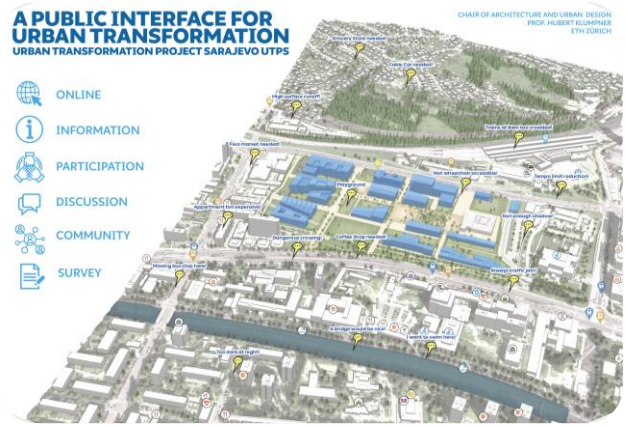
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A Public Interface for Urban Transformation (UTPS Sarajevo)

Submitted By: ETH Zürich



Organization Profile

Organization Name: ETH Zürich (Chair of Architecture and Urban Design Hubert Klumpner)

Organization Type: University and research institution

Website: https://ethz.ch/de.html

Practice Details

Country(ies): Bosnia and Herzegovina

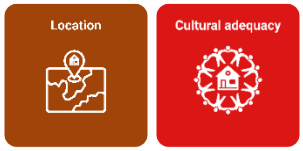
City(ies): Sarajevo

Start Year: 2024

Ongoing: Yes

End Year: N/A

Main Adequate Housing Components:



Housing Thematic Areas:

Technology & Digital Solutions in Housing

Relevant SDGs:



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Problem & Context

Sarajevo, as a post-war city, still bears social fragmentation. Citizens remain divided by political, ethnic, and administrative boundaries that hinder collective decision-making. Severe air pollution, caused by the city's topography, outdated heating systems, and heavy car dependency, worsens living conditions. Limited public transport excludes informal hillside settlements, and traffic congestion further reduces urban quality of life. The lack of reliable spatial data and effective planning frameworks makes urban development slow and reactive. The Urban Digital Twin of the Urban Transformation Project Sarajevo (UTPS) is an online information platform that addresses these challenges by making simulation outputs, urban developments and transformation processes more transparent within an interactive 3D GIS-Model. It allows online participation and supports evidence-based decision-making among citizens, planners, and policymakers.

Solution Developed

In a fragmented context with limited publicly available data, the Urban Digital Twin creates a shared foundation for dialogue. Traditional 2D maps are often hard to interpret for citizens unfamiliar with spatial planning, while the 3D model (developed using ESRI, photogrammetry and AI) makes urban contexts and proposed changes tangible. Residents can grasp potential impacts, fostering trust, acceptance, which leads to faster planning processes. The platform presents traffic and demographic scenarios (simulations) that inform urban frameworks and makes the jointly developed Urban Plan (Planning Institute of Canton Sarajevo, University of Sarajevo, ETH Zürich) accessible and transparent (soon). It also integrates survey tools used on the University Campus outdoor areas, allowing users to place pins and share location-based feedback on accessibility and public space quality. Physical participatory events remain essential, but the platform enlarges reach and enables asynchronous engagement. By engaging citizens, university employees, and campus users, it aligns development with community needs, incorporates local insights, and strengthens shared responsibility for urban spaces.

Implementation

The 3D GIS-Model provided spatial context and visualized data of the simulation outputs generated by Enerpol, a startup of ETH Zürich (now SwissAI). These visualizations were used in discussions with planners and policy makers as the main tool to present and communicate planning scenarios. The Planning Institute of Sarajevo will soon publish the newly developed zoning plan (currently in progress) on their website. The Urban Model is flexible and can be integrated into other websites.

On the University Campus, the platform was used interactively: a QR code provided access to the 3D-model, allowing employees, students, and other campus users to complete a survey linked to the map. Participants could upload images, share ideas for outdoor spaces, and

indicate their usual access points to the campus. The platform collected detailed information about user behaviors and preferences, informing planning decisions.

The online platform remains in active use and development, continuously adapted to current needs and topics, serving as a tool to present information, engage stakeholders, and collect actionable data.

Key collaborators included the Canton Sarajevo Institute of Development Planning (CSIPD), the University of Sarajevo (UNSA), and ETH Zürich, with UTPS supported by the Swiss State Secretariat for Economic Affairs (SECO). It was developed in dialogue with UrbaPlan, Helvetas, enova AG, and city authorities in Zürich and Sarajevo.

Enablers & Obstacles

Key enablers included ESRI tools, which enabled visualization of the Urban Model, and access to high-quality digital surface data from ESA (NoR Sponsorship), allowing 3D building extraction via photogrammetry. Interdisciplinary collaboration, combining architecture, engineering, IT, geography, environmental science, etc. fostered innovative approaches. The openness of the Planning Institute of Sarajevo was also crucial. Obstacles included low-quality initial data, the ongoing challenge of keeping the model updated, and working in a socially fragmented, data-poor context, which made establishing a common, trusted base for planning more difficult. Overcoming these challenges require integrating diverse expertise and a shared digital platform helps to connect stakeholders and support acceptance of planning interventions.

Results & Impact

The 3D urban platform has generated both quantitative and qualitative insights by combining technical data with community inputs. Surveys on the campus platform revealed patterns of access, preferred public spaces, and suggestions for improvements, providing concrete data to guide design decisions. The tool allows marginalized or less-mobile groups to engage asynchronously, overcoming barriers of time, mobility, or social divisions. Participants reported feeling more included and understanding planning processes better, while planners received valuable input from the community to inform proposals. Longer-term impacts include fostering trust and collaboration between citizens and institutions, supporting equitable urban planning, and enabling future improvements, such as connecting informal hillside settlements to public transport to reduce car dependency. The platform also helps identify opportunities to optimize green spaces, reduce the urban footprint, and improve environmental quality. By combining technical analyses with community contributions, the practice strengthens evidence-based, participatory urban development and provides a replicable model for inclusive, community-driven planning.

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Replication & Scale Up

The practice is highly replicable because it combines a flexible 3D urban model with interactive, community-driven input, allowing adaptation to different spatial contexts and planning needs. Key factors for replication include access to basic spatial data (raster imagery, DSM, DTM). Institutional openness, digital infrastructure, and participant engagement are essential.

The practice can be scaled by expanding the 3D model to more neighborhoods or cities, integrating additional datasets, and extending online surveys to reach more residents. Partnerships with authorities, universities, and community groups can broaden participation. Its flexible design allows replication in diverse contexts.

Policy Uptake

This housing practice is a new or innovative practice that is not yet adequately or fully integrated into formal policy frameworks.

Integrate its use in zoning, transport, and development approvals. Establish guidelines for regular data updates, public participation, and stakeholder collaboration. Encourage cross-departmental coordination and link the platform to digital governance strategies. Training planners and community facilitators ensures effective use. Teaching of GIS also in department of architecture or political science.

Lessons & Takeaways

Enhancing the quality of the deep-trained model, update data, enhance tools (more functions to interact, collaborative mapping).