Available online at
http://journal.uitm.edu.my/ojs/index.php/BEJ

e-ISSN: 2637-0395

Built Environment Journal 22(2) 2025, 125 – 140.

Built Environment Journal

Issues and Conceptual Framework for Museum Spatial and Exhibition Design in China

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ARTICLE INFO

Article history:
Received 27 August 2024
Revised 28 November 2024
Accepted 24 January 2025
Online first
Published 01 July 2025

Keywords:
China Museums
Spatial
Exhibition

DOI:
10.24191/bej.v22i2.3050

ABSTRACT

This study reviews theories on the impact of spatial design and display systems on audiences in Chinese museums and unpacks how spaces and display systems affect audiences. With the rapid development of Chinese museum industry, diversified exhibition design is a prerequisite for museum development. For example, various display systems provide visitors with comprehensive information and improve their visiting experience, resulting in a mutually beneficial relationship between visitors and museums. At the same time, museums are constantly refining their spatial design to enhance visitors' experience and ensure effective use of space. Therefore, it is crucial to understand the impact of spatial and exhibition design factors in museums on the visitor experience. This study provides a comprehensive review of journals, books, conference papers, and other textual resources to establish a framework for understanding how museum space and exhibition design can affect the visitor experience. The purpose of this study is to develop a conceptual framework for museum spaces and exhibitions in China. For instance, to improve visitors' visiting experience and space utilisation in the museum, Chinese museum designers should optimise functional space and good design of basic configurations. Moreover, the display system can be achieved through dynamic and static displays, ergonomic principles, colour use, and the choice of display cases. This study also aims to contribute to the literature by proposing design concepts to form the basis for future museum layouts and exhibition display system designs. At the end of this study, the author provides valuable insights into design decisions for museums in China.

INTRODUCTION

The number of museums and visitors in China is increasing rapidly. Each museum organises its activities to attract visitors. Furthermore, free museum admission enables visitors to access it easily. In recent years,

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https://doi.org/10.24191/bej.v22i2.3050

China has paid extensive attention to museum spaces and displays to enrich visitors' museum experiences and maximise the information visitors receive. Museums display their collections using a variety of scientific and technological mediums. The exhibition display method is gradually changing from focusing on physical objects to concentrating on visitors. The traditional display system is no longer suitable for diverse exhibits and requires greater attention from visitors (Ma, 2023; Huang, 2018). The concept of "object-centred" promotes the shift from traditional to new ways of displaying museum exhibits. Although experiences are invisible and intangible, visitors can feel authentic feedback through their senses, psychology, and other perceptual factors (Liu, 2023; Xiao, 2021).

Conversely, while meeting national building code requirements, museum spaces integrate functional partitions with the main building characteristics to promote a more comprehensive urban complex (Luo, 2019). With development, museum spatial layouts are becoming more organised and user-friendly. These include ensuring reasonable ratios between spaces, integrating indoor and outdoor areas, and setting up supporting facilities that enhance visitors' experiences.

This study explores the spatial and exhibition design factors of Chinese museums. It aims to investigate how these factors impact visitors' overall museum experiences.

Background of The Study

The abundance of museums in China reflects the country's deep cultural diversity and historical significance. According to the latest data from the State Administration of Cultural Heritage (2024), the number of museums in China grew substantially from 5,136 establishments in 2017 to 6,833 by the end of 2023, as shown in Figure 1.

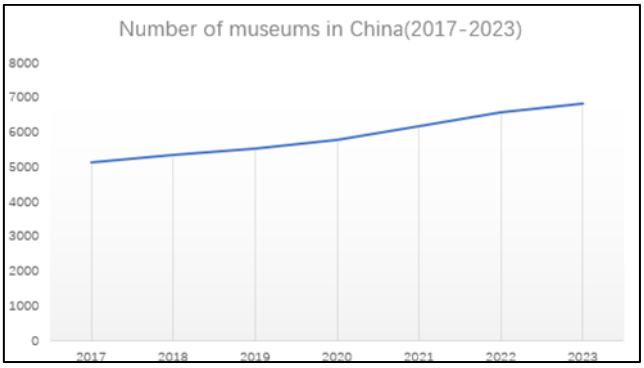

Fig. 1. Number of Museums Registered in China From 2017 to 2023.

Source: State Administration of Cultural Heritage (2024)

In response to the number of museums in China, Zhang (2019) states that museum visitors have shown a gradual upward trend in 2018, with 1,126 million visitors and 26,000 exhibitions. Despite the impact of the new coronavirus outbreak in 2020, museums continued to host over 29,000 exhibitions and 225,000 educational activities. However, the number of visitors dropped to 540 million, with more than 100 million visited online (Wang, 2021). In 2021, Chinese museums hosted 36,000 exhibitions and 323,000 educational activities, attracting 779 million visitors (Wen, 2022). In 2022, there were 34,000 offline exhibitions and over 230,000 educational activities, attracting 578 million visitors. The trend continued in 2023 with over 40,000 displays and exhibitions, 380,000 educational activities, and 1.29 billion visitors (Song, 2024). The data is shown in Figures 2 and 3.

https://doi.org/10.24191/ bej.v22i2.3050

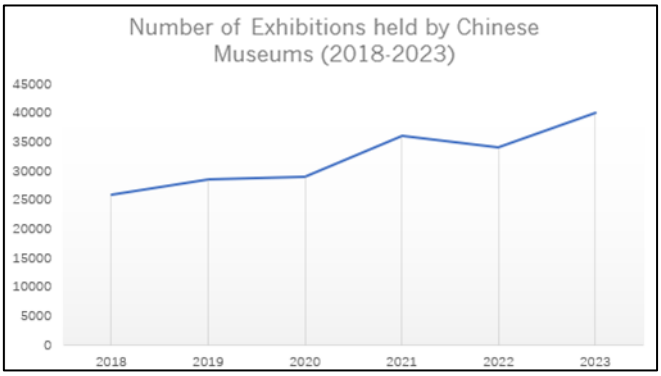

Fig. 2. Number of Exhibitions Organised By Museums in China From 2018 to 2023

Source: State Administration of Cultural Heritage (2024)

Fig. 3. Total Number of Museum Visitors in China From 2018 to 2023 (in Billion)

Source: State Administration of Cultural Heritage (2024)

The significant increase in the number of museums and visitors in China, along with the continuous improvement of their functions in all aspects, indicates progress in the development of museums in China (Gao, 2020). Therefore, there is an opportunity and necessity that can be meaningful to study museums' spatial and exhibition systems in China.

METHODOLOGY

This study is based on a literature review of the current state of museum spatial layout and display systems in China. A literature review of the factors influencing visitors' museum experiences was presented. This article discusses two (2) main factors: museum spatial design (i.e., functional spaces and basic configurations) and museum exhibition design (i.e., display systems, ergonomics, colour design, and display cabinets). Literature cited includes journal articles, conference papers, and books. By reviewing the main ideas of 42 articles, this study focusses on the current development of museum spatial and exhibition design in China. It also clarifies the significant impact of these factors on visitors' museum experiences, forming a conceptual framework. This study suggests that the rational planning of space and the adoption of diverse exhibition designs play an essential role in determining visitors' experiences. This study aims to

https://doi.org/10.24191/ bej.v22i2.3050

gain a deeper understanding of how these factors affect museum visitors and, ultimately, provide ideas for design decisions in Chinese museums.

MUSEUM SPATIAL DESIGN

The exhibition space provides a platform for the exhibition display to show the cultural value of cultural relics and achieve the role of propaganda and education, whether the space is reasonably utilised is the key to the perfect presentation of museum exhibition displays (Yang, 2021). For instance, a well-considered spatial layout can improve and enhance efficiency and practicality for visitors or end users. Spatial planning should ensure the layout aligns with the exhibition's content and logic. This planning involves creatively configuring the spaces to showcase the exhibition content. For this reason, changing exhibition lines, creating undulating display rhythms, and employing staggered spatial layouts are conducive to enhancing overall visitors' experiences (Song, 2024).

Functional Space

China's current design process in the museum building is no longer like what it was in the past, which only focused on building area, floor space, and other superficial work; nowadays, more attention has been placed on improving exhibition design, spatial layout and functional space (Zhu, 2022). According to the Ministry of Housing and Urban-Rural Development of the People's Republic of China (2015), a museum building should be divided into three (3) functional spaces: public areas, service areas, and administrative regions. The public areas encompass exhibition spaces, educational facilities, and service amenities such as ticket halls, foyers, restrooms, infirmaries, and restaurants. The service areas include collection storage, technology spaces, and rooms dedicated to business operations and research. The administrative regions comprise reception rooms, conference rooms, and fire control centres for management purposes, while ancillary rooms encompass garages, staff dining areas, and equipment storage facilities.

Among the three (3) areas mentioned above, the public area is the most important and commonly used space for museum visitors and should be given full attention. According to Luo (2019), introducing some leisure elements into the exhibition space is important in improving the quality of the "experience" of the entire exhibition space. For example, rest seats and green facilities can be introduced directly into the exhibition space and coordinate with the exhibition space to form a comfortable visiting environment; open spaces such as courtyards and atriums can be introduced into the exhibition hall to increase the hierarchy of the tour route; we can also try to let the indoor space of the museum share with the outdoor space to form a node with ornamental value and fully mobilise audiovisual feelings. Li (2021) also believes that in order to achieve the optimal layout of the museum display and improve the efficiency of space utilisation, it is necessary to use modern scientific and technological means to enhance artistic expression, follow the principles of science and the laws of aesthetics, and enhance the visual impact, infectious and expressive power of the visitors in a multi-dimensional perspective, to achieve the best publicity and display effect.

In conclusion, museum managers should fully consider the needs of contemporary visitors in terms of function. In addition to conforming to the national architectural norms for museums, they should also focus on the areas that are closely linked to the audience and optimise the quality of the exhibition space by strengthening the importance of design elements and spatial layout and keeping abreast of the times. In this way, the museum's function can be fully demonstrated so that tourists can have a better experience during the visit.

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Basic Configuration

The Ministry of Housing and Urban-Rural Development of the People's Republic of China (2015) issued the "Museum Building Design Code" for the basic configuration of the museum to make provisions. Firstly, specific requirements should be outlined for the entrance facilities of the museum building, encompassing essential entrance facilities such as a ticket office, porch, security check area, and foyer. Ample space should be allocated to accommodate gathering and dispersing activities. Additionally, it is essential to allocate appropriate areas for service facilities, including ticketing counters, ticket validation stations, security checkpoints, storage spaces for rain gear and personal belongings (such as clothes and hats), information desks for inquiries, audio guide requests, wheelchair services, and children's car rentals. to cater to visitors' needs. If dining facilities are provided, such as a restaurant or cafe space, they should comply with the current industry standard, "Design Code for Catering Buildings" (Ministry of Housing and Urban-Rural Development of the People's Republic of China, 2015).

The above basic configuration of the museum ensures that visitors' visits run smoothly, clearly, and safely. These supporting design services effectively assist visitors during their visit. Liu (2024) reports that increasing the number of interactive experience zones on the premises (e.g., children's interactive facilities, small game areas, viewing areas, resting spaces, and catering spaces) would improve visitors' overall visiting experience, meet their needs for play, viewing, leisure while optimising space and achieving upgrades. According to Luo (2019), introducing some leisure elements into the exhibition space is important in improving the quality of the "experience" of the entire exhibition space. For example, rest seats and green facilities should be introduced directly into the exhibition space to create a comfortable visiting environment; open spaces such as courtyards and atriums should be incorporated into the exhibition halls to increase the hierarchy of the tour routes; and combining the indoor and outdoor spaces of the museum to form a node with ornamental value, fully mobilising the audio-visual experience. Li (2021) reports that to achieve the optimal layout of the museum display and improve the efficiency of space utilisation, it is necessary to use modern scientific and technological means to enhance artistic expression, to follow the principles of science and the law of aesthetics, and to enhance the visual impact, appeal, and expressiveness to the visitors from a multi-dimensional perspective to achieve the best publicity and display effect.

In conclusion, as Simonsson (2014) states, the museum's spatial layout design creates a conducive visiting environment, facilitates visitors' comprehension of the exhibition context, and establishes an immersive experiential space. Simultaneously, it entails the cultivation of an atmosphere that stimulates visitor comfort, excitement, and curiosity. As one travels through a museum space, one may experience various feelings that are not entirely caused by the exhibition's content but are likely to be enabled by the space itself. Therefore, space has a more significant influence on our experiences and meanings than we might think.

MUSEUM EXHIBITION DESIGN

Display Systems

Based on numerous researchers, this study categorised museums' standard display systems into three (3) types: static display, dynamic display, and interaction design.

The most common display system in museums is the static display. The static display form is mainly based on pictures, text, and exhibits. It is a more traditional and widely used method applicable to most

https://doi.org/10.24191/ bej.v22i2.3050

types of exhibition halls. It presents information and meaning intuitively to visitors through well-designed display cabinets, exhibition boards, and scene restoration. Direct displays directly convey colour and aesthetic information for ornamental exhibits like porcelain. Sculptures and paintings are more intuitive in conveying the information they contain (Cui, 2023). When using static display techniques in museums, the more elaborate and carefully designed they are, the more effective they become (ElDamshiry & ElFouly, 2022). Therefore, it is essential to pay attention to static displays and ensure that curators work closely with designers to fulfil their essential messaging role. Static displays have the advantage of being less expensive to produce while providing an intuitive and visible message. However, this display method's shortcomings, such as relatively simple stylistic effects and limitations on the presented content due to graphic forms, may lead to visual fatigue.

Secondly, dynamic display through video playback reproduces historical and cultural scenes, events, and characters, allowing visitors to understand the development of history and culture. According to Liu (2016), dynamic display fully combines the audio-visual language expression of film and television art with the help of video playback, audio explanation or music accompaniment, and other technical means, mapping out the new trend of the development of multidisciplinary technology cross-fertilisation of visual communication, animation, and interaction design. Similarly, Tong (2023) argued that the multimedia assistance method integrates various acoustic, optical, and electric technologies and, under the control of computers, makes sound and light play more intuitive, interesting, and interactive. The video display can quickly convey a large amount of information to the visitors and present more affluent and diversified visual information, richer than the traditional static scene. It also improves the dissemination efficiency of the exhibition content. However, the shortcoming of this method is in its form; it is vivid but needs more specific interactivity to attract visitors' attention.

Interaction design is the process of two-way information exchange between visitors and digital museum exhibits through human-computer interaction technology. This design is based on a rational relationship between museum collections and visitors' interests and needs. According to Liu & Yu (2022), the interaction design process involves multiple aspects, such as thinking, hearing, vision, and touch, and the use of 3D graphic image technology, facial recognition, motion capture, stereoscopic display system, and virtual reality (VR) technology to provide the visitors with a rich interactive experience. Rao & Li (2021) and Pattakos et al. (2023) agreed that the museums' interactive design emphasises interactivity, enhances visitors' experience, and incorporates multi-channel and diversified information input and output. Various technologies are integrated to adjust spatial forms, colours, materials, lighting, furniture, sounds, and smells to create good memories and incorporate the user's visual, auditory, olfactory, gustatory, and tactile senses. Yin (2021) and Liu (2023) summarised interaction design into three digital media technology categories, namely touch, voice, and motion interaction, to personalise the dissemination of information related to digital museums and stimulate visitors' interest and viewing experience.

Interaction design applies multimedia technology, digital information technology, and VR interaction techniques to exhibitions, allowing visitors to actively engage and interact with the exhibition's form and space (Tang, 2022). Museum visitors are encouraged to interact with information and digital content. Thus, enhancing existing museum content and exhibits and providing alternative content is crucial. The ultimate goal is to enhance the museum visitors' immersive or personal experience (Pattakos et al., 2023). Conversely, research has shown that visitors adopt various strategies during their interaction engagement, providing opportunities to improve and extend the design of museum installations and assisting museum practitioners in understanding how to improve display systems (Ali et al., 2018). Interaction design enhances the viewer's sensory experience from physical to virtual space, ultimately optimising the display system.

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Fig. 4. Different Display Methods Used in Chinese Museums

Source: Authors (2024)

In summary, visitors generally expect to acquire information through various means such as audio-visual, sensory experience, social interaction, and entertainment. Therefore, focusing on visitors' participation in museum display design and establishing the connection between people and exhibits improves the efficiency of museum content dissemination (Ma et al., 2018). The three ways mentioned above have advantages and disadvantages respectively, whereas their common goal is to convey and display the exhibits better. In China's museum design, it is necessary to diversify the exhibition methods as much as possible to meet the different levels and needs of the audience, such as the need for quiet appreciation or the need for further exploration and multiple experiences.

Ergonomics

Ergonomics can help human beings achieve the purposes of ease of use, comfort, efficiency, and safety while satisfying spiritual and emotional needs, as "people-centred" is an unchanging tenet in design (Yan, 2022). Ergonomics mainly uses anthropometrics, body mechanics, labour physiology, and other professional research methods to carry out in-depth research on the characteristics of the body structure and functional characteristics. At the same time, ergonomics uses the functional characteristics of the human visual, auditory, tactile and other sensory organs to analyse the adaptability of the human being in the implementation of the activities of the behaviour of the person and then study the impact of the human being in the process of physical activity on the efficiency of the work. Reasonable use of ergonomics in the indoor environment can enhance efficiency and, at the same time, pleasant mood and increase humanised features so that people are more comfortable staying in the space for a long time (Yin, 2024).

Zhang & Zheng (1999) classified ergonomic dimensional data into static and dynamic dimensions in the design process. According to Zhang et al. (1999) and Liu (2016), the static dimension refers to the basic dimensions of the human body structure, measured in a relatively fixed state. These dimensions mainly include height, sitting height, hip width, shoulder width, and arm length. Dynamic dimension represents the dimensional changes in the body when a person is active. In museum design, it is crucial to consider the dynamic dimensions of the human body when standing and sitting, as the human body's need for dimensions changes during activity. For instance, factors such as the height of the seats, the width of the channel, the height of the exhibits, the density of the exhibits in the museum, and other size-related issues directly affect visitors' experience. Hence, it is important to consider these factors from an ergonomic standpoint when determining their size. Only by taking full account of the ergonomic dimensions can we ensure that visitors can complete their visit comfortably and safely.

In addition, designing accessible museums shows attention to ergonomics, especially for the elderly, young children, pregnant women, and people with hearing or visual impairments. According to Yan & Yu

(2020), museums should maximise accessibility for different groups and emphasise detailed construction of accessible designs, such as installing ramps for people with disabilities, children's washbasins, and accessible toilets. Similarly, González-Herrera et al. (2023) argued that museums are spaces that incorporate society's values and cultures. The researchers emphasised the importance of designing accessibility so everyone could benefit from this shared history, regardless of their physical, sensory, or intellectual abilities.

As mentioned earlier, correctly applying ergonomic principles in museums is crucial. It ensures visitors' safety, health, and comfort, thus significantly reducing human-machine fatigue and improving human-machine systems' efficiency. Conversely, designs that do not adhere to ergonomic principles can lead to visitor fatigue, confusion, and overcrowding, among other psychological discomforts. Therefore, focusing on ergonomics in museum design is not just essential, but it also ensures visitors a smooth and comfortable experience. Ergonomic museum is audience friendly as it focuses on different ages and needs of the audience, which can make their visit more comfortable. Therefore, in terms of the visiting experience of audience, it is necessary to fully consider ergonomics in museum designing.

Colour Design

Colour is a visual language that is more persuasive than textual communication. Among the various visual factors, colour has a direct and decisive influence that can impact mood and expression and dominate fashion aesthetics. It is the most widely accepted way of communicating emotions and aesthetics and for exhibits to communicate effectively with visitors. In addition, colour can effectively alleviate prolonged visual fatigue and enhance the effect of exhibition halls by clearly delineating functional areas (Cai & Zhou, 2022; Wang, 2022). Moreover, colour can also be used to highlight exhibits. Designers can use colour to guide the viewer's eyes so that the viewer's attention is focused on important exhibits. In addition, colour can be used to differentiate various exhibit areas and display contents to help viewers better understand the overall structure of the exhibition (Zhang & Qin, 2024).

According to Cheng & Chen (2018) and Li (2018), the fundamental tone is the basic colour that dominates the largest area in any environment and influences visitors' first impressions. The basic colour is determined by the most extensive areas: ceiling, floor, and wall. It can also be influenced by selecting several basic colours according to the museum's exhibition theme. The second tone is the harmony colour, representing a broader range of tones alongside the fundamental tone. The design aims to visually excite visitors' interest and inspire them to visit the museum through medium-sized colours with a certain degree of contrast. For instance, the clever use of complementary contrast, warm and cold contrast, and brightness and purity contrast can improve the overall spatial atmosphere while focusing on the use of black, white, and grey, which have no apparent tendency to assist in balancing the relationship between the colours. Finally, distinct and prominent colours are used in small areas to emphasise the focus and theme of the exhibits and draw attention to them. In addition, Zhuo (2018) suggested that the colour for specific display cabinets should be selected based on the characteristics of the exhibits, the theme, and the surrounding environment.

To sum up, in the design process, we should pay full attention to the important role of colour in the exhibition space, understand the psychological effect of various shades on the audience, and choose the appropriate colour to highlight the exhibits and stimulate the interest of the audience to visit and improve the attractiveness of the exhibition. As highlighted by Cai & Zhou (2022) and Wang (2021), colour symbolism permeates all aspects, and different colours can create different emotional atmospheres, which provides an accessible channel for the audience to understand the works. Therefore, colour should be actively used as an important visual perception through the appropriate colour matching to highlight the exhibits and, at the same time, guide the audience into a specific emotional state.

https://doi.org/10.24191/ bej.v22i2.3050

Display Cabinets

Display cabinets are special equipment used in museums and art galleries to display and protect cultural relics and solve the problem of 'display' and 'collection'. It plays the role of a communication bridge between museums and visitors. The display cabinet's primary function is to ensure exhibits' safety and focus on practicality, aesthetics, and intelligence. With technological advancement, modern display cabinets should have basic design requirements such as safety, reliability, detachability, reusable, and flexibility to adapt to different exhibition themes, number of cultural relics, and characteristics (Guo & Yu, 2024; Zhao, 2022).

There are various collections in museums, each requiring different display cabinets to display and protect artefacts and prevent visitors' aesthetic fatigue. According to Yang (2023) and Zhao (2022) concepts of museum display cabinets, this study summarised the forms of display cabinets commonly found in museums into the following types:

(i) Table cabinet: The upper part of the table cabinet displays the display area, and the lower part of the table legs is suitable for overhead viewing. Generally applicable to the requirements of the horizontal placement of cultural relics, such as hand scrolls, albums, ancient books, and other flat-class cultural relics on display. The table cabinet has a small unit, is easy to move, has a simple appearance, and has other advantages. It is arranged in the centre of the exhibition hall, allowing visitors to access it from all sides.

(ii) Column display cabinet: A column display cabinet is a free-standing display cabinet, mainly composed of a three-layer structure of the top part, display area, and bearing area. The upper part is designed with transparent glass, and the lower part is an opaque base. The column display cabinet is well preserved and sealed, small, single-shaped, and easy to move. Most free-standing display cabinets are strategically placed in the centre of museum exhibition halls to showcase precious three-dimensional cultural relics, such as bronzes, porcelains, and jades.

(iii) In-wall display cabinets: This museum display cabinet is mainly embedded in the museum exhibition hall wall. The size of the artefacts determines the dimensions of the wall display cabinets and the exhibition wall layout.

(iv) Great wall cabinets: Great wall cabinets have a continuous display space and an arranged, permeable joint cabinet form. They are often made of large pieces of transparent glass spliced together to create a transparent display space. They can display many exhibits that have a majestic and solemn appearance.

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Fig. 5. Different Types of Display Cabinets Used in Chinese Museums

Source: Authors (2024)

Yang (2023) & Zhao (2022) found that the presentation of display cabinets and the level of craftsmanship and technology directly affect cultural relics' display effect and safety. Therefore, when carrying out systematic scientific design requirements for museum display cabinets, it is necessary to improve their artistic effect and process quality through specialised demand control. This will ultimately contribute to improving the display of cultural relics. The constructive design requirements for the display cabinets should prioritise structural safety and convenient operation. It is also essential to ensure safety and proper sealing to avoid performance loss due to structural or quality issues. As the last barrier to effectively protect cultural relics, the design of display cabinets should provide excellent sealing, self-stability, and prevention of external insecurity factors such as vibration, explosion, or fire. Guo et al. (2024) and Hu et al. (2021) highlight the importance of the multifunctionality of display cabinets, the presentation of artistic effects, immersive interactive experiences, and the improvement of recycling rates as emerging trends in contemporary display cabinet design. At the same time, the application of intelligent display cabinets has become increasingly prevalent due to the continual advancement in technologies such as big data and artificial intelligence. These cabinets are mainly embodied in controlling the micro-environment inside the cabinet, including opening, safety protection, lighting, temperature, and humidity. Intelligent display cabinets can provide an optimal solution for protecting cultural relics exhibits.

To summarise, strategically arranging display cabinets can effectively guide visitors through the exhibit content to enhance their overall experience (Zhao, 2022; Yu, 2021). Using different display cabinets can help to strengthen the design of spatial lines and pique visitors' interest in understanding the more profound connotation of the cultural relic exhibits. The design should highlight the cultural relic exhibits as the display centre, creating an immersive and sensory experience for visitors. For example, the audience will tend to pay more attention to the exhibits in the freestanding cabinet because the exhibits displayed in freestanding cabinets are more expensive and have higher artistic value. Moreover, freestanding cabinets are conducive to the audience's all-around viewing, so choosing such cabinets for the audience's visit is also a kind of guidance. Therefore, the museum display cabinet design, types, and placement can impact visitors' experiences, and museum designers should consider these factors when arranging the display cabinets.

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FINDINGS

As a result of literature review explorations, there are two (2) main considerations regarding museum design in China, emphasising enhancing functional spaces and exhibition experiences. The findings are organised into two main sections: Spatial Design and Exhibition Design as shown in Figure 4.

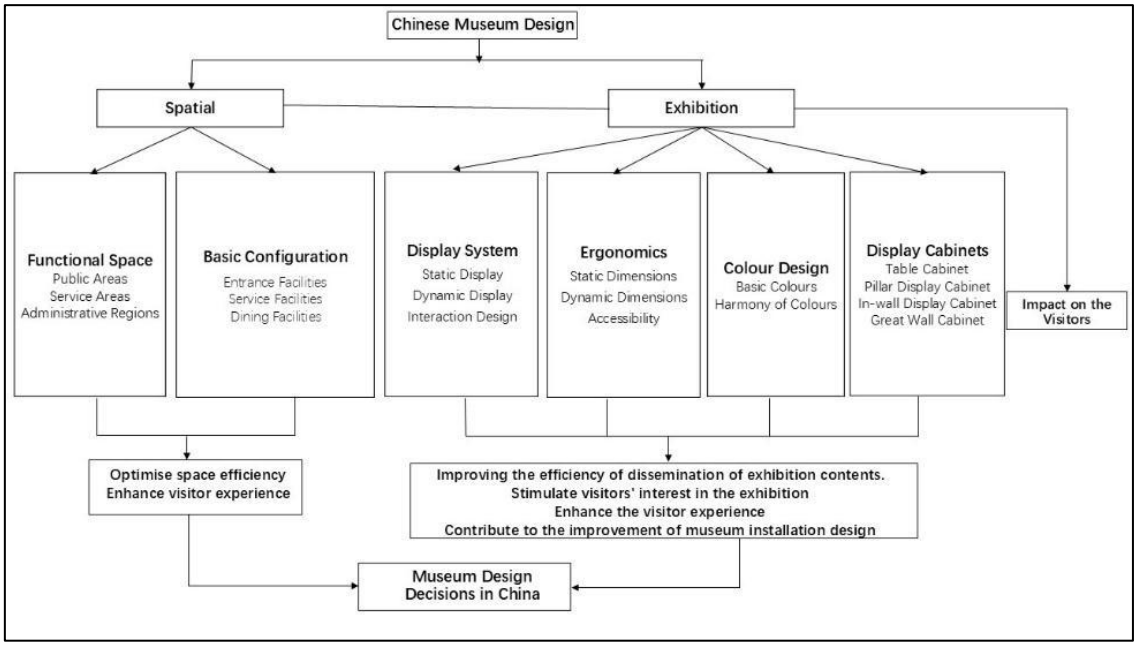

Fig. 6. A Conceptual Framework for The Impact of Museum Spatial and Exhibition Design on Visitors

Source: Authors (2024)

The functional space and basic configuration are the elements to develop the concept of spatial design in the context of museum design in China. Spatial design in a museum context refers to the arrangement and organisation of physical spaces to facilitate the museum's functions and enhance the visitor experience. It involves carefully planning and designing public areas, service areas, and administrative regions. Public areas are the spaces that visitors can freely access. They include exhibition halls, interactive zones, and other visitor-friendly spaces. The spatial design of these areas is crucial as it directly impacts the visitor's journey and experience in the museum. Service areas include ticket counters, restrooms, cafeterias, and gift shops. The spatial design of these areas should ensure they are easily accessible and do not disrupt the flow of visitor movement. Administrative regions areas for museum staff and operations, including offices, storage, and maintenance rooms. While visitors do not access these areas, their design is important for the efficient operation of the museum.

The basic configuration is influenced by the museum's functional requirements. For example, exhibition halls must be spacious and well-lit, while administrative areas must be functional and efficient. The spatial design and basic configuration are interconnected. A well-planned spatial design supports the functional space requirements, while the basic configuration informs the spatial layout.

The display system, ergonomics, colour design, and display cabinets form the concept of exhibition design in the context of museum design in China. The display system is a crucial aspect of the exhibition

space. It includes the layout of exhibits, the use of lighting, and the design of display cases. A well-designed display system can highlight the exhibits and make them more engaging for visitors. It includes static displays (fixed exhibits), dynamic displays (changing or interactive exhibits), and interaction dimensions (ways in which visitors can interact with the exhibits).

Ergonomics involves designing the exhibition to fit the needs and capabilities of the visitors. This could involve considerations such as the height of displays, the readability of text, and the accessibility of interactive elements. Good ergonomic design can make the exhibition more comfortable and enjoyable for visitors of all ages and abilities. It also includes static dimensions (fixed physical properties of the space and exhibits) and dynamic dimensions (changing properties).

Colour design involves the strategic use of colours in the exhibition. The right use of colours can set the mood of the exhibition, highlight key exhibits, and guide visitor attention. It is important to consider factors such as cultural associations of colours and the impact of lighting on colour perception. There are two (2) main types of colour designs: basic colours (the primary colour palette used in the exhibition) and harmony colours (complementary colours that create a balanced and pleasing visual experience).

Display cabinets are also a key component of the exhibition design. They protect and preserve the exhibits and contribute to the overall aesthetic of the exhibition space. The design of display cabinets can greatly influence how visitors perceive and interact with the exhibits. The types of display cabinets include table display cabinets, in-wall display cabinets, column display cabinets, and great wall cabinets. Each type of cabinet has different functions to highlight exhibits and create varied viewing experiences.

The display system, ergonomics, colour design, and display cabinets all significantly shape the exhibition space. They influence how visitors navigate the space, interact with the exhibits, and ultimately perceive and remember their museum visit. It is important to consider these elements thoughtfully and harmoniously integrate them to create a successful exhibition space.

In summary, the display system, ergonomics, colour design, and display cabinets all play a significant role in shaping the exhibition space. They influence how visitors navigate the space, interact with the exhibits, and ultimately perceive and remember their museum visit. Museum spatial and exhibition design work together to create a space that is not only functional but also provides a positive and engaging experience for visitors. These elements should be carefully considered and harmoniously integrated to create a successful exhibition space. In addition, these factors help authorities to make informed decisions regarding future museum designs in China.

CONCLUSION

This study reviews the theories that focus on museum space and display systems and develops a conceptual framework on museum space and display systems in China.

The importance of this study lies in clarifying the critical impacts of two elements of museum design, namely space and display system, on visitors, explaining how these elements affect visitors' experience, and finally emphasising the importance of rational planning of museum space and diverse display systems. It suggests that museum practitioners should focus on enhancing spatial planning and using diverse display methods, focusing on mobilising active visitor participation and enhancing spatial planning. This study helps to enhance the visitor experience, stimulate the audience's interest during the exhibition, promote the formation of the audience into a big habit of museums, and effectively improve the efficiency of museum

https://doi.org/10.24191/ bej.v22i2.3050

use. At the same time, this study supplements the vacancy of theoretical research in the indoor display industry to a certain extent, promotes the transformation of theory into social practice, and provides ideas for Chinese museum design decision-making.

ACKNOWLEDGEMENTS

The authors would like to acknowledge the Department of Built Environment Studies and Technology, College of Built Environment, Universiti Teknologi MARA, for providing the research platform. The authors also thank Zulkarnain Hazim and Norashikin Abdul Karim for their guidance in this research.

CONFLICT OF INTEREST STATEMENT

The authors agree that this research was conducted in the absence of any self-benefits, commercial or financial conflicts and declare the absence of conflicting interests with the funders.

AUTHORS' CONTRIBUTIONS

Zhang Sijia carried out the research and wrote and revised the article. Zulkarnain Hazim conceptualised the central research idea, provided the conceptual framework, reviewed it, and approved the article submission. Norashikin Abdul Karim supervised the research progress.

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