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RESEARCH ARTICLE

A Multi-Dimensional Model of Intelligent Art Exhibition Development in China: Insights from Grounded Theory

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ABSTRACT

The integration of intelligent technologies such as artificial intelligence (AI), virtual reality (VR), and the Internet of Things (IoT) is reshaping the landscape of art exhibitions globally. In China, this digital transformation is gaining momentum, yet the absence of a comprehensive, context-sensitive model limits the understanding and implementation of intelligent art exhibitions. This study addresses that gap by investigating the developmental dynamics of smart exhibitions within China's cultural sector. The research aims to explore the challenges faced by art institutions, examine the impact of intelligent technologies on artistic creation, and identify strategies for harmonizing technology with artistic and cultural values. Adopting a Straussian grounded theory approach, the study conducted 22 semi-structured interviews with visual artists, curators, art agency professionals, and audiences involved in intelligent exhibitions. The findings reveal a multi-dimensional model comprising three interrelated core categories: Exhibition Challenges (resource constraints, technical barriers, and market uncertainties), Creative Impact (changes in artistic tools, values, and environments), and Inclusive Development (balanced integration, institutional innovation, and standard-setting). These dimensions are interconnected in a cyclical framework that reflects the dialectical tensions between technological innovation and cultural authenticity. The study concludes that intelligent art exhibitions in China require not only technological adaptation but also cultural sensitivity, strategic planning, and institutional readiness. The proposed model contributes to theoretical development in digital culture and offers practical guidance for curators, policymakers, and cultural institutions navigating the intelligent transformation of the art sector.

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Contribution/Originality: This study develops a grounded, multi-dimensional model of intelligent art exhibitions in China, integrating technological, creative, and institutional dimensions. It uniquely traces the shift from traditional to smart exhibitions and reveals how emerging technologies reshape visitor experience, curatorial practices, and cultural preservation within the context of China's digital cultural transformation.

1. Introduction

In recent years, the integration of intelligent technologies such as artificial intelligence (AI), virtual reality (VR), and the Internet of Things (IoT) has significantly transformed the landscape of art exhibitions. These technologies have also improved interactivity and interaction, and people can uniquely engage with art. For instance, VR has been used to enhance the viewers' engagement by providing them with a more profound experience, while AI has been used to design personalized art tours that have changed the conventional ways of exhibiting art (Kenderdine, 2016; Kwastek, 2013).

The Chinese cultural industries have gone digital due to government support and massive investments in the country's digital markets. The Chinese government's 'Digital China' plan has effectively focused on applying digital elements in various fields, including art (Zhou, 2021). Some of the major cities, like Beijing, Shanghai, and Guangzhou, were found to be great centers of digital art where technology and art are blended. These cities have hosted several exhibitions that apply VR and AI and use technology to improve cultural experiences, making it a trend to incorporate technology into the exhibition (Wu, 2020).

It is evidenced by the recent surge in the application of intelligent technologies in Chinese art that the use of new media in art has both the creative potential and the problems linked with introducing new technologies into the art world.

1.1. Research Gap

The advancement of intelligent technologies like artificial intelligence (AI), virtual reality (VR), and the Internet of Things (IoT) have changed art exhibitions around the world by providing creative interactivity to visitors and making the operations smooth and efficient (Kenderdine, 2016; Kwastek, 2013). This is especially evident in China, as it coincides with the country's strategic plans, such as "Digital China," aimed at improving cultural sectors (Zhou, 2021). Beijing and Shanghai are some of the cities that are the most popular among digital art exhibitions, as the technology has become popular in the culture sector (Wu, 2020).

However, there is still a severe lack in the existence of grounded, systemic models concerning the development and construction of intelligent art exhibitions. Previous research has examined chiefly the technology factors or investigated single solutions without developing extensive frameworks that would explain the diverse nature of these technologies and their impact (Zhang, 2024). For example, the use of AI in art generation is quite well-discussed, yet the curatorial and the experiential aspects are not researched extensively (Hohl, 2009).

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In addition, social and cultural factors in China increase the challenge of using intelligent technologies in art exhibitions. The increasing technological advances and the disparity in culture require models that are not only of the technological world but also of the culture (Ji et al., 2023). The lack of these models poses a problem in the planning and development of intelligent art exhibitions, raising a significant research gap.

1.2. Research Objectives

Intelligent technologies and modern art exhibitions have introduced a new paradigm of curating and producing art. The advancements in technology, including AI, VR, and IoT, have not only improved the level of interactivity and audience but also have created issues regarding authenticity, creativity, and culture (Grau et al., 2019; Paul, 2015). Although intelligent exhibitions have become more prevalent in China, very few studies in this context have investigated the developmental processes in detail (Zhang, 2024; Zhou, 2021). Additionally, while most of the current literature focuses on technological possibilities or audience reception, there are not enough theoretical frameworks to reflect the system in actual practice (Candy & Edmonds, 2018; Ji et al., 2023).

This study aims to establish a multi-dimensional GT to elucidate how intelligent art exhibitions are developed in China. The research focused on three major objectives:

i. To investigate the core challenges—such as resource limitations, technical complexity, and market uncertainty—faced by art exhibitions adopting intelligent technologies;
ii. To explore strategies for balancing technological integration with artistic expression in pursuit of harmonious development;
iii. To analyze how the intelligent era has reshaped visual artists' creative methods, value systems, and production environments.

1.3. Research Questions

To address these objectives, the study posed the following research questions:

i. What challenges did Chinese art exhibitions face in the era of intelligence?
ii. How can the harmonious development of art and technology be maintained in the context of intelligent exhibitions?
iii. What impact does the intelligent era have on the creation and identity of visual artists?

1.4. Methodological Framework

In this research, the author chose grounded theory as the central paradigm to investigate the multifaceted process of intelligent art exhibitions in China. Glaser and Strauss (1967) first developed grounded theory in 1967, during which the process involved identifying theories from data collected systematically and analyzed. It was particularly suitable in research settings with a lack or limited development of the theory (Charmaz, 2006).

Using the grounded theory approach meant that the researcher did not impose outside theoretical frameworks but developed the theoretical categories from the research data. This was especially important because intelligent technologies are dynamic and can vary depending on the context of the Chinese art exhibition (Bryant & Charmaz, 2019). Other studies in digital creativity and interactive media have also supported the use of grounded theory as a robust approach to identifying emergent patterns in art and

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culture practice (Candy & Edmonds, 2018; Hohl, 2009).

This research used open, axial, and selective coding methods of grounded theory, which offered an organized and cyclic approach to data analysis. This allowed the development of a multi-faceted theoretical framework encompassing curators' and artists' practices, viewers, and institutional workers in China's evolving digital art environment.

2. Literature Review

2.1. Intelligent Art Exhibitions: Definitions and Global Trends

Intelligent art exhibitions are those that employ digital technology tools, including AI, Virtual Reality (VR), augmented reality (AR), big data, and the Internet of Things (IoT) to enhance the visitor experience, curatorial content, and space. Intelligent formats are different from conventional expositions as their applications of computational intelligence are not only limited to the display design but also to the feedback systems, tracking, and dynamic content generation (Grau et al., 2019; Kenderdine, 2016). Such may be designed to erode the divide between the artwork and the onlooker, turning the latter into a performer within the technologically interactive sphere (Kwastek, 2013).

It is noteworthy to mention that institutions all over the world, including the Mori Art Museum of Japan, the Louvre of France, and the Smithsonian in the United States, have applied intelligent exhibitions to reproduce cultural activity, especially among the young generation (Parry, 2013). For instance, the British Museum's experience in "Ancient Egypt" shows how immersion in storytelling brought forth by real-time simulation and narrative helps to close historical distance (Economou, 2015). In the same way, the ZKM Center for Art and Media in Germany has continued to support intelligent installations incorporating AI in generative art (Paul, 2015).

While intelligent exhibitions have become popular in the exhibitions industry, advancements in this area vary from country to country. It has been ascertained that the former refers to Western institutions' more developed digital resources and interdisciplinarity. At the same time, the latter concerns the lack of funding, policies, and technical support for development contexts (Katifori et al., 2017). Besides, the question of data ownership, the relationship between an artist and the artwork, and the role of technology in the artistic process has raised debates on the agency of the machine (Candy & Edmonds, 2018; Rinehart & Ippolito, 2014). These global trends indicate that international art exhibitions have benefits and challenges that can be discussed to understand how they can be adapted in countries like China.

2.2. Existing Research on Digital Transformation in Chinese Art Institutions

The digital transformation of Chinese art institutions has been significantly influenced by national policies promoting integrating digital technologies within the cultural sector. Since 2016, the Chinese government has promoted the use of digital technology in the contemporary art business, and the use of the technology has become widespread across various organizations and in various professional practices (Duester & Zhang, 2024).

As for the application of innovative approaches, Chinese museums have adopted digital twins and virtual reality (VR) to enrich the content and save historical artifacts. For instance, the Dunhuang Academy and the Chengdu Museum have adopted VR to offer

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new ways of experiencing the exhibition (The VR Collective, 2024). On the same note, the introduction of AI has made it possible to have virtual docents and tours to enhance the experience of the museums (Global Times, 2022).

However, the following issues are some of the major challenges that Chinese art institutions experience in their digital transformation. From the study done by Zhang (2024), the challenges identified include a lack of funds, a lack of enough expertise in the digital world by the curators, and the need for other support staff to tackle the digital departments. Also, due to the dynamic advancement in technology, there is a need to train staff continuously and ensure that they update themselves with innovations to manage and curate digital exhibitions.

The COVID-19 outbreak led to the adoption of online exhibitions, and since museums lost their visitors during the lockdowns, they started making online exhibition platforms. This period recorded a higher increase in digitization, and various institutions opened online tours and engagements with the public (People's Daily Online, 2020). However, it also revealed a digital disadvantage regarding the urban-rural gap in using digital resources, meaning that equality in terms of digital infrastructure is necessary (Zhang, 2024).

In conclusion, it was found that although there are promising advancements in Chinese art institutions concerning technology integration, some issues concerning funding, skill development, and regional disparity are still persistent. Therefore, future studies should endeavor to establish solutions for the challenges and improve the scope and quality of digital services in art institutions in China.

2.3. Challenges and Opportunities in Tech-Art Integration

The use of technology in art exhibitions in China has opened up new avenues for creativity and the reception of artworks. This fusion also creates a rather intricate field of aspects that can be considered opportunities and threats for art institutions.

Another issue that deserves mention is the problem of having limited funds at the disposal of many art colleges and universities. Integrating such technologies as AI and VR is difficult as it may involve significant investments. The lack of sufficient finances to fund these technological enhancements reasserts itself as a digital divide among smaller museums and galleries (Zhang, 2024). Furthermore, human resources are scarce and possess the skills of curating and managing technology-enhanced exhibitions. This challenges the integration and management of new technologies and calls for the training of curators and staff (Duester & Zhang, 2024).

Nevertheless, the use of technology has several benefits, as highlighted below. Applications of VR and AR in the field of education can generate high audiences and levels of engagement. For example, the Central Academy of Fine Arts Museum (CAFAM) has been experimenting with integrating science, technology, and art to increase people's involvement in education (Jin, 2024). In addition, there are online means through which art institutions can expand their operations beyond physical regions, thus providing virtual visitation to galleries and collections, especially during the COVID-19 pandemic, as noted by Zhang (2024).

In conclusion, despite the challenges facing technology application in art exhibitions in

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China, the opportunities for the development of innovation and the interaction between the artists and their viewers are vast. This paper will thus examine the best approaches through which financial and skill-related hurdles can be overcome through strategic investment and training to enhance art and technology.

2.4. Gaps in Theory and Empirical Evidence

Digital transformation in art institutions has become an important topic in China, but the current literature mainly discusses the application of technology and policy studies. Even so, there is a lack of theory-building context focusing on the specific experiences of stakeholders in such institutions. This has left a gap in the knowledge regarding the socio-cultural factors that underlie the integration of digital technologies in the Chinese art context.

For example, Ji et al. (2023) focused on the development of digital art in China by studying artworks to make a call for a further understanding of the culture and artistry of digital media. Nevertheless, their study focused more on the historical perspective and did not develop models based on empirical evidence. Similarly, Ma (2024) examined the role of digital media in constructing Chinese art theory and aesthetics but did not use qualitative methods to investigate the artists and curators' narratives.

However, Zhao et al. (2023a) studied the digital economy's effect on this country's creative industries. They found out that the digital economy positively influences the expansion of industries. However, it did not consider the stories and the social background that the quantitative analysis could not reveal as qualitative research would. The lack of such research means that there is limited understanding of how digital change affects art practices, the process of curation, and engagement with audiences among Chinese art organizations.

To fill this research gap, qualitative research methods, including interviews and ethnography, must be employed to develop theories more applicable to Chinese art institutions. Such approaches would be more helpful in understanding the prospects and threats posed by digital transformation, leading to more culturally appropriate solutions for integration.

3. Methodology

3.1. Research Design

This research work adopted the Straussian variant of Grounded Theory (GT) as a research method for the study of the development of intelligent art exhibitions in China. Grounded Theory was selected because it allows the development of the theory from the data collected and is particularly appropriate in areas where few existing theories are available (Glaser & Strauss, 1967; Strauss & Corbin, 1998).

The study was carried out in China because it is one of the most technologically advanced countries that have integrated AI and VR into art exhibitions, and the three most developed cities - Beijing, Shanghai, and Guangzhou in terms of digitalization, governmental support for culture creativity, and usage of new technologies in exhibitions. These sites were chosen to achieve the research objectives and their dynamism in the evolution of China's digital culture.

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The target population comprised people involved in intelligent art exhibitions' curation, production, and experiences, including artists, curators, art agents, and the public. Since this study was conducted qualitatively, the aim was to discover the views and experiences rather than obtain the overall picture.

The sample comprised of 22 participants, out of which 4 were artists, 3 were curators, 4 were professionals from art organizations, and 11 were the audience. From the above details, it is clear that the sample size was done theoretically to the point of saturation in line with the grounded theory (Guest et al., 2006). The sampling technique used was purposive because the participants were purposely sought from the population of individuals who recently participated in intelligent art exhibitions. Such an approach provided multiple perspectives of the phenomenon's institutional, curatorial, and experiential aspects.

The research instrument used in the study was the semi-structured interview guide, which provides an opportunity to delve deeper into the experiences of the participants and, at the same time, provides a level of uniformity to the questions posed to the participants. The interviews took an average of 45 to 60 minutes and were recorded and transcribed for analysis.

Data analysis was done using the coding processes of Straussian GT, which included open coding, axial coding, and select coding. Therefore, a constant comparative analysis was employed to refine and define the nature of the relationships between the categories to develop a multi-dimensional theoretical model.

The Research Ethics Committee of Universiti Teknologi MARA (UiTM) approved the research. All participants read and signed information sheets and obtained informed consent before the study in compliance with the Declaration of Helsinki and institutional ethics. To ensure the participants' rights, they were informed of their right to confidentiality and anonymity and to withdraw from the study at any time.

3.2. Data Collection

The research method employed in the data collection in this study was interviews as planned in the research proposal and documented in the methodology chapter. This helped allow the researcher to follow up on emergent themes while not deviating from the overall aims and objectives of the study as suggested by Adams (2015). One significant advantage of semi-structured interviews is that they are particularly useful for grounded theory as they provide contextually detailed responses and reveal meanings.

Each interview was conducted based on a semi-structured interview guide comprising broad questions formulated to understand the subject of intelligent art exhibitions in terms of adoption, implementation challenges, creativity, and development. The questions were developed further after pre-testing to enhance the clarity and relevance of the questions based on the theoretical sampling and grounding theory concept (Charmaz, 2006; Strauss & Corbin, 1998).

The data was collected over 3 months, from July to September 2024, and on both an online and face-to-face basis, depending on the participant's preference and

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availability. The face-to-face interviews were conducted in Beijing, Shanghai, Guangzhou, and some other cities, while the online interviews were conducted using secure online meeting platforms to reach the participants in other areas. It also guaranteed maximum population coverage while ensuring the interviews were of high quality.

The sessions were conducted for about 45 to 60 minutes each, and all the sessions were audio-recorded with the consent of the participants. As a next step, all the interviews were tape-recorded and transcribed to produce a written text, which was then subjected to coding and analysis. Notes were also taken during the field setting to record body language and other related observations to enrich the study's outcome and validity (Boscaino, 2021).

This approach of multiple data collection cycles helped in the emergence of the grounded categories and building a rather consistent, contextually informed theoretical model of the intelligent art exhibition development in China.

3.3. Data Analysis Process

It was necessary to assign unique participant identification numbers to all verbatim quotes to ease understanding when presenting the findings and coding segments containing quotations. Every interviewee was given a code that referred to the position within the structure of the intelligent art exhibition–the role of an artist, a curator, a professional of an art agency, or a viewer, and a numerical code based on the order of the interviews.

More specifically, the identifiers P1 to P4 were related to visual artists, P5 to P7 to curators, P8 to P11 to art agency workers, and P12 to P22 to the audience. For example, "P1: Artist" denotes the first interviewed visual artist, and "P7: Curator" denotes the seventh interviewee, who was a curator.

This labeling system was useful in differentiating the participants from each other and in seeing the various views representing institutional, creative, and experienced settings. All direct quotes were in italics to distinguish the participants' words from the researcher's general comments or analyses. This practice promotes the principles of disclosure, improves interpretive usability, and is commensurate with the current guidelines for grounded theory studies in qualitative accounting (Etikan et al., 2016).

3.3.1. Open Coding Analysis and Initial Categories

Open coding was the first stage of coding in this study to develop preliminary theoretical codes from the interview transcripts. In this way, the textual fragments extracted from the qualitative data gathered from interviews with curators, artists, employees of art agencies, and spectators were divided into lines of meaning, and conceptual labels were assigned to them. These labels can also be referred to as free nodes or primary concepts and their purpose was to define patterns of meaning that the participants used in their descriptions, feelings, and assessments of intelligent art exhibitions.

The purpose of this coding phase was to find data fragments regarding three major categories: challenges of the new intelligent era to Chinese art exhibitions, art creation by intelligent technologies, and co-evolution strategies of art and technologies. This way, the initial codes were constantly compared, modified, and grouped according to the

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identified themes. To reach the objective of providing reliability and conceptual clarity to the emerging categories, the labels that appeared only once or that were insignificant to the research objectives were omitted.

This process led to the creation of 27 initial categories (shown in Table 1) derived from the interviews. These categories of themes were general concerns about the exhibition that may involve issues such as economic constraints, site constraints, lack of talent, equipment issues, and insecurity, among others. Creativity-related nodes include tool change, expression, art, and technology. At the same time, co-development strategies were expressed in categories: integrated innovation, operational innovation, training and development of human capital, integration of resources, assurance of quality, and means of assessment.

Table 1: The 27 Initial Categories

Initial Categories	Original Text Sentence
Economic Pressures	*"Money is one thing. He said his original product was relatively high, so he needed more money. This is a requirement from one place to another, and there are also big requirements."* (P5: Curator)
Site Restrictions	*"But we cant find a reasonable or easy way to achieve artificial intelligence art, such as a partner or a venue to build some kind of equipment."*(P6: Professional)
Lack of Talent	*"Then how many talents can you actually produce, and how intelligent and high-tech these people are, they should all be in big companies, like Tencent. Baidu is one such big company; it might have more, with higher salaries. Do you think a government agency can afford such expensive talent?"*(P8: Professional)
Equipment Problem	*"In terms of equipment, most of the equipment is rented. For example, it is rented on a daily basis, on a monthly basis. For example, when the exhibition is over, it is rented. It is all equipment."*(P6: Professional)
Operation Difficulty	*"And then there are a lot of things that involve professionalism, and the people who work at the venue, and everything that they dont have access to, are all things that need to be repaired or adjusted by professionals."*(P7: Professional)
Security Risk	*"I think I will still be a little worried about the disclosure of personal information, but since some of the exhibition halls are relatively authoritative, I still trust them."*(P10: Professional)
Audience Acceptance	*"So I think there is a difficulty in this, that is to say for the public or those who have been on the road for years, there is a bigger problem for those who are older and not familiar with this kind of equipment. So I think this is a problem that needs to be considered or solved later."*(P13: Audience)
Business Model	*"The threshold may be too high, and smaller exhibitions or less developed cities may have fewer smart technology events, which may be limited to people in remote rural areas."*(P14: Audience)
Homogenization Is Serious	*"What hes doing is copying images, copying things that other people already have. This is just a kind of artisanal copy. So when ai1 came out and got slapped in the face, it was because AI could quickly produce these things."*(P14: Audience)
Tool Change	*"There was also a VR virtual reality in the exhibition I curated, including the intelligent one, which may be a specific exhibition that assists in searching for some artists information."*(P3: Artist)
Expression Expansion	*"Its not a large group of people who pay attention to it, but through this kind of check-in Internet celebrity exhibition, it has a good publicity effect. I think this is an important significance of the Internet celebrity exhibition and check-in Internet celebrity."*(P12: Audience)

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Initial Categories	Original Text Sentence
Creative Concept	*"Intelligent technology actually has a very wide range, and the characteristics of easel painting? It is flat. If we look at the function of art museums, we need to explore and dig deep into the culture of our country."*(P2: Artist)
The Question Of Authenticity	*"So weve seen that in recent years, the online galleries, or the pure online virtual galleries in the United States, havent really developed further, or have not been better represented, and I think its probably because of this problem. Specifically AR."*(P11: Audience)
Copyright Protection	*"This is primarily about the organizers informing the audience of certain matters. When they say something, its about protecting information. In fact, for each digital exhibition at our station, it has been authorized by art institutions or artists themselves. After obtaining authorization, they develop various products, including the software they use, all of which have been authorized. Regarding the privacy of our audience, authorization is a key aspect."*(P10: Professional)
Artistic Depth	*"I think its like maybe a lot of people are crazy about this kind of intelligence, or this kind of pursuit of visual effects, and maybe I think it affects the work itself, or the way that work expresses this idea."*(P2: Artist)
Market Orientation	*"This is what I think is a good way to use AI, but how to support the exhibition may still need to be explored. I think one of the more intuitive points is that VR technology has been popular in online exhibitions in recent years."*(P11: Audience)
Technology Dependency	*"The work itself has its own breath, which is not your value, not the problem of value. It is the unique breath of each work when it is produced by the work 11. But AI works cant achieve this kind of personalization and uniqueness."*(P11: Audience)
Innovation Pressure	*"The biggest challenge in the process is that you need a big model, you need more models and creative ideas, and then you need to learn English."*
Technology Is Moderate	*"I think the key to this visual is to make sure that the technology serves the content, not overshadow it, but just to show the visual effect."*(P3: Artist)
Art First	*"It was a painting exhibition. Ive been doing a lot of new media, including immersive exhibitions, in recent years... but I still feel that its better to see the original."*(P5: Curator)
Integrated Innovation	*"It may be some of the traditional ones. Exhibitions bring new thinking to intelligence, and then on this basis, they combine it, or update it, or innovate it, or there is a certain part of inheritance in this."*(P1: Artist)
Operational Innovation	*"Including the design team, the design of posters, the space design, including some searching for information, writing questions, writing copy, these people through ai, its said that they may have saved at least half of the people, and they say that it can help curators to reduce a lot of work."*(P7: Curator)
Talent Development	*"If its possible, we can cultivate some technical talents, because of such professional skills."*(P9: Professional)
Resources Integration	*"We will say that including the future, such exhibitions will become increasingly accessible to the public, delving deeper into your experience. With this digitalization, from professional spaces all the way to commercial spaces, including public spaces, even extending to restaurants or other such spaces. In the future, we can even hold exhibitions in our homes and various other spaces."*(P9: Professional)
Codes Of Practice	*"Generally speaking, this is also part of intellectual property rights, and we should improve the law to perfect it."*(P10: Professional)
Quality Control	*"I think its more about looking at the quality of the experience. If its just a very ordinary one, I say yes. Its a digital interactive experience or its not a digital interactive experience, and if it doesnt have much impact on my*

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Initial Categories	Original Text Sentence
	viewing of the exhibition, then I probably wont choose to use it."(P12: Audience)
Evaluation Mechanism	*"The relevant laws should be regulated, and on the other hand, there should be clear agreements to sign. This is a more feasible solution, I think."*(P10: Professional)

The themes generated from the 27 conceptual nodes were the basis of the axial coding process, which involved categorizing codes into higher-order categories. This open coding phase was to maintain the focus of the emerging theory on the empirical facts and to capture the dynamics of the intelligent art exhibition practices in the Chinese context.

3.3.2. Axial Coding and Core Theme Development

After the open coding process, in which 27 different conceptual categories were developed, the research proceeded with axial coding to elaborate on the data. The process of open coding allowed for the emergence of many concepts that refer to difficulties in exhibitions, creativity, and strategies; however, these concepts were not given a clear structure. Axial coding handled This issue well, which involved categorizing the data by patterns, relationships, and categories of higher order.

This phase involved categorizing the 27 initial codes into higher-order categories to identify patterns of relationships. Thus, nine major topics were identified from the comparisons and were further grouped into themes: resource limitation, technical issues, market issues, creativity, arts, creative environment, both-sided development, optimal strategies, and standards. These categories were further grouped into three broad core categories (shown Table 2) underpinning the grounded theory model: Exhibition challenges, Creative impact, and Inclusive Development.

Table 2: Axial Coding and Core Theme

Core Areas	Fundamental Category	Initial Categories
Exhibition Challenge	Resource Constraints	Economic Pressures
		Site Restrictions
		Lack Of Talent
	Technical Barriers	Equipment Problem
		Operation Difficulty
		Security Risk
	Market Woes	Audience Acceptance
		Business Model
		Homogenization Is Serious
Creative Impact	The Way Of Creation	Tool Change
		Expression Expansion
		Creative Concept
	Artistic Value	The Question Of Authenticity
		Copyright Protection
		Artistic Depth
	Creative Environment	Market Orientation
		Technology Dependency
		Innovation Pressure
Inclusive Development	Balanced Development	Technology Is Moderate
		Art First

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	Strategy Optimization	Integrated Innovation Operational Innovation Talent Development Resources Integration
	Standard Construction	Codes Of Practice Quality Control Evaluation Mechanism

The Exhibition Challenges subthemes are the resource issues, such as economic factors, space constraints, lack of qualified manpower, technical issues, equipment troubles, operational issues, security concerns, and market issues, including audience reception, business model issues, and standardization. These are some of the systematic challenges experienced by art institutions that embrace intelligent technologies.

Creative impact can be defined as changes in the approach to creativity (such as a tool switch or an expansion of the way creativity is expressed), the place of artistic creation in today's society (like the issue of originality and copyright), the market climate, use of technology, and the pressure to innovate.

Inclusive development involves strategic planning and execution, such as appropriately incorporating technology and art in institutions, enhancing organizational efficiency, and setting industrial benchmarks.

With axial coding, the analysis transitioned from the initial code-structured categories to the development of different, more complex concepts to embrace the evolving and complex change happening in Chinese art exhibitions in the intelligent era. This step was done to facilitate selective coding and constructing the theoretical model.

3.3.3. Selective coding

The last step in the grounded theory analysis in this study was selective coding (shown Table 3) since it involved the refinement of the axial codes into the key concepts of Exhibition Challenges, Creative Impact, and Inclusive Development that formed the study's theoretical framework. This was done to facilitate the process of theorization of the core category which was labelled as the course of evolution of intelligent art exhibitions in China. The study aimed to establish how the various factors influence and facilitate the development of intelligent exhibitions in the context of socio-technical change.

Table 3: Selective Coding Result

Positionality	Structural Connotations	Typical Case
Resource Constraints lead to Policy Optimization	Resource bottleneck drives exhibition institutions to seek innovative strategies	*"High equipment investment and maintenance costs, new operating models and resource integration need to be explored"*(P5: Curator)
Technical Barriers lead to Balanced Development	The difficulty of applying technology has led to a search for a balance between technology and art	*"Technology should serve the creation of art and avoid overshadowing the main event."*(P3: Artist)

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Creative Method lead to Artistic Value	Intelligent tools change the way of creation and affect the value of art	*"New technologies bring efficiency to creation, but may affect the authenticity and artistic depth of works."*(P2: Artist)
Market Dilemma lead to Standard Construction	Market issues drive the establishment of industry standards and norms	*"The exhibition is highly homogeneous and needs to establish quality standards and evaluation mechanisms."*(P14: Audience)
Creative Environment lead to Fusion Innovation	The change of creative environment promotes the integration and innovation of tradition and modernity	*"While maintaining the essence of art, explore the possibilities of innovation brought by new technologies."*(P1: Artist)

As for resources, the category was deemed relevant in altering institutional practices by forcing exhibition organizers to devise policies and re-strategize due to limitations on finances and space. One of the curators even said, "*High equipment investment and maintenance costs, new operating models, and resource integration have to be discovered."* (P5: Curator)

Technical factors such as operational and skill-based issues were the reasons that led the institutions to adopt a balanced development strategy. This strategy stressed using technology as a tool, not a weapon, in attaining artistic goals and aims. One of the participants expressed it in the following way: ''*Technology must always assist in the creation of art, and it should not dominate the event*.''(P3: Artist)

As for creative practice, intelligent tools remolded art techniques, which, in turn, impacted artistic value. Some of the technologies improved efficiency but at the same time served as a cause for concern for the originality and depth of the creations one artist said, *"New technologies make the creation faster, but the issue arises about the originality and the depth of the artwork."*(P2: Artist)

Two primary issues in the construction market have led to the need for standard construction: homogenization and audience segmentation. Institutions suggested better evaluation methods and quality indicators: *"The exhibition is very similar and may require the formulation of more definite quality checks and measures."* (P14: Audience)

Finally, advancement in the creative platforms and interaction with the public led to the fusion of innovation, combining tradition with technological advancement. Another respondent stated: *"On the one hand, you should preserve the art aspect to the maximum, on the other – consider how the new technologies can influence it."* (P1: Artist)

Altogether, these relationships provided a theoretical framework for the study, encompassing different dimensions of intelligent art exhibitions in the context of China's socio-cultural and technological environments.

3.3.4. Theoretical saturation test

In qualitative research, especially in grounded theory, theoretical saturation refers to a stage where more data collected do not generate new codes or categories, implying that the sample data is adequate to develop the theoretical framework (Glaser & Strauss, 1967). This means the categories and themes are sufficiently elaborated, and the additional data will not bring new qualitative findings (Guest et al., 2006).

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Therefore, a comprehensive method was used to identify the theoretical sample regarding Chinese art exhibitions' challenges and developmental strategies in the intelligent era. First, qualitative data were gathered from semi-structured interviews with directors of the art institution, curators, artists, and audiences. The open coding procedure helped define the first concepts related to the research along the lines of resource constraints, technical challenges, creative effects, and inclusive development.

This means that in the process of the research, a continuous comparison was made, during which new data collected was compared with the categories and subcategories developed with a view of identifying other concepts that may be emerging. This was done by refining and merging the categories to improve the clarity of the concept and the agreement between coders (Strauss & Corbin, 1998). The process was concluded by forming three significant categories: exhibition challenges, creative impact, and inclusive development.

To ensure that theoretical saturation has been achieved, the data from various interviews was carefully analyzed to check for inter-observer reliability of the identified categories. This process verified that the subsequent data did not bring new properties or dimensions within the identified categories and thus met the theoretical saturation criterion according to the qualitative research methodologies procedures (Fusch & Ness, 2015).

The fact that the theoretical framework was established based on the data collected in the current study brings more credibility to the theoretical saturation attained in this study, as it indicates that the theoretical framework is comprehensive in capturing the diverse complexities and strategies that are associated with the evolution of art exhibitions during the intelligent era. This framework also outlines the significant problems facing intelligent exhibitions. It explains the reasons that could be responsible for such issues while also offering ways to improve the quality and efficiency of the exhibitions through positive adjustments to the framework and standardization.

3.4. Trustworthiness and Ethics

Triangulation and member checks were used throughout the study to improve the credibility of the presented results. Triangulation was done through the use of multiple sources of data that included artists, curators, art agency professionals, and audiences in order to bring together multiple views to verify emerging categories (Denzin, 2012). This methodological pluralism helped enhance the credibility of the data and, at the same time, reduced bias. Member checking was also employed, and participants were given transcribed summaries of interpreted information to validate the findings (Birt et al., 2016). Responses to the questionnaires were considered while analyzing the results, thus increasing data validity.

Consequently, ethical considerations were followed throughout the study. Patient privacy was ensured by excluding any information that could lead to the identification of the patient from the reports and transcriptions. The participants were informed that all their answers would be kept confidential and used for research purposes only. Moreover, before the interviews, participants read and signed consent forms per the ethical research guidelines that included voluntary participation and the right to withdraw from the study without any repercussions (Orb et al., 2001). These procedures met the international ethical consideration for conducting qualitative research, increasing the

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study's credibility, reliability, and validity.

4. Findings

4.1. Core Categories and Concepts

Out of the analysis, three major themes were identified that were key to the development of intelligent art exhibitions in China: exhibition challenges, creative impact, and inclusive development. Challenges of the Exhibitions included systematic factors like resource, technical, and market constraints. Creative Impact pointed out that the onset of unprecedented technologies impacted arts in terms of practice, value, and the overall environment. Inclusive Development discussed the following strategies: The work and use of art and technology, developing institutions, and standardization. These categories served as the framework by which the relationship between technology adoption and curatorial change could be conceptualized during the intelligent exhibition period.

4.1.1. Exhibition Challenges

Several barriers have been observed to affect the development of intelligent art exhibitions in China and they include resource limitations, technical challenges, and market challenges.

a) Challenges

Financial challenges have been a major factor that has limited art institutions' ability to adopt increased technology in their exhibitions. This has posed a challenge to most organizations since they cannot afford good quality equipment, which would enable them to create better exhibitions. Secondly, the lack of human capital by individuals with adequate knowledge in art and technology also fuels the problem because there is a scarcity of people who have the skills in both disciplines. After all, the demand for professionals with such skills is high (Wang & Chen, 2024).

b) Technical Barriers

This is another important factor that has a dual nature to art exhibitions in that they have experienced breakthroughs due to their advancements. It opens new possibilities for artists to create new masterpieces, but at the same time, it poses some challenges associated with the use and functioning of complex systems. It is common for many art organizations to struggle to implement technologies such as virtual reality and artificial intelligence into their art pieces because of the lack of technological skills and resources available to them (Zhang, 2023). However, issues such as data privacy and the conservation of virtual art complicate the process of technicality (Li, 2022).

c) Market Challenges

There are some market problems in the Chinese art market, including market bubbles and price inflations, which are very negative for art exhibitions and their credibility. The soaring art market has induced speculative conduct at times, which has caused turbulence in determining the true worth of the artwork (Cao, 2024). In addition, the rise of fake artwork has created doubts among buyers, and institutions must now identify effective ways to prove the authenticity of the artwork (Chen, 2023).

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To overcome these challenges, more resources need to be devoted, technical competency must be raised to the next level, and higher levels of market control need to be introduced to improve the conditions for intelligent art exhibitions in China.

4.1.2. Creative Impact

Intelligent technologies have significantly impacted Chinese visual artist's creative processes and caused new approaches and changes in considering values. This could be seen in integrating artificial intelligence into art, a cooperative factor in creating art. It was found that 42% of contemporary Chinese visual artists integrated AI into their artworks in 2023, and they did not use it as a mere tool but as a collaborator (Duester, 2024). It will help to create new art that integrates human experience and creativity with the artificial intelligence of machines.

Furthermore, the concept of the Immersive Artspace has evolved with the introduction of Digital Immersive Art (DIA). The expansion of DIA into China's creative economy has brought new perspectives on how to engage the viewers with creative and immersive art and not limited to passive viewing (Duester & Zhang, 2024). This evolution requires a reflection on the value of art, especially because, in this context, the difference between the individual who creates and the one who observes is less clear.

They are also integrating it with traditional art-making practices, revolutionizing the artistic aspects. This is so because, by integrating AI algorithms into their work, artists can create complicated patterns or compositions that humans cannot create, thus enhancing artistic possibilities (Zhao et al., 2023b). Besides, this combination of art and technology improves creativity and, at the same time, raises philosophical questions regarding authorship and originality in the digital age. These are the reasons that indicate that there has been a significant change in the Chinese art scene, marked by the changes brought about by technological advancement and continuing creativity.

4.1.3. Inclusive Development

Intelligent art exhibitions in China have grown and created a need for proper development for its growth, equality development, optimization, and setting of standards. One of them is the proper incorporation of technology and art for individuals with disability as well as other persons in order to make development equal for all. For instance, museums supported by UNESCO's "Accessible Museums for Persons with Disabilities" project implemented between 2024 and 2025 show attempts to make cultural spaces barrier-free for everyone (UNESCO, 2024).

Strategic optimization entails using new techniques that can be implemented in construction to meet sustainable development goals. The application of modular integrated construction is an effective approach that can be taken to help conserve resources and the environment when developing cultural infrastructures (Zhang et al., 2025).

This is because the art exhibition business is still relatively new, and standardization is vital to providing quality services to the public. The current "14th Five-Year Plan for National Economic and Social Development" also emphasizes the development of sustainable development demonstration zones and transformation innovation pilot

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zones, which have become model construction areas in different industries, including cultural industries (Government of China, 2021). All these measures help create intelligent art exhibitions in China, including modernity, technology, and accessibility.

4.2. Interactions Between Categories

The relationships between the challenges and impacts of exhibitions, as well as the factors of inclusion and development, are all contradictory and dynamic, and the idea of 'intelligence' in the transformation of Chinese art exhibitions also contains dialectical elements. The foundational problems of resources and technological issues as core challenges were antithetical to the goal of inclusiveness, which was a tension between accessibility and innovation (Duester & Zhang, 2024). Shortage of funds and variability in the development of infrastructure within the regions limited the institutions, which, in a way, hampered the attempts to provide equal experiences for all, especially in the use of digital technology (Gu & O'Connor, 2023).

Another tension between using intelligent technologies and creativity in art and artistic works is the tension between using intelligent technologies and traditionalist artistic values. AI and VR being creative tools gave rise to new ways of creating art, but at the same time, they created controversies in terms of the originality of the works produced (Li & Wang, 2023). For instance, artists using AI to create imagery had to grapple with issues related to ownership and copyright, as has been the case in society today concerning creativity in the digital realm (Zhang & Zhang, 2022). This tension raised the need for standards and ethical frameworks in the intelligent art market.

Furthermore, inclusive development created a dialectical relationship with creative impact, with positive correlations and contradictory effects. The attempts to reach for balanced growth and standardized construction allowed multiple community engagement and inclusion in digital art, which means that more various groups may approach and influence the creation of such art. However, such standardization sometimes threatened individual creativity, and most products and art forms tended to become standardized (Chen et al., 2024). Therefore, cultural policy strategies that sought to promote inclusive development needed to be well thought out so as not to stifle innovation through the adoption of best practices (Gu & O'Connor, 2023). Altogether, these dialectical interactions highlighted the sophisticated discursive matrix through which intelligent technologies have been introduced to the cultural field, which balances the tensions between modernity and tradition and the public and private domains in Chinese art exhibitions.

4.3. Theoretical Model Presentation

The theoretical model (shown Figure 1) created from the grounded theory analysis provided the conceptualization of the multiple and complex processes involved in the intelligent transformation of Chinese art exhibitions. At its fundamental level, the model defined three key concepts of exhibition challenges, creative influence, and development, which all worked in a system.

The exhibition challenges were considered the key factors that drove the changes and were defined by resource limitations, technical barriers, and market difficulties. Resource constraints included the problem of economic factors, space constraints of a venue, and lack of available human capital, all of which collectively defined sustainable

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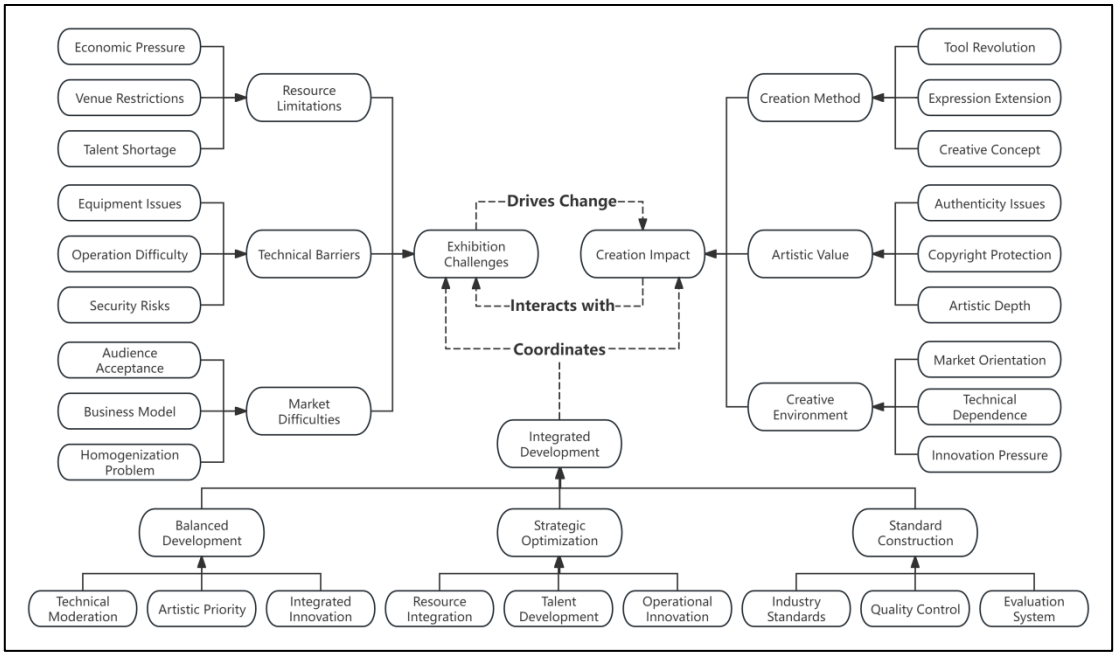
exhibition practices in contradiction to the company's goals (Gu & O'Connor, 2023). Technical barriers such as operation, reliability of equipment, and security concerns made it difficult for intelligent technologies to be integrated into exhibitions smoothly (Duester & Zhang, 2024). Market difficulties extended these challenges by including factors such as fluctuating audiences' acceptance, instability of the business models, and the generalization of exhibition services (Chen et al., 2024).

Figure 1: The Theoretical Model Developed for the Study



These insights highlighted several strengths and tensions of the creative impact dimension, including the creation methods, artistic values, and creative environments. The introduction of intelligent technologies is not just a sign of the advancement of technology but the philosophical changes of an era in art. While intelligent tools enriched the expressive potential and the media, the same tools also raised concerns regarding authenticity and the shallowness of the art (Li & Wang, 2023). Furthermore, other alterations in the creative environment, such as a higher degree of market orientation, growing technical reliance, and higher competitive pressures for creativity, also amplified conflicts between artistry and commerce (Zhang & Zhang, 2022).

Integrated development surfaced as a moderating factor meant to address these issues and conflicts with integrated, balanced, strategic, and standardized approaches to development. Balanced development emphasized the need to integrate technology with artistic spirit while practicing that technological infrastructure was used not to dominate artistic objectives (Gu & O'Connor, 2023). Strategic optimization outlined specific improvement activities such as operation innovation, resource integration, and talent development, which indicate that the approach should be systematic rather than focusing on individual practices (Duester & Zhang, 2024). They established standardized construction, which offered industry standards, quality assurance, and evaluating systems to ensure coherence, durability, and quality during the exhibitions (Chen et al., 2024).

The relations between these categories were cyclical and interdependent rather than sequential. The existing challenges in exhibitions led to changes in the approaches to the

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format of exhibitions and the ways of engaging the audience. Innovative concepts then transformed the business definitions of challenges that affected the distribution of resources and the application of technologies. Overall integration facilitated this cyclic process, whereby the different responses were managed and coordinated via strategic management and policies. This systemic interaction, therefore, implied a continuous cycle of adaptation and optimization, which is seen as a core characteristic of intelligent transformation in the context of Chinese art exhibitions (Li & Wang, 2023). It explained the status of the present systemic connections and provided concrete theoretical frameworks to deal with future problems and direct the development of exhibitions.

5. Discussion

5.1. Theoretical Implications

The proposed multi-dimensional model indeed advanced the theoretical understanding of the development and transformation of digital art exhibitions in China in terms of uncovering various correlations between exhibition challenges, creative effects, and integration. Compared to previous ad hoc approaches, this model provided a more coherent picture of how different components of intelligent art processes engaged in dialogic relations, thus providing a holistic view of the processes at work in intelligent art contexts (Duester & Zhang, 2024).

Specifically, the results expanded the knowledge of the theoretical contradiction between technological advancement and cultural artistry and the conceptualization of the relationship between commercialism and artistry. Earlier research works tended to separate technology impacts from creative effects while leaving out the paradigm changes that take place in artistic practice as a result of integrating intelligence technology (Li & Wang, 2023). This is an area that was not explored enough in previous studies, and this research sought to fill that gap by arguing that the use of digital tools and AI not only changed the way art was created but also brought drastic changes to the artists' value system which indicated a change in the culture production paradigm.

Also, the integrated development category specification offered a theoretical contribution to the model. Thus, the research outlined a clear and feasible development strategy for the digital transformation of art exhibitions by balancing and optimizing development, selecting strategic areas for construction, and standardizing construction. This approach enriched theoretical approaches by pointing out the necessity of the equal development of technology and culture/creativity.

The interactions were dynamic and recursive, which is not an approach that one commonly encounters in other models. Rather than focusing on the direct cause-effect relation, it identified cyclical and system-based feedback mechanisms, thus expanding upon the current conceptualizations of digital cultural systems. These iterative interactions highlighted the importance of the paradigm of flexibility when developing theories of intelligent cultural industries for academic scholars to expand upon the concept of adaptive behavior within digital and art contexts (Chen et al., 2024).

5.2. Practical Implications

This study offered valuable practical implications for policymakers, curators, designers, and cultural organizations related to the art exhibition sector in China. Policymakers

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could use the identified categories of exhibition challenges to guide the distribution of grants, create applicable training initiatives, and facilitate infrastructure improvements. This was important in establishing sustainable exhibition environments supporting the integration of digital technology into the exhibition (Gu & O'Connor, 2023).

Curators found it useful to gain insights into creative effects, especially concerning the relationship between artistic worth and technological approaches to creation. This understanding helped avoid compromising curatorial decision-making, making it easier to include intelligent tools while maintaining the artistic value of the works. Curators who straddled these dialectical tensions could build experiences that enriched the audiences, foster discussions and extension of art and technology, and make sure that the exhibitions remain cultural and artistic (Li & Wang, 2023).

For the designers and artists, the changes in the creative environment, as revealed by the insights provided in the article, highlighted the need for contingency measures. The design culture was to, first and foremost, be seen as innovative while also not losing its freedom to technology, meaning intelligent implementations of such technologies had to be made without compromising the essence of designs. The practical recommendations were to support and encourage the acquisition of continuing education about new technologies and to request more specific directions regarding the ownership of the works created in digital environments to protect intellectual property (Zhang & Zhang, 2022).

Culture was raised to the level of an organized structure and integrated development of cultural institutions was carried out with the help of balanced growth, optimum utilization, and rationalization of work. Such measures as setting standard guidelines for exhibition industries and criteria for assessing exhibitions' results may greatly increase the effectiveness of institutions and the quality of exhibitions. Adopting operation innovations, resource integration practices and holistic talent management processes would enhance efficiency in managing institutions and help establish institutions ready to embrace ever-evolving technologies (Chen et al., 2024).

These practical implications pointed to the need to adopt a strategic and systematic approach, which would allow stakeholders to work well in managing intelligent transformations in art exhibitions, resulting in sound and culturally enriched effects.

5.3. Integration with Existing Theories

The theoretical model in this study advanced prior theories by including exhibition challenges, creative effects, and integrated development sequentially and in relationship to intelligent art exhibitions. In contrast to the prior works, which investigated specific areas of digital transformation in silos, this framework offered a systemic view by defining intricate interlinkages and reciprocal causation between the components (Duester & Zhang, 2024). Therefore, it developed and extended ideas of the innovation diffusion theory covering the acceptance of new technology and the subsequent social-cultural change when the technology is applied in an art context (Rogers, 2003).

The model also expanded the Technology Acceptance Model (TAM) by adding technical factors and the audience to the challenges faced by art exhibitions. Although TAM has focused on perceived usefulness and ease of use as major constructs, this study's framework added new dimensions, such as resource constraints and market challenges,

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that enhanced the understanding of how external organizational factors impacted the implementation of technology in cultural organizations (Venkatesh & Bala, 2008). This approach questioned TAM to a large extent because structural and market-oriented factors greatly determined some variables in the art sector.

Furthermore, the framework discussed cultural sustainability theories, especially to the extent of analyzing the tension between technology enhancement and art aesthetics. This critical dialogue was in line with current discussions regarding digital authenticity and cultural integrity by appreciating the role of intelligent technologies without compromising the cultural essence of people and their societies (Li & Wang, 2023). In this way, the model offered new directions for inclusive development, including the balanced development and standardization approaches, which supported other sustainability frameworks that called for integrating innovation and heritage conservation (Gu & O'Connor, 2023).

This theoretical integration helped advance by elaborating, enriching, and problematizing existing theories. It offered a virtually exhaustive theoretical framework to approach the multifaceted relationship between art, technology, and managerial action in the era of digitalization.

5.4. China-Specific Insights

This study's results provided several key findings specific to China, revealing the cultural, economic, and infrastructural factors underpinning the intelligent transformation of art exhibitions. In terms of culture, incorporating intelligent technologies into artistic works challenged historical conventions of symbolism in art, craft, and philosophical perspectives. This tension was evident in artists' careful balancing act between maintaining cultural identity and incorporating technology, which is a more general discourse about concerns of globalization and loss of culture in China's rapidly progressing transformation into a modern society (Li & Wang, 2023).

From the economic perspective, the development of intelligent art exhibitions in China was affected by the unbalanced regional investment, the gap between large and small cities, and the strategic emerging industry policies. Large cities like Beijing, Shanghai, and Shenzhen achieved significant growth due to governmental and corporate funding in digital cultural sectors, while other areas had insufficient funds and infrastructure for similar intelligent practices (Gu & O'Connor, 2023). This contributed to the formation of an irregular regional structure of digital art and created difficulties for the unification and accessibility of digital art across the country.

Furthermore, from an infrastructural perspective, the significant development of 5G and other related digital technologies in China enabled AR, VR, and AI applications in the context of exhibitions. However, these advancements also brought out issues such as compatibility, shortage of talent, and lack of standardization in implementation across different institutions. The absence of extensive training courses and career mapping for art workers became the limiting factor in developing intelligent exhibitions, particularly in districts that are not megalopolises (Chen et al., 2024).

In addition, policy directions were also important in the determination of institutional behavior. Including the digital culture in developmental strategies like the "14th Five-Year Plan" helped boost intelligent technology integration into the cultural sectors. Still,

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the implementation was not consistent, and that is why context-sensitive policies need to take into account the cultural environment and institutional realities in a given country (Zhang & Zhang, 2022).

5.5. Limitations

The following are the study's major limitations in terms of scope and the extent to which the study may have captured all the pertinent information concerning the objectives and research questions. The study was based on intelligent art exhibitions in China. Still, the variation of the exhibition forms and the maturity of technology in regions made the conclusion improbable for use in the national setting. The inability to capture all the areas of the entire sector due to regional differences in digital infrastructure and policy implementation was another issue (Gu & O'Connor, 2023).

Concerning the limitations of the study, the sample size was another hindrance. The limitations of the study stem from the fact that 22 participants, including artists, curators, art agency workers, and audience members, contributed qualitative data only, and the sample size was small, so the findings cannot be generalized. Such qualitative research tends to focus more on depth rather than width; however, having participants from more institutions and geographical locations would increase the validity and reliability of the study (Patton, 2015).

Furthermore, the application of the theoretical model to international settings may be limited. It was interesting to note that the cultural, economic, and institutional requirements of China were different from any other country, and the grounded theory model also portrayed country-specific circumstances. Therefore, I recommend that using it in other cultural contexts should be done cautiously and with the need for further comparative studies to determine the tool's usability (Chen et al., 2024).

6. Conclusion

This study aimed to explore the development of intelligent art exhibitions in China by building the multi-dimensional grounded theory model integrated with the challenges and impacts of creative exhibitions and inclusive development. Through a qualitative analysis of interviews with artists, curators, art agency professionals, and audiences, the research identified three interlinked core categories: (1) challenges related to resource limitations, technological barriers, and market uncertainties; (2) creative transformations involving evolving artistic values, tool-mediated processes, and shifting environments; and (3) mechanisms of inclusive development emphasizing balanced growth, strategy optimization, and institutional standardization (Duester & Zhang, 2024; Gu & O'Connor, 2023).

The model was useful in contributing to research and practice. Theoretically, it enriched the current literature by applying structural and cultural factors to the technology acceptance model (Venkatesh & Bala, 2008) in art contexts. It also contributed to the knowledge of the cultural change in the digital age by conceptualizing dynamics as cyclic, not sequential. In terms of implications, the conclusions provided prescriptive advice for the stakeholders: the policymakers were urged to fill gaps in infrastructure and funding; the curators and designers were suggested to consider the paradox of preservation and creation; the institutions were called to apply systematic approaches to integrate resources and digitalize standards (Chen et al., 2024; Li & Wang, 2023).

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Recommendations for future studies were the increase in the number of participants and the geographical generalizability of the study. Such comparative analysis across different countries could reveal whether the tensions and resolutions are country-specific or cross-country. Moreover, examining the changes in intelligent exhibitions over time through longitudinal studies may provide an understanding of how they occur in practice and whether institutions are evolving continuously with disruptions deeply rooted in the digital world today. Lastly, future studies can employ a quantitative approach to assess the level of audience engagement and institutions' performance in response to intelligent changes, which would provide more drive to enhance the theoretical development (Zhang & Zhang, 2022).

All in all, this research provided a more context-sensitive perspective that enriched the knowledge of the Chinese intelligent art exhibition environment and the interrelated and intertwined dynamics that defined it. It also made clear the process of change and the measures that can be adopted to ensure innovation without compromising sustainability as well as cultural values.

Ethics Approval and Consent to Participate

The researchers adhered to the ethical guidelines provided by the Research Ethics Committee of Universiti Teknologi MARA (UITM). All procedures conducted in this study involving human participants complied with the ethical standards of the institutional research committee. Informed consent was obtained from all participants in accordance with the Declaration of Helsinki.

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Conflict of Interest

The authors reported no conflicts of interest for this work and declare that there is no potential conflict of interest with respect to the research, authorship, or publication of this article.

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