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Architectural Discourse and Spatial Reality: A Critical Approach to Stadium Architecture

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Abstract

This study aims to examine the relationship between the discourse articulated by architects and the resulting physical products in stadium buildings constructed in the 21st century. A total of ten stadiums—eight from Turkey and two from abroad—are evaluated based on six main criteria: urban integration, symbolic value, multi-functionality, environmental impact, sustainability, and transportation. Through a "critical" perspective, the analysis compares the architect's discourse, the stated objectives of the project, and the actual outcomes of the built structures. The findings indicate that many stadiums built in Turkey over the past two decades have been primarily assessed in terms of technical adequacy and increased capacity. However, concepts such as sustainability, multifunctionality, and urban integration often remain superficial. In contrast, international examples demonstrate a more apparent implementation of conceptual coherence, energy efficiency, and user-oriented design principles. The study concludes that the conceptual goals expressed by architects do not always align with the functional and spatial outcomes of the buildings. It emphasizes that the consistency between discourse and practice should be addressed more carefully, especially in projects funded by public resources. In this context, the importance of designing future stadiums as integrated, sustainable, multifunctional, and vibrant public spaces is reasserted.

Keywords: Stadium Architecture, Discourse-Practice Consistency, Critique

Özet

Mimarlık Söylemi ve Mekansal Gerçeklik: Stadyum Mimarisine Eleştirel Bir Yaklaşım

Bu çalışma, 21. yüzyılda inşa edilen stadyum yapılarında mimarların dile getirdiği söylemler ile ortaya çıkan fiziksel ürün arasındaki ilişkiyi irdelemeyi amaçlamaktadır. Türkiye'den sekiz ve yurt dışından iki olmak üzere toplam on stadyum, kente entegrasyon, simgesel değer, çok amaçlı kullanım, çevresel etki, sürdürülebilirlik ve ulaşım gibi altı temel kriter çerçevesinde değerlendirilmiştir. "Eleştiren" bir bakış açısıyla yürütülen analizlerde, mimarın söylemi, projedeki hedefler ve ortaya çıkan yapının gerçek çıktıları karşılaştırmalı olarak incelenmiştir. Elde edilen bulgular, Türkiye'de son yirmi yılda inşa edilen birçok stadyumun yalnızca teknik yeterlilik ve kapasite artışı üzerinden değerlendirildiğini, ancak sürdürülebilirlik, çok yönlü işlevsellik ve kentsel entegrasyon gibi kavramların çoğunlukla yüzeysel kaldığını göstermektedir. Uluslararası örneklerde ise kavramsal bütünlük, enerji etkinliği ve kullanıcı odaklı tasarım ilkelerinin daha belirgin biçimde hayata geçirildiği gözlemlenmiştir. Çalışma sonucunda, mimarların ifade ettikleri kavramsal hedeflerin yapıların işlevsel ve mekânsal çıktılarıyla tam olarak örtüşmediği; söylem-eylem tutarlılığının, özellikle kamu kaynaklarıyla inşa edilen yapılarda daha dikkatli ele alınması gerektiği vurgulanmaktadır. Bu doğrultuda, gelecek stadyum tasarımlarında kentle bütünleşik, sürdürülebilir, çok amaçlı ve yaşayan kamusal mekânlar üretmenin önemi yeniden ortaya konmuştur.

Anahtar Kelimeler: Stadyum Mimarisi, Söylem-Eylem Tutarlılığı, Eleştiri

INTRODUCTION

Football, the most popular sport of the 21st century, appeals to wide audiences due to its ease of understanding and accessibility through mass media (16). With the rapid growth of the football industry, modern stadiums capable of serving large crowds have been constructed in recent years. As technology has advanced, stadiums with diverse architectural designs have begun to occupy significant space in urban plans, influencing numerous factors such as transportation and infrastructure (4). Major events like the 2010 South Africa, 2014 Brazil, 2018 Moscow, and 2022 Qatar World Cups have also contributed significantly to the infrastructure of host cities and countries (20).

In antiquity, the term stadium referred to a complex consisting of an open racecourse for athletic competitions—often held as sacred events—and the surrounding seating areas for spectators (12). The earliest examples of stadium architecture are found in Ancient Greek architecture, and similar structures are frequently observed in Roman urban plans (8). In modern terms, a stadium is defined as an open or semi-enclosed sports facility constructed in accordance with international regulations, comprising a football field surrounded by athletics tracks and spectator seating areas, along with the service spaces required for their operation (25). More broadly, it refers to a specially designed venue for hosting various sports events (28). The first examples of modern stadium architecture appeared in the late 1700s and throughout the 1800s in countries such as Spain, France, and Portugal (22). Compared to Greek and Roman stadiums, significant differences can be observed in construction technology and site placement, as well as in usage purposes—these earlier stadiums were primarily built for bullfighting. One of the earliest examples of a modern stadium is the Real Maestranza de Sevilla, constructed in 1761 in Seville, Spain, with a capacity of 12,500 spectators (33).

After 1900, with the development of industry and technology, stadium construction accelerated rapidly, particularly in Europe. The stadiums built during this period differed significantly from those of previous eras in terms of architectural characteristics. One of the most notable changes was the introduction of roof structures covering the spectator areas (33). In the 21st century, stadiums in Europe and other parts of the world have increasingly been designed solely for football. The stadiums built for the UEFA Euro 2000 championship are considered important pioneers of modern stadium design. One early example of a stadium with a retractable roof is the Amsterdam Arena, built in Amsterdam in 1996, with a capacity of 51,324 spectators. The stadium was designed exclusively for football. Another prominent example of modern stadium architecture that blends past architectural forms with contemporary technology is the Busan Asiad Main Stadium in South Korea. With a capacity of 55,982, this stadium has served as an example of innovative roof structures in stadium design (33).

By the 21st century, stadium architecture had undergone a significant transformation. Unlike the multipurpose stadiums typical of the mid-20th century, modern stadiums are increasingly designed as specialized venues. The global growth of football and the large investments in the sport have led to the construction of stadiums dedicated solely to football. From antiquity to the present day, stadiums have evolved from mere sports arenas into structures that reflect collective memory, architectural development, and technological advancement (23). Especially in the 21st century, with increasing urbanization and architectural diversity on a global scale, stadiums are no longer seen merely as sports facilities but also as public spaces, cultural centers, and urban landmarks (6).

In Turkey, the first example of a multipurpose stadium is the Atatürk Olympic Stadium, built in 2001. With a seating capacity of 82,576, it is the largest stadium in the country. The stadium is equipped with infrastructure that allows it to host a wide range of events—from amphitheater performances to educational activities (34).

The primary aim of this study is to examine the relationship between what architects "claim" and what is actually "delivered" to users and cities through the analysis of ten stadiums built over the last 20 years. The study focuses on a total of ten stadiums eight from Turkey (Beşiktaş, Konya, Gaziantep, Kayseri, Kocaeli, Sakarya, Sivas, and Mersin) and two international examples (Atlanta and Bordeaux). The selection was made to allow for a comparative evaluation within a global context.

From Turkey, eight stadiums constructed after 2005 were chosen, representing different geographical regions and featuring publicly available architectural discourses. These stadiums were selected due to their status as state-supported transformation projects and their influence on the development of sports architecture in Turkey. On the international scale, two stadiums—Atlanta and Bordeaux—were selected for their conceptual architectural approaches, their frequent citation in architectural literature, their award-winning status (35, 36), and their role as influential examples in contemporary stadium architecture. These structures are considered notable for their technological innovations, sustainability practices, and urban integration strategies, making them exemplary representations of 21st-century stadium design.

This selection enables a comparative analysis of local policies implemented in different Turkish cities alongside current global architectural trends, thus offering a platform for both internal and external evaluation.

The selected stadiums were analyzed in conjunction with public statements made by their architects and assessed based on architectural design, relationship with the city, functionality, energy efficiency, and accessibility.

Within this framework, the study seeks to answer the following questions:

- To what extent does 21st-century stadium architecture align with the conceptual, technical, and social goals articulated by architects?
- How successfully have the architects' stated discourses been realized, and which projects have effectively achieved coherence between discourse and practice?

Adopting a critical perspective, the study evaluates the selected stadiums based on six main criteria:

- Location in relation to the city
- Iconic/symbolic architectural qualities
- Alternative uses beyond sports events
- Shading and impact on the surrounding environment
- Use of contemporary materials and energy efficiency
- Ease of transportation and accessibility

As a result of these evaluations, the study demonstrates that stadium architecture should not be assessed solely in terms of form and aesthetics, but also in relation to its connection with the urban fabric, its social functionality, and its approach to sustainability.

METHOD

This study adopts a qualitative research method with the aim of examining the relationship between discourse and practice in architectural works. The central approach of the research is to evaluate the selected stadiums not only through their physical or technical attributes but also through a comparative analysis of the architects' statements and the actual spatial, functional, and social outcomes of the constructed buildings. Accordingly, a critical reading model was developed, and the analysis process was structured around a "critical" perspective.

In this context, the term "critical" refers to an approach that is free from bias or affiliation, one that questions through independent thinking and produces alternative viewpoints. The evaluation thus aims to consider not only the technical or formal data of the stadiums but also qualities such as urban context, social functionality, and sustainability.

The study sample was designed to examine the discourse-practice relationship in stadium architecture both on a national and international scale.

Evaluation Model:

Within the scope of the research, each stadium was analyzed on three fundamental levels:, Architect's Discourse: The architect's statements, conceptual approach, and stated objectives, Project: The planning, functional layout, and technical solutions of the design, Built Product: The final physical structure and the experiential outcomes delivered to users

These three levels were comparatively assessed using a matrix based on six key questions:

1. Urban Location: The spatial relationship between the stadium and the city, distance from the center, and its impact on the urban silhouette

2. Iconic/Symbolic Value: The alignment between the architect's conceptual intent and the building's symbolic presence in the urban memory

3. Alternative Uses Beyond Sports: The stadium's potential for multi-purpose use, continuity of activity, and public engagement

4. Impact on Surrounding Environment: The structure's scale and its shadowing or dominating effect on nearby buildings and public spaces

5. Contemporary Materials and Energy Efficiency: Material technologies used, sustainability practices, and certifications

6. Accessibility: Availability of public transportation, ease of access, and diversity of transit options

Through this matrix, a comparative analysis of the ten stadiums was conducted, and consistency between discourse and action was assessed. At the conclusion of the evaluation, the stadiums were ranked according to their strengths and weaknesses, resulting in a comprehensive overview.

FINDINGS

Contemporary stadium architecture stands out as a multi-layered building typology, both functionally and symbolically. Today, the success of a stadium is not measured solely by its capacity or architectural form, but also by its contribution to the city, sustainability, multi-functionality, and user experience. Architectural discourses are no longer limited to aesthetic or structural analyses; they must also address social, ecological, and technological parameters.

Annual competitions that rank the "most popular" or "best" stadiums are often based largely on visual surveys. A significant portion of the participants in these competitions are individuals without architectural education, and their evaluations are mostly based on the appearance of the stadium façades. However, stadiums constructed using contemporary building technologies and modern materials have multidimensional impacts that go far beyond aesthetics—such as integration with the urban fabric, environmental effects, and contributions to urban life. These dimensions have not been sufficiently addressed in the academic literature and remain underexplored from a scientific perspective. This highlights the need for a comprehensive architectural and urban analysis of stadium structures (4). At this point, the consistency between the discourses expressed by architects and the spatial and functional realities of the final product becomes critically important.

Stadium architecture should not be considered solely as a functional or structural design challenge; rather, it is a complex form of spatial production that must be examined within the contexts of representation, urban memory, power dynamics, and collective identity. This study questions the degree of alignment between the architectural "discourse" expressed during the design process and the "actions"—namely, the physical and functional outcomes—of the completed structures. This approach is closely related to critical theories in architecture that view the practice not merely as the production of form, but also as the production of meaning and value.

1. Location within the City: The Physical and Monumental Relationship with the Urban Context

The placement of stadiums within the urban fabric is significant not only in terms of accessibility, but also with regard to the historical, physical, and symbolic relationship the structure establishes with the city. This

criterion includes evaluations such as proximity to the city center, impact on the skyline, relationship with surrounding buildings, and distance to public spaces (7).

With the growing awareness of the importance of sustainable development by public institutions and stakeholders, the environmental impacts of stadiums that host large-scale sports events are being taken into greater consideration. Depending on their location, stadiums are generally categorized as either urban (inner-city) or suburban (peripheral) structures (6). Inner-city stadiums, particularly when designed with integrated recreational areas, can create new urban focal points that contribute to city branding and enhance tourism potential. Their strong relationship with the city also provides strategic advantages for hosting international events (7).

On the other hand, suburban stadiums are often preferred for their ability to minimize issues such as traffic congestion, noise pollution, and land costs. These structures are typically connected to city centers via rail systems. Before the 2000s, such locations were more commonly preferred, especially in light of compliance with UEFA and FIFA standards (46).

However, large-scale stadiums are not limited to hosting sports events; they often offer multi-purpose usage such as museums or social spaces, and thus exert significant physical and social influence on their surroundings (2). In this context, if environmental impact assessments are not conducted rigorously, such structures may lead to urban issues such as traffic congestion or irregular urban development.

The Beşiktaş Stadium was built on the site of the historic İnönü Stadium, directly across from the Dolmabahçe Palace, a prominent element of Istanbul's historical memory. As a structure that integrates harmoniously with the city's silhouette, it has established a strong connection with the urban context. The design carefully limited the building's height to avoid overshadowing neighboring historical buildings, which demonstrates a deliberate and sensitive urban-architectural relationship. It is considered the most positive example in this regard.

The Atlanta Stadium, located 1.5 km from the city center, has formed both a symbolic and functional center. Its location has been evaluated positively in terms of both accessibility and urban significance (37).

Most of the Anatolian stadiums—such as those in Sakarya, Sivas, Kocaeli, Mersin, and Gaziantep—are situated 3 to 9 km from their respective city centers. These structures were generally constructed in areas that are not integrated with the city and lack surrounding development. Consequently, they fail to become part of daily urban life, weakening their potential as public spaces (37).

Although the Kayseri and Konya stadiums are also located 7 to 9 km from the city center, they are considered advantageously positioned due to their accessibility via rail systems (37).

The Bordeaux Stadium is located on the northern edge of the city. Despite its distance from the city center, the strong relationship it establishes with the surrounding landscape balances this disadvantage. Architecturally, the stadium successfully connects with its natural environment (37).

Table.1. Location within the City (37)

Stadium	Photograph	Proximity to the City Center	Urban Integration
Beşiktaş		High	High
Atlanta		Medium- High	High
Bordeaux		Low	Integration with the landscape
Kayseri, Konya		Medium	Supported by transportation infrastructure
Sakarya, Gaziantep, Kocaeli, Sivas, Mersin		Low	Urban connection is weak

2. Iconic / Symbolic Architectural Quality: Conceptual Power and Urban Representation

Hasol (2010) defines the concept of the icon as sacred depictions used for both worship and religious instruction in Orthodox Christianity, emphasizing that icons were historically associated with sanctity (15). However, in contemporary discourse, the concept of the icon is more commonly used to mean "symbol," "visual sign," or "indicator," having moved away from its sacred context to acquire new functions across various disciplines.

With societal, political, and economic transformations, icons—once representations of authoritative power—have evolved into city icons shaped by capital. These structures gain significance not only through their physical attributes but also by contributing to the construction of the city's image and leaving a lasting impression on collective memory. Lynch (2016) argues that a city's memorability is shaped through the relationships among its components—such as buildings, squares, shops, and urban furniture—and describes "landmarks" as focal points that help orientation and create new centers in the urban fabric(19).

In the 21st century, as cities become increasingly globalized and homogenized due to advances in technology and transportation, many strive to secure a place in the global economy either through trend-setting iconic projects or by emphasizing historical urban layers. Jencks (2006) defines the transformative impact of Frank Gehry's Guggenheim Museum in Bilbao as the "Bilbao Effect," where a single building elevates a city's global profile—a model that many cities, large and small, have since sought to replicate(17). The Sydney Opera House, the Centre Pompidou in Paris, and Gehry's Guggenheim in Bilbao are often cited as such symbolic structures (1).

According to Jencks (2006), these buildings are typically located within walking distance of city centers and near bodies of water(17). They are shaped by a search for originality and innovation, often favoring visual impact over functionality. Although such designs may initially face public resistance (as in the case of Sydney), they frequently evolve into symbols of local pride and regional identity. In this context, cities' ambitions to

"put themselves on the map" through iconic architecture are directly tied to long-term tourism growth and sustained economic gain. Sklair (2005) notes that since the 1950s the driving force behind these iconic structures has shifted from the state or religious institutions to the global capitalist class, their transformative impact on urban identity remains potent(26).

In recent years, international stadium architecture has witnessed a shift away from purely functional approaches. New-generation stadiums reflect a broader trend toward creating iconic structures within the global competition among cities and institutions (32). These iconic stadiums stand out not only due to their architectural originality but also because of their potential to attract interest beyond their immediate regions.

Many sports venues have become new symbols of the cities in which they are located, increasing both their international recognition and prestige (24). A structure's symbolic value lies not just in its striking form but in its references to the city's cultural and historical context, offering an interpretation of the city through the architect's conceptual approach. In this context, the conceptual backgrounds of the stadiums discussed in this study, and their alignment with the architects' discourse, are evaluated under this heading.

The Atlanta Stadium draws inspiration from the Pantheon in its architecture, featuring a retractable roof system designed like a camera lens. Composed of octagonal ETFE panels, the dynamic and movable roof provides a kinetic expression. This technological concept renders the building not only functional but also an iconic and monumental structure, transforming it into a city-scale symbol. It possesses the highest symbolic potential among the examples.

The Bordeaux Stadium, with its thin columns inspired by the surrounding forested landscape, makes a reference to classical temples. Its emphasis on architectural purity and geometric clarity invites comparisons to traditional temple typologies. In this respect, the structure emerges as an elegant and poetic image that stands out in the architectural memory of the city.

The Gaziantep Stadium uses a design language on its facade that references the mosaics of Zeugma, thereby making a cultural connection to the city. However, this conceptual aspect remains limited to the facade and is not reflected in the interior space or functional organization.

The Konya Stadium offers visual dynamism through the use of dynamic lines and club colors emphasized on the membrane facade. Nevertheless, this movement lacks conceptual depth related to the city or its users. Still, in terms of architectural expression, it stands out among the Anatolian examples.

The Beşiktaş Stadium consciously refrains from claiming iconic status. Instead, it positions itself as a representative of "cultural continuity" by respecting the historical silhouette of Dolmabahçe and acknowledging the significance of its location. Designed with sensitivity to its context, it pulls back visually, which is evaluated as a deliberate and positive architectural stance.

The stadiums in Kayseri, Mersin, Sivas, Sakarya, and Kocaeli generally lack an aspiration to be iconic or fail to base such an ambition on architectural concepts. In the case of Kocaeli, a superficial reference to the local dessert "is seen as conceptually weak (41). The Mersin and Sivas examples fail to establish any connection with the local culture at all.

Table.2. Symbolic Architectural Quality

Stadium	Photograph	Conceptual Depth	Connection with Urban Identity
Atlanta(38)		High	High
Bordeaux(39,40)		High	Medium- High
Beşiktaş(41,42)		Medium	High
Gaziantep (41,43)		Superficial	High
Konya (41)		There is visual narration	Superficial
Kocaeli (41)		Superficial	Low
Sivas, Mersin, Sakarya, Kayseri(41,43)		No conceptual	Low

3. Alternative Uses Beyond Sports: Functionality, Continuity, and Public Life

Lu et al. (2019) argue that the design of a sports venue should incorporate human-centered approaches, enable multifunctional use, and remain valuable after the main event has concluded(18). Furthermore, various studies have demonstrated that collaboration between venues and communities in public-benefit activities—such as local cultural events, environmental campaigns, and sports education—can enhance the social service capacity of such spaces (31). Another expert opinion highlights that social sustainability involves not only ensuring social equity but also improving accessibility to venues, offering inclusive leisure opportunities for individuals from different social backgrounds, and protecting the rights of disadvantaged groups (11).

In this context, over the past two decades, stadiums are increasingly expected to host not only sporting events but also a wide range of activities such as concerts, exhibitions, museums, and social gatherings. The

stadiums examined in this study are therefore evaluated in terms of their "non-match-day use" potential. The primary objective is to determine whether the structure functions as a continuously active social center that serves the public throughout most of the day and year.

The Atlanta Stadium stands out as the most comprehensive example in this regard. It is supported by a 13-acre green area open for use as a playground, cultural event space, and venue for large concerts and festivals. Additionally, the stadium includes restaurants, cafés, and bars within its interior, making it a vibrant social hub operating 24/7 (38).

The Bordeaux Stadium was designed to accommodate not only rugby and football matches but also concerts, shows, and corporate events. It features restaurants, VIP bars, and showroom areas inside, catering to diverse user profiles. The architectural integration of the stadium into social life is strong and intentional (39).

The Beşiktaş Stadium goes beyond sports by including a museum, café, offices, retail spaces, and multipurpose halls, offering a socially rich program. The presence of permanent functions such as the Beşiktaş Museum helps keep the structure lively year-round (41, 42).

The Konya Stadium offers some opportunities for non-sporting use through supporting units like sports halls. However, these facilities remain focused solely on athletics. Proposed functions such as a swimming pool and athletic track were never realized. Recently, a functioning restaurant within the complex has become actively used by the public (41).

The Kocaeli and Sakarya Stadiums contain spaces such as restaurants, kiosks, and ticket offices, but all of these are only operational on match days. As a result, the stadiums fail to maintain a continuous public presence.

The Kayseri, Mersin, and Gaziantep Stadiums have limited social amenities. Their spaces open to public use outside of match days are minimal. In these stadiums, cafés and restaurants function only during match days, leaving the venues underutilized for the majority of the year (41,43).

The Sivas Stadium is used solely for national matches and is a single-function structure with no additional programs or multifunctional uses (41).

Table.3. Alternative Uses

Stadium	Non-match Use	Continuity / Social Function
Atlanta	Very high	24/7 use
Bordeaux	High	Variety of activities
Beşiktaş	High	Continuity with museum, cafe, shop
Konya	Medium	Restaurants/Gyms are available but limited
Kocaeli, Sakarya	Low	Match-oriented use
Gaziantep, Kayseri, Mersin	Low	Underutilized buildings
Sivas	None	Single function

4. Does the Stadium Cast a Shadow on Its Immediate Surroundings?

The visual impact of light and shadow in design goes beyond the limitations of visual perception and leads people to experience a different type of psychological response. Therefore, creating a reasonable balance of light and shadow can vividly enhance the architectural and landscape theme (31). However, due to their large scale and wide-span structures, stadiums often create significant physical effects on their surroundings. One such effect is the shading they cast on nearby buildings and open spaces. In particular, the prolonged overshadowing of residential or public spaces can raise concerns about the negative physical relationship between the stadium and its urban context.

Since 2018, all newly built or renovated official FIFA World Cup stadiums have been required to obtain green building certification (10). Within this framework, stadiums are expected to play a more environmentally conscious role. In this regard, shading effects are a significant parameter in assessing how stadiums engage with their environmental context (18).

The Beşiktaş Stadium is situated in a valley basin, 3.5 meters below sea level, and its roof height was lowered to avoid overshadowing historic buildings. This approach preserves the silhouette of Istanbul and prevents any permanent shadowing on surrounding structures. Its respectful attitude toward the cityscape serves as a model from an architectural perspective.

The Atlanta and Bordeaux Stadiums are surrounded by large open spaces, so they do not cast shadows on any nearby buildings. In particular, the Bordeaux stadium's integration with the landscape minimizes this risk even further (38, 39).

The Sakarya, Kocaeli, Mersin, Konya, and Gaziantep Stadiums are also located in sparsely built areas, often on vacant land, and thus do not cast permanent shadows on nearby structures. However, since these surroundings lack rich public or social spaces, the absence of shading cannot be considered a substantial advantage (41).

The Kayseri Stadium casts permanent shadows over adjacent residential areas. This is regarded as a negative physical intervention on an urban scale (43).

Similarly, the Sivas Stadium casts shadows on residential blocks located on its western façade. This indicates that environmental impacts were not sufficiently considered during the stadium's placement and design process (41).

Table 4. Impact of Stadium Design on Surrounding Shadowing Effects

Stadium	Photograph	Shadowing Effect in the Environment	Comment
Beşiktaş		None	Design respectful of silhouette
Atlanta		None	Extensive landscaping
Bordeaux		None	Planning integrated with nature
Konya, Sakarya, Kocaeli, Mersin, Gaziantep		None	The social environment is also weak
Sivas		Exist	Affects residences on the western side
Kayseri		Exist	Residential areas remain in the shadow

5. Contemporary Building Materials and Energy Efficiency: Technological Adequacy and Sustainability Reality

In the context of ecological sustainability, it is widely acknowledged that the construction and renovation of sports venues lead to high levels of energy and resource consumption, which directly impact environmental sustainability (10). In this regard, changing production and consumption habits and the use of recycled materials are emerging as critical methods to achieve sustainability (22). Sustainability has increasingly become a decisive factor in urban development and architectural design processes, particularly in large-scale public buildings, such as stadiums, which have high energy consumption and significant operation and maintenance costs (44). This situation has a considerable impact not only on similar structures but also on the sustainable planning and construction of entire urban areas (31). Some sports organizations, like FIFA, require stadiums to obtain mandatory green building certification to promote environmentally sustainable venues (3). Several studies have detailed the requirements for energy, water, and materials in sustainable buildings for large stadiums aimed at improving venue sustainability (44).

Stadium structures should be evaluated not only in terms of visual or structural aspects but also in terms of environmental sustainability, energy efficiency, and technological innovation (10). This section explores whether contemporary building materials (such as steel, membrane systems, ETFE, etc.) are being used in stadiums, whether passive and active climate control systems are implemented, and, most importantly, whether these applications are supported by concrete data.

The Atlanta Stadium stands out in this field. It is the first professional stadium in North America to have received a LEED Platinum Certification. It generates its own energy with 4,000 solar panels, and its ETFE panels on the roof provide passive cooling. The movable roof system is technologically superior to global standards (38).

The Sivas Stadium incorporates many energy-efficient features, such as rainwater harvesting, greywater use, and solar panels. However, these systems have not been certified with any green building certifications (LEED, BREEAM). Therefore, the architect's claim that it "generates its own energy" remains at the theoretical level, and the practical impact has not been fully validated (41).

The Konya Stadium has used membrane materials with varying permeability for façade solutions and contemporary building technologies such as steel structural systems and underfloor heating for the pitch. However, there are no certifications or measurable energy-saving data available (41).

The Gaziantep and Kayseri stadiums incorporate modern roof systems, steel structures, and sunshades, but these applications do not form a proven systemic integrity in terms of sustainability (41). Although awards have been received, these awards are primarily given for aesthetic or commercial value.

The Beşiktaş Stadium hosts technological elements like hybrid grass systems, smart security, and digital infrastructure, but it lacks concrete sustainability data regarding energy efficiency (41,42).

The Kocaeli, Sakarya, Mersin, and Bordeaux stadiums have minimal use of contemporary materials. Although some projects feature membrane or steel systems, these applications remain mainly structural solutions and do not provide measurable gains in energy performance (39).

Table 5. Contemporary Building Materials and Energy Efficiency

Stadium	Photograph	Materials and Technology	Sustainability Certificate
Atlanta		The most advanced (ETFE, roof, PV panel)	LEED Platinum, 88 points
Sivas		Passive systems + PV panels	No certificate
Konya		Steel + membrane systems	No certificate
Gaziantep, Kayseri		There are modern systems	No measurable data
Bordeaux		No emphasis on sustainability	No information provided
Kocaeli, Sakarya, Mersin, Beşiktaş		Basic building systems	No certificate

6. Is Stadium Access Easy, Accessibility, Transport Network, and User Comfort

Sports facilities are strongly connected to the planning and development of urban areas. When properly located and effectively managed, these structures can play an important role in the transformation processes of cities (5). Economically, sports venues create employment and support regional economic vitality by attracting new businesses and commercial activities (23). As part of the infrastructure, these buildings can also enhance societal and environmental resilience, serving as temporary shelters, election centers, or hospitals during emergencies (21). However, the location of sports facilities is crucial. The increasing demand for transporting athletes and spectators and for logistics further raises energy consumption and emissions (45).

While the impact of stadiums on urban structures is often limited economically (13), they can lead to significant consequences at the local level, particularly in terms of traffic. The increased number of visitors accompanying the construction of a new stadium can lead to transportation-related issues such as heavy traffic, parking problems, and pressure on public transportation. This situation often causes discomfort among local residents around the stadium and increases resistance to the projects. Traffic congestion and other transportation problems, combined with architectural preferences of modern stadiums, have become one of the main reasons for negative attitudes among local residents (1).

Transportation, as a core part of the user experience in a stadium, not only determines the comfort of access but also whether the building becomes an active focal point within the city. Public transportation options, parking capacity, railway system connections, and pedestrian access are considered essential criteria in this context.

Beşiktaş Stadium, located in the city center, is easily accessible by foot, public transport, and private vehicles. This location integrates the stadium into the city life, keeping it active at all times of the day (41, 42).

Atlanta Stadium has made access easier with a 3 km railway line and an advanced public transport system. The integrated planning of the transportation network helps minimize congestion on match days (38).

Bordeaux Stadium is connected to the city center via public transport systems such as buses and trams. However, its distance of 7 km results in a relatively longer travel time (39).

Kayseri Stadium is strategically located at a point between the city center and the bus terminal, with a rail system in place, making it advantageous in terms of transportation (41).

Konya Stadium is a positive example due to its proximity to the bus terminal and tram line. Public transport and private vehicle options are available (41).

Kocaeli, Sivas, and Sakarya Stadiums are located near the city center and are supported by parking and public transport systems. Detailed parking planning is particularly noticeable in Sakarya and Kocaeli (41).

Mersin and Gaziantep Stadiums are located far from the city center. In Mersin, public transport stops were added later, but they are insufficient. In the case of Gaziantep, the lack of proper transportation planning and vacant spaces around the structure weakens accessibility (41,43).

Table 6. Accessibility

Stadium	Public Transport	Private Vehicle / Parking Lot	Connection with the City
Beşiktaş	Very easy	Centrally located	High
Atlanta	Advanced system	Rail connection	High
Konya, Kayseri	Rail system + parking lot	The transportation network is strong	Medium -positive
Bordeaux	Tram/bus	The distance is long	Medium
Sivas, Kocaeli, Sakarya	Close location + parking	Public transportation is medium level	Medium
Gaziantep, Mersin	Access is poor	Far from the center	Negative

DISCUSSION AND CONCLUSION

This study analyzed 8 different stadiums built in Turkey over the last 20 years and 2 stadiums built abroad, evaluating whether they align with the architects' statements based on six key criteria: location in relation to the city, iconic status, multifunctional use, environmental shading impact, contemporary building technologies/sustainability, and transportation options. Comparisons made under each criterion examined the strengths and weaknesses of both domestic and international examples.

- Atlanta Stadium stands out as the most successful example of the study, both technically and conceptually. With its LEED Platinum Certification, innovative roof technology, sustainability practices, and multifunctional social spaces, it has become a reference point for 21st-century stadium architecture.

- Bordeaux Stadium features architectural purity, a poetic relationship with the landscape, and a potential for multifunctional use, representing contemporary European architectural language. However, its limited information on energy efficiency and sustainability has caused it to lag behind in the evaluation.

- Beşiktaş Stadium is notable for its strong connection to the city's memory, architectural simplicity, and focus on cultural continuity rather than an emphasis on sustainability. It has avoided the claim of being iconic and has instead shown respect for its surroundings, integrating seamlessly with the city.

- Konya and Gaziantep Stadiums stand out among the examples in Anatolia for adopting contemporary building technologies and striving for architectural differentiation. However, the lack of documented sustainability practices and weak conceptual depth has hindered their full success.

- Kayseri, Kocaeli, and Sakarya Stadiums incorporate modern building systems but fall short in terms of multifunctionality and sustainability. These structures remain largely unused outside of match days and

have not been integrated into social life.

- Sivas and Mersin Stadiums feature distinct characteristics compared to the other stadiums. While Sivas Stadium claims to have energy-efficient systems, it fails to support this assertion with any documentation; Mersin Stadium, on the other hand, is inadequate in terms of capacity, usage, and context.

21st-century architecture is being redefined not only by formal innovations but also by concepts such as social interaction, environmental sustainability, and multifunctionality. In this context, stadium structures must go beyond sports and become active parts of urban life. However, the 10 different stadium examples examined in this study have shown significant differences between the architects' expressed intentions and the resulting products. The relationship established with the urban context has proven to be a determining factor in the identity of the structures.

When examining stadium structures in Turkey, contemporary building materials are used in new stadium projects, but sustainability often remains uncertified. While technical criteria such as modern building technologies and compliance with UEFA/FIFA standards are generally met, concepts like multifunctional use and energy efficiency are often either neglected or remain at the level of rhetoric. Furthermore, a large portion of the stadiums built in Turkey are single-purpose and idle outside of match days.

Foreign examples, especially Atlanta and Bordeaux stadiums, are noteworthy not only for technological innovations but also for their architectural conceptual depth and urban integration. One of the positive examples in Turkey, Beşiktaş Stadium, presents a unique stance with its design that respects the city's memory. However, most of the stadiums built in Anatolia become idle structures outside of match days and fail to fulfill their social function.

- Urban and Socio-Cultural Context Should Be Considered in the Design Process: Stadiums should establish a connection with the historical, cultural, and natural values specific to their city. These structures should be approached with city-specific solutions, not just as "standard" sports buildings.

- Multifunctional Use Should Be Made Mandatory: Stadiums should be supported with different functions such as concerts, theaters, exhibitions, museums, libraries, and gyms, transforming them into 24/7 living structures.

- Sustainability Certifications Should Be Encouraged: Energy-efficient systems and green building applications should not remain as rhetoric but should be substantiated with certifications like LEED and BREEAM.

- Stadiums Should Be Located Close to City Centers and Be Accessible: Stadiums that are not integrated into transportation networks may be physically accessible but remain socially distant. Therefore, site selections should be made with great care.

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