Transformation Of The Information Museum Into A Smart Museum

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Abstract. The term smart museum has started to emerge in recent years along with the development of digital technology and smart concepts related to the application of technology in helping people in various sectors of life. The concept of a smart museum itself refers to the use of internet of things (IoT) technology such as sensors, wireless networks, digital applications, virtual reality, augmented reality, and smart systems to increase the interactivity, accessibility and involvement of visitors in the museum. Now more and more museums are adopting this smart solution as a way to attract visitors and optimize the visitor experience. In Indonesia, one of the museums that has transformed into a smart museum is the Museum Penerangan. In its efforts to become a smart museum, the Museum Penerangan has several supporting factors such as the number of human resources, technology support, program creativity, and support from top management. However, the main obstacle is funding because it requires a large investment to transform into a smart museum, besides that special human resources are needed to understand the technological needs that match the collection.

Keywords: smart museum, internet of things, Museum Penerangan

Abstrak. Istilah museum pintar mulai muncul dalam beberapa tahun terakhir seiring dengan berkembangnya teknologi digital dan konsep cerdas terkait penerapan teknologi dalam membantu masyarakat di berbagai sektor kehidupan. Konsep museum pintar sendiri mengacu pada pemanfaatan teknologi internet of things (IoT) seperti sensor, jaringan nirkabel, aplikasi digital, virtual reality, augmented reality, dan sistem pintar untuk meningkatkan interaktivitas, aksesibilitas, dan keterlibatan pengunjung dalam museum. museum. Kini semakin banyak museum yang mengadopsi solusi cerdas ini sebagai cara untuk menarik pengunjung dan mengoptimalkan pengalaman pengunjung. Di Indonesia, salah satu museum yang menjelma menjadi smart museum adalah Museum Penerangan. Dalam upayanya menjadi smart museum, Museum Penerangan mempunyai beberapa faktor pendukung seperti jumlah sumber daya manusia, dukungan teknologi, kreativitas program, dan dukungan top manajemen. Namun kendala utamanya adalah pendanaan karena memerlukan investasi yang besar untuk bertransformasi menjadi smart museum, selain itu diperlukan sumber daya manusia yang khusus untuk memahami kebutuhan teknologi yang sesuai dengan koleksinya.

Kata kunci: smart museum, internet of things, Museum Penerangan

INTRODUCTION

Talking about tourist destinations, museums are one of the tourist attractions when visiting a city (Bustam, 2022; Junaid, 2017). There are various museums that have become icons of a city, for example the Karst Museum in Wonogiri, the Noken Museum in Papua and the Louvre Museum in Paris (ESDM, 2009; Evrard & Krebs, 2018; Mawel, 2021)

Museums generally store cultural and historical artifacts of the city or collections that are thematic in nature. According to the International Council of Museums (ICOM), museums are non-profit institutions that serve society by collecting, preserving, researching, communicating, and exhibiting tangible and intangible aspects of humanity (International Council of Museums, 2017). Museums are educational and recreational institutions by providing equal access to collections for all individuals. In 2017, ICOM expanded the definition of museums to include their role as inclusive and polyphonic spaces for critical dialogue about the past and the future (International Council of Museums, 2017).

In Indonesia, museums are regulated in Government Regulation of the Republic of Indonesia of 2015 Number 66. In this regulation, museums are institutions that protect, develop, utilize collections, and communicate them to the general public (Kementerian Hukum dan HAM, 2015). There are museums in Indonesia that are public institutions, but some are managed by private institutions and individuals (Raksapati, 2020).

In Indonesia, museums were initially considered as less popular tourist destinations (Litbang Kompas, n.d.). This is because the collection is considered static and seems formal (supomo, 2013). Therefore the Ministry of Education and Culture then launched the National Love Museum Movement in 2010 along with the jingle and tagline Museum di Hatiku (Bustam, 2022; Daranca, n.d.). The aim of this movement is to instill a love for museums in the general public (Bustam, 2022; Daranca, n.d.). Museum visitors are starting to increase, although it is not significant and only certain museums are being visited by tourists (Litbang Kompas, n.d.).

However, the museum and the government continue to try to increase the attractiveness of the museum by cooperating with communities who have an interest in history and cultural heritage (Raksapati, 2020). The museum has also started launching various public education and programs that attract the general public to participate (Museum et al., 2014).

On the one hand, in several cities new museums are starting to appear that carry the concept of a modern museum, this is also in line with the increasing recognition of the smart museum concept (Chianese & Piccialli, 2014). They present an attractive collection arrangement and are equipped with various games and the use of technology, so that they become an attraction for tourists (Balducci, Buono, Desolda, Impedovo, & Piccinno, 2020).

These museums include the Angkut Batu Museum and the Macan Museum in Jakarta (Junaid, 2017).Other museums in Indonesia are also starting to transform into smart museums. They optimize digital technology from promoting and introducing museum collections through social media, as well as by utilizing internet of things (IoT) technologies such as sensory, augmented reality, and immersive visuals to attract visitors (Servasius Vidiardi, 2015). Their target is growing, now they are increasingly targeting generation Z, who are used to digital technology (Zhang & Abd Rahman, 2022).

One of the museums in Indonesia that is starting to transform into a smart museum is the Museum Penerangan which is located in the Taman Mini Indonesia Indah area. The museum, whose management is under the Ministry of Communication and Informatics Public Communication Information Directorate, presents collections on communication and information media in the past and present.

This collection is laid out attractively and thematically, by utilizing technologies such as virtual reality, sensory technology, and interactive games to provide education to visitors in a more interesting way and invite visitors to be more actively involved. However, in practice, this transformation did not go smoothly, especially when a pandemic occurred and Taman Mini Indonesia Indah was revitalized, so the museum was closed for a long time.

Therefore, in this study the author will explore the journey of the Museum Penerangan transforming into a smart museum, as well as the challenges and opportunities. The research question is how the stages of the Information Museum transform, and what are the challenges and opportunities it faces in realizing a smart museum?

Recently, papers and journals have started to appear that discuss the development of Indonesian museums, but not much has been described about the journey of a traditional museum to become a modern museum that carries a smart museum. With this research, it is hoped that it can become a lesson learned for other museums in Indonesia when will adopt the concept.

LITERATURE REVIEW

Definition of Smart Museums

Smart museum refers to a museum that optimizes the use of technology to improve visitor experience in accessing collection information services, as well as assisting museum operations and services, as well as helping to control the museum environment (Mizushima, 2001; Ruotsalo et al., 2013). The use of technology here in including creating interactive activities between museums and visitors as well as immersive experiences that are dynamic and personal for visitors (Balducci et al., 2020; Tesoriero, Gallud, Lozano, & Penichet, 2014).

The technology used here is generally in the form of sensors, multimedia, immersive visuals, augmented reality (AR), virtual reality (VR), artificial intelligence (AI), interactive websites, and mobile applications which are part of the internet of things technology (Chen, Chang, & Huang, 2014; Miyashita et al., 2008; Moorhouse, tom Dieck, & Jung, 2019; Rhodes, 2015). By utilizing this technology, museums can display interactive collection exhibitions, display additional realities, and also mobile applications that can provide more information about the collections on display (Kounavis, Kasimati, & Zamani, 2012; Miyashita et al., 2008). Visitors can also access collection information remotely by using an interactive website or mobile application (Tesoriero et al., 2014).

The term smart museum itself has developed, initially under the 1990s research called it a digital museum, then in 1990-2010, the term referred more to living museums, intelligence museums, and interactive museums, only then in 2010 and above, the term smart museums are more widely used (Bocconcino, Piras, Vozzola, Pavignano, & Gioberti, 2023; Jbara, Kuflik, Soffer, & Stock, 2007).

Various famous museums have changed by carrying out the smart museum concept. Famous museums that have become smart museums, one of which is the Louvre Museum in Paris (Evrard & Krebs, 2018). The museum uses augmented reality to bring their famous collections to life. When visitors point their smartphone at the collection barcode, additional realities will appear, one of which can be in the form of animation (Rhodes, 2015).

However, in implementing a smart museum, there are several challenges and opportunities. The main challenge faced by museum managers is cost because the investment, maintenance and maintenance costs are expensive (Jevremovic & Petrovski, 2012). Besides that, another factor is determining which technology is right for displaying collections and providing a more enjoyable experience to visitors because there are also technologies that do not interoperability with others (Kounavis et al., 2012).

This is because not all visitors can access the experience with AR because it requires hardware and software with certain requirements (Kounavis et al., 2012). Other challenges can be in the form of HR competencies including museum guides, as well as dissemination and usage guides to visitors (Pisoni, Díaz-Rodríguez, Gijlers, & Tonolli, 2021).

The opportunity to implement a smart museum itself is huge because technology continues to grow rapidly and can be explored to provide many benefits (Lim, Khan, & Picinali, 2021; Pisoni et al., 2021). Technology to support the implementation of smart museums also varies from free, such as social media technology to help socialize and promote, to expensive investment technologies such as immersive visual technology (Puspasari, Ermatita, & Zulkardi, 2021).

Internet of Things (IoT) Technology

Internet of Things (IoT) technology continues to evolve. There are so many definitions of IoT which generally discuss the use of the internet, cloud-based, and provide solutions from data collection, data analysis, and other solutions (Asemani, Abdollahei, & Jabbari, 2019). There are also those who divide IoT into 10 categories, namely interaction, virtual things, physical object services, standardized technologies, information, data, ubiquitous, user, unique (Sorri, Mustafee, & Seppänen, 2022).

In museums, there are a number of IoT technologies that are generally used, including technology for securing collections, technology for providing a more visitor experience, technology for visitor convenience, and technology for analyzing visitor habits (Chianese & Piccialli, 2014; Jevremovic & Petrovski, 2012).

There are so many IoT technologies that are used, including augmented reality (AR) and virtual reality (VR) technologies. AR and VR technologies have advanced rapidly, and according to (Mclean, 2005) the ideal museum exhibition should engage visitors by allowing them to interact with all of their senses so that these technologies are increasingly being adopted in modern museums around the world.

Augmented Reality (AR) refers to mixed reality or media that combines real objects and environments with virtual content (Kounavis et al., 2012; Okazaki & Taylor, 2013). AR systems are characterized by three key elements: integration of real and virtual objects in a real environment , alignment of real and virtual objects, and interactive navigation (Kounavis et al., 2012)

On the other hand, virtual reality (VR) is a technology that creates an immersive work environment that resembles the real world (Havig, McIntire, & Geiselman, 2011). It allows users to explore virtual destinations that closely resemble reality

RESEARCH METHOD(S)

In this study, the authors used a qualitative study method. Qualitative research is a way to study and understand the meanings that individuals or groups have in the context of certain problems (John W, 2009). In this research, the writer asks questions and follows certain procedures. Then, the data is analyzed inductively by looking for specific themes and then compiling them into a more general theme. Researchers also provide interpretations of the meaning of the data that has been collected (John W, 2009).

In conducting this research, the writer begins with the formulation of the problem. Furthermore, the authors conducted a literature review based on the formulation of the problem, namely a review of the literature on smart museums, and trends in internet of things technology used, as well as problems that are often faced by museums in implementing smart museums.

The author then made observations and conducted interviews with several sources consisting of the head of the museum and the four heads of the working team (partnership and public relations work team, visitor service and public program work team, communication education work team, collection management work team), along with their staff. The results of the interviews were then recapitulated and analyzed, to find out the journey of the Museum Penerangan in carrying out the transformation along with the challenges and opportunities.

FINDINGS AND DISCUSSION

Museum Penerangan Profile

Museum Penerangan is a technical implementation unit under the Directorate General of Information and Public Communication of the Ministry of Information and Communication (ICT). The museum, which was inaugurated on April 20, 1993, has 250 collections consisting of collections of radio, television, film, public information, graphic press, which as a whole shows the history of information since the time of the national movement to the present.

Museum Penerangan has a vision, namely a smart and communicative museum. While its mission is to manage collections with national and international standards; provide excellent service; making the museum a means of education and recreation; create good governance by involving the public; and make exhibition arrangements that are relevant to the development of society.

The tagline of Museum Penerangan is to witness the change of generations, meaning to be a witness to changes in the history of information and communication, from its periodization and tools. Museum Penerangan also makes efforts to keep up with technological developments and provide interesting experiences to serve as inspiration for the public.

The main tasks and functions of the Museum Penerangan are based on ICT Ministerial Regulation No. 5 of 2022 concerning the Organization and Working Procedures of the Information Museum, namely the preservation and service to the public regarding objects of historical and scientific value in the field of communication and informatics. While its functions consist of: 1) preparation of programs for the preservation of objects of historical and scientific value in the field of communication and informatics; 2) implementation of services and education to the public regarding objects of historical and scientific value in the field of communication and informatics; 3) implementation of information dissemination facilities; 4) implementation of conservation and restoration of objects of historical and scientific value in the field of communication and informatics; and 5) implementing the affairs of preparing plans, programs, evaluations, reports, and cooperation, as well as matters of administration, finance, staffing, equipment, and household, as well as public relations.

Museum Penerangan carries a new paradigm of "museum as a hub", the museum is expected to be a bridge for all levels of society in getting to know the history of information and communication services in Indonesia.

In carrying out its daily operations, the head of the museum is assisted by the head of the general subdivision, the partnership and public relations work team, the visitor service and public program work team, the communication education work team, the collection management work team

Museum Penerangan has a masterpiece collection that is included in the national level collection, namely the Aceh tsunami camera and the Indonesian Film Agency camera used to cover the Ikada incident, 19 September 1945. Information on this national level collection is reported to the Directorate General of Culture, Ministry of Education and Culture.

Other collections are outside and inside the building. The collection outside the building includes stage lighting cars, PFN Sinerama unit cars, Radio Republik Indonesia outside broadcast cars, Television Republic of Indonesia (TVRI) outside broadcast cars, the first to cover the Asian Games IV in Jakarta in 1962, and four TVRI outside broadcast cars .

While the collection on the first floor includes a Javanese letter typewriter used by the Surakarta Palace starting in 1917, an oemoem radio from 1940, cameras recording the first RI cabinet meeting, kelompencapir dioramas, TVRI mini studio, Unyil's doll collection, various printing presses and cameras. film. The collection on the second floor consists of digital rides and interactive presentation tools that show the development of information and communication technology up to the present day, as well as reliefs that contain stories about communication from the existence of the first humans to the present. The museum also accepts collections donated by the public, such as the Usmar Ismail collection, the Ismail Marzuki collection, and the Djamaludin Adinegoro collection.

Museum Penerangan is also equipped with a library and a mini theater with a capacity of 60 visitors which can be used for educational events and programs in collaboration with institutions and communities, as well as film screenings. The museum also provides playgrounds for toddlers and a soundproof room for broadcasting podcasts and creating digital content.

Result

1. Fulfillment as a Smart Museum

   Museum Penerangan (Muspen) has implemented a smart museum. This is included in Muspen's vision, namely a smart and communicative museum. Smart here means a museum that not only displays historic collections, but also serves as a space as well as a place to share knowledge about lighting and communication, as well as providing new experiences for visitors through interactive spaces that present information by utilizing digital-based technology. Meanwhile, communicative here means that information about the history of communication is received by the public well and easily, by presenting a friendly display system for all people and in accordance with the message to be conveyed to the public.

   In achieving the vision as a smart museum, one of the missions carried out is to create exhibition arrangements that are relevant to the development of society, namely by presenting audio narration, visualization and teaching aids with digital technology.

   This smart museum is defined by Muspen as a museum that makes it easy for visitors and removes barriers to accessing collections.

2. Stages of Smart Museum Transformation

   In order to transform into a smart museum, Muspen has made various reforms. There are six elements that are overhauled in accordance with Government Regulation no. 66 of 2015 concerning Museums, namely physical aspects, programs, imagery/brand, management, regulation, and networking.

The transformation of the museum began in 2018, namely from the physical side, the museum was revitalized so that the ambience of the museum is more comfortable for visitors.

The use of digital technology was initiated in 2018, but due to a limited budget, starting in 2019, the museum can only buy some simple technological devices. Since 2020, the purchase of technology equipment has begun, especially for the second-level exhibition.

Because in 2020-2022 there was a Covid pandemic, Muspen is innovating with a virtual experience). Not only the videos are there but also there are guides who go around. There are MCs. There is direct interaction with the audience. Many participants from various provinces. There were those from Palembang, Aceh, Bali, even to Egypt, Indonesian schools in Egypt. There used to be every day, two sessions in the morning and in the afternoon. 60 minute tour duration, Q&A. At this time virtual experience is only based on requests from schools and other institutions.

Muspen's current activities include traveling exhibitions, virtual experiences, Muspen storyline Information and Communication Services, Collections, Digitalization Installations, Digital Interactive Zones. Muspen collaborates with communities, museums and other groups to collaborate in holding events.

As of now on the second floor there are about six interactive panels and tables. There is sensor technology for coloring which is then scanned and immediately appears on the screen. On the second floor there is a hoax buster using virtual reality. Also there are interactive games with sensors.

In disseminating information, Muspen also utilizes social media, including Instagram, YouTube, Twitter and TikTok, as well as Telegram. Muspen also has a museum friendly community called Muspen Bestie.

This year Muspen is also conducting a study on changes to the exhibition system for the Information Museum and it is almost complete, as well as digitizing collections and all collections have sufficient narrative. A QR code will also be made to make it easier for visitors to get narration by utilizing augmented reality technology. Then it is being explored to adopt technology that helps visitors with disabilities.

3. Barriers and Opportunities

The use of digital technology helps Museum Penerangan meet performance goals. The level of service satisfaction is high in the second half of 2022, namely 3.75/4 or 93.86 with the offline service index being higher than online services, namely 3.75 and 3.74. This figure has increased compared to 2020, which was 90,442. From the service satisfaction survey, visitors gave suggestions for virtual experience activities to be more frequent, to update information on social media platforms, to improve the online registration system, and to be more innovative.

The use of information technology also encourages an increase in the number of visitors. In 2019 the number of visitors reached 65,714, then the number decreased drastically during the 2020 and 2021 pandemic for physical visitors, namely 17,545 and 4,924. In 2022, the number of physical visitors will increase to 8,408. To achieve the target, the number of online visitors, both participating in the virtual experience and visiting social media, Muspen (engagement) is then calculated so that by 2022 the total number of visitors will be 132,024 visitors. Meanwhile, until June 2023, the total number of visitors reached 112,143 visitors. While the performance target is 125 thousand/year.

Based on the results of interviews, the factors that hinder the Museum Penerangan from transforming into a smart museum are the investment costs for purchasing technological devices and the lack of human resources who can determine the right technological devices and assist with maintenance to prevent equipment damage. While the opportunities are still great because the museum's human resources are still young and have a passion for learning as well as being united and creative in making programs. They also have the ability to be museum guides. In addition, there is also the support factor from top management.

CONCLUSION AND RECOMMENDATION

Museum Penerangan is one of the museums in Indonesia which is being transformed into a smart museum. Until now they have utilized digital technology, such as interactive games, virtual reality, and sensors to increase the attractiveness of visitors. They also take advantage of social media for engagement. The result is an increase in the number of visitors. However, in an effort to become a smart museum, they face challenges in the form of a budget and competent human resources to determine the required technology. While the opportunities for implementation are large due to the quality of competent and creative human resources, as well as management support.

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