

Towards Vibrant Urban Spaces: A Sustainable Humanizing Placemaking (SHP) Framework

Asmaa M. Hassan 1,2 *, Shimaa F. Mohamed 2

1. Department of Architectural Engineering and Urban Planning, Faculty of Engineering, Port Said University,
Port Said, Egypt

2. Department of Architecture Engineering, College of Engineering and Information Technology, Buraydah
colleges, Buraydah, Qassim governorate, Saudi Arabia

Abstract - This study aims to discuss the process of placemaking as a human-centered approach to sustainability and to humanize cities, and to present a novel, holistic framework that integrates diverse prior approaches to create vibrant, humanizing urban spaces. The research employs multiple methods to achieve its objectives, including a comprehensive literature review, bibliometric analysis, and comparative case studies. The proposed framework builds on community participation development, aiming to merge the concepts of placemaking, sustainability, and humanizing cities into a single, integrative framework. While previous research has mainly focused on the physical aspects of placemaking, this study addresses a critical gap: the fragmented nature of existing models which often overlook the integration of technological innovation and sustainability principles within human-centered design. The SHP framework uniquely bridges this gap by incorporating renewable energy monitoring and digital identity elements alongside traditional social and aesthetic dimensions. The framework provides both the predesign of new urban spaces and the renovation of existing environments, grounded in four interconnected approaches: social, cultural, environmental, and economic, that illustrate how Sustainable Human-centered Placemaking (SHP) can enhance urban life. The findings highlight the framework's potential to foster ownership, belonging, and well-being, while advancing sustainable and humanizing cities development. Furthermore, further empirical testing and practical validation of the findings are needed. Ultimately, this holistic framework serves as a strategic reference for specialists and decision-makers aiming to activate user engagement in urban spaces, while promoting the integration of sustainability and city humanizing strategies into contemporary urban contexts.

KEYWORDS:

Placemaking; Sustainability; Urban spaces; Collaborative engagement, Humanization cities

1 Introduction

Cities are dynamic environments that require innovative approaches to maintain a positive image (Augustyn, 2013; Hassan and Megahed, 2021). Countries worldwide strive for sustainable visions and environmental preservation, including expanding green and urban areas, considering climate change, while sustainable development programs inspired by initiatives like Sustainable Development Goals (SDGs) and Vision 2030 to improve the urban environment, landscape, preserving cultural heritage, tourism, enhancing urban design, and security, while fostering profitable and equitable economic growth (Ali et al., 2023; Fine et al., 2022; Pasupuleti et

al., 2023; Shehata et al., 2022). Lynch's five key elements in his influential book, "The Image of the City," landmarks, paths, nodes, edges, and districts, highlight how people's experiences and perceptions shape their understanding and emotional connection to urban spaces (Alawadhi et al., 2023).

Therefore, creating livable and engaging urban spaces that foster positive social behaviors and interactions requires attention to both the physical and psychological dimensions of the environment. This is advantageous for both urban designers and citizens, as it enhances the overall experience and functionality of cities. Factors such as safety, accessibility, social activities, diversity, building design, sense of place, comfort, livability, edge effects, seating, scale, aesthetics, and authenticity all play a crucial role in shaping vibrant and inclusive urban environments (Mona Y. Shedid and Hefnawy, 2021). Public spaces aim to make users feel comfortable and welcome. Instead, public spaces need be conceived and curated using approaches that encourage people to gather, engage with one another, and feel at ease within the space (Giamarino and Angeles, 2023).

In this context, the concept of placemaking emerged as a human-centered approach aimed at creating multi-functional, meaningful, and inclusive spaces that prioritize users' needs over physical form (Kwon, 2024). It emphasizes community involvement, fosters social connections, strengthens community identity, and enhances the overall quality of urban life. Placemaking seeks to design places that go beyond functionality to become vibrant environments that nurture engagement, belonging, and shared experience (Wesener et al., 2020). The concept is often interpreted differently across contexts, which can reduce its theoretical clarity and practical effectiveness (Saleh and Baper, 2023).

Building on these principles, the Project for Public Spaces (PPS) has been instrumental in advancing standard placemaking as a universal approach for creating vibrant and inclusive environments. For over three decades, PPS has promoted placemaking and supported communities worldwide by providing valuable frameworks and practical resources. This approach can be applied incrementally, through small-scale projects and community-led activities that gradually improve spaces, or transformatively, through large-scale developments that rapidly reshape urban areas (Courage, 2016).

Placemaking reimagines public spaces as the heart of community life, strengthening social ties and enhancing both economic vitality and urban sustainability (Elshapasy and Mohamed, 2024). Effective placemaking also relies on continuous monitoring, accessibility, material reuse, and social potential, which are essential for developing sustainable urban green spaces (Herman et al., 2018).

From a broad perspective, placemaking represents a comprehensive and evolving process that integrates design, human behavior, and collective experience to shape meaningful urban environments. As urban scholar Alan Lew notes, "everyone is a participant in placemaking" through their ongoing interactions with geographic spaces and social environments (Singh et al., 2023). This inclusive understanding also extends beyond human actions to encompass non-human elements such as natural features, built structures, and economic systems, highlighting the complexity of contemporary urban settings.

The term "Creative Placemaking", introduced in 2010, builds upon this foundation by incorporating arts, culture, and creativity as central tools in shaping the physical, social, and economic character of a place (Ellin, 2012). It promotes collaboration among multiple stakeholders—designers, artists, communities, and policymakers—

to revitalize neglected historic areas, preserve cultural heritage, and enhance urban attractiveness through artistic and cultural engagement. The results-oriented nature of this approach makes it an effective strategy for improving livability and reinforcing a city's identity and visual appeal(Rezaei et al., 2022).

The core objective of placemaking is to create and enhance public spaces that serve as the heart of community life, leveraging local assets to promote health, happiness, and well-being (Ellery and Ellery, 2019). This collaborative process involves a diverse range of actors, including community members, in shaping the public realm and ensuring that art, culture, and social interaction are integrated into the built environment (Zitcer, 2020). Achieving this goal requires a shared vision that harmonizes renewal, conservation, and creativity, ensuring contextual compatibility in color, materials, and form.

Strategic placemaking takes this further as a targeted approach to developing quality, attractive environments that appeal to skilled workers and innovative industries. In the global “new economy,” such spaces are crucial, as talent and investment are increasingly drawn to cities that offer vibrant, inclusive, and culturally rich lifestyles (Mayer and Knox, 2006; Pancholi et al., 2017). Consequently, placemaking has become a central paradigm in contemporary urban design, integrating principles from sustainable development, community empowerment, and cultural regeneration (e.e, Toolis 2017; Ghavampour and Vale 2019). It encourages coordinated urban policies that promote balanced growth, environmental responsibility, and social well-being (Matthew Carmona, 2021; Di Marino et al., 2023; Robert Riddell, 2008).

Despite the growing global attention to sustainability, city humanization, and placemaking, a significant gap remains in integrating these concepts A new SHP framework is necessitated by the contemporary urban challenges that traditional placemaking models fail to fully address, such as rapid technological development, evolving human lifestyles, and the urgent pressures of climate change. Current urban design lacks a cohesive model that simultaneously prioritizes human well-being and environmental resilience through a structured design sequence. Consequently, this research provides a strategic response by synthesizing these disparate domains into a unified, sustainable strategy for modern cities. This study responds to that gap by proposing a novel integrative framework that connects sustainability, human-centered urbanism, and placemaking into a cohesive model for guiding contemporary urban development. The research aims to examine placemaking as a human-centered process related to sustainability and humanization, propose an integrative framework for creating inclusive and livable cities, enhance urban quality of life through belonging and engagement, and offer practical insights for planners and decision-makers.

This study is based on a multi-methodological approach, starting with a systematic literature review, bibliometric analysis, and comparative case studies. Although the humanizing, sustainability, and placemaking approaches have been gaining popularity, the topic still requires more study to investigate the rapid change in the human person's lifestyle, the effects of recent climate changes, and rapid technological development. This also indicates a growing need for an integrative framework that can bridge the gap in previous research and enhance urban studies as a whole. Therefore, the present study creates an integrative framework of Sustainable Humanizing and Placemaking. Therefore, the research aims to develop a novel framework that integrates approaches such as

sustainability, humanizing cities, and placemaking, considering not only the predesign of urban spaces but also the renovation of existing urban spaces.

The comparative analysis focuses on Saudi Arabian case studies for four main reasons. First, Saudi Arabia is undergoing an unprecedented urban transformation under Vision 2030, which prioritizes city humanization and quality of life, making it an appropriate context for this research. Second, the Saudi context is characterized by unique socio-cultural conditions that influence placemaking practices, including privacy requirements, cultural identity, and the integration of religious heritage. Third, the selected case studies represent diverse climatic conditions, ranging from the humid coastal environment of Jeddah to the mountainous climate of Abha and the hot-arid climate of Riyadh, allowing the proposed framework to be evaluated across different environmental contexts. Finally, because placemaking strategies for hot-arid Arab regions differ significantly from those developed for temperate climates, the study aims to establish a localized framework that can later support broader international applications.

Therefore, this study starts with reviewing previous studies in Section 2, and then discussing the placemaking process and collaborative engagement toward city humanization in Section 3. Section 4 presents the bibliometric analysis using Scopus, Biblioshiny, and VOSviewer to map research trends, identify influential authors, and explore thematic relationships. Section 5 emphasizes comparative analysis of diverse Saudi Arabian examples—including King Khalid Cultural Center, Jeddah Corniche, Hajj Path, Quba Avenue, Art Street, and King Abdulaziz Historical Center—exploring technology's impact, addressing urban decline, promoting diversity, enhancing place value, designing healthy cities, improving governance, adapting to climate change, and considering economic, environmental, and equitable goals to create inclusive urban environments. Results and discussion from both bibliometric and comparative analyses are synthesized in Section 6, while the proposed integrative framework and the conclusion are presented in Sections 7 and 8, offering practical insights for sustainable, human-centered, and culturally adaptive urban development.

2 Literature review

The extent of interest in transforming quickly to sustainability in urban spaces within cities requires further efforts and research into innovative planning and placemaking practices that connect humans with their surrounding environments, promoting healthy lifestyles and community engagement (Bibri et al., 2020). In response to this need, the present study reviews the relevant literature and classifies it into three main clusters, as presented in Table 1, providing insights that contribute to developing evaluation approaches for creating environments responsive to users and communities. Despite these contributions, existing research remains fragmented and mainly focused on the physical aspects of urban environments, lacking a comprehensive perspective that integrates social, environmental, and technological dimensions. To bridge this gap, the study introduces the Sustainable Humanizing Placemaking (SHP) Framework, which holistically combines sustainability, placemaking, and urban humanization to enhance human well-being, strengthen place identity, and promote urban livability.

The literature is classified into three thematic clusters to establish a multidisciplinary foundation for the SHP framework. Collectively, these clusters provide the theoretical basis for the framework's Social, Environmental, Economic, and Spatial dimensions.

Cluster 1 (Placemaking Evaluation Insights) analyzes user perception, livability, and human-place relationships to substantiate the Social and Spatial dimensions. *Cluster 2 (Planning Theories and Studies Comparison)* investigates planning principles and physical interventions that inform the Environmental and Spatial dimensions. Lastly, *Cluster 3 (Social Justice in Urban Values)* addresses equity, resilience, and community well-being to reinforce the Economic and Social dimensions. This structured integration ensures that the SHP framework is positioned as a scientifically grounded model supported by established scholarly evidence.

The first cluster, “**Placemaking Evaluation Insights**,” underscores the transformative capacity of placemaking to enhance urban livability and reinforce local identity. By focusing on defining and assessing placemaking through both theoretical and applied lenses, this cluster demonstrates how the concept has evolved into a vital instrument for strengthening human-place connections and bridging the city-human divide. It provides the foundational evaluative metrics necessary for the framework's human-centered and inclusive urban development goals.

Abesinghe et al (2023) introduced a novel social media data analysis method to capture the evolving Lynchian image of cities, revealing how community perceptions of landmarks, paths, nodes, edges, and districts influence urban cognition. Their findings underscore the importance of geo-coded analytics in understanding the dynamic relationship between people and place. Similarly, Saleh and Baper (2023) proposed a framework to assess livability in Erbil's commercial streets, emphasizing the role of balanced spatial dimensions, adequate street widths, and the preservation of local identity.

In terms of theoretical perspective, Ellery and Borkowsky (2021) identified basic principles guiding placemaking and proposed a model for further applications. Rezaei et al. (2022) expanded the concept through heritage-based placemaking, showing how adaptive reuse transformed the abandoned Sa'd al-Saltaneh Caravanserai into a vibrant, culturally enriched space. On the social dimension, Boeri (2017) and Toolis (2021) emphasized equity and inclusion by introducing the notion of “critical placemaking” to counter the privatization of public spaces and promote democratic engagement.

The second cluster, titled “**Planning Theories and Studies Comparison**,” explores broader urban design approaches and related research addressing the theoretical and practical dimensions of urban planning. These studies underscore the importance of planning theories and analyses in fostering inclusive, participatory, and identity-driven urban development. They identify key elements necessary for creating convivial and inclusive urban spaces, highlighting safety, security, accessibility, and social interaction as fundamental aspects shaped by both physical and psychological contexts. By focusing on these physical and participatory elements, this cluster directly informs the Environmental and Spatial dimensions of the SHP framework, providing the necessary justification for integrating safety and accessibility as core sustainability and design indicators.

For instance, Mona Y. Shedid et al. (2021) identified the essential factors of welcoming public spaces by emphasizing safety, accessibility, and social connectivity. Through a combination of theoretical analysis, user surveys, and statistical methods, their research introduced a decision-making framework that integrates expert and

user perspectives, providing a practical tool for designing engaging and comprehensive public spaces. Rishbeth, Ganji, and Vodicka(2018) conducted a critical literature review of 24 ethnographic studies, leading to the development of urban design factors that maximize participatory processes, promote “micro-retreats” for quiet reflection, and address inequalities in open space provision. The study by Moayedi et al. (2019) used desk research, field observations, and questionnaires, analyzed through SPSS, to determine whether pedestrianization and high-quality public space interventions in central Tehran increased people's presence and social interactions. Furthermore, Toolis (2017) and Herman et al. (2018) investigated the role of color interventions as a transformative design strategy to revitalize and transform urban environments, emphasizing the need for a shared vision that ensures material compatibility, balances renewal with conservation, and enhances the human experience, aiming to preserve the identity of cities through creative and historically-grounded interventions.

The third cluster, titled “**Social Justice in Urban Values,**” focuses on the significance of designing urban spaces that provide social justice, equality, and community well-being, while also supporting environmental stewardship and cultural identity. These studies lay the conceptual groundwork for developing integrative frameworks that merge sustainability, humanization, and placemaking to enhance livability and social cohesion. They address contemporary urban challenges related to social equity, moral values, and health crises, examining how global disruptions, such as the COVID-19 pandemic, have reshaped socio-spatial dynamics and heightened the demand for more complete, value-driven urban development. By highlighting the interdependencies between social equity and economic vitality, this cluster provides the theoretical justification for the Economic and Social dimensions of the SHP framework, ensuring that urban interventions promote both community well-being and sustainable economic growth.

In this context, Di Marino et al. (2023) investigated the hybridization of workspaces in Oslo post-COVID-19, providing insights for future urban planning strategies that accommodate evolving work and social patterns. Similarly, Pfeiffer et al. (2022) highlighted the significance of interstitial spaces in facilitating neighborly coping during the pandemic. From a governance and justice perspective, Valizadeh et al. (2021) proposed a democratic, bottom-up framework for urban spaces that encourages collective action and equity. In a related analysis, Rossini et al. (2022), examined 28 privately owned public spaces in Hong Kong's dense urban core, introducing an evaluation framework to assess spatial qualities and their impact on social engagement, while emphasizing strategies to enhance pedestrian experience and inclusivity in high-density environments.

Complementing these approaches, Mayer et al. (2006) explored the Slow City movement as a balanced model integrating economic, environmental, and social equity. Carmona (2021) further examined the interdependencies among these factors, advancing the understanding of alternative approaches to local economic vitality. Additionally, Riddell (2008) advocated for a value-based, democratically administered planning methodology that fosters sustainable, equitable, and secure urban growth.

Previous research has agreed on the necessity of creating and designing places that achieve social justice and equality through various evaluative tools. Several studies have also sought solutions to modern pandemics and environmental preservation while supporting human capital development and identifying new opportunities for

urban communities. Researchers (Rezaei et al., 2022; Boeri, 2017; Herman et al., 2018) have emphasized the user’s perception and the importance of color in shaping cultural identity and enriching historical areas. Similarly, Moayedi et al. (2019) aimed to create pedestrian pathways to enhance the management of urban spaces. Mayer and Knox (2006) and Carmona (2021) achieved many of the foundational elements of urban design and placemaking.

Building on the gaps identified in previous studies, this research emphasizes the images formed by users and how they both influence and are influenced by the designed urban environment. It aims to define the general and context-specific concepts of public spaces within Saudi Arabia, where social, cultural, and political variables shape their application. The study addresses key challenges in placemaking by incorporating elements that connect users to their needs and their surrounding urban context. It focuses on evaluation points such as target age groups, site-appropriate activities, and multifunctionality to create sustainable and inclusive public spaces. Moving beyond prior work that mainly emphasized physical evaluation, this research integrates technological developments, sustainability criteria, and renewable energy monitoring. Moreover, it highlights the importance of the “sense of place,” encompassing both tangible and intangible dimensions, including livability, aesthetics, adaptability, visual experience, and communication distance. Therefore, this study proposes the Sustainable Humanizing Placemaking (SHP) Framework as a comprehensive approach to integrating sustainability, placemaking, and city humanization to enhance human well-being and strengthen urban identity.

Table 1 synthesizes the reviewed studies within the three clusters, highlighting their theoretical contribution to the Sustainable Humanizing Placemaking (SHP) Framework and demonstrating how each work addresses identified conceptual gaps.

Cluster	Core Contribution (Method/Findings)	Linked SHP Dimensions	Theoretical Integration & Relevance to SHP Framework	Ref.
Placemaking evaluation insights	• Used social media data analysis to capture evolving Lynchian images of cities, identifying how community perceptions of landmarks and nodes shape urban cognition.	• Social & Spatial	• Demonstrates how digital tools can assess dynamic human–place connections, informing the SHP framework’s human-centered evaluation dimension.	(Abesinghe et al., 2023)
	• Proposed a livability assessment framework for Erbil’s commercial streets based on spatial balance and preservation of local identity.	• Spatial & Cultural	• Supports spatial and cultural balance as key SHP indicators of urban livability and identity.	(Saleh and Baper, 2023)
	• Defined guiding principles for placemaking and proposed a conceptual model for community development.	• Social & Environmental	• Establishes theoretical foundations for the SHP framework’s integration of social and environmental dimensions.	(Ellery et al., 2021)

Cluster	Core Contribution (Method/Findings)	Linked SHP Dimensions	Theoretical Integration & Relevance to SHP Framework	Ref.
	• Demonstrated heritage-based placemaking through adaptive reuse of Sa'd al-Saltaneh Caravanserai.	• Spatial & Cultural	• Connects cultural continuity with sustainability in placemaking, reinforcing SHP's heritage dimension.	(Rezaei et al., 2022)
	• Introduced 'critical placemaking' emphasizing equity, inclusion, and democratic participation.	• Social	• Anchors SHP in socially just and participatory urban practices.	(C. Boeri, 2017; Toolis, 2021)
Planning theories and studies comparison	• Developed a decision-making framework integrating expert and user perspectives for inclusive public spaces.	• Social	Contributes user-based evaluation models essential for SHP's participatory design process.	(M.Y. Sheded and Hefnawy, 2021)
	• Empirically tested pedestrianization and public space interventions in Tehran through field observations and surveys.	• Social & Spatial	Provides empirical evidence of spatial-human interaction vital to SHP's social activation goals.	(Moayedi et al., 2019)
	• Conducted literature review on ethnographic studies to establish principles for participatory and reflective spaces.	• Social	• Advances SHP's human-centered dimension through empathy-based design principles.	(Rishbeth et al., 2018)
	• Studied color interventions as design strategies for revitalizing urban environments.	• Spatial	Highlights sensory and aesthetic experience as SHP's intangible qualities of place.	(Herman et al., 2018; Toolis, 2017)
Social justice in urban values	• Analyzed hybrid post-COVID workspaces in Oslo and their spatial implications.	• Economic & Social	Expands SHP to adaptive urban models that address evolving social and work patterns.	(Di Marino et al., 2023)
	• Examined the interstitial spaces' role in community coping during the pandemic.	• Social	• Reinforces social resilience and community ties within SHP's livability component.	(Pfeiffer et al., 2022)
	• Proposed a democratic, bottom-up urban governance framework promoting collective action.	• Social	• Integrates equity and governance mechanisms essential for SHP's inclusivity objectives.	(Valizadeh and Iranmanesh, 2021)

Cluster	Core Contribution (Method/Findings)	Linked SHP Dimensions	Theoretical Integration & Relevance to SHP Framework	Ref.
	• Developed an evaluation framework for privately owned public spaces in Hong Kong to enhance inclusivity and pedestrian experience.	• Spatial & Social	• Demonstrates practical evaluation methods aligning with SHP's accessibility and inclusion principles.	(Rossini, 2022)
	• Explored the Slow City model, integrating social, economic, and environmental balance.	• Environmental & Economic	• Provides a conceptual foundation for SHP's holistic sustainability component.	(Mayer and Knox, 2006)
	Examined interdependencies between social equity and urban economic vitality.	• Economic & Social	• Strengthens SHP's linkage between human well-being and sustainable urban economics.	(M. Carmona, 2021)
	• Advocated for value-based democratic planning promoting equity and sustainability.	• Social & Environmental	• Reinforces SHP's moral and justice-oriented framework for humanized urban environments.	(R. Riddell, 2008)

3 Placemaking process and collaborative engagement towards city humanization

Placemaking is based on people-centered urbanism that emphasizes engagement and empowerment of the users to provide a sense of responsibility for the space, transforming a simple user of a green space into a host, caretaker, or facilitator [6]. Such engagement can promote the physical, social, and economic features of urban life (Toolis, 2019). Accordingly, the following points discuss the integration of the placemaking process and its potential levels to influence a community and principals, as illustrated in Figure 1.

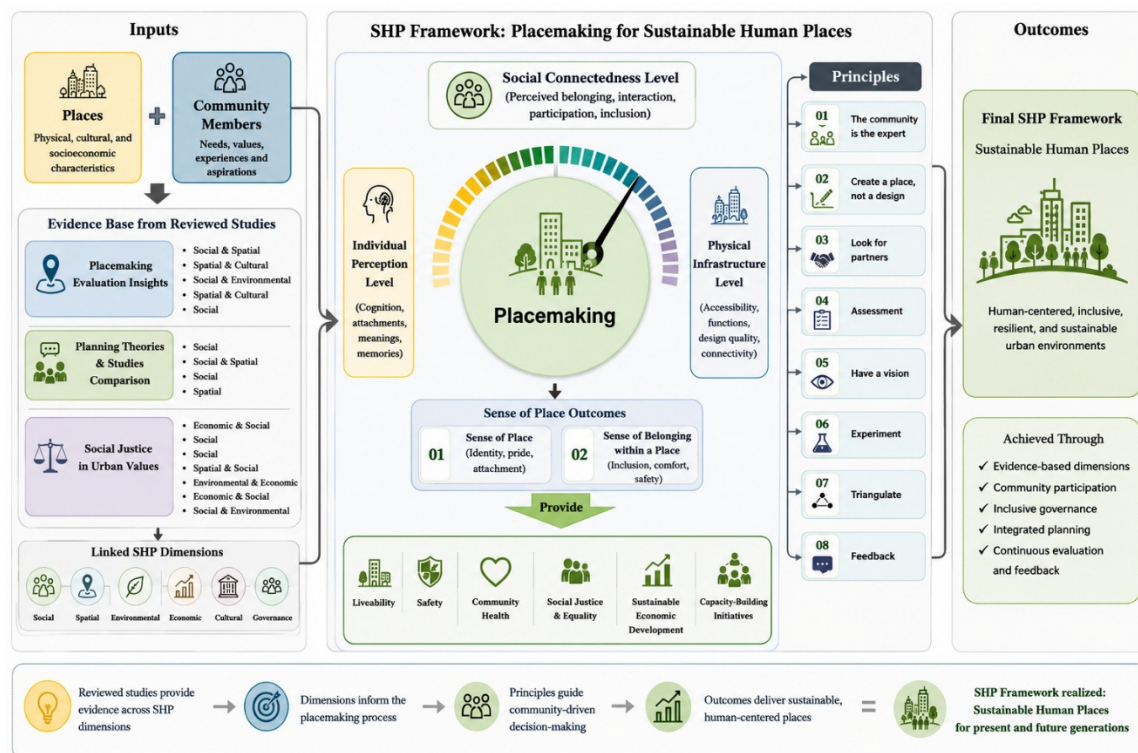
Figure 1: Placemaking process and collaborative engagement. Source the authors after (Mehanna and Mehanna, 2023; Singh et al., 2023; Valizadeh and Iranmanesh, 2021).

Overview of the Placemaking Concept

The place consists of relational, emotional, cultural, economic, political, social, and educational aspects, mainly based on community (Brain, 2019; Singh et al., 2023). Therefore, the place-making concept has been provided as a process of human-centered urban transformation that emphasizes collaboration and community users and provides more efficient spaces with their inhabitants' characteristics (e.e, Toolis 2021; Mehanna and Mehanna 2023; Erin E Toolis 2019). The place-making concept can be considered a bottom-up process to develop urban spaces based on human behaviour to directly and indirectly influence the design of public spaces (Herman et al., 2018; Mehanna and Mehanna, 2023; Vardhan, 2019). As a result, the place-making approach can promote the surrounding environment and well-being by providing livability, safety, comfort, attractiveness, community health, social justice, equality, sustainable economic redevelopment, and capacity-building initiatives to create more people-oriented places (Cristina Boeri, 2017; Toolis, 2021).

Placemaking and collaborative process

The collaborative placemaking concerns the cooperation, stakeholders, civic engagement, and government (Mehanna and Mehanna, 2023; Toolis, 2021). In this context, Vardhan (2019) has considered placemaking not only a method but also a tool. Placemaking as a procedure implies interventions by specialists to provide order and the physical form of space that influences user groups to generate a common goal and vision. However, placemaking as a tool helps designers understand how users value and relate to a place to promote affiliation with the urban



environment (Mehanna and Mehanna, 2023). Placemaking can be considered a user-centric process, which overlooks local community preferences. Whereas multidimensional indicators (environmental, social, and

economic) and participatory action dynamics ensure that neighborhood evaluations reflect localized needs and preferences (Ferrón et al., 2025; Hassan and Kotb, 2025). In this context, the integration of Internet of Things technologies in urban performance assessments emphasizes user-centric (Metwally et al., 2024; Shehata et al., 2024). Moreover, the Sustainability Performance Metric (SPM) framework, which uses latent variable methods to manage sustainability indicators, tested on single-family-detached housing, highlights the significance of observing all aspects of sustainability through a comprehensive metric (Marjaba et al., 2020). These approaches demonstrate practical applicability by aligning user needs with sustainability goals, ensuring that placemaking frameworks are both user-centric and environmentally sustainable.

On the other hand, the engagement between the community members and the place in which they live, work, and play can be classified as either a personal connection to a place itself (sense of place), or a connection to members of a community within a place (sense of belonging within a place) (Ellery et al., 2021; Rossini, 2020).

Various studies have discussed several tools that can provide such engagement, for instance, new green spaces. Waste recycling, community gardening, car sharing, co-working, food cooperatives, and urban dwellers (Cristina Boeri, 2017; Herman et al., 2018), urban scape (Hassan and Megahed, 2021), arts (Cristina Boeri, 2017), digital media in cities that can transform the role of citizens (Abo Elenien et al., 2015; Valizadeh and Iranmanesh, 2021). Such collaborative processes can be classified into three levels according to (Ellery et al., 2021). Firstly, the Individual Perception level can be identified by smells, sounds, and sights experienced while immersed in the place itself, and this is where each individual's sense of place is developed. Secondly, social connectedness that comes from being part of a neighbourhood community, resulting in co-sharedness. Lastly, the physical infrastructure level emphasizes the role of planning and design.

In this context, the concept of place identity is attached to the placemaking concept, which develops a sense of recognition and familiarity, norms, and opportunities about the purposes and behaviours afforded by particular spaces, like cultural, historical, and political meaning and activities (Rezaei et al., 2022; Singh et al., 2023). Connection is affected by various physical and social factors, including residence length, home ownership, mobility, neighbourhood relations, neighbourhood legibility, social capital, aesthetic qualities, green space, and access to services (Cristina Boeri, 2017; Mehanna and Mehanna, 2023; Singh et al., 2023; Toolis, 2019).

Principles of Placemaking and Humanizing Cities

The concept of placemaking can contribute to attaining humanizing cities through a number of principles, as detailed below. Firstly, the community is the expert, whereas community members can be considered the milestone of any such development. Then, the design process is based on places with uses, economic opportunities, and the presence of physical elements that make people feel welcome and comfortable with effective relationships with the surrounding activities, not only physical design. Moreover, partners like local institutions, governments, and individuals can provide ongoing support, both financial and political, and planning activities. In addition, the assessment process via observing how people use public spaces and providing pleasure and peace, meaning. Moreover, every space needs to have a unique character with a vision based on people living or working in or near the space, and their activities and uses. Such character can be attained via the key points, like landmarks, to provide social-cultural meanings and identities in addition to designing events, celebrations, via sound and light shows, fairs and festivals, and carnivals. Then, long-term planning and short-term improvements can provide flexibility via specific characteristics like lighter, quicker, cheaper installation which need to be varied for example, the art of refabrication, the seat, trash can, and coffee booths placed near the bus stop form synergistic rings, and passengers will be more willing to wait for busses than if they are isolated from each other, which provide repetition of journeys and performances that makes the place constantly alive through interlinking production, installation, and maintenance, and absorbing new imposition. Lastly, feedback from the community and partners advises on how places work and the way they need to be done (Mehanna and Mehanna, 2023; Singh et al., 2023; Valizadeh and Iranmanesh, 2021).

4 Bibliometric analysis

The procedures of this study are divided into two major parts, which include the creation of a database as well as the selection of Biblioshiny and VOSviewer tools. The database was created using the preferred reporting items for systematic reviews and meta-analysis (PRISMA) method, as emphasized in the subtitles below.

4.1.1 Development of database

Creating a database represents a crucial step that directly influences the quality of outcomes (Adel et al., 2023; Omrany et al., 2022). This research highlighted Scopus, regarded as one of the most accessible bibliometric resources (Hassan, 2023; Olawumi and Chan, 2018). Concerning the criteria for publication inclusion, a literature search was performed on Scopus using pertinent keywords such as “Placemaking” AND “Urban Spaces” OR “Public Spaces” OR “Heritage.” The criteria for inclusion in this study focus on placemaking and urban environments. In evaluating publication filtering criteria, the search was performed utilizing the titles, abstracts, and keywords of the publication materials. On the 16th of October 2023, 90 publications were found. Additionally, this research applied three filters to narrow down pertinent in-scope publications, factoring in publication type and language. This research relies on validated information found in “articles,” “review articles,” “books,” and “book chapters.” Finally, works published in languages other than English were not included. Consequently, 85 documents were identified that satisfied the initial criteria. The full content of the 85 publications was examined for suitability to remain as articles pertinent to the research subject, following the process outlined below. Searching and retrieving from databases serves as an initial step to identify and gather numerous potentially relevant publications for analysis inclusion. The process of screening and initial analysis entails utilizing established inclusion and exclusion criteria to meticulously evaluate the collected papers. Papers that are not relevant are discarded, while those meeting the eligibility criteria are retained for additional analysis. Ultimately, the stage of full-text review and analysis (interpretation and presentation) involves integrating the results of the included studies and evaluating the variability and quality of the evidence. Consequently, 44 were connected to the purpose of this bibliometric analysis, as illustrated in Figure 2).

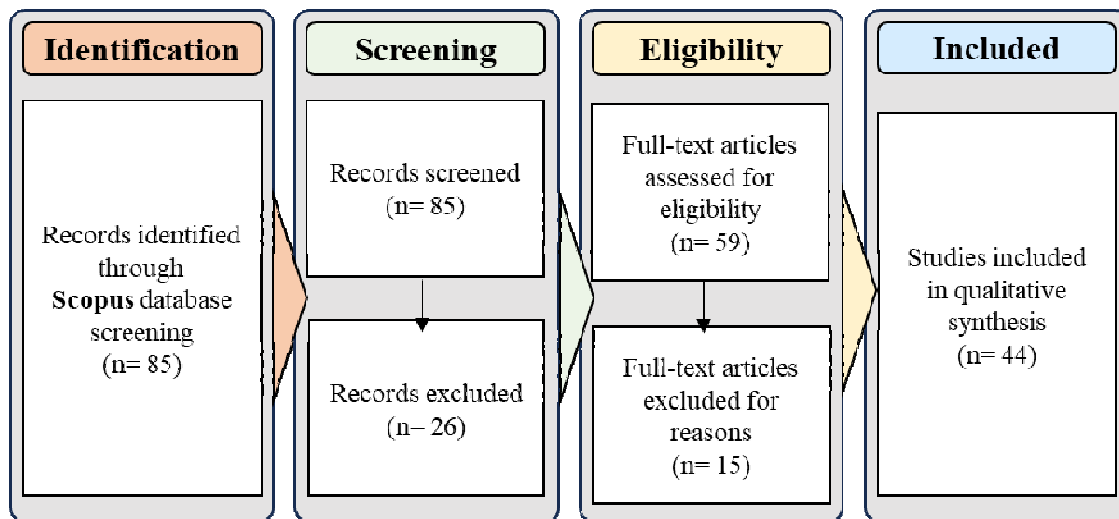


Figure 2: Selection procedure's workflow based on the PRISMA method.

4.1.2 Selection of bibliometric tools

Documents, keywords, authors, journals, references, countries, and other entities in research fields can be visualized using the Biblioshiny and VOSviewer applications. As a result, both Biblioshiny (version 4) and VOSviewer (version 1.6.17) were used in this investigation. The bibliometric maps created can visualize "co-occurrence", "co-citation", "co-authorship", "bibliographic coupling", and "citation" analyses. Co-occurrence

analysis can cover key topics and main research approaches relating to the concept of placemaking in urban spaces regarding the vernacular side. Moreover, the most reputable journals and publications in the research field can be identified by performing the “co-citation” analysis. In addition, the analysis of ‘bibliographic coupling by country’ can identify countries with the highest records of research in the field.

5 Case Studies Analysis

The analysis is based on integrating the spatial context of placemaking with sustainability dimensions, following the presentation of general site information. A crucial emphasis is placed on analyzing multiple urban sites to identify opportunities for enhancing the urban environment and highlighting positive outcomes—rather than providing criticism—as detailed in Table 2. The analysis was conducted based on field visits, relevant publications, and official websites. It begins with environmental aspects, including comfort, climate change solutions, recycling, transportation, accessibility, energy, and renewable resources. The social dimension examines personal attributes, users’ needs and activities, sociability, human connection, and community participation. The economic dimension considers stakeholder involvement, production, collaboration, and multifunctionality. Finally, the spatial context covers physical characteristics (heights/scale, boundaries, density, land uses, internal circulation, entrances, and urban furniture), identity elements (uniqueness, digital, historical, and cultural values), and sense of place (livability, aesthetics, adaptability, visual experience, and communication distance).

5.1 Case Selection and Geographic Context

The selection of these six cases resulted from a multi-phase screening process designed to ensure a diverse representation of locations, microclimates (coastal, mountainous, and desert), land uses, activities, spatial characteristics, identity, scales, and development potential. This diversity provides a comprehensive basis for evaluating the framework across different urban conditions and offers valuable insights that support the proposed SHP framework.

The focus on the Saudi Arabian context enables a targeted application of the SHP framework within a region undergoing rapid urban transformation driven by Saudi Vision 2030. This geographic focus is justified by unique socio-cultural and environmental variables—such as specific privacy norms and religious significance—that fundamentally shape the use and perception of public spaces in the region. These cases provide the necessary insights to ensure the framework is robust enough to handle localized needs within a consistent strategic landscape, serving as a foundational step before further international validation.

6 Results and Discussions

Bibliometric Analysis

Bibliophony and VOSviewer findings can provide an overview of the overall bibliometric analysis, indicating co-occurrence analysis, author keywords, authors, journals, bibliographic coupling, and co-citation analysis. Each section of the findings was examined to provide meaningful data on the study's progress, trends, and further potential.

6.1.1 Publication evolution and research areas

According to Figure S-1, the number of publications relating to the study scope rises with time. According to the publication evolution over the years, the initial evolution phase of publications, from 1950 to 1977. However, the

primary evolution phase, from 1978 to 2013, significantly increased. In the rapid evolution phase, exponential growth has been seen from 2014 to the present. This growing trendline reflects the awareness of placemaking and its impacts through the urban spaces and academia sectors. It is important to note that the reason there are fewer papers in 2023 is that the literature review for this work was completed in the early months of that year. In 2023 and the years after that, a rising trend is predicted.

Table 2: Analysis of selected case studies. Source the authors after (Expedia 2024; Rivki et al., n.d.; Communication 2022; Mostafa 2017; Thanh and David 2019; Woodford 2015; Saudi Commission for Tourism and National Heritage 2015(Turap et al., n.d.);Middleton 2021).

Sustainable Humanizing, Placemaking (SHP)		Case 1: open space of King Khalid Cultural Center	Case 2: Jeddah Corniche	Case 3: Hajj path, Historic Jeddah, the Gate to Makkah	Case 4: Quba Avenue, Madina	Case 5: Art Street,Abha	Case 6: King Abdulaziz Historical Center
General	Figure						
	Location	Saudi Arabia / Buraydah	Saudi Arabia/ Jeddah	Saudi Arabia / Jeddah	Saudi Arabia / Medina	Saudi Arabia / Abha	Saudi Arabia/Riyadh
	Area	120000 m2	730,000 m ² over 4.2 kilometers of Jeddah's Red Sea coastline.	1.00 Km	280,000 m ² , 3-kilometre and 300 m width	The walkway/street branching off from King Khaled Street has an approximate near of300 m.	440,000 m ²
Environmental	Climate changes & Comfort solutions	Shades& trees	Shades, palm trees & trees	The heights of buildings provide self-shading.	shades &sit areas	Art Shades& Jacaranda trees	Shades by trees, A palm oasis, and building heights provide self-shading.
	Recycling	NA	NA	The materials of surrounding buildings present historic materials like wood and bricks.	Using recyclable materials effectively.	Reused materials are processed and utilized.	NA
	Transportation / Accessibility	Available as the center is located in the middle of the city, at the intersection of King Abdul Aziz and King Fahd.	Available on King Abdulaziz Road, besides providing parking space for 3000 cars	Available onOld Makkah Road,whereas the Haii road expands from Bab Mecca in the east to Bab Al-Fardha to Al-Nafa'ah in the west on King Abdulaziz Street	Situated near Prophet's Mosque, across from Masjid Bilal, in Al-Jumaa District, Quba Road.	Located in the center of the city of Abha, within the Asir region, specifically in the southwest of the Kingdom. It is a branch off of King Khaled Street.	Bordered by Prince Abdullah bin Jalawi bin Turki Street to its west, King Faisal Street to its east, Al-Delam Street to its north, and Al-Foutah Garden on its southern side.
	Energy resources	NA	NA	NA	An environmentally sustainable approach to non-renewable energy use.	Energy-efficient elements are used, such as lighting poles and fountains that utilize recycled water.	NA
	Renewable resources	NA	NA	NA	NA	NA	NA
Social	Age	Activities targeting visitors of all ages	Activities target visitors of all ages. The visitors are groups of families or some bachelors sitting in a remote atmosphere along the Corniche.	The path depends on historic value, with various activities to target various ages of visitors.	Suitable for all ages.	Activities cater to visitors across all age groups.	The space offers a diverse range of activities suitable for visitors of all ages.
	Users' needs	Visitors require social and entertainment open spaces.	Visitors require open spaces along the waterfront for barbecuing, swimming, fishing, water skiing, or snorkeling.	Visitors require cultural, commercial, and	Visitors need religious educational tourism activities.	Social interactions increase throughout the year and during events	Visitors require cultural, social, and entertainment open spaces.
	Personal attributes impact	The design of open spaces provides various activities throughout the year, including social, cultural, heritage, entertainment, commercial, and service activities.	The design provides the following: ○ Watch a falcon show ○ Visit Saudi craft exhibitions ○ Take a walk in the parks ○ Watch the dancing water fountain ○ Performing prayers at Al-Rahma Mosque ○ Outdoor exercise, etc. ○ Parking space for 3000 cars ○ Restaurants and cafes ○ Hiking trails ○ gardens ○ Phone charging stations ○ Facilities for people of determination and more	There are various buildings already been restored, and various ruins are there to be seen. ○ Walk as infrastructure is rehabilitated and streets are comfortable to walk and see around. ○ Commercial as the shops and art galleries to visit. ○ Nice and hidden cafes you can find and enjoy Arabic and Turkish coffee. ○ Visit Nasseef House in the square from the late 19th century.	Intentional design promotes communal experiences and a variety of activities to visit a group of heritage buildings of historical value. -Cafes and restaurants -Commercial as the shops - The site requires versatile public spaces to facilitate a range of activities, social interaction, parks, and religious tourism, going beyond conventional commercial amenities.	Open space design enables a variety of activities to take place throughout the year, with a wide range of artistic practices and engaging recreational and creative activities taking place.	The design provides the followingeducational and recreational activities: - Visit the National Museum, King Abdulaziz Historical Center, art gallery, living museum, Memorial Hall, and a modern exhibition hall for the car collection - Walk in a large internal garden, through lakes with decorative rocks - Visit a documentation center with a separate men's and women's library. - Traditional, Mud Buildings, and the Water Tower enable visitors to enjoy a breathtaking panoramic view of the city.
	Activities						

Journal of Xi'an University of Architecture & Technology					ISSN No : 1006-7930									
Sustainable Humanizing, Placemaking (SHP)		Case 1: open space of King Khalid Cultural Center		Case 2: Jeddah Corniche		Case 3: Hajj path, Historic Jeddah, the Gate to Makkah		Case 4: Quba Avenue, Madina		Case 5: Art Street,Abha		Case 6: King Abdulaziz Historical Center		
	Sociability &Human Connection	Community participation	Great community interaction isnoticed due to its location and meeting users' needs.		Moderate community interaction isnoticed due to the variety of provided activities.		Great community interaction isnoticed due to its location and meeting users' needs.		Great community interaction due to the location of the pedestrian walkway near places of worship.		Great community interaction due to the vital community gathering place that successfully engages users in contemporary creative thinking and fosters great community interaction.		Great community interaction due to a mix of contemporary educational attractions, immersive experiences, and public spaces that foster social interaction and celebrate Saudi heritage and identity.	
Economics	Stakeholder Involvement	Production and joint work	Simple economic activities are involved, like the cooking and live preparation headquarters for food and kaleja, the organic food and natural products are based onproductive families.		The Jeddah Urban Development Company provides various activities besides shops, restaurants, and cafes.		Jeddah Urban Development Company presents the main authority.		Diverse cultural backgrounds have led to a wide variety of products and shared popular dishes across countries.		An inclusive exhibition catering to artists and art enthusiasts, showcasing a diverse range of artistic ideas and hobbies.		Public spaces provide community activitiesand vibrant cultural hubs.	
		Multi-functionalityentities	Integration of Qassim Municipality with several economic bodies in achieving development, raising the level of services, and humanizing cities.		Jeddah Municipality with several economies.		Jeddah Urban Development Company and cooperation with the Ministry of Culture. Presents the main authority.		Government support aims to elevate the region to achieve Vision 2030, but the location's limited capacity restricts its functions beyond just shopping. However, the site has potential for hosting Eid al-Adha and Eid al-Fitr celebrations, as well as other ceremonies.		The project represents a collaborative effort between Abha Municipality and various economic entities to drive development, enhance service levels, and foster humane city design. The space showcases diverse artistic expressions.		A multifaceted cultural campus with historical buildings, parks, a theme park, and traditional homes repurposed as event venues, catering to local communities and tourists.	
Spatial context	Physical	Heights /Scale	The height of the King Khalid Cultural Center, with around 12 m, and the fences 4 m high are the main heights that present the main borders.		The heights of side hotels present the main heights around the Corniche .		The path includes 11 tourist attractions, including mosques, ancient houses, markets, and historical roads.		The walkway links the Prophet's Mosque and Quba Mosque, harmonizingwith the 9-18m surrounding buildings. Enabling open access to sacred sites.		The design features a collection of single-story cafes and sales kiosks, with a maximum height of 3 meters.		A harmonious blend of building heights, from modest structures to heritage towers, creates a cohesive architectural experience that strengthens the overall sense of place.	
		Borders	The King Khalid Cultural Center and fencespresent the main borders.		Skyscrapers and hotels beside the waterfront present the borders of Corniche.		The historic buildings present the main borders of the path.		The walkway provides a harmonious connection between the primary boundaries of the Prophet's Mosque and the Quba Mosque.		The abundant jacaranda trees, numbering over 13,000, that line the street are considered a main border feature of Art Street.		The land of Al Murabba's Palace, the Darah, Antiquities and Museums Sector, Al-Midi Mosque, the Red Palace, and King Abdulaziz Mosque are considered the main borders.	
		Density	Density is considered appropriate due to the large area.		Density is considered high after Asr Prayer, within an hour or more, until nearly midnight.		The density in the path can be considered high regarding multiple activities in such a linear path.		The walkway's carrying capacity and density suit users, and the area is still under development and expansion.		Despite the expansive area, the overall density is considered relatively low.		The King Abdulaziz Historical Center is considered a moderate-densitycenter that accommodates a variety of activities.	
		Uses	Varies between cultural, entertainment, commercial, and social.		Varies include restaurants, retail outlets, hotels, an aquarium, a cultural center, a water dancing fountain, blossoming gardens, and fountains		Varies between cultural, commercial, and social.		The walkway currently serves as a resting area,commercial and commuter path between mosques, but needs expanded uses.		Art Street covers a wide area Jacaranda trees, restaurants, retail outlets, hotels, water dancing fountains, blossoming gardens, and fountains.		A diverse range of culture, entertainment, and social activities.	
		Internal circulation	Only pedestrian movement is available.		Both pedestrian and cycling are provided.		Both pedestrian and electric cars are provided		Only pedestrian transit, bicycle, and golf cart usage.		Pedestrians and cars.		Both pedestrian and cycling are provided.	
		Entrances	Only available via the main entrance of King Khalid Cultural Center and its inner sub-entries.		Several entrances are provided along the length of the Corniche.		Several entrances are provided around the boundary of Historic Jeddah.		The entrances to the walkway are unclear.		The entrance to the street is from the Al-Miftaha area onto King Khalid Road.		Bordered by Prince Abdullah bin Jalawi bin Turki Street to its west, King Faisal Street to its east, Al-Delam Street to its north, and Al-Foutah Garden on its southern side.	
		Furniture	- Children's Theatre - Roman theater that houses -Children's playground - Shades - Kiosks - Outdoor exhibitions		-Children's playground - Shades - Kiosks - King Fahd's Fountain, the highest fountain in the world - Parks and recreation areas - Pavilions - Monumental civic sculptures		- Seats - Palm trees		The walkway requires: -Waiting benches -Green areas - Shades -Children's play spaces -Open spaces for cultural displays		-Open and shaded gardens for families. -Kiosks -Library -Outdoor exhibitions. -Free painting spaces. -Recreational, walks,and entertainment theater. -An exhibition for productive families.		- Artificial lakes with decorative rocks A palm oasis of 100 palm trees -an area for reading. -A historic well, a lake, and flowing waterways. -Art gallery, living museum, -Children's playground - Green areas	
	Identity Elements / Unique	Digital tools	Only the Buraidah Water Tower is decorated with various lights and images regarding public occasions.		Hundreds of surveillance cameras as well as Wi-Fi service.		The path requires digital tools.		The walkway lacks the integration of modern smart systems, while the focus has been on equipping surrounding buildings with numerous surveillance cameras.		Display screens and delightful lighting Expressing the evolving events and activities contained within the street.		The old original Murabba's Palace, with the main Diwan renovated as a "living museum", and the "Memorial Hall" with digital elements. 'Water Tower' offers panoramic city views.	
		Historical /	The surrounding buildings successfully		The modern style is prevailing, whereas		Traditional Hijazi houses are characterized by		The walkway's design reflects Islamic		The region showcases heritage through		The Murabba's Development Project	

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Sustainable Humanizing, Placemaking (SHP)		Case 1: open space of King Khalid Cultural Center	Case 2: Jeddah Corniche	Case 3: Hajj path, Historic Jeddah, the Gate to Makkah	Case 4: Quba Avenue, Madina	Case 5: Art Street,Abha	Case 6: King Abdulaziz Historical Center
	Culture	reflect the spirit of vernacular architecture.	different shots show well-constructed spaces, with no clear order referring to the city's heritage.	their wooden Roshan windows and balconies.	heritage through vocabulary, lighting, colors, and materials, creating a culturally significant space.	blooming Jacaranda trees and reactive coordination to visual communication among the surrounding features.	transformed the historic area into a comprehensive national heritage site, with restored palace buildings, new cultural institutions like museums and libraries, and public spaces like parks and plazas, to celebrate Saudi Arabia's history, identity, and the legacy of its founder for the country's Centennial celebrations.
Spatial context	Liveability	Several activities provide livability, like: - Children's theatre - The Roman theater - The theatrical and competitive events. - Children's playgrounds.	The proposed activities provide livability, like: -Restaurants and cafes -Hiking trails, gardens -Facilities for people of determination and more	The path is considered a Popular market, including several activities and cultural shows, beyond historic buildings, and paths promote livability.	Several activities provide livability, like: - Social Spaces - Islamic heritage sites entertainment, creating an interconnected experience of reverence in this strategically located sacred space for the community.	Several activities provide livability, like: -Open and shaded gardens for families. -Library -Outdoor exhibitions. -Free painting spaces. -Recreational, walks an entertainment theater. -An exhibition for productive families.	Murabba's Development Project varied attractions like: -Landscaped gardens, lakes, and separate libraries. -Educational and recreational activities. -National Museum, historical center, galleries, and immersive exhibits. -Restored traditional buildings and iconic viewpoint towers.
		Aesthetic	The sounding buildings provide vernacular aesthetic values.	The modern style, with tent shades in addition to the waterfront of the Red Sea, provides ethical values.	The historic style of buildings and paths provides ethical values.	The surrounding buildings possess architectural aesthetics that reflect the local vernacular style and traditions.	The location of the Art Street breaks free from conventional systems and coordination in creating a space that emphasizes visibility.
		Adaptability	The area's open spaces and green areas, besides various activities, adapt significantly to visitors.	Families adapt by achieving privacy in their cars, sit very close to their cars, women shelter by the open doors, or may groups face each other in patterns that reflect the importance of privacy.	The compact fabric of the path, cultural and commercial activities, provides adaptable spaces.	The location transcends typical place-making, using varied lighting to evoke Islamic architecture and harmoniously blend open spaces, human scale, and surrounding heights.	Passersby quickly adapt to the presence of various artistic fields and concepts, giving them space for engagement and a sense of belonging, often capturing moments through photography.
		Visual experience	Based on low-density and adaptive furniture, the case study provides various visual experiences.	Visual experience varies regarding mosques, artworks on the Corniche, and different branded cafes along the Corniche.	Various experiences are provided based on compact fabric.	Visual experiences enabled by mid-density design and user feedback/perspectives within the space.	Artistic elements and diverse mural concepts seamlessly integrate with the enchanting natural surroundings, including purple-hued trees and intertwining colors, creating spaces that inspire contemplation, innovation.
	Communication distance	All intimate, personal, social, and public distances are provided.	Intimate scale in open spaces is related to usage; in this case, families or groups need a scale that combines openness and privacy to suit their culture.	Intimate, personal, and socialdistances are provided.	Communication zonescater to intimate, personal, social, and public interaction distances.	The development offers diverse spaces for individuals and community groups.	Dedicated spaces for families and individuals to engage in reading, education, and cultural contemplation.



6.1.2 Frontiers, networking, and co-occurrence analysis

On the other hand, Figure 4 (a) indicates the co-occurrence analysis network, in which colors present various clusters, and the cluster formation is based on the relationships between the objects, resulting in clusters of sections that are strongly related. The most frequently occurring keywords in the chosen publications, in order of highest

occurrence, placemaking, urban planning, and sense of place proposed the relevant concerns about the possibilities of placemaking towards providing urban spaces.

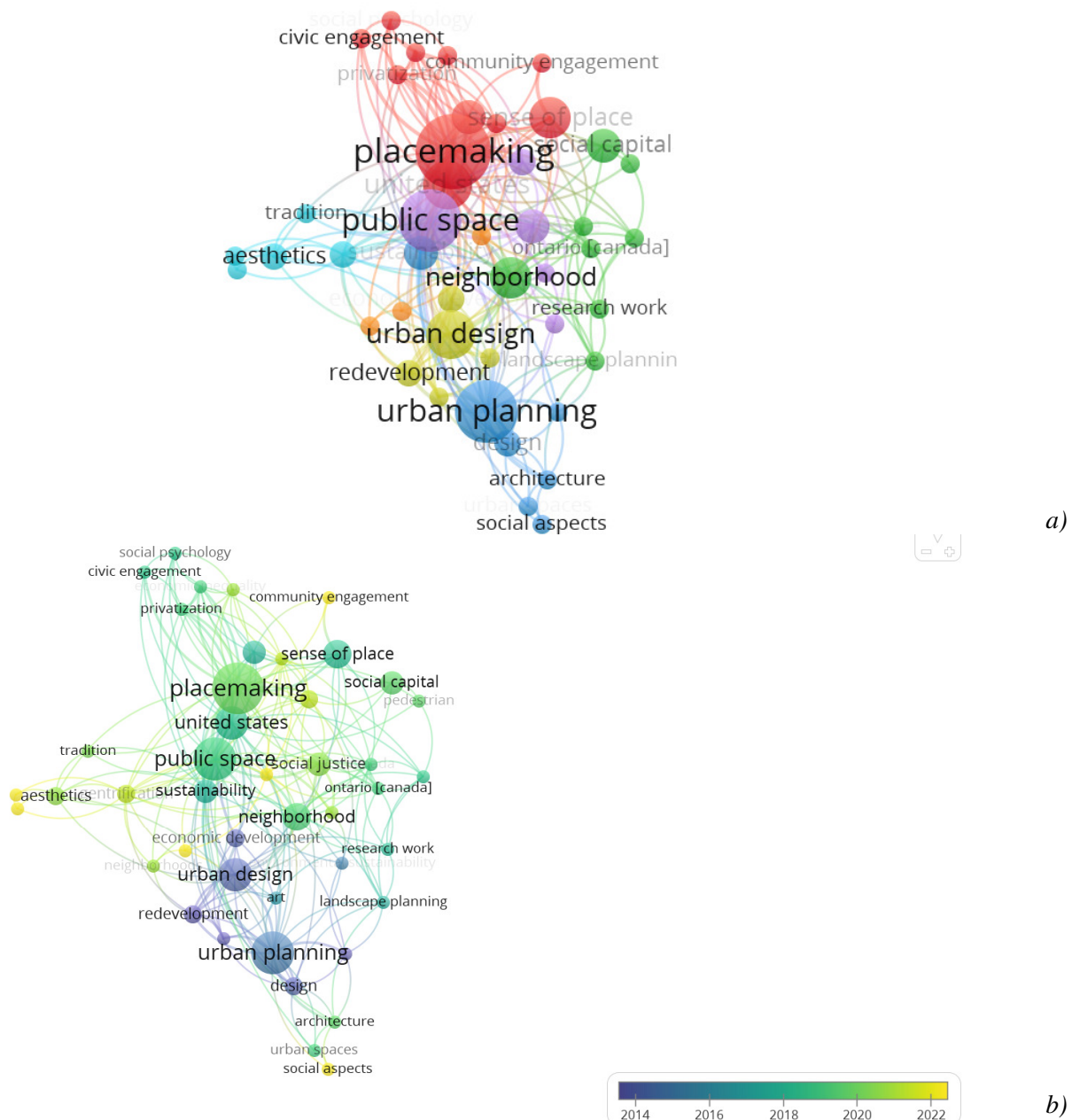


Figure 4: Clustering of co-occurrence networks based on: (a) Different clusters; and (b) Evolution over time.

The co-occurrence analysis network was based on six clusters, with the largest cluster (red color), which includes placemaking, civic engagement, and community development, as shown in Figure 4 (a). In addition, the blue cluster includes urban planning, and social space. While the third cluster (yellow color) is based on urban design, and redevelopment. Likewise, Figure 4(b) highlights the evolution of the co-occurrence analysis network over time, which demonstrates the possibilities of new technologies like bigdata to provide sustainable placemaking.

6.1.3 Thematic analysis

The thematic map can intuitively plot and group the keywords to identify research themes via four quadrants: niche themes, emerging or declining themes, motor themes, and basic themes (Figure 5). The keywords “sense of place” and “community engagement” present niche themes, meaning they are very specialized themes. However, the keywords “social capital” and “Covid 19” are considered emerging or declining themes, despite their importance.

On the other hand, the keywords “public spaces”, “sustainability”, “public spaces” and “civic engagement” are considered motor-themes, which reflect well-developed and important themes. In contrast, “urban planning” and “urban design” are considered basic themes, which means they are significant but are not developed, and need more investigation and analysis ahead to turn into motor-themes.

Moreover, Figure 6 illustrates the topic dendrogram map that reflects the correlation between the various keywords associated with placemaking and urban spaces using hierarchical clustering and hierarchical order. This map integrates keywords with seven clusters to explore how the topics are associated. In addition, such visualizations presented in Figure S-2 provide significant identification of prominent placemaking and their several research fields, highlighting methods in urban spaces and civic communities.

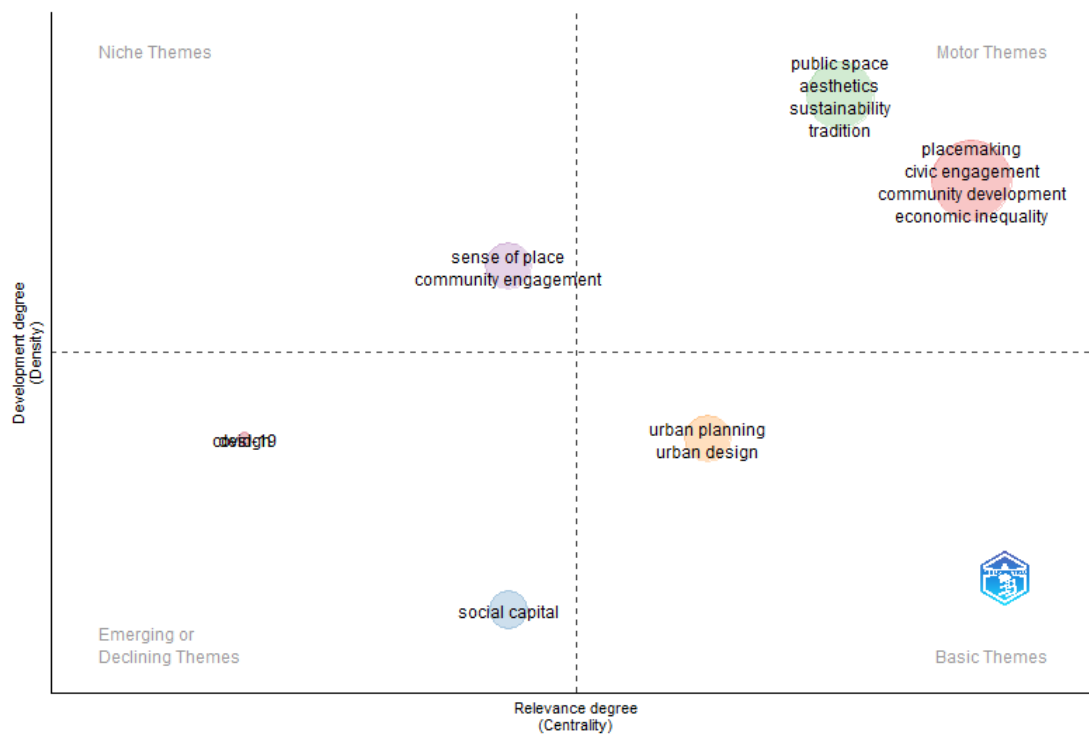


Figure 5: Thematic map of the 250 most frequent keywords.

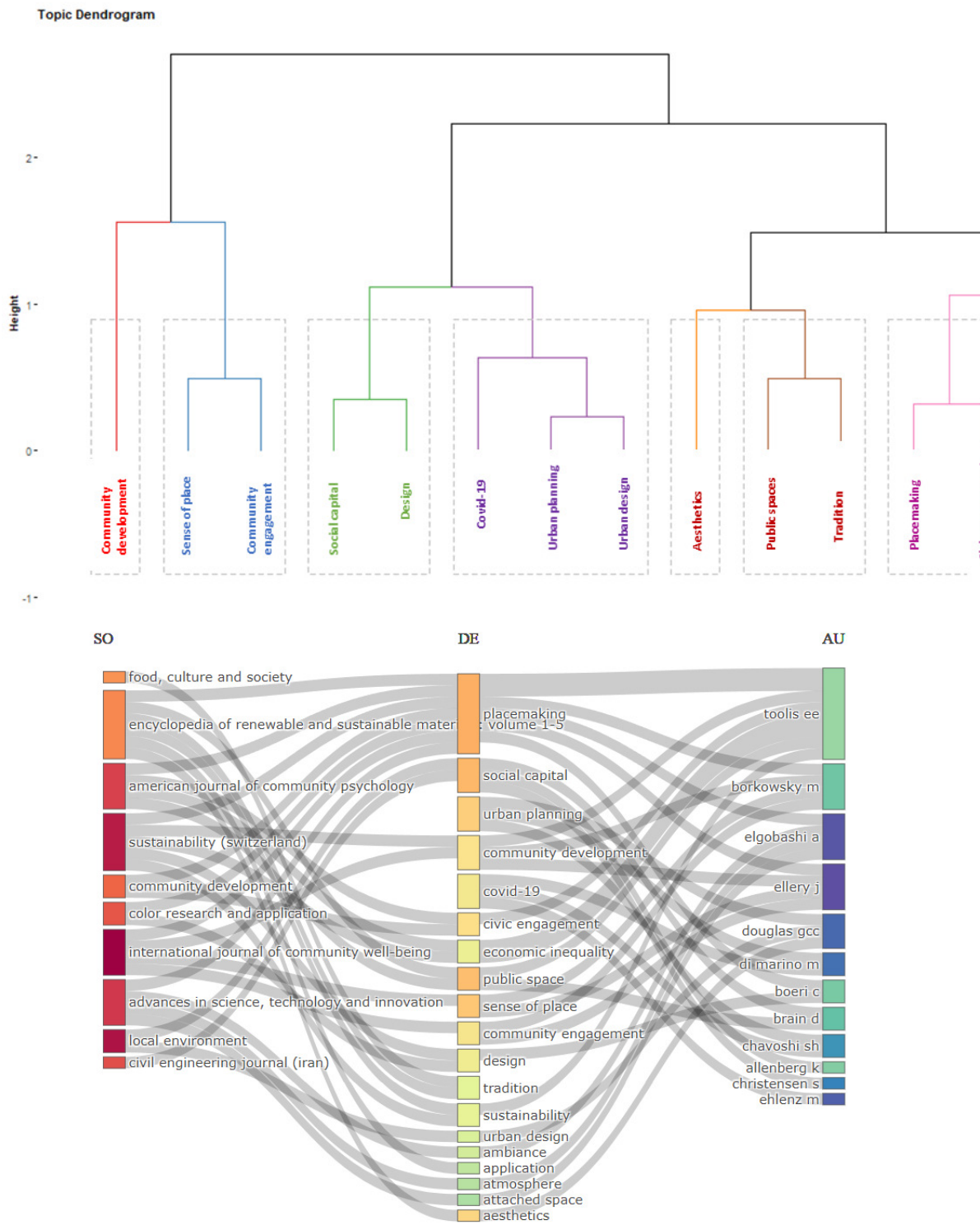


Figure 6: The topic dendrogram with associated keywords and six clusters using hierarchical clustering and hierarchical order.

6.1.4 Most cited documents and network of authors

Co-citation analysis was accomplished to recognize the most cited publications, which present one of the most important indicators in an academic field (Ampese et al., 2022). The results were identified for the most globally cited publications, as shown in the factorial map (Figure 7).

According to the author's impact regarding overall total citation, Ghaziani A, Khirfan L, Talen E, and Talen E attained the highest value in H-Index, as shown in Figure S-3 (a). S-3 (b) presents the top 10 authors' production over the years, showing the number of articles (circle size) and total citations per year (circle color). Khirfan L. and Toolis E. E. are the most productive authors, whereas their documents in the research scope present a greater number.

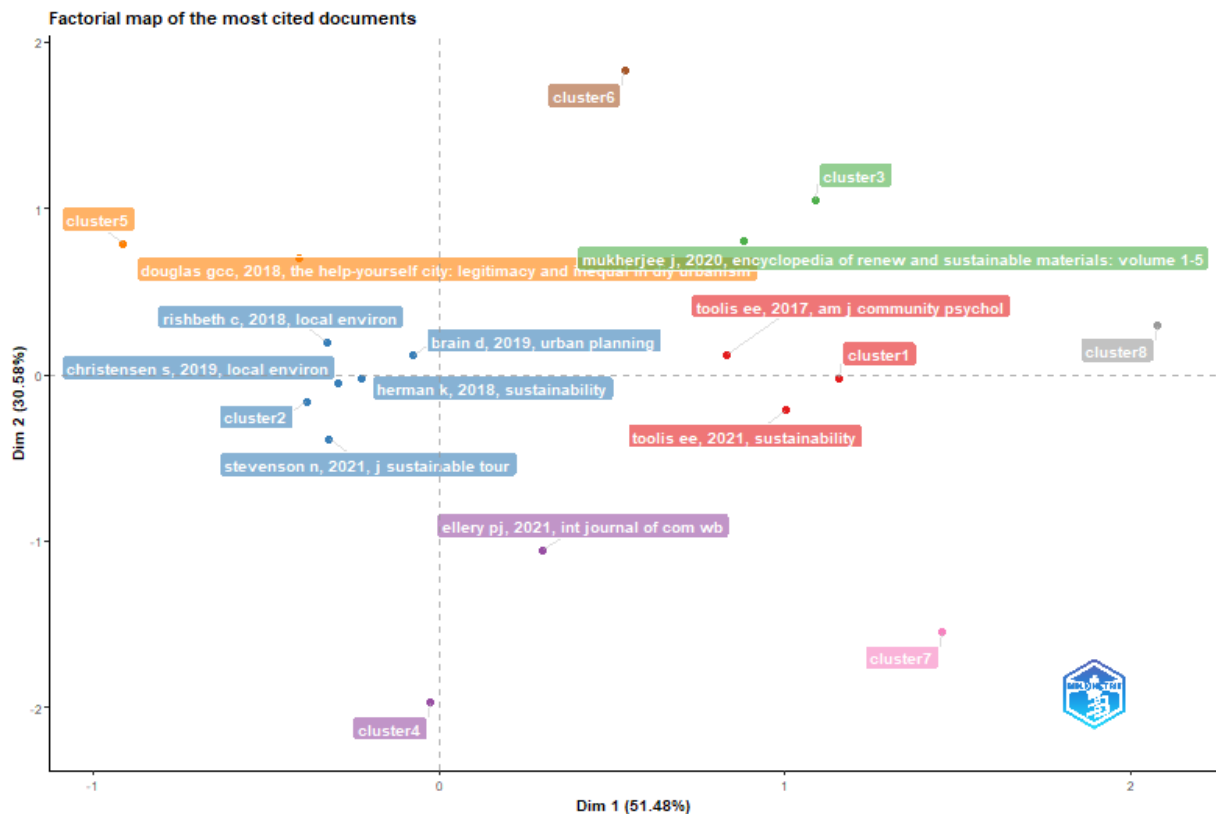


Figure 7: Factorial analysis for most cited publications.

6.1.5 A network of prominent countries, sources, and affiliations

According to countries, Figure S-4 illustrates the most prominent countries in the study field, based on the number of documents. The results show that the USA accomplished 20 documents with 329 citations.

The top 10 most frequent sources published studies of placemaking and urban spaces can be considered a significant indicator of the credibility of a publication (Wang and Guo, 2022). Figure S-5(a) illustrates the Cities journal and Journal of planning education and research as the most prominent source, and the strongest relationship occurs with keywords. Regarding affiliations, Jilin University in China is the most prominent organization in the research scope, as shown in Comparative case studies Figure S-5 (b).

Comparative case studies

The analysis of previous examples is based on the integration of sustainability, placemaking, and city humanizing that can provide human well-being in outdoor spaces and the quality of urban spaces, besides enhancing the identity of such projects. The results of the analysis of the six various examples indicate the holistic interest of the concept of placemaking via various feature examples. The general results indicate the possibilities of such examples and their provided visitors' experience and impression. The following points emphasize the drawn insights of each example and the promising possibilities of development reaching the proposed framework.

The first case of the open spaces inside the King Khalid Cultural Center, which is considered the main entertainment centre of the city. This case considered the identity not only via the style of surrounding borders but also the proposed activities and various shows, which reflect significant features. However, the need for shades and shading devices presents the main need to consider the environmental side, in addition to the ability to benefit from the raw materials and recycle available materials. On the other hand, producing renewable energy can provide promising opportunities via solar cells in shading devices.

Notably, the addition of digital and interactive smart activities can contribute to encouraging visitors of various ages. Regarding livability and adaptability, the center provides various activities for kids, whereas several activities can be added to provide privacy for families. Moreover, circulation paths can be added, like bikes and other tracks for pets.

The case Quba Avenue in Medina, Saudi Arabia has undergone an urban transformation, a historically significant road that has undergone an urban transformation as part of the Medina Humanization Program. The area has evolved into a vibrant commercial hub, with the Quba Walkway Park connecting the two mosques and providing a range of dining, shopping, and mobility options. The project has demonstrated a commitment to sustainability through recyclable materials and transportation alternatives. However, it lacks renewable energy integration and could benefit from more diverse and culturally appropriate activities, informative spaces, and educational/touristic programs. Recommendations include improved signage and lighting to capture the Islamic architectural heritage, the addition of shades and shading devices for environmental needs, and the incorporation of digital and interactive activities to engage diverse visitors. To enhance livability, the project could provide more privacy-oriented activities for families. Overall, the Quba Avenue project has made progress, but there are opportunities to further enhance its social, economic, and environmental sustainability.

The case of Abha's Art Street is a lively center that offers a wealth of artistic encounters and cultural connections. It presents a wide array of activities, such as art exhibitions, interactive workshops, music performances, and cultural festivals. This renowned street draws the attention of both local and international artists, creating an essential destination for individuals, friends, and families in search of a delightful and immersive experience.

To elevate Abha Art Street's visitor experience and align with the city's strategic vision, a comprehensive approach is recommended. Improving amenities, such as adding more seating and smart public restrooms, would enhance comfort and convenience. Integrating cutting-edge technologies, like virtual and augmented reality experiences and dynamic digital displays, could further elevate the artistic encounters. Sustainability should also be

prioritized through energy-efficient lighting and kinetic energy-harvesting floors. Maintaining the street's diverse artistic offerings, including traditional handicrafts and recycled creations, while expanding interactive programming, would strengthen its cultural identity and creative appeal. Crucially, strengthening collaborations with local stakeholders would ensure Art Street's initiatives align with community interests and foster a sense of belonging. By addressing these key areas, the Abha Art Street can enhance its appeal, improve visitor experiences, and contribute to the city's cultural and economic development aligned with Vision 2030.

In case of The King Abdulaziz Historical Center in Riyadh is a comprehensive example of integrating user needs and placemaking. The center features expansive parks, a central plaza with a palm oasis and a flowing water stream, hosting cultural events and using greenery to showcase Riyadh's heritage and the nation's history. The 440,000 square meter site is designed with a focus on environmental sustainability, with vast green spaces and trees to absorb carbon emissions. The parks' total area is about 20,000-30,000 m². The center has a mix of historic and modern facilities, creating a cultural oasis for the city.

The design exhibits a thoughtful division of interconnected plazas that tell the Kingdom's great history. However, some areas for improvement exist. The frequent presence of raised areas without considering accessibility for those with special needs, and the lack of incorporating modern technologies like virtual reality and smart systems, could enhance the experience for all visitors, especially women, to fully socialize, interact, and participate in the center's activities. Additionally, adding spaces for active engagement in local folklore and vernacular architecture, as well as exploring recycling initiatives, could further strengthen the center's role as a preserver of Riyadh's heritage while providing a dynamic, inclusive, and sustainable cultural destination.

7 Sustainable Humanizing, Placemaking (SHP) Framework

Based on the previous analysis of bibliometric and comparative case studies, this section proposes a preliminary conceptual SHP framework(Figure). Urban designers and decision-makers can refer to this frameworknot only for the predesign of the urban spaces process but also for the renovation and development of urban spaces to enhance the quality of urban spaces and provide vibrancy and city humanizing.This framework is intended as a strategic reference for urban designers and decision-makers to explore the integration of sustainability and city humanizing strategies, though it requires further empirical validation to confirm its effectiveness in diverse urban environments.

The framework is designed to enhance urban public spaces via starting with context and site analysis to determine the appropriate strategy forholistic SHP design.The SHP framework introduces a novel design sequence that begins with context-specific microclimate and socio-cultural analysis, followed by a prioritized social approach that centers community needs. A key distinct contribution is the inclusion of environmental indicators like solar energy integration in shading devices and recycling treatments, which are often absent in traditional placemaking. This structure ensures that the spatial approach, incorporating digital tools and identity elements, is always grounded in ecological and economic sustainability.Whereas such analysis affects the actual vision and character of SHP design. The main design process involves four approaches, whereas the social one centers the whole process. The social approach emphasizes on the needs, activities, and participation of the community. It focuses on creating

spaces that foster social interaction and community participation, ensuring that the design is driven by the people who will use it. This is a fundamental aspect of placemaking, which aims to create a "sense of belonging" and social cohesion.

Environmental approach addresses physical and ecological factors, including solutions for climate change and comfort, accessibility through various transportation means, and the use of renewable energy resources. The environmental approach is associated with microclimate analysis and the provided comfort treatments can be considered a significant factor affecting SHP design, besides the treatments of recycling and renewable energy.

The economic approach can also ensure the success and continuity of the proposed framework. The economic approach examines how placemaking can contribute to the local economy. It includes fostering local production, joint work, and the creation of multi-functional spaces that can support small-scale entrepreneurship and attract investment. The goal is to create economically viable places that also support the well-being of the community.

On the other hand, the spatial approach can include physical design of the urban space, including its physical form, identity, and the "sense of place" it evokes. Key elements within this approach include managing height and scale, defining borders and density, and considering historical and cultural aspects to create a unique and meaningful environment. This also incorporates digital tools and factors like liveability, adaptability, internal circulation, and furniture to improve the user's experience, which can contribute to promoting the actual character and vision of urban spaces. However, regarding renovation design, several tools can be implemented for the first phase of context and site analysis. Both types of design processes need to be assessed, and various alternatives are based on the placemaking process and collaborative engagement. The framework illustrates that effective placemaking is a collaborative, multidisciplinary effort that integrates these social, economic, and environmental dimensions to create resilient and inclusive urban spaces. It is worth mentioning that varying cultural or microclimatic conditions influence the sequence of the placemaking approach. Whereas the strategies of environmental control and the cultural context of users reflect the procedures and strategies towards attaining spaces based on SHP spaces. In other words, the strategies followed in Arab regions differ from other, and hot, dry regions differ from humid, cold, and continental.

7.1 Implementation and Monitoring Mechanisms

To ensure the usability of the SHP framework for urban practitioners, its application is supported by a continuous feedback loop and specific Performance Indicators (KPIs) across its four core approaches:

- Environmental Monitoring: Practitioners should monitor ecological performance through indicators such as solar energy integration levels in shading devices, waste recycling rates, and the effectiveness of microclimate treatments in reducing ambient temperatures.*
- Social and Cultural Monitoring: Success is measured through user-centric metrics, including the diversity of age groups utilizing the space, the frequency of community-led events, and a 'sense of belonging' index. This can be captured via Internet of Things (IoT) sensors and digital feedback tools that monitor real-time user density and engagement.*

- *Economic Monitoring:* Indicators include the growth of small-scale entrepreneurship within multi-functional spaces and the level of joint-work production facilitated by productive families.

- *Spatial Monitoring:* This involves assessing the adaptability and livability of the physical form through periodic visual experience audits and communication distance evaluations to ensure the space remains vibrant and inclusive.

The implementation process follows a structured design sequence:

Phase 1: Multi-scale Assessment: Using site and microclimate analysis to define the strategy.

Phase 2: Collaborative Design: Prioritizing the social approach to center community needs.

Phase 3: Digital and Physical Integration: Implementing spatial tools, furniture, and digital identity elements.

Phase 4: Continuous Monitoring: Utilizing stakeholder feedback and data analytics to refine and renovate the space in response to urbanization and climate challenges.

8 Conclusion

In this study, an integrative framework has been developed to bridge the gap in previous research on placemaking and primarily focused on physical assessments. This study expands on integrating placemaking as a human-centered strategy that connects sustainability with the enhancement of urban variations. It provides an innovative, integrative framework that combines various methodologies to create vibrant, people-focused spaces. Improving urban life quality by prioritizing user needs and experiences can be considered the main aim of the research. It examines how these perceptions interact with public spaces, particularly in Saudi Arabia, where social, cultural, and political factors significantly influence their habits.

A bibliometric analysis was developed using Scopus to compile a database of keywords related to placemaking and urban spaces. After applying specific filters, 85 relevant publications were identified, resulting in a comprehensive analysis of 320 documents. Additionally, the study utilized Biblioshiny and VOSviewer to visualize bibliometric data. The study emphasized the concept of "sense of place," which integrates tangible and intangible elements like livability, aesthetics, adaptability, visual experience, and communication distance. This underscores the urgent need for a robust placemaking framework that combines sustainability, urban humanization, and community well-being to enhance urban identity.

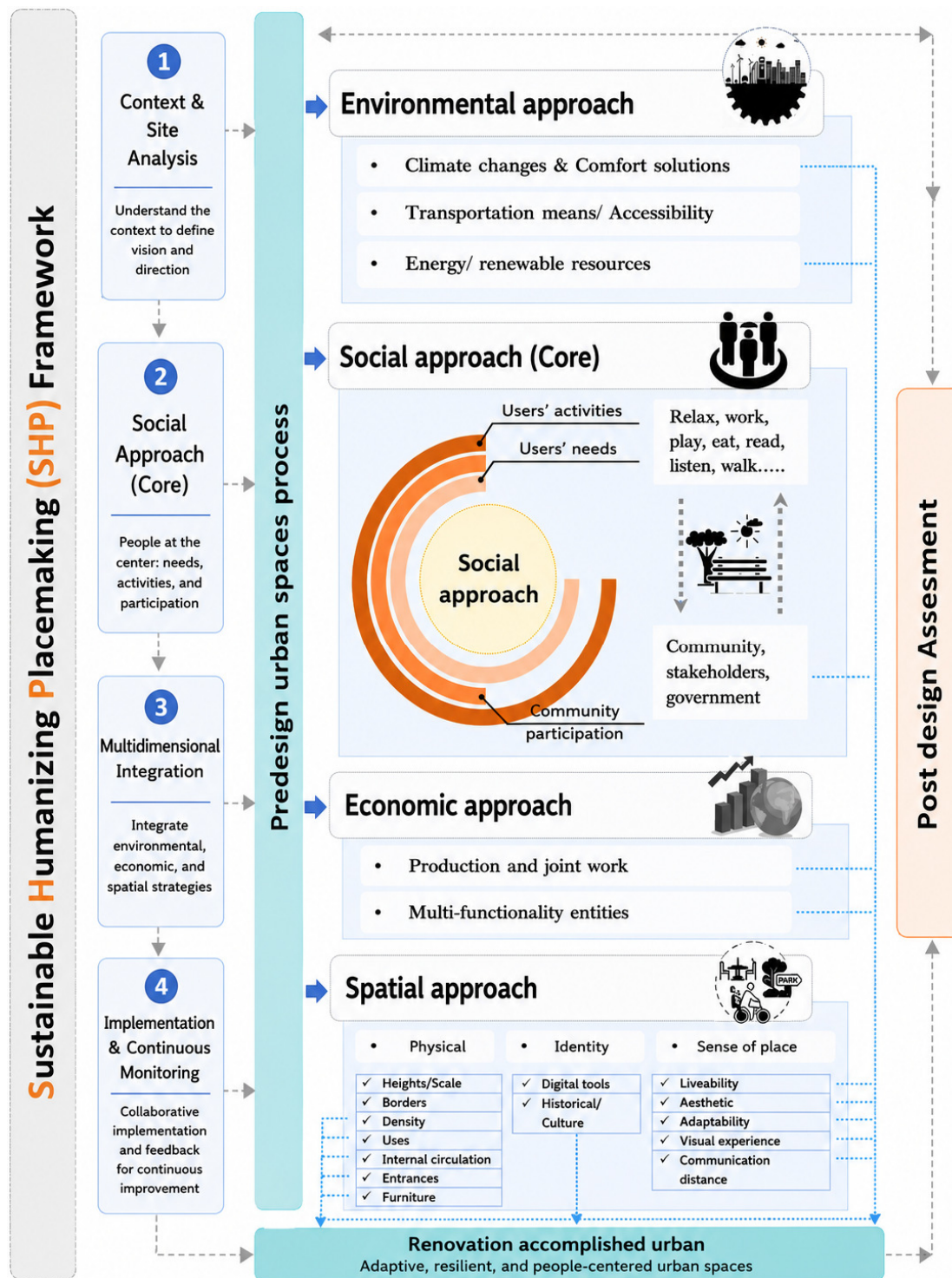


Figure 8: The proposed framework SHP.

Through case studies of six urban projects, the research highlighted the integration of sustainability, placemaking, and urban humanization, demonstrating how these elements can enhance outdoor spaces and urban quality. The proposed Sustainable Humanizing Placemaking (SHP) framework serves as a holistic guide for urban

designers and decision-makers, focusing on social, environmental, economic, and spatial strategies to foster vibrant urban environments. The study identified three levels of engagement in placemaking: individual perception, social connectivity, and physical infrastructure, all contributing to greater community involvement. Effective placemaking values community expertise, fosters unique identities, and encourages continuous feedback and collaboration.

This paper contributes to the integration of sustainability, placemaking, and urban humanization. The provided framework can be considered a guide to not only design such spaces but also renovate and develop spaces in response to associated urbanization, climate change, and digital challenges via multi-scale opportunities. The proposed framework contributes to enhancing the holistic design of public spaces and streets, not only from a design perspective but also by considering environmental and sustainability aspects. This reflects an active role in the health and comfort of users and encourages them towards sustainable and resilient spaces. The study also contributes to evaluating and validating numerous urban spaces to develop them more comprehensively and enhance the creation of spaces, including their implications for achieving sustainable development goals. This study can be considered an initial step, and further investigations are needed to validate and develop such a framework.

In conclusion, this study establishes the SHP framework as a preliminary conceptual model that integrates sustainability, placemaking, and urban humanization to address contemporary urban challenges. It demonstrates the potential of bridging physical assessment, user experience, and technological resilience within the context of Saudi Arabia's Vision 2030, while offering a holistic guide for the potential design and renovation of urban spaces. It is important to note that these conclusions are based on theoretical and descriptive analyses. Therefore, the SHP framework should be considered an initial foundational step rather than a finalized tool.

As an initial step, the study combines bibliometric analysis and selected case studies to construct and illustrate the framework, highlighting its multi-level approach to individual perception, social connectivity, and physical infrastructure.

Future research should focus on introducing quantitative performance indicators and testing the framework across diverse international contexts to further validate and strengthen its applicability for sustainable, human-centered urban design.

9. Limitations and Future Research

Despite the proposed integration of sustainability, humanization, and placemaking, this study has several limitations that provide pathways for future research. Primarily, the SHP framework is currently a preliminary conceptual model that lacks empirical validation through quantitative field surveys, stakeholder assessments, or longitudinal real-world implementation. Consequently, the findings should be interpreted as a strategic guide rather than a tested technical standard.

Furthermore, the analysis of the six Saudi Arabian case studies is primarily descriptive and illustrative. While these cases provide essential insights into the framework's potential application, the evaluation relies heavily on secondary sources, including publications and official websites, alongside qualitative field observations. The study does not yet incorporate measurable, quantitative performance metrics for each site, which limits the depth of the comparative assessment.

Finally, the exclusive focus on the Saudi Arabian context—driven by the unique socio-cultural variables and rapid urban transformations of Vision 2030—may limit the immediate generalizability of the findings to significantly different cultural or microclimatic environments. As the strategies for environmental control and user habits vary

between hot-dry regions and humid-cold or continental climates, the framework is presented as an initial foundational step. Future research is encouraged to test and adapt the SHP framework across diverse international settings to enhance its global robustness and practical utility for urban practitioners.

Declarations

Competing interests

The authors have no affiliation with any organization with a direct or indirect financial and personal relationships with other people or organizations that could inappropriately influence (bias) their work

Ethics approval and consent to participate

“not applicable”

Consent for publication

“not applicable”

Competing interests

“not applicable”

Acknowledgements

“not applicable”

Data Availability Statement

The authors confirm that the data supporting the findings of this study are available within the article and its supplementary materials

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