Digital art scene development strategy and conceptual framework一Coding analysis through artist interviews

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Abstract—With the increasing need for distinctive experiences in public art spaces, the roles of these places are progressively evolving to accommodate the intersection of technical advancements and spectators' preferences. In light of the emergence of Metaverse Internet 3.0, there is a renewed examination and exploration of the operational framework of public art spaces. This transformation is evident not just in the presentation of artistic works but also in the approaches and techniques employed in urban management.

The present study will adopt a conceptual framework that centers around the digital art scene while considering the impact and backing it receives from both the physical public art space and the virtual Metaverse. This framework will offer a more precise comprehension of forthcoming development strategies for the digital art domain. Simultaneously, it will also offer fresh perspectives and insights for urban administrators, enabling them to more effectively adjust to the emerging paradigm of Internet-based intelligent artistic lifestyles.

Keywords—digital art scene, Metaverse, smart city operation, Internet

I. INTRODUCTION

The emergence of Internet 3.0 has given rise to a novel area of research about the integration of information technology and artistic elements in urban public places, sometimes referred to as Internet IT smart art life. Nevertheless, the majority of existing study is constrained to the examination of public art space and the Metaverse within a two-dimensional framework. There exists a notable deficiency in existing scholarly investigations about the establishment of a connection between the two entities, as well as the precise manner in which this relationship is manifested as a distinct interconnection port. Hangzhou was selected as the research backdrop within the framework of Internet 3.0 due to its emergence as a prominent hub for digital cultural production. Hangzhou effectively integrates traditional culture with modern technology through the utilization of digital technology, resulting in the development and establishment of distinctive cultural products and experiential venues. This initiative contributes to the enhancement and growth of the local cultural economy.

This study examines the theoretical and practical considerations surrounding digital art scenes in various public spaces in Hangzhou. By conducting interviews with digital artists who reside, work, or have collaborated in Hangzhou, we aim to understand the necessary contextual elements that can enhance the aesthetic appeal and functional aspects of these spaces. Additionally, we explore how artists can contribute to the development of a multi-dimensional digital art scene in Hangzhou's future urban landscape.

The present study adhered to the methodological framework of grounded theory, encompassing several research procedures such as data collecting, open coding, axial coding, selective coding, theoretical integration, and validation and revision. During the period of data collecting, information pertaining to public art spaces, digital art scenes, and the Metaverse was gathered through the means of interviews and observations. During the encoding phase, the process involves the identification of interconnected concepts within the data, which are subsequently assigned appropriate labels. Subsequently, the interconnections among these concepts are examined in order to construct more advanced taxonomic structures or thematic frameworks. Based on this foundation, we have identified three fundamental notions: public art space, digital art scene, and Metaverse. Subsequently, we have developed theoretical frameworks centered on these main concepts.

By incorporating digital art and virtual simulation technologies, our theoretical framework highlights the importance of innovation, urging artists and designers to surpass conventional limitations and venture into novel modes of expression and interaction. This innovative mindset will challenge the limits of art and technology, consistently enhancing and offering the public more profound and engaging art encounters.
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II. RESEARCH METHODS

The researcher employed qualitative research methodologies, including grounded theory and partial analytic techniques, to undertake a comprehensive examination of the interplay between public art spaces, the digital art scene, and

the Metaverse. Grounded theory is a research methodology that prioritizes the derivation of theory from empirical facts, as opposed to the conventional approach of gathering and analyzing data guided by pre-existing theoretical frameworks. The researchers amassed a substantial quantity of data using observational techniques and interviews, from which they constructed a theoretical framework elucidating the interdependent dynamics between the digital art scene and the Metaverse.

The study's sample encompasses a diverse range of constituents within the digital art domain, namely artists, audiences/visitors, art institutions, corporations, and managers. This study exclusively offers an in-depth examination of interviews conducted with artists, to comprehend their involvement and reciprocal impact within the interacting dynamics between the digital art sphere and the Metaverse.

A comprehensive record of all interviews was created through meticulous recording and subsequent hand transcription. The transcriptions were inputted into the NVivo11 program in order to facilitate coding and conduct thematic structure analysis. The scholarly literature has placed significant emphasis on the attributes of credibility, dependability, transferability, and confirmability when evaluating samples[1]. The researcher understands the subjectivity of reality [2], and has chosen to employ a qualitative research methodology that aligns with this understanding. The study additionally posits that employing a single-case research design, along with purposive sampling, data gathering, and analytic methodologies, is suitable and yields plausible outcomes. The limitations of this study mostly revolve around challenges related to replication, limited generalizability[3], and the potential for bias due to social desirability response[4].
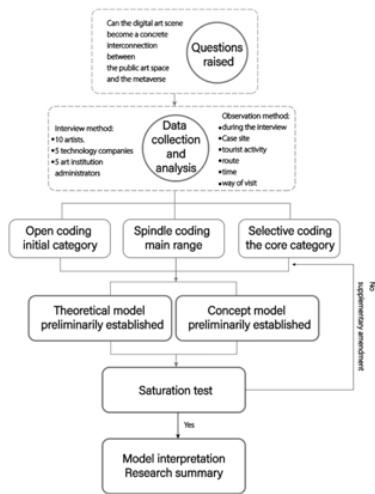

Figure 1 Grounded theory research process （Source, this study）

III. OPEN CODING

To comprehensively develop a public art space and virtual space model that primarily connects with the digital art scene, this study systematically categorizes the research materials into individual sentences, resulting in a total of 163 primary codes. The aforementioned codes encompass several aspects of intelligent art within the realm of Internet-based information technology, encompassing art creation, exhibition, communication, and consumption. The primary codes were analyzed and grouped based on their shared meanings or features, resulting in the creation of new codes. In total, there were 86 codes identified. The aforementioned codes offer additional insights into the inherent logic and regulations governing the realm of Internet IT intelligent art life. They serve as a valuable theoretical instrument for comprehending and elucidating the intricate interplay between public art space and virtual space. Following the presentation of codes exhibiting conflicting semantics, a subsequent iteration of categorization and inference was conducted, ultimately resulting in the formation of 51 initial concepts. These themes encompass various crucial aspects of intelligent art life in the realm of Internet IT, encompassing art innovation, technology application, user experience, community building, and commercial models, among others. In conclusion, a total of 51 original concepts were identified and classified into 16 distinct groups. The aforementioned categories not only serve as a representation of the wide range and intricate nature of intelligent art life inside the realm of Internet IT, but also shed light on the crucial roles and duties that urban operations play in facilitating this process.

IV. SPINDLE CODING

This article conducts a more in-depth examination of the open coding process, develops the logical connections between many conceptual categories, and identifies five primary categories, as presented in Table 2. These categories include meaning, virtual space, public art space, public digital art scene, and public. The interrelationship of space exploration, artists, and government institutions.

TABLE I.   TABLE TYPE STYLES

Code	Main category	Counterpart category
C1	significance	B1 Provides digital economic opportunities
		B2 Digital art expands the boundaries of art
		B3 Digital sustainability
		B4 Interactivity
C2	virtual space	B5 Types of audience groups
		B6 Economic revenue touchpoints
		B7 Interactivity characteristics
		B8 Functionality
C3	Public Art Space	B9 Functionality
C4	Public Digital Art Scene	B10 Measures to enhance the digital art scene in future cities
		B11 Applications of digital technology or digital art in urban operations
		B12 Reasons why digital art scenes draw traffic to virtual spaces
		B13 Functions
C5	Links between public space, artists, and government agencies	B14 Role
		B15 Models of good cooperation and interaction
		B16 Relationships

Through the process of open coding and axial coding, the researchers have identified the central category of the structural dimensions of public art spaces and virtual space models, wherein digital art scenes serve as connecting elements. The subsequent fundamental components are subjected to analysis:

A. Expansion of art limits through digital art

The provision of chances for the digital economy is a significant aspect to consider. Additionally, the expansion of art limits through digital art, the promotion of digital sustainability, and the enhancement of interactivity are all noteworthy factors. The meaning dimension constitutes a crucial component within the model framework of public art space and virtual space, serving as a pivotal nexus for the digital art scene. Public digital art spaces have the potential to offer chances for the digital economy when referring to digital economic prospects. The digital economy is predicated on the utilization of digital technology to facilitate economic operations encompassing production, distribution, exchange, and consumption, all of which are executed via digital channels. Within the realm of public digital art, artists have the potential to get economic advantages through various means such as the sale, display, and authorization of their digital artworks. Simultaneously, digital art has the capacity to stimulate the advancement of associated sectors, including digital art platforms and digital art sales, thereby generating economic prospects within the realm of digital art.

The advent of digital art has significantly broadened the horizons of artistic expression. The utilization of evolving technologies has facilitated the transcendence of traditional artistic boundaries by digital art, hence engendering a novel mode of artistic expression. Digital art has the capacity to employ various technologies, such as virtual reality, augmented reality, and artificial intelligence, to produce artistic creations that are interactive and participatory in nature. These works of art engage with the audience, pushing the limits of artistic expression, and fostering a more multifaceted and immersive art encounter. Digital sustainability encompasses the processes and practices involved in safeguarding, transmitting, and exhibiting artistic creations via digital platforms, thereby ensuring the preservation and perpetuation of art's cultural legacy. Digital art has the capacity to be conserved through digital media, eliminating the constraints of time and location. This enables a broader audience to appreciate and spread artworks, ultimately contributing to the sustainable development of the art field. Interactivity refers to the capability of spectators to engage with digital artworks in an interactive manner. Digital art facilitates the engagement of audiences in artistic endeavors, allowing them to assume the roles of both creators and participants in the realm of art, thanks to the use of cutting-edge technology like virtual reality and augmented reality. The engagement of audiences with works of art can be enhanced through many forms of interaction, such as gestures, noises, bodily movements, and more. This interactive approach allows individuals to cultivate a more personalized and immersive creative encounter, resulting in a heightened level of aesthetic enrichment. The use of interactive elements inside artistic works has the potential to augment the level of engagement and experiential involvement for the audience, hence amplifying the interactivity and aesthetic appeal of the art.

B. Serving as a linking point with the digital art scene within the virtual space model

The function of the virtual space dimension is integral to the framework of the public art space, serving as a linking point with the digital art scene within the virtual space model. The concept of audience types pertains to the diverse groups of individuals who are drawn to digital art. In the realm of digital art, there exists a diverse range of potential consumers, including but not limited to individuals with a passion for gaming, devotees of art as a kind of entertainment, those who engage in virtual social interactions, business investors, technological enthusiasts, creators, practitioners of art, as well as digital art creators and practitioners. The concept of the economic benefit contact point pertains to the potential economic advantages and prospects associated with digital art. The emergence of digital art has the potential to provide economic prospects. Virtual retail refers to the practice of selling digital artwork, virtual commodities, and other similar products through digital channels. Virtual event entertainment encompasses a range of activities such as virtual exhibitions, concerts, performances, and other similar events that are conducted online. These events are designed to captivate audiences and entice them to willingly contribute financially to partake in the virtual experience. The virtual service consultation offers a range of services including virtual art guidance, artwork evaluation, and several other services. These services are provided by charging consultation fees. The digital economy has paved the way for new opportunities in advertising branding, particularly through collaboration with digital platforms. This partnership enables the promotion of brands and products through digital advertising strategies. The term "interactive characteristics" pertains to the inherent interactivity found within the realm of digital art. Digital art has a range of interactive aspects. The concept of independent creation allows for active audience engagement in the artistic process, enabling individuals to generate personalized works of art. Real-time engagement: Spectators can actively engage with digital artworks in real time, thereby producing immediate feedback. Social engagement occurs when audiences engage in the sharing and discussion of digital artworks with others on virtual social platforms. Economic engagement: Individuals have the opportunity to engage in economic transactions with digital art through the acquisition and sale of such artistic works. The phenomenon of personalization in digital art encompasses not only visual art, but also extends to domains such as sound art, digital performance, and network art. Viewers have the opportunity to engage with the artwork via a range of sensors and input devices, which elicit individual sensory and emotional reactions. The interactive art-making method ensures that each experience is distinctive, as it is influenced by the audience's individual choices and interactions. It provides artists with a novel opportunity to create and provide distinctive art encounters tailored to the specific preferences and requirements of their audiences. This customised connection not only amplifies the audience's feeling of engagement, but also offers boundless opportunities for artistic creativity.

Audiences are provided with enhanced experiences and chances for involvement as a result of the aforementioned characteristics, which contribute to the increased level of participation and interactivity that is present in digital art.

C. *Model structure of public art space and virtual space*

The function of public art space forms the dimension of public art space in the model structure of public art space and virtual space, where the digital art scene is the connection point. The function of public art space refers to the functions and uses of places or spaces in the public domain that are dedicated to displaying, presenting, and promoting art. The function of the public art space is to provide audiences with multi-level services and experiences such as artistic experience, cultural exchange, social interaction, and educational inspiration, enrich the cultural life in the public domain, and enhance the cultural quality of the city and the happiness of the people.

D. *The connection point*

This function forms the public digital art scene dimension in the power structure of the public art space and virtual space model with the digital art scene as the connection point. The function of the public digital art space is to provide digital economic opportunities, expand the boundaries of art, increase sustainability, and provide interactivity. Through digital art spaces, different types of audiences can be attracted, including game enthusiasts, art entertainment enthusiasts, virtual social enthusiasts, business investors, technology enthusiasts, creators, and art practitioners. These audiences can engage in independent creation, real-time interaction, social interaction, economic interaction, personalized interaction, and multi-dimensional interaction through the digital art space.

E. *The dimension of the connection*

The dimension of the connection between public space, artists, and government agencies in the model structure of public art space and virtual space is formed with the digital art scene as the connecting point. A good model of cooperation and interaction between public spaces, artists, and government agencies refers to the positive interactive relationships established between them to achieve common artistic goals and social values. Through this good model of cooperation and interaction, public spaces, artists, and government agencies can jointly promote the prosperity and development of art, promote the inheritance and innovation of culture, and bring more beauty and enlightenment to society.

V. SELECTIVE CODING

The core category of "the structural dimension of public art space and virtual space model with digital art scene as the connection point" is identified by the application of open coding and main category coding techniques. The fundamental theme of the core category revolves around social interaction, entertainment, cultural exchange, and the portrayal of the city's image. The establishment of public art spaces that are attributed to specific artists and receive official backing has led to the emergence of a vibrant digital art scene. The presence of digital art in the public art space not only introduces a novel operational framework but also stimulates the growth and advancement of related enterprises. The Metaverse is being increasingly embraced by the digital art community, as it serves as a platform for artistic expression and engagement with a wider audience.

The establishment of a port in the global context brings out an influx of fresh vehicular movement within the Metaverse realm. Simultaneously, the Metaverse area offers technical assistance to the digital art domain, enhancing the audience's immersion and enabling their active engagement in social interactions, virtual entertainment, virtual tourism, and cultural exchanges. The model structure of the public art space and the virtual space, serving as the nexus for the digital art scene, is depicted in Figure
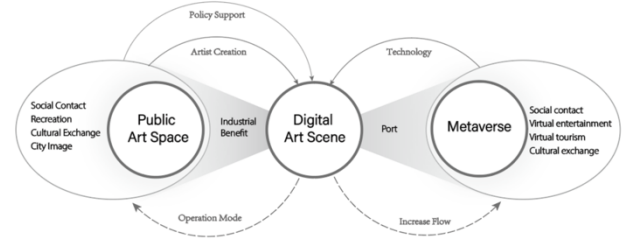

Figure 2 Digital art space is used as a medium to connect public art space and virtual space

VI. CONCLUSION

In conclusion, it can be inferred that the preceding arguments support the notion that...

Within the context of Internet 3.0, we seek to investigate the fundamental category of "the structural dimensions of public art spaces and virtual space models, with digital art scenes serving as the nexus." Our research reveals that the digital art scene not only offers economic potential in the digital realm and the expansion of artistic boundaries, but also sustainability and interactivity in the digital domain. The aforementioned characteristics enable digital art scenarios to appeal to a variety of audiences, generate economic benefits, and provide immersive interactive experiences. Our research reveals that the digital functionality of public art venues plays a crucial role in enhancing the urban digital art scene of the future. Urban administrators have the potential to enhance the functionality of public art spaces by employing digital technology or digital art, thereby transforming them into conduits for virtual spaces. This has the potential to increase the city's allure and vitality. In addition, the research investigates strategies for enhancing the digital art landscape in future urban areas, as well as the use of digital technology or digital art in urban functions. An effective cooperation and interaction model plays a crucial role in enhancing the digital creative landscape, it was discovered. By employing efficient collaboration and interaction models, it is possible to optimize the use of digital art scenes to attract visitors to virtual locations, thereby enhancing the appeal and vitality of the city. Our study exposes the pivotal significance of digital art scenes within the structural aspects of public art spaces and virtual space models, offering novel insights and theories for future scholarly investigations. Our research has disclosed that public art spaces play a crucial role in fostering the creative process of artists and influencing public policy. The presence of support has resulted in the emergence of a digital art scene, which not only introduces a novel operational framework to the domain of public art but also stimulates the expansion of

adjacent businesses. The digital art scene acts as a portal for the general public to access the Metaverse universe, thereby increasing foot traffic in the Metaverse region. Simultaneously, the Metaverse area provides technical assistance to the digital art domain, thereby heightening the audience's immersion and engagement. It allows the viewer to engage in social interactions, virtual entertainment, virtual travel, and cultural exchanges simultaneously.

This study clarifies the significance of digital art scenes within the structural dimensions of public art spaces and virtual space models, providing a novel perspective and theoretical foundation for future research endeavours. This theoretical framework is expected to serve as a valuable resource for future scholars and practitioners, allowing them to gain a deeper understanding of digital art scenes and exploit their potential for enhancing the appeal of public art spaces. In addition, it is anticipated to contribute to the enhancement of urban cultural life and facilitate the sustainable growth of cities.

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