



**Sinergie SIMA**  
Management Conference



# **Rediscovering local roots and interactions in management**

*Conference Proceedings*

**Short papers**

*Bari (Italy)*

**29-30 June 2023**

Sinergie-SIMA Management Conference Proceedings  
*Rediscovering local roots and interactions in management*  
29-30 June 2023  
Mercure Villa Romanazzi Carducci (Bari)

ISBN 978-88-94-7136-3-3

The Conference Proceedings are published online on <https://www.sijmsima.it>

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Via Interrato dell'Acqua Morta, 26  
37129 Verona - Italy



# **Rediscovering local roots and interactions in management**

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### **Short Papers**

edited by

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# How management uses AI in the museum field: from chatbots towards chat GTP

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## Abstract

*Artificial intelligence is an innovative tool with considerable potential. In the cultural sector, the use of new technologies translates into the definition and design of a cultural offer based on the components of interactivity and customization. In this direction are inserted the Technological Advances through which the visitors of Cultural Sites can dialogue with deep learning inspired chatbot software, ask for information and even suggestions on the Cultural Experience. The aim of this work is to explore the use that cultural organisations, and in particular museums, make of Chatbot technology, in order to understand if this tool can be effective in enhancement and fruition museum management. To achieve this goal, the strategic choices by a selection of case studies were analysed. From the analysis carried out, the use of Chatbot technology appears to bring the museum audience closer, involving them in the museum narrative thanks to the possibility of making autonomous choices and providing important information on public behavior to management. The future application of elaborate AIs such as GTP chat may offer food for thought on how these processes will be automated and become increasingly efficient.*

**Introduction.** *Technological innovation pervades every aspect of contemporary society. In the cultural and creative sector, the use of digital and immersive technologies is a fundamental pillar of attractiveness for organisations that use them. The process through which these organisations are called to create social, cultural and economic value implies the use of structures and tools that can provide innovative and interactive approaches in cultural-based enjoyment (Chung et al., 2015; Sfodera et al., 2020). The use of the most innovative technologies in the creation and co-creation of cultural value allows to overcome the physical distance in the cultural fruition and invest resources to establish a relationship not only on-site but also online with its users (Del Vacchio et al., 2022). The technology constituted by Artificial Intelligence, in particular, is able to guide and enhance the cultural experience in the phase before the visit, in the phase concomitant to the visit and also in the subsequent phase, triggering significant relational mechanisms between cultural organisations and stakeholders that gravitate in their orbit.*

*In this direction, particular attention is covered by chatbot technology. For about a decade, the output from Artificial Intelligence has been receiving increasing attention from cultural organisations, and in particular from museums, as well as scholars (Boiano et al., 2018; Robinson et al. 2008; Vassos et al. 2016). The introduction on the cultural market of software able to dialogue with users and respond to their needs has upset the typical communication trajectories between users and professionals in the cultural sector. The paradigm shift is associated with technological advances introduced not only with written language but also with voice recognition (Gaia et al., 2019). The experiments focused on the use of chatbot technologies are many and varied. The solutions guided by deep learning, through systems that respond to specific requests and, recently, also to recommendation systems, aim to quickly and dynamically customize the interaction with users, improving the experience of cultural enjoyment (Bordoni et al. 2016). The innovativeness of digital solutions is such as to learn to understand the intent or context of a user with the aim of maximizing the effectiveness and efficiency of the chat system and return personalized answers and information (Fast et al. 2018).*

*This research project intends to explore, through a qualitative approach, the ways in which museums manage these technologies with the aim of understanding, from a managerial perspective, whether these tools constitute a real differential element in the online and online cultural fruition and enhancement of Cultural Heritage.*

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## Literature review

### *Digital technologies in museum management*

*The museum sector is a particularly interesting scenario from a technological point of view: a relationship marked by revolutions in this sector, dictated precisely by digital innovations (Del Vacchio et al., 2020). These convergences between culture and digital have been the subject of numerous studies of a managerial nature, which have contributed to analyzing their dynamics (Antoniou & Lepouras, 2010, Russo Spina et al., 2021). The very management of these enhancement technologies has been based on these technologies above all with involving the public more with interactive processes: an example is augmented reality which in recent years has had a significant application in cultural contexts (Do et al., 2020), but also virtual reality (Williams & Hobson, 1995), and virtual tours (Caspani et al., 2017). It is precisely the search for new variations of these technologies in the cultural context, and in particular in the museum, which is extremely interesting in attracting new audiences, often even less interested in these contexts, such as the younger generations (Akmermer, 2022). For example, there are many contributions in the managerial field on how social media have influenced the relationship between users and subjects related to culture (Vassiliadis & Belenioti, 2017; Liang & Martin, 2021; Maniou, 2021;). In particular, it has been underlined how the use of social media by museums has generated strong loyalty with museums, improving users' skills, and making them more willing to financially support these institutions (Zollo et al., 2022). Museum marketing itself exploits these tools to better understand its audiences, sometimes starting profiling processes in order to detect the socio-demographic and behavioral characteristics of users, easier to detect on social media than in physical visits (Gargiulo & Carignani, 2022). There are therefore numerous studies stating that data from social network content analysis should be taken into account in the decision-making process of cultural heritage management (Liang et al., 2021). This analysis of data obtained from social media, the so-called big data, is therefore fundamental for the management of the museum in the relationship with the public and for developing co-planning relationships with visitors, increasing the value of their experience (Cuomo et al., 2021). The analysis therefore made by the museums of their social networks, therefore traces a scenario composed of users who are characterized in different groups, which together however form real communities with similar interests (Chang, 2022). The main problem of museums, however, is that not always tools such as social networks, but digital technologies in general, are exploited to the fullest, often due to a lack of specialized personnel among the museum staff (Carignani et al., 2022). If social networks are generally more focused on younger audiences, the contribution of digital should not be underestimated in improving the visit of other types of audience, especially the over 50s, particularly useful in providing useful information to users even in the pre and post visit (Traboulsi et al., 2018). Management literature has also focused on digital technologies such as augmented reality (AR) or virtual reality (VR), seen in the past as an element that could compete with a museum visit (Guttentag, 2010), today they are tools considered extremely useful for making the museum visit even more attractive (Passebois-Ducros, 2019). They are therefore a fundamental tool not only for attracting new audiences, but because they give the possibility of using cultural heritage from a distance, often damaged or lost (Styliani et al., 2009). A modern museum management cannot therefore ignore these forms of technology, also focusing on the training of dedicated staff and on communication, through modern digital storytelling (Trunfio et al., 2022). This type of museum management, which involves users in this way, can only create new forms of co-creation of services, where the subjects, curators, managers, visitors and artists, find themselves interacting in completely new dynamics (Massi & Turrini, 2020)*

### *The use of AI in museum management*

*In recent years, cultural services have seen the implementation of the use of AI in their dynamics, in order to improve the quality of their services (Ivanov & Webster, 2019). In the museum sector there has been a growth in the use of AI in order to offer ever better services to its visitors, entering the perspective of Industry 5.0, and transforming itself from a tool to a real approach to the cultural world and making it possible to better understand users' wishes at different times: before, after and during the visit experience (Orea-Giner et al., 2022). If the lack of resources and the difficulty in managing these technologies at a technological level represent barriers involving economic and human resources (Villaespesa & Murphy, 2021), the evolution of these systems, which increasingly reduce response times, are particularly reconciled with the application in the museum field, where the visitor needs to access information in ever faster times, supported by available devices (Wang & Cai, 2022). The objective becomes twofold: if on the one hand these technologies preserve the cultural heritage, on the other they can give museum management important information on the level of visitor satisfaction in their museum experience (Recuero Virto & López, 2019). At the same time, museum management must not underestimate the importance of monitoring and analyzing the relationship that is created between users and AIs, which can turn into a real co-creation process (Merzagora et al., 2022). In fact, already with the first forms of chatbot, an important change in relations with these technologies takes shape: the relationship is transformed from a linear one to an extremely more interactive relationship, with the user who does not passively follow the visit, but is called to interact directly with the chatbot (Toumanidis et al., 2019). However, the use of these technologies has broadened the studies on the impact of management in the use of these technologies, such as chatbots, in order to facilitate interactions with visitors, but also to initiate processes that can be managed by staff of museums (Ivanov & Webster, 2019).*

*In fact, it should not be underestimated in the interface between chatbot and user, the possible anxiety that can be generated by the use of a technology and that could adversely affect the experience, although studies show that simple and intuitive interfaces can overcome the problem (Pillai & Sivathanu, 2020).*

**Methodology.** *In order to investigate how museums manage the use of Artificial Intelligence technologies to personalize cultural experiences, the authors have chosen to adopt a qualitative approach (Dubois & Gadde, 2002), consistent with the nature of the theme linked to the analysis of the context in which these technologies are used and the community to which they relate. To achieve this goal, a direct observation was conducted to a selected basket of case studies. In particular, four international organisations related to the museum sector, responding to different legal forms, were found to be in line with the subject of the survey. The selected cases respond to territorial contexts and different audiences for origin and cultural attendance, they are also part of heterogeneous subsectors with each other. In addition to this distinction, each of the selected cases uses different extensions of chatbot technology. The selected cases are:*

- *Centre national d'Art et de Culture Georges Pompidou;*
- *Colosseum Archaeological Park;*
- *Ecomuseum Mare Memoria Viva;*
- *Museum of Tomorrow*

*The collected data were analysed following a “logic of replication”, according to which the analysed cases carried out a cross-analysis, with the aim of identifying similar characteristics, differences and determining best practices (Yin, 2018). The multiple case study approach adopted (Gummesson, 2017) is based on a broad and heterogeneous dataset. Specifically, the study stems from an overlap between primary and secondary information sources, such as interviews, articles, website content, essays and reports (Creswell & Creswell, 2017).*

**Findings.** *In the contemporary cultural and artistic scenario, there have been numerous attempts to engage audiences in a more dynamic and interactive way. As Noh and Hong pointed out (2021), cultural organizations exert much effort to engage visitors, provide knowledge, create meaningful experiences and make emotional connections. Artificial Intelligence (AI) proves to be a useful tool in pursuit of this goal as it can provide cultural managers with valuable support in numerous activities.*

*The conducted analysis showed how artificial intelligence can have various fields of application in the cultural sector. The first one concerns the use of AI for the production of works of art: various artificial intelligence software and tools, such as Midjourney, are able to generate images and illustrations, with a considerable degree of complexity, from a written text. Nowadays, an increasing number of artists incorporate artificial intelligence into their installations, making this technology an intrinsic component of the experience itself and allowing viewers to become protagonists of the artwork. The U-DATInos project, realised by the Ecomuseo Mare Memoria Viva in Palermo in collaboration with the artists Salvatore Iaconesi and Oriana Persico, aims to create a fusion between the human ecosystem and technology. The installation representing a Mediterranean maquis forest takes the form of an interactive artwork that generates effects of light and sound to visualise and represent the conditions of the surrounding environment. The installation transforms itself based on data from sensors, open data and surveys, conducted by a group of selected visitors, and managed by artificial intelligence software.*

*The second field of application pertains to the use of artificial intelligence, in the form of chatbots, to assist and support customers of cultural institutions such as museums and archaeological sites.*

*Aiming to offer its visitors a new way to experience the museum and interact with the artworks, the Centre Pompidou developed, in collaboration with Ask Mona, an interactive mobile guide adapted to the needs of the public. The chatbot, named Tubo, is designed to accompany visitors throughout the visit experience. This tool facilitates the fruition of the artworks by answering frequent questions with the help of artificial intelligence. The user can access the service by taking a photo of the work of interest, which is recognised by the AI and provides access to exclusive content that explain the history of the work, as well as the possibility of asking the chatbot for further curiosities. The chatbot also responds to practical enquiries from users such as rates, opening hours, programmes and activities. Its features are designed to respond effectively at each stage of the visitor journey, from the needs of information before the visit, to specific questions during the visit and after it. Since its launch in December 2021, Tubo has been downloaded more than a hundred times a day and in the first two months has reached a total of 17,000 users, making it rightfully an essential part of the Centre Pompidou's digital toolbox to make visits more accessible and to attract a new target group of younger customers who are less inclined to follow the traditional museum tour.*

*At the beginning of 2023, the Colosseum Archaeological Park launched Nerone, an artificial intelligence software, designed to provide the public with information about the cultural site and its services. The main goal lies in reaching a more diversified audience and decreasing the response time to information requests made through traditional communication channels including email, telephone and social media. The chatbot is the result of an international collaboration between the Park, the Italian company Machineria srl and the French company Ask Mona, both active in the production of innovative services for cultural enterprises. A detailed analysis of the communication strategy of the Colosseum Park and of the audience it seeks to intercept led to the choice of the iconography representing the Roman emperor Nero, which turned out to be appropriate and led to relevant results in a short time. In the month of January, in fact, the platform was used by more than 160 users per day. The study of the most frequent questions asked by the users helped the cultural manager to intercept the most recurring themes and enabled an improvement in the chatbot's performance with more detailed answers in line with visitors' expectations. The data provided by the Colosseum Archaeological Park reveal that more than half of the questions posed to Nero (69%) are related to the ticketing system, but there is no shortage of requests for curiosities or anecdotes (parocolosseo.it).*

*Accessibility is a major area that cultural institutions are trying to address in new and innovative ways and artificial intelligence can also be a useful tool for cultural management to observe and understand customers' demands.*

*Rio de Janeiro's Museum of Tomorrow incorporates AI as a core part of the cultural experience. Through the tool IRIS+, which is a pioneering use of Watson Services, visitors can personalise their experience when interacting with exhibition components in the galleries. The artificial intelligence is designed to engage visitors through a conversational interface, to accept unconstrained responses from visitors and to give meaning to the data collected through these interactions. The information collected helps the museum to understand user needs and improve museum services.*

Tab. 1: Use of AI by Cultural firms

Name	Identity	AI Application	Opportunity for visitors and cultural firms
Centre national d'Art et de Culture Georges Pompidou	Museum of Contemporary Art	Tubo Chatbot	Facilitate the enjoyment of works of art and improve the accessibility of the museum.
Colosseum Archaeological Park	Archaeological Site	Nerone Chatbot	Provide the public with information on the services offered and use the data collected to improve the promotion and attractiveness of the site.
Mare Memoria Viva	Ecomuseum	U-DATInos Data physicalization	Provide a new way of enjoying a work of art and stimulate the public to active participation.
Museum of Tomorrow Rio de Janeiro	Museum of Applied Sciences	IRIS+ Digital Assistant	Collect data to understand visitor needs and create tailor-made experiences.

Source: Author's elaboration

As can be seen from the information in Table 1, the institutions analysed have different applications of artificial intelligence. The goals that cultural enterprises and visitors can achieve through this tool are manifold and include: increased knowledge of the site and services offered, a higher level of engagement throughout each stage of the visitor journey and the reaching of different target groups, such as so-called young adults.

In particular, the exponential growth in the use of chatbots by cultural companies (Gaia et al., 2019) is also due to the use of deep learning systems that accelerate the learning process of such tools and make them suitable for providing increasingly personalised information that can increase user satisfaction and improve the enjoyment of the works but also the moments before and after the visit.

**Implication.** Digital technologies pervade every aspect of creating cultural value process. The use of artificial intelligence, together with other technologies such as augmented or virtual reality, is spreading to offer new experiences of artistic enjoyment. Artificial intelligence, in particular, is an effective tool to support cultural organizations to strengthen the link between them and their stakeholders by providing customers with innovative storytelling for a more immersive cultural experience. The analyzed cases have shown that the tools provided by AI, in the different forms of apps, software, chatbot technology, allow to guide and enhance the cultural experience in the phase before the visit, in the concomitant phase of the visit and also in the subsequent phase. From a theoretical point of view this process implies the strengthening of the relational links between cultural organizations and stakeholders that gravitate in their orbit. From a managerial point of view, these tools provide tangible and objective data about the number of people seeking information about the cultural organization and its proposals. In the same direction, it allows cultural firms to profile users and provide effective metrics on their experience satisfaction. The insights derived from the digital technology of AI allow, in summary, address the strategic and operational choices of cultural management, aligning them to the needs of their stakeholders.

**Limitation and future research.** The potential of using artificial intelligence for cultural organizations is manifold. This study investigated from a qualitative point of view the use of cultural management in relation to technologies derived from AI. The heterogeneity of the case studies tackled allows to photograph the general state of the art but also constitutes a limit of the research. In this direction also fits the belonging to different cultural subsectors. In view of the above, it seems necessary to extend the number of selected case studies and to observe also through quantitative methodologies the use that cultural organizations belonging to different sub-sectors make of AI. In the same direction, it could be interesting investigating the ways in which museum management achieve stakeholder newest needs regarding the use of AI such us data security and privacy, as weel as induced unemployment. This innovative usage is at the early stages of its experimentation but its development could soon be of interest to museums and major cultural institutions that aim to provide their users with a diversified service that can be used remotely.

**Conclusion.** The applications of artificial intelligence in the museum environment can be extremely varied. Therefore, tools are created that can be extremely useful to museum management, which acquires important information about the user and has the possibility of correcting the cultural offer to better meet the needs of visitors and involve them more and more. At the same time, therefore, these tools are perceived positively by visitors, whose judgement is influenced by the use of simple and immediate interfaces, providing precise and detailed information.

Another great advantage is the speed of processing of the answers, other than the automation of these processes which allow the management to concentrate the workforce on other sectors. However, we must not believe that everything is automatic: it is essential for management to have competent staff who know how to correct the offer and above all interpret the data that these devices collect. Only in this way will the effort behind the adoption of AI be optimized. These processes could also be optimized in the future by the same AIs, such as Chat GTP, which, thanks to a considerable computing power, made available to more and more cultural subjects in an accessible way, could carry out these processes automatically in the future, suggesting any corrective measures are also sent to management.

**Keywords:** museums; Artificial Intelligence; chatbot; AI; cultural heritage; chatGTP

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