

## EVALUATION OF THE IMPACT OF PARTICIPATORY ARCHITECTURE ON PUBLIC WORKS PROJECTS IN VULNERABLE URBAN ENVIRONMENTS

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### Summary

Participatory architecture has established itself as an innovative approach in the design and management of public works projects, especially in vulnerable urban contexts where social exclusion and lack of infrastructure are prevalent. This study assesses the impact of participatory architecture on the generation of social capital, community cohesion and urban sustainability. Through a mixed approach of documentary review and case analysis in Latin America and Europe, benefits were identified in institutional legitimacy, the strengthening of local identity and efficiency in the use of resources. The results confirm that the active participation of the community in the architectural process not only improves the technical quality of the projects, but also their social relevance and long-term sustainability.

**Keywords:** participatory architecture, social urbanism, public works, vulnerable environments, urban sustainability.

### Introduction

Contemporary cities face growing challenges arising from accelerated urbanization, social inequality and precarious access to basic infrastructure. These conditions are accentuated in **vulnerable urban environments**, where high rates of poverty, housing deficit, and poor access to essential public services converge (García & Pinto, 2020). In these territories, the implementation of public works projects is often marked by a disconnect between state policies and the real needs of communities, which limits their effectiveness and long-term sustainability (Ramírez, 2023).

In this context, **participatory architecture** has emerged as a methodology that proposes to actively involve communities in the process of design, planning and management of urban

projects. Its purpose is not only to build physical spaces, but also to promote appropriation, social cohesion, and citizen empowerment (Silva & Contreras, 2021). This approach is linked to the paradigm of **inclusive urbanism**, which promotes the democratization of the city as a collective space of rights and opportunities (Arango, 2020).

The relevance of participatory architecture lies in the fact that it allows local knowledge to be integrated into the production of urban solutions, which ensures that infrastructures respond effectively to the socio-cultural dynamics of territories (Lerner & Fischer, 2022). In particular, it has been shown that projects built under this approach tend to reduce levels of deterioration and vandalism, since citizens feel co-responsible for the care of spaces (Navarro et al., 2023). Likewise, the co-production of public works generates processes of trust towards institutions, strengthening governance and the legitimacy of urban policies (Sánchez & Gómez, 2021).

In Latin America, experiences such as those of Medellín, Bogotá or Mexico City show how community participation in architecture has transformed marginalized areas into **territories of urban resilience**, where public space functions as a platform for inclusion and social justice (Gutiérrez & López, 2022). Similarly, in European contexts such as Barcelona, participatory planning has been found to contribute not only to environmental sustainability, but also to innovation in urban management models (UN-Habitat, 2022).

Therefore, assessing the impact of participatory architecture on public works projects within **vulnerable urban environments** is essential to understand its capacity to generate structural transformations, beyond the physical dimension. This article aims to provide scientific evidence on the benefits and limitations of this approach, highlighting its potential to strengthen social cohesion, promote urban equity, and move towards more sustainable and inclusive development models (Fernández & Martínez, 2020; Sarmiento & García, 2021).

## **Theoretical Framework**

### **1. Participatory architecture: concepts and foundations**

Participatory architecture is understood as a process of co-creation in which citizens are involved in the phases of diagnosis, design and execution of urban projects. This approach is opposed to traditional models, in which professionals unilaterally design solutions, disconnected from community realities (Silva & Contreras, 2021). On the other hand, citizen participation encourages **co-responsibility** in the use and maintenance of infrastructures, generating a sense of belonging (Lerner & Fischer, 2022).

In the last decade, international organizations such as UN-Habitat have promoted participatory architecture as a key strategy to guarantee the right to the city and improve sustainability in vulnerable territories (UN-Habitat, 2022).

### **2. Social cohesion and community capital**

One of the main impacts of participatory architecture is manifested in **social cohesion**. By including communities in the design of public works, social capital is strengthened and networks of trust are generated that transcend physical infrastructure (Sánchez & Gómez, 2021).

Recent studies have shown that the co-production of public spaces improves citizen coexistence, reduces vandalism, and encourages the construction of collective identities (Navarro et al., 2023). In this way, participatory architecture is constituted as an instrument of social transformation in vulnerable urban contexts (García & Pinto, 2020).

### 3. Participatory governance and institutionalality

Urban governance requires mechanisms that allow balancing **the relationship between the State and citizens**. In public works projects, participatory architecture has become a channel for legitimizing institutions, by making decision-making processes transparent and reducing the perception of corruption (Ramírez, 2023).

Recent literature highlights that institutional trust increases when citizens recognize themselves as active actors in the construction of the territory, generating a collaborative governance model (Fernández & Martínez, 2020). This aspect is especially relevant in Latin American countries, where trust deficits in the public sector are high (Arango, 2020).

### 4. Urban resilience and sustainability

Urban **resilience** refers to the ability of cities to adapt and recover in the face of social, economic or environmental shocks. In this sense, participatory architecture not only produces physical works, but also contributes to the construction of more resilient communities, capable of managing risks and adapting to changes (Sarmiento & García, 2021).

Likewise, participatory urban projects tend to optimize resources, adapt to local conditions, and promote the sustainable use of materials and energies (Gutiérrez & López, 2022). Consequently, this approach constitutes an essential component in the transition towards **sustainable and inclusive city models**.

**Table 1. Main approaches to participatory architecture in vulnerable urban environments**

| <i>Dimension</i>                | <i>Description</i>                                            | <i>Observed impacts</i>                                                                                | <i>Recent References</i>                      |
|---------------------------------|---------------------------------------------------------------|--------------------------------------------------------------------------------------------------------|-----------------------------------------------|
| <i>Social cohesion</i>          | Citizen participation in diagnosis and design.                | Greater appropriation of space, reduction of vandalism, strengthening of local identities.             | Navarro et al. (2023); Sánchez & Gómez (2021) |
| <i>Participatory governance</i> | Transparency and co-responsibility in public management.      | Decrease in the perception of corruption, institutional legitimacy, greater trust in local government. | Ramírez (2023); Fernández & Martínez (2020)   |
| <i>Urban resilience</i>         | Community adaptation to crises through shared infrastructure. | Capacity to respond to emergencies, cohesion in risk situations.                                       | Sarmiento & García (2021)                     |
| <i>Urban sustainability</i>     | Local solutions that integrate social resources and needs.    | Optimization of resources, lower environmental impact, greater durability of projects.                 | Gutiérrez & López (2022); UN-Habitat (2022)   |

**Source:** Authors' elaboration based on Fernández and Martínez (2020), Sarmiento and García (2021), Sánchez and Gómez (2021), Navarro et al. (2023), Ramírez (2023), Gutiérrez and López (2022), and UN-Habitat (2022).

### Methodology

The research was developed under a **qualitative-comparative design with a mixed approach**, integrating documentary analysis, case studies and secondary interviews

reported in the literature. This methodological strategy seeks to holistically understand the impacts of **participatory architecture** on public works projects in vulnerable urban environments (Creswell & Creswell, 2021).

### 1. Type of research

It was an **exploratory and descriptive** study, aimed at identifying common patterns in the implementation of participatory architecture in different urban contexts (Flick, 2020). The choice of an exploratory design responds to the need to examine phenomena under construction and little systematized in recent literature.

### 2. Sources of information

Data collection was based on:

- **Systematic bibliographic review** of scientific articles, reports of international organizations and theses published between 2019 and 2024. The search was carried out in databases such as *Scopus*, *Web of Science* and *Google Scholar* (Snyder, 2019).
- **Selection of case studies:** Medellín (Colombia), Mexico City (Mexico) and Barcelona (Spain). These were chosen for their relevance in the application of community participation methodologies in urban projects (Ramírez, 2023; Gutiérrez & López, 2022).
- **Secondary sources:** Reports by UN-Habitat and local governments documenting participatory urbanism processes (UN-Habitat, 2022).

### 3. Procedure

The methodological procedure was carried out in three phases:

1. **Information collection:** identification and systematization of academic and technical documents on the subject.
2. **Content analysis:** categorization of information into four analytical dimensions: social cohesion, governance, urban resilience, and sustainability (Sarmiento & García, 2021).
3. **Case comparison:** contrast of the impacts reported in the selected cities, to identify contextual similarities and differences (Navarro et al., 2023).

### 4. Analysis techniques

Data analysis was performed by:

- **Qualitative content analysis**, applying thematic coding to identify patterns of impact (Silva & Contreras, 2021).
- **Methodological triangulation**, which allowed information to be contrasted between academic, institutional, and community sources (Creswell & Creswell, 2021).
- **Comparative matrix of cases**, which served to synthesize results.

**Table 2. Methodological strategy of the research**

| <i>Stage</i>                  | <i>Description</i>                                                                                                         | <i>Tools used</i>                                                | <i>References</i>                               |
|-------------------------------|----------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------|-------------------------------------------------|
| <i>Research Design</i>        | Exploratory and descriptive study with a qualitative-comparative approach.                                                 | Documentary review and case analysis.                            | Flick (2020); Creswell & Creswell (2021)        |
| <i>Sources of information</i> | Scientific literature, institutional reports and urban case studies (2019-2024).                                           | Academicdatabases, UN-Habitat, local reports.                    | Snyder (2019); UN-Habitat (2022)                |
| <i>Procedure</i>              | Collection, content analysis and comparison of participatory urban experiences.                                            | Thematiccoding, comparative matrices.                            | Sarmiento & García (2021)                       |
| <i>Analysis techniques</i>    | Methodological triangulation and categorization into four dimensions: cohesion, governance, resilience and sustainability. | Qualitative software (NVivo, Atlas.ti) and comparative analysis. | Silva & Contreras (2021); Navarro et al. (2023) |

**Source:** Authors' elaboration based on Creswell & Creswell (2021), Snyder (2019), Flick (2020), Sarmiento & García (2021), Silva & Contreras (2021), Navarro et al. (2023), UN-Habitat (2022).

## Results

The findings of the research reflect that **participatory architecture** in public works generates significant impacts on three levels: **social, institutional and environmental**. The analysis of cases in Medellín, Mexico City, and Barcelona allowed us to identify common patterns and particularities associated with the local context.

### 1. Social cohesion and appropriation of space

In Medellín, **participatory social urbanism** projects —particularly Comuna 13's escalators and library-parks—have increased the perception of security and social cohesion. According to data from the Urban Security Observatory, violence decreased by 40% in the intervened areas between 2015 and 2022 (Sánchez & Gómez, 2021). Community participation was key to the sustainability of these projects.

In Mexico City, participatory public space renovation projects in Iztapalapa have benefited more than 150,000 people, reducing vandalism rates in intervened spaces by 25% (Ramírez, 2023).

### 2. Institutional legitimacy and governance

The case of Barcelona showed that the application of **participatory processes in the Neighbourhood Plan** (2016-2022) strengthened trust in local government. According to municipal surveys, 68% of the inhabitants stated that the projects reflected their needs (Gutiérrez & López, 2022). This shows that participatory architecture can become a mechanism of institutional legitimation and democratic governance (Fernández & Martínez, 2020).

### 3. Urban resilience and sustainability

The projects analysed show a strong resilience component. In Medellín, participatory infrastructure has made it possible to manage risks associated with floods and landslides through linear parks and community gardens (Sarmiento & García, 2021).

In Barcelona, **participatory superbblock** projects reduced air pollution in pilot areas by 25% and increased pedestrian spaces by 40% (UN-Habitat, 2022). These results highlight the importance of integrating sustainability and participation into urban planning.

**Table 3. Social, Institutional and Environmental Impacts of Participatory Architecture in Three Cities**

| City             | Representative projects                           | Social impacts                                                                   | Institutional impacts                                            | Environmental impacts                                       | References                                        |
|------------------|---------------------------------------------------|----------------------------------------------------------------------------------|------------------------------------------------------------------|-------------------------------------------------------------|---------------------------------------------------|
| Medellín (Col.)  | Comuna 13 escalators, Parks-Library               | Reduction of violence by 40%, greater social cohesion and community ownership.   | Strengthening confidence in municipal programs.                  | Risk management with urban gardens and linear parks.        | Sánchez & Gómez (2021); Sarmiento & García (2021) |
| Mexico City      | Participatory renewal in Iztapalapa               | 150,000 beneficiaries, a 25% reduction in vandalism.                             | Transparency in processes, increase in institutional legitimacy. | Community green spaces with neighborhood participation.     | Ramírez (2023)                                    |
| Barcelona (Esp.) | Neighbourhood Plan and participatory superbblocks | 68% of inhabitants perceive improvements in quality of life and local democracy. | Increased citizen confidence in local authorities.               | 25% reduction in air pollution, 40% more pedestrian spaces. | Gutiérrez & López (2022); UN-Habitat (2022)       |

**Source:** Authors' elaboration based on Sánchez & Gómez (2021), Ramírez (2023), Sarmiento & García (2021), Gutiérrez & López (2022), UN-Habitat (2022).

### 4. Synthesis of results

Overall, the results allow us to conclude that:

- Social **cohesion** is one of the main achievements, with greater appropriation and reduction of conflicts in vulnerable urban environments.
- Institutional **legitimacy** increases significantly when communities participate in decision-making.
- Urban **resilience and sustainability** are enhanced through projects that integrate environmental criteria and citizen participation.

### Conclusions

The comparative analysis of the cases of Medellín, Mexico City and Barcelona confirms that **participatory architecture** is an effective strategy to transform vulnerable urban



environments. The results show that citizen participation in public works projects not only improves the quality of urban design, but also generates significant impacts in the **social, institutional and environmental** dimensions.

First, it is concluded that **social cohesion** is one of the most relevant achievements. Communities that participated in co-creation processes experienced a greater sense of belonging and conflict reduction. This finding coincides with recent literature that indicates that the social appropriation of public spaces strengthens collective identities and decreases urban deterioration (Navarro et al., 2023; Sánchez & Gómez, 2021).

Second, **institutional legitimacy** was reinforced in contexts where participation was real and binding. Transparency in planning and community inclusion increased trust in local authorities, decreasing the perception of corruption. This aspect is fundamental in Latin America, where distrust of public institutions continues to be an obstacle to inclusive urban development (Ramírez, 2023; Fernández & Martínez, 2020).

Third, participatory architecture proved to be a **driver of resilience and urban sustainability**. The solutions that emerged from the joint work between technicians and communities showed greater durability and capacity for adaptation in the face of environmental or social crises. Examples such as the superblocks in Barcelona and the community projects in Medellín confirm that citizen participation enhances urban resilience and contributes to the reduction of polluting emissions (UN-Habitat, 2022; Sarmiento & García, 2021).

However, important challenges **were also identified**:

- The need to institutionalize participation mechanisms, preventing them from depending solely on the political will of the moment (Gutiérrez & López, 2022).
- The lack of technical training in some community sectors, which limits the depth of their participation (Silva & Contreras, 2021).
- The lack of robust regulatory frameworks that guarantee the continuity of projects beyond changes of government (Arango, 2020).

Consequently, it is recommended:

1. **Strengthen public policies** that guarantee binding participation in urban planning.
2. **Promote community technical training** to balance citizen knowledge with professional knowledge.
3. **Develop regulatory and institutional frameworks** that ensure the continuity and sustainability of projects.
4. **Integrate environmental criteria** in a cross-cutting way, so that participatory architecture contributes to the Sustainable Development Goals (SDGs).

In short, participatory architecture should not be understood only as an urban design methodology, but as a **tool for social justice, sustainability and democratic governance**. Its implementation in vulnerable urban environments demonstrates that it is possible to build more inclusive and resilient cities when citizens are recognized as central actors in the transformation of the territory (Lerner & Fischer, 2022; UN-Habitat, 2022).

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