ISSN 1828-5961

Matteo Cavaglià
PhD in Architecture, Built Environment and Construction Engineering (disciplinary sector ICAR/10) from the Polytechnic University of Milan. The research activity focuses on the development of visual analysis methods for the design of the built environment, with particular attention to computational design and AI.

Lorenzo Ceccon
PhD in Urban Planning (disciplinary sector ICAR/17) at the Poly- technic University of Milan.
The research activity focuses on parametric modeling and simulation, the application of artificial intelligence systems, photogrammetry, and virtual/mixed reality for the built environment.

From Representation to Participation: Generative AI as a Catalyst for Collaborative Design of the Built Environment

As the built environment across Europe and other regions continues to age, the challenge of adapting existing building stock to contemporary needs is becoming increasingly important. In this context, the necessity to manage and update lived spaces will intensify in both frequency and complexity. Participatory design may thus assume a central role in the management of the built landscape, offering a way to align spatial interventions with the lived realities, values, and expectations of local communities. However, one of the enduring challenges faced by participatory design is the risk of inadvertently excluding valuable contributions due to disparities in technical knowledge and design literacy. When non-professional users are invited to engage in participatory frameworks, the activities proposed must be carefully calibrated to match their skills. For instance, practical design tasks, such as generating or commenting on design proposals, must be accessible and meaningful, regardless the participant's background. This paper explores generative AI (GENAI) as a tool able to foster a more inclusive participation within the participatory design framework. By lowering the technical threshold for engagement while preserving the richness of participant contributions, GenAI can help democratize the design process and reveal latent community values that might otherwise remain unspoken. This paper explores how GenAI, when embedded within a socio-technical framework encompassing tools such as natural-language interfaces, culturally fine-tuned adaptation, multimodal fusion, and transparent governance, can significantly enhance participatory design. Rather than replacing expert judgment, GenAI serves as a mediator and amplifier of diverse perspectives, one that not only expands who can participate, but also deepens the quality and relevance of the resulting design outcomes.

Keywords:
Generative AI; Co-Design; Participatory Design; Mass Customization; User-Centered Design

DOI: https://doi.org/10.20365/disegnarecon.35.2025.15

INTRODUCTION

The built landscape is a spatial region encompasses patterns of streets, blocks, buildings, and infrastructure at urban scales[1]. The built landscape constitutes, in practical terms, the primary human environment, the habitat, in which everyday human life develops: as Sir Winston Churchill once acutely stated "We shape our buildings; thereafter they shape us" (speech to the meeting in the House of Lords, October 28, 1943). As with any other living beings, the well-being of people is closely tied to the quality of the environment they inhabit. For this reason, the characteristics of the built landscape play an active role in shaping the quality of life at multiple levels, influencing not only physical health, but also cognitive, emotional, and social dimensions.
This fundamental association has become a cornerstone for a growing body of research, which approaches the built environment as a determinant of well-being [2], [3]. From access to daylight and green areas to the structure of urban mobility and social space, the design of the built landscape, and the built environment as an extension, is now understood as a crucial field of intervention for promoting individual and collective well-being[4]. The built landscape results from the gestalt of multiple components that collectively define the quality of urban space. For this reason, the spatial performance of each element, along with ongoing maintenance and improvement, directly influences how a place is experienced. As such, the overall quality of the built environment depends both on the configuration of its parts and on the care invested in their long-term management[5], [6].
In this regard, participatory design is gaining traction as an approach to transform urban spaces while considering inhabitants' [7]. Participatory design aims to incorporate the perspectives of non-professional actors into the design process. In densely populated contexts, this often translates into involving local residents in shaping strategies for transformation or management, recognising them as the primary recipients of the design impacts. However, integrating non-professionals presents several challenges, particularly due to the potential lack of domain-specific knowledge[8]. For this reason, participatory processes are commonly structured through predefined formats like workshops or surveys, which help guide engagement into a more regulated interaction mode but may also risk reducing participation to a token gesture[9] if overly constrained. In this context, generative AI (GenAI) may serve as a useful intermediary, helping to interpret intentions and translate them into visual or textual content, improving communication between residents and professionals.

CURRENT PERSPECTIVES ABOUT THE EUROPEAN BUILT LANDSCAPE

European cities are undergoing a gradual transition from expansive development toward the maintenance and modernization of existing structures[10]. This shift is driven by demographic contraction[11], aging infrastructure[12], and a growing focus on environmental sustainability[13]. While this trend may reduce the pace of large-scale transformations in the built landscape, it simultaneously increases the frequency of interventions within inhabited areas. In this context, managing the quality of these lived-in environments becomes a key concern. Some researchers advocate improving quality of life for existing residents and promoting civic engagement as sustainable approaches to managing urban shrinkage[14], [15]. The issue has been directly analysed by the European Goverments in multiple attempts (Fig. 1 and Fig.2). For example, the European Building Stock Analysis developed in collaboration with EURAC provides a detailed age mapping of the building stock across all European countries. The data reveal that both residential and non-residential buildings are predominantly composed of structures built before 1990[16]. While building age is not inherently indicative of poor environmental quality, it often serves as a reasonable marker for the need for upgrades in energy efficiency[17], structural performance[18], essentially indicating the need for either maintenance or outright renewal. In other words, it outlines the likelihood of future alterations to the local built landscape within inhabited areas. This highlights the challenge of carrying out necessary alterations in ways that genuinely enhance the quality of local spaces, rather than diminish them.
Within this perspective, participatory design offers a way to align planned transformations with local conditions, helping ensure that interventions are not only beneficial but also more tolerated during implementation and accepted by those who live with their outcomes. Participatory design can be defined as a framework that integrates non-professional actors into the development of architectural and urban projects. Mirzaean Mahabadi Shahab et al. describe participatory design as a process for regenerating public spaces through the direct involvement of diverse social groups[20]. However, the notion of "social groups" remains open. Who are the participants in participatory design? Reich et al. argue that the scope of engagement can extend beyond the user, ultimately including all individuals affected by a given project. From this perspective, participation is not limited to established experts but can involve a broader range of contributors with different levels of proximity to the design outcome[21]. People may be involved in various stages of project development, either to provide insight on how a project might evolve or to offer feedback that validates its current trajectory. In practice, participation by users and stakeholders outside the construction sector is typically structured through specific formats such as interviews, questionnaires, and workshops[22]. Digital tools, ranging from mixed reality to online platforms, are increasingly adopted to support and broaden participation[23]. Participatory design in architectural and urban contexts remains a highly experimental practice, marked by significant variability in its application. Rather than following a standardized model, its implementation often depends on the specific context, objectives, and actors involved. As a result, participatory processes can differ widely in format, scope, and intensity, ranging from informal consultations to structured co-design sessions.

ISSN 1828-5961

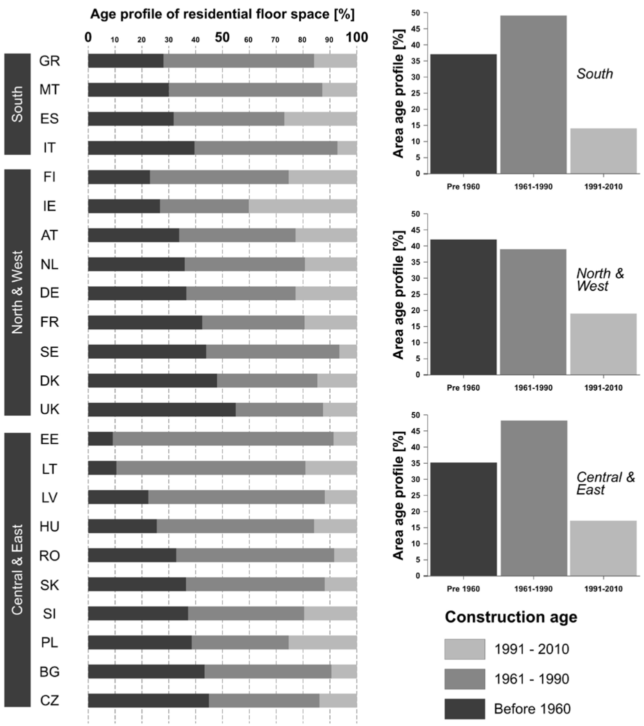
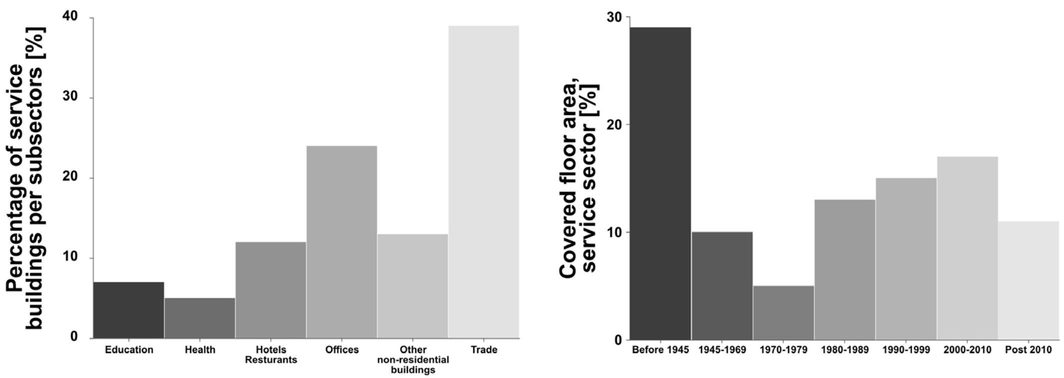


Fig. 1 - Adapted from the data published in the Europe's Buildings Under The Microscope report[19]. The image summarize the construction period of the European building stock.

Fig. 2 - Adapted from the data published in the European Building Stock Analysis report[16]. The image summarize the construction period of the European non-residential building stock.



PARTICIPATORY DESIGN PRACTICES, MODE OF ENGAGEMENT, REQUIRED SKILLSETS AND TOOL IMPLEMENTATION

To better frame the challenges of implementing effective participatory design formats, a small case-study-based review was conducted. The goal is to explore the variety of participatory sessions and the skillsets required for users to contribute meaningfully. While approaches vary depending on project goals, a common challenge lies in presenting sessions in ways that align with participants' knowledge and abilities. When barriers are too high, feedback may be limited or misdirected, leading to design outcomes that fail to reflect the needs of the intended users.

The review was conducted using a supervised AI-based classification of case-study publications related to participatory design in the built environment. The objective was to analyse how each study facilitated the involvement of non-professional stakeholders, focusing on the strategies behind the definition of the engaging formats used expected output, rule of engagement, and so forth. Three main categories were defined as the analysis targets: mode of engagement, required expertise, and implemented tools. The first describes the type of session format proposed (e.g., workshop, interview), the second refers to the inferred skillsets needed by participants (e.g., drawing ability, communication skills), and the third identifies the tools provided to support interaction (e.g., drawing materials, handheld devices, or computers). Each category was defined through a set of predefined features that could be consistently identified across the selected studies. For example, the "mode of engagement" category included eight possible formats: workshop, focus group, interview, mapping, digital co-design, survey, participatory design practice, and observational methods. To support the classification process, a session using ChatGPT (GPT-4o), with a backup implemented in Deepseek (R1), was developed to analyse incoming PDF articles according to this limited pool of features. This setup enabled a semi-automated classification of a large volu-

ISSN 1828-5961

me of documents. The dataset comprised the 150 most recent publications on participatory design in the built environment, retrieved from the Scopus database at the time of writing (Fig. 3).
Among the 150 most recent results, 45 provided open access PDF files suitable for analysis. The classification focused on this subset, applying the predefined categories to each article. The results were manually validated and subsequently analysed using Gephi. The outcome is a network graph connecting modes of engagement, required expertise, and implemented tools based on their co-occurrence within individual studies (Fig. 4). The frequency of each feature and the structure of the resulting network offer valuable insights into how participatory design is currently implemented and communicated across the field.
The Gephi network highlights a clear centralisation of certain features within each category. In the mode-of-engagement cluster, workshop (occurrence of 28/45), mapping (occurrence of 13/45), and interview (occurrence of 10/45) emerge as the most frequently occurring format of enagement, indicating that these formats form the backbone of recent participatory design studies. On the required-expertise side, communication skills is linked to 41 of the 45 studies analysed (occurrence of 41/45). These rankings are further confirmed through the analysis of a network metric known as closeness centrality[24]. This measure captures how centrally positioned a feature is within the network, based on the reciprocal of the total distance to all other nodes[25]. High values of closeness centrality are associated with features that frequently co-occur with a broad range of other elements across the dataset. Therefore, it could be said that these features represent central patterns or shared tendencies within participatory design practices. Notably, the analysis of closeness centrality reveals a significant observation within the required expertise category: communication skills stand out with a substantial lead over the second most prominent feature, digital skills (Fig. 5).

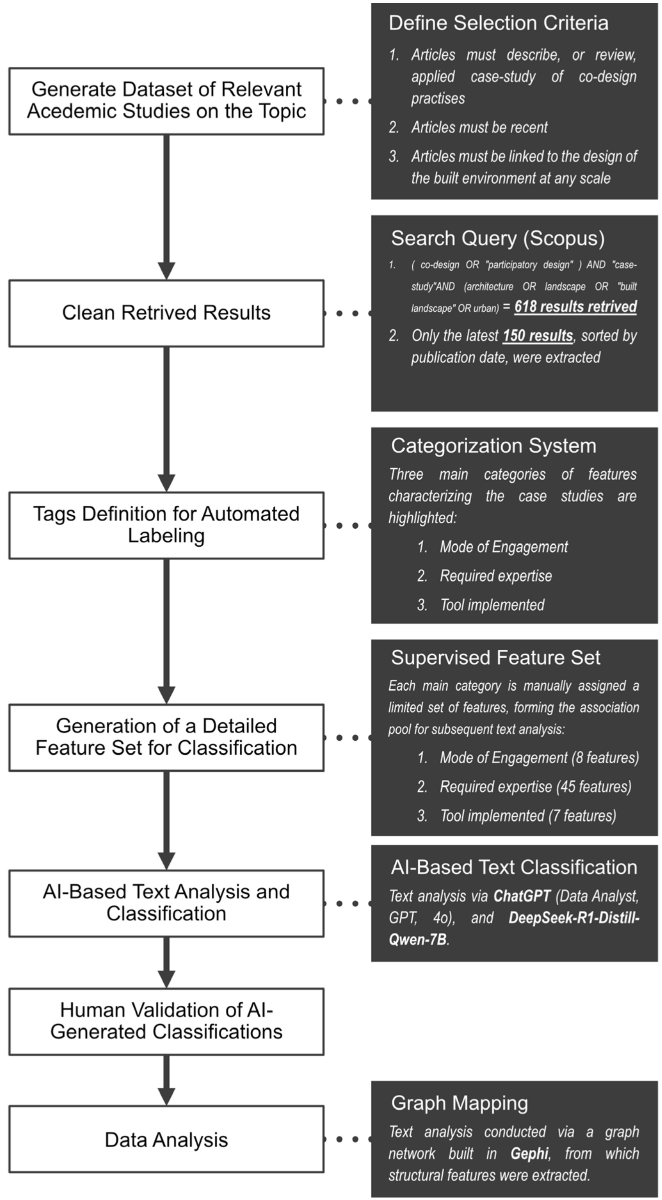


Fig. 3 - Workflow detailing the AI-aided analysis of recent academic publication in the field of participatory design.

ISSN 1828-5961

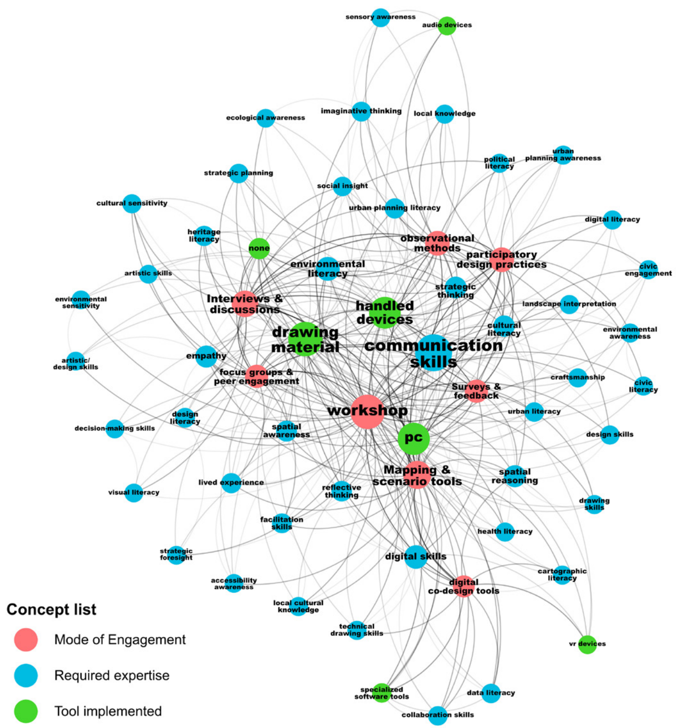


Fig. 4 - Graph output of the text-analysis.

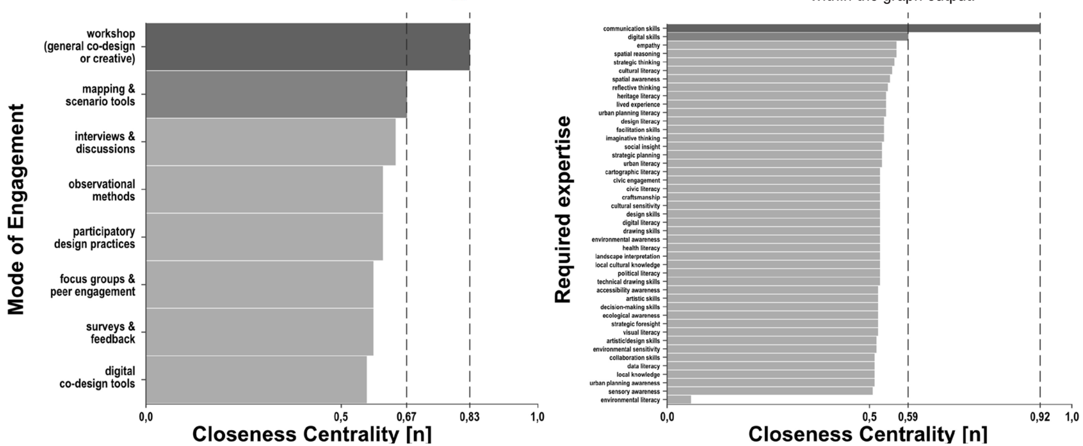


Fig. 5 - Closeness centrality analysis within the graph output.

The prominence of communication skills in the analysis can be understood in light of their widespread and non-professionally oriented nature. Formats such as interviews or commenting sessions tend to rely on general verbal or written expressions, which are less likely to act as exclusive criteria for participation. In contrast, most other skillsets, such as drawing ability or technical knowledge, introduce higher entry barriers that may limit who can meaningfully engage in a participatory session.
Interestingly, digital skills rank second among the required expertise. This is notable, as their presence is typically associated with the use of apps, platforms, or interactive tools designed to lower participation barriers. The relatively high centrality of digital skills may indicate that these tools are increasingly effective in broadening access to participatory processes, suggesting a growing potential for technology to enable more inclusive engagement.

IS GENAI A GATEWAY FOR BROADER PARTICIPATION IN THE MANAGEMENT OF THE BUILT LANDSCAPE? PATHWAYS FOR IMPLEMENTING AI IN THE MANAGEMENT AND CO-CREATION OF THE BUILT ENVIRONMENT

Contemporary participatory design research stresses that genuine inclusivity requires both lowering technical barriers to contribution and investigating latent community values[26], [27]. Generative AI (GenAI), underpinned by large-language and diffusion models, offers a powerful means to re-balance the expert/lay dynamic by enabling rapid, iterative co-creation (Fig. 6). Yet realising this potential demands careful alignment of model affordances with participatory theory, rigorous evaluation of equity outcomes and robust governance mechanisms. We here propose seven main interrelated pathways – each grounded in empirical systems and methods reported in the literature – through which GenAI can systematically broaden stakeholder engagement in the built environment.

Fig. 6 - Example of artificial intelligence-assisted conceptualisation of thinking. The participant who was asked to imagine how he could change a specific area (image set on the left), could implement GEN-AI to generate an image reflecting his thinking (image set on the right) to share with professionals.

1.NATURAL-LANGUAGE VISUAL CO-CREATION INTERFACES

Bridging non-professional users' ideas, possibly vague ones and not rooted in solid knowledge, and the desired spatial outcome can be streamlined and helped by AI and GenAI tools. For instance, DesignAID[28] couples a large-language model (GPT-4) for prompt expansion with a Stable Diffusion backbone fine-tuned on CAD-style architectural graphics. In structured workshops, participants specify everyday-language details – "terracotta paving patterns" "bench seat height circa 450 mm" "solar shading on west façade" – and immediately receive six comparative renderings in a grid interface. Controlled experiments report a 30 % reduction in iteration time and significantly higher user satisfaction compared with analogue sketch methods[28]. Moreover, for participatory processes this implies that stakeholders no longer need to master design software or technical drafting – they simply describe their vision in everyday language[29]. Hybrid UIs – combining free-text prompts with structured dropdown taxonomies for materiality and lighting typologies – reduce cognitive load for novices without constraining aesthetic exploration[29]. Future research should develop quantitative prompt-efficacy indices, semantic-fidelity metrics and regulatory-alignment checks to evaluate how these interfaces affect design novelty, participant empowerment and compliance with local planning codes[27].

2. CULTURALLY FINE-TUNED GENERATION VIA LORA ADAPTERS

Out-of-the-box diffusion models often reproduce homogenised, globalised aesthetics that can erode local identity. This may steer the co-design process beyond the very same cultural horizon, needs and intent of the local communities. Low-Rank Adaptation (LoRA) offers a parameter-efficient fine-tuning strategy – small adapter modules bias pretrained Stable Diffusion or Midjourney models towards vernacular styles using compact, curated image corpora. Xu et al. [30], in their Urban Generative Intelligence (UGI) framework, fine-tuned a Stable Diffusion model on approximately 350 site-specific photographs – local brick textures, traditional roof-tile geometries and historic street-section drawings – yielding proposals that inherently respect proportions and material palettes characteristic of the locale. Guridi et al. [31] apply analogous LoRA adapters within Midjourney, using community-sourced material palettes and archival drawings from Catalonia. Their evaluation highlights two imperatives: dataset representativeness, ensuring inclusion of minority heritage elements to avoid marginalisation, and drift detection, monitoring embedding-space distances across model versions to prevent gradual aesthetic homogenisation[30], [32]. Robust metadata tagging (source, date, contributor) and version-control protocols are essential to maintain provenance, accountability and community trust.

3. MULTIMODAL INTERFACES FOR RICHER SEMANTIC INTERACTION

True inclusivity demands support for diverse modes of expression – text, sketch and speech – within a unified GenAI framework (Fig. 7). Hu et al. [33] survey architectures integrating CLIP for image-text alignment and Whisper for speech-to-text transcription, feeding a multimodal diffusion pipeline. In a reference implementation, participants upload (a) hand-drawn circulation sketches via smartphone capture, (b) voice memos detailing accessibility constraints and (c) contextual site photographs. A joint embedding layer fuses these inputs, and sequential diffusion steps produce annotated site plans accompanied by explanatory narratives[34]. To cultivate transparency, interactive provenance heatmaps overlay colour codes on plan features to indicate the relative influence of each modality – for example, highlighting which sketch strokes informed pedestrian routing or which spoken phrases guided material choices. Initial studies reveal that such visual cues significantly enhance trust and enable more targeted iterative refinement, especially among users with differing literacy or cognitive styles[33]. Remaining research questions include how modality preferences vary by age, language proficiency or cultural background, and which uncertainty-visualisation techniques (e.g. confidence corridors, probability overlays) most effectively communicate model ambiguities in fused outputs[27].

Fig. 7 - AI-generated conceptual image about graphic-based communication via AI.

4. PARTICIPATORY MULTI-AGENT FRAMEWORKS FOR SIMULATED CONSENSUS

While the creation of physical focus groups, including local representatives and communities, has been used to try to include local stakeholders, sometimes the required time and resources to make it work risks to make it a mere selection of those stakeholders who have higher interests and resources to afford to be present, excluding other slices of the social body. GenAI can instantiate virtual "agents" that embody distinct stakeholder priorities – heritage conservation, commercial vitality or universal accessibility – simulating negotiation dynamics before in-person workshops. Joshi & Tolloczko [35]introduce a Town Hall Simulator in which each agent is a fine-tuned GPT-4 instance with a unique utility function. Agents exchange proposals and counter-proposals in natural language, while a paired diffusion model generates schematic annotations to visualise trade-offs in real time. This dual textual-visual simulation surfaces latent conflicts – such as cyclist throughput versus pedestrian safety – and identifies compromise corridors, enabling project teams to focus subsequent community meetings on refined, pre-negotiated options rather than discovering basic disagreements (Fraunhofer Institute, 2024). The Fraunhofer white paper [36] further integrates agent-based modelling (NetLogo with Python) to incorporate quantitative performance indicators – such as emissions projections, pedestrian-flow densities and noise attenuation – directly into agent dialogues. Early evaluations suggest these augmented simulations increase perceived legitimacy among participants and reduce face-to-face deliberation time by up to 25 % [36]. Crucial next steps include empirical validation of simulated consensus maps against actual community feedback, and the establishment of bias-audit protocols – documenting agent configurations, training-data provenance and decision-threshold logs – to ensure equitable representation of all stakeholder voices[32].

5. STAGE-BASED URBAN DESIGN WORKFLOWS WITH HUMAN-IN-THE-LOOP (HITL)

To reconcile rapid generative iteration with professional rigour, He et al. [37]propose a modular pipeline in which discrete GenAI modules are interleaved with expert review checkpoints. First, a diffusion model conditioned on demographic, land-value and mobility datasets generates alternative zoning layouts. Second, a graph-neural-network-enhanced diffusion module produces pedestrian and vehicular circulation diagrams[38]. Third, three-dimensional massing options – fine-tuned on local typologies via LoRA adapters – are generated. Fourth, a final module suggests façade articulations and material palettes drawn from community-curated corpora. At the end of each stage, multidisciplinary experts vet outputs for technical feasibility, regulatory compliance and alignment with overarching master-planning objectives. This structure – which tags every output with stage identifiers, model parameters and dataset versions – prevents unchecked propagation of generative artefacts into construction documents, frames public participation as selection among bounded, expert-curated options and maintains clear provenance trails[36]. Empirical studies demonstrate up to a 50 % reduction in overall iteration time without sacrificing stakeholder satisfaction, yet further research must determine optimal stage granularity to balance depth of engagement against decision fatigue and assess whether integrated visual-analytics dashboards can support truly informed multi-criteria evaluation[27].

6. NARRATIVE VISUALISATION OF PLACE IDENTITY AND MEMORY

Beyond geometric proposals, GenAI can co-create spatial narratives that foreground collective memory. Gaete Cruz et al. [39] describe pilots in which residents submit audio testimonials and archival photographs of vanished landmarks; a multimodal diffusion pipeline then synthesises these inputs into animated “memory trails” overlaying past and present streetscapes with timed visual transitions and captioned transcripts. Jang et al. [34] emphasise the need for narrative plurality by presenting conflicting accounts in parallel branches, allowing users to explore multiple perspectives side by side. Participants report heightened emotional engagement and a deeper sense of co-ownership of subsequent design proposals compared with conventional visualisations. Ethical protocols – co-designed with community facilitators – ensure that minority voices and contested histories are surfaced rather than suppressed[32]. To assess impact, researchers should develop sentiment-diversity metrics and conduct longitudinal studies correlating narrative engagement with sustained civic participation.

7. TRANSPARENT AI GOVERNANCE IN PARTICIPATORY PLATFORMS

Trust in GenAI-mediated processes depends on transparent governance of data, models and decision-paths. The Fraunhofer Institute [36] recommends participatory portals embedded within interoperable “data spaces” that use distributed-ledger technology to immutably log every prompt, model version, training datum and consent transaction. De Angelis [32] argues for user-centric governance dashboards that visualise provenance chains – from raw inputs through generative transformations to final outputs – and expose consent metadata, enabling participants to contest, annotate or revoke specific contributions. Compliance with GDPR and the forthcoming EU AI Act mandates data-minimisation, explainability and the right to human oversight. Techniques such as federated fine-tuning and differential privacy allow local datasets to inform generative models without exposing raw data or compromising anonymity. Future research should investigate how such governance interfaces influence user trust, perceived fairness and willingness to share sensitive information, using mixed-methods evaluations combining usability testing, focus groups and trace-data analysis.

THE RISKS OF GEN-AI IMPLEMENTATION WITHIN THE PARTICIPATORY DESIGN PRACTICE

The use of generative AI, while potentially powerful and effective, must be approached with care. This is especially important when such tools are used by individuals with limited design experience or domain knowledge. In these cases, there is a heightened risk of what could be described as an “AI take-over”, where users rely too heavily on the system’s outputs without critically engaging with the design process. This can lead to results that lack contextual relevance, originality, or alignment with human intent. This “AI take-over” can, in many ways, be compared to the anchoring effect observed in group brainstorming sessions[40], where the first idea presented unintentionally shapes and limits the direction of subsequent thinking. Similarly, when a generative AI produces an output, especially in visual or conceptual design tasks, users may become overly influenced by that first result. In this regard, multiple studies have examined how AI systems can be highly persuasive in their interactions with users[41]. Several factors contribute to this effect, including the perceived objectivity of the machine, the general trust in its accuracy, and the authoritative tone often associated with automated outputs[42]. For this reason, the role of professionals in participatory design practices is crucial. As individuals with deeper, more ramified disciplinary backgrounds, they bring a higher degree of critical inertia that helps balance the influence of both human and non-human actors in the design process.

CONCLUSION

Together, these seven pathways – natural-language interfaces, culturally fine-tuned LoRA adaptation, multimodal fusion, simulated consensus, stage-based HITL workflows, narrative visualisation and transparent governance – form a cohesive socio-technical framework for embedding Generative AI in participatory urban design. Far from supplanting expert judgment, GenAI serves as an amplifier of diverse perspectives, surfacing latent community values and accelerating iterative exploration. To translate this framework into operational practice, several critical research and implementation priorities must be addressed.
First, standardised quantitative metrics are needed to compare performance across projects. Prompt-efficacy indices should measure how effectively user inputs translate into intended outputs; semantic-fidelity scores must quantify alignment between generated visuals and design requirements, and equity impact measures should assess distributional effects on participant empowerment. Developing such metrics will enable robust comparative evaluation and drive evidence-based improvements to GenAI co-creation tools.
Second, longitudinal field studies are essential to evaluate whether GenAI-enhanced workflows sustain or augment civic engagement over time, particularly among historically under-represented groups. Such studies must track participant retention, measure shifts in perceived agency and document real-world impacts on planning outcomes. Only through longitudinal inquiry can we determine if initial enthusiasm translates into lasting community stewardship or if novel barriers emerge as projects progress.
Third, transparent accountability and governance must be baked into system architectures from the outset. Immutable provenance logging – recording every user prompt, model version and data source – must be complemented by bias-audit protocols that routinely inspect generative outputs for unintended distortions. Co-designed governance procedures, developed in collaboration with community stakeholders, will ensure that ethical and legal standards are fully integrated into everyday practice rather than retrofitted.
Finally, sustained investment in human facilitation remains indispensable. As Sanders and Stappers [27] emphasise, co-creation is as much a social process as a technical one. Facilitators skilled in prompt design, cultural mediation and ethical oversight will be the linchpin that ensures GenAI tools operate as bridges rather than barriers. Training programmes for such facilitators must combine technical proficiency in AI interfaces with deep understanding of local contexts, power dynamics and inclusive engagement methods. Moreover, the presence of technical experts in the fields of architecture and urban planning, as well as of all the other knowledge fields at stake, is needed to ensure that the black-box effect of GenAI is left uncontrolled, and that AI persuasiveness doesn't steer the decision process for which it cannot have any real accountability.
By confronting these priorities, we can harness Generative AI not as an end in itself, but as a catalyst for a new era of collaborative urban stewardship, one in which the built environment is shaped through genuinely co-created visions of collective aspiration, cultural identity and social equity.

REFERENCES

Abraham, A., Sommerhalder, K., & Abel, T. (2010). Landscape and well-being: a scoping study on the health-promoting impact of outdoor environments. International Journal of Public Health, 55(1), 59–69. https://doi.org/10.1007/s00038-009-0069-z

Aleksandr, G., Simon, P., Stefano, Z., Silvia, C., Ulrich Filippi, O., Roberto, L., Lukas, K., & Andreas, M. (2021). European Building Stock Analysis: A country by country descriptive and comparative analysis of the energy performance of buildings.

Andalib, E., Diaconu, M. G., & Temeljotov-Salaj, A. (2023). Happiness in the urban built environment, people, and places. IOP Conference Series: Earth and Environmental Science, 1196(1), 012090. https://doi.org/10.1088/1755-1315/1196/1/012090

Arnstein, S. R. (1969). A Ladder Of Citizen Participation. Journal of the American Institute of Planners, 35(4), 216–224. https://doi.org/10.1080/01944366908977225

Berglund, L. (2021). Democratizing design: possibilities for Detroit's community benefits ordinance. Journal of Urban Design, 26(5), 630–650. https://doi.org/10.1080/13574809.2021.1917985

Burtell, M., & Woodside, T. (2023). Artificial Influence: An Analysis Of AI-Driven Persuasion.

Cai, A., Rick, S. R., Heyman, J. L., Zhang, Y., Filipowicz, A., Hong, M., Klenk, M., & Malone, T. (2023). DesignAID: Using Generative AI and Semantic Diversity for Design Inspiration. Proceedings of The ACM Collective Intelligence Conference, 1–11. https://doi.org/10.1145/3582269.3615596

Disney, A. (2020). Social network analysis 101: centrality measures explained. https://cambridge-intelligence.com/keylines-faqs-social-network-analysis/

Gaete Cruz, M., Ersoy, A., Czischke, D., & van Bueren, E. (2023). Towards a framework for urban landscape co-design: Linking the participation ladder and the design cycle. CoDesign, 19(3), 233–252. https://doi.org/10.1080/15710882.2022.2123928

Gephi Open-source network analysis and visualization software. (2025). https://bellingcat.gitbook.io/toolkit/more/all-tools/gephi

Guridi, J. A., Hwang, A. H.-C., Santo, D., Goula, M., Cheyre, C., Humphreys, L., & Rangel, M. (2024). From Fake Perfects to Conversational Imperfects: Exploring Image-Generative AI as a Boundary Object for Participatory Design of Public Spaces. https://doi.org/10.1145/3710912

Haase, A., Wolff, M., & Rink, D. (2018). From Shrinkage to Regrowth: The Nexus Between Urban Dynamics, Land Use Change and Ecosystem Service Provision (pp. 197–219). https://doi.org/10.1007/978-3-319-59324-1_11

Havin, M., Kleinman, T. W., Koren, M., Dover, Y., & Goldstein, A. (2025). Can (A)I Change Your Mind?

He, M., Liang, Y., Wang, S., Zheng, Y., Wang, Q., Zhuang, D., Tian, L., & Zhao, J. (2025). Generative AI for Urban Design: A Stepwise Approach Integrating Human Expertise with Multimodal Diffusion Models.

Hospers, G.-J. (2014). Policy Responses to Urban Shrinkage: From Growth Thinking to Civic Engagement. European Planning Studies, 22(7), 1507–1523. https://doi.org/10.1080/09654313.2013.793655

Hu, Y. "Owen," Tang, J., Gong, X., Zhou, Z., Zhang, S., Elvitigala, D. S., Mueller, F. "Floyd," Hu, W., & Quigley, A. J. (2025). Vision-Based Multimodal Interfaces: A Survey and Taxonomy for Enhanced Context-Aware System Design. https://doi.org/10.1145/3706598.3714161

Jang, K. M., Chen, J., Kang, Y., Kim, J., Lee, J., & Duarte, F. (2023). Understanding Place Identity with Generative AI.

Joshi, S. G., Tolloczko, C. H., Wenaas, S., Holm, O. J., & Langved, M. L. F. (2024). Investigating How Generative AI Affects Decision-Making in Participatory Design: Shifting the space to make design choices. Nordic Conference on Human-Computer Interaction, 1–14. https://doi.org/10.1145/3679318.3685384

Kee, T. (2015). Cultivating a Participatory Design Practice in Architecture – A Case Study of Hong Kong Housing Authority. The International Journal of Architectonic, Spatial, and Environmental Design, 8(3–4), 13–25. https://doi.org/10.18848/2325-1662/CGP/v08i3-4/38339

Ko, J., Ajibefun, J., & Yan, W. (2023). Experiments on Generative AI-Powered Parametric Modeling and BIM for Architectural Design.

Kutty, N. (1999). Determinants of Structural Adequacy of Dwellings. Journal of Housing Research, 10(1), 27–43. https://doi.org/10.1080/10835547.1999.12091943

Lu, H., Gu, J., Li, J., Lu, Y., Müller, J., Wei, W., & Schmitt, G. (2018). Evaluating Urban Design Ideas from Citizens from Crowdsourcing and Participatory Design. 297–306. https://doi.org/10.52842/conf.caadria.2018.2.297

Mahabadi, S., Zabihi, H., Majedi, H., & Journal of Architecture and Urban Development, I. (2022). Participatory Design; A New Approach to Regenerate the Public Space.

Marina, E., Jens, L., Paul, R., Dan, S., David, S., Silvia, Z., Bogdan, A., Chantal, D., Marina, E., Joana, M., Ingeborg. Nolte, & Oliver, R. (2011). EUROPE'S BUILDINGS UNDER THE MICROSCOPE A country-by-country review of the energy performance of buildings.

Mustafa, D. (2024). GENERATIVE AI AND DATA SPACES White Paper. https://doi.org/10.13140/RG.2.2.24371.75043

Nursanty, E., Rusmiatmoko, D., & Widiantara, I. W. A. (2024). Shaping City Identity: The Role of Built Environment Quality. E3S Web of Conferences, 533, 04028. https://doi.org/10.1051/e3sconf/202453304028

Oksman, V., & Kulju, M. (2017). Developing online illustrative and participatory tools for urban planning: towards open innovation and co-production through citizen engagement. International Journal of Services Technology and Management, 23(5/6), 445. https://doi.org/10.1504/IJSTM.2017.088943

Reich, Y., Konda, S. L., Monarch, I. A., Levy, S. N., & Subrahmanian, E. (1996). Varieties and issues of participation and design. Design Studies, 17(2), 165–180. https://doi.org/10.1016/0142-694X(95)00000-H

Reyna, J. L., & Chester, M. V. (2015). The Growth of Urban Building Stock: Unintended Lock-in and Embedded Environmental Effects. Journal of Industrial Ecology, 19(4), 524–537. https://doi.org/10.1111/jiec.12211

Ro- ak, M., Hospers, G.-J., & Reverda, N. (2016). Civic action and urban shrinkage: Exploring the link. Journal of Urban Regeneration and Renewal, 9(4), 406. https://doi.org/10.69554/QVKJ5345

Sanchez, T. W., Brenman, M., & Ye, X. (2025). The Ethical Concerns of Artificial Intelligence in Urban Planning. Journal of the American Planning Association, 91(2), 294–307. https://doi.org/10.1080/01944363.2024.2355305

Sanders, E. B.-N., & Stappers, P. J. (2008). Co-creation and the new landscapes of design. CoDesign, 4(1), 5–18. https://doi.org/10.1080/15710880701875068

Segalowitz, M., & Brereton, M. (2009). An examination of the knowledge barriers in participatory design and the prospects for embedded research. Proceedings of the 21st Annual Conference of the Australian Computer-Human Interaction Special Interest Group: Design: Open 24/7, 337–340. https://doi.org/10.1145/1738826.1738890

Stagno, E. (2021). Investigating Relationship Between Built Environment and Health (pp. 285–296). https://doi.org/10.1007/978-3-030-48279-4_27

Stettinger, M., Felfernig, A., Leitner, G., & Reiterer, S. (2015). Counteracting Anchoring Effects in Group Decision Making (pp. 118–130). https://doi.org/10.1007/978-3-319-20267-9_10

Thomsen, A. (2011). The building paradigm shift and its effect on Western European housing stocks.

Van Hoof, J., Kazak, J. K., Perek-Białas, J. M., & Peek, S. T. M. (2018). The Challenges of Urban Ageing: Making Cities Age-Friendly in Europe. International Journal of Environmental Research and Public Health, 15(11), 2473. https://doi.org/10.3390/ijerph15112473

Wheeler, S. M. (2015a). Built Landscapes of Metropolitan Regions: An International Typology. Journal of the American Planning Association, 81(3), 167–190. https://doi.org/10.1080/01944363.2015.1081567

Wheeler, S. M. (2015b). Built Landscapes of Metropolitan Regions: An International Typology. Journal of the American Planning Association, 81(3), 167–190. https://doi.org/10.1080/01944363.2015.1081567

Wiechmann, T. (2008). Errors Expected — Aligning Urban Strategy with Demographic Uncertainty in Shrinking Cities †. International Planning Studies, 13(4), 431–446. https://doi.org/10.1080/13563470802519097

Xu, F., Zhang, J., Gao, C., Feng, J., & Li, Y. (2023). Urban Generative Intelligence (UGI): A Foundational Platform for Agents in Embodied City Environment.

Xu, H., Omitaomu, F., Sabri, S., Zlatanova, S., Li, X., & Song, Y. (2024). Leveraging generative AI for urban digital twins: a scoping review on the autonomous generation of urban data, scenarios, designs, and 3D city models for smart city advancement. Urban Informatics, 3(1), 29. https://doi.org/10.1007/s44212-024-00060-w