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### The Role of Media Technology in the Social Sustainability of Staged Spaces

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#### KEY WORDS

Multimedia Technology,  
Social Sustainability,  
Architectural Staged  
Space, Interactivity,  
Transformative Design.

#### ABSTRACT

Multimedia technologies are effective tools for stimulating the senses and enhancing engagement in architectural spaces. By activating perception, they help transform static environments into interactive platforms that support social sustainability. This study aims to explore the role of multimedia in this process. A descriptive and analytical approach was employed, incorporating a literature review and an analysis of two case studies: one local and one global. Results showed that integrating multimedia improves vitality, visual appeal, and functional performance. It also strengthens users' sense of identity and belonging while encouraging social interaction. Furthermore, multimedia enables the creation of immersive spaces rich in content and sensory experience. These qualities enhance participation and contribute to the development of dynamic, responsive environments that meet user needs. The study concludes that multimedia plays a key role in shaping spaces that are more interactive, inclusive, and aligned with the principles of social sustainability in contemporary architectural design.

#### الكلمات المفتاحية

تكنولوجيا الوسائط المتعددة،  
الاستدامة الاجتماعية، الفضاء  
المعماري المنصلي، التفاعل،  
التصميم الديناميكي.

#### المخلص

تعد تقنيات الوسائط المتعددة أدوات فعالة لتحفيز الحواس وتعزيز المشاركة في المساحات المعمارية. من خلال تنشيط الإدراك، فإنها تساعد في تحويل البيئات الثابتة إلى منصات تفاعلية تدعم الاستدامة الاجتماعية. يهدف البحث إلى استكشاف دور الوسائط المتعددة في هذه الفضاءات. تم استخدام نهج وصفي وتحليلي، بما في ذلك مراجعة الأدبيات وتحليل دراستي حالة، واحدة محلية والأخرى عالمية. أظهرت النتائج أن دمج الوسائط المتعددة يعزز الحيوية والجاذبية البصرية والأداء الوظيفي. كما أنه يعزز شعور المستخدمين بالهوية والانتماء مع تشجيع التفاعل الاجتماعي. علاوة على ذلك، تتيح الوسائط المتعددة إلى إنشاء مساحات غامرة غنية بالمحتوى والتجربة الحسية، حيث تزيد هذه الصفات من المشاركة وتساهم في تطوير بيئات ديناميكية وسريعة الاستجابة تلي احتياجات المستخدمين. توصل البحث إلى أن الوسائط المتعددة تلعب دوراً رئيساً في تشكيل الفضاءات الأكثر تفاعلية وشمولية وانسجاماً مع مبادئ الاستدامة الاجتماعية.

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## 1. Introduction

Many spaces within the contemporary built environment are witnessing a significant decline in the levels of interaction and social attraction, which led to a weakness in their dynamism and architectural function, which directed research attention towards exploring possible ways to activate these spaces, as the technological factor "represented by multimedia technology" emerged as an effective tool capable of transforming architectural spaces into vibrant interactive stages for live communication with users. Moreover, because architectural spaces have historically represented frameworks for interactive narrative presentation based on creating opportunities for interaction with the influence of architectural characteristics and features, and with the shift to digital characteristics through the integration of multimedia technology in the space to create interactive architectural scenes capable of translating data and information in visual and sensory formats, it redefined the architectural space to represent an interactive platform including Enhances quality of life which identified the research problem as "the unclear role of multimedia technology in the sustainability of a socially staged space".

Thus, the research embarked on a review of the literature and previous studies with the aim of building a solid knowledge base on the concepts of interactive architectural spaces, with a special focus on the concepts of "platform space" and "social sustainability," Represented by :

- Marichela focused on the role of multimedia technologies and IT tools in enhancing the value of architectural spaces by improving knowledge and increasing social interaction. The study highlighted the role of social media in providing insights into user demographics and preferences. It demonstrated that multimedia technology tools activate these spaces, increasing their usage and fostering social cohesion. Thus, the study affirmed that technology supports sustainable urban policies by enhancing awareness, participation, and social cohesion (Marichela, 2023).
- Yiannoudes emphasised the impact of digital technologies on the evolution of architectural discourse and practices. It found that these technologies have transformed architectural spaces into more flexible and adaptive environments, incorporating interactive technologies and smart materials, as well as augmented and virtual reality. The study highlighted the enhancement of social interaction through smart city systems that respond in real-time to residents' behaviours, creating dynamic and interactive spaces. It also underscored the importance of computational design thinking in achieving social sustainability, concluding that this interplay between technology and architecture leads to more inclusive and innovative design solutions, creating adaptable and sustainable spaces that meet user needs and promote social sustainability (Yiannoudes, 2022).
- Gauchi asserted that visual media technologies can significantly contribute to enhancing social sustainability in architectural spaces. Media acts as a catalyst for change, transforming abandoned areas into vibrant community hubs. Through creative interventions such as art and advertising, these spaces can be revitalised, fostering a sense of community belonging. Media technologies help develop sustainable urban environments by optimising existing resources, reducing environmental impact, and enhancing community interaction while restoring architectural values (Gauchi, 2019).
- Gehring focused on the role of media technology in promoting social sustainability within stage-based architectural spaces. Media façades with integrated visual technologies, like digital screens in buildings, facilitate social interaction by providing a stage for collaborative engagement. The experience from the ARS Electronica Festival indicated that digital applications encourage users to engage socially. Despite challenges related to user awareness, the study demonstrated that technology can enhance social bonds in both collaborative and competitive ways. Overall, media interfaces play a crucial role in building more sustainable communities through user interaction (Gehring, 2012).

The analysis of the previous literature review revealed common vocabulary and values among them, as shown in Table 1.

**Table 1. Comparative analysis of previous literature review. Source: (Authors).**

Common indicators	Consistent studies
<b>Marichela, Marichela, Gehring</b>	Transforming spaces into interactive and dynamic environments through (presenting an architectural discourse - adapting the space - lengthening the response and reactions of individuals - adapting their needs within the space)
<b>Yiannoudes, Marichela, Gehring</b>	Enhancing social interaction by (improving the cognitive, cognitive, and behavioural aspects of individuals in space - offering preferences to users increases your social contact)
<b>Yiannoudes, Marichela, Gauchi,</b>	Raising the vitality of space and developing competitiveness in it through (creating new events - introducing visual attractions such as arts and advertisements)
<b>Yiannoudes, Marichela, Gauchi, Sven</b>	Promoting belonging in space through restoring heritage values
<b>Gauchi, Gauchi</b>	Promoting belonging and identity through (raising memories and societal values)
<b>Gauchi</b>	Creating opportunities to activate the space using (reactivating abandoned spaces by creating new activities)
<b>Marichela</b>	Activating social communication between users by displaying diverse knowledge content in the space

## 2. Staged Space Concept

"Staged space" is a contemporary architectural concept that refers to the transformation of physical spaces into interactive exhibition platforms, closely resembling a stage, where the space is designed to convey specific messages and content through multimedia and digital technologies. In this context, the user is not a passive recipient but becomes an active participant within a living architectural experience, which changes according to their presence, movement, and interaction within the space (Kossak, 2017). The platform space relies on a narrative structure that integrates digital media and architectural language, so that the space itself becomes part of the presentation; all its elements—lighting, sound, and image—contribute to the formulation of a perceptual sensory experience. These spaces intensify the interaction between humans and their surroundings through full immersion in multidimensional content, linking the physical dimension with the digital dimension (Schumacher, 2010). The concept of platform space has evolved in response to rapid technical progress, where projection technology, projection, augmented reality, and interactive media have contributed to transforming architecture from a fixed framework into a dynamic environment that tells a story or expresses an idea, thereby giving the space an artistic, cultural, and emotional character. This type of space is also an effective tool in promoting social sustainability by stimulating collective interaction, strengthening social ties, and promoting cultural identity. Thus, the "platform space" represents a conceptual shift in the function of architecture, as space is no longer just a physical container for activities but has become an effective platform for building meaning and cultural and social communication, making it a pivotal element in contemporary architectural experiences of an interactive nature (Sharma, 2020).

### 2.1. The Concept of Media Technology

Media technology refers to the set of digital tools and systems used to produce, transmit, and process visual, audio, and interactive content, with the aim of enhancing communication and information transmission in multimedia ways. This technology incorporates a combination of computing, communications, and display techniques, allowing text, images, video, audio, and interactive elements to be combined into a single environment (Manovich 2001) (texts, still images, animations, and sounds) and then presented interactively, making them represent tools and means of transmitting information, knowledge, and intellectual and behavioral cultures in a certain way with the aim of influencing human thought and instincts for their potential to transform architectural spaces into dynamic communication platforms that enhance the human experiences of the user (Husham, 2024) (Al-Musawi, 2024). These optical technologies include digital screens and three-dimensional projections, such as projection imaging techniques and augmented and virtual reality applications, to allow users to interact with spaces in unconventional ways. After the architectural space was able to embody specific ideas and information thanks to these technologies, it became an effective tool to convey messages and increase cultural and social awareness, thanks to its impact on how space is perceived. As a whole, its content and experiences, which have been transformed from mere observation and reception to a real interaction with the ocean (Shokrani,

2021), are due to the creation of a physical and electronic field together that is constantly changing, and thus the value of space changes, as multicultural images meet to be displayed on the surfaces of space to restore space with various images that achieve exchange, cultural dialogue, and interaction. Thus, these technologies have contributed to the accumulation of cumulative digital layers in the architectural space, such as the use of "illuminated cladding," which adds a fourth dimension to the space, making it more interactive and vibrant. These digital additions contribute to the provision of new services to the space such as education, entertainment, and interactive activities, which support social interaction by promoting local cultural values, such as heritage and art values, as well as engaging the public more in the space by addressing their senses and minds, which motivates them intellectually, physically, and behaviorally (Husham 2023). Therefore, it is used as an expressive medium that enriches architectural spaces and reshapes the relationship between humans and their surroundings. Media technology is limited to the technical aspect only. However, it is a cultural tool that enables architects to transform spaces into dynamic environments that pulsate with experience and meaning, as it contributes to the generation of interactive architectural scenes that address the senses and invite the user to participate effectively within the space (Fisher, 2007).

## 2.2. The Concept and Pillars of Social Sustainability

Social sustainability refers to the capacity of the built environment to support and strengthen the social fabric of a community (Isabella, 2020), through the design and development of spaces that prioritize the well-being and inclusion of all individuals. It encompasses various dimensions that contribute to the welfare of individuals and groups within space (Alessandro, 2020), emphasizing the importance of creating areas that foster social interaction, inclusivity, and a sense of belonging among inhabitants (Abood, 2019). Social sustainability is a holistic, interdisciplinary approach that considers social, cultural, economic, and environmental factors comprehensively. Achieving social sustainability is essential for creating spaces that not only meet immediate needs but also contribute to the long-term well-being of communities (Delpont, 2022). Digital media tools are considered effective instruments for enhancing interaction between users and architectural spaces, contributing to social sustainability by reactivating public environments (Abdulzahra, 2025).

Architectural spaces with cultural and historical significance serve as social catalysts, supporting the local social fabric by revitalizing cultural and civilizational values. They enhance livelihoods and welfare within communities, becoming proud tourist destinations both locally and internationally (Jabar, 2023), thus holding shared significance for current and future generations. Revitalising, enhancing, and investing in these spaces is therefore one of the most critical factors in realizing social sustainability within nations (Jabar, 2024).

From the above, it becomes clear that media technology redefines space from being a fixed element to being a living stage that interacts with the sensory and behavioral variables of users, which makes it an effective tool in supporting activities and events, and the nature of individuals' use of space, which is reflected in relations between them.

## 2.3. Pillars of Social Sustainability

- **Creating Spaces for Social Gathering and Interaction to Foster Social Cohesion:** Carefully designed architectural spaces can play a vital role in building strong social cohesion by encouraging social interaction and strengthening bonds among residents. Designing public parks, communal spaces, and shared areas is essential to this aim, as these spaces provide environments where individuals can connect, fostering more cohesive communities. Designers can also integrate privacy, security, and social interaction, achieving a balance between individual privacy and community engagement (Mohammed, 2022).
- **Achieving Functional, Multi-use Spaces:** Functional spaces are pivotal in enhancing social sustainability, as they encourage diverse activities that meet the various needs of the community. The adaptability of these spaces to accommodate residents' diverse needs enhances their usability and helps create flexible, sustainable environments (Husham, 2024).
- **Enhancing and Showcasing Identity:** Cultural identity can be strengthened by adapting historical buildings and sites to meet contemporary needs while preserving their cultural and historical

significance. Achieving a balance between modern accessibility requirements and the preservation of historical elements is essential to maintaining the authenticity of these sites. The goal is to ensure that everyone, regardless of ability, can access and enjoy these historic environments without compromising their heritage (Isabella, 2020).

Additionally, cultural identity requires that architectural spaces reflect and honour the cultural identity of communities, a crucial component of social sustainability (Abdulhaad, 2023). This can be achieved by using local building materials and traditional design elements that enhance the residents' sense of belonging and pride. This approach helps create spaces aligned with the local history and cultural identity of communities, fostering continuity between past and present (Mohammed, 2022).

From the above, it becomes clear that the pillars of social sustainability in space raise questions about the role of integrating multimedia technology into space and enhancing it to support the sustainable development of space.

### **3. Foundations For Transforming Space into A Sustainable Interactive Stage**

Throughout architectural history, architecture has fostered interaction and communication among individuals by creating interactive spaces that enhance social sustainability (Mohammed & Mazin, 2025). With the advent of the digital age and the capabilities of modern technology, the integration of digital elements with the physical structure of architectural spaces has led to the creation of dynamic environments. These spaces encourage social participation and strike a balance between the physical and digital realms, transforming the space into a stage that supports social sustainability (Yiannoudes, 2022). The key foundations for this transformation are:

#### **3.1. Space as an Entity**

Space encompasses two aspects. The first is its physical entity, which includes horizontal and vertical elements, surfaces, structures, and modern materials that shape the physical environment. These components define the spatial form through their visual properties. However, the physical aspect goes beyond mere visual manifestations to include sounds, smells, and tactile sensations, all of which contribute to shaping the space (Kovalchuk, 2023). These sensory inputs provide material information related to the existential and scenic image of the space perceived by the observer, sparking their physical, mental, sensory, emotional, and experiential responses. Thus, the material formations play a crucial role in shaping the media perception of architectural spaces, influencing human decision-making, organisational actions, and behaviour.

In contrast, the visual image of the architectural space transcends the boundaries of time and place, focusing on a transition towards the future (Gehl, 2011). The second aspect is the immaterial entity or content, which includes digital media and technologies integrated into the physical structure of architectural spaces, transforming them into communication interfaces. Oleg's theory posits that spatial elements act as sources of information aligned with the human perceptual system, reinforcing their subject. With the advent of technologies such as printing, radio, cinema, and digital media, which provide instant information transmission and capabilities for writing, storage, and broadcasting, space has become a medium for content creation and dissemination. Marshall McLuhan regarded these new digital technologies as tools for shaping society, even influencing individual mindsets by unifying visual experiences into a more general framework (Stojšić, 2017).

The integration of multimedia technology, interactive systems, and computational techniques with architecture has transformed it into an element of communication and information transfer, to the extent that architecture is now often referred to as "media architecture." Every interactive component translates an idea and materialises it, or conversely, manifests its absence by embodying a language that carries information comprehensible to humans, who then use their cognitive skills to interpret it. This interaction reflects on their experience within space, granting it additional dimensions that redefine our perception of space today (Kovalchuk, 2023).

#### **3.2. The Audience**

The production of contemporary architectural content has a profound impact on the audience's experience through a deliberate compositional process. The use of digital media contributes to transforming

architectural spaces into interactive interfaces that reflect the needs of users and promote participatory urban experiences (Mohammed, 2025). Here, the designer employs a set of contrasts grounded in a conceptual formal system that considers the possibilities and constraints of the content. As the audience interacts with this content, the process of understanding and interpretation is governed by a semantic and intellectual framework shaped by collective memory, which influences the audience's acceptance or rejection of the content (Ghusoon, 2024). This acceptance is also contingent upon the cultural and personal background of the audience, playing a crucial role in shaping their interaction and understanding of the space, where variations in interpretation emerge (Nagim & Ra'ouf, 2025).

Within a staged space, this interaction is further enriched by multimedia technologies that allow for a deeper integration of the audience with the content, broadening the horizons of comprehension and perception. Instead of offering direct representations, the designer's messages and information create a sensory experience akin to a dream, evoking reflection and imagination. The audience actively participates in generating meaning through continuous interaction, both with the physical elements of the space and with others within it, initiating a dynamic dialogue that enhances the social dimension. This interaction is enhanced by technological advancements that support sensory responsiveness and social engagement, fostering social sustainability by creating spaces that enable the development of sustainable and interactive communal experiences, thereby strengthening the social fabric and expressing the community's identity in a more holistic manner (Husham, 2023).

### **3.3. The Presentation (Content)**

In contemporary architecture, content serves as a fundamental essence, embodying the ideas and meanings intended to be conveyed to the audience. It enhances the value of space by manifesting aesthetic and intellectual dimensions. With digital evolution, content in architecture has transformed from static concepts into dynamic elements that continuously change and interact, thanks to technological advancements (Abed, 2025). Digital technologies have become tools for converting architectural spaces into interactive stages, allowing these spaces to engage with visitors. This dynamic and captivating nature enriches the user experience, making spaces vibrant and pulsating with life as they blend information, emotions, and visual beauty (Manovich, 2001). These technologies have redefined content, making it multidimensional and rich in technological media. Architectural spaces now showcase diverse content, including images, texts, and multimedia presentations, adding layers of information that enrich the user experience and enhance the spaces as a stage for communicating cultural and informational ideas in innovative and appealing ways.

Additionally, marketing and promotional content have become prominent, with digital façades being used as tools to promote brands and cultural identities, thereby increasing the economic value of the space and attracting tourists and investors. This creates a synergy between cultural and economic aspects. Moreover, imaginative and creative content opens new horizons, as it is used to craft immersive experiences that transport visitors to inventive, fantastical environments, enhancing social interaction and redefining the relationship between humans and space. These experiences rely on technology to create content that immerses visitors, fostering social sustainability through shared, attention-grabbing experiences that expand the boundaries of spatial exploration (Zumtobel, 2022).

It turns out that the employment of media technology within the architectural spaces has achieved a transformation in its architectural characteristics and features nominally its visual, functional and functional vitality, as well as the features of its environmental, health and cultural quality, which generated new opportunities to create a link between the individual and the space on the one hand and between the individuals themselves on the other hand, which reflected the indicators of social sustainability in the space as the content display and stimulating methods allowed new thinking patterns in space and thus changed the way they understand architectural and symbolic messages. In addition, the manipulation of space visually enhanced its attractiveness, resulting in a higher response from individuals, which lends a vivid and immersive character to the platform space.

## **4. Derivation of the Theoretical Framework**

According to a review of what was proposed by previous literature, as well as an analysis of what was highlighted by the knowledge base of the paragraphs proposed by the above research, the main

vocabulary, its secondary indicators, and its possible values were extracted, as shown in Table 2, to represent the theoretical framework of the research.

**Table 2. Theoretical Framework for Measuring Social Sustainability of Staged Spaces in Light of Media Technology. Source: (Authors).**

Main Element	Sub-element	Values	
Digital Composition of Staged Space	Visual and Light Technologies	Projection mapping, photogrammetry, and augmented reality technologies	
	Historical Digital Structures	Digital compositions inspired by historical forms	
	Creative Digital Structures	Innovative and artistic digital forms	
	Artistic Structures	Sculptures and installations inspired by fictional characters and similar themes	
Interactivity of Staged Space	Sensory Enjoyment	Diverse light shows create elements of surprise, mystery, excitement, curiosity, play, relaxation, memory-making, and storytelling.	
	Social Interaction	Social mingling, relationship-building, cooperation, dialogue, communication, learning, listening, conversations, belonging, sense of security	
	Usage and Activities	Types of activities (play and entertainment, arts and drawing, cultural heritage, environmental awareness) Activity facilitation (various age groups, people with special needs, different social groups, individual and group activities) A variety of events (cultural, educational, social)	
Social Sustainability of Staged Space	Connectivity	Connection with the Space	Theme and content, spatial expressiveness, space scenarios
		Connection with Individuals	Aspects of daily life, human experiences, emotions, and feelings
	Effectiveness	Continuous community programs and events (e.g., cultural exhibitions, markets)	
		Enhancing quality of life through providing a healthy and attractive environment	
		Providing multi-level social seating areas, encouraging interaction across age groups	
		Installing interactive communication points for audience feedback and participation	
		Creating public squares and internal gathering spaces	
		Establishing walkways that ease movement and interaction within the space	
	Participatory	Implementing interactive pedestrian paths	
		Incorporating natural areas that create attractive gathering spots	
	Privacy	(Dialogue, usability, effectiveness) to foster collective experiences	
Identity	Cultural Heritage Identity	Control of space and its elements (image, sound) to create a personalised experience	
		Inclusion of architectural elements reflecting local heritage, such as arches and traditional motifs	
	Cultural Identity	Emphasis on formal characteristics tied to cultural identity, like colours and building materials	
		Utilising local building materials Adopting local elements Embedding societal cultural values with significant symbolic meanings, such as icons and symbols	
Characteristics of Staged Space Shaped by Media Technologies	Vitality	Visual, functional, and occupancy aspects	
	Quality	Environmental, health, semantic, symbolic, cultural, and interactive qualities	
	Connectivity	Effectiveness across age, location, time, advertising, media, educational, imaginative, and innovative dimensions	

## 5. Survey Study (Application)

Two case studies were selected (as outlined below) to apply the elements of the theoretical framework in both a global and an Arab context. The first case study focuses on the Sydney Opera House, while the second examines the Sheikh Zayed Grand Mosque. Then, the analysis of the description of the two projects

will be adopted, as confirmed by studies, in order to verify the values of the components of the theoretical framework of the research:

- Contextual and spatial diversity of samples (Arab- international)
- Literature support for selected samples as a transformation into a theatre
- Diversity of content achieved in selected samples
- The selected samples were adopted as a site for cultural festivals in different contexts.

### 5.1. Global Case: Staged Space of the Sydney Opera House

The Sydney Opera House, as shown in Figures 1A and 1 B, designed by architect Jørn Utzon in the 1950s and 1960s, is a renowned landmark of Sydney and one of its most iconic tourist attractions. Recently, media technology has been integrated into the building's exterior surfaces during Sydney's annual festival, making it a remarkable example of fostering social cohesion (both local and global) through the use of projection mapping and lighting technologies. The festival merges art and technology to create interactive visual experiences that encourage social interaction among visitors and the local community. During the festival, people from diverse cultural and age backgrounds gather in shared public spaces to celebrate artistic and technological creativity. The festival is distinguished by its accessibility, offering free entry to most performances, thus enabling all members of the community to partake in the event regardless of their economic status. Moreover, the festival enhances collaboration between local and international artists, creating opportunities for cultural and social exchange. This strengthens community bonds through a shared artistic experience, promoting dialogue and interaction among participants, and showcasing the power of media technologies in cultivating a vibrant and inclusive public space (Nomadasaurus, 2024).

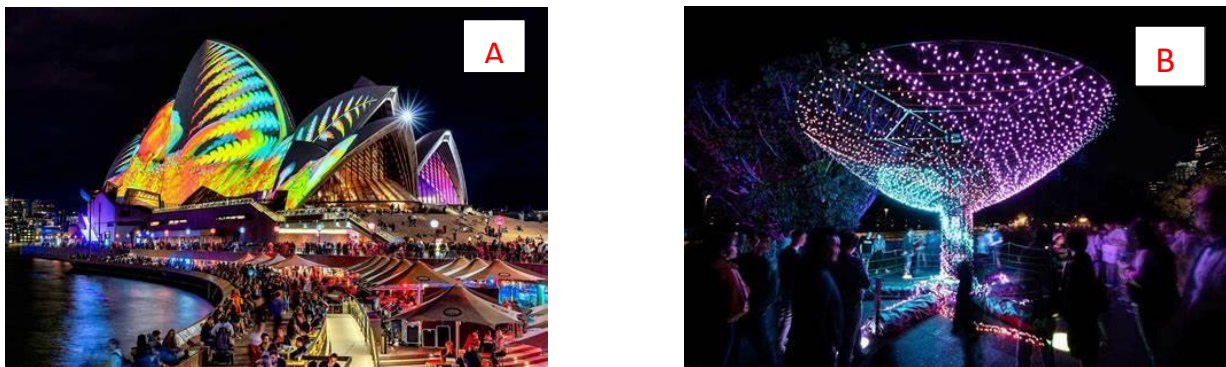


Figure 1. A & B show the Sydney Opera House. Source: (Nomadasaurus, 2024).

### 5.2. The Arabic sample: The Staged space of Sheikh Zayed Mosque, Sharjah Light Festival

The Emirate of Sharjah in the United Arab Emirates, as shown in Figures 2A and 2 B, takes great pride in the Sheikh Zayed Mosque, where the mosque's courtyard embodies a space that reflects the inclusive vision of Muslims, both in spirit and heart. It is not merely a space for worship but is deeply intertwined with the spiritual, social, and cultural life of Muslims, as well as their community activities. The integration of multimedia technology onto the building's surfaces, in celebration of the Sharjah Light Festival, has transformed it into one of the most prominent cultural, social, and artistic events in the Emirate. This festival highlights the rich Islamic architectural and artistic heritage of the region, further enhancing its cultural tourism. As depicted in Figure 2, the festival features unique light shows presented across twelve different scenes on the mosque's facades, using advanced 3D projection and music (audiovisual content), to create a breathtaking visual experience that blends art, history, and culture. Creative artists design these shows to highlight the beauty of Islamic architectural structures in an innovative and captivating way. These performances invite the public to explore Sharjah's cultural landmarks through new perspectives by digitally reviving these monuments. Additionally, the festival raises awareness of cultural and architectural heritage, fostering interactive and communicative experiences between individuals, as well as between people and architecture. Thus, the mosque's courtyard has been transformed into an artistic stage where

technology and art converge, enriching social interaction and providing a unique experiential journey (Khawaja, 2023).



Figure 2. A & B show the Sheikh Zayed Mosque in Sharjah. Source: (Khawaja, 2023).

## 6. The Results of the SURVEY Study

To measure the indicators of the theoretical framework, descriptive analysis was employed for each sample, based on the sources, and a value of 1 was assigned to the achieved indicator. In contrast, a value of 0 was assigned to the unachieved indicator, which was not mentioned in the sample description. The research relied on calculating the percentage for each indicator, and the results were represented using a statistical chart in the Excel program.

- The results of the variable "digital composition of the monumental space," as shown in Figure 3, clearly show a 75% achievement rate in both samples. However, there was a distinction in the type of technologies used, depending on the content intended to be showcased in space. The Sydney Opera House emphasised creative and artistic digital compositions to reflect aesthetic and intellectual content. At the same time, the Sheikh Zayed Mosque focused on historical Islamic compositions, indicating that the designer's choice of technology is related to the type of impact and content he wants to convey.

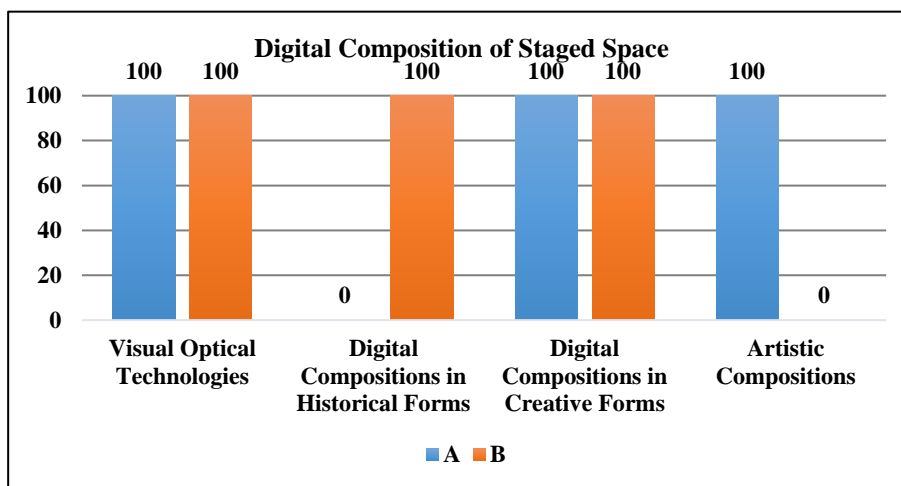


Figure 3. Illustrates the key components of digital composition within the staged architectural space. Source: (Authors using the Excel program).

- The results of the variable "interactivity of the monumental space," as shown in Figure 4, clearly indicate that both samples equally provided diverse sensory experiences that enhance sensory enjoyment and social interaction. However, there was a discrepancy in activity fulfilment: The Sydney Opera House achieved 80% in cultural and educational activities, while the Sheikh Zayed Mosque reached only 40%.

This indicates that the designer is responsible for the type of interaction achieved in space, based on the impact (sensory, cognitive, physical, emotional) determined by the designer based on the technologies and lighting projections achieved, which are reflected in human mental or behavioural responses.

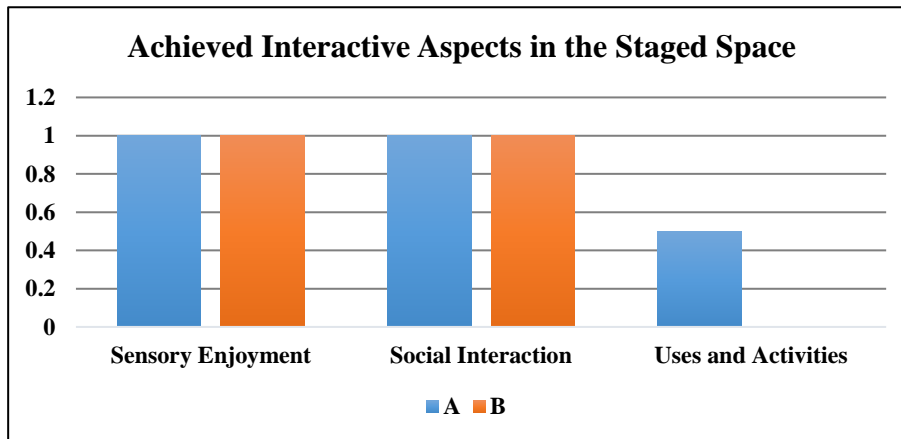


Figure 4. presents the achieved interactive aspects within the staged space. Source: (Authors using the Excel program)

- The results of the variable "social sustainability of the staged space," as shown in Figure 5, clearly indicate high values in both samples, reflecting the role of these spaces in fostering strong connections with individuals. However, the effectiveness differed based on the type of activity. The Sydney Opera House demonstrated a high level of effectiveness by providing an attractive environment and a range of community facilities. In contrast, Sharjah was lower in this regard, lacking certain services that support quality of life and communication. Regarding participation and privacy, Sydney showed a clear advantage with a 90% rating, while Sharjah achieved only 50%. In terms of identity, both spaces reflected strong local cultural elements, although Sharjah displayed greater emphasis on utilising traditional local forms.

This demonstrates the possibility of determining the type of connection between individuals and space by determining the type of scenes and light displays they advertise using media technologies. They may focus on scenes connected to the memory and history of the place to achieve a sense of belonging and the uniqueness of the place, or they may present attractive contemporary scenes that support a sense of progress and global development.

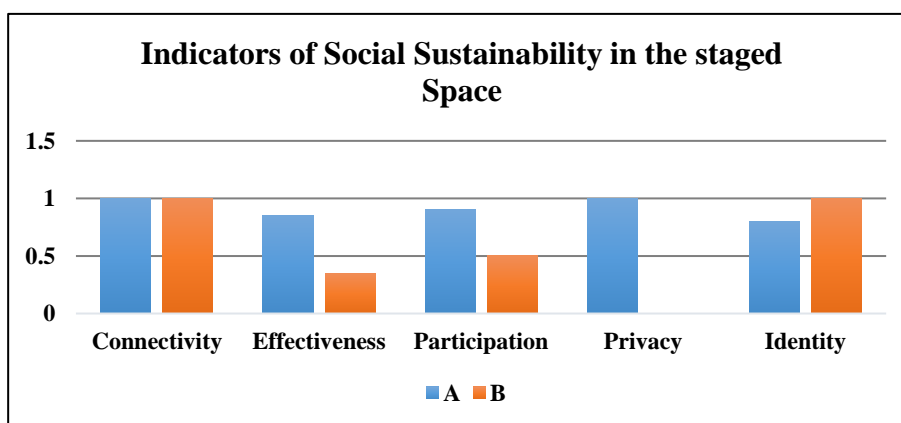
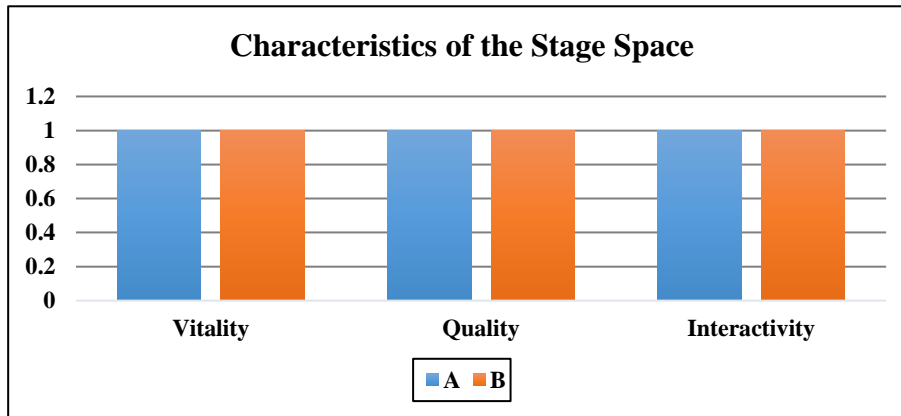


Figure 5. highlights key indicators of social sustainability within staged spaces. Source: (Authors using the Excel program)

- The results of the variable "characteristics of the monumental space," as shown in Figure 6, clearly show that both samples, due to media capabilities, transformed the physical space's characteristics through digital integration into electronic ones. This made the space higher quality, more vibrant, and more connected due to its dynamism and constant formal change. This confirms that the new space acquired new characteristics that were reflected in its sensation, the way it was perceived, and the type of activities and events it generated.



**Figure 6. Summarizes the fundamental characteristics of the staged space. Source: (Authors using the Excel program)**

- Overall, the analysis of the results indicates that Sydney excels in aspects of social sustainability, achieving higher levels of engagement, and thus serves as a model for a designed space that enhances quality of life and encourages social interaction. On the other hand, Sharjah demonstrated a notable focus on cultural and heritage identity, adding aesthetic and emotional value to the designed space. However, as an Arab experience, it is the first within the Arab context, and, compared to global experiences, it confirms the importance of adopting media technologies to enhance the social sustainability of spaces, despite social and cultural specificities.

## 7. Discussion

The results of this research reinforce the growing trend in architectural studies emphasizing the impact of multimedia technologies in transforming architectural spaces into socially sustainable environments. The results have shown that integrating visual and interactive digital content enhances sensory interaction, stimulates emotional responses, and improves social interaction among users. This aligns with Marichela (2023), Gauchi (2019), and Yiannoudes (2022), who pointed out the ability of digital media to activate public spaces, support inclusivity, and encourage participation.

- The research also confirmed that multimedia contributes to the consolidation of cultural identity by reactivating symbolic and historical elements through an immersive visual narrative. This trend reflects a redefinition of space as an interactive stage that responds to the context and the user, rather than a static architectural framework. The results demonstrate the validity of the theoretical framework adopted and confirm that media-assisted architectural spaces hold high potential in supporting social cohesion, expression of identity, and inclusive interaction in both local and global contexts.

## 8. Conclusions

- Media technologies are not merely digital additions to architectural spaces. They represent design tools that reshape the structure of space and its sensory and cognitive characteristics. This impacts individuals' perception of the surrounding environment and influences their behaviour within it.
- The nature of the media technology used directly impacts the characteristics of the physical space, imparting intangible characteristics. This integration transforms the space into an interactive environment, adding a vital dimension by enhancing sensory interaction (visual, tactile, auditory), which stimulates cognitive perception and encourages various modes of response, such as dialogue, conversation, discovery, learning, and others. This encourages social interaction and cultural exchange through the advertised content, thereby contributing to achieving social sustainability, as it is based on inclusiveness, integration, and global openness. Media technology opens new horizons for designing multi-layered cultural experiences that enhance local identity on the one hand and support global interaction on the other. This is achieved by creating spaces that revive the symbolic and spiritual bonds associated with belonging and community traditions. Media technologies also contribute to transforming spaces into dynamic platforms with targeted content, based on creating diverse human

experiences that enhance participation and communication and support social cohesion by intensifying interactive activities and strengthening communication between people and place, to the point where people become immersed in a dynamic space whose content constantly changes according to the desired event, as well as the type of audience it prefers to attract, their desires, and their preferences, which make them more connected to the place and more connected to each other. Media technologies provide architects and urban planners with advanced analysis and design tools that enable them to create interactive spaces that respond to users' senses and behaviors and adapt to the needs of multiple segments of society, including the elderly, where space can be presented in a temporal context and with pre-existing spatial characteristics that appeal to them. They can also benefit people with special needs by creating technologically enhanced environments that enhance their integration into urban life through control of sound, colour, lighting, noise, and activity types.

- The adoption and integration of media technologies into the physical entity of organised spaces enhances their quality and value, transforming them into multi-use environments that accommodate cultural, artistic, and social activities. These spaces thus become attractive hubs for human activity and experiences, increasing their economic value, stimulating investment and tourism, and fostering innovation in contemporary architectural practice.
- Media technologies can transform physical spaces into educational platforms that attract learners and innovators of all ages. They create an effective learning environment that stimulates the senses, helping to activate the educational process. Information is received as engaging, interactive visual and audio content that transcends the boundaries of space and time, opening horizons and liberating the educational process.

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