A Study on: Adoption of Digital Technology (AI) for Gen Z in Museum Through "Co-Creation through Interaction Framework"

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ABSTRACT

In this research, the authors investigate the implementation of digital technology in the form of AI by Generation Z (Gen Z) in museums, and discuss it with the theoretical framework of the co-creation through interaction framework (CCF). Addressing the Hang Tuah Museum in Melaka, Malaysia, as the first museum with the incorporation of AI into heritage storytelling in the country, the research investigates the digital technologies involved in value co-creation mechanisms, sustainable touristic development of heritage and guiding museum management. The research follows a qualitative approach, employing semi-structured interviews and observations of Gen Z visitors and the staff of the museum, to collect their observations. The observations emphasise that Gen Z favours interactive and immersive digital reality such as holograms, virtual tours and AI-powered chatbots, due to the tech-savvy and multi-tasking nature. The study identifies certain gaps in what has already been done like the fact that the previous literature has not paid sufficient attention to AI adoption by Gen Z in museums and the contextual gap on the Hang Tuah Museum. The analysis of the co-creation framework allows the study to highlight that the creation of customizable heritage experiences through collaborative relationships among visitors, digital technologies and museum objects is an imperative. The results offer an action plan that museums can follow to enable the efficient incorporation of digitalization, being relevant and sustainable in heritage tourism. The presented study is related to the emerging debate about digital transformation in cultural institutions, and presents a framework which can help in making cultural institutions more engaged with their visitors via technology enabled co-creation.

Keywords: Generation Z; co-creation through interaction framework; Hang Tuah Museum; Digital Technology (AI);

INTRODUCTION

In this current expert technology world, most people are accustomed to using electronic products such as smartphones, which have become a necessity in their lives. Nowadays, digital technology is also widely used in various fields such as in the social, political, economics, educations and also global interaction and communication purposes. It allow the peoples able to engage and acquire the information easily anytime, anywhere without barriers. Based on the previous study from Aithor (2025), mentioned that the growth of AI and automated technology could help society become more efficient which could greatly affect workers, companies and the economy. Many believe that by investing in AI and automation, routine and manual tasks will be handled quicker and companies will experience more economic success.

Besides that, used of digital technology also allow the digital transformation occur in the business operations, help in interacting with people and also build a new strategy management precisely to achieve the organization goals effectively. For example, this study shows the digital transformation allow digital technology to be used in the museum able to attract and increase the number of tourists visit there, meanwhile, digital transformation also able to improve the facilities in the museum and also create a new opportunity for growth in many aspects of the museum. Digital transformation in tourism activities affects the needs and behaviour of tourists and the interaction between tourists and tourism businesses. Advanced technology helps enhance customer experience by increasing convenience and flexibility in tour booking, payment, and communication (International Bank for

Reconstruction and Development / The World Bank, 2023).

Co-creation through the interaction is the key important that could help in increasing the overall heritage tourism. This theory in the research brings the advantages to create a better self-experience and the relationships between the tourists and the local countries" culture as well as social communication. It involves sharing perspectives, giving feedback, and building on each other"s input to create something new that wouldn"t be possible individually. For the example, value co-creation in tourism is demonstrated by Makemytrip.com, where tourists can plan their trip by adding chosen destinations, activities, place to stay and number of stay days.

Problem Statement

Diagram 1.0 Problem Statement (Developed by Researcher)
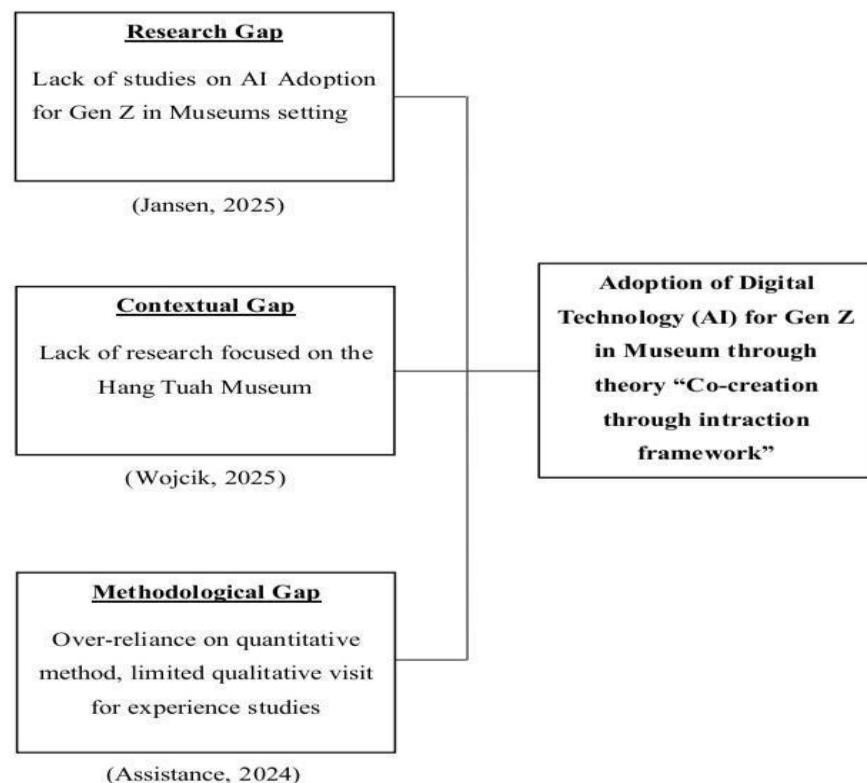
In the museum context, researcher found that in the museum context is lack of studies about digital technology in Gen Z use in the museum. This research able to know the current technology existed that utilise digital technology in the museum among group Gen Z peoples. Besides that, In the local country majority of the researchers likely to do the research on the particular museum place such as National Museum of Malaysia, Islamic Art Museum Malaysia, Perak Museum, and also Biomedical Museum. However, no have researchers that studies the Hang Tuah Museum. Besides that, researcher likely make an different study about the Hang Tuah Museum in qualitative method, In order to get more close to the self- experiences and observation of visitors experiences in the first look.

This research focuses on the adoption of digital technology for Gen Z in Museum to examine their satisfaction, personalised experience, and perception of the digital technology used in the Hang Tuah Museum. Data will be collected through a qualitative interview by asking some general questions to the people who are in the group of Gen Z. This study will target respondents in Melaka to reflect the views of visitors who come to the museum at a particular time.

LITERATURE REVIEW

Museum

Museum is a not-for-profit organization, public legal entity, non-profit making cultural institution, which aims

at studying, acquiring, preserving, documenting, interpreting, and displaying material and non- material cultural properties. A museum are diverse, open for the public and promotes sustainability. They are run and managed in an ethical and professional manner as well as with the involvement of people; they provide opportunities for learning, fun, contemplation, and knowledge exchange (Ten Ros, 2023). The Islamic Art Museum Malaysia operates as an art museum type, while the Melaka Sultanate Palace Museum serves as an example of a historical establishment. The science and technology museum in Malaysia operates as Petrosains together with specialized showcases including music and fashion and sports themes. The essential characteristics of museums encompass essential functions which start with collecting and safeguarding historical items for future populations alongside grouping displays by thematic categories and offering research facilities and educational tours and digital content and welcoming the public while enabling interactive exhibitions and experiential depictions for attendees.

Hang Tuah Museum

Diagram 2.0 Hang Tuah Museum (Photo by Researcher)

Malay history and Hikayat Hang Tuah were the basis of my journeys of life from Hang Tuah's childhood until adolescence. Interaction and modelling techniques will make your visit more interesting. The complex also includes a mini auditorium that can be utilised for theatre, film and video for screening, cultural performance, and seminars. Five houses in the kampung represent the Malay warriors Hang Tuah, Hang Jebat, Hang Kasturi, Hang Lekir, and Hang Lekiu, who served in the Melaka government before. Through a refined technique and a unique interpretation, the 14 superiority and uniqueness of Malay architecture are displayed in symbolic ways. The silat court is in each house, which is equipped so activities can be conducted like silat training, culture and so on. This Museum are located at Kampung Sungai Duyong, Melaka. It was where the Hang Tuah was born (Harun & Mohd Fadil, 2023a).

The reason researcher likely to choose the Hang Tuah Museum as a place to conduct the research because it was the first museum that apply the Artificial Intelligence (Ai) technology in the facilities and infrastructure of the museum in order to enhance tourists‟ experience of the museum. Hang Tuah Museum also have been apply the hologram technology to showcase the scenario of the battle between Hang Tuah and Hang Jebat, while a „virtual tour‟ method is used to narrate Hang Tuah‟s trading activities around the world (Harun & Mohd Fadil, 2023b).

Museum Management

According to the review from the previous research journal articles Pal (2022), the term „museum management‟ is used to cover a variety of museum roles, including information handling and organizing and coordinating activities. Museum management includes the handling of financial and legal tasks, overseeing collections and planning different aspects sof museum activities. In this context of museum management also has been recognizing by many of the professionals of the museum people explain that the management of practices and theories have the potential to help the museum getting the clear goals and purposes to manage the huge of resources in the museum effectively and efficiency while to face the changes challenges and opportunities that come in the future.

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Museum management is not just only about preserving the artifacts. However it is about keeping the histories true to life for the next future generations" experience. Museums are so much more than a building, holding objects, it was a building secure the memory, a bridge of sorts between past and present, and places where people meet history, culture and each other. A good museum for a museum is not a place where treasures are displayed, it is a place where treasures speak. It makes an ancient coin into a trade story; a faded photograph into an effusion about missing lives; a sculpture into a talk about beauty and sense.

Strategies Museum Management

In order to make sure the operation of museum is going on smoothly and efficiently, all of the museum around the world having their own strategic planning and management to help manage the daily operation of museum effectively, but more focusing on visitors" self-experiences and ensuring the long-term preserving of objects and the histories in the museum. Due to the advancement of the technology evolution, museum can take this opportunities by applying the digital technology in the strategies museum management in order to enhance and increase the effectively and efficiency, meanwhile utilising the digital technology in the strategies museum management are able to enhance the number of tourists visit the museum and also increase conservation and maintenance quality level of the historical objects.

Sustainable Development

Sustainable development is usually defined as the satisfaction of today"s needs at the expense of nothing damaging the capacity of subsequent generations to satisfy their needs. This concept highlights the association between the environment, society and economy dimensions of development that seeks a balance that will enhance permanence sustainability of all. Its principals include responsible use of the resources, social equity and economic growth without reducing the environment. A sustainable management method considers how what a company does today will 20 influence the environment, society and the economy down the road. Sustainable management includes handling resources and activities so that sustainability, the environment and social aspects are always balanced (Study Mind, 2023).

Heritage Tourism

Heritage tourism can said as a activities which is the persons from the outside the country visit for watching, seeing and experiencing the cultural or natural heritage of a local country such as visiting spots of historical and arts tourist destinations, tourist museums, arts and natural landscapes. The purpose is to preserve the heritage while sharing the local economic development and cultural exchanges. Heritage tourism is a kind of cultural tourism, which is tourism which seeks to enjoy on traditional culture in foreign countries, trace remaining on culture activities, conduct all cultural celebrities or join cultural activities that held locally. For example, Sabah, a Malaysian state, has become a popular destination which attracts visitors who are interested in art, architecture handicrafts, traditional attire, music and dance (Aljohani & Choy, 2021).

Sustainable Heritage Tourism

Sustainable heritage tourism is to keep and preserve the cultural and the natural heritage sites, at the same time fullfill tourists, industries and the environment needs and wants, meanwhile it also boost the sustainable development model of the tourism in the economics, social and environmental balanced in order to ensure that heritage can bring benefits and values for the future generations and local communities. For the example way the sustainable cultural heritage tourism is the technologies such as Augmented Reality (AR), Virtual Reality (VR) and digital archives are now driving progress in saving heritage sites by supporting culture and helping them thrive. AR gives visitors more ways to discover cultural heritage by placing digital details over real locations. Because of this technology, printed and physical signs are no longer necessary, saving the environment

from unnecessary waste (Humanities, 2025).

Phygital Heritage

In details, phygital heritage is a combination of physical objects such as artifacts, historical, buildings or landscapes together with the current digital technologies such as Ai chatbox, virtual reality and hologram to create more engaging and impressive experiences for the tourists to enjoy heritage tourism in the museum more meaningful. More engaging and interactive ways of learning are now possible because museums now use virtual reality (VR), augmented reality (AR) and naked-eye 3D. New technologies update museums and help in the wider distribution of their cultural heritage. For example from Liu and Sutunyarak (2024) showed that the Nanjing Museum uses both naked-eye 3D and high- precision digital 3D tools to give people options for virtual and real-life interactions and this allows more people to learn about its exhibits. Applying these solutions greatly improves how appealing an exhibition is and how interested visitors are.

Digital Technology

In this current new technology, digital technologies become necessary things in the human daily life. This is because the digital technologies have been widely used by communities across the boundaries especially among the group of peoples that comes from generation Z. It brings a lot of benefits in the social life such as increase the work efficiency, reduce time in manage some matters and enhance the effectiveness of solve in a particular business. Now, digital technology also play an important role model in sustainable the local

tourism through the co-creation process. It able increase the numbers of tourism visit to the local heritages. Heritage tourism helps to preserve cultural heritage while also fostering local prosperity. Digital technologies have revolutionised cultural heritage conservation and tourism, altering how heritage places are viewed and shared with global audiences (Avci & Akyol, 2023).

Co-creation through interaction framework

Diagram 2.0 Co-creation through interaction framework (Ramaswamy & Ozcan, 2017)
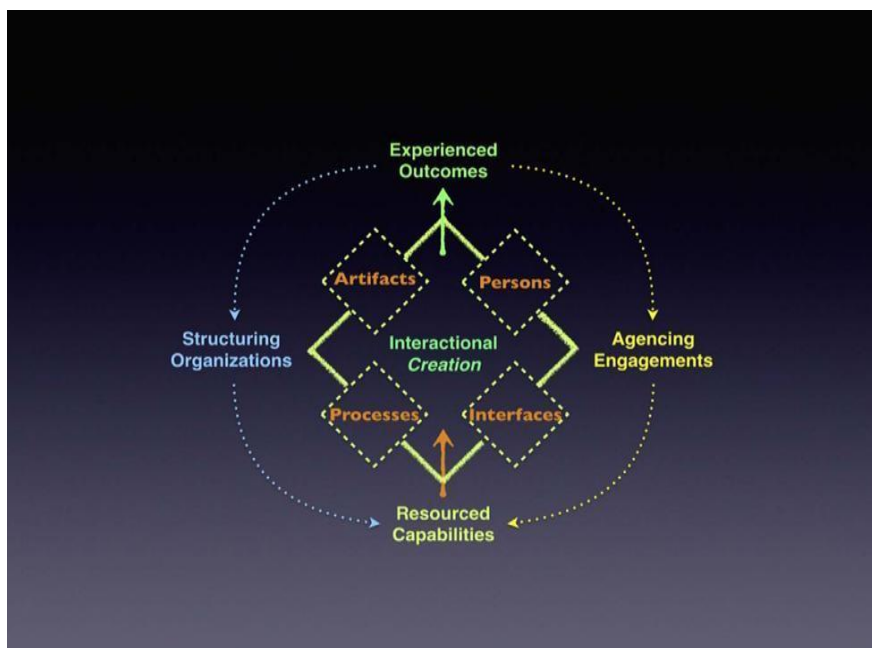
Related to the co-creation through interaction framework, Ramaswamy and Ozcan (2018a) have operationalized interactive platform as „an instance of an agencies assemblage of relations of artefacts, processes, interfaces, and persons, that support a plurality of interactive system environments. It is important for organizations to engage their stakeholders for purposes of creating digital ecosystems to co- deliver value worth through the stakeholders" resource capabilities and exchanges. This co-creation process is based on a central communication interface that is connected to other subsidiary interfaces.

The structure of the system is never complete and undergoes a state of continuous development which does not reach a final form. In order to function and compete it needs to learn from real life situations and information that is generated out of interactions Agostino et al. (2020) use the CCF framework to explain that technology is still in the position of a „strategic relational tool" in the improvement of museum experiences. According to Kirova (2020), it may be pertinent to relate to the concept defining by Ramaswamy and Ozcan from a tourism point of view as the concept deals with interfaces of organization- people and material objects creating the value. Her studies agree to the importance of technology in enriching visitors" learning experiences making them more lively, sensory and involving, proffed and entertained. It also provides an opportunity to filter the offered services and products according to the user"s preferences and engage with the service environment and people.

This research thus operationalize museums as „growth entities" where value is created through a multiplicity of interactions between artifacts, individuals, processes and interfaces, in a more and more digital world. These institutions prepare to promote sustainable development of destinations and communities, including their tourism ones, through the secure „museum-mediated interactions.

METHOD

This research is aimed at the use of digital technology (AI) among Gen Z visitors to the Hang Tuah Museum, and based on the interaction co-creation theory. The study adheres to qualitative study design, especially through semi-structured interviews and observations, which form important data collection instruments. This method will make it possible to study Gen Zs interaction with AI within the museum framework and their contribution to the co-creation of knowledge in depth. The type of research design is exploratory that is, intending to reveal rather than to prove existing theories. This approach fits best when dealing with a subject that has not received much research in the past, and facilitates flexible and situated results.

This research is based on the philosophy of interpretivism that focuses on the necessity to learn about subjective human experience in a definite context. The mentioned philosophical angle helps to justify the qualitative philosophy, as it attaches importance to individual values, experiences, and relationship with others. It provides a deductive approach to theory development beginning with existing theories with regard to digital adoption and interaction structures and applies such theories to the museum setting. The researcher will prove these theories to be true or improve them with the data reported after interviewing Gen Z visitors and the 68 museum employees. Mono-method qualitative strategy was chosen to provide some consistency and richness of the analysis.

The strategy to be employed in the case study focuses on Hang Tuah Museum in Malacca, being the first museum in Malaysia to use AI in heritage storytelling. Non-probability purposive sampling was applied to collect data, the population included visitors of Gen Z group, and museum management. The study resorted to a theme analysis of qualitative data and found common themes and consequent understanding of them. The study considered the assessment of scientific rigor by addressing internal, construct, and external validity, as well as the assessment of reliability in order to guarantee creditability. Triangulation and attentive scheduling of the interviews also contributed to the credibility of the results, and this methodology was also sound to investigate the subject of the co-creation of digital heritage experiences.

Primary Data and Secondary Data Resources

Based on the theory stated by Saunders et al. (2019a) the sources of information as the foundation of research can be classified into two broad categories namely primary source and secondary source. First, the data from primary source provides first hand or direct evidence about an object, event, person, or work of art. Meanwhile, secondary source data are the information of publish summaries which taken from further analyses of data that have already been collected for some other purpose.

For conducting the case study in Hang Tuah Museum, the researcher collected data from the primary sources through interviews and site observation. Furthermore, some of the studies related to the digital technology and Gen Z"s information and statistics previously are collected as the secondary data. These secondary data retrieved from the internet, reference books, organizational websites, and journal articles has supported the progress of the

research.

Research Strategy

In this research, researcher selected the case study method to study the topic title of "Adoption of Digital Technology (AI) for Gen Z in Museum through theory co-creation through interaction framework". The case study is the ideal qualitative approach to your study as it will allow you to intensively examine the Gen Z generation embracing AI within an actual museum environment with all of its dynamic interactions among users, technology, and the environment as the theory co creation through interaction framework demands. With the AI exhibit in a particular museum as an example, you can witness live co- creation, such as how the Gen Z approach to playfully interact with the AI can influence its use or how museum personnel can modify the technology depending on the feedback, and then theory can be induced organically out of these rich real-world encounters.

Although the results are unlikely to be generalized, the richness and contextualized information that a case study provides is unparalleled when trying to untangle the dynamic and frequently changing nature of the Gen Z and AI relationship in museums, which is why it is the most suitable method to address your research question.

Sampling Design

Sampling design is the method that use to select a particular group of peoples or (interviewees) from a larger population of people to study the specific research topic. According to Kiran (2022) definite plan of getting a sample in a given population is known as sampling design. It is also the procedure or technique that the researcher will use in choosing items that will form the sample of the population or universe. In this research, the non-probability sampling technique was selected by the researcher which is the researcher conducted the purposive sampling known as judgemental and selective or subjective sampling.

Besides, sampling method is one of the techniques that often used in qualitative investigation. It is one of the ways to seek the knowledge and data effectively. The rationale chooses this approach is seeking the data from the adoption of digital technology (AI) in museum for Gen Z.

In this research, there are two main groups of respondents:

1. Firstly, 10 respondents of the tourists who is in the population of Gen Z visit to the Hang Tuah Museum experience the adoption of digital technology (AI) in museum"s historical objects.
2. Second group is expected 3 respondents who are working as museum management.

In this sampling design the non probability sampling refers to the approach in the selection of units of a population in a subjective. The non-probability sampling technique is simple, convenient and low cost method of data collection since one is not obligated to use a comprehensive survey frame. In making inferences about the population based on the sample however, the sample must suppose that the sample represents the population. In this qualitative research, the researcher interviewed the targeted respondents in Hang Tuah Museum of adoption for the digital technology (AI) for Gen Z in Museum located at Malacca, Malaysia. Besides, it aims to achieve the objective of this study which seeking data on the criteria adoption of digital technology (AI).

Analysis Qualitative Data

In this qualitative research data, researcher use the data analysis is the systematic gathering, cleaning, transforming, describing, modelling and interpreting of data, typically using statistical methods. Data analysis plays a role in both business and scientific research, and in recent years there has been an increase in the demand for data-driven decision making. Statistical methods employ a variety of mathematical and statistical methods to draw informative insights (useful information) out of datasets, which may subsequently serve as the basis of operational decisions or future research direction (Eldridge & Stephen, 2025).

In this research, the thematic analysis method was selected to use for data analysis, meanwhile. Thematic analysis refers to the qualitative data analysis method. It is most often deployed on a collection of texts, like an interview

or transcripts. The researcher goes through the data closely and seeks to find out any common themes, topics, ideas and patterns of meaning that keep on reoccurring (Caulfield, 2024). In

order to conduct the thematic analysis step by step, there is few of procedures when conduct it.

DISCUSSION

Diagram 3.0 Research Framework (Developed by Researcher)
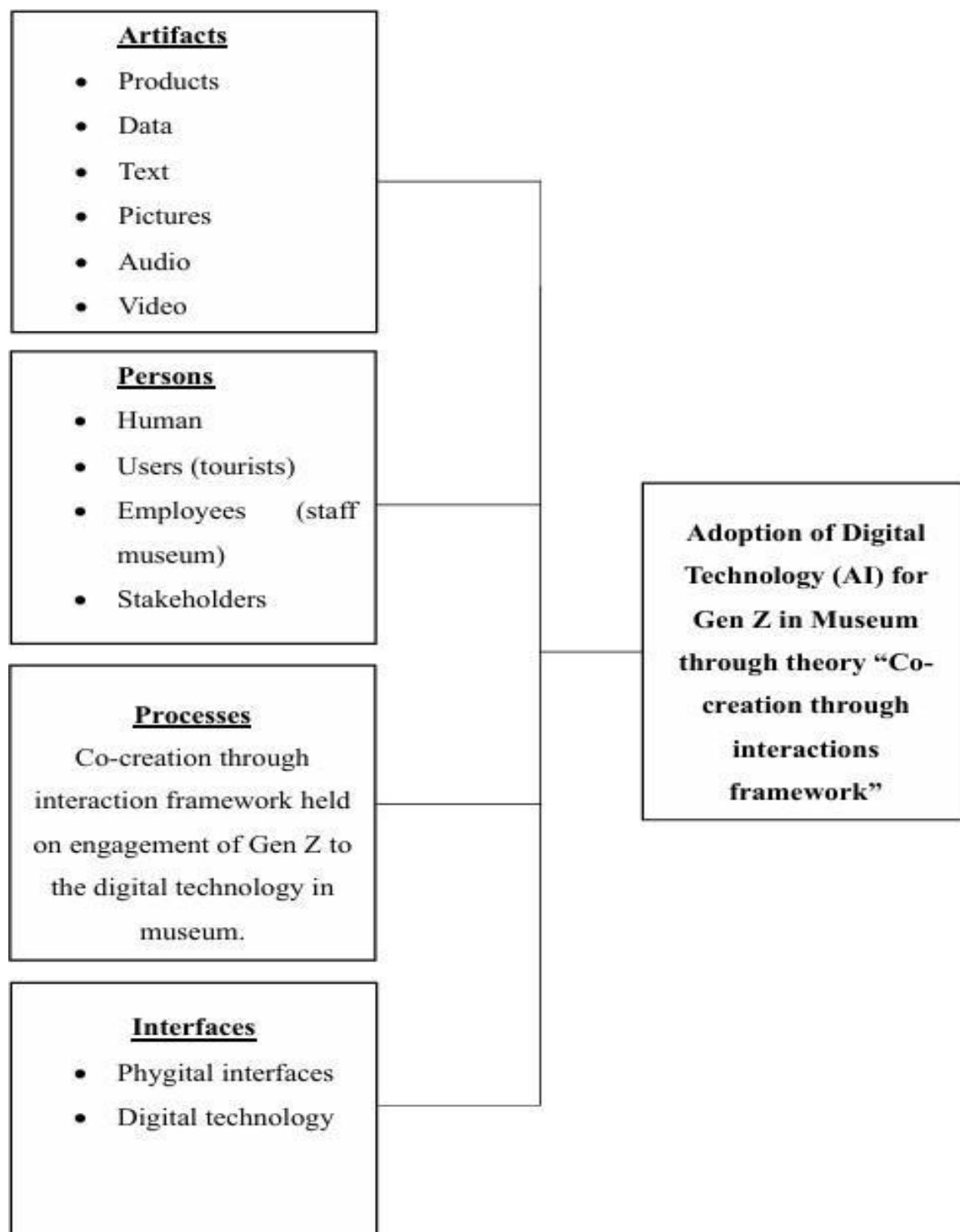
This research thus operationalize museums as „growth entities" where value is created through a multiplicity of interactions between artifacts, individuals, processes and interfaces, in a more and more digital world. These institutions prepare to promote sustainable development of destinations and communities, including their tourism ones, through the secure „museum-mediated interactions".

Artifacts

Artifacts know as a physical and/ or digital, including products, symbols, data, text, pictures, audio, or video. According to the research from Friedman (2007) mentioned that the term artifact has been derived from two Latin words wherein arte meaning by skill and factum or the past participle form of facers which means to do or make back in the early 1800s. Many definitions suggest artifacts as object that was made by the hand of men and not being natural, some definitions used are, "something made by human art and handicraft," or "an artificial object," especially in the archaeological sense where they refer to paleo-archaeological item as distinguished from the paleontological, notably prehistoric ones or culturally made and modified by man.

Persons

Person is mean by human that live in this earth planet. Human beings are creatures that live in the 21st century. In addition, humans are also creatures that have the ability to think and judge. In this context of co-creation through interaction framework, persons are referring to the users, employees, suppliers, financiers, partners, and other stakeholders. Generally, the word person is used for a person who has individual identity and is conscious of themselves. In this context, it means that any thinking, feeling and responsible being is viewed as human.

Processes

Process help in increasingly software-based and algorithmic, specific to particular interactions, connect a series of interactions within a particular environment or activate multiple environments of experiences along an individual"s interactive journey. Processes include digitized and more conventional business processes of interactions. In the context of co-creation through interaction frameworks, process is used to define the series of structured events engaged in the creation of objects or services.

Interfaces

As stated by Ulrich (1995), it is apparent that the kind of physical interface is of primary importance and therefore it is easier to define an interface in the following manner: In other words, when we say that certain components are interactive, it means that they share some means of contact. An interface could be the physical connection between two components such as the gear and the shaft or any other component as in the case of infrared signal link between a remote control and the television set. In the world where people use devices as interfaces for software, APPI components need to co-function and co-connect as an interface.

CONCLUSION

The thesis by Adoption of Digital Technology (AI) as a Gen Z in Museum through Co-creation through Interaction Framework discusses how artificial intelligence (AI) can revolutionize a museum setting with the Hang Tuah Museum in Melaka, Malaysia, as the first museum in the country to use AI in telling heritage stories. The study focuses on Generation Z (Gen Z), a technologically literate generation, used to working with digital technologies, and explores how their engagement with AI is used to create co-created and customized experiences of heritage. It establishes digital adoption as a key to the sustainable heritage tourism and museum management in the future.

The research establishes the following gaps in the study: the insufficient focus on AI implementation in museums in relation to Gen Z, the absence of the research on the Hang Tuah Museum in particular, and the overuse of quantitative research methods in previous studies. To overcome this, the researcher will employ qualitative approach whereby he/she will utilize semi-structured interviews and observations when visiting Gen z visitors and museum employees. The technique captures lived experiences, preferences and perceptions and provides insights that would be missing in structured surveys. It is also in line with interpretivism, which stresses on the significance of personal experience and sense-making.

It has been found that Gen Z is more drawn to immersive and interactive technologies like holograms, AI- based chatbots, and virtual tours. Such tools are in line with their multitasking character and their need to have engaging

experiences. The paper provides relevance to the process of co-creation with the help of interaction in which heritage experiences are co-created by visitors, digital technologies, and museum objects. This will add personalization and increase the involvement of visitors, and heritage will become more relatable to the modern viewers.

Overall, this study is relevant to the current discussion on the topic of digital transformation in cultural organizations. It proves that the use of AI, facilitated through the interactivity framework of co-creation, can make museums an interactive, welcoming, and futuristic experience. The study also has practical implications to the museums aiming to appeal to younger audiences, enhance the engagement, and stay relevant in a growing digital society because it is focused on Gen Z.

ACKNOWLEDGEMENT

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