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Comparison of Sustainable Development Components in Selected Football Stadiums of Iran and the World

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Abstract

The aim of this study was to identify and compare the components of sustainable development in selected football stadiums in Iran and around the world. This applied research adopted a descriptive-analytical approach to evaluate and compare top international and Iranian stadiums based on the environmental, social, and economic dimensions of sustainable development. The research methodology was based on George F. Brady's four-stage model of comparative analysis, including description, interpretation, juxtaposition, and comparison. The study sample consisted of five prominent international stadiums (Camp Nou, San Siro, Allianz Arena, Rungrado 1st of May Stadium, and Mercedes-Benz Stadium in Atlanta) and three major Iranian stadiums (Azadi, Takhti, and Yadegar-e-Emam Stadium in Tabriz). Data were collected from credible internet sources, academic articles, theses, and library documents. The results revealed that the Iranian stadiums performed poorly in environmental components such as energy consumption, pollution, use of hazardous materials, and waste management. In the social dimension, these stadiums did not demonstrate satisfactory performance in enhancing cultural identity, social cohesion, or civic participation. From an economic perspective, the Iranian stadiums faced challenges such as inefficiency in attracting investment and poor distribution of urban revenues. These findings underscore the necessity of revising national policies and the design of sports

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stadiums in Iran with a stronger emphasis on sustainable development principles.

Extended Abstract

Introduction

Sustainable development, defined as meeting the needs of the present without compromising the ability of future generations to meet their own needs, has become a central paradigm in planning and managing modern infrastructure. In the context of sports, particularly football stadiums, sustainability has garnered increasing attention due to the significant environmental, social, and economic impacts these facilities can impose. Stadiums are large-scale structures that consume vast resources, generate substantial waste, influence urban landscapes, and interact directly with diverse communities. Thus, their alignment with sustainability goals is critical. Over the past two decades, international organizations such as the International Olympic Committee have emphasized the integration of sustainability into sports development, promoting concepts like "green stadiums" and "sustainable sports venues." These initiatives advocate for renewable energy use, community engagement, social inclusion, and economic viability. Despite global progress, many countries, including Iran, lag behind in adopting these principles. There is a growing need to assess how Iranian stadiums compare with international best practices in sustainable design and operation. This study aims to fill that gap by evaluating and comparing the environmental, social, and economic components of sustainable development in selected football stadiums in Iran and around the world.

Materials and Methods

This applied study employed a descriptive-analytical research approach using George F. Brady's four-phase comparative method. The phases included:

1. Description – compiling detailed profiles of the selected stadiums,
2. Interpretation – analyzing the components of sustainability based on the three-pillar model (environmental, social, economic),
3. Juxtaposition – organizing similarities and differences in sustainability practices, and
4. Comparison – drawing conclusions about performance gaps and implications.

The study sample comprised eight stadiums:

- *International stadiums*: Camp Nou (Spain), San Siro (Italy), Allianz Arena (Germany), Rungrado 1st of May Stadium (North Korea), and Mercedes-Benz Stadium (USA).
- *Iranian stadiums:* Azadi Stadium, Takhti Stadium (both in Tehran), and Yadegar-e-Emam Stadium (Tabriz).

Stadiums were selected based on factors such as prominence, size, location, and available data. Data collection was conducted via secondary sources, including academic journals, official reports, published theses, and

credible online databases. Indicators of sustainability were categorized under three main areas:

- Environmental (energy use, pollution, waste management, green building),
- Social (community engagement, inclusiveness, cultural identity),
- Economic (income generation, investment, cost-efficiency).

Results

The findings revealed significant discrepancies between international and Iranian stadiums across all three dimensions of sustainable development.

- *Environmental Performance:* International stadiums demonstrated strong environmental practices. Mercedes-Benz Stadium, for example, achieved LEED Platinum certification, utilized solar energy, and implemented advanced waste recycling. Allianz Arena incorporated smart lighting and climate control systems. In contrast, Iranian stadiums displayed minimal attention to sustainability. There was a notable lack of energy-efficient systems, poor waste management, and the use of environmentally harmful materials.
- *Social Performance:* International stadiums played broader roles in enhancing community identity and cohesion. They hosted diverse events, supported inclusive participation (e.g., for women, people with disabilities), and fostered civic engagement. Iranian stadiums, however, remained functionally limited to sporting events with little community integration or social programming. Cultural identity, social solidarity, and civic participation indicators were weak or absent.
- *Economic Performance:* International stadiums actively contributed to local economies by generating jobs, attracting investment, and leveraging commercial activities. In contrast, Iranian stadiums were heavily dependent on government funding, lacked strategic financial planning, and showed poor performance in attracting private investment or generating revenue from non-sporting events.

Discussion

The results highlight a clear performance gap between Iranian and international football stadiums in implementing sustainability principles. Several factors contribute to this disparity, including outdated infrastructure, centralized governance, limited awareness of sustainability practices, and the absence of long-term planning strategies in Iran. Globally, sustainability in sports infrastructure has evolved from a theoretical concern to an operational imperative. As illustrated in studies by Ansari et al. (2024) and Francis et al. (2023), modern stadiums are increasingly designed with integrated environmental systems, community development goals, and economic sustainability in mind. However, the Iranian case demonstrates that many of these advancements have not yet been translated into national policy or design standards. The lack of public-private partnerships, insufficient training for

stadium managers, and restrictive regulations on inclusive access (particularly for women) are additional barriers. Moreover, sustainability is often perceived in Iran as a secondary concern, rather than a foundational requirement. Addressing these institutional and cultural challenges is essential for progress.

Conclusion

This study provides a comprehensive comparison of sustainability components in selected football stadiums across Iran and the world. The findings underscore the urgent need for Iranian sports authorities and urban planners to reform their approaches to stadium development and management. Specifically, environmental innovation, social inclusion, and economic planning must be embedded in all stages of stadium design, construction, and operation. By learning from successful international models and adapting strategies to the local context, Iran can begin to close the gap and ensure that its sports infrastructure contributes positively to sustainable urban and national development. Future research could focus on pilot projects within Iran, investigate barriers to green innovation, or assess the effectiveness of proposed sustainability policies at the regional level.

Keywords: stadium, sustainable development, environment, football