

Research Proposal

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Is the integration of advancing technologies beneficial to museums and heritage sites?

Research Problem

Where there's civilisation there is the need for people to examine their past and marvel at history. Museums have allowed this to be done, with the oldest known museum stemming from Babylonia 2500 years ago (Kampouris, 2025). With museums being an aspect of nations from ancient times, the introduction of technology is rather recent in comparison. Cultural heritage is an extensive tradition of preservation and education of cultures for the local community and tourism. With the advancing of technologies more museums and heritage sites are integrating technologies to aid them in both preservation methods, like digital twinning as well as in the education and outreach to locals and visitors (Gallagher & Armstrong, 2025). This project will explore the impacts of digital integration on museums and heritage sites, examining the positives that this can bring as well as the issues that have stemmed from this increasing adoption.

Objectives

This project seeks to explore the impact of technological integration within the tourism and heritage sectors, with a core focus on museums and heritage sites. Despite the growing adoption of digital tools and immersive technologies, there remains a lack of comprehensive understanding regarding their overall benefits, drawbacks and implications for diverse audiences. The primary objective of this research is to analyse previous studies on the industry and its technological integrations to gain insights into the progression of this topic and whether the integration is beneficial, harmful or mixed in its outlook.

To effectively examine the benefits and drawbacks of this research and previous works, it is also key to enforce secondary objectives that are conducted in relation to the primary objective, supporting its material. This project has two secondary objectives being that; the project will examine the personal perceptions of individuals in relation to psychological response and whether active participation and personal connection is better experienced through traditional or digital means. As well as the further goal to examine the impact of advancing technologies on inclusivity and awareness within museums and heritage sites to gain insight into how minority groups are affected by digitalisation.

Research Questions

This research aims to explore the multifaceted impacts of technological integration on museums and heritage sites. The success of this research is measured using targeted questions. These questions are designed to address the key aspects of the research

objectives, ensuring a comprehensive understanding of the outcomes and potential challenges. The questions are as such;

Firstly, how have emerging technologies such as AR, VR, digital archiving and interactive displays been beneficial to museums and heritages sites? This question seeks to identify concrete benefits and applications that have improved the sector, for example by enhancing operational efficiency, visitor engagement or preservation efforts.

Second, what are the potential risks or drawbacks associated with the integration of technology in these settings? This includes examining issues such as the impact on authenticity, cultural sensitivity or the potential alienation of certain visitor groups.

Third, which projects exemplify the successful utilisation of advanced technologies and how have these initiatives or sites evolved over time? This aims to highlight case studies that demonstrate the technological development of the industry and its influence on visitor experience and the sites management.

Fourth, how does the balance between traditional methods and technological innovations influence visitor participation, emotional connection and overall satisfactions? This question investigates the effectiveness of different approaches in engagement and whether traditional or technological methods are more beneficial.

Finally, what effects has the technological integration within the museum and heritage sector had on minority and marginalised groups, particularly regarding inclusivity, representation and awareness? This question seeks to address the social equity issues within the sector and whether technological integration is beneficial or harmful in the involvement of minority groups.

These research questions ensure that the project can explore both sides of the primary objective, analysing and examining the research from varied outlooks. Furthermore, the questions can help to address the secondary objectives properly ensuring a structured examination, and the production of examples and supporting evidence.

Methodology Considerations

Data Collection

This research adopts a comprehensive mixed-methods approach, integrating both qualitative and quantitative techniques to thoroughly explore the current scope of research and studies on the technological integration in museums and heritage sites. The reasoning for employing a mixed-method design is to help provide a holistic understanding of the objectives, combining the statistical efficiency of quantitative data with the depth and insights offered by qualitative analysis. This section discusses in detail the methods for data collection, analysis, the ethical considerations and the

overall feasibility of the research, ensuring that the methodology aligns with the research objectives and questions.

The core foundation of this study will be secondary data, curated from a wide array of scholarly and industry sources. Academic journals, peer-reviewed papers, industry reports and case studies will be reviewed to gather existing insights on technological trends, visitor engagement, inclusivity and the impact of digital tools within the sector. These sources will help to provide a contextual background reinforced by the existing research, allowing this project to identify patterns, gaps and trends in the industry that can inform the current state of technological integration and its effects.

Complementing the core secondary data will be the collection of primary data gathered through surveys to people on their experiences with museums and heritage sites. The purpose of these surveys is to capture current perceptions, attitudes and experiences related to technological integration from the perspective of visitors themselves. The survey will be designed to include both close-ended questions to facilitate quantitative analysis and open-ended questions to allow responders to express their opinions and feelings for examination and analysis.

Participants will be selected via convenience sampling, a method of sampling that involves collecting data from available pools of respondents. There are no criteria required to be included and is not aiming for a specific audience in mind. This makes it a quick, easy and inexpensive methods of research. This method is beneficial as it will allow for fast data collection and can help build a large data set for examination and insight. The core issues with convenience sampling are that it isn't random but rather done by proximity and that it runs the risk of subjective choice of participants leading to survey bias (Golzar et al, 2022). However, in this project the survey will reduce the impact of potential issues due to the surveys being distributed online, ensuring that the answers are not limited to proximity and that the research can't choose the participants.

Data Analysis

The collected data will undergo analysis through multiple complimentary techniques to ensure comprehensive insights and robust conclusions. Primarily, descriptive analysis will form the backbone of the data analysis. Descriptive analysis and statistics will allow the summarisation of existing data, providing an overview of prevalent trends, visitor demographics, general attitudes and types of technological adoption. For instance, the proportion of visitors who feel that technology enhances their experience versus those who believe it removes from personal connection can be quantified.

In addition, inferential analysis can be used to extend findings from the survey data, existing papers and case studies to the larger population. Inferential techniques will examine relationships and differences across demographic groups and can identify predictors of positive or negative perceptions of technology like ages, prior familiarity or

frequency of visits. This analysis enables the research to make statistically supported generalisations about the industry.

Furthermore, the utilisation of predictive analytics to anticipate future trends through analysis and forecasting techniques can be applied to existing datasets, papers and studies. These methods will help to predict potential outcomes of technological integration, visitor engagement and inclusivity from the future perspective. By utilising the data from the primary survey data and the secondary papers/journals data, we can effectively address the research questions at hand.

Ethical Considerations

Ethical integrity will underpin all stages of this research. Participants involved in primary data collections from the surveys will be provided the context about the purpose of the study and what their participation entails. Informed consent will be obtained, ensuring voluntary participation. Confidentiality and anonymity will be maintained, with data removing any personally identifiable information and digital data stored securely. Participants' responses will be reported in aggregate form where possible to prevent identification.

Regarding secondary sources, when examining the data and compiling sources it's important to consider the potential of research bias within the papers being examined. This bias could conflict with the actual industry or populations' opinions and skew the data. Thus, the research will be critically evaluated to ensure the credibility, reliability and potential bias within each source. Preference will be given to peer-reviewed, highly cited publications and papers which have undergone rigorous review processes. Furthermore, cross-referencing multiple sources will help mitigate the influence of individual biases and ensure a balanced perspective.

It is also important to address other potential ethical challenges like ensuring that the survey questions do not lead or bias responses and that cultural sensitivities are respected during data collection. The research will adhere to institutional ethical guidelines through the data collection and analysis process.

Feasibility & Reflection

The chosen mixed-methods approach is both feasible and appropriate given the research objectives. The reliance on secondary data reduces resource and time demands, while primary data collection provides current, context-specific insights. The combination allows for increased validity and reliability of findings (Kuhn, 2024).

The quantitative methods will enable the research to establish measurable relationships and generalise findings to larger populations, while qualitative techniques can provide contextual understanding of visitor perceptions and industry viewpoints. This dual approach ensures a comprehensive exploration of the complex interaction between

technology, visitor experience and inclusivity. Furthermore, ethical considerations are integrated into every phase of the methodology, reinforcing the integrity and credibility of the research whilst upholding ethical standards.

In summary, this methodology is designed to effectively address the research questions by leveraging diverse data sources, analytical techniques and ethical safeguards. It ensures that findings will be robust, meaningful and applicable to both academic and industry stakeholders, contributing insights into the evolving role of technology within the heritage sector.

Literature Review Considerations

The literature review will explore several interconnected themes relevant to the research objectives, providing a comprehensive understanding of the evolving landscape of digital integration within museums and heritage sites. The key themes identified are:

- The timeline of technological integration in museums
- The evolution of cultural heritage and preservation
- The psychological impacts of cultural connection and heritage engagement
- The inclusivity and accessibility within museums and heritage sites

These themes are selected to address the multifaceted nature of digital integration in the sector and collectively these themes will offer a holistic framework for understanding the complex interplay between technology, culture and visitor experiences.

The Digital Shift in Museums

The integration of digital technology into museum practices has been an ongoing process since the late 1990s, originally aimed at enhancing public engagement (King et al, 2016). The COVID-19 pandemic marked a pivotal moment, accelerating this digital shift and integration as physical access was restricted. During this period, digital engagement became the norm, with digital engagement replacing physical engagement as the museum standard (Hoffman, 2020). Museums employed virtual tours, online lectures, 360-degree exhibitions, interactive discussions and digital archives to maintain visitor interaction. A survey by the Network of European Museum Organisations reported that when 650 museums in 41 countries were asked, over 60% of museums increased their online presence during the pandemic (NEMO, 2020). Further supported by an ICOM survey indicating a global rise in the use and introduction of new digital services (ICOM, 2020).

This surge in digital activity underscores a significant transformation in museology, shifting from traditional physical spaces to hybrid or predominantly virtual environments. Notably, browsing online archives/collections and virtual tours of museums emerged as the 2nd and 3rd most popular online art and cultural activities during the pandemic, demonstrating the importance of digital engagement (The Audience Agency, 2020a).

Immersive Media and its Role

Immersive media, including augmented reality (AR) and virtual reality (VR), are experiences where the user is aided towards a bodily experience of an event, place or artefact using visuals, sounds or interaction (Illsley et al, 2024). These technologies can deepen understanding by simulating physical proximity to artefacts or sites and active involvement in education. However, critics highlight concerns about the potential for these technologies and interactive media to over-rely on aesthetically pleasing visuals, potentially distorting historical accuracy or undermining critical engagement with the past (Engberg & Bolter, 2020) (Huvila, 2021). The risk lies in prioritising visually stunning representations and entertaining interactions over factual fidelity, which can comprise educational goals.

Furthermore, the integration of reality media raises challenges regarding the preservation of heritage authenticity and the research-application gap. Scholars argue that while immersive technologies can enhance visitor experience, they often exist within a tension between market-driven trends and scholarly integrity, potentially diverting focus from rigorous research to spectacle (Illsley et al, 2024).

Digital Engagement Vs Physical Experience

The effectiveness of digital engagement in replicating the benefits of physical museum visits remain a subject of debate. Critics contend that digital interactions may lack the capacity to foster long-term memories, deep learning or social values associated with in-person visits (Poria et al, 2003) (Wang, 1999). Digital technology has shown issues with allowing superficial entertainment and inauthentic experiences and common concerns are that these materials can diminish the perceptions and actual educational value of physical engagement (Parry, 2013).

Despite these criticisms, the pandemic highlighted the strategic value of digital tools in expanding access and outreach. Interviews with museum professionals emphasised “Ways in which digital technologies can be used to overcome the anxieties of entering the physical museum, to connect, to widen reach and produce attendance numbers that far exceed on-site events” (Noehrer et al, 2021). Notably this is further supported by a survey of museum/heritage website visitors that indicated 61% of first-time website visitors and 35% of high-frequency website visitors had engaged solely online, illustrating digital's capacity to attract new audiences (The Audience Agency, 2020b).

Psychological and Inclusivity Dimensions

Research suggests that digital access can have significant psychological benefits during periods of social isolation. During the pandemic, approximately 55% of online visitors to museums and heritage organisations engaged to “boost their mood” whilst 37% engaged to “reduce stress and anxiety” (The Audience Agency, 2020b). These findings imply that digital engagement may positively impact emotional wellbeing, even without physical engagement and interaction.

Furthermore, digital resources have shown trends of being more accessible for visitors with disabilities. Survey data indicated that 18% of digital museum audiences that identified as having a disability, compared to 10% among in-person visitors. This highlights the potential of digital platforms to foster greater accessibility (The Audience Agency, 2018). This raises importance considerations for future digital and hybrid museum strategies aimed at broadening access.

In Reflection

While existing research underscores the transformative potential of digital and immersive technologies, gaps remain regarding their long-term education efficacy, authenticity and impact on visitor psychology. Conflicting viewpoints exist concerning whether digital engagement can truly replicate physical museum experiences, highlighting the need for nuanced, evidence-based assessment. Additionally, the balance between technological innovation and scholarly integrity warrants further exploration to ensure that technological integration does not hinder heritage preservation being accurate and meaningful.

This review will address these themes to position the current research within ongoing scholarly debates, identifying opportunities to address existing gaps and contribute new insight into the evolving role of digital technologies in museum and heritage environments.

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