



Contents lists available at ScienceDirect

Journal of Business Research



ICT adoption in heritage organizations: Crossing the chasm☆

Anne Gombault, Oihab Allal-Chérif, Aurélien Décamps

Kedge Business School, Creative Industries Research Cluster, 680 cours de la Libération, 33400 Talence, France

ARTICLE INFO

Article history:

Received 1 February 2016

Received in revised form 1 March 2016

Accepted 1 April 2016

Available online xxx

Keywords:

Heritage

Knowledge

ICT

Innovation

Adoption

ABSTRACT

This article studies the adoption of information and communication technologies (ICTs) by heritage organizations in southern Europe and contributes to the understanding of how these organizations use technology, an underresearched sector in the management literature but an important one in knowledge society. A multi-case study approach, based on ten reference heritage organizations in France, Portugal, and Spain, generates a theory to identify various types of heritage organization adoption behavior of ICTs and the factors that favor or inhibit this adoption. The authors then test this theory on a complementary sample of 20 other heritage organizations from the same regions. The study characterizes adoption behaviors and influencing factors more precisely. The authors make recommendations to support heritage organizations in their efforts to adopt digital technologies and integrate them in a more meaningful way into their missions.

© 2016 Elsevier Inc. All rights reserved.

1. Introduction

Heritage in Europe is an important asset not only for tourism but also for the attractiveness of the knowledge economy when digitization turns cultural heritage into a source of wealth and employment as mentioned in the Agenda for Culture and the Digital Agenda for Europe of European Commission 2010. This observation is particularly true for southwestern Europe because heritage is one of its major resources. Paradoxically governments and other organizations undermanage heritage, despite progress in recent years gained through help from UNESCO labels and spectacular regeneration projects (e.g., Bilbao).

In spite of active e-tourism in these regions as well as digital clusters, digital heritage remains an emerging phenomenon, consistent with the noticeable gap between these Latin countries (France, Spain, and Portugal) and English-speaking countries where the phenomenon is more present (Bertacchini & Morando, 2013). Nevertheless, the literature in the academic community on the subject of *digital heritage* (Parry, 2005), which combines information and heritage management, focuses mainly on tools and technical solutions but does not discuss the adoption of ICT from an organizational perspective. This article addresses this gap by studying the ICT adoption process of heritage organizations and generates an empirical model.

This study aims to understand the behavior of heritage organizations regarding ICT adoption and to identify the factors favoring and inhibiting this adoption. This research uses the principle that a good

theory follows from bad or good practices as its base (Van de Ven, 1989). The employed method follows three stages: (1) an in-depth observation of a reference sample of ten heritage organizations and their practices regarding digital technologies, (2) the inductive building of a model based on the practices identified, and (3) the testing and adjusting of this theoretical model on a sample of 20 other heritage organizations. The construction of the theory from empirical reality functions as a bricolage (Weick, 1989).

After this introduction, Section 2 connects heritage literature to the research on ICT adoption. Section 3 explains the methodology adapted from the multi-case study method. Section 4 presents the results and the inductively built theory. Section 5 discusses this theory tested on a new sample. Section 6 provides a conclusion and suggestions for further research.

2. The adoption of ICT in heritage organizations

ICT adoption in the context of heritage is underrepresented in the information and arts management literature. This section provides an overview of research on ICT and an adaptation of general ICT adoption theory to heritage organizations.

2.1. ICT's contribution to addressing the mission statement of heritage organizations

Digital technologies are a source of innovation and development for the heritage sector (Bakhshi & Throsby, 2012). Information and communication technologies have a profound influence on how heritage collections are managed and made visible to the public (Bertacchini & Morando, 2013). However, this influence is difficult to demonstrate

☆ The authors are grateful to contributions from Professor Ludovico Solima, Second Naples University, and Professor Javier Castro, University of Basque Country, for their careful reading and suggestions.

E-mail addresses: anne.gombault@kedgebs.com (A. Gombault), oihab@kedgebs.com (O. Allal-Chérif), aurelien.decamps@kedgebs.com (A. Décamps).

because of the dispersion of heritage in several disciplines, practices, formats, and media (Parry, 2013).

ICT practices in heritage organizations are structured according to their mission statement: (1) preserving and curating monuments, natural spaces, collections, documents, or any heritage artifact; (2) welcoming and educating audiences by providing various experiential access to artifacts; (3) communicating with their environment, other institutions, territorial authorities, and society in general (Hooper-Greenhill, 2004).

Thanks to new digital technologies, heritage organizations have the ability to store and preserve data in much greater quantity and with better speed, reliability, accessibility, and profitability (Ray, 2014). ICT offers easier management and access to heritage artifacts. Mediation technology can be classified in two categories: curator-oriented with a scientific and content perspective and visitor-oriented for entertainment and customization of knowledge (Kéfi & Pallud, 2011).

Some heritage organizations already have included digital technologies into self-guiding systems and interactive presentation tools (Conway & Leighton, 2012). ICT can be used by heritage organizations to reach visitors where they are and to bring the visitors virtually to the organizations (Samis & Pau, 2009). Multimedia information systems based on Internet and social media use immersive technologies such as virtual environments and augmented reality to support the public experience of heritage.

2.2. ICT adoption strategies in heritage organizations

The behavior of heritage organizations with respect to ICT adoption seems to be similar to that of businesses: the organizations prefer to stay in their comfort zone and are interested only in what is close to their practices. Their use of technology is mainly incremental. Technology could be even perceived as source of organizational disruption (Giddens, 1990). This social inertia (Orlikowski, 2000) inhibits ICT adoption. Most heritage organizations won't adopt a digital technology spontaneously and will wait for another similar organization to try it first and provide good feedback. The more other heritage organizations adopt innovation, the lower the perceived associated risk is (Kaminski, Benson, & Arnold, 2014). This is why digital firms try to build a strong foundation of reference customers.

Despite the omnipresence of ICT in contemporary society, ICT adoption within heritage organizations is growing slowly and often remains limited to a basic website and a simple Facebook page, associated with the classic low-tech audio guides (Gonzalez, Llopis, & Gasco, 2015). Even the use of ICT as part of the visiting experience does not seem to have reached a high degree of maturity to be of significant relevance for visitors and is accepted within a traditional conception of what a museum is (Rey & Casado-Neira, 2013).

Adopting technology means accepting that at some point the technology will reach the end of its life cycle and become obsolete, hence the necessity of switching to a new generation of technology and being periodically confronted with change management (Son & Han, 2011). Rather than facing this instability and possibly making a bad technological decision, heritage organizations prefer to avoid investing in technology altogether and devote their budgets to their core activities.

Studies looking at the success of setting up digital technologies in cultural heritage organizations have focused on two approaches: organizational factors and contextual elements. In the literature, several organizational factors are key for learning: (1) using the appropriate technology; (2) obtaining the necessary funds; (3) being convinced, especially at management level; (4) being aware of the needs of the organization and the advantages of going digital; (5) having a qualified and motivated staff; (6) aligning digital strategy with the corporate strategy; (7) establishing a change management policy; (8) convincing others in the same field of the advantage of this type of action; and (9) taking advantage of the relational dynamics of the context (Parry, 2013; Peacock, 2008).

The second approach highlights the importance of context in order to successfully put these technological systems in place. Encouragement for digital development from public authorities, such as awarding grants at local and national levels, is vital. Investment in digital technologies by private stakeholders is also a good indicator. Cultural and creative clusters are ideal to foster the emergence of innovative technologies related to heritage.

Literature informs about specific digital tool strategies such as web and social media use. Lagrosen (2003) has identified three strategies implemented by museums: avoidance, content, and technological. Similar, but from another perspective, Padilla-Meléndez and del Águila-Obra (2013) have found three strategy types: defender, analyzer, and prospector. Only superstar heritage organizations such as the Louvre Museum (Paris), the MOMA (Museum of Modern Art, New York), the National Gallery (London), and the Tate Modern (London) (Padilla-Meléndez & del Águila-Obra, 2013) have invested in advanced ICT involving the latest innovations.

2.3. ICT adoption life cycle adapted to heritage organizations

The theory of adoption characterizes the factors that positively or negatively influence the decision to choose a new method or a new management approach (Lin & Yu, 2006). The adoption of ICT is generally influenced by the profile of decision makers, system characteristics, the specifics of the organization, the environmental context (Thong, 1999), and the strategic vision, modes of interaction with other organizations, and capacity of ownership and integration (Lyytinen & Damsgaard, 2011).

According to Moore (2014), the adoption of every technology follows the same life cycle (Fig. 1). Moore identifies five categories associated with five different adoption behaviors. (1) Innovators, or technology enthusiasts, are early adopters of innovations. They like to learn about technology and test new products as soon as they are available. (2) Visionaries, or early adopters, are aware of the competitive advantages provided by advanced technology. They like taking risks and want to acquire customized high-tech innovations as soon as possible to reduce time to market. (3) Pragmatists, or early majority, focus on applications and systems that have already proven their efficiency and follow the leaders' strategies. (4) Conservatives, or late majority, are concerned with reducing risks and costs. They are followers and want to avoid being left behind by their competitors. (5) Skeptics, or laggards, have a conservative approach and are very reluctant to change. They differentiate themselves by not succumbing to mainstream trends. (See Fig. 2.)

In heritage groups as in other sectors, a number of organizational factors impede the evolution in this adoption life cycle and maintain

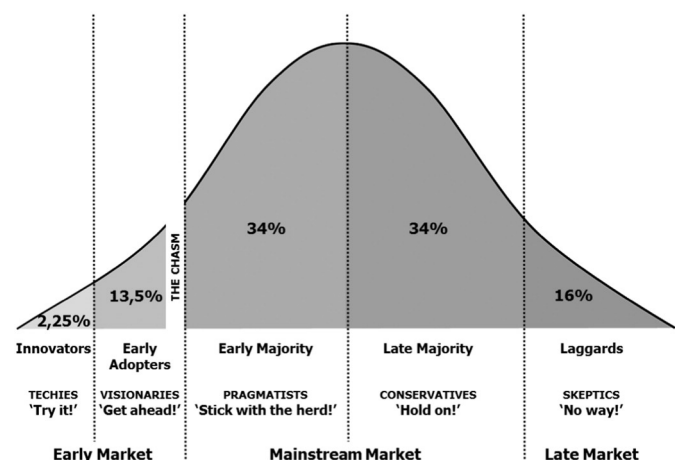


Fig. 1. Technology adoption life cycle model (Moore, 2014).

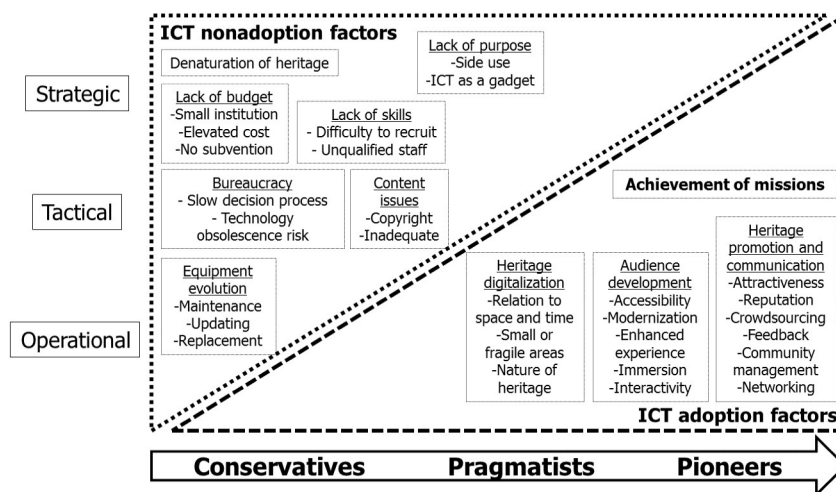


Fig. 2. Factors motivating and hindering ICT adoption in heritage organizations.

the actors at a low level: lack of vision and unstructured strategy, defective leadership or management, resistance to change, doubtful tool-added value and reliability, elevated cost, budgetary priorities, high level of investment in resources and time, inappropriate activities or practices, and perceived negative social consequences (Kaminski et al., 2014).

Moore (2014) gives advice on how to progress in the adoption life cycle particularly adapted to heritage organizations: “The key to getting beyond the enthusiasts and winning over a visionary is to show that the new technology enables some strategic leap forward, something never before possible, which has an intrinsic value and appeal to the non-technologist.”

3. Methodology

The research design follows three steps: (1) the deep observation of the practices of a reference sample of ten cases provides elements (2) to build a theory, and (3) the theory is then tested on 20 other heritage organizations to be refined and extended.

3.1. Research strategy: a multi-case study approach

This research aims to explore, describe, and understand why heritage organizations adopt ICT or not in order to generate a theory (Van de Ven, 1989) based on the key question: going digital, which learning process? The study determines then classifies the reasons into categories. The significance of the observed phenomenon and the lack of a plausible existing theory frame the research design (Eisenhardt & Graebner, 2007).

The case study methodology is a relevant research strategy to analyze digital adoption for three reasons: case studies are done in natural settings and generate theory from practices, the research answers the question why, and the research is done in an area in which few studies have been carried out (Benbasat, Goldstein, & Mead, 1987; Woodside, 2010).

The research focuses on countries from southwestern Europe, in particular three regions previously studied in the context of the Transcreativa European project (Interreg/Sudoe) carried out in 2013–2014: Aquitaine (France); Euskadi (Basque Country, Spain); and Centro (Portugal). In these regions, heritage is rich, diversified, and constitutes a key strategic resource for the attractiveness, economic and social development, and profitability of tourism.

Thirty heritage organizations are studied in three phases: (1) in-depth investigation of ICT adoption behavior of ten reference cases; (2) inductive theory building characterizing the different observed behaviors and the factors fostering and inhibiting ICT adoption in heritage

organizations; and (3) deductive testing of this theory using an additional sample of 20 cases.

3.2. Elaboration of the case study samples

The selection process for the two samples is as follows. The reference sample is chosen to bring together organizations that seem to have put the most into digital technologies. Criteria are added to diversify the cases and thus improve sample quality: reputation and attendance (all stars at different levels according to international or national, regional and local levels, ranging from 1,500,000 to 10,000 visitors annually), geographic rural and urban areas; type of heritage (tangible – moveable, real estate, natural – and intangible); status (private, public, for-profit, nonprofit); budget; and staff (Table 1).

In order to test the generic theory derived from the reference sample, an additional testing sample of 20 cases is created using the same criteria but increasing the diversity of organization types (Table 2).

3.3. Data collection and analysis

Data collection is triangulated for each case through documentary analysis, deep participant observation, and semi-structured interviews. The documentary analysis explored a large quantity of diverse material such as posters, brochures, programs, websites, applications, conference communications, and published articles. Participant observation is separated in two types of immersion: (1) as a distant customer using the practices associated with the websites, applications, blogs, and social networks such as Facebook, Twitter, Flickr, YouTube, and TripAdvisor; and (2) as an onsite user engaging in a mystery visit using digital technology of sheets, photos, and videos. Semi-structured interviews with several employees, such as the director, curator, audience department manager, communication manager, and digital/community manager, enhance understanding of the contribution of digital technology to the mission statement of heritage organizations.

A thematic content analysis is carried out for each case and overall for the cases in the base sample, then structured to create a dictionary of empirical themes and reduced down to a dictionary of theoretical themes. The resulting theory is compared with the empirical thematic content analysis produced for the additional sample cases and is enhanced as a final result.

4. Results and inductive theory building

The empirical study shows that the three dominant behaviors of heritage organizations regarding technology adoption are conservative,

Table 1
Reference sample of heritage organizations.

Heritage organization	Attendance 2014	Country	Heritage type	Status
<i>Dune du Pilat</i> , Bassin d'Arcachon		France	Natural heritage	Public–private
<i>Jurisdiction of Saint-Emilion</i> , Tourism Office UNESCO label	<i>International and National stars:</i> 1,500,000 to 500,000 visitors	France	Material and immaterial heritage ensemble	Private
<i>Semitour</i> , Périgord, Lascaux Cave UNESCO label		France	Prehistoric site	Public–private
<i>Monastero Di Batalha</i>		Portugal	Historical monument Religious site	Public
<i>Catedral Santa Maria</i> , Vitoria	<i>Regional stars:</i> 500,000 to 100,000 visitors	Spain	Historical monument, religious site	Public
<i>Museo San Telmo</i> , Donostia-San Sebastián		Spain	Arts and civilization museum	Public
<i>Museu Grão Vasco</i> , Viseu		Portugal	Arts and civilization museum	Public
<i>Museo Marítimo de Ilhavo</i>	<i>Local stars:</i>	Portugal	Maritime museum	Public
<i>Pireneas</i> , Library of Pau	100,000 to 10,000 visitors	France	Digital Library	Public
<i>Basque Culinary Center</i> , Donostia-San Sebastián		Spain	Food heritage center	Public–private

pragmatist, and visionary. Adoption factors and obstacles are largely common to all three categories, although to different degrees.

4.1. The three behaviors types: conservatives, pragmatists and visionaries

Although three different behaviors are distinguished, the majority of heritage organizations have a conservative attitude. They act as rather late followers who don't want to take any risk and are preoccupied by costs and resources. They use technology to showcase artifacts and attract more assets. ICT attracts new audiences with interactive and personalized communication. For example, for the Museo Marítimo de Ilhavo, Aveiro, Portugal, technology is “a way to attract, to see the objects” but ICT is not essential. The most important aspects are history and aura, meaning the transcendent beauty and legitimacy of heritage material and environment (Benjamin, 1931).

Many heritage organizations have a comprehensive and more-or-less up-to-date website. For cultural heritage monuments such as the UNESCO site at Saint-Emilion, France, or even for religious buildings and natural sites such as Catedral Santa Maria de Vitoria, Spain, or Dune du Pilat, Bassin d'Arcachon, France, the Internet is an essential tool to provide the correct information for tourists. To deal with misinformation and harmful images of people degrading the environment, the web communication of the Dune du Pilat protected natural site provides correct information and aims to preserve the reputation of the place.

Pragmatic heritage organizations invest in more accessible and mainstream digital technologies, such as social media and interactive

applications. Despite their lack of resources or other managerial constraints, these organizations develop simple sponsorships with accessible companies and use common technologies, such as Facebook or Twitter, in a very creative way that enables overcoming limitations and maximizing benefits. For pragmatic heritage organizations, ICT is a modern and effective way of promoting art and culture among all audiences, especially younger ones. Information about exhibits and events is quickly updated and widely disseminated. For example, Monastero di Batalha, the third most visited monument in Portugal, obtains *bricole* partnerships with local companies and the polytechnic school, and collaborates with Google.

Agostinho Ribeiro, the Grão Vasco museum director with 30 years of experience, explains: “We are constantly putting information and invitations on our Facebook page. At the moment, we have 4000 Likes, we need more, but I've only been director for three months! When we open a temporary exhibition, we no longer have to send out paper invitations, we send invitations via Facebook. We don't use Twitter, because we can't put the same scientific information on there as on Facebook.”

Some visionary adopters of ICT are also identified among heritage organizations, such as Semitour, the company in charge of the Lascaux caves, France, and the San Telmo Museum, Donostia-San Sebastián, Spain. They view ICT as the future of heritage and culture and consider the adaptation necessary to the evolution of society. Technology is everywhere and especially in the pockets of every potential visitor. According to the Basque Culinary Center, San Sebastian, Spain: “It seems that technology is all around us, in everything: the nutritional process, the traceability of food, (...)”

Table 2
Test sample of heritage organizations.

Heritage organization	Attendance 2014	Country	Heritage type	Status
<i>Guggenheim Museum</i> , Bilbao		Spain	Arts museum	Private
<i>Fêtes de Bayonne</i>	<i>International and National stars:</i>	France	Immaterial heritage	Public
<i>Semana Grande</i> , Donostia-San Sebastián	1,500,000 to 500,000 visitors	Spain	Immaterial heritage	Public
<i>Cathédrale Saint-André</i> , Bordeaux		France	Historical monument religious site	Public
<i>Aldeias Do Xisto</i> , Centro region		Portugal	Natural heritage site	Public–private
<i>Museo Machado Di Castro</i> , Coimbra		Portugal	Arts and civilization museum	Public
<i>Museo de las Bellas Artes</i> , Bilbao		Spain	Arts museum	Public
<i>Musée et Galerie des Beaux-Arts</i> , Bordeaux		France	Arts museum	Public
<i>Museo Balanciaga</i> , Getaria	<i>Regional stars:</i>	Spain	Fashion museum	Public–private
<i>Cap Sciences</i> , Bordeaux	500,000 to 100,000 visitors	France	Science museum	Private
<i>Eureka</i> , Donostia-San Sebastián		Spain	Science museum	Public–private
<i>Pôle International de la Préhistoire</i> , Les Eyzies		France	History museum	Public
<i>Museo Do Pao</i> , Seia		Portugal	Food museum	Private
<i>Artium</i> , Centro-Museo Vasco de Arte Contemporáneo de Vitoria-Gasteiz		Spain	Arts museum	Public–private
<i>Museu Da Ciencia</i> , Coimbra		Portugal	Science museum	Public
<i>Filmoteca Vasca</i> , Donostia-San Sebastián		Spain	Digital portal	Public–private
<i>Musee Gorrotxategi de la confiserie</i> , Tolosa	<i>Local stars:</i>	Spain	Food museum	Private
<i>Museo De Imagen em Movimiento</i> , Leiria	100,000 to 10,000 visitors	Portugal	Digital image museum	Public
<i>Son d'Aqui</i> , Bilière		France	Digital portal	Public–private
<i>Maison des Gens de Garonne</i> , Couthures sur Garonne		France	Natural heritage site	Public

4.2. Factors motivating adoption

The sample helps to identify motivating factors for heritage organizations to adopt digital technologies to achieve institutional missions: (1) preservation and accessibility of administered collections, (2) impact on the quality of visitor experience and potential to earn additional audiences, and (3) desire to develop the reputation, network, and influence of the institution.

Considering the nature of collections, digital technologies are essential to promote and disseminate intangible heritage. This role played by ICT is essential for organizations such as the Basque Culinary Center of San Sebastian, Spain: “In gastronomy, the art of cooking, which is very visual, everyone is going to dinner, taking a picture of the dish and uploading it to Instagram or sharing on Twitter, or another network.”

The digitization of collections is practiced in the three studied regions to enable an easier and wider access to professionals and the public and amateurs. For example, permanent collections San Telmo Museum, Donostia-San Sebastián, Spain, are accessible online. ICT radically modifies the perception of time and space, eliminating some barriers. Digital technologies meet the needs of natural sites or monuments where the number of visitors is limited because of the risk of damage. This type of heritage organization can make available vast areas of knowledge to an unlimited audience. For Semitour, the company in charge of managing the Lascaux caves in France, digital technologies and innovations are “absolutely essential (...) there is no limit: you are in a virtual world! We put you in the steppe of the Ice Age, three million years ago, and we tell you ‘Now you’re on your own: you’re a pre-historic man.’”

Visitor experiences are significantly enhanced by digital technologies: the smallest details of any artifact become visible, for example, on architectural or monumental works; accessibility is improved by modern and immersive guiding equipment; and augmented reality, such as in Saint-Emilion, facilitates gaining knowledge, especially for younger people, thanks to interactive and entertaining educational tools.

Attractiveness to potential new visitors comes from the mobilizing power of images and multimedia. Screens create a more substantial and influential sensorial experience. According to the Basque Culinary Center, “we know that in social networks, if you put a good picture, you have a lot more impact than if you put a really interesting text that people won’t read.”

From a marketing perspective, social networks enable heritage organizations to crowdsource and get feedback from the public, as well as give access to their collections and events. The San Telmo Museum, Donostia-San Sebastián, Spain, observes a strong impact of its community management campaigns. For its Frivolity exhibition, fashion bloggers were contacted via Twitter to help complete the collection.

4.3. Factors hindering adoption

Similar to most businesses and institutions, sample heritage organizations mention the lack of budget and limited human resources as the main reasons for not adopting digital technologies. Sophisticated ICT is often costly and heritage organizations depend on public policies in which funding is frequently inadequate. Augmented reality is a technology appreciated by curators and the public but Semitour, in charge of the Lascaux caves, is the only heritage site using this process because of its great expense. The Grão Vasco Museum underlines that “we are at the beginning in putting digital in the museum; at the moment the problem is money.” For the digital library Pireneas, “the issue of digital preservation is an important one because it’s a lot of terabits in libraries, and it has a cost.”

Choosing someone to take care of digital technologies full-time can be complicated. Recruiting an expert is even more difficult because of administrative and financial constraints. Existing teams don’t have the necessary skills and training to elaborate a digital strategy, implement

the corresponding tools, manage their use and maintenance, and provide appropriate and meaningful content. The institution in charge of the Catedral Santa Maria de Vitoria, Spain; the Museo San Telmo, Donostia-San Sebastián, Spain; and the digital library Pireneas, Pau, France, emphasize the lack of resources and qualified staff.

The slowness and bureaucracy associated with decision making in public institutions and nonprofit organizations result in significant delays before a technology is implemented on site. Material or software can become completely obsolete between the time decided to invest in the technology and when the technology is deployed. Maintenance, updating, and equipment replacement must also be taken into account: when digital technologies are no longer appropriate or information is out-of-date, the heritage site seems to be abandoned and the consequences on its image are catastrophic. For example the very pragmatic Monastero di Batalha, Portugal, describes these kinds of obstacles.

5. Deductive testing of the new theory: discussion, final theory, and recommendations

The theory in the previous section is tested on 20 other sites in France, Portugal, and Spain. The results are confirmed, deepened, and nuanced through a greater diversity of cases.

5.1. Validation and enrichment of the results

The three adoption behaviors identified in the reference sample are also found in the test sample: conservative, pragmatist, and visionary. This new phase enables a much better characterization of the visionary category. Visionary heritage organizations believe that technology doesn’t alter or denature artifacts or monuments. They emphasize that the understanding of the work’s message is more important than physically seeing the objects or being in the heritage environment. Digital technology is a tool separate from the heritage but becomes a medium to disseminate and even embody the heritage, as is the case for the Artium Museum, Vitoria, Spain: “It is not necessary to be in front of a fetish. The most important thing is the message conveyed by the observed image. Even from California, one can watch everything on a screen in every detail, much better than before. It is a wonderful unique experience, almost mystical, although virtual visitors are not physical visitors.”

Scientific museums and organizations are especially comfortable technologically. They use more advanced digital technologies such as serious games and other interactive systems. Cap Science, Bordeaux, France, offers visitors the opportunity to interact and contribute to the exhibits. A virtual map follows investigators and helps them design their visit according to their tastes and priorities.

The testing sample confirms the adoption factors identified in the reference sample. Collections digitalization and experiential access is widely spreading like in the Museo de las Bellas Artes, Bilbao, Spain. The larger number of cases highlights the desire to improve attractiveness and reputation as a determining factor in ICT adoption, especially if a link is accompanied by the promotion of a region as a tourist destination. Digital technologies are used to show the best possible image of an event or place. For Semana Grande, Donostia-San Sebastian, Spain, “thanks to the Internet everyone can be what he wants to be and not what he is (...). We can show a crowded place and the best image of your festival.” An investment of EUR 500,000 for augmented reality has increased the visits to the Thot Park, Semitour, France by 35%. As mentioned, leader heritage organizations strongly influence other organizations. The digital strategy of the world-famous Guggenheim Museum is considered a reference for many players in Euskadi.

ICT non-adoption factors are also confirmed by the testing sample. The lack of necessary skills, the impossibility to dedicate a person to digital technologies, and the difficulty to hire young people are fairly common situations, observed for example in the Machado de Castro museum in Coimbra Portugal. The rapid obsolescence of ICT is also widely deplored in the studied cases in terms of hardware, such as

tablets, or software, such as operating systems and applications. The Pôle International de la Préhistoire, Les Eyzies, France, reveals that “the question concerns the problem of the aging of scenography, screens and equipment. In general, we don't replace hardware equipment piece by piece but we go for the latest most innovative equipment when replacement is needed.”

Some heritage organizations from the sample denounce the behavior of Google, which digitizes everything and puts online historic and cultural documents free of charge for the whole world to see. The copyright issue is crucial for ICT adoption. Infringement generates mistrust and conflicts, especially for works that are not in the public domain.

5.2. Generated final theory

ICT adoption of heritage organizations is categorized in 3 types: conservatives, pragmatics and pioneers. Heritage organizations adopt ICT to achieve each of their missions: artifacts digitalization, audience development and heritage promotion. Despite this strategic need, factors restraint adoption: risk of heritage denaturation; perception of a lack of purpose; lack of budget; lack of skills; slow decision making inadequate to rapid technology obsolescence; content issues; difficulty to maintain the equipment.

5.3. Recommendations

Results of this study invite favorable environments and solutions to improve digital technology adoption in the southern Europe heritage sector. Actions are already being implemented in the regions of the studied cases. In Aquitaine, France, calls for tender, subsidies for digital projects, and incubators foster ICT adoption by local heritage organizations. In the Centro region of Portugal, partnerships with digital firms and university research centers are encouraged and supported. In Euskadi, Spain, the government has created a database with an inventory of Basque works.

To go further, the heritage sector has to work on structural obstacles: reconsidering the place of ICT in their strategic management, improving their governance and management, focusing on training and skills, and being more pragmatic to find creative solutions, such as partnerships, to help implementation and vernacular use of ICT. A promising way could be to design true communities of practice involving mutual commitment, resource repertoire, and practice-based networks in order to learn collectively, and transferring and co-creating knowledge and innovation (Hildreth & Kimble, 2004).

6. Conclusion

This research generates a theory about the behaviors of heritage organizations regarding ICT adoption and results identify three types: conservative, pragmatic, and visionary. Heritage organizations adopt ICT to achieve each of their missions: artifacts digitalization, audience development and heritage promotion. Despite this strategic need, heritage organizations, but face specific factors that slow the adoption of digital technologies: danger of heritage denaturation; perception of a lack of purpose; lack of budget; lack of skills; slow decision making; inadequate to rapid technology obsolescence; content issues; and difficulty to maintain the equipment.

Further research could study heritage organizations from other regional contexts in order to enrich the generated theory. The adoption

model can be improved with a larger and more diversified sample of heritage organizations from other parts of Europe and other continents. Research agenda could focus on how ICT helps heritage organizations achieve each of their missions through collection digitalization, audience development, and heritage promotion. Specific recommendations associated with the digital technologies corresponding to the missions could then be formulated.

References

- Bakhshi, H., & Throsby, D. (2012). New technologies in cultural institutions: Theory, evidence and policy implications. *International Journal of Cultural Policy*, 18(2), 205–222.
- Benbasat, I., Goldstein, D. K., & Mead, M. (1987). The case research strategy in studies of information systems. *MIS Quarterly*, 11(3), 369–386.
- Benjamin, W. (1931). *A short history of photography*. Wellington, NZ: Random House.
- Bertacchini, E., & Morando, F. (2013). The future of museums in the digital age: New models for access to and use of digital collections. *International Journal of Arts Management*, 15(2), 60–72.
- Conway, T., & Leighton, D. (2012). “Staging the past, enacting the present” experiential marketing in the performing arts and heritage sectors. *Arts Marketing: An International Journal*, 2(1), 35–51.
- Eisenhardt, K. M., & Graebner, M. E. (2007). Theory building from cases: Opportunities and challenges. *Academy of Management Journal*, 50(1), 25–32.
- Giddens, A. (1990). *The consequences of modernity*. Stanford: Stanford University Press.
- Gonzalez, R., Llopis, J., & Gasco, J. (2015). Social networks in cultural industries. *Journal of Business Research*, 68(4), 823–828.
- Hildreth, P. M., & Kimble, C. (Eds.). (2004). *Knowledge networks: Innovation through communities of practice*. London: IGI Global.
- Hooper-Greenhill, E. (2004). Measuring learning outcomes in museums, archives and libraries: The learning impact research project (LIRP). *International Journal of Heritage Studies*, 10(2), 151–174.
- Kaminski, J., Benson, A. M., & Arnold, D. (2014). *Contemporary issues in cultural heritage tourism*. New York: Routledge.
- Kéfi, H., & Pallud, J. (2011). The role of technologies in cultural mediation in museums: An actor-network theory view applied in France. *Museum Management and Curatorship*, 56(3), 273–289.
- Lagrosen, S. (2003). Online services marketing and delivery: The case of Swedish museums. *Information Technology and People*, 16(2), 132–156.
- Lin, C. H., & Yu, S. F. (2006). Consumer adoption of the Internet as a channel: The influence of driving and inhibiting factors. *The Journal of American Academy of Business*, 9(2), 112–117.
- Lyytinen, K., & Damsgaard, J. (2011). Inter-organizational information systems adoption: A configuration analysis approach. *European Journal of Information Systems*, 20(5), 496–509.
- Moore, G. A. (2014). *Crossing the chasm* (3rd ed.). New York: HarperCollins.
- Orlikowski, W. J. (2000). Using technology and constituting structures: A practice lens for studying technology in organizations. *Organization Science*, 11(4), 404–428.
- Padilla-Meléndez, A., & del Águila-Obra, A. R. (2013). Web and social media usage by museums: Online value creation. *International Journal of Information Management*, 33(5), 892–898.
- Parry, R. (2005). Digital heritage and the rise of theory in museum computing. *Museum Management and Curatorship*, 20(4), 333–348.
- Parry, R. (2013). *Museums in a digital age*. New York: Routledge.
- Peacock, D. (2008). Making ways for change: Museums, disruptive technologies and organisational change. *Museum Management and Curatorship*, 23(4), 333–351.
- Ray, J. (2014). Putting museums in the data curation picture. In L. Bolikowski (Eds.), *Theory and practice of digital libraries*. London: Springer.
- Rey, F. B., & Casado-Neira, D. (2013). Participation and technology: Perception and public expectations about the use of ICTs in museums. *Procedia Technology*, 9, 697–704.
- Samis, P., & Pau, S. (2009). After the heroism, collaboration: Organizational learning and the mobile space. *Proceedings of the museums and the web*.
- Son, M., & Han, K. (2011). Beyond the technology adoption: Technology readiness effects on post-adoption behavior. *Journal of Business Research*, 64(11), 1178–1182.
- Thong, J. Y. L. (1999). An integrated model of information systems adoption in small businesses. *Journal of Management Information Systems*, 15(4), 187–214.
- Van de Ven, A. H. (1989). Nothing is quite so practical as a good theory. *Academy of Management Review*, 14(4), 486–489.
- Weick, K. E. (1989). Theory construction as disciplined imagination. *Academy of Management Review*, 14(4), 516–531.
- Woodside, A. G. (2010). *Case study research: Theory, methods and practice*. London: Emerald.