Literature and Practice Review

To establish a foundation for our analysis, we conducted a critical review of academic literature, public platforms, and digital engagement practices in urban planning. The review focused on citizen participation. Our aim is to understand current barriers to inclusive participation and assess how technologies like AI and gamification can improve outcomes. This foundation supports the development of StreetAIbility, a prototype platform designed to make participatory urban design more accessible, engaging, and community-driven.

Citizen engagement is widely recognised as essential for democratic and effective urban planning. In Germany, it is not only encouraged but also mandated under §3 of the Baugesetzbuch (Federal Building Code, 2022). While public participation is intended to ensure that urban development reflects local needs and aspirations, its practical implementation often falls short of these ideals (Münster et al., 2017).

Research indicates that when citizens are engaged, urban environments tend to become more equitable and long-lasting (Münster et al., 2017). Although digital tools such as online platforms and mapping interfaces are designed to boost engagement, their effectiveness depends on whether they are inclusive, transparent, and genuinely empowering (Jha et al., 2021). This suggests that merely adopting technology is not sufficient unless it is grounded in participatory values.

Digital innovation, particularly gamification and AI, is increasingly proposed to address these challenges (Jha et al., 2021; Licht et al., 2025). Gamification can enhance appeal among younger demographics, but its impact on inclusivity remains understudied (Licht et al., 2025). Although AI improves analytical power and visualisation capabilities, it may reproduce existing biases or exclude individuals without reliable digital access (Jha et al., 2021). These limitations highlight the need for platforms that balance technological advancement with equitable access.

Existing Solutions in the Field

In Germany, platforms such as MeinBerlin (2025) and Stadtmacher (2025) exemplify traditional engagement tools. MeinBerlin, for example, enables users to explore urban development projects via maps and submit feedback directly to city officials (MeinBerlin, 2025), while Stadtmacher offers structured forums for dialogue between citizens, planners, and policymakers (Stadtmacher, 2025).

Recent developments integrate artificial intelligence (AI) to analyse land use patterns, simulate urban growth, and optimise transport routes (Jha et al., 2021). In Germany, cities are beginning to adopt such systems to enhance transparency and decision quality (Münster et al., 2017). However, their use still tends to be for planners and experts, with limited accessibility for the general public (Münster et al., 2017). This disparity underscores a critical gap between technological potential and participatory equity.

How StreetAIbility Differs from Previous Work

StreetAIbility synthesises gamification, AI, and real-world data to address systemic barriers in participatory planning. Unlike many existing platforms that operate within generic or simulated urban environments, StreetAIbility allows users to redesign specific streets using actual map data. This place-based approach fosters tangible connections between participants and their communities, enhancing engagement through immediate relevance.

The platform’s AI-driven interface democratises urban design by eliminating technical prerequisites. Features like drag-and-drop infrastructure elements and real-time impact scoring allow users without planning expertise to contribute meaningfully. This feature promotes active learning while aligning

participation with Germany's national goals for digital inclusion and sustainability (Joss, 2014; Münster et al., 2017).

Another distinguishing feature is StreetAIbility's support for ongoing, community-led interaction. Users can vote on, comment on, and create local petitions, fostering continuous engagement rather than one-off input. This social layer extends the platform's utility beyond visual design into the realm of civic mobilisation.

In contrast to traditional platforms, which often limit users to predefined options or comment boxes, StreetAIbility invites co-creation, experimentation, and feedback, all embedded in a gamified ecosystem. This positions it as a potentially transformative tool for inclusive urban development.

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