

Social Innovation in Urban Public Spaces: An Analysis of Urban Management Policies and Actions in Ferdowsi Street, Sanandaj

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Abstract

In recent years, urban public spaces have increasingly been regarded as potential arenas for social innovation; however, our empirical understanding of how these capacities are realized—particularly in non-Western contexts—remains limited. This study aims to identify and prioritize the factors influencing the role of urban public spaces in social innovation, with a special emphasis on analyzing urban management policies and actions, through a case study of Ferdowsi Street in Sanandaj. The scientific contribution of this research lies in presenting a validated quantitative model comprising six key mechanisms that enable social innovation within a pre-existing public space—an approach not previously tested empirically in the urban literature of developing countries. Adopting a quantitative approach and utilizing a questionnaire (validated through Delphi and Cronbach's alpha), the study collected data from 142 key actors (urban managers, academics, artists, and NGO members). The data were analyzed using PLS-SEM, confirming a six-factor model: social dynamics (0.907), design innovations (0.846), managerial innovations (0.845), institutional-structural innovations (0.804), environmental innovations (0.789), and spatial sustainability innovations (0.385). Social dynamics, emphasizing spatial justice and inclusiveness, emerged as the strongest predictor. The theoretical contribution of this research is providing an analytical framework for urban policymakers in similar contexts, highlighting the primacy of social dynamics and introducing a new type of "soft space" emerging from lived experience—one that underscores the key role of everyday interactions, feedback-driven design, and stakeholder participation in realizing social innovation. Urban public spaces become effective platforms for social innovation when they transcend mere physical functions and transform into interactive ecosystems centered on stakeholder engagement and feedback-oriented design. The findings underscore the necessity of revising design and urban management policies toward participatory and inclusive approaches.

Keywords: Ferdowsi Street, Sanandaj, Social Innovation, Urban Management, Urban Public Spaces

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1. Introduction

In recent decades, social innovation has become one of the central axes of the programs of diverse social actors, ranging from governmental institutions and the private sector to civic actors and the field of education (Foroudi et al., 2021; Horgan & Dimitrijević, 2020; Moralli & Allegrini, 2021; Portales, 2019; Sørensen & Torfing, 2018). The importance of this concept has been recognized not only at local, regional, and national levels but also in transnational documents such as the Europe 2020 strategy and the United Nations 2030 Agenda (Ardill & Lemes de Oliveira, 2018; Domanski et al., 2020). Today's cities face emerging challenges, and urban public spaces are generally recognized as the locus of the emergence and concentration of these transformations. In many parts of the world, when confronting collective problems that governments have failed to solve under austerity policies, citizens increasingly turn to self-organization and produce innovative solutions (Parés et al., 2017). Urban public spaces in developing countries, particularly in emerging economies, have undergone profound transformations following political, economic, and cultural fluctuations and have largely lost their historical role as arenas for citizens' free interaction (Mandeli, 2019). However, these very spaces can become key infrastructure for regional innovation systems by strengthening social capital networks and creating platforms for co-creation (Manzini, 2015).

Various dimensions of social innovation have been studied in different scientific disciplines (Marques et al., 2018; Oeij et al., 2019; Pel et al., 2020; Schubert, 2019). However, given that one of the main arenas for the emergence of social innovation is urban public spaces, there still remains a serious gap in robust empirical frameworks to explain how urban public spaces actively structure, enable, and sustain social innovation processes (Marques et al., 2018; Pel et al., 2020). This gap is felt even more acutely in developing countries and in less privileged cities of Iran such as Sanandaj, which face socio-spatial inequalities and governance constraints. While previous studies have mainly focused on policy and social entrepreneurship dimensions (Foroudi et al., 2021; Marques et al., 2018) or, when attending to public spaces, have emphasized physical-design aspects (Pancholi et al., 2015; Mandeli, 2019), few studies have systematically identified the institutional, managerial, and social mechanisms mediating between public space and social innovation in urban contexts grappling with structural challenges. This is while the complexity and multifaceted nature of social issues in Iran and the increasing role of civic networks and local participations double the importance of addressing social innovation (Ashtari Mehrjerdi, 2021). Therefore, research on how social innovation is manifested and strengthened in urban public spaces, especially in non-Western contexts, has become an undeniable necessity.

The city of Sanandaj, with a long-standing background in cultural and artistic activities, especially in the field of music, has in recent years been recognized as a "Creative City of Music" in the UNESCO Creative Cities Network (Mirzaei et al., 2023). However, this city faces structural socio-spatial challenges such as inequality in access to urban facilities (Sasanpour et al., 2016), informal settlement (Irandoost et al., 2019), and a lack of inclusive public spaces (Karimi & Boussauw, 2018). On the other hand, the urban management of Sanandaj is attempting to provide platforms to address these challenges and strengthen social solidarity by leveraging existing cultural and artistic capacities and employing design elements and creative interventions in various parts of the city; an approach that can be considered an instance of efforts toward social innovation in the context of public space, that is, collective problem-solving processes that, instead of focusing solely on temporary events, seek to empower citizens and promote spatial justice through everyday interactions (Wahby et al., 2022). In this regard, Ferdowsi Street, as one of the most frequented public spaces in the city, has become one of the main focal points of this approach. With a mix of diverse land uses, the active

presence of artistic groups, and the continuous holding of socio-cultural events, this street provides a unique context for examining the question of to what extent and through which pathways urban public spaces can become a platform for problem-solving and fostering social innovation in urban contexts with structural challenges.

Despite these capacities, no systematic study has yet addressed the identification and prioritization of factors influencing the role-playing of public spaces, especially from the perspective of urban management policies and actions. Therefore, the present study was formed with the aim of identifying and ranking the key factors influencing the role-playing of urban public spaces in social innovation, and specifically seeks to answer these questions: What are the facilitating factors of social innovation in urban public spaces, and how much does each influence this process? Also, through which pathways and with what intensity do urban management policies and actions influence the formation and continuation of social innovation? Answering these questions requires identifying the independent variables (facilitating factors) and the dependent variable (social innovation) and explaining the logical relationship between them in the form of a quantitative conceptual model that will be tested in the context of Ferdowsi Street in Sanandaj using structural equation modeling (PLS-SEM).

The present study, employing a quantitative approach and using confirmatory factor analysis (CFA) and structural equation modeling (PLS-SEM), measures and ranks the factors influencing the role-playing of urban public spaces in social innovation. Data were collected through a survey of the opinions of 142 key actors, including urban managers, university professors, local artists, and members of non-governmental organizations (NGOs). Subsequently, the article explains the conceptual framework of the study by reviewing the theoretical literature and research background, then presents the methodology, findings, and discussion in detail, and finally concludes with a conclusion and practical recommendations for urban policymaking.

2- Theoretical and Empirical Background

2-1- The Concept and Dimensions of Social Innovation

Social innovation arises from the creative combination of existing resources (from social capital and cultural heritage to advanced technologies) to achieve social goals (Manzini, 2015) and is recognized as a key strategy in confronting the challenges of the twenty-first century. However, although social innovation is not a new phenomenon (Schnelzer & Franz, 2021), systematic analyses of its theories and effects have always been inadequate (Rogge & Stadler, 2023) and have led to a "recognized but confusing discourse" (Leitheiser & Follmann, 2020). Many challenges have been labeled as social innovation, often without a clear distinction in meaning, context of emergence, or mechanisms of development and acceptance (Domanski et al., 2020). Extensive efforts to formulate a comprehensive definition (Foroudi et al., 2021; García et al., 2015; Horgan & Dimitrijević, 2020; Marques et al., 2018; Moralli & Allegrini, 2021; Oeij et al., 2019; Pel et al., 2020; Schubert, 2019) generally emphasize responding to social needs with a purely social goal (not economic profit), although the means can be technological (Mokhtari, 2023).

Social innovation is defined as a service, product, process, or action that is locally formed and collectively expanded to benefit society and its territory, and is rooted in responding to emerging issues or solving unmet problems through shared cultural horizons and individual creativity (Moralli & Allegrini, 2021). This concept directly leads to collective benefits

(Ardill & Lemes de Oliveira, 2018) and not merely the provision of services to specific individuals (Oeij et al., 2019). Social innovation is often regarded as "a set of tools for providing immediate solutions to immediate problems" (Moulaert & MacCallum, 2019), a response to "unmet social needs," or a reaction to crises (Horgan & Dimitrijević, 2020). Social innovation involves complex processes through which new ideas, products, services, or models are introduced and profoundly transform practices, beliefs, or resource flows within social systems (Parés et al., 2017), acting as a solution for rebuilding social order (Schubert, 2019). These processes usually begin with innovations rooted at the community level (Havas et al., 2023) and manifest their dimensions at the macro level (social, structural, systemic) as well as at the community-based level. A review of previous research shows that although extensive efforts have been made to formulate a comprehensive definition of social innovation, most of these definitions emphasize outcome-oriented and functional aspects and have paid less attention to the spatial, interactive, and contextual dimensions of social innovation in urban spaces (Marques et al., 2018; Pel et al., 2020). In this study, social innovation is understood not merely as a set of outcomes or individual initiatives, but as a spatialized, interaction-based, and actor-centered process that is realized through collective practices, local relationships, and the specific structures of each urban context. Table 1 summarizes these dimensions across different studies, which, despite differences, revolve around common fundamental themes. This table has been used as an analytical basis for extracting and operationalizing the key dimensions and shapes the conceptual framework of social innovation in urban public spaces presented in this study.

Table 1. *Key Criteria and Processes for the Success of Social Innovation*

Criteria / Processes	Research						
	(Murray, Mulgan and Caulier-Grice 2008)	(Phills, Deiglmeier and Miller 2008)	(García, Eizaguirre and Pradel 2015)	(Lin and Chen 2016)	(Domanski, Howaldt and Kaletka 2020)	(Horgan and Dimitrijević 2020)	(Moralli and Allegrini 2021)
Systemic change	◐	○	◐	●	●	●	●
Structural change	○	◐	○	●	●	●	●
Stakeholder participation	◐	●	●	●	◐	●	◐
Acceptance and adaptation by citizens	○	○	●	●	●	○	○

Interdependence and interaction of systems	○	○	○	●	○	○	○
Expected outcomes and impacts	●	◐	●	●	○	◐	◐
Recognition of social problems	●	●	●	●	●	●	●
Social innovation process	●	●	◐	●	◐	◐	◐
Market interest expansion	◐	●	○	○	○	○	○
Participatory design	◐	○	●	●	●	●	○
Prototyping and feedback	●	○	○	●	○	○	○
Networked communication of actors	●	●	○	●	●	●	●
Legal and regulatory innovations	◐	○	●	○	●	○	○
Sustainable innovation flows	●	●	●	○	●	◐	◐

Note: Strongly emphasized = ●, partially or limitedly mentioned = ◐, not mentioned = ○

2-2- Multi-Actor Collaboration in Social Innovation

Social innovation is a bridge between top-down and bottom-up approaches, realized through a model known as "bottom-linked" (Ardill & Lemes de Oliveira, 2018). In this approach, citizen initiatives are the main axis and are supported by institutions through democratic, rights-based, and sustainable mechanisms. Research shows that developing an efficient "bottom-linked" approach—in which local initiatives are able to establish constructive relationships with governance institutions at higher levels—is considered one of the key factors in enhancing the effectiveness and scalability of social innovation (Eizaguirre Anglada & Parés i Franzi, 2019). Social innovation is formed through creative collaborations between public actors and civil society to empower citizens and reduce social exclusion (García et al., 2015). This process is purposefully guided by specific actors seeking to respond to emerging needs (Domanski et al., 2020). The inclusion of stakeholders—sometimes described as "soft landing"

or "soft transition"—requires co-creation of solutions, collective responsibility toward shared resources, and active participation of citizens as co-developers in urban transformation (Horgan & Dimitrijević, 2020; Ardill & Lemes de Oliveira, 2018). Active participation of actors is of particular importance, as social innovation efforts may fail in hostile environments or in the face of institutional resistance (Bartels, 2020).

All sectors of society contribute to the formation of social innovation, and non-governmental organizations, public institutions, and private companies together form a framework known as the "Quadruple Helix" (Domanski et al., 2020). Active social innovation is a bottom-up process dependent on the active role of individuals and social groups (Mokhtari, 2023). Innovation in the public sector involves a set of actors—politicians, managers, contractors, civil servants, and end-users—who act collectively rather than individually (Moralli & Allegrini, 2021). Social innovation encourages collective problem-solving among diverse stakeholders and provides the ground for reciprocal learning, shared understanding, and shared ownership of projects (Sørensen & Torfing, 2018), which ultimately leads to a form of what Klein calls "*collective awareness*" (Moralli & Allegrini, 2021). On the other hand, multi-stakeholder collaborations are often essential for creating "*soft spaces*." These spaces, which can emerge in informal or public contexts, act as refinement mechanisms and make it possible for institutional actors and third-sector organizations to approach vulnerable individuals in low-pressure environments, identify their emerging social needs, and facilitate empowerment processes (Lazzarini & Pacchi, 2024). This perspective views social innovation not as a replacement for existing welfare policies, but as a complementary approach aimed at filling the structural gaps of these policies. Urban public spaces are tangible arenas in which these multi-actor collaborations are realized and act not merely as a background, but as interactive platforms that provide the possibility of co-creation, negotiation, and implementation of innovative social initiatives. Although previous research has well emphasized the importance of multi-actor collaboration in social innovation (Domanski et al., 2020; Lazzarini & Pacchi, 2024), the role of public space as the concrete context for the realization of these collaborations, as well as the managerial mechanisms facilitating this process, has been less empirically examined. The present study addresses this gap by emphasizing the analysis of urban management policies and actions in the context of a pre-existing public space.

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2-3- Urban Public Spaces as the Context for the Realization of Social Innovation

Today, innovation has become a public priority in many Western countries (Sørensen & Torfing, 2018), and urban areas are considered key arenas for social innovation, as social challenges emerge with greater concentration in cities (Ardill & Lemes de Oliveira, 2018). Urban contexts manifest issues such as economic crises, demographic changes, and climate change as urgent social needs, while simultaneously providing the possibility for unexpected collaborations (Domanski et al., 2020). Although social innovation is often local and limited to a small scale (Schubert, 2019), in cities it is formed through co-initiated efforts and initiatives; efforts in which state actors, citizens, and civil society participate in joint design and implementation (Sørensen & Torfing, 2018). Social innovation operates in alignment with sustainable development at the macro level and is also manifested at the micro level in areas such as territorial development, neighborhood planning, and urban governance (Foroudi et al., 2021).

Manzini identifies three key features of urban innovative projects that align with the definition of social innovation:

- 1) The initial step is taken by professionals: At this stage, experts, by leveraging their design skills and capabilities, identify existing social initiatives and innovations and transform them into more effective, more attractive, more sustainable, and more replicable solutions. Traditionally, experts were asked to identify technological innovations and translate them into more acceptable social products and services. This approach remains valid, but to strengthen social innovation, further actions are needed: the bridge between technology and society must also be traversed in the reverse direction; that is, professionals and designers must be helped to make their solutions more accessible, more effective, more sustainable, and more replicable.
- 2) The use of advanced but conventional skills and capabilities: However, two key features make these projects compatible with social innovation: service design, which is used to visualize and develop solution concepts in order to enhance the quality of stakeholder interactions, and strategic design, which strengthens and supports collaboration among the various actors involved in the project.
- 3) Design support through appropriate (feedback-oriented) products, services, and communication activities: This framework can function as a digital platform, platforms that increase horizontal synergy and provide the possibility for more efficient and effective individual interventions (Manzini, 2015).

Finally, all social initiatives and innovations in urban spaces or neighborhood units are expected to lead to social transformation through three distinct pathways: spatial justice, spatial inclusion, and urban transformation (Parés et al., 2017). In this regard, the concept of "soft spaces" (Lazzarini & Pacchi, 2024), as arenas of informal and low-pressure interaction between institutional actors and citizens, plays a key role in facilitating social innovation processes. Such spaces, which can emerge in informal or public contexts, act as refinement mechanisms and provide the possibility of identifying emerging social needs and empowering vulnerable groups. Despite the theoretical emphasis on the role of public spaces in social innovation

(Ardill & Lemes de Oliveira, 2018; Manzini, 2015), few empirical studies have systematically addressed the identification and ranking of the facilitating factors of this process in pre-existing public spaces (rather than designed projects); especially in urban contexts of developing countries that face structural challenges (Mandeli, 2019). This study, by examining Ferdowsi Street as an organic and pre-existing public space, seeks to fill this gap.

2-4- Public Spaces as Catalysts of Social Innovation: A Theoretical Framework

Public spaces are considered the heart of a city's democratic life and, through encounters with diversity, the exchange of experience, and the strengthening of tolerance, provide the ground for social interactions, while symbolically reinforcing the collective identity of society (Pancholi et al., 2015). In this study, "going beyond the merely physical role" means transitioning from a view that sees space merely as a geometric-functional substrate toward an understanding of space as a "lived, interactive, and meaning-making arena." This understanding is based on the views of Henri Lefebvre (Lefebvre, 1991), who regards space not as a passive substrate but as "social production," and introduces it as comprising three aspects: "perceived space" (the physical body), "conceived space" (sign systems, planning, and dominant discourses), and "lived space" (everyday experiences, collective actions, and urban memories). From this perspective, urban public space is regarded not as a pre-determined and static "place," but as a dynamic process of "place-making" that is continuously redefined through social interactions, the reproduction of norms, and the active agency of citizens (Madanipour, 2017). Furthermore, Foucault (Foucault & Miskowiec, 1986), with the concept of "heterotopia," emphasizes that certain spaces, regardless of their prescribed physical functions, have the capacity to create new meanings, alternative social orders, and heterogeneous patterns of interaction. Therefore, the transformation of a public space into a context for social innovation depends on the activation of precisely this lived and relational aspect of space—not merely a change in its physical form or land use.

In many cities, especially in emerging economies, political, economic, and cultural changes have redefined public spaces; environments that often do not reflect local values, and consequently, the public perception of these spaces is transformed. As a result, public spaces have lost their traditional role as social arenas and have become mainly functional and instrumental (Mandeli, 2019). In this context, public spaces can strengthen social innovation as a catalyst; by linking innovative actions, facilitating participatory financing, shaping norms, and regulating legal and regulatory frameworks (Portales, 2019). However, public spaces can strengthen social innovation by linking innovative actions, facilitating participatory financing, shaping norms, and regulating legal frameworks (Portales, 2019). There are limited empirical studies in this area; for example, Wu et al. (Wu et al., 2022) in Shanghai showed that participatory design helps strengthen friendships and public welfare, and Martinus (Martinus, 2014) emphasized the role of "third places" as a context for social capital. However, the specific mechanisms for realizing this potential, especially in the complex socio-spatial contexts of the Global South, remain unknown.

2-5- Empirical Background and Research Gap

Despite this potential, a systematic review of the research literature shows that no study has yet directly examined the mechanisms through which urban public spaces influence social innovation, especially in the context of developing countries and particularly the Global South. Most existing studies have focused on the role of social innovation in the domains of policymaking, social entrepreneurship, or regional development, and have paid less attention to the spatial-physical and interactive capacities of public spaces as concrete contexts for the realization of social innovation. Therefore, the main theoretical-empirical gap that the present study addresses is the absence of a systematic and quantitative study that, relying on the existing theoretical framework concerning social innovation and emphasizing the role of urban management policies and actions, identifies and prioritizes the facilitating mechanisms of social innovation in a pre-existing and organic public space in the context of a developing city such as Sanandaj. By presenting a quantitative and validated model, this study takes a step toward filling this gap.

2-6- Conceptual Model of the Research

Based on a comprehensive review of the literature related to social innovation and urban public spaces, and drawing on Table 1, which has synthesized the key criteria and processes for the success of social innovation from seven foundational studies in this field, and also relying on the theoretical foundations presented in the previous sections that point to the role of institutions, agencies, multi-actor collaboration, and participatory design, Figure 1 presents a conceptual framework that integratively demonstrates the outcome and synthesis of all the key factors and mechanisms influencing the strengthening of social innovation in urban public space. In this framework, six main factors (social dynamics, design innovations, managerial innovations, managerial/institutional and structural innovations, environmental innovations, and sustainable innovations in space) and the observable indicators associated with each have been extracted from the literature. Then, for each observable indicator, a dedicated question has been designed so that, through confirmatory factor analysis (CFA), the nature of the model can be tested and validated in the real context of Ferdowsi Street in Sanandaj, and the influence of each factor and the extent of its effect can be quantitatively measured. This model, by identifying factors such as managerial and institutional/structural innovations, provides the possibility of analyzing urban management policies and actions in the context of Ferdowsi Street and specifically answers the main research question regarding the role of urban management in strengthening social innovation. By linking theoretical structures with empirical investigations, this framework offers a structured approach for analyzing the performance of urban spaces as interactive contexts of social innovation.

To develop the conceptual model of the research, a combined approach of systematic review and thematic analysis (Braun & Clarke, 2006) was used. This process was carried out in four steps:

- Step One: Systematic Literature Review. By searching for the keywords "social innovation," "urban public spaces," "participatory design," "urban management," and "innovative governance" in reputable databases (Web of Science, Scopus, Google Scholar), 67 sources related to the topic were identified, and after

refinement, 32 sources that directly addressed the role of public spaces in social innovation were selected for final analysis.

- **Step Two: Thematic Analysis and Identification of Initial Indicators.** Using the thematic analysis method (Braun & Clarke, 2006), the selected texts were coded. At this stage, 47 initial codes were identified, which, after merging similar codes, were reduced to 24 indicators. Table 1, which synthesizes the key criteria and processes for the success of social innovation from seven foundational studies in this field, shows part of the output of this step.
- **Step Three: Categorization of Indicators into Main Constructs.** The 24 identified indicators, based on conceptual commonalities and drawing on the theoretical foundations presented in the previous sections (which point to the role of institutions, agencies, multi-actor collaboration, and participatory design), were categorized into six main constructs: (1) social dynamics, (2) design innovations, (3) managerial innovations, (4) institutional and structural innovations, (5) environmental innovations, and (6) sustainable innovations in space. Figure 1 integratively displays these six constructs along with the conceptual relationships among them.
- **Step Four: Development of Observable Indicators and Questionnaire Design.** For each of the 24 identified indicators, a dedicated question was designed. After conducting a Delphi process with the participation of 10 experts (including university professors in the fields of urban design and architecture and executive managers of urban management) and removing indicators on which sufficient agreement was not reached, the number of indicators was reduced to 18 observable indicators, which are presented in Table 5. These indicators formed the basis for the questionnaire design and the field measurement of the research.

Thus, both the conceptual model of the research (Figure 1) and the observable indicators (Table 5) are the product of a systematic and literature-based process, and their relationship is clearly traceable through these four steps.

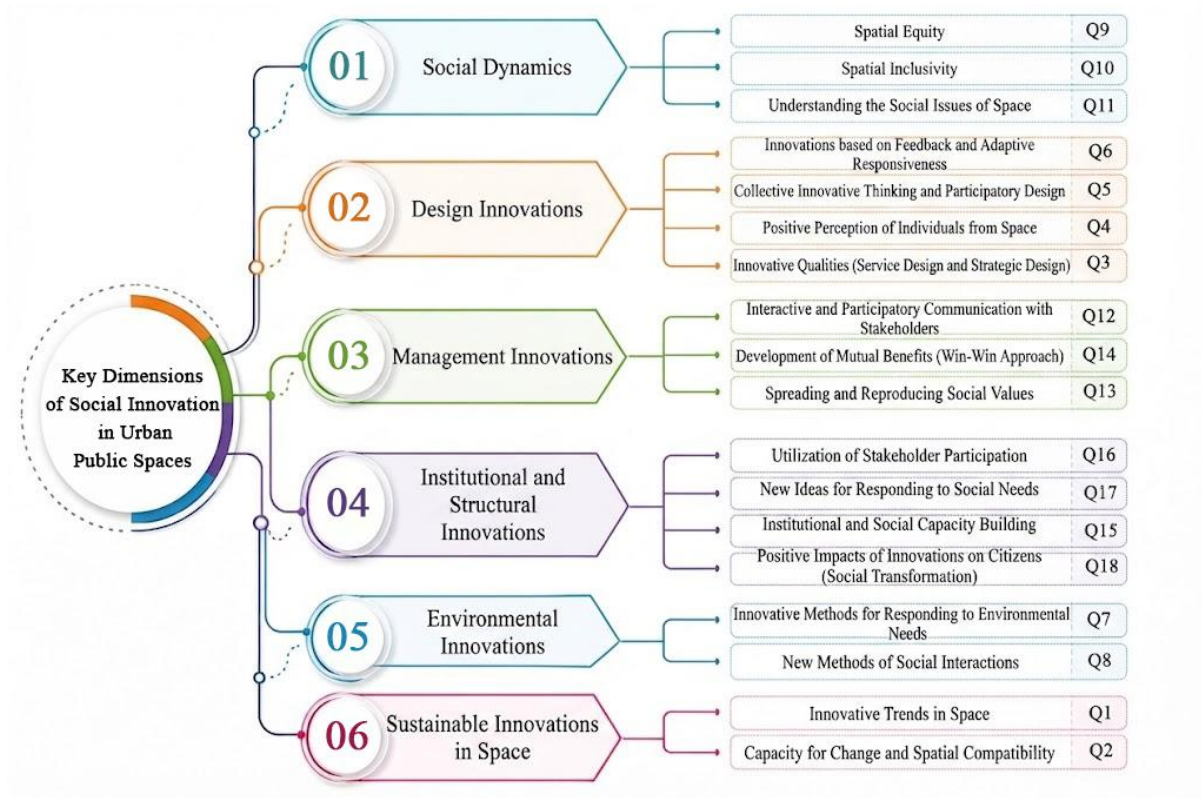


Figure 1. Urban Public Space as an Interactive Context: A Conceptual Framework of Six Main Constructs Facilitating Social Innovation

3- Methodology

This study employs a quantitative approach and, in terms of purpose, falls within the category of fundamental-applied research. In the first step, potentially influential factors on social innovation in urban public spaces were extracted through documentary studies and a review of related literature. In the next step, observable indicators corresponding to the conceptual and thematic scope of each factor were developed for field measurement and questionnaire administration. Since the emergence and success of social innovation in the urban context is heterogeneous and highly context-dependent (Eizaguirre Anglada & Parés i Franzi, 2019), the conceptual framework of this study was evaluated and tested through a case study of Ferdowsi Street in Sanandaj, Iran; one of the most vibrant urban public spaces in the country. This location was selected not only for its high dynamism but also as an exemplar of multi-actor interactions among stakeholders and the physical-public environment, providing a suitable context for the empirical examination of social innovation as a spatial, actor-based process. Thus, in addition to identifying key factors, the analysis of urban management policies and actions in this space has also been taken into consideration. For data collection, a field study was conducted using a questionnaire based on observable indicators. The proposed research model and constructs were then evaluated using second-order confirmatory factor analysis (CFA) in SmartPLS software. The CFA method was chosen for its capability to validate the multidimensional structure of social innovation factors and ensures that the observable indicators correctly reflect the conceptual mechanisms governing urban public spaces. The aim

of this study is to identify and validate the factors that strengthen social innovation in urban public spaces.

The main data collection instrument was a structured questionnaire based on the observable indicators extracted from the research literature. The questionnaire design process was carried out in several steps: first, through a systematic review of the literature, the potential factors influencing social innovation in urban public spaces were identified and categorized into six main constructs (social dynamics, design innovations, managerial innovations, institutional and structural innovations, environmental innovations, and sustainable innovations in space). Then, for each construct, observable indicators were developed and converted into questionnaire items. The content validity of the questionnaire was confirmed through a two-stage Delphi process with the participation of 10 experts (including university professors in the fields of urban design and architecture and executive managers of urban management), such that complete agreement among all participants was achieved for all indicators. The reliability of the instrument was also confirmed through a pretest of 50 items and the calculation of Cronbach's alpha coefficient (greater than 0.7).

The statistical population of the study consisted of key actors related to the public space of Ferdowsi Street, comprising four main groups: urban managers, university professors, local artists, and members of non-governmental organizations. Using purposive sampling and employing the snowball method, 142 questionnaires were collected over two months through the Porsline platform and by distributing the link in specialized groups on social networks (WhatsApp and Telegram). The questionnaire was designed with a five-point Likert scale (from strongly agree to strongly disagree) to enable precise measurement of the respondents' views.

Given the study's aim of analyzing urban management policies and actions in the context of a public space, the statistical population of the research was purposively selected from among key actors, since this group plays a direct role in the design, implementation, and reception of urban policies, and their perception of managerial and institutional processes is essential for answering the research question. However, to reduce bias, part of the respondents consisted of citizens with education related to the urban field, who, as informed users of the space, represent a perspective close to that of ordinary citizens (Karimi Yazdi et al., 2016). Nevertheless, the present study explicitly acknowledges that the perceptions of everyday users and marginalized groups of the space have not been included in this study, and this issue is discussed in the limitations section. Sampling was conducted purposively using the snowball method. The inclusion criteria were: for urban managers, having executive experience in the municipality, Roads and Urban Development, the Sanandaj City Council, and other executive bodies of the city; for university professors, teaching or research in the fields of urban planning, architecture, or urban management at universities in Kurdistan; for local artists, continuous activity in artistic fields related to urban space (such as music, visual arts, or urban design); and for members of non-governmental organizations, active membership in civil institutions with a record of activity in the field of public interest in Sanandaj. Access to the samples was obtained through membership in specialized groups on social networks (WhatsApp and Telegram), including groups of urban managers, civil activists, non-governmental organizations, and specialized groups of the Kurdistan Province Engineering Organization, and the questionnaire link was distributed in these groups. It should be noted that this study does

not seek an in-depth narrative inquiry into the individual experiences of citizens; rather, its aim is the quantitative measurement and prioritization of the key mechanisms influencing social innovation at a broader level.

For data analysis, structural equation modeling with the partial least squares approach (PLS-SEM) and second-order confirmatory factor analysis (CFA) were used in SmartPLS software. The confirmatory factor analysis method was chosen for its capability to validate the multidimensional structure of social innovation factors, in order to ensure that the observable indicators correctly reflect the intended conceptual constructs. PLS-SEM was selected due to its suitability for complex models with a predictive nature, its lack of need for the assumption of data normality, and its capability to work with moderate sample sizes (such as the present study's sample of 142) (Hair et al., 2011; Sarstedt et al., 2021). Using this method, it became possible to quantitatively measure the influence of each of the six factors and to rank them based on path coefficients, which in turn provides a basis for analyzing urban management policies and actions on Ferdowsi Street. Also, to assess the reliability of the constructs, composite reliability (CR) was used, and to confirm convergent and discriminant validity, the average variance extracted (AVE) and the Fornell-Larcker criterion were used, respectively.

Compliance with research ethics standards was emphasized at all stages. Participants, with full awareness of the research topic and objectives, declared their informed consent. Also, the confidentiality of information and the identity of individuals was maintained, and the data were kept anonymously (Bos, 2020). This research was in accordance with the guidelines of the Social Research Association (SRA), and on the welcome page of the questionnaire, complete explanations regarding the objectives, confidentiality, and the voluntary nature of participation were included.

4- Findings

This section presents the results of the PLS-SEM analyses, which evaluate the constructs of the proposed research model. First, the validity and reliability of the indicators and results are examined, and then the factors influencing social innovation in urban public spaces are determined in order of their influence (based on factor loadings and path coefficients).

4-1- Model Reliability and Construct Validity

The validity and reliability of the constructs of the research model were evaluated based on various parameters. Composite reliability (CR) and average variance extracted (AVE) were used to assess the reliability and validity of the constructs (Table 2). Given that CR values above 0.7 indicate sufficient internal consistency and AVE values above 0.5 indicate that more than 50% of the variance is explained by the model constructs (Bandalos & Finney, 2018), the results show that all constructs possess the required level of reliability and have acceptable validity.

Table 2. Reliability and Validity of the Research Constructs

Factors	Composite Reliability (CR)	Average Variance Extracted (AVE)
Design innovations	0.826	0.543
Environmental innovations	0.796	0.662
Managerial innovations	0.859	0.670
Social dynamics	0.823	0.615
Sustainable innovations in space	0.936	0.879
Institutional and structural innovations	0.773	0.501

To assess the discriminant validity of the research model constructs, the Fornell-Larcker criterion was used (Rasoolimanesh, 2022). Given that the diagonal values of the matrix (the square root of AVE) are greater than the correlation of each construct with other constructs (Table 3), the discriminant validity of the research model constructs is confirmed.

Table 3.Discriminant Validity of the Research Constructs Based on the Fornell-Larcker Criterion

Factors	Design innovations	Environmental innovations	Managerial innovations	Social dynamics	Sustainable innovations in space	Institutional and structural innovations
Design innovations	0.737					
Environmental innovations	0.712	0.814				
Managerial innovations	0.574	0.605	0.819			
Social dynamics	0.702	0.636	0.792	0.784		
Sustainable innovations in space	0.283	0.215	0.172	0.249	0.937	
Institutional and structural innovations	0.557	0.508	0.614	0.687	0.324	0.685

Note: The bold diagonal values represent the square root of the AVE for each construct

4-2- Path Coefficients and Variable Importance

In the conceptual model of this study (see Figure 1), the factors influencing the social innovation process in urban public spaces were identified. Six factors—social dynamics, design innovations, managerial innovations, institutional and structural innovations, environmental innovations, and sustainable innovations in space—comprise a set of observable indicators. In line with the research objectives, the importance of these factors and their observable indicators was examined in the sample of participants. All factor loadings were above 0.4, indicating the significant influence of these factors on social innovation in urban public spaces (Figure 2). Sustainable innovations in space, with a factor loading of 0.385, showed the lowest direct influence among the model factors. Although the factor loading of this construct is slightly below the conventional threshold of 0.4 for exploratory research (Sarstedt et al., 2021; Hair et al., 2011), it was retained in the model due to its statistical significance ($P < 0.01$) and its theoretical importance in the literature on innovation sustainability (Murray et al., 2008). However, future research with redefined indicators and larger samples could validate this construct more precisely in different urban contexts. Also, the two observable indicators of this construct ("innovative flows in space" with a factor loading of 0.947 and "spatial transformability capacity" with a factor loading of 0.928) indicate that the concept of "sustainability of innovation in space" in the context of Ferdowsi Street requires additional indicators to be fully operationalized.

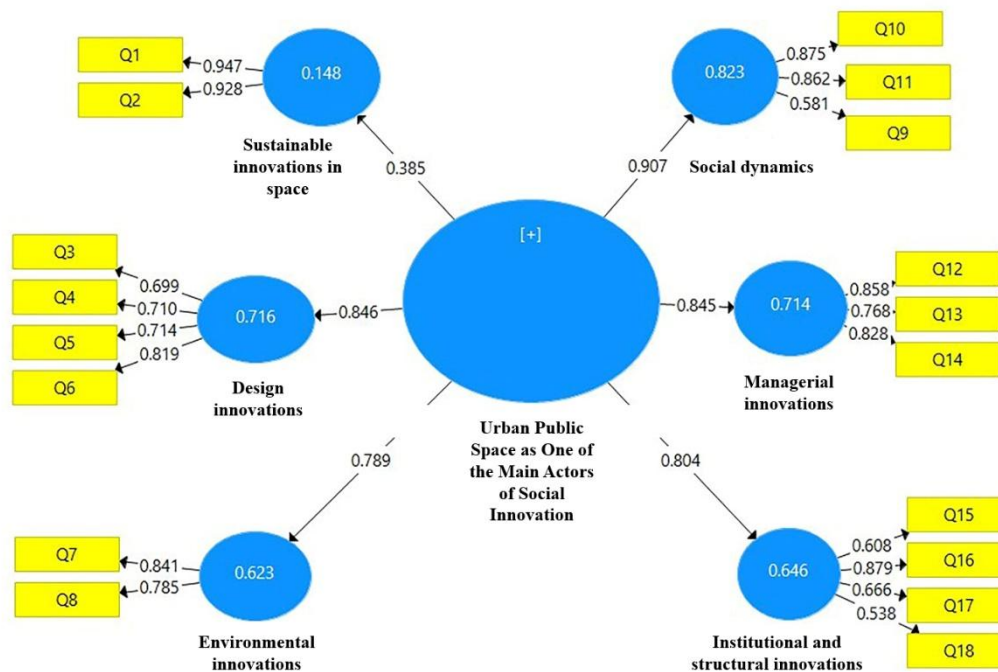


Figure 2. Path coefficients of factors and factor loadings (>0.4) of observable indicators confirmed by the research participants

Given that the path coefficients of each construct indicate the extent of their influence in explaining changes in the dependent variable, social dynamics (path coefficient = 0.907) was recognized as the strongest predictor of activating Ferdowsi Street as a hub of social innovation (Table 4). After that, managerial innovations and design innovations, with relatively similar influences, were ranked second (path coefficients of 0.845 and 0.846, respectively). This emphasizes the key role of innovative managerial strategies in strengthening social innovation in public spaces, while simultaneously highlighting the contribution of creative and practical designs in advancing such innovations. Institutional and structural innovations are ranked third; creating capacities and opportunities for the formation of new ideas in urban spaces can strengthen this factor. Environmental innovations rank fourth, and sustainable innovations in space have the lowest direct influence. The results show that although all constructs are important, focusing on enhancing social dynamics and managerial and design innovations will have the greatest impact on the dependent variable.

Given that T-values greater than 1.96 and P-values less than 0.05 were obtained for all constructs, it can be stated with 95% confidence that the six factors—social dynamics, design innovations, managerial innovations, institutional and structural innovations, environmental innovations, and sustainable innovations in space—are significant and determining constructs for enhancing the role of urban public spaces as one of the main actors of social innovation. The interpretation of path coefficients in the context of Sanandaj shows that social dynamics, with a coefficient of 0.907, was the strongest predictor due to the active presence of diverse ethnic and religious groups on Ferdowsi Street and the holding of collective events such as ritual celebrations. Managerial innovations (0.845) and design innovations (0.846) have also played a key role by leveraging the capacity of the "Creative City of Music" and feedback-based urban interventions (such as creative furniture). In contrast, the lower factor loadings of environmental innovations (0.789) and sustainable innovations in space (0.385) can be interpreted by the lack of green infrastructure and the episodic nature of events on Ferdowsi Street.

Table 4. *T-Statistics, Path Coefficients, and Correlations of Model Variables*

First-Order Factors	Second-Order Factor (Higher-Order Element)	Path Coefficients and Correlation	Standard Deviation (STDEV)	T-Statistic (absolute value) (O/STDEV)	P-Values*
Public spaces as actors in social innovation	Social dynamics	0.907	0.021	44.182	0.000
	Design innovations	0.846	0.046	17.809	0.000
	Managerial innovations	0.845	0.040	21.203	0.000
	Institutional and structural innovations	0.804	0.056	14.469	0.000
	Environmental innovations	0.789	0.052	15.051	0.000

Sustainable innovations in space	0.385	0.145	2.661	0.008
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* **Note:** P-values less than 0.05 indicate the significance of the relationship between the second-order and first-order constructs. The factors in the table are ranked based on path coefficients.

5- Discussion

Urban public spaces have always been among the most contentious and debated topics in urban discourse. This study, with a distinctive perspective, examines how these spaces, given their inherent capacities and the ongoing social interactions within them, can act as key actors and vibrant hubs for social innovation. By examining the conceptual model of the research, which was formed through field and library studies and validated using confirmatory factor analysis (CFA), six key factors influencing the strengthening of the role of urban public spaces as hubs of social innovation were identified and, based on importance, are as follows in order: social dynamics, design innovations, managerial innovations, institutional and structural innovations, environmental innovations, and sustainable innovations in space. Each of these key factors, considering its associated observable indicators, can be examined and analyzed within a broader framework and in interaction with one another:

5-1- Social Dynamics: The Strongest Predictor of Social Innovation

Social dynamics, with the highest path coefficient (0.907), showed a greater influence than other factors in explaining the role of urban public spaces in shaping social innovation, such that all indicators associated with this factor showed significant factor loadings (Table 5). The very high path coefficient of this construct indicates that in the context of Ferdowsi Street, factors such as equality in space and spatial inclusiveness are the strongest predictors of social innovation. This finding is consistent with the active and diverse presence of different citizen groups on this street (from families and the elderly to youth and artists); a presence and activity that is clearly observable in events such as ritual celebrations (Figure 5) and street art performances, indicating the high capacity of this space for inclusive collective interactions. The high factor loading of the "equality in space" indicator shows that social innovation is more likely to flourish in environments where diverse social groups enjoy equal opportunities; a matter that directly leads to the strengthening of social dynamics. Such spaces correlate with a suitable context for social co-creation (Mostashar Nezami et al., 2023); where interaction and collaboration among the state, citizens, and civil society become possible, and a fertile ground for the emergence and expansion of innovation is provided (Sørensen and Torfing 2018). Many studies, without a precise understanding of the role of society, have merely sufficed with applying the concept of social innovation (Grilo and Moreira, 2023). From this perspective, the findings of the present study, which introduces "social dynamics" with components such as equality and spatial inclusiveness as the strongest factor in the role-playing of public spaces in social innovation, is considered a fundamental step toward filling this conceptual gap; in that

it shows that the realization of social innovation in urban spaces is not possible without attention to the concrete contexts of social interactions and the active role of citizens.

Earlier studies have also shown that informal institutions, compared to formal institutions (laws and regulations), have a greater influence on the development of social innovation (Ezati Arasteh et al., 2023); in that these institutions, by shaping everyday interactions and reproducing collective norms, provide a suitable context for citizens' innovative actions. This finding further highlights the importance of "social dynamics," which in the present study has been identified as the strongest predictor of the role-playing of urban public spaces in social innovation. Although concepts such as equality and inclusiveness have previously been addressed in urban studies (Witten and Ivory 2018; Jian et al. 2020), from the perspective of social innovation, these concepts represent a form of democratic innovation that makes collective problem-solving possible beyond merely managerial approaches. In such conditions, the dominance of urban elites over space is limited, and various actors are empowered as "innovation heroes" (Domanski et al. 2020) or pioneering actors of innovation.

Table 5. Factor Loadings of Key Dimensions of Innovation in Urban Public Space and Observable Indicators

Factor Loading	Code in Model	Observable Indicators	Factor
0.875	q_9	Equality in space	Social dynamics
0.862	q_10	Spatial inclusiveness	
0.581	q_11	Understanding the social issues of space	
0.819	q_6	Feedback-based innovation and adaptive responsiveness	Design innovations
0.714	q_5	Innovative collective thinking and participatory design	
0.710	q_4	Positive perception of individuals toward space	
0.699	q_3	Innovative qualities (service design and strategic design)	Managerial innovations
0.858	q_12	Interactive and participatory communication with stakeholders	
0.828	q_14	Expansion of shared interests (win-win approach)	
0.768	q_13	Dissemination and reproduction of social values	Institutional and structural innovations
0.879	q_16	Utilizing stakeholder participation	
0.879	q_17	New ideas for responding to social needs	

0.608	q_15	Institutional and social capacity building	
0.538	q_18	Positive impacts of innovations on citizens (social transformation)	
0.841	q_7	Innovative methods of responding to environmental needs	Environmental innovations
0.785	q_8	New methods of social interactions	
0.947	q_1	Innovative flows in space	
0.928	q_2	Capacity for spatial transformability and adaptability	Sustainable innovations in space

5-2- Design Innovations

Design innovations, with a path coefficient of 0.846, are the second most influential factor in the model, indicating the key role of feedback-based and participatory design approaches in the context of Ferdowsi Street. The high factor loading of the "feedback-based innovation and adaptive responsiveness" indicator (0.819) in this model is consistent with examples of design interventions on Ferdowsi Street (Figure 3); interventions that appear to have been welcomed by citizens and have led to a redefinition of patterns of space use. However, definitive confirmation of this alignment requires supplementary research with direct citizen participation. Design innovations consist of four observable indicators: innovative qualities, positive perception of individuals toward space, innovative collective thinking and participatory design, and feedback-based innovation with adaptive responsiveness; all of these indicators had factor loadings above 0.4 (Table 5). This finding clearly emphasizes the pivotal role of feedback-based design approaches and participatory thinking; approaches that are inherently human-centered and can transform urban public spaces from merely physical substrates into dynamic and responsive environments that have the capacity to foster social innovation. In such a framework, design is considered not only a tool for organizing space but also an interactive process for shaping collective experiences, strengthening the sense of belonging, and activating the creative capacities of citizens. On Ferdowsi Street, the installation of temporary artistic elements, creative urban furniture, and interactive guideboards are examples of the application of design based on citizen feedback (Figure 3). These design interventions, by creating a dynamic environment, appear to correlate with citizens' stopping, interaction, and participation in collective events.



Figure 3. An example of urban furniture on Ferdowsi Street in Sanandaj, which is noteworthy as an instance of feedback-based design interventions

5-2-1- Feedback-Based Innovation and Adaptive Responsiveness

The highest factor loading in this dimension belongs to feedback-based innovation and adaptive responsiveness; a matter that highlights the role of open, iterative, and learning design processes that are based on the continuous receipt of public feedback. Urban spaces that have the capacity for flexible adaptation to their users' needs pave the way for social trust, a sense of belonging and collective ownership, and active citizen participation; conditions that are considered fundamental prerequisites for the realization of social innovation. In accordance with Klein's idea about the "structuring effect of local collective action" (Moralli and Allegrini 2021), the continuity of social interactions in public spaces provides the possibility for the formation of collective innovations.

5-2-2- Innovative Collective Thinking and Participatory Design

This dimension, with the second highest factor loading, emphasizes the necessity of involving all innovation actors in the design process of urban public spaces. Although the value of participation and collective thinking is well documented in the scientific literature (Murty et al. 2010; Horgan and Dimitrijević 2020; Bromell 2024), social innovation goes beyond mere participation, in that it requires accepting the diversity of creative inputs and providing the possibility for local actors to have a real influence on the formation of projects. Since social innovation has a bottom-up linked nature, its emergence depends on the recognition of individual initiative, local creativity, and the social agency of citizens (García et al. 2015). Thus, participatory design is considered not only a tool for producing space but also a mechanism for activating the social and creative capacities of the city. Subsequently, citizens' positive perception of space and the innovative services located within it rank third and fourth in terms of factor loadings, respectively. The results show that social innovation is more likely to flourish in spaces where citizens not only consider the quality of the physical environment valuable but also regard the functional and service innovations of the space as meaningful and efficient.

5-3- Managerial Innovations

Managerial innovations, with a path coefficient of 0.845, appear as one of the main determining forces in strengthening social innovation. The high factor loading of the "interactive and participatory communication with stakeholders" indicator (0.858) in this model highlights the importance of inclusive communication approaches in urban management. Holding events such as the Nowruz ceremony on Ferdowsi Street (Figure 4) can be considered an example of urban management's effort to create interactive platforms and promote social values; an effort that, within the framework of the presented model, has had a positive effect on the expansion of shared interests (with a factor loading of 0.828). This dimension is based on three key components: participatory communication with stakeholders, expansion of shared interests (win-win approach), and dissemination of social values. Among these components, active collaboration and interaction with stakeholders shows the greatest influence in advancing social innovation. Since the present study was also conducted with the direct participation of stakeholders, the findings clearly reflect the multi-actor and networked nature of urban public spaces; a nature that has also been emphasized in the theoretical literature (Orum and Neal, 2009; Neal 2010; Németh, 2012). Social innovation flourishes in a context where urban management can create inclusive and meaningful communication channels and, through program-based interventions, align the multiple interests of different groups toward common goals. Public spaces are more likely to act as an effective context for social innovation when they reflect collective ideals and goals and, at the same time, correlate with positive social values (path coefficient = 0.768).



Figure 4. Holding the Nowruz ceremony on Ferdowsi Street in Sanandaj; an example of urban management's effort to create interactive platforms and promote social values (Source: ISNA News Agency)

5-4- Institutional and Structural Innovations

Institutional and structural innovations, with a path coefficient of 0.804, demonstrate the role of institutional infrastructures in the formation of social innovation. The high factor loading of the "utilizing stakeholder participation" indicator (0.879) in this model indicates that successful public spaces require sustainable institutional mechanisms to attract the participation of various actors. On Ferdowsi Street, the active presence of non-governmental organizations and artistic groups in holding collective events are examples of this institutional capacity building that can pave the way for innovative responsiveness to social needs (with a factor loading of 0.879). This factor contributes to strengthening social innovation in urban public spaces through four main mechanisms: capacity building, effective utilization of stakeholder participation, generation of new ideas for responding to social needs, and positive impacts of innovations on citizens (social transformation). Among these mechanisms, active and meaningful stakeholder participation still has the greatest influence, followed by the ability to create innovative responses to social needs in second place. Adaptive and flexible urban spaces, with a dynamic understanding of collective demands and social changes, can creatively respond to these evolving needs. However, the realization of such an approach requires prior capacity building in the urban management system; a capacity that equips institutions and urban actors with the necessary skills, knowledge, and resources (path coefficient = 0.608). It is only on the basis of such institutional and knowledge infrastructure that systemic innovations can achieve continuity and institutionalization; especially given the internal and inseparable link between social innovation and sustainable development (Schmiedeknecht, 2020).

5-5- Environmental Innovations

Environmental innovations, with a path coefficient of 0.789, emphasize the role of creative environmental solutions in promoting social innovation. The high factor loading of the "innovative methods of responding to environmental needs" indicator (0.841) in this model indicates the importance of ecological approaches in urban public spaces. Although exemplary environmental measures such as fully pedestrianized streets or clean energy infrastructures have not been widely implemented on Ferdowsi Street, initial efforts such as creating environmentally compatible urban furniture and increasing green space can be steps toward realizing this component. The 2030 Agenda and the Sustainable Development Goals (SDGs) explicitly consider innovation a fundamental condition for achieving sustainable development. Although these documents have not always directly referred to social innovation (Ardill and Lemes de Oliveira, 2018), public spaces can become an effective context for promoting social innovation through strategies that respond to environmental challenges.

5-6- Sustainable Innovations in Space

The last factor, sustainable innovations in space, with a factor loading of 0.385, showed the lowest direct influence among the model factors. This seemingly contradictory finding, given the high factor loadings of its two indicators (innovative flows and spatial transformability capacity), indicates that the sustainability of innovation in urban public spaces is a more complex concept than merely the two aforementioned components, and has probably not been well operationalized in the context of Ferdowsi Street due to the cross-sectional nature of the study or the lack of complementary indicators. Nevertheless, the statistical significance of this factor ($P < 0.01$) and its theoretical importance in the literature on innovation sustainability (Murray et al., 2008) indicate that ignoring it is not possible either, and future research with more precise indicators can reveal its true contribution in different urban contexts. The continuous holding of events such as the Moloudi-Khani celebration (Figure 5) on Ferdowsi Street can be considered an example of "innovative flows" that contribute to the continuity of the social life of the space. However, the low factor loading of the construct itself indicates that more supplementary indicators are needed for a more precise measurement of "innovation sustainability" in this space. The continuous holding of innovative events such as festivals, exhibitions, and artistic performances correlates with the continuity of social innovation in urban spaces, although its influence in the studied sample has been lower compared to other factors; because these events, by redefining the mode of space use and the lived experience of users, reproduce the social life of the space. Given that culture and creativity are increasingly recognized as key drivers of social innovation in urban contexts (Tricarico et al., 2022), Ferdowsi Street is a telling example of this dynamism; where the continuity of artistic and ritual events (such as the Mouludi-Khani celebration of Ummat Ahmad, despite some limitations in service provision) has paved the way for the formation of diverse and meaningful social interactions. Moreover, urban spaces that strengthen social innovation must inevitably have the capacity to adapt to social, environmental, and technological changes; especially changes that directly affect public spaces (Mandeli, 2019).

The realization of this requires the integration of flexible, sustainable, and innovative responses in the design and management of space to ensure the sustainability of social innovation in the long term.



Figure 5. The grand celebration of the Ummah of Ahmad (PBUH) for the fourth consecutive year on Ferdowsi Street in Sanandaj on the occasion of the Week of Unity and the birth anniversary of the Noble Prophet (September 2026); an instance of "innovative flows in space" that contributes to the continuity of the social and cultural life of this public space (Adapted from images from Fars, Mehr, and IMNA news agencies)

The examination of Ferdowsi Street presents us with a different understanding of the concept of "soft spaces" (Lazzarini and Pacchi, 2024). In the classic definition, "soft spaces" are introduced as designed and purposeful projects that create platforms for social interaction through top-down or bottom-up interventions (Mattila & Heinilä, 2022). However, Ferdowsi Street is an example of a "soft space emerging from the lived context"; a space that, prior to any design intervention, already possessed a background of everyday interactions, cultural agency, and pre-existing physical structures. In other words, Ferdowsi Street is not merely a "design project" but a "lived context" that tactical design interventions (such as the installation of creative furniture and temporary artistic elements) and continuous cultural events (such as ritual celebrations and musical performances) have transformed into a dynamic arena for the realization of a "soft space." This finding, contrary to purely project-oriented approaches, shows that pre-existing public spaces, with their internal potentials, can pave the way for the emergence of soft space; provided that design interventions, instead of imposing pre-determined structures, are aligned with the everyday rhythms and social needs of the existing context. The findings of this study show that the mechanisms driving social innovation in this space have not arisen from top-down plans or from episodic and short-term initiatives, but have emerged naturally from the internal ecosystem of the street; from the everyday rhythms of users' social life, from rooted cultural agency, and from a physical structure that enables particular patterns of interaction. This leads us to a fundamental observation: some public spaces are far beyond being considered merely a passive container for the establishment of innovation projects. In such spaces, "spatial DNA" and everyday lived reality turn them into strategic urban assets; spaces that not only are receptive to innovation but also cultivate its

capacity for bottom-up and endogenous generation. This approach enriches our understanding of spatial agency in social innovation. While "soft spaces" act as purposeful and intervention-oriented catalysts, the findings of this study show that a strong and everyday public space such as Ferdowsi Street can function as a kind of permanent generative infrastructure. The role of such a space is not limited to hosting innovation; rather, it continuously produces social dynamism and fertile conditions that make possible the germination and consolidation of innovation. The prominence of components such as spatial justice and feedback-based design in the results of this study confirms this very point. It seems that for a space to become a true hub of innovation, these seemingly "soft" qualities—accessibility, inclusiveness, and responsiveness—must be woven into its spatial fabric from the very beginning.

6-Limitations of the Research and Suggestions for Future Studies

Despite efforts to adhere to rigorous methodological procedures and empirical validation of the research model, several fundamental limitations should be noted that must be considered in interpreting the results:

- First, the present study was conducted as a case study on a specific public space (Ferdowsi Street in Sanandaj). Although this street was selected due to its unique socio-spatial dynamics, the obtained results cannot be directly generalized to other urban public spaces, especially in cities with different cultural, economic, and governance contexts. Future research can evaluate the generalizability of the findings by replicating this model in diverse public spaces (such as urban parks, pedestrian pathways, or historical squares).
- Second, one of the fundamental limitations of the present study is the concentration of the statistical population on key actors (urban managers, professors, artists, and members of non-governmental organizations) and the exclusion of the opinions of everyday users and marginalized groups of the space (such as women, low-income groups, and residents of marginal areas). Since components such as "social dynamics" and "spatial inclusiveness" are directly tied to the lived experience of citizens, future research can add to the analytical richness of this field by employing mixed methods (quantitative-qualitative) and multi-stage sampling that also includes the voices of diverse urban groups. However, the emphasis on key actors in this study has been in line with its main objective, namely "analyzing urban management policies and actions," and its findings can serve as a basis for supplementary research with a participatory approach.
- Third, the online distribution of the questionnaire through social networks (WhatsApp and Telegram), although it facilitated access to diverse groups of participants, may have mainly limited respondents to active users of these networks, and some key actors with less access to cyberspace may have been excluded from the study. Also, the cross-sectional nature of this research does not provide the possibility of examining trends of change in social innovation over time. Conducting longitudinal studies that can track the developments of social innovation across different time periods in a public space can provide a more accurate picture of its dynamics.

- Finally, the relatively low factor loading of the "sustainable innovations in space" construct (0.385) indicates that this construct did not possess sufficient empirical validity in the context of Ferdowsi Street. Although this construct remained in the model due to its statistical significance and theoretical importance, in order to address this limitation, it is suggested that future research employ qualitative methods (such as in-depth interviews or participant observation) or mixed approaches (quantitative-qualitative) to redefine more precise indicators for measuring the "sustainability of innovation in space," and then test the revised model in different urban contexts (such as urban parks or historical squares).

Despite these limitations, the present study, by presenting a quantitative and validated model in a context that had previously received less empirical attention, has taken an effective step toward filling the existing research gap regarding the role of urban public spaces in social innovation, especially in Iranian cities.

7-Conclusion

This study, by presenting a quantitative and validated model, identified six key factors facilitating social innovation in urban public spaces in order of importance: social dynamics, design innovations, managerial innovations, institutional and structural innovations, environmental innovations, and sustainable innovations in space. The theoretical contribution of the research lies in that, by emphasizing the primacy of "social dynamics" and offering a new type of "soft space emerging from the lived context," it provides an analytical framework for future studies in developing urban contexts. The findings confirm that public spaces are more likely to become an effective context for social innovation when they go beyond a merely physical function and become an interactive, inclusive, and feedback-oriented ecosystem in which all citizens, regardless of gender, class, or ethnicity, have the possibility of active participation. Ferdowsi Street is a prominent example of this approach, which, by combining cultural activities based on the capacity of the "Creative City of Music," social dynamism arising from the presence of diverse citizen groups, and systemic design innovations, has become a dynamic center for creativity and collective action.

6-1- Broad Implications for Urban Public Space Management

Urban planning, management, and design can, by applying targeted interventions, provide the ground for fostering social innovation in urban public spaces:

- 1) Given that social dynamics was identified as the strongest predictor of social innovation on Ferdowsi Street, the following are recommended to the urban management of Sanandaj:
 - Planning to increase spatial inclusiveness on Ferdowsi Street with the aim of attracting more diverse groups of citizens (especially women, the elderly, and low-income groups); because the level of citizen participation in Sanandaj is in a weak state, and this can be considered an opportunity to enhance social dynamics.

- Designing and implementing regular programs of socio-cultural events on Ferdowsi Street with an emphasis on the participation of marginalized and less-visible groups, such that these events are not limited merely to artistic elites.
 - Creating formal mechanisms for continuous feedback from citizens regarding the quality of the space and events, so that planning can be based on the real needs of users.
- 2) Given that design innovations are the second most influential factor in the model and the "feedback-based innovation" indicator has the largest share in this dimension, the following are recommended to the urban management of Sanandaj:
- Leveraging the capacity of the UNESCO "Creative City of Music" to design urban elements and furniture based on the musical identity of Kurdistan on Ferdowsi Street, such that these elements are not only decorative but also functional and interactive, paving the way for citizens to stop, converse, and interact.
 - Creating local digital platforms (in collaboration with the Sanandaj Municipality Studies Center) to receive citizen feedback on design interventions and cultural events, and redesigning based on feedback (as confirmed in the model) instead of top-down designs.
 - Given the high cost of the Ferdowsi Street pedestrianization project (40 billion tomans), it is recommended that the next phases of this project be designed with the direct participation of citizens and stakeholders, so that the investment made leads to a real improvement in the quality of social interactions.
- 3) To strengthen managerial innovations (the third factor in enhancing social innovation) and the "interactive and participatory communication with stakeholders" indicator, which has the largest share in this dimension, the following are recommended to the urban management of Sanandaj:
- Forming a permanent working group on "Social Innovation on Ferdowsi Street" with the participation of representatives from the municipality, the city council, the University of Kurdistan, local artists, non-governmental organizations, and representatives of businesses and citizens; such that this working group acts as a sustainable institutional mechanism for coordination and synergy among different actors.
 - Given the challenge of the lack of sustainable income in the Sanandaj municipality, it is recommended that participatory financing models (such as sponsorship of cultural events by the private sector or public participation in covering the maintenance costs of the space) be designed and implemented for Ferdowsi Street to ensure the financial sustainability of urban management interventions.
 - Planning for the regular holding of socio-cultural events on Ferdowsi Street by leveraging the capacity of the Ethnic Music Secretariat and collaborating with local artists, such that these events continue as sustainable innovative flows (with a factor loading of 0.947) in the space.

- 4) Given that institutional and structural innovations emphasize the role of institutional infrastructures and the "utilizing stakeholder participation" indicator has the largest share in this dimension, the following are recommended to the urban management of Sanandaj:
 - Revising the strategic-operational plan of the Sanandaj municipality and adding specific objectives for promoting social innovation in public spaces, with emphasis on Ferdowsi Street as a pilot implementation.
 - Given the weakness of the municipality's expert body, it is recommended that specialized training courses be held for municipal experts in the fields of "participatory design," "social innovation management," and "methods of attracting citizen participation" to strengthen institutional capacity building (with a factor loading of 0.608) in urban management.
 - Given Sanandaj's need for 20-year policymaking in the field of urban management, it is recommended that a long-term development plan for Ferdowsi Street be formulated with a social innovation approach that encompasses 5-, 10-, and 20-year horizons and is not limited merely to episodic projects.
- 5) In line with strengthening environmental innovations (creative environmental solutions) and the "innovative methods of responding to environmental needs" indicator, which has the largest share in this dimension, the following are recommended to the urban management of Sanandaj:
 - Given the shortage of green space in Sanandaj, designing and implementing vertical and temporary green spaces on Ferdowsi Street (such as large planters, green walls, and plant elements) that, in addition to improving environmental quality, act as interactive elements for citizens to stop and converse.
 - Planning to convert other streets in the historical fabric of Sanandaj that currently play practically no role in motorized trips into a "complete pedestrian pathway" with priority given to pedestrians, cyclists, and clean transportation.
- 6) Regarding the strengthening of sustainable innovations in space, the following are recommended to the urban management of Sanandaj:
 - Planning for the continuity and diversification of cultural events on Ferdowsi Street, such that these events move beyond being episodic and ceremonial and become sustainable and continuous flows. A successful example of this approach is the annual Mouludi-Khani celebrations, which can serve as a model for other events.
 - Designing mechanisms for spatial flexibility on Ferdowsi Street, such that the space has the capacity to change use and adapt to events and diverse social needs (for example, movable furniture, multi-purpose spaces, and temporary infrastructures for holding events).

Overall, this study demonstrates that fostering social innovation in urban public spaces requires the integration of equality, inclusion, feedback-oriented design, and long-term sustainability into urban planning and management approaches. The six identified factors provide a practical roadmap for policymakers and urban designers and offer actionable insights for creating dynamic, interactive, and innovative public spaces. Future research can examine the long-term effects of these factors and evaluate their generalizability across diverse socio-cultural and economic contexts, especially in developing urban environments.

Authors' Contributions

First author: Study design, data collection, statistical analyses, and writing the initial draft (40%)

Second author: Supervision of the research process, critical revision, and final editing (35%)

Third author: Participation in study design, data analysis, and revision of the final version (25%)

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Conflict of Interest

The authors declare that there is no conflict of interest regarding the conduct of this research, the writing, and the publication of the article.

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