

EDITORIAL

Mapping Beyond the Monodisciplinary Approach: Exploring the Potential of Mapping in Comparative Research Methods.

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Humanity is facing a wide range of transitions—from the climate crisis and energy transition to migration and digitalization—unfolding at multiple scales. These transformations impact urban, rural, and even uninhabited landscapes, often in cumulative or reinforcing ways. Industrial regions, cross-border territories, capital cities, and river-port areas exemplify the spatial intersections where global pressures are materializing. The scale and urgency of these challenges demand innovative, interdisciplinary approaches that account for the social, environmental, political, and economic dimensions of space.

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Geo-spatial mapping has long been a valuable resource across diverse disciplines—such as planning, geography, and the digital humanities—offering both visual and analytical insights that extend beyond traditional textual narratives. In this issue, geospatial mapping refers to the computer-based process of generating, visualizing, analyzing, and interacting with spatial data using digital tools. However, despite this wide applicability, mapping is often confined to single fields of study or specific case studies, constrained by national contexts, linguistic boundaries, or narrow temporal scales. To address the complexity of today's interconnected challenges, we need mapping methods that transcend geographic and temporal limitations and integrate multiple disciplinary perspectives—approaches that reflect the fluid, dynamic nature of territories rather than treating them as fixed or isolated spatial units.

This special issue, *"Mapping Beyond the Monodisciplinary Approach: Exploring the Potential of Mapping in Comparative Research Methods,"* aims to overcome these limitations by highlighting interdisciplinary and comparative methodologies that broaden the scope of digital mapping. Because maps are inherently visual and spatial, they are particularly well suited for comparative research, enabling scholars and practitioners to explore relationships, flows, and patterns across otherwise fragmented contexts. In doing so, they reveal contrasts and connections that support more comprehensive analysis.

A central theme of this issue is the role of scale in comparative analysis. The contributors demonstrate how digital mapping techniques can be applied innovatively across a range of fields, revealing that digital mapping is not merely a supplemental tool, but a foundational element in shaping interdisciplinary knowledge. These articles show how mapping at multiple scales can illuminate spatial dynamics while also emphasizing the need for methodological flexibility in grappling with complex realities.

The articles assembled here link mapping techniques to a wide array of spatial challenges—from historical urban morphology to infrastructure development. Grouped into thematic sections and spanning both historical and contemporary contexts, they illustrate how digital cartography informs interdisciplinary research, public debate, and policy. Ultimately, this collection positions mapping as an active, iterative process—one that fosters new inquiries and practical responses to global transformations.

1. Historical and Morphological Approaches

Applying Kevin Lynch's conceptual framework to historical cartographic material, the paper by Sahar Abdollahi, Martin de Jong, Jurian Edelenbos and Jan Fransen (2025) showcase a mapping-based approach that reveals long-term patterns of urban development in six cities in the Low Countries. Their study goes beyond description by systematically cate-

gorising morphological change and identifying recurring spatial dynamics. This method not only enriches our understanding of historical urban development, but also contributes to comparative research by examining several cities in parallel. Through the lens of geospatial mapping, the article demonstrates how spatial analysis of the past - using historical maps - can inform contemporary discussions on urban development and heritage conservation. It highlights the value of cartographic sources in revealing complex transformations and offers a compelling case for integrating mapping into broader urban studies.

While Abdollahi et al. use the map to explore the layered material history of the city, the following papers turn attention to lived experiences and the ethical considerations involved in visualizing movement and memory. They reveal that mapping is not just about spatial representation, but about capturing the layered socio-spatial experiences, memories, and power relations embedded in place. They highlight how mapping practices can trace, surface, and make sense of the personal stories, emotions, and everyday encounters that shape—and are shaped by—urban and territorial transformation.

2. Socio-spatial Experiences and Narratives

Vincent Baptist (2025) studies the case of Katendrecht, a former pleasure district in the port-city of Rotterdam, now undergoing rapid waterfront regeneration and gentrification. He investigates how long-term residents, who witnessed Katendrecht's changes since the 1970s, experience walking through today's redeveloped neighborhoods. Methodologically, the paper combines walking interviews and time geography, producing space-time maps that trace both the spatial routes and temporal pauses or 'stillstands' during these resident-led walks. Due to its random paths and non-rigid interview structures, this approach captures the authentic, spontaneous recollections and place-based reflections of this neighborhood. Mapping these interviews reveal patterns that go beyond individual memories, uncovering shared reactions to specific urban features, appreciation for renovated historic facades, critique of the scale and design of new developments and the ambivalence towards the district's transformation. The outcome is a layered interpretation of how time and space intersect in the lived experience of locals in this 'new' Katendrecht undergoing such significant spatial and socio-cultural changes.

In their paper, Elena Dorato and Richard Lee Peragine (2025) critically study the mobility of agricultural works in Ferrara located in northeastern Italy, within the Po Valley (Pianura Padana), near the Adriatic Sea. This area is historically shaped by large land-reclamation projects that transformed marshlands into fertile agricultural lands, making it one of Italy's major agro-industrial production zones. Ferrara's agricultural sector relies heavily on migrant, seasonal, and day labourers, many of whom are

exploited through the illegal system of caporalato – gangmasters who control recruitment, transport, and payment. Aim of their research is to map the commuting and mobility patterns of those migrant day-labourers exploited under the illegal caporalato system, using surveys, interviews, fieldwork, and GIS analysis. However, the authors argue that mapping alone cannot address the deeper political-economic roots of exploitation embedded in such capitalist agricultural production. The study reveals critical gaps and barriers, such as opaque labor and mobility arrangements, resistance from both workers and employers, and the difficulty of gathering reliable, non-coerced data. Therefore, the authors call for ‘critical mapping’, an approach that recognises mapping not solely as a technical tool, but as a space for political and ethical reflection. Instead of seeking to ‘fix’ mobility through technocratic solutions, the authors advocate for a combined mapping with deep structural critique, on-ground investigation and a high level of awareness to limitations and unintended consequences that might accompany attempts to visualise and intervene in exploitative labour regimes

Juan Sanz Oliver, Gregory Bracken and Víctor Muñoz Sanz (2025) study on the role of mapping in regenerative modernist housing estates, focusing on t’Hooft in Eindhoven, Netherlands and Montbau in Barcelona, Spain. The research uses critical cartography to assess how these mid-century neighbourhoods, once celebrated for their experimental designs and social ambitions, perform today against the ideals of the ‘Open Society’. While the two cases study areas share many similarities, they differ in crucial ways. t’Hooft, built in the late 1960s in Eindhoven, emerged from a bottom-up cooperative process, with strong resident participation, diverse housing typologies, and spatial strategies designed to support flexibility and community identity. Montbau, by contrast, was a top-down public housing project from 1950s–70s Barcelona, shaped by CIAM modernist ideals but constrained by political, economic, and topographical challenges, leading to a more rigid structure despite its early innovations. By combining archival research, site visits, spatial analysis and Bakema’s 64 Open Society principles, the authors show that while these sites offer rich lessons in human-centered urbanism, their renewal faces deeper challenges. They argue that mapping cannot be reduced to a technical exercise of documenting or redesigning space, but rather must be understood as a political and ethical exercise that reflects on power relations, historical legacies and the risk of oversimplifying complex urban realities. Instead of seeking one-size-fits-all design fixes, the study calls for a critical, reflexive approach that blends mapping with historical sensitive, sociological insights and transdisciplinary collaboration, in order to offer both site-specific lessons and broader principles for more inclusive and sustainable urban regeneration.

3. Analytical Mapping for Specific Typologies

Although the paper by Das, Rahman et al. (2025) does not reveal a macro-level comparative analysis, it clearly demonstrates the value of analytical mapping for specific typologies. Focusing on the micro-climatological performance of campus street types, the authors use GIS-based techniques - such as Inverse Distance Weighted (IDW) interpolation and Ordinary Least Squares (OLS) regression - to visualise and analyse spatial data. Their approach combines quantitative datasets with spatial analysis to reveal localised patterns and correlations that might otherwise go unnoticed. In doing so, the study demonstrates how digital mapping methods can address small-scale spatial challenges with broader implications. The analytical model developed provides a transferable framework for assessing the climatological performance of other urban typologies, extending the relevance of the study beyond the immediate site. This paper demonstrates how typology-focused mapping approaches can support sustainability research and inform spatial planning, even in cases where the study itself is not explicitly comparative or macro-scale.

Merten Nefs' paper (2025) also shows how mapping can be used for in-depth spatial analysis and to challenge dominant narratives, especially when applied to specific spatial typologies. His research focuses on the logistics landscape of the Netherlands, using a counter-mapping approach that combines multiple datasets, including OpenStreetMap (OSM), company data (LISA), business park inventories (IBIS) and the Key Register of Addresses and Buildings (BAG). The result is an open-access dataset and interactive dashboard that visualises the extent and character of logistics space across the country. Using GIS-based techniques and typological analysis, the research reveals spatial patterns that are often invisible to conventional planning. By challenging both the data and its gaps, Nef's work highlights the analytical potential of mapping, while also pointing to the limitations and needs of transdisciplinary research. In doing so, she contributes to a broader understanding of how analytical mapping can inform the governance of complex and often overlooked spatial systems.

4. Geospatial Frameworks and Digital Tools for Planning

The Bauhaus of the Seas Sails geospatial platform is a digital tool designed to support sustainable development in coastal and port-city territories. Michael Rodrigues, Lukas Höller and Alankrita Sarkar (2025) present a work developed under the New European Bauhaus initiative, this open-access platform integrates spatial data, sustainability metrics, aesthetics, and narratives to foster cross-disciplinary dialogue and informed decision-making. Two research cases underscore its versatility: one explores health and wellbeing in the transnational Rhine watershed, using a multi-

scalar approach grounded in Max-Neef's Human Scale Development model; the other investigates cross-border planning in the Flemish-Dutch Scheldt Delta, focusing on integrative urbanism and stakeholder collaboration. The platform's grid-based system enhances spatial analysis by improving data processing and resolution flexibility. Through these functions, it offers a valuable foundation for participatory planning, knowledge sharing, and transnational cooperation. As a flagship of the New European Bauhaus vision, the platform bridges science, policy, and local communities, positioning itself as an essential instrument for addressing complex socio-ecological challenges in Europe's coastal regions. It exemplifies how digital innovation can align environmental, social, and spatial goals toward a more resilient and inclusive future.

The following section explores how mapping also operates as a participatory and educational tool. These contributions show that maps are not only for analysis and planning, but also for empowering communities, shaping learning, and fostering inclusive dialogue. Together, they illustrate how geospatial tools can link high-level policy with everyday experience.

5. Participatory Mapping and Pedagogical Tools

The 'Mani in Mappa' (Hands on Map!) initiative, part of the EU-funded I-CHANGE project, demonstrates how citizen science and participatory mapping can drive sustainable urban mobility planning. Carlone et al. (2025) present an activity conducted in Bologna, Italy. The activity engaged students, local stakeholders, and citizens in a serious game that simulated real-world mobility challenges using fictional personas. By mapping daily routes and transport choices on both paper and digital maps, participants identified barriers to sustainable transport, such as gender inequities, caregiving responsibilities, and inadequate infrastructure for vulnerable groups. The project revealed how mapping, when used as a collaborative and experiential tool, fosters critical reflection and knowledge co-production. Participants' interaction with the maps deepened their understanding of urban complexity, empowering them to suggest inclusive mobility solutions. While digital maps offered precision, paper maps enhanced collective spatial reasoning and dialogue. Interviews confirmed the tool's educational and transformative potential, though challenges remain in engaging underrepresented groups and ensuring data accuracy. Overall, "Mani in Mappa!" illustrates how integrating maps into citizen science can democratize urban planning, build environmental awareness, and amplify marginalized voices.

Ingrid Mulder, Michael Rodrigues, María Reyes, Ariele Empirio and Alankrita Sarkar (2025) contribution explores value mapping as a transformative pedagogical tool for addressing complex urban and landscape challenges through a values-based approach. Centered on a Master-level course titled "Design & the City," the study demonstrates how students

use cities as learning ecosystems to explore sustainability issues through design. By creating value maps, students visually articulated the diverse and sometimes conflicting values of stakeholders, fostering critical thinking, collaboration, and inclusive design practices. These visual tools help students and practitioners navigate the “green dilemmas” of urban development by grounding interventions in shared values. The methodology emphasizes contextual specificity, participatory engagement, and long-term sustainability goals.

Practise

Kersten Nabielek (2025) introduces the Spatial Outlook 2023 by the PBL Netherlands Environmental Assessment Agency, presenting four imaginative scenarios for how the Netherlands could look in 2050, addressing the nation’s pressing spatial and environmental challenges. These scenarios serve not as blueprints, but as tools for fostering informed, inclusive debate on future spatial planning. Developed through a multidisciplinary process combining GIS-based land use modeling and design research, the maps visualize key themes such as energy, housing, climate adaptation, and nature. They functioned as “conversation pieces” during development, “communication tools” in public outreach, and “boundary objects” in participatory workshops, bridging diverse stakeholders. Balancing visual clarity with technical accuracy, the maps make complex spatial issues tangible for policymakers and the public alike. The approach underscores mapping’s vital role in navigating uncertainty and envisioning sustainable, climate-neutral futures.

Miscellanea

The contribution by Jasmin Suroor Abdulghafoor and Ismaeel Emad Hani (2025) with the title “Computer-Aided Decision-Making for the Highest Sustainable Reuse of Historic Buildings” uses data-driven assessment method for the sustainable reuse of historic buildings, with a focus on the Al-Barood Khana building in Mosul. The research introduces a software system — MAROHB — that uses multi-criteria decision-making algorithms to assess the highest and most sustainable reuse options for heritage structures. By combining architectural and urban requirements, the program calculates compatibility scores across potential functions, helping decision-makers identify reuse strategies that prolong a building’s life while respecting its cultural and historical significance. Rather than treating adaptive reuse as a purely technical or economic exercise, the authors argue that sustainable reuse must balance architectural integrity, cultural value, social needs, and environmental concerns. Their work shows that digital tools, when carefully designed, can enhance—not replace—expert judgment, stakeholder participation, and ethical stewardship. By testing

MAROH on the case of Al-Barood Khana, the study demonstrates how computational approaches can support informed, context-sensitive decisions that safeguard historic buildings for future generations.

Across thematic sections, this special issue underscores that mapping is not a neutral exercise but a powerful tool for revealing hidden inequities, supporting informed decision-making, and fostering cross-sector collaboration. Whether tracing historical urban layouts, protecting the identities of vulnerable populations, or planning for climate resilience by 2050, the contributors use maps as both instruments of insight and platforms for critique. We invite readers to view these contributions as interconnected case studies demonstrating how spatial tools cannot only represent our world, but help shape more just and sustainable futures.

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Yvonne van Mil is a researcher at the Department of Architecture at Delft University of Technology. After graduating in Delft in 2009, she worked for 10 years as an independent researcher, collaborating with various heritage and academic institutions. She specialises in spatial history and geospatial mapping, with a particular interest in the history of (regional) strategic planning. She worked on the publication of the *Atlas of the Dutch Urban Landscape* (2014), the first overview of urbanisation in the Netherlands from a long-term perspective. She is co-author of several books, including *Port City Atlas. Mapping European Port City Territories* (2023), *Driven by Steel. From Hoogovens to Tata Steel 1918-2018* (2018), *Atlas van het Westland* (2016) and contributed chapters to the *Atlas van de Schie* (2016). The focus of her research is on mapping-based research methods for the comparative analysis of complex urban and rural landscapes in transition.

Michael Rodrigues is a Geographer dedicated to innovating spatial data visualization and enhancing communication to reach broader audiences. Currently a Postdoctoral Researcher at the Chair History of Architecture and Urban Planning within TU Delft's Faculty of Architecture and the Built Environment, his research focuses on rendering spatial data more accessible and comprehensible. His aim is to facilitate learning about the surrounding world and empower stakeholders to make informed decisions.