



## Interactive public spaces and their role in the local development of informal human settlements in Guayaquil

Espacios Públicos Interactivos y su Función en el Desarrollo Local de Asentamientos Humanos Informales de Guayaquil

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### Abstract

Informal human settlements represent a complex and growing urban reality in the contemporary global context. One in three urban citizens worldwide lives in poverty and overcrowding, demonstrating the magnitude of this urban phenomenon that affects more than one billion people worldwide. This problem is intensified in Latin America, where approximately 80% of the population resides in urban areas, and a significant proportion of these inhabitants live in informal settlements that lack basic services, adequate infrastructure, and legal recognition. This study seeks to describe the role of interactive public spaces as catalysts for development in informal human settlements in Guayaquil, based on a functional analysis that characterizes the planning of public spaces in relation to the social context of the community.

**Keywords:** interactive public space, local development, society and culture

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## Resumen

Los asentamientos humanos informales representan una realidad urbana compleja y creciente en el contexto global contemporáneo. Uno de cada tres ciudadanos urbanos del mundo vive en condiciones de pobreza y hacinamiento, evidenciando la magnitud de este fenómeno urbano que afecta a más de mil millones de personas a nivel mundial. Esta problemática se intensifica en el contexto latinoamericano, donde aproximadamente el 80% de la población reside en áreas urbanas, y una proporción significativa de estos habitantes se concentra en asentamientos informales que carecen de servicios básicos, infraestructura adecuada y reconocimiento legal. El presente estudio busca describir la el papel que representan los espacios públicos interactivos como catalizadores de desarrollo en asentamientos humanos informales de Guayaquil, a partir de un análisis funcional que caracteriza la forma de planificación de un espacio público referenciado al contexto social de la comunidad.

**Palabras clave:** espacio público interactivo, desarrollo local, sociedad y cultura

## Introduction

Informal human settlements represent a complex and growing urban reality in the contemporary global context. One in three urban citizens worldwide lives in poverty and overcrowding, highlighting the magnitude of this urban phenomenon that affects more than one billion people globally. This problem is intensified in the Latin American context, where approximately 80% of the population resides in urban areas, and a significant proportion of these inhabitants are concentrated in informal

settlements that lack basic services, adequate infrastructure, and legal recognition.

In this context, public spaces emerge as fundamental elements for social and territorial articulation, especially when they incorporate interactive dimensions that enhance their role as catalysts for community development. The digital transformation of cities has generated new opportunities to reimagine these spaces, integrating digital technologies with traditional social dynamics to create more inclusive and participatory urban experiences.

This research focuses on the analysis of interactive public spaces as tools for urban integration in informal human settlements. These spaces, characterized by their capacity to generate participatory and adaptive experiences, represent unique opportunities to transform marginalized territories into active components of the formal urban fabric. The issue addressed arises from the need to understand how these spaces can function as interfaces between the formal and informal city, generating processes of social and territorial inclusion that recognize existing community dynamics without generating processes of gentrification or displacement.

The relevance of the study is based on the urgent need to develop innovative urban policies that go beyond traditional approaches to intervention in informal settlements. Conventional strategies, often characterized by welfare or eradication approaches, have shown significant limitations in generating sustainable urban integration processes. Interactive public spaces represent an alternative that recognizes the endogenous capacities of communities and enhances their role as active agents of territorial transformation.

The overall objective of this research is to analyze the role of interactive public spaces in the urban context of informal human settlements, examining their potential as articulating elements

of the territory and catalysts for urban integration processes. The specific objectives include characterizing the types of interactive public spaces present in these contexts, evaluating their impact on community social cohesion, identifying the most effective strategies for their implementation and management, and proposing a conceptual framework to guide public policies aimed at participatory urban integration.

The central hypothesis of the research argues that interactive public spaces, when designed and implemented through participatory processes that recognize pre-existing community dynamics, function as effective interfaces between the formal and informal city, generating urban integration processes that strengthen social cohesion and enhance endogenous territorial development.

Public spaces are indisputably the essential foundation of democratic, participatory, and inclusive urban life in contemporary societies. These spaces represent much more than simple open areas in the urban fabric; they constitute the fundamental setting where the dynamics of citizenship building, the exercise of collective rights, and the expression of cultural diversity that characterize modern urban societies unfold. They are strategic places open to all citizens without discrimination, publicly owned or intended for common use, which must necessarily guarantee universal, safe, and truly welcoming access, particularly for vulnerable populations such as women, children, the elderly, or people with physical or cognitive disabilities.

The traditional conceptualization of public spaces has evolved significantly in recent decades, incorporating new dimensions that recognize their strategic role in building social fabric and promoting sustainable territorial development processes. This evolution has been influenced by multiple factors, including globalization processes, the digital technological revolution, changes in forms of social organization, and new citizen

demands for participation and recognition. In the specific context of urban interactivity, these spaces completely transcend their traditional and relatively passive function to become dynamic, adaptive, and transformative platforms for active citizen participation and authentic community expression.

Interactivity in contemporary public space manifests itself through multiple complex and interconnected dimensions that include technological, social, cultural, and environmental aspects. The technological dimension incorporates digital elements that facilitate communication, access to information, and participation in decision-making processes. The social dimension refers to the capacity of these spaces to facilitate encounters, exchanges, and the construction of social networks. The cultural dimension includes the appreciation and promotion of artistic expressions, local traditions, and cultural diversity. The environmental dimension incorporates criteria of sustainability, relationship with the natural environment, and promotion of ecological practices.

By creating genuinely “phygital” spaces that innovatively and strategically combine the physical with the digital, users can actively interact, obtain relevant and timely information, produce original and meaningful content, and even dynamically adapt their environment to specific and changing needs. This comprehensive and innovative approach integrates traditional material components with emerging virtual elements, generating extraordinarily enriched, genuinely inclusive, and significantly personalized urban experiences that effectively respond to the specific and diverse demands of each particular community.

Interactive public spaces are characterized by their ability to adapt and respond to the changing needs of the communities that use them. This adaptability manifests itself both physically, through modular and reconfigurable elements, and programmatically, through the possibility of hosting diverse and

changing activities according to the specific demands of each moment. Interactivity is not limited to the incorporation of digital technologies, but also includes mechanisms for citizen participation, spaces for cultural expression, and platforms for the collective construction of solutions to local problems.

Thus, interactive public spaces contribute significantly to effective citizen empowerment and decisively foster new creative and innovative forms of collective appropriation of the territory. This appropriation transcends the simple occasional use of spaces to include profound processes of symbolic significance, physical transformation, and active defense of the territory as community heritage. Interactive spaces thus become laboratories for social innovation where communities can experiment with new forms of organization, territorial management, and collective project building.

### **Informal Human Settlements: Characteristics and Challenges**

Informal human settlements represent a particular form of urbanization that arises from the inability of formal planning systems to respond to the housing demands of populations in conditions of socioeconomic vulnerability. Informal settlements are residential areas where inhabitants have no security of tenure over the land or housing they occupy, ranging from illegal occupation to informal rental housing, characterized by the absence of basic services, adequate infrastructure, and legal recognition by the competent authorities.

These territories are characterized by self-construction processes that reflect the technical and organizational capacities of their inhabitants, progressive densification that responds to particular demographic and economic dynamics, and the development of intense social networks that form the basis of community organization. Self-construction refers not only to the building of homes, but also to the construction of community infrastructure, public spaces, and service systems

that respond to specific needs identified by the inhabitants themselves.

Rapid urbanization has largely exceeded the capacity of municipalities to provide land with public services and accommodate the influx of newcomers, generating housing deficits that are expressed in both quantitative and qualitative terms. However, these territories also constitute spaces for social and economic innovation, where alternative forms of community organization and territorial management are emerging, demonstrating the capacity of communities to generate creative solutions to complex urban problems.

Informal settlements have specific physical characteristics, including irregular urban layouts, high housing densities, variable construction quality, and deficient or non-existent public service systems. These physical characteristics are linked to particular social dynamics, such as the prevalence of informal economies, the existence of grassroots community organizations, and the construction of deeply rooted territorial identities.

The challenges facing these settlements include legal uncertainty of tenure, vulnerability to natural disasters, limited connectivity with the formal city, social stigmatization, and low public investment in infrastructure and services. These challenges are complexly interrelated, generating cycles of exclusion that require comprehensive interventions that address multiple dimensions simultaneously.

### **Social Function of Public Space in Informal Contexts**

In informal settlements, public space acquires specific and particular characteristics that significantly differentiate it from its counterpart in the formal city. This differentiation is not only manifested in physical and morphological terms, but fundamentally in the social, economic, and cultural functions that these spaces fulfill in community life. In addition to

attempting to meet basic housing demands, these territories simultaneously produce a physical and social environment whose specific configuration responds to their own community logics, which are dynamic and complex and not always visible, understandable, or recognized from a formal institutional point of view.

The invisibility of these community logics from an institutional perspective often leads to inappropriate urban interventions that ignore existing social dynamics and can have counterproductive effects. This invisibility is explained by the absence of effective mechanisms for citizen participation in urban planning processes and by the prevalence of technical approaches that prioritize physical criteria over social and cultural considerations.

Public space in these territories fulfills multiple functions that go far beyond the traditional functions of recreation and casual encounters. First, these spaces significantly stimulate the local and informal economy by providing places for commercial, productive, and service activities that constitute the basis of economic survival for many families. This economic function includes the creation of improvised markets, local fairs, artisan production workshops, and spaces for the provision of various services that respond to the specific needs of the community.

Second, public space fundamentally facilitates social encounters and the construction of community networks. These spaces function as nodes of socialization where information is exchanged, friendships and solidarity are built, and community ties are strengthened. The importance of this social function is intensified in contexts where homes are small and overcrowding limits the possibilities for social interaction within the home.

Third, these spaces contribute decisively to the construction of collective identity and a sense of territorial belonging. Public space becomes the stage where cultural traditions are



expressed, community festivities are celebrated, and symbols of territorial identity are constructed. This symbolic function is fundamental to social cohesion and the construction of collective territorial development projects.

Public spaces in informal settlements can host a wide variety of activities that reflect the creativity and adaptability of communities. These may include improvised markets that operate at specific times, cultural celebrations that involve the entire community, community assemblies where collective decisions are made, children's games that occupy versatile spaces, training workshops that respond to specific needs, and religious activities that strengthen spiritual and community ties.

This multifunctionality makes these spaces hubs of economic and social activity that are absolutely indispensable to community life. The loss or deterioration of these spaces can have devastating consequences for social cohesion and the economic sustainability of the community. For this reason, their design and management require extraordinarily flexible and participatory approaches that explicitly recognize pre-existing social dynamics and allow them to be effectively articulated with broader objectives of urban development and territorial integration.

Flexibility in design refers to the ability of these spaces to adapt to different uses and changing needs over time. This flexibility can be facilitated by incorporating modular elements, versatile surfaces, and adaptable infrastructure that allow for different configurations depending on the specific activities taking place.

Participatory approaches to management involve the active incorporation of the community in the planning, implementation, and maintenance of public spaces. This participation should not be limited to superficial consultation, but should include effective decision-making on design, activity programming, and day-to-day management of the spaces.

Effective participation requires the development of community capacities and the construction of institutional mechanisms that recognize and value community contributions.

Recognizing pre-existing social dynamics involves a deep understanding of the organizational forms, cultural traditions, economic activities, and social networks that already exist in the community. This understanding should guide the design of interventions that enhance these dynamics rather than replace or ignore them. Ignorance of these dynamics can lead to interventions that, although well-intentioned, are inappropriate or counterproductive to community development.

### **Theories of Urban Integration and Social Cohesion**

The urban integration of informal settlements through public spaces is based on theories that recognize the importance of social appropriation of territory as a mechanism for building citizenship and democratizing urban space. Public space as an object of study entails a profound need for reflection; this text addresses the ways in which public space is appropriated as a common good in a dimension of temporality and the reconfiguration of forms of appropriation determined by use, recognizing that appropriation transcends simple use to include processes of signification, transformation, and defense of territory.

Urban integration processes require strategies that recognize the complexity of these territories and promote their articulation with the formal city without generating processes of gentrification or displacement that affect the original communities. Urban integration is defined as the set of processes that facilitate physical, social, economic, and symbolic articulation between different urban fragments, promoting territorial equity and the effective exercise of citizen rights.

Considering that informal settlements are a source of a large amount of labor and micro-enterprises, it is possible to incorporate strategies that involve these settlements in the formal city, which would bring significant benefits for social cohesion, service provision, and job creation. This perspective recognizes the economic and social potential of these territories, overcoming welfare-based visions to promote approaches that enhance endogenous capacities.

Social cohesion is understood as the degree of consensus among members of a community on shared norms, values, and objectives, as well as the collective capacity to face common challenges and build territorial development projects. In the context of informal settlements, social cohesion is expressed through solidarity networks, community organizations, and practices of reciprocity that constitute the social capital of these territories.

Theories of urban integration include approaches that prioritize physical connectivity through the construction of infrastructure that links informal settlements with the formal city, approaches that emphasize social integration through the promotion of intercultural encounters and the reduction of stigmatization, and approaches that promote economic integration through the articulation of formal and informal economies.

## Methodology

This research adopts a mixed methodological approach that combines qualitative and quantitative techniques for the comprehensive analysis of interactive public spaces in informal settlements. This approach allows for the triangulation of information, the validation of findings, and the generation of knowledge that articulates the understanding of complex social dynamics with the measurement of specific impacts on the communities studied.

Public spaces are accessible to everyone, central to social life, and play a fundamental role in cities. Therefore, their analysis requires an interdisciplinary approach, that is, one that is open to different methods and techniques from other disciplines in order to address all dimensions of the phenomenon under study. The research integrates perspectives from urban sociology, social geography, urban anthropology, territorial planning, and studies on technology and society.

The methodological design is structured in three complementary phases that guarantee the scientific rigor and social relevance of the findings. The exploratory phase allows for the identification of relevant case studies, the establishment of preliminary categories of analysis, and the construction of conceptual frameworks to guide the subsequent phases. This phase includes a specialized literature review, interviews with experts, and initial reconnaissance of territories.

The descriptive phase focuses on the detailed characterization of the identified interactive public spaces, documenting their physical, functional, and social characteristics through systematic observation techniques, cartographic surveying, and analysis of usage dynamics. This phase allows for the construction of typologies of interactive public spaces and the identification of implementation and management patterns.

The analytical phase seeks to establish causal relationships between the characteristics of these spaces and their impact on urban integration, using multivariate analysis techniques, statistical modeling, and comparative case analysis. This phase allows for the validation of hypotheses, the identification of factors determining the success of interventions, and the proposal of public policy recommendations.

### **Data Collection Techniques**

Data collection was carried out using multiple complementary techniques that allow for the triangulation of the information

obtained. Participant observation was the main technique, developed through intensive fieldwork in three informal settlements selected as case studies. This technique made it possible to document the dynamics of use and appropriation of public spaces, as well as to identify patterns of social and territorial interaction.

Semi-structured interviews were conducted with three groups of key actors: community leaders, regular users of public spaces, and representatives of public and private institutions involved in territorial interventions. The interviews were structured around thematic areas addressing perceptions of the function of public spaces, the transformations observed after their implementation, and future development expectations.

Participatory workshops were a fundamental tool for validating findings and collectively constructing proposals for improvement. These workshops were designed as spaces for dialogue between different community actors, using social mapping and participatory planning techniques that allowed for the identification of specific needs and territorial potentialities.

### **Case Study Selection Criteria**

The case studies were selected based on criteria that ensure their relevance and comparability. Priority was given to settlements that had been established for more than ten years, with a visible presence of interactive public spaces (technological, cultural, or participatory), geographic and socioeconomic diversity, and the existence of active community organizations that facilitated the implementation of participatory methodologies.

### **Analysis Tools**

The importance of this research lies in developing a characterization methodology for the eligibility of urban interstices that can be transformed into public spaces, with the

aim of serving as articulating elements of the existing urban structure. In this context, specific analysis tools were designed to evaluate multiple dimensions of interactive public spaces.

Spatial analysis was performed using geographic information systems that allowed for the characterization of the location, accessibility, and area of influence of the public spaces studied.

The morphological analysis examines the physical and functional characteristics of these spaces, identifying elements that enhance or limit their community use. The social analysis focuses on patterns of use, appropriation, and community management, while the impact analysis evaluates the transformations generated in the territory and the community.

## **Results**

### **Characterization of Interactive Public Spaces**

The research results reveal the existence of various types of interactive public spaces in the informal settlements studied. The first type corresponds to community sports spaces that incorporate basic technological elements such as smart lighting systems and mobile applications for managing shifts and activities. These spaces are characterized by generating dynamics of intensive use that transcend sports activities, functioning as nodes of intergenerational encounter.

The second type includes squares and parks that integrate interactive urban furniture, such as digital information panels, free Wi-Fi systems, and outdoor coworking spaces. These spaces have demonstrated the potential to articulate informal economic activities with social encounter dynamics, generating processes of territorial appropriation that strengthen community identity.

The third type corresponds to cultural and educational spaces that use digital technologies to enhance community training

and artistic expression processes. These spaces include community libraries with digital access, technology training workshops, and urban art exhibition spaces that incorporate elements of augmented reality.

### **Impact on Social Cohesion**

Interactive public spaces have demonstrated a significant impact on strengthening community social cohesion. The results show that these spaces function as catalysts for organizational processes, facilitating the emergence of new forms of community leadership and the consolidation of mutual support social networks.

Analysis of usage dynamics reveals that interactive public spaces generate patterns of territorial appropriation that transcend generational, gender, and socioeconomic differences within the community. Interactive components function as mediating elements that facilitate dialogue between different social groups, promoting processes of collective construction of norms of coexistence and community management.

Participatory workshops showed that users perceive these spaces as symbols of progress and community development, which translates into processes of collective care and maintenance that guarantee their long-term sustainability. Technological interactivity is combined with traditional forms of community organization, generating organizational hybrids that enhance territorial management capacity.

### **Urban Integration Processes**

The results show that interactive public spaces function as effective interfaces between the formal and informal city. Their strategic location on territorial edges allows for the generation of articulation processes that facilitate access for the population of informal settlements to services and opportunities in the

formal city, without generating displacement or gentrification processes.

The analysis of territorial connectivity reveals that these spaces enhance the physical and symbolic accessibility of informal settlements, contributing to their recognition as a legitimate part of the urban fabric. The interactive components facilitate the generation of territorial information that can be used by public institutions to plan more relevant and effective urban interventions.

Integration processes are also manifested through the articulation of formal and informal economies. Interactive public spaces facilitate the development of community enterprises that take advantage of the opportunities generated by increased flows of people and activities. This economic articulation becomes an engine of territorial development that transcends the physical limits of the informal settlement.

### **Implementation and Management Strategies**

The results identify successful strategies for the implementation and management of interactive public spaces in informal settlements. The first strategy corresponds to participatory design processes that involve the community from the initial planning stages. This participation ensures that the spaces respond to specific needs and are articulated with pre-existing organizational dynamics.

The second strategy refers to the gradual and adaptive implementation of interactive components, enabling community learning processes that ensure the effective appropriation of the technologies incorporated. The results show that progressive implementation facilitates the overcoming of digital divides and the building of local technological management capacities.



The third strategy involves building intersectoral partnerships that bring together public, private, and community resources to ensure the financial and technical sustainability of interactive public spaces. These partnerships make it possible to combine economic resources with technical knowledge and community organizational capacities, generating hybrid management models that enhance the effectiveness of interventions.

## Conclusions

Interactive public spaces are effective tools for the urban integration of informal human settlements, functioning as interfaces that facilitate territorial and social articulation between the formal and informal city. Their effectiveness lies in their ability to combine technological components with pre-existing community dynamics, generating processes of territorial appropriation that strengthen social cohesion and enhance community development.

Research shows that these spaces transcend their traditional function as social meeting places to become platforms for territorial development that articulate multiple dimensions: economic, social, cultural, and environmental. Their design and management require participatory approaches that recognize the complexity of informal settlements and enhance their endogenous organizational capacities.

The results show that technological interactivity must be complemented by participatory processes that guarantee community appropriation and the sustainability of interventions. The combination of digital components with traditional social dynamics generates territorial hybrids that enhance the capacity to respond to specific needs and adapt to changing contexts.

Successful implementation strategies are characterized by participatory design processes, gradual implementation, and the building of intersectoral alliances. These strategies make it

possible to overcome technical and financial limitations, generating management models that combine the resources and capacities of different territorial actors.

Interactive public spaces represent an opportunity to rethink urban policies aimed at informal settlements, shifting the focus from welfare-based interventions to strategies that recognize and enhance existing community capacities. Their successful implementation requires institutional frameworks that facilitate community participation and intersectoral coordination.

The research opens up future lines of work that include the analysis of long-term impacts, the evaluation of scalability models, and the identification of specific territorial conditions that enhance the effectiveness of these spaces. These lines of research will contribute to consolidating conceptual and methodological frameworks for participatory urban planning in contexts of informality.

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