilient and happy, they not only safeguard their communities against crises but also enhance the quality of life, leading to healthier, more engaged, and productive populations. This dual focus contributes to sustainable urban development, attracting investment and creating vibrant, thriving communities that can adapt to and flourish amidst future challenges (Liao et al. 2022).

As a result, the present study focused on understanding the measures captured by previous analyses that were focused on creating urban resilience and happiness. It employs a comprehensive systematic review and qualitatively analyzes them to capture

the framework of creating more resilient and happier cities in areas facing various types of stressors. This article contributes to the existing literature in several ways. First, to our knowledge, while there are several systematic reviews of these fields in isolation (Fraser et al. 2021), it is among the first studies to investigate the literature that covers both resilience and happiness. Second, rather than a qualitative summary or table listing of the dozens of studies under review, we provide easy-to-understand visualisations that illuminate the overlap (and lack thereof) in factors connected to happiness and resilience (Tomz et al. 2003). Finally, this paper provides city managers, urban planners, and disaster agencies with a concrete set of variables that can help them create happier and more resilient cities.

2. Resilience

Multidisciplinary and complex (Rodin 2014), a resilience-centred approach recognises the world as an adaptive, dynamic system (Amirzadeh et al. 2022). The term derives from the Latin word *resilire*, meaning springing back (Davoudi et al. 2013). Early resilience definitions were often focused on returning to the pre-disaster equilibrium, while more recent definitions focus on bouncing forward to enable communities and institutions to overcome the same shock in the future (Sobhaninia and Buckman 2022). An over-reliance on returning to pre-disaster characteristics can lock cities and communities into the same vulnerable status and lead to similar and, in some cases, worse responses in time of future shocks (Saunders and Becker 2015). Merely focusing on resuming pre-disaster characteristics also leads to unsustainable patterns of urban development (Chelleri 2012).

The resilience concept originates from engineering science studies of material resistance (Tierney and Bruneau 2007), which seeks to adjust system performance to the prevailing conditions (Madni and Jackson 2009). It rests on the concept of returning to equilibrium (Ahern 2010), meaning that a system should resist upcoming disruptions, adjust its function to the changing situations, and return to the status quo (Simmie and Martin 2010). However, in the late 20th century, many scholars considered resilience as a non-equilibrium paradigm. The non-equilibrium resilience model derived from ecological science depended on the amount of stress a system could

withstand without changing its structure (Holling 1973). Later in the 1970s, psychologists started to study resilience as the individual's ability to respond to adversity (Runswick-Cole and Goodley 2013). Another recent resilience approach to the topic is community resilience, which is the ability of communities to maintain the well-being of community members in times of challenges and cope with disruptions derived from social, political, or environmental changes (Aldrich 2012; Sobhaninia et al. 2023).

The concept of resilience arrived relatively recently in the city planning literature. As cities are multidimensional, adaptive social-ecological systems, resilience can provide valuable insights into cities' social, physical, and ecological aspects (Orleans Reed et al. 2013; Delgado-Ramos and Guibrunet 2017) by increasing cities' ability to withstand, adapt, and respond to uncertain changes (Desouza and Flanery 2013). Urban resilience refers to the city's ability to cope with and respond to various stresses and shocks (Leichenko 2011). Meerow et al. (2016) defined urban resilience as the capability of urban systems, along with their socio-technical and socio-ecological networks across various spatial and temporal scales, to sustain or quickly restore desired functions when it is disturbed, adapt in times of change and transform systems that constrain present or future adaptive capacity swiftly.

In addition, resilience includes various disciplines, including cultural, economic, political, and educational focused ones (Huang et al. 2022; Sobhaninia 2023). Culturally resilient cities consider a set of culturally normal behaviours depending on the cultural context in which a shock happens (Ungar 2004). Economically resilient cities aim to develop commercially and withstand and address interruptions to their economic systems, such as a recession (Simmie and Martin 2010). Governmentally resilient cities seek to be actively involved when needed, engage citizens in planning, and allocate resources equally (Pearson et al. 2014). Lastly, education resilience aims to promote and develop children's emotional and social well-being at school (Gillham et al. 2013). Although resilience disciplines are various, they all share five goals: awareness, diversity, integration, self-regulation, and adaptiveness (Rodin 2014; Amirzadeh and Barakpour 2019).

Furthermore, resilience contains various approaches, including recovery, coping with change, incremental adaptation, and transformational adaptation

(Amirzadeh et al. 2022). Recovery seeks to return the system to pre-disaster equilibrium or bounce forward and create a new equilibrium (Sobhaninia and Buckman 2022). Coping represents maintaining the system's current equilibrium by responding to disasters' impacts in the short term. Adaptation aims to improve the capacity of cities and develop the current characteristics to adjust and respond to changing internal and external drivers (Folke et al. 2010). Incremental adaptation includes developing more than usual to cope with drastic stresses and maintain the city's performance (Chelleri et al. 2015). Lastly, the transformation, which is the primary disaster risk management strategy, includes long-term structural changes, which may or may not alter the city's fundamental characteristics to facilitate reaching a new equilibrium to deal with large-scale shocks (Davidson 2010; Martin 2012; Buckman and Sobhaninia 2022).

2.1. The resilience of what to what?

Resilience can be viewed from two perspectives: general and specified. Depending on the context and situation, resilience strategies might focus on a wide range of stressors or a specific one (Galaitis et al. 2021; Amirzadeh et al. 2022). General resilience seeks to integrate various uncertainties and improve cities' capability to cope with and respond to a wide range of potential shocks and risks (Leichenko 2011). Some researchers believe that overly focusing responses on studies of one type of shock possibilities can lead to a fragile, unbalanced system. By creating a more general and flexible approach to resilience that improves urban resilience in various aspects, cities can better withstand a broad spectrum of uncertain futures (Folke et al. 2010; Sapountzaki 2014). Some general resilience dimensions include self-organisation, self-sufficiency, multi-functionality, flexibility, diversity, and connectivity (Amirzadeh et al. 2023).

On the other hand, other researchers believe that specified resilience – with plans to achieve resilience to a specific risk – better aligns with the complex features of cities. They see resilience not as an abstract concept that can be applied to a broad spectrum of abstract possible uncertainties but rather as specific adaptive capacities to concrete risks. To develop resilience in cities, practitioners need to identify the

particular risks that cities face and improve city aspects that facilitate coping with their threats in the present and future (Carpenter et al. 2001; Desouza and Flanery 2013; Vale 2014).

3. Happiness

Throughout history, *happiness* has captured a variety of loosely linked concepts. Philosophers employed the term to signify leading a virtuous life and highlighting ethical conduct (cf. Plato's *The Republic*). Additionally, happiness was associated with favourable living conditions and was synonymous with 'livability.' In recent years, a growing number of scholars have explored the conceptual analysis of happiness through various notions such as happiness (Veenhoven 1997; Easterlin 2003; Tella and MacCulloch 2006; Layard 2010), quality of life (Veenhoven 2000; Marans 2012), life satisfaction (Cummins 1996; Diener et al. 2013; Ouria 2019; Moulay and Ujang 2021), and (subjective) people's well-being (Diener 1994; Diener et al. 1999; Veenhoven 2007; Layard 2010 Dolan and Metcalfe 2012). Positive emotions have been found to aid in recovery from negative experiences (Lyubomirsky and Della Porta 2010). In this paper, we adopt this conceptual framework,

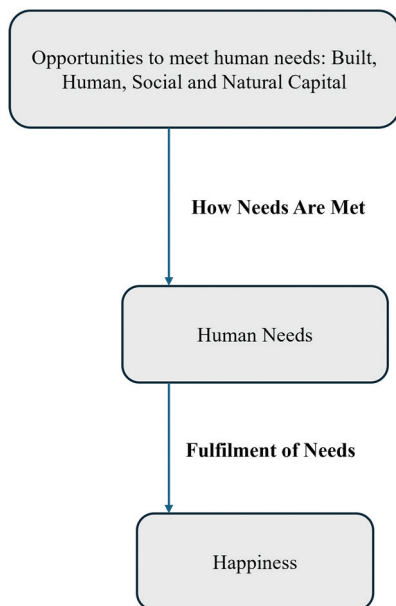


Figure 1. Definition of happiness, adapted from Costanza et al. (2007).

building on the work of the World Database of Happiness (Veenhoven 2022). We align with their definition of happiness as the subjective enjoyment of an individual's life as a whole; essentially, it is how much individuals like the life they live. Figure 1 traces one approach of developing happiness over time (Costanza et al. 2007).

3.1. Concept of urban happiness

The characteristics of the city can affect how residents view themselves and their environment, which can lead to different emotional states, such as feelings of comfort, security, happiness, or annoyance (Weijs-Perrée et al. 2020). Previous studies that have analysed people's subjective well-being regarding urban environments focus mainly on happiness, which is an essential indicator of individuals' mental health (e.g. Sepe 2016). Urban Happiness stems from social, physical, and cultural dimensions, broader conditions of communities and governments, subjective factors, and the qualities of urban spaces (Shoval et al. 2018; Samavati and Ranjbar 2019). Urban happiness can be defined as the combined impact of various public space qualities that determines citizen happiness (Samavati and Desmet 2022). It is a multifaceted concept that encompasses a positive perception of a place by its inhabitants and induces them to spend a long time there (Sepe 2016; Samavati et al. 2024). Moreover, it serves as a qualitative indication of the general contentment and standard of living experienced by inhabitants within a designated geographical region, often within a local community or urban centre (Battistoni et al. 2023). Figure 2 below visualises the dimensions impacting happiness in urban spaces.

4. The importance of urban happiness in resilience

As the frequency of both slow-onset and rapid-onset disasters escalates globally, the imperative to refine urban planning and design strategies to mitigate their impacts on communities and cities grows more urgent (Mark et al. 2023). Furthermore, the concept of resilience extends beyond mere survival; it encompasses the creation of cities that not only withstand a wide variety of adversities but also promote the well-being and happiness of their

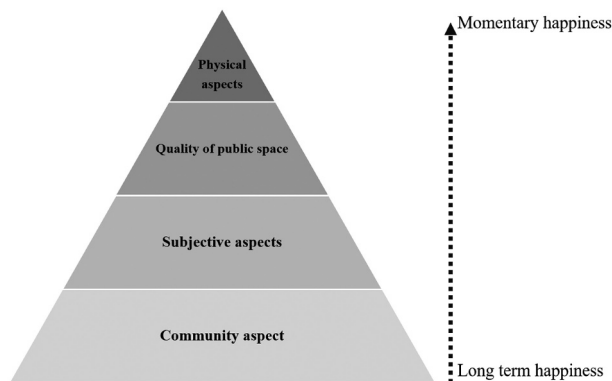


Figure 2. Dimensions influencing happiness in urban spaces (from Samavati and Ranjbar 2019).

inhabitants (Magdi 2022). Urban resilience, therefore, plays a pivotal role in fostering subjective well-being among residents. Research has shown that bolstering urban resilience contributes to enhanced happiness through improved satisfaction with one's surroundings, along with stronger ecological, infrastructure, community, and economic resilience (Liao et al. 2022).

5. Research methodology

This article sought to identify the indicators of urban resilience and happiness that were employed in studies that focused on creating both resilience and happiness in cities. The primary research question posed was: How can happy cities be developed in areas facing disasters? A systematic review was conducted using the framework outlined by Moher et al. (2009) to address such complex questions. The analysis focused on identifying the predominant indicators used in the literature for urban resilience and happiness. The methodology was guided by the Preferred Reporting Items for Systematic Reviews and Meta-Analyses Extension for Scoping Reviews (PRISMA-ScR) Checklist, as suggested by Tricco et al. (2018).

The initial data collection phase involved an extensive search on the Web of Science (WoS) database on 28 March 2024. We selected the WoS because it contains more than 22,000 peer-reviewed journals, 226,000+ conference publications, and 126,000+ books. Our search aimed to comprehensively cover the literature regarding the studies on the

relationship between creating happier and more resilient cities. The search query was structured around two key themes, urban resilience and happiness, and was limited to studies published in English. The specific search query employed was as follows:

TITLE-ABS-KEY (('resilient*') AND ('urban' OR 'city' OR 'cities') AND ('happy' OR 'happiness'))

The search yielded 85 articles with abstracts and full manuscripts which the team thoroughly reviewed to pinpoint studies addressing ways to create both happier and more resilient cities. This initial screening resulted in the exclusion of 43 studies that did not align with the research objectives.

The focused examination of the remaining 42 studies utilised the PRISMA-ScR Checklist to categorise data concerning the indicators of urban resilience and urban happiness separately. Each study was analysed using this qualitative inductive content analysis method. PRISMA-ScR facilitated an organic emergence of categories as team members reviewed the literature, allowing for the addition of new information to existing categories or the creation of new ones as necessary. The analysis was comprehensive, ensuring all relevant data was captured and categorised, fostering a comprehensive comparison of different perspectives and minimising redundancy. Through this systematic literature review and inductive content analysis, we identified the most used urban resilience and happiness indicators in the studies. Additionally, studies published after the initial March 2024 search were acknowledged for their insights, although they were not included in the systematic review. The

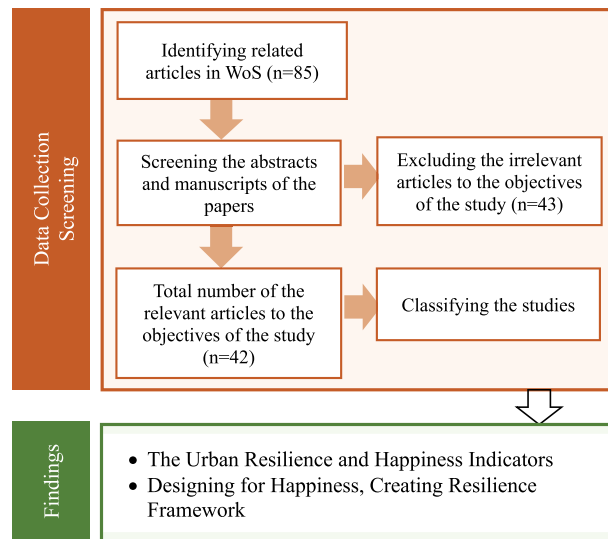


Figure 3. Systematic literature review process, structure adapted from Moher et al. (2009).

research methodology incorporated many relevant findings from these additional studies, enhancing the scope of the research. The reviewed studies were deemed sufficient to achieve the research goals, with further additions unlikely to impact the results significantly. Figure 3 below illustrates the systematic literature review process.

6. Results

The results showed that there is limited research worldwide that has studied both urban resilience and happiness concepts, especially in the context of environmental changes. However, as can be seen in Figure 4, except for 2020 and 2021, the research on

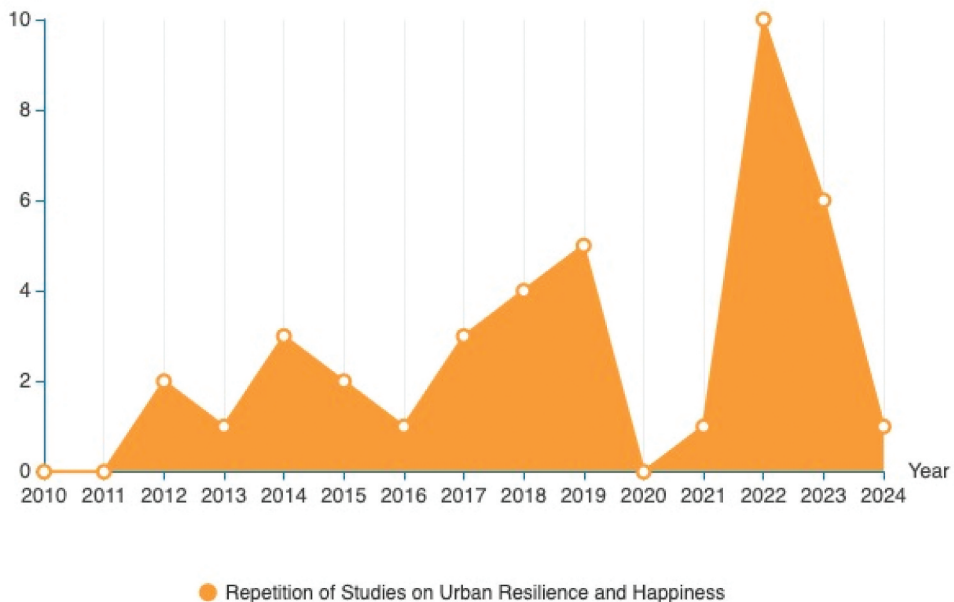


Figure 4. Temporal range of the research on creating resilient and happy cities.

Table 1. Geographic location of sample studies.

Location	Frequency	Percentage
Europe	12	28.6%
Asia	11	26.2%
North America	4	9.5%
Africa	2	4.8%
Australia	1	2.4%
Not Specified	12	28.6%

creating urban resilience and happiness has an upward trend, with the most research being done in 2022.

We also examined the geographical distribution of the studies reported in the 42 papers included in our review. The results, as presented in [Table 1](#) and [Figure 5](#), reveal that most of the reviewed studies (28.6%) were conducted in Europe, including countries such as Greece, Denmark, Finland, the United Kingdom, Italy, the Netherlands, and Norway. Additionally, a significant number of studies have explored the relationship between happiness and resilience in Asia, such as in China, Iran, Thailand, and the Palestinian territories. A smaller proportion of published papers (4.8%) focused on African and North American countries (9.5%). Notably, 28.6% of the papers did not specify the context of their study.

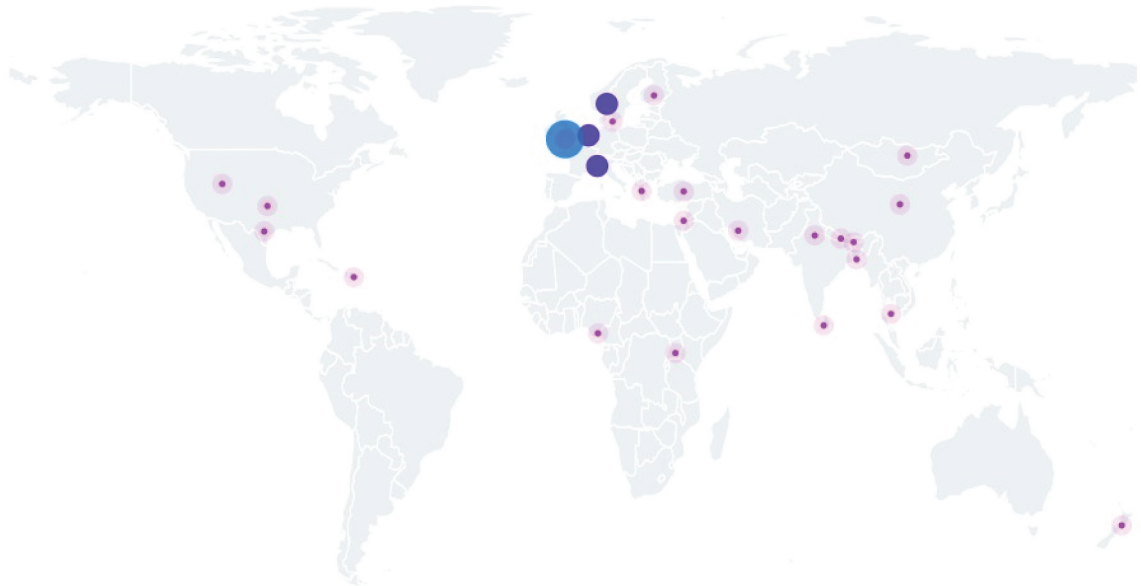
Next, we examined the type of shock research studied to create resilience against. The results are

shown in [Figure 6](#). According to the literature review, most studies had not focused on specific stressors and approached resilience in terms of its general meaning. However, among those that mentioned a specific stressor, studies mainly focused on creating urban resilience and happiness against COVID-19 and climate change.

Next, we examined the indicators of urban resilience and happiness that previous studies used to create both more resilient and happier cities.

The indicators of resilience regarding creating urban happiness mentioned in previous studies were social activity, health and well-being of communities and individuals, social equity, local leadership, community institutions, public spaces, social cohesion, urban ecological resources, financial resources, social trust, upgraded built environment, technological improvement, quality of life, and community education. Results showed that the most repeated indicators of resilience regarding creating a happier city were social activities, individuals' and communities' health and well-being, and social cohesion. [Table 2](#) and [Figure 7](#) lay out these indicators.

Furthermore, some of the most repeatedly mentioned indicators of urban happiness regarding creating resilience mentioned in previous studies were neighbourhood density, transportation infrastructure, natural environment, walkability, social cohesion,

**Figure 5.** The geographical distribution of studies on urban resilience and happiness.

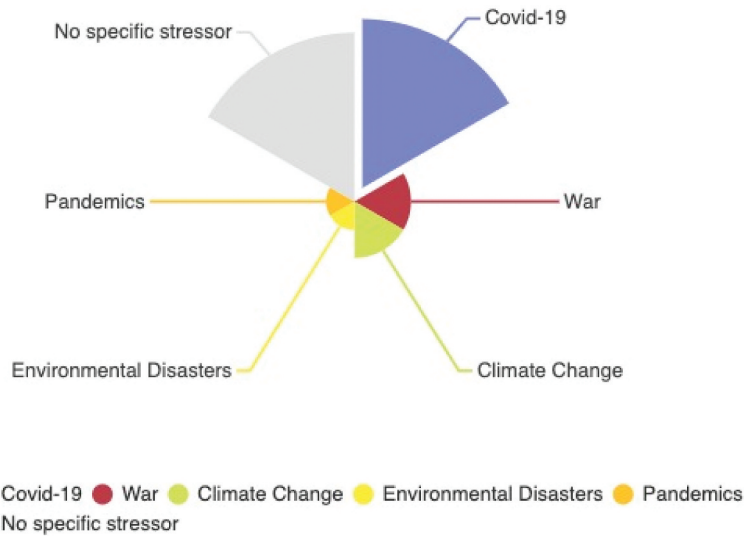


Figure 6. The types of stressors that studies have focused on.

Table 2. Resilience indicators regarding creating urban happiness.

Indicator	Reference	Frequency
Social activities	Bach (2018)	2
Individuals and community well-being and health	Ogwueleka and Ogbonna (2018); Shekhar et al. (2019); Sassen and Kourtit (2021); Collado and Potangaroa (2023); Danielli et al. (2023)	5
Social equity	Benner and Pastor (2016)	1
Local leadership	Danielli et al. (2023)	1
Community institutions	Bach (2018)	1
Public spaces	Mukherjee et al. (2022)	1
Urban ecological resources/green infrastructure	Bach (2018); Liao et al. (2022); Mukherjee et al. (2022); Kourtit et al. (2022)	5
Social cohesion	Bach (2018); Bowden et al. (2018); Kourtit et al. (2022)	3
Financial resources	Satumanatpan and Pollnac (2017); Liao et al. (2022); Collado and Potangaroa (2023)	3
Social trust	Liao et al. (2022)	1
Place quality	Collado and Potangaroa (2023)	1
Sustainable energy	Bach (2018)	1
Quality of life/life satisfaction	Ogwueleka and Ogbonna (2018); Sassen and Kourtit (2021)	2
Community education	Corcoran et al. (2018)	1
Redevelopments	Liao et al. (2022)	1
Air quality	Liao et al. (2022)	1
Sustainable infrastructure	Liao et al. (2022)	1
Socio-economic conditions (income, job opportunities, etc.)	Liao et al. (2022); Satumanatpan and Pollnac (2017)	2
Population density	Liao et al. (2022)	1
Social capital	Satumanatpan and Pollnac (2017); Collado and Potangaroa (2023); Kourtit et al. (2022)	3
Social participation	Sassen and Kourtit (2021)	1
Political resources	Sassen and Kourtit (2021)	1
Sense of community	Kourtit et al. (2022)	1
Public service accessibility	Kourtit et al. (2022)	1

place identity, social participation, land use, people's well-being, and life satisfaction. Table 3 and Figure 8 demonstrate these indicators.

Finally, we overlapped the urban resilience and happiness indicators to see which indicators matched

between them. Some indicators that overlap between creating urban resilience and urban happiness were urban ecological resources, individuals' and communities' health and well-being, social cohesion, sense of community, socio-economic status, public service

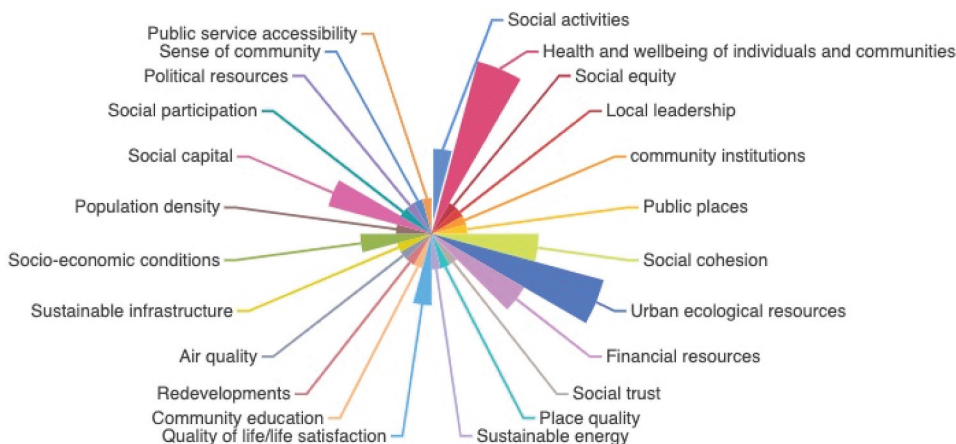


Figure 7. Resilience indicators regarding creating urban happiness.

accessibility, place quality, social participation, life quality and satisfaction, public spaces, social activity, population and neighbourhood density, air quality, integrated development plans, sustainable energy, social trust, and financial and economic resources. Figure 9 represents these indicators. In this figure, the thicker the link between the concept and indicator is, the more it has been repeated. In addition, the indicators with yellow rectangular are related to urban happiness, the indicators with blue rectangular are related to urban resilience, and the indicators with green rectangular are related to both happiness and resilience concepts.

7. Discussion

A happy city simultaneously can be resilient as it fosters a strong sense of community, well-being, and social cohesion, factors which are vital in times of crisis (Aldrich 2019; Sobhaninia 2024b). When residents are content and engaged, they are more likely to support one another, collaborate, and participate in collective recovery efforts. Happy cities typically prioritise mental and physical health, provide ample green spaces, and ensure access to recreational and cultural activities, all of which contribute to a population's overall well-being. This positive environment enhances people's capacity to cope with stress and adversity, making them more adaptable and resourceful during emergencies. Moreover, a focus on happiness can drive proactive measures in urban planning and development, creating environments

that are not only pleasant to live in but also designed to withstand and bounce back from disruptions. Thus, by cultivating happiness, cities build a robust foundation for enduring and thriving through challenges.

The study findings showed that even though hundreds of studies focus on improving resilience and dozens on creating urban happiness, the number of studies that focus on both concepts is limited. However, due to the rising necessity of resilient and happy cities and the focus given by the UN in 2011, the World Health Organization in 2014, and the Intergovernmental Panel on Climate Change (IPCC) in 2018, more and more research has focused on improving both resilience and happiness in cities, especially in the last decade.

According to the literature review, some of the most repeatedly mentioned indicators of urban resilience were social activities, health and well-being of individuals and communities, social equity, social cohesion, urban ecological resources, financial resources, quality of life and life satisfaction, socio-economic status, and social capital. Moreover, some of the most repeatedly mentioned indicators of urban happiness were distance to the city centre, neighbourhood density, transportation infrastructure, ecological resources, public service accessibility, affordable housing, walkability, place quality, community participation, socio-economic status, land use, place identity, health and well-being, and life satisfaction.

Results suggest that many urban resilience and happiness indicators overlap with one another in

Table 3. Urban happiness indicators regarding creating urban resilience.

Indicator	Reference	Frequency
Distance to city centre	Mouratidis and Yiannakou (2022)	1
Population and neighborhood density	Mouratidis and Yiannakou (2022); Mouratidis (2022)	2
Transportation infrastructure	Bach (2018); Shekhar et al. (2019); Mouratidis and Yiannakou (2022)	3
Ecological resources	Beatley and Newman (2013); Kamel Boulos et al. (2015); Beatley (2017); Shekhar et al. (2019); Prescott et al. (2019); Mouratidis and Yiannakou (2022)	6
Public service accessibility	Kourtiti et al. (2022); Mouratidis and Yiannakou (2022); Mouratidis (2022)	3
Affordable housing/housing quality	Bach (2018); Shekhar et al. (2019); Mouratidis and Yiannakou (2022); Mouratidis (2022)	4
Air quality	Bach (2018)	1
Walkability	Battistoni et al. (2023); Joulaei et al. (2022)	2
Bicycle-oriented	Battistoni et al. (2023); Joulaei et al. (2022)	2
Spatial cohesion	Battistoni et al. (2023); Joulaei et al. (2022)	2
Place quality (variety, flexibility, legibility, spatial accessibility and penetrability, street layout, urban form)	Shekhar et al. (2019); Joulaei et al. (2022); Battistoni et al. (2023)	3
Community participation and engagement	Shekhar et al. (2019); Mukherjee et al. (2022)	2
Safety	Shekhar et al. (2019)	1
Public space	Shekhar et al. (2019)	1
Socio-economic conditions	Shekhar et al. (2019); Veronese et al. (2012)	2
Integrated development plans	Mukherjee et al. (2022)	1
Land use	Kamel Boulos et al. (2015); Shekhar et al. (2019); van den Dobbelaere (2021)	3
Hedonic adaptation	Collado and Potangaroa (2023)	1
Social cohesion	Collado and Potangaroa (2023)	1
Spatial mobility	Sassen and Kourtiti (2021)	1
Urban resilience	Satumanatpan and Pollnac (2017); Hanrahan and Gonzalez (2019); Romano (2022)	3
Basic needs fulfillment	Satumanatpan and Pollnac (2017)	1
Social trust	Chai et al. (2023)	1
Social and individual activity	Mouratidis and Yiannakou (2022); Romano (2022)	2
Place identity	Shekhar et al. (2019); van den Dobbelaere (2021); Battistoni et al. (2023)	3
Support network	Swahn et al. (2022)	1
Smart cities and regions	Swahn et al. (2022); Zhu et al. (2022); Shchepkina et al. (2024)	3
Individuals and communities' well-being and health	Mouratidis and Yiannakou (2022); Romano (2022); Swahn et al. (2022); De Noia and Rossetti (2023)	4
Sustainable technologies	Takefuji (2023)	1
Job opportunities	Satumanatpan and Pollnac (2017); Bach (2018)	2
Hope	Hanrahan and Gonzalez (2019); Prescott et al. (2019)	2
Life satisfaction	Veronese et al. (2012); Liao et al. (2022); Mouratidis and Yiannakou (2022)	3

previous studies. The observation that urban resilience and happiness indicators were mostly mutual suggests a strong interconnectedness between these two concepts. Urban resilience, which refers to a city's ability to absorb, recover, and adapt to various shocks and stresses, inherently supports the well-being and satisfaction of its residents. Indicators such as community engagement, economic stability, accessible healthcare, and quality infrastructure often contribute to both resilience and happiness. For instance, a resilient city with robust social networks and effective governance not only better withstands crises but also fosters a sense of security and community belonging, enhancing residents' happiness.

Similarly, access to green spaces and public amenities, which are crucial for urban resilience, also improves quality of life and happiness. This mutual relationship indicates that efforts to enhance urban resilience simultaneously promote the happiness and overall well-being of urban populations, highlighting the importance of integrated approaches in urban planning and policymaking.

Based on the comprehensive literature review findings, Figure 9 illustrates the research framework that represents the integrated model for designing urban environments with the dual goals of fostering happiness and creating resilience. This model encompasses a comprehensive approach that intertwines various

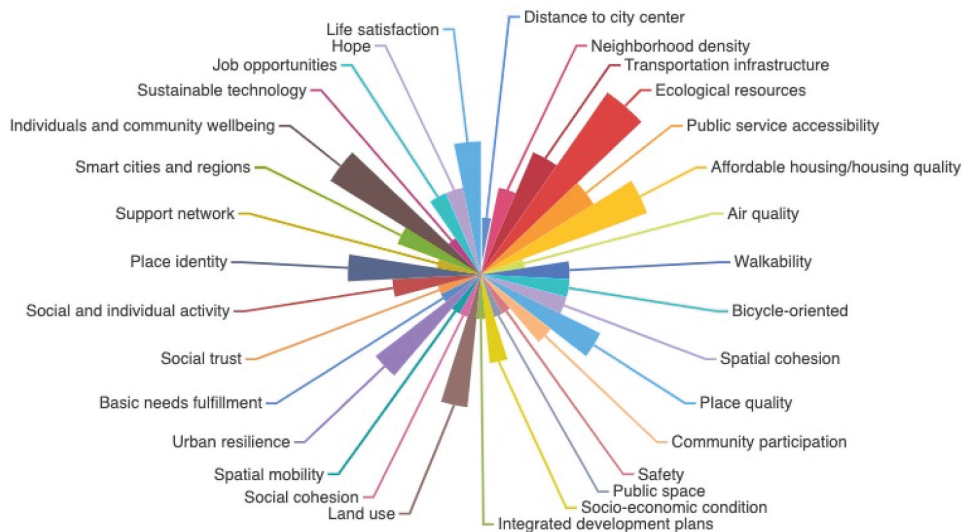


Figure 8. Urban happiness indicators regarding creating urban resilience.

elements critical to achieving these objectives. It includes the indicators identified in previous studies, all of which contribute to the overall well-being and adaptability of urban populations. Based on the findings, urban resilience and happiness indicators can be categorised into individual, social, socio-economic, environmental, infrastructural, technological, resource-based, place-based, urban planning, and housing-related variables.

By prioritising these elements, the framework guides urban planners and policymakers in creating environments that not only enhance the quality of life but also ensure the city's capacity to withstand and recover from various challenges. This holistic approach acknowledges that happiness and resilience are interdependent, with measures that promote one often benefiting the other. Thus, Figure 10 below can serve as a blueprint for developing urban strategies that simultaneously uplift the spirits of residents and fortify the city's structural and social fabric against future adversities.

The following paragraphs elaborate on each indicator category.

• Social Indicators

Studies that focused on the social dimensions of designing for happiness and creating resilience revealed several important variables that lead to the

happiness and resilience of citizens. People are happier and feel more resilient in cities when they feel safe and secure (Shekhar et al. 2019, Nasri et al. 2022). Additionally, when communities are designed to augment social cohesion, social capital, and social equality, individuals are likely to experience an elevated sense of community and a heightened state of well-being, even during disasters (Fraser et al. 2022). Social activity in the urban environment, social participation (Sassen and Kourtit 2021), and social trust (Liao et al. 2022) were also found to be significant determinants of designing for happiness and creating resilience in cities.

• Socio-economic Indicators

Research indicates that socio-economic indicators, such as population density, income level and job opportunities, are important factors affecting designing for citizens' happiness and creating resilience. Social cohesion is more frequent in the reviewed studies (Mitchell and Thompson 2013; Bach 2018; Bowden et al. 2018; Kourtit et al. 2022).

• Urban planning Indicators

Multiple papers highlight the significant impact of urban planning indicators on designing for happiness and creating resilience in the urban environment. The

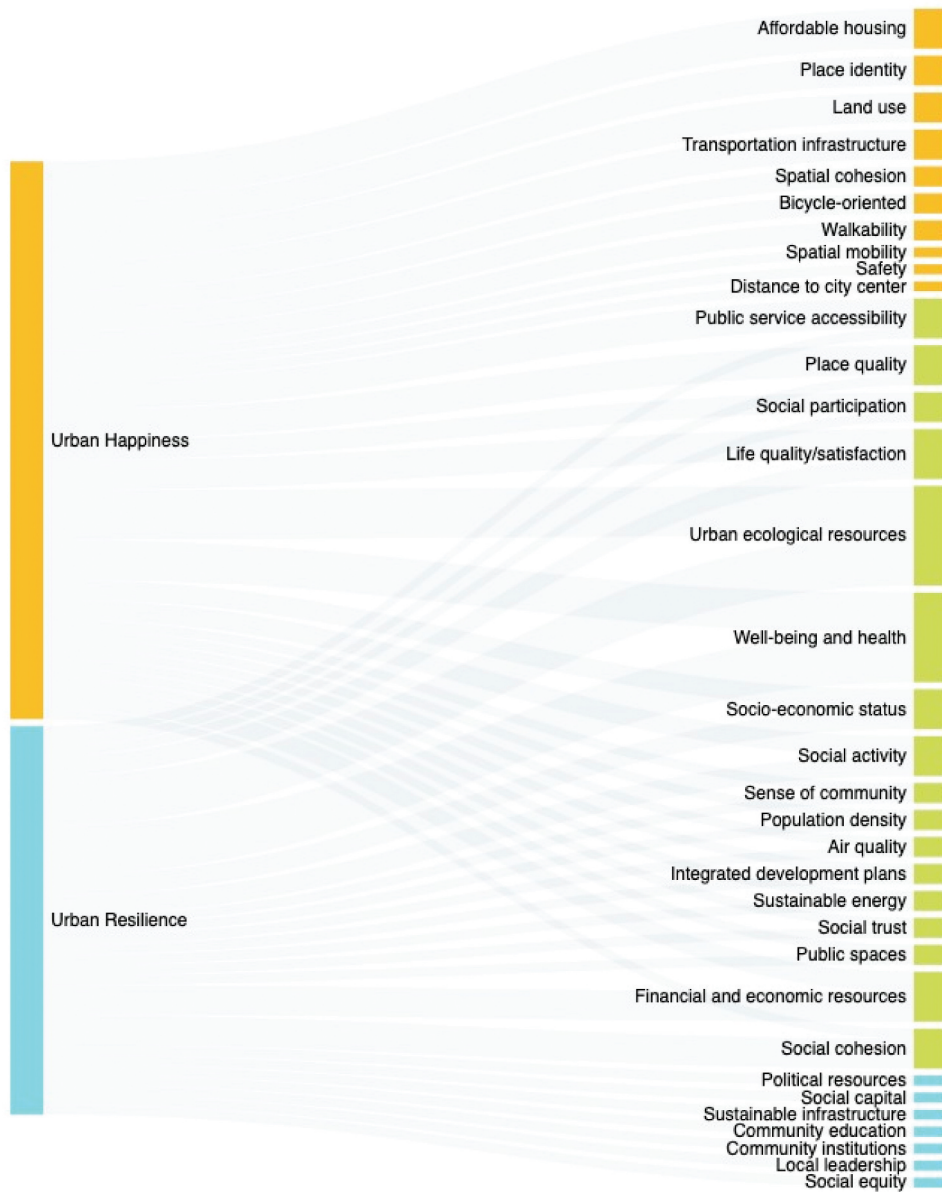


Figure 9. Overlapping urban resilience and happiness indicators.

urban planning indicators of designing for happiness and creating resilience encompass a wide range of features, such as land use, integrated development plans, walkability, spatial mobility, and distance to the city centre. Among these factors, *land use* was found to be more frequently mentioned in studies and has a positive effect on happiness, as supported

by a range of studies (Kamel Boulos et al. 2015; Shekhar et al. 2019; van den Dobbelen 2021).

- **Housing-related Indicators**

Housing-related factors affect citizens' happiness and resilience in urban environments. Housing-related



Figure 10. Designing for happiness, creating resilience model.

indicators revealed important variables that lead to the happiness of citizens. As indicated in studies, housing affordability and housing quality can help people to feel more happiness and create a higher level of resilience (Bach 2018; Shekhar et al. 2019; Mouratidis and Yiannakou 2022; Mouratidis 2022; Achmadi and Sintusingha 2023; Shakib et al. 2024).

- **Resource-based Indicators**

Research indicates that urban planning indicators, such as a scenic environment, are important factors affecting citizens' happiness. Table 1 includes a total of six factors related to visual environment qualities. Several studies have consistently demonstrated that

individuals residing in *visually appealing* and *aesthetically vibrant* urban environments perceive higher levels of happiness (e.g. Kwon et al. 2019; Shedid and Hefnawy 2021). Notably, the presence of *attractive, aesthetically pleasing, and colorful urban spaces* (Saeedi and Dabbagh 2021), as well as *scenic landscapes* (Zhang et al. 2018; Seresinhe et al. 2019), has consistently been associated with heightened levels of happiness among urban residents.

- **Technological Indicators**

Studies demonstrate the crucial role of technical indicators on citizen happiness and resilience in urban environments. Leveraging sustainable energy

solutions and IoT services can significantly contribute to the well-being of residents (Takefuji 2023).

- **Infrastructure Indicators**

Studies that have focused on infrastructural indicators for designing happiness and building resilience have highlighted important variables, including transportation infrastructure and sustainable infrastructure (Wang et al. 2024). As shown in these studies, these variables significantly contribute to enhancing citizens' sense of happiness.

- **Place-based Indicators**

Research has highlighted the significance of place-based variables in designing happiness and fostering resilience. Several factors associated with specific locations contribute to enhancing citizens' well-being and resilience. These factors include place identity, spatial cohesion, and public spaces. Notably, place identity emerges as a particularly influential variable (Shekhar et al. 2019; van den Dobbelsteen 2021; Battistoni et al. 2023).

- **Environmental Indicators**

Various studies have shown that environmental indicators affect citizens' happiness and resilience. Figure 3 provides two factors, including urban ecological resources and air quality.

7.1. Strategies to foster urban resilience and happiness

Urban resilience and citizen happiness are intertwined, and recent research underscores the importance of intentional strategies to foster both. Drawing from empirical studies, the key approaches that can contribute to resilient and happier cities:

- Prioritising happiness: by focusing on the happiness and well-being of individuals, neighbourhoods, and communities, urban designers, architects and policymakers can create more sustainable and resilient urban settlements. This involves considering physical health, mental well-being, and social connectedness.
- Empowering social movements: Establish a dynamic social movement aimed at improving

health and equality; transfer 'old power' to City Mayors; empower communities by giving them authority and privilege.

- Designing and supporting social spaces and social infrastructure: Physical spaces play a pivotal role in urban life. By intentionally designing public areas where people can meet, interact, and engage as active citizens, the social fabric can be strengthened and is so fundamental to resilient societies (Fraser et al. 2022; Aldrich 2023).
- Embedding happiness in resilience strategies: Resilience planning should encapsulate and reflect citizens' well-being. This research advocates merging citizen science-inspired experimental approaches at a decentralised territorial level with user-friendly digital technologies to enhance acceptance and efficiency in improving people's quality of life.
- Upgrading Built Environments: Transitioning to upgraded infrastructure and sustainable urban design enhances resilience. Investments in green spaces, efficient transportation, and eco-friendly buildings contribute to both well-being and adaptability.
- Resilience Training: Equipping citizens with resilience skills is crucial. Training programmes can enhance coping mechanisms, crisis response, and community cohesion.
- Urban Ecological Resources: The availability, quantity, and quality of ecological resources matter. Prioritising green spaces, clean water, and biodiversity contributes to both resilience and happiness.
- Personal Health Improvement: A healthier population is more resilient. Promoting physical fitness, mental health awareness, and preventive care directly impacts overall well-being (Musa et al. 2018).
- Social Integration and Social Trust: Strengthening social bonds fosters resilience. Communities with high levels of social integration and trust are better equipped to face challenges.
- Economic Well-Being: Rising income levels and improved family consumption positively correlate with happiness. Economic stability contributes to overall urban resilience.

In conclusion, a holistic approach that integrates happiness, social empowerment, and sustainable design

is imperative for creating resilient and happy cities. This research was one of the first studies that systematically examined the intersection of urban happiness and resilience, providing an integrated framework for understanding how cities can simultaneously enhance well-being and adaptability to disruptions through urban design, policies, and practices. This approach offers valuable insights for future research and informs evidence-based strategies to create cities that are both adaptable to challenges and conducive to human happiness. Policymakers and urban planners can use these strategies to foster citizens' happiness and create a resilient community. Future studies can adopt the model in various case studies, adapt the indicators to the specific features of each context and the types of stressors they face, and provide strategy recommendations to increase urban resilience and happiness.

A limitation of this study is its reliance on existing literature, with limited research specifically addressing both resilience and happiness. As a result, the study may not have fully captured emerging trends or local variations in urban happiness and resilience across different geographical and cultural contexts. Future studies can contribute to a deeper understanding of the relationship between urban happiness and urban resilience by measuring the identified ingredients from the systematic review in the context of specific cities, quantifying the correlation between happiness and urban resilience at the city level, investigating the mechanisms through which individual happiness contributes to urban resilience, examining the role of moderator variables that may influence the relationship between happiness and resilience, and conducting case studies with various geographical and cultural contexts to explore the specific dynamics and factors contributing to happiness and resilience in particular cities. Additionally, future studies can explore factors contributing to unhappiness or marginalisation in the resilience process.

8. Conclusion

Urbanisation and climate change pose numerous challenges, significantly affecting the health and quality of life of residents. Consequently, urban happiness and resilience are vital for promoting well-being and ensuring that city dwellers can flourish despite these challenges. This study aimed to identify the indicators that most influence urban resilience and happiness

through a systematic literature review. Our findings reveal that, despite its importance, few studies have simultaneously addressed urban resilience and happiness, particularly in the context of multiple stressors.

The indicators identified in previous studies as having a dual impact on improving urban resilience and happiness are categorised into individual, social, socio-economic, environmental, infrastructural, technological, resource-based, place-based, urban planning, and housing-related variables. The indicators that had the most impact on creating for happiness and building resilience were social cohesion, land use, social participation, social trust, housing affordability and quality, visually appealing and aesthetically vibrant urban environments, transportation infrastructure, and place identity. Policymakers and urban planners can apply the indicators and strategies highlighted in this research to enhance citizen happiness and build resilient communities in diverse contexts and under various stressors.

Disclosure statement

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

Notes on contributors

Saeideh Sobhaninia, Ph.D., is a Postdoctoral Research Scholar at Arizona State University working on urban climate resilience. Her research primarily revolves around climate resilience, community resilience, disaster recovery, environmental justice, and placemaking.

Sahar Samavati, Ph.D., is a visiting scholar at Delft University of Technology and specializes in the field of human-centered design, design for health.

Daniel P. Aldrich, Ph.D., is a full professor and director of the Resilience and Security Studies Program at Northeastern University, who specializes in Japanese politics, nuclear power, NIMBY politics, and disaster recovery.

References

- Achmadi A, Sintusingha S. 2023. Vulnerable resilience in COVID-19 Invisibility and adaptability of the 'informal' cities of Southeast Asia. In: Hu R, editor. Routledge Handb Asian Cities Routledge. 1st ed. London: Routledge; p. 49–59.
- Ahern J. 2010. Planning and design for sustainable and resilient cities: theories, strategies, and best practices for green infrastructure. In: Novotny V, Ahern J, and Brown P, editors. Water centric sustainable communities: planning, retrofitting, and building the next urban environment. Hoboken, USA: John Wiley and Sons, Inc; p. 135–176.

- Aldrich DP. 2019. Social capital in post disaster recovery: towards a resilient and compassionate east asian community. In: Sawada Y, Oum S, editors. Black wave: how networks and governance shaped Japan's 3/11 disasters. Jakarta: University of Chicago Press; p. 157–178.
- Aldrich DP. 2023. How social infrastructure saves lives: a quantitative analysis of Japan's 3/11 disasters. *Jpn J Of Polit Sci.* 24(1):30–40. doi: [10.1017/S1468109922000366](https://doi.org/10.1017/S1468109922000366).
- Aldrich DP. 2012. Social capital in post disaster recovery: towards a resilient and compassionate East Asian community. In: Sawada Y Oum S, editors. Economic and welfare impacts of disasters in East Asia and policy responses. ERIA research project report 2011-8. Jakarta: ERIA; p. 157–178.
- Amirzadeh M, Barakpour N. 2019. Evaluating the resilience of local communities in Isfahan to Zayandehrood river and madies' drying up. *Environ Sci Technol.*
- Amirzadeh M, Sobhaninia S, Buckman ST, Sharifi A. 2023. Towards building resilient cities to pandemics: a review of COVID-19 literature. *Sustain Cities Soc.* 89(1–12):104326. doi: [10.1016/j.scs.2022.104326](https://doi.org/10.1016/j.scs.2022.104326).
- Amirzadeh M, Sobhaninia S, Sharifi A. 2022. Urban resilience: a vague or an evolutionary concept? *Sustain Cities Soc.* 81:1–12. doi: [10.1016/j.scs.2022.103853](https://doi.org/10.1016/j.scs.2022.103853).
- Bach U. 2018. Copenhagen: resilience and liveability. *Field Actions Sci Rep.* 18:30–33.
- Battistoni P, Romano M, Sebillo M, Vitiello G. 2023. Monitoring urban happiness through interactive chorems. *Sustainab.* 15(11):1–19. doi: [10.3390/su15118733](https://doi.org/10.3390/su15118733).
- Beatley T. 2017. Biophilic cities and healthy societies. *Urban Plan.* 2(4):1–4. doi: [10.17645/up.v2i4.1054](https://doi.org/10.17645/up.v2i4.1054).
- Beatley T, Newman P. 2013. Biophilic cities are sustainable, resilient cities. *Sustainability.* 5(8):3328–3345. doi: [10.3390/su5083328](https://doi.org/10.3390/su5083328).
- Benner C, Pastor M. 2016. Whither resilient regions? Equity, growth and community. *J Urban Aff.* 38(1):5–24. doi: [10.1111/juaf.12194](https://doi.org/10.1111/juaf.12194).
- Bowden L, Reed K, Nicholson E. 2018. The contribution of occupation to children's experience of resilience: a qualitative descriptive study. *Aust Occup Ther J.* 65(4):268–275. doi: [10.1111/1440-1630.12462](https://doi.org/10.1111/1440-1630.12462).
- Buckman ST, Sobhaninia S. 2022. The impact of sea-level flooding on the real estate development community in Charleston SC: results of a ULI member survey. *J Sustain Real Estate.* 14(1):4–20. doi: [10.1080/19498276.2022.2095699](https://doi.org/10.1080/19498276.2022.2095699).
- Carpenter S, Walker B, Anderies JM, Abel N. 2001. From metaphor to measurement: resilience of what to what? *Ecosystems.* 4(8):765–781. doi: [10.1007/s10021-001-0045-9](https://doi.org/10.1007/s10021-001-0045-9).
- Chai Y, Gunawan I, Nguyen N, Zuo J. 2023. A preliminary study of system dynamics models for resilient and smart cities. 2023 IEEE International Conference on Industrial Engineering and Engineering Management (IEEM), Singapore. IEEE.
- Chelleri L. 2012. From the «resilient city» to urban resilience. A review essay on *understanding* and integrating the resilience perspective for urban systems. *Documents d'Anàlisi Geogràfica.* 58(2):287–306. doi: [10.5565/rev/dag.175](https://doi.org/10.5565/rev/dag.175).
- Chelleri L, Waters JJ, Olazabal M, Minucc G. 2015. Resilience trade-offs: addressing multiple scales and temporal aspects of urban resilience. *Environ Urban.* 27(1):181–198. doi: [10.1177/0956247814550780](https://doi.org/10.1177/0956247814550780).
- Collado JRN, Potangaroa R. 2023. (Re) constructing (re) settlement: risk reduction and urban development negotiations in Santo Domingo, Dominican Republic. *Int Dev Plan Rev.* 45(2):203–233. doi: [10.3828/idpr.2022.10](https://doi.org/10.3828/idpr.2022.10).
- Corcoran R, Mansfield R, De Bezenac C, Anderson E, Overbury K, Marshall G, Wilson RK. 2018. Perceived neighbourhood affluence, mental health and wellbeing influence judgements of threat and trust on our streets: an urban walking study. *PLOS ONE.* 13(8):1–18. doi: [10.1371/journal.pone.0202412](https://doi.org/10.1371/journal.pone.0202412).
- Costanza R, Fisher B, Ali S, Beer C, Bond L, Boumans R, Danigelis NL, Dickinson J, Elliott C, Farley J. 2007. Quality of life: an approach integrating opportunities, human needs, and subjective well-being. *Ecol Econ.* 61(2–3):267–276. doi: [10.1016/j.ecolecon.2006.02.023](https://doi.org/10.1016/j.ecolecon.2006.02.023).
- Cummins RA. 1996. The domains of life satisfaction: an attempt to order chaos. *Soc Indic Res.* 38(3):303–328. doi: [10.1007/BF00292050](https://doi.org/10.1007/BF00292050).
- Danielli S, Ashrafian H, Darzi A. 2023. Population health: transformation will happen at the speed of trust. *J Public Health.* 45(2):410–413. doi: [10.1093/pubmed/fdac044](https://doi.org/10.1093/pubmed/fdac044).
- Davidson DJ. 2010. The applicability of the concept of resilience to social systems: some sources of optimism and nagging doubts. *Soc Nat Resour.* 23(12):1135–1149. doi: [10.1080/08941921003652940](https://doi.org/10.1080/08941921003652940).
- Davoudi S, Brooks E, Mehmood A. 2013. Evolutionary resilience and strategies for climate adaptation. *Plan Pract Res.* 28(3):307–322. doi: [10.1080/02697459.2013.787695](https://doi.org/10.1080/02697459.2013.787695).
- De Noia I, Rossetti S. 2023. Participation for everyone: young people's involvement in the shift towards happier and more resilient cities. International Conference on Innovation in Urban and Regional Planning; Cham: Springer Nature Switzerland.
- Delgado-Ramos GC, Guibrunet L. 2017. Assessing the ecological dimension of urban resilience and sustainability. *Int J Urban Sustain Dev.* 9(2):151–169. doi: [10.1080/19463138.2017.1341890](https://doi.org/10.1080/19463138.2017.1341890).
- Desouza KC, Flanery TH. 2013. Designing, planning, and managing resilient cities: a conceptual framework. *Cities.* 35:89–99. doi: [10.1016/j.cities.2013.06.003](https://doi.org/10.1016/j.cities.2013.06.003).
- Diener E. 1994. Assessing subjective well-being: progress and opportunities. *Soc Indic Res.* 31(2):103–157. doi: [10.1007/BF01207052](https://doi.org/10.1007/BF01207052).
- Diener E, Inglehart R, Tay L. 2013. Theory and validity of life satisfaction scales. *Soc Indic Res.* 112(3):497–527. doi: [10.1007/s11205-012-0076-y](https://doi.org/10.1007/s11205-012-0076-y).
- Diener E, Suh EM, Lucas RE, Smith HL. 1999. Subjective well-being: three decades of progress. *Psychol Bull.* 125(2):276–302. doi: [10.1037/0033-2909.125.2.276](https://doi.org/10.1037/0033-2909.125.2.276).
- Dolan P, Metcalfe R. 2012. Measuring subjective well-being: recommendations on measures for use by national governments. *J Soc Policy.* 41(2):409–427. doi: [10.1017/S0047279411000833](https://doi.org/10.1017/S0047279411000833).
- Easterlin RA. 2003. Explaining happiness. *Proc Natl Acad Sci USA.* 100(19):11176–11183. doi: [10.1073/pnas.1633144100](https://doi.org/10.1073/pnas.1633144100).
- Folke C, Carpenter SR, Walker B, Scheffer M, Chapin T, Rockström J. 2010. Resilience thinking: integrating resilience,

- adaptability and transformability. *Ecol And Soc.* 15(4). doi: 10.5751/ES-03610-150420.
- Fraser T, Aldrich DP, Small A. 2021. Connecting social capital and vulnerability: citation network analysis of disaster studies. *Nat Hazards Rev.* 22(3):04021016. doi: 10.1061/(ASCE)NH.1527-6996.0000469.
- Fraser T, Cherdchaiyapong N, Tekle W, Thomas E, Zayas J, Page-Tan C, Aldrich DP. 2022. Trust but verify: validating new measures for mapping social infrastructure in cities. *Urban Clim.* 46:1–20. doi: 10.1016/j.uclim.2022.101287.
- Galaitsi SE, Kielsler JM, Trump BD, Linkov I. 2021. The need to reconcile concepts that characterize systems facing threats. *Risk Anal.* 41(1):3–15. doi: 10.1111/risa.13577.
- Gillham J, Abenavoli RM, Brunwasser SM, Linkins M, Reivich KJ, Seligman ME. 2013. *Resilience education*. Oxford, UK: Oxford Handbook of Happiness.
- Hanrahan K, Gonzalez K. 2019. Happiness: the highest form of health. *Nurse Lead.* 17(4):308–314. doi: 10.1016/j.mnl.2019.04.001.
- Holling C. 1973. Resilience and stability of ecological systems. *Annu Rev Ecol Syst.* 4(1):1–23. doi: 10.1146/annurev.es.04.110173.000245.
- Huang J, Sun Z, Du M. 2022. Differences and drivers of urban resilience in eight major urban agglomerations: evidence from China. *Land.* 11(9):1470. doi: 10.3390/land11091470.
- IPCC (Change PC). 2018. *Global warming of 1.5° C*. Geneva, Switzerland: World Meteorological Organization.
- Joulaei H, Fathi F, Rakhshani T, Nazari M, Hosseinkhani Z, Fatemi M, Foroozanfar Z. 2022. Gender differences in the effect of resilience training on emotional intelligence in At-risk students in Shiraz, Iran. *Int J High Risk Behav Addict.* 11(2):1–8. doi: 10.5812/ijhrba-121942.
- Kamel Boulos MN, Tsouros AD, Holopainen A. 2015. ‘Social, innovative and smart cities are happy and resilient’: insights from the WHO EURO 2014 International healthy cities conference. *Int J Health Geogr.* 14(1):1–9. doi: 10.1186/1476-072X-14-3.
- Klinenberg E. 2002. Heat wave: death comes to the city of extremes. *The Baffler.* 15:65–70. doi: 10.1162/bflr.2002.15.65.
- Kourtit K, Nijkamp P, Türk U, Wahlstrom M. 2022. City love and neighbourhood resilience in the urban fabric: a microcosmic urbanometric analysis of Rotterdam. *J Urban Manag.* 11(2):226–236. doi: 10.1016/j.jum.2022.04.004.
- Kwon SM, Cho SW, Kim M, Heo JS, Kim YH, Park SK. 2019. Environment-adaptable artificial visual perception behaviors using a light-adjustable optoelectronic neuromorphic device array. *Adv Mater.* 31(52):1–8. doi: 10.1002/adma.201906433.
- Layard R. 2010. Measuring subjective well-being. *Science.* 327(5965):534–535. doi: 10.1126/science.1186315.
- Leichenko R. 2011. Climate change and urban resilience. *Curr Opin Environ Sustain.* 3(3):164–168. doi: 10.1016/j.cosust.2010.12.014.
- Liao L, Du M, Huang J. 2022. The effect of urban resilience on residents’ subjective happiness: evidence from China. *Land.* 11(11):1–19. doi: 10.3390/land11111896.
- Lyubomirsky S, Della Porta MD. 2010. Boosting happiness, but-tressing resilience : results from cognitive and behavioral interventions. In: Reich JW, Zautra AJ, and Hall JS, editors. *Handbook of adult resilience*. New York: The Guilford Press; p. 450–464.
- Madni AM, Jackson S. 2009. Towards a conceptual framework for resilience engineering. *IEEE Syst J.* 3(2):181–191. doi: 10.1109/JSYST.2009.2017397.
- Magdi SA. 2022. Towards a resilient city: an adaptive planning model for a healthy and happy city. *MSA Eng J.* 1(4):126–144. doi: 10.21608/msaeng.2022.273858.
- Marans RW. 2012. Quality of urban life studies: an overview and implications for environment-behaviour research. *Procedia Soc Behav Sci.* 35:9–22. doi: 10.1016/j.sbspro.2012.02.058.
- Mark S, Holder S, Hoyer D, Schoonover R, Aldrich DP. 2023. Understanding polycrisis: definitions, applications, and responses. *Applications Responses J.* doi: 10.2139/ssrn.4593383.
- Martin R. 2012. Regional economic resilience, hysteresis and recessionary shocks. *J Econ Geogr.* 12(1):1–32. doi: 10.1093/jeg/lbr019.
- McGrath M. 2018. Final call to save the world from ‘climate catastrophe’. BBC News [accessed 2024 Apr]. <https://www.bbc.com/news/science-environment-45775309>.
- Meerow S, Newell JP, Stults M. 2016. Defining urban resilience: a review. *Landscape Urban Plan.* 147:38–49. doi: 10.1016/j.landurbplan.2015.11.011.
- Mitchell E, Thompson SM. 2013. The healthy neighbourhood audit instrument: understanding the environmental and socio-cultural conditions to support healthy, happy and resilient residential communities. Proceedings of the 7th Australasian Housing Researchers Conference; Fremantle, Western Australia.
- Moher D, Liberati A, Tetzlaff J, Altman DG. 2009. Preferred reporting items for systematic reviews and meta-analyses: the PRISMA statement. *Res Methods Rep.* 339(1):b2535–b2535. doi: 10.1136/bmj.b2535.
- Moulay A, Ujang N. 2021. Insight into the issue of underutilised parks: what triggers the process of place attachment? *Int J Urban Sustain Dev.* 13(2):297–316. doi: 10.1080/19463138.2021.1885039.
- Mouratidis K. 2022. COVID-19 and the compact city: implications for well-being and sustainable urban planning. *Sci Total Environ.* 811:1–11. doi: 10.1016/j.scitotenv.2021.152332.
- Mouratidis K, Yiannakou A. 2022. COVID-19 and urban planning: built environment, health, and well-being in Greek cities before and during the pandemic. *Cities.* 121:1–17. doi: 10.1016/j.cities.2021.103491.
- Mukherjee M, Wickramasinghe D, Chowdhoree I, Chimi C, Poudel S, Mishra B, Shaw R, Shaw R. 2022. Nature-based resilience: experiences of five cities from South Asia. *Int J Environ Res Publ Health.* 19(19):1–25. doi: 10.3390/ijerph19191846.
- Musa HD, Yacob MR, Abdullah AM, Ishak MY. 2018. Enhancing subjective well-being through strategic urban planning: development and application of community happiness index. *Sustain Cities Soc.* 38:184–194. doi: 10.1016/j.scs.2017.12.030.
- Nasri M, Tsou YT, Koutamanis A, Baratchi M, Giest S, Reidsma D, Rieffe C. 2022. A novel data-driven approach to examine children’s movements and social behaviour in schoolyard

- environments. *Children*. 9(8):1–18. doi: [10.3390/children9081177](https://doi.org/10.3390/children9081177).
- Ogwueleka AC, Ogbonna SN. 2018. Effect of positive organizational behaviour (POB) characteristics on construction employees' turnover in uyo city of akwa ibom state, Nigeria. *Afr J Sci Technol Innov Dev*. 10(2):159–168. doi: [10.1080/20421338.2017.1412610](https://doi.org/10.1080/20421338.2017.1412610).
- Orleans Reed S, Friend R, Toan VC, Thinphanga P, Sutarto R, Singh D. 2013. "Shared learning" for building urban climate resilience—experiences from Asian cities. *Environ Urban*. 25(2):393–412. doi: [10.1177/0956247813501136](https://doi.org/10.1177/0956247813501136).
- Ouria M. 2019. Sustainable urban features and their relation with environmental satisfaction in commercial public space: an example of the great bazaar of Tabriz, Iran. *Int J Urban Sustain Dev*. 11(1):100–121. doi: [10.1080/19463138.2019.1579726](https://doi.org/10.1080/19463138.2019.1579726).
- Pearson L, Newton P, Roberts P, Eds. 2014. *Resilient sustainable cities: a future* 9780203593066. Abingdon: Routledge.
- Prescott SL, Hancock T, Bland J, van den Bosch M, Jansson JK, Johnson CC, Wegienka G, Katz D, Kort R, Kozyrskyj A, et al. 2019. Eighth annual conference of inVIVO planetary health: from challenges to opportunities. *Int J Environ Res Publ Health*. 16(21):4302–4362. doi: [10.3390/ijerph16214302](https://doi.org/10.3390/ijerph16214302).
- Rodin J. 2014. *The resilience dividend: being strong in a world where things go wrong*. New York: Public Affairs.
- Romano M. 2022. Urban happiness planning through interactive chorems. In: Calabrò F, Della Spina L, and Piñeira Mantiñán MJ, editors. *New metropolitan perspectives. Lecture notes in networks and systems* Vol. 482, Cham: Springer; p. 2822–2832.
- Runswick-Cole K, Goodley D. 2013. Resilience: a disability studies and community psychology approach. *Soc Pers Psychol Compass*. 7(2):67–78. doi: [10.1111/spc3.12012](https://doi.org/10.1111/spc3.12012).
- Saeedi I, Dabbagh E. 2021. Modeling the relationships between hardscape color and user satisfaction in urban parks. *Environ Dev Sustain*. 23(4):6535–6552. doi: [10.1007/s10668-020-00866-z](https://doi.org/10.1007/s10668-020-00866-z).
- Samavati S. 2022. Recognition the concept of a happy city based on global experiences and documents. *J Space Place Stud*. 1401(22):5–17.
- Samavati S, Desmet PMA. 2022. *Happy public spaces: a Guide with 20 ingredients to design for urban happiness*. Delft: Delft University of Technology.
- Samavati S, Desmet PM, Ranjbar E. 2024. Happy urban public spaces: a systematic review of the key factors affecting citizen happiness in public environments. *Cities & Health*. 1–17. doi: [10.1080/23748834.2024.2358600](https://doi.org/10.1080/23748834.2024.2358600).
- Samavati S, Ranjbar E. 2019. Identifying factors affecting happiness in urban public space (case study: pedestrian zone of historic part of Tehran). *Motaleate Shahri*. 8(29):3–18.
- Sapountzaki K. 2014. Resilience for all" and "collective resilience": are these planning objectives consistent with one another? In: Gasparini P, Manfredi G Asprone D, Editors. *Resilience and sustainability in relation to natural disasters: a challenge for future Cities*. SpringerBriefs in earth sciences. Cham: Springer; p. 39–53.
- Sassen S, Kourtiti K. 2021. A post-corona perspective for smart cities: 'should I stay or should I go?'. *Sustainab*. 13(17):1–15. doi: [10.3390/su13179988](https://doi.org/10.3390/su13179988).
- Satumanatpan S, Pollnac R. 2017. Factors influencing the well-being of small-scale fishers in the Gulf of Thailand. *Ocean Coast Manag*. 142:37–48. doi: [10.1016/j.ocecoaman.2017.03.023](https://doi.org/10.1016/j.ocecoaman.2017.03.023).
- Saunders WSA, Becker JS. 2015. A discussion of resilience and sustainability: land use planning recovery from the Canterbury earthquake sequence, New Zealand. *Int J Disaster Risk Reduct*. 14:73–81. doi: [10.1016/j.ijdrr.2015.01.013](https://doi.org/10.1016/j.ijdrr.2015.01.013).
- Sepe M. 2016. The role of public space to achieve urban happiness. *Urban Regen Sustain*. 96:364–373.
- Seresinhe CI, Preis T, MacKerron G, Moat HS. 2019. Happiness is greater in more scenic locations. *Sci Rep*. 9(1):1–11. doi: [10.1038/s41598-019-40854-6](https://doi.org/10.1038/s41598-019-40854-6).
- Shakib MS, Solís P, Varfalameyeva K. 2024. Mapswipe for SDGs 3 & 13: take urgent cartographic action to combat heat vulnerability of manufactured and mobile home communities. *Int J Cart*. 1–23. doi: [10.1080/23729333.2024.2359074](https://doi.org/10.1080/23729333.2024.2359074).
- Shchepkina N, Negi GS, Bhalla L, Nangia R, Jyoti J, Surekha P. 2024. IoT-enhanced public safety in smart environments: a comparative analysis using the public safety IoT test. *BIO Web of Conferences*, France. EDP Sciences; Vol. 86. p. 1–8.
- Shedid MY, Hefnawy NH. 2021. An approach to convivial urban spaces: a comparison between users' and experts' perception of convivial urban spaces. *J Eng Appl Sci*. 68(1):1–13. doi: [10.1186/s44147-021-00021-z](https://doi.org/10.1186/s44147-021-00021-z).
- Shekhar H, Schmidt AJ, Wehling HW. 2019. Exploring well-being in human settlements-A spatial planning perspective. *Habitat Int*. 87:66–74. doi: [10.1016/j.habitatint.2019.04.007](https://doi.org/10.1016/j.habitatint.2019.04.007).
- Shoval N, Schwimer Y, Tamir M. 2018. Real-time measurement of tourists' objective and subjective emotions in time and space. *J Travel Res*. 57(1):3–16. doi: [10.1177/0047287517691155](https://doi.org/10.1177/0047287517691155).
- Simmie J, Martin R. 2010. The economic resilience of regions: towards an evolutionary approach. *Camb J Reg Econ Soc*. 3(1):27–43. doi: [10.1093/cjres/rsp029](https://doi.org/10.1093/cjres/rsp029).
- Sobhaninia S. 2023. Does social cohesion accelerate the recovery rate in communities impacted by environmental disasters in Puerto Rico? An analysis of a community survey. *Environ Adv*. 13:100400. doi: [10.1016/j.envadv.2023.100400](https://doi.org/10.1016/j.envadv.2023.100400).
- Sobhaninia S. 2024a. A resilient disaster recovery model for Puerto Rico: a qualitative case study. *Environ Hazards*. 1–21. doi: [10.1080/17477891.2024.2390426](https://doi.org/10.1080/17477891.2024.2390426).
- Sobhaninia S. 2024b. The social cohesion measures contributing to resilient disaster recovery: a systematic literature review. *J Plan Lit*. 08854122241238196. doi: [10.1177/08854122241238196](https://doi.org/10.1177/08854122241238196).
- Sobhaninia S, Buckman ST. 2022. Revisiting and adapting the Kates-Pijawka disaster recovery model: a reconfigured emphasis on anticipation, equity, and resilience. *Int J Disaster Risk Reduct*. 69:102738. doi: [10.1016/j.ijdrr.2021.102738](https://doi.org/10.1016/j.ijdrr.2021.102738).
- Sobhaninia S, Amirzadeh M, Lauria M, Sharifi A. 2023. The relationship between place identity and community resilience: evidence from local communities in Isfahan, Iran. *Int J Disaster Risk Reduct*. 90:103675. doi: [10.1016/j.ijdrr.2023.103675](https://doi.org/10.1016/j.ijdrr.2023.103675).
- Swahn MH, Nassaka J, Nabulya A, Palmier J, Vaught S. 2022. A qualitative assessment of place and mental health: perspectives of young women ages 18–24 living in the urban

- slums of Kampala, Uganda. *Int J Environ Res Public Health*. 19 (19):1–15. doi: [10.3390/ijerph191912935](https://doi.org/10.3390/ijerph191912935).
- Takefuji Y. 2023. How to build disaster-resilient cities and societies for making people happy. *Build Environ*. 228 (109845):1–4. doi: [10.1016/j.buildenv.2022.109845](https://doi.org/10.1016/j.buildenv.2022.109845).
- Tella RD, MacCulloch R. 2006. Some uses of happiness data in economics. *J Econ Perspect*. 20(1):25–46. doi: [10.1257/089533006776526111](https://doi.org/10.1257/089533006776526111).
- Tierney K, Bruneau M. 2007. Conceptualizing and measuring resilience: a key to disaster loss reduction. *Transp Res Board*. 250:14–18.
- Tomz M, Wittenberg J, King G. 2003. CLARIFY: software for interpreting and presenting statistical results. *J Stat Softw*. 8 (1):1–30. doi: [10.18637/jss.v008.i01](https://doi.org/10.18637/jss.v008.i01).
- Tricco AC, Lillie E, Zarin W, O'Brien KK, Colquhoun H, Levac D, Straus SE, Peters MDJ, Horsley T, Weeks L, et al. 2018. PRISMA extension for scoping reviews (PRISMA-ScR): checklist and explanation. *Ann Intern Med*. 169(7):467–473. doi: [10.7326/M18-0850](https://doi.org/10.7326/M18-0850).
- Ungar M. 2004. A constructionist discourse on resilience: multiple contexts, multiple realities among at-risk children and youth. *Youth Soc*. 35(3):341–365. doi: [10.1177/0044118X03257030](https://doi.org/10.1177/0044118X03257030).
- United Nations. 2011 Jul 19. Happiness should have greater role in development policy – UN member states. [accessed 2024 Mar]. <https://news.un.org/en/story/2011/07/382052>.
- Vale LJ. 2014. The politics of resilient cities: whose resilience and whose city? *Build Res Inf*. 42(2):191–201. doi: [10.1080/09613218.2014.850602](https://doi.org/10.1080/09613218.2014.850602).
- van den Dobbelsteen A. 2021. The regenerative city: positive opportunities of coupling urban energy transition with added values to people and environment. In: Roggema R, editor. *TransFewmation: towards design-led food-energy-water systems for future urbanization, contemporary urban design thinking*. Cham: Springer; p. 235–252.
- Veenhoven R. 1997. Advances in understanding happiness. *Rev Qué Psychol*. 18(2):29–74.
- Veenhoven R. 2000. The four qualities of life. *J Happiness Stud*. 1 (1):1–39. doi: [10.1023/A:1010072010360](https://doi.org/10.1023/A:1010072010360).
- Veenhoven R. 2022. Affective component of happiness. In: Maggino F, editor. *Encyclopedia of quality of life and well-being research*. Cham: Springer International Publishing; p. 1–4.
- Veenhoven R. 2007. Subjective measures of well-being. In: McGillivray M, editor. *Human well-being. Studies in development economics and policy*. London: Palgrave Macmillan UK; p. 214–239.
- Veronese G, Castiglioni M, Tombolani M, Said M. 2012. 'My happiness is the refugee camp, my future Palestine': optimism, life satisfaction and perceived happiness in a group of Palestinian children. *Scand J Caring Sci*. 26(3):467–473. doi: [10.1111/j.1471-6712.2011.00951.x](https://doi.org/10.1111/j.1471-6712.2011.00951.x).
- Wang N, Wu M, Yuen KF. 2024. Modelling and assessing long-term urban transportation system resilience based on system dynamics. *Sustain Cities Soc*. 109:1–21. doi: [10.1016/j.scs.2024.105548](https://doi.org/10.1016/j.scs.2024.105548).
- Weijts-Perrée M, Dane G, van den Berg P. 2020. Analyzing the relationships between citizens' emotions and their momentary satisfaction in urban public spaces. *Sustainab*. 12 (19):7921. doi: [10.3390/su12197921](https://doi.org/10.3390/su12197921).
- Zhang Y, Han M, Chen W. 2018. The strategy of digital scenic area planning from the perspective of intangible cultural heritage protection. *Eurasip J on Image Video Process*. 2018 (1):1–11. doi: [10.1186/s13640-018-0366-7](https://doi.org/10.1186/s13640-018-0366-7).
- Zhu H, Shen L, Ren Y. 2022. How can smart city shape a happier life? The mechanism for developing a happiness driven smart city. *Sustain Cities Soc*. 80:1–15. doi: [10.1016/j.scs.2022.103791](https://doi.org/10.1016/j.scs.2022.103791).