THE ERRATIC IMPLEMENTATION PATH OF DIGITAL TECHNOLOGIES IN PUBLIC SERVICE DELIVERY: SOME EVIDENCE FROM ITALIAN MUSEUMS

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Introduction

Digital technologies, from social media and QR-codes, to Apps, RFID (Radio Frequency Identification) or cloud services, have significantly affected public administrations in the recent ten years (e.g. Shin, 2013; Gil-Garcia et al., 2014; Bertot et al., 2016).

The main characteristic of these technologies is represented by the possibility to achieve real time interactions between multiple parties. On the one hand, digital technologies enact activities real time, giving rise to a continuously amount of data generated in a variety of formats, referred to as big data (George et al., 2014). On the other hand, these technologies favour the movement from a one way to a two-ways and dialogic communication (e.g. Agostino and Arnaboldi, 2016).

Real time interactions allow organizations to establish a many-to many relationship and better understand users of the service, shifting the service delivery paradigm from a service-centric model to a user-centric model (e.g. Kosaker and Lee-Kelley, 2006; Verdegem and Verleye, 2009). While a user-centric model for public service delivery has received some attention in the public sector literature with some authors discussing some revised paradigm for public service delivery such as the public-service dominant approach (e.g. Osborne et al., 2013), little is known about the role of technology in enacting this shift.

This study addresses this issue by investigating how public administrations are implementing and using digital technologies in service delivery and the extent to which these technologies affect the relationship between the public institution and service users. More specifically, we address two main research questions:

- How are digital technologies implemented and used by public institutions?
- How do digital technologies affect the relationship between the public institution and service users?

We explored these questions by first elaborating the results of an Italian survey on museums and then conducting a multiple case study in three Italian public museums. Public museums are a representative example of an old style bureaucracy, traditionally perceived as "old" and "classic", that are now investing on the emergent digital technologies to render their services more attractive and to a wide variety of audience, including young people. Within this context, the issue of reconfiguring the service by positioning users at the centre has become of crucial importance with some authors underlying the need to understand implications and benefits of digital tools in the attempt to develop and strengthen the relationship with the audience (Hayes and Slater, 2002). The museums investigated, although located in different Italian regions, do all share the same institutional background:

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in 2015 they became autonomous public institutions, having freedom in managing resources. This condition stimulated some innovation projects, often related to the adoption of digital technologies to stimulate audience development and a user-centric model of service delivery.

Data sources include 12 semi-structured interviews with the directors of the three museums, their administrative staff and curators, participant observations, derived by visiting museums and their offices more than one time, internal and external documents as well as social media and website.

Preliminary results show a prevalent diffusion of website and social media with a slow implementation pace and high retention by museums in implementing new technologies. With respect to the implementation, we found that in all the cases the implementation of technology was not followed by a change in the organizational roles and processes. This resulted into a limited usage of technology by users, that in the majority of the cases have declared to have not used the technology itself.

These findings have supported a broader discussion on the complexity of the implementation path of digital innovations in public institutions and the contribution of these technologies on user involvement, and the movement towards a user-centric model of service delivery more in general.

Literature background

Digital technologies in public institutions: state of the art
The importance of digital technologies in public institutions is widely addressed in literature with several studies discussing the types of available technologies, the benefits associated with this technologies and measurement models to quantify the impact of such technologies (Shin, 2013; Gil-Garcia et al., 2014; Bertot et al., 2016).

A first line of research, and also the earlier one, is mainly interested in understanding the type of technologies that are available for public institutions, seeking to define key features of each of them and the optimal condition of usage (e.g. Gil-Garcia et al., 2014). Social media are the most discussed technologies at different levels of administrations, from central to local government institutions (Chun and Luna-Reyes, 2012; Mergel 2012; Agostino, 2013); augmented reality and 2D and 3D imaging are widely explored within smart city context (e.g. Kitchin, 2014; Kim et al., 2017; Rashid et al., 2017), while sensors are a relevant area of investigation within welfare services such as health care or transportation.

A second stream of research is instead focused on the exploration of the opportunities and benefits associated with the adoption of digital technologies. In this respect, several studies have underlined how digital technologies are associated with a shift in the relationship with service users, from a government centric to a citizen-centric relationship (Kosaker and Lee-Kelley, 2006; Verdegem and Verleye, 2009; Osborne et al., 2013). Some other authors have instead posed the attention on the internal benefits, by underling the possibility to improve efficiency and effectiveness through the digitalization (e.g. Linders, 2012; Porumbescu, 2016; Meng and Zheng, 2017; Reddick et al., 2017)

Connected to this second stream, a further stream of research has been specifically interested in measuring and quantifying the impact of digital technologies. Accordingly, some measurement models have been developed, for example to quantify the level of awareness and engagement associated with social media adoption or exploiting analytics from big data (Ikeda et al., 2013; Van Dam and Van De Velden, 2015; Agostino and Arnaboldi, 2016; Williamson, 2016).

Although this increasingly attention on digital technologies in public institutions, little is known about if and how digital technologies are changing public institutions and their influence on the relationship with service users. Starting from this gap, the purpose of this study is to address the challenges for public institutions in connection with the introduction of digital technologies. This can be articulated into two main research questions: 1) How are digital technologies implemented and used by public institutions? and 2) How do digital technologies affect the relationship between the public institution and service users?

These questions have been empirical investigated in Italian public museums.

Framing digital technologies in museums

Museums are widely adopting digital technologies for a variety of purposes: (1) preserving and curating monuments, natural spaces, collections, documents or any heritage artefact; (2) welcoming and educating audiences by providing experiential access; (3) communicating with their environment and the society, along with other public institutions and authorities (Gombault, et al., 2016). With digital technologies museums have the possibility to preserve and store data in greater quantity and re-use those data to enrich the communication with public, with a better speed, reliability, accessibility and profitability. Moreover, technologies have been studied to be used by museums in back-office activities (for yield management of tickets for example), front-office activities (when there is a contact with the audience, so to manage customer relations), web-based services (as web pages, social media, location-based services as GPS for example) and in clean technology (using technology for a correct planning of spaces, as VR to model the exhibition in an effective way, before mounting) (Nigro et al., 2016).

Not only the purposes of use by museums are several, but also the available digital technologies are continuously developing and evolving. Within this context, it becomes imperative framing the existent technologies. In this respect, some classification exists; for example, La Rocca (2014), according to the reason why the application is padopted by the museum, clusters technologies into three different macro-areas: information-centred, tourist-centred and tourist-engaging. This classification has been revised by Nigro et al. (2016), who clustered technologies into three main categories: site-centred, site uncentered and big data. According to the authors, site-uncentred technologies are characterised by a usage which does not prescribe the physical presence of the visitor within museum, and it groups virtual guides and interactive maps (available usually on the webpage). Site-centred technologies on the other hand, require the physical presence of audience inside museums in order to take advantage of them. Augmented Reality, Wi-fi connection and QR codes are comprehended in this class. Big Data are considered as a third cluster, since they have no connections and they are for the majority relevant for museum internal organization.

Starting from this classification, for the purpose of our analysis, we adopted the distinction between site centred and site uncentred technologies to frame the available technologies for museums (see Table 1 for details). We exclude big data since they are not a technology, but they mainly refer to data generated by digital technologies.

Technology cluster	Name of technology and brief description
Site centric technologies	• *Location based technologies*, referring to all the technologies used to track the position of the visitor in the space, as RFID system, GPS, NFC and Beacon. • *Mobile applications*, developed by museums as a support tool for visitors and taking advantage of the constantly tendency of younger generation to hand mobile phones. The mobile phone is no longer what distracts from the exhibition, but it is the mean through which the visitor can enjoy a better experience. • *Virtual Reality*, installations creating a virtual environment where the visitor enters through wearable devices and can move in freedom in a parallel world. The virtual reality installations are designed to create a complete new space or to recreate a place in the past from scratch or on the rest of what it was. • *Augmented Reality*, generally used on mobile guided, augmented reality is thought to improve the experience of the audience with many contents directly on the artefact of reference. • *Screens*, as touchscreens and HD screens to show images and information in a more interactive way or where to display serious games and videos to entertain. • *Wearable devices*, as smart-glasses or visors to enjoy new experiences in virtual reality or augmented reality. • *QR codes*, placed near musealia, they are usually used to access to contents directly on place just screening the code, with a PDA(tablet or Ipad) or smartphones.
Site uncentered technologies	• *Websites*, displaying many kinds of information and reaching different levels of interactivity with the audience. At least the webpage of a museum should have information about entrances timetable, tickets, exhibits on show, maps and generic information about the building or the entity. • *Social media*, museums are present on social networks, as Facebook, Instragram, Youtube and so on, following the mainstream trend of getting social. • *Serious games*, on the webpages there could be a folder dedicated to games on artifacts of museums, combining education and entertainment in order to increase the level of interactivity of the website. • *Virtual tours* in VR or AR, collections of museums are shown in digital format, to enlarge the audience reached and to extend the fruition over the physical space and one-shot occasion of visiting the museum. • *2D/3D imaging* and digitization technologies as a whole, which are used to recreate digital versions of collection for storage and cataloguing purpose, but also they are used to create contents of websites and communication advertisements, in a real digital value chain.

Table 1: Classification of technologies

The last aspect, is related to the pace at which the adoption of digital technologies is occurring. The Moore model is taken as a reference in this respect, in order to understand the different clusters of adoption depending on the moment in which an innovation is introduced. This model is a revision of the Rogers curve for innovation adoption, inflected into technological innovation. Moore (1991) states that the adoption of every technology

follows the same bell-shape life cycle and there are five behaviours of adopters of technologies (compared to the five of Rogers model, for adoption of innovation in general). Figure 1 depicts the model.
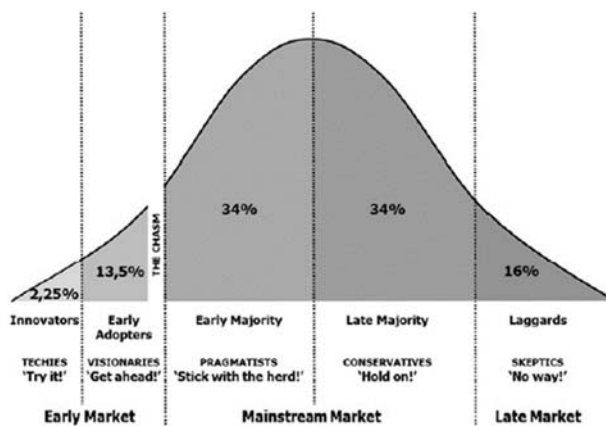

Figure 1: Moore Model

According to this model, five different clusters can be identified:
- Innovators or Technology Enthusiasts. They like to learn about technology and test new products as soon as they come out.
- Early adopters or Visionaries. They are aware of the competitive advantage of advanced technology and so they want to own customised high-tech innovations to reduce the time to market.
- Early majority or Pragmatists. They focus on applications and systems that have already proved and they use to follow the leaders' strategies.
- Late majority or Conservatives. They are followers and do not want to be behind competitors, so they adopt technology to keep up with competitors.
- Laggards or Skeptics. They have a very conservative mind-set and they are reluctant to changes so they do not follow the mainstream in adopting technologies.

The previously presented classification of technologies and the Moore model are taken as a reference framework to analyse the empirical data about museums.

Methodology

The research methodology consisted of two parts: a first part focused on an analysis of the level of diffusion of digital technologies in Italian museums; a second part focused on exploratory case studies aimed at further investigating the implementation process and use of technologies on a sample of Italian museums.

The first part of the research consisted of an extensive analysis about the diffusion of digital technologies in Italian museums. This analysis has been performed by relying on a national survey managed by the national Italian office of statistics (ISTAT)[2]. This is a national survey on 4977 museums in Italy (both public and private) carried out with reference to the year 2015 and aimed at collecting a variety of information about museums, from the number of employees and type of offer until the diffusion of digital technologies and other support

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[2] Survey on Museums managed by ISTAT. Results are available here https://www.istat.it/it/archivio/167566

services. We analysed this available dataset by focusing specifically on the variables of interest for the current study; these variables can be attributed to two main categories: type of technology adopted and museums individual characteristics. With reference to this latter category, they include: governance form, geographical location, typology of museum (e.g. contemporary arts, religious museums, science and technology, archaeological museums…).

This was a preliminary analysis that allowed to gain a preliminary understanding about digital technologies in museums in terms of:

- Level of diffusion of digital technologies and types of technologies most diffused
- Museums characterised by the highest level of adoption of digital technologies.

Through this analysis, we identified five different clusters of museums on the basis of their level of adoption of digital technologies. This distinction facilitated the selection of the case studies for a deep exploration.

Indeed, the second part of the research consisted of case studies conducted in 3 different museums (alpha, beta and gamma; names keep anonymous for confidentiality reasons). Within each museum, we interviewed the director and the reference role for digital technology management, being in some cases the digital officer and on other cases a more generic administrative role. In total, we conducted 12 interviews and performed a document analysis of strategic documents and internal reports about digitalization provided by museums. Moreover, a customer satisfaction survey was delivered in each of the three museums during the month of May 2017. The survey was a larger one aimed at understanding the perception by visitors about the overall services provided by the museums. Yet, some ad hoc questions were available to investigate the satisfaction with respect to each digital technology has declared to use. During this month, were overall collected 1102 questionnaires, respectively 385 in alpha, 376 in beta and 341 in gamma, corresponding respectively to the 0.75%, 1.17% and 5.79% of the overall visitors of the month.

Museum Alpha is situated in the north of Italy and it has has an extension of 35,000 squared meters. The palace was built in different times starting from the 13th century. Initially in the history, there existed just several components disaggregated until the XVI century when it became a unique architectural complex. Museum Gamma counts more than 950 rooms and gardens, stores and cellars, courts and loggias, built side by side over the years.

Museum Beta is situated in the centre of the city. It is a complex composed of several parts. The extension of the museum is 46,500 squared meters and all the parts are visible under a unique ticket. The cultural offer is wide and disparate with testimonies that go from prehistory to the modern age. The connections among the structures are long almost 3 kilometres and offer a path among history, culture, art and landscapes to relive the whole history of the city in different eras.

Museum Gamma is a large aristocratic residence which has been decorated over the years, composed by more parts (buildings, gardens and collections). There are over a hundred paintings displayed in the various rooms and the heritage of the museum is composed both

from fixed assets (palace and rooms) and movable asset (paintings, sculptures and furniture). The building has been elected as a world heritage of UNESCO.

The common features of the three museums is that they are all public museums that received administrative autonomy from the central government since 2015. Therefore, starting from the end of 2015 a new director has been appointed in each of the three places.

Results

Results are distinguished into two sections. The first section reports the initial part of the analysis related to the level of diffusion of digital technologies in Italian museums; this analysis supported the identification of a different levels of digital readiness of public institutions and enhanced the identification of case studies, object of the second step of the investigation.

The second section presents the results from the in depth case studies, by underlying the type of technologies adopted the implementation path and the effects associated with the implementation of digital technologies in museums.

The diffusion of digital technologies: a prevalence of digital laggards

The first type of analysis conducted on the available data set was related to the identification of the frequency of adoption of digital technologies, distinguishing between site centric and site-uncentred technologies (see Figure 2).

Some interesting insights emerged from this initial analysis. First, site uncentered technologies were found being more diffused than site centred technologies (on average 31% vs 14%). Above all, website and social media technologies are the most diffused one, while tablet, mobile apps and virtual tours the less diffused.

A second insight is related to the different influence of public and private museums on the level of adoption of digital technologies. As the figure shows, the type of technologies adopted does not change from a public to a private museum even though, on average, private museums are characterised by a higher level of adoption of digital technologies than public museums; more specifically, the level of adoption in public museums is of 18% vs 24% of adoption in private museums. However, the type of technology adopted does not change from a public to a private museum.
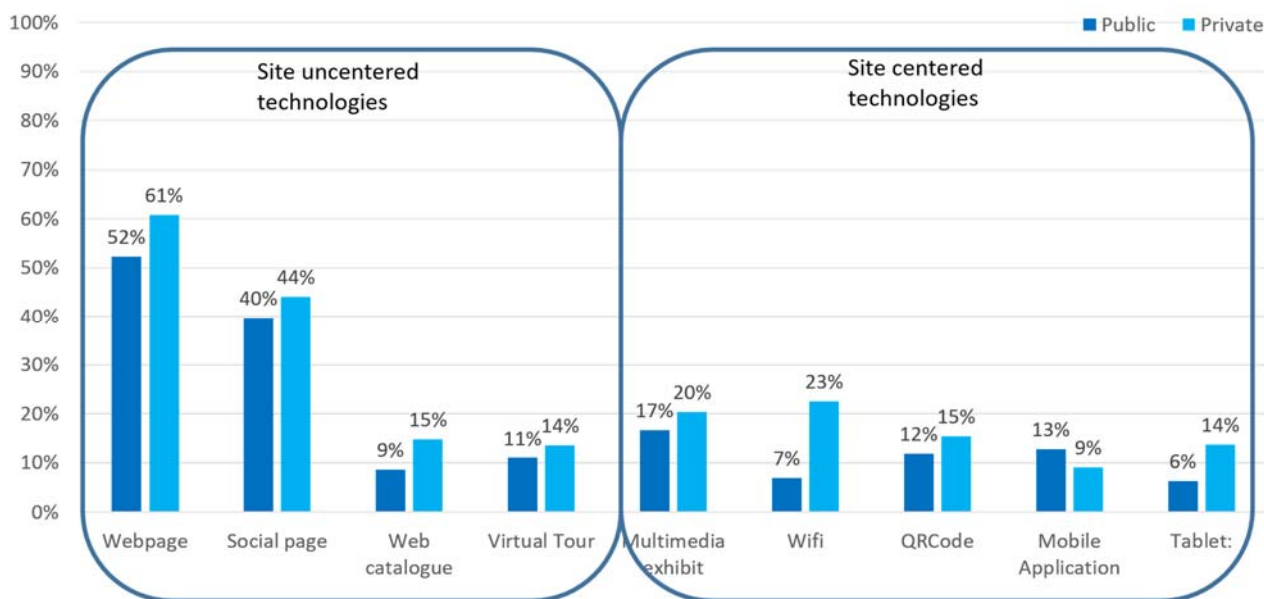
Figure 2: Level of diffusion of technology

A further analysis was related to the analysis of the level of adoption of these technologies distinguishing between the type of museum in order to understand whether the type of collection of the museum can impact on the propensity to adopt a certain technology or not (Table 2). It is important to underline that the sum by line or column does not equal 100% since each museum can adopt more than one technology. For example, the table suggests that 78% of science and technology museums have a website, while only the 12% of them has a mobile App.

	Webpage	Social pages	Wifi:	Multimedia exhibit	QRCode	Web catalogue	Virtual Tour	Tablet:	Mobile Application
Science and Technology	78%	49%	28%	32%	23%	22%	14%	21%	12%
Industrial	73%	51%	31%	26%	19%	14%	15%	9%	11%
Archeological	58%	53%	26%	31%	20%	12%	14%	18%	12%
Specialised	68%	48%	27%	26%	15%	21%	14%	17%	8%
Contemporary arts	65%	52%	29%	10%	19%	21%	15%	13%	12%
Natural Sciences	64%	41%	27%	30%	16%	12%	15%	19%	9%
Fine Arts	64%	51%	19%	16%	15%	21%	18%	12%	13%
Historical	61%	38%	20%	25%	13%	14%	12%	15%	7%
Ethnography/ Antropology	53%	37%	18%	17%	10%	10%	11%	13%	6%
Religious	39%	25%	12%	8%	9%	7%	11%	4%	5%

Table 2: Technology diffusion by museum typology

This analysis provides some interesting insights:

- Science and technology museums, as one might expect, are more incline in adopting digital technologies while religious museums are the less inclined. This result can be explained by the nature of the museum itself. A science and technology museum, given its mission to promote technology, pushes the adoption of digital innovation. Although percentages are higher than the other types of museums, it is important to

highlight that multimedia exhibits are adopted by only the 32% of these museums, QRcode by the 23% of them, while virtual tour by the 14% of them. For what concern religious museums, their limited willingness in the adoption of digital technologies can be explained by the fact that religious institute might be more conservative and more focused on the preservation of heritage rather than increasing its fruition through digital technologies.

- Although the different percentages, the trend in the adoption of digital technologies is the same in the different types of museums: webpages and social media, irrespectively the typology of museum, are the most adopted technologies. On the other side, the less diffused technologies consist of table and mobile application, as the general analysis previously showed.

A further analysis conducted is related to the number of technologies adopted by each museum. Indeed, we distinguished between those that adopted all the identified technologies (both site centred and uncentred) and those progressively adopting less technologies, until arriving to museums with any technologies in place. This allows to identify five different clusters of museums that, following the Moore model on technology adoption life cycle (Moore, 1991) can be associated to the five different phases of technology adoption from "the innovators" (adopting 8 technologies) moving to "early adopters" (adopting 7 or 6 technologies), early majority (adopting5, 4 or 3 technologies), late majorities (adopting 2 or 1 technologies", arriving until "the laggards" with no technologies in place (see Figure 3).
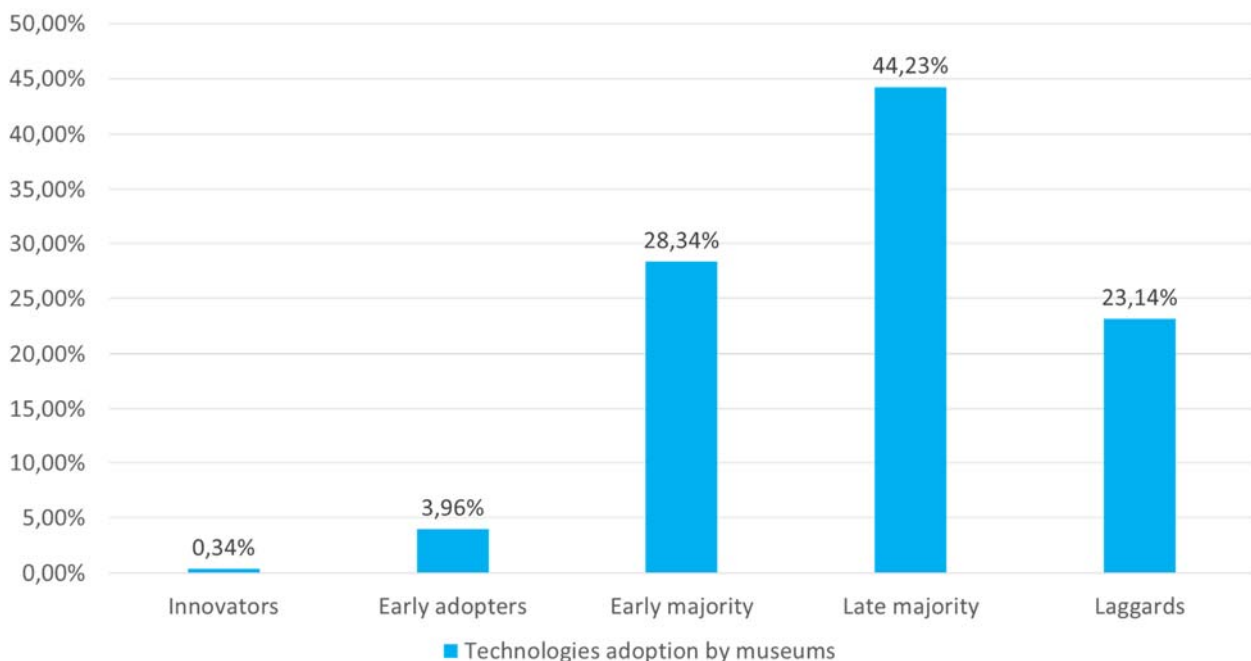

Figure 3: Clusters of technology adoption

Also this analysis has revealed some interesting insights. First, the shape bell of the technology adoption lifecycle is not visible since the majority of the museums are positioned in the right tail of the shape. According to the Moore model, laggards (i.e. the more sceptic

part of the population) should be around the 16% of the data set, while in our empirical analysis they reach the 23%. In the same vein, also late majority are expected around the 34% of the data set, while in our case they are more than the 44%. This result underlines a certain aversions and limited adoption of digital technologies by Italian museums. This result poses the question about the importance of digital technologies for museums.

Second, innovators, intended as those museums adopting all the identified technologies, resulted into the 0,34% of the sample. This implies that 13 museums out of 3864 were found relying on several site centred and site uncentred technologies. In this respect, we searched for common features between these few museums to understand whether descriptive factors might explain technologies adoption. However, we did not find geographical location, nor museum typology or governance mechanisms as explanatory variable for the adoption of digital innovation.

This last analysis was particularly useful since it supported the second phase of analysis related to the selection of case studies. At the present stage of the research, we have conducted three completed case studies interviewing museums belonging to three out of the five different categories in order to understand how they implement digital technologies (and why) and the level of users' involvement in the usage of the technology itself.

Case studies

Museum Alpha
The digital technologies adopted by this museum comprise site uncentered technologies only: website, social media and virtual tour. The website has been entirely renewed in 2016, through the support of an external companies and it has now become aligned with the more recent website standards. The museum is active on three different social media, Facebook, Twitter and Instagram. While the followers on Facebook are continuously growing (counting now almost 5,000 followers), Twitter and Instagram are less active channels both in terms of posts and in terms of fan with respectively 600 and 1,000 followers.
In 2016, during the renewal of the website, also a virtual tour of some portion of the museums became available on the website giving users the possibility to watch some tours of the museums directly from home.

In terms of digital strategy, when interviewing the director and asking his view of the museum and his mission, he did not mention digital technologies, but once we asked his position in this respect, he underlined the importance of all the digital technology as a medium to achieve the mission of the museum of promoting and diffusing culture. This view of the technology as a medium is also underlined in the statute of the institute:

> *"to achieve its mission (i.e. acquire, preserve, promote and communicate its collection and monuments), the museum wants to pursue high qualitative standards, also related to digital technologies, and favour an active role of users." (Statute of the museum)*

This sentence, not only underline the role of technology as a medium, but it also underlines another issue: the need to involve the users actively in the life of the museum.

Although this view of the technology, once analysing their implementation and everyday usage in terms of organizational roles involved and managed processes, no changes occurred nor in the procedures nor in the roles involved. With reference to the roles involved, the introduction of social media, a renewed website and the presence of virtual tours has not been associated with the identification of a new organizational position entirely devoted to technological issue. Even with the introduction of social media that require a constant updating, no one is entirely in charge to manage those tools. Their management is in charge of the assistant of the director as a small part of her duties (out of 13 administrative employees).

Moreover, this person managing digital technologies did not have the right competences not even were trained on those issues. For example, while discussing with the assistant of the director on social media management, she argued:

> *"I'm not a social media expert; I know social media as a traditional user; sometimes, while doing my regular work, I spend some time posting on social media of the museum, but this is something I do not with a clear strategy or with a particular rational in mind. I'd love to receive more skills and devote more time on them, but I'm immersed in my every day working duties."*
> *(Assistant of the Director)*

In terms of perception of the digital technologies by users of the service, results from the survey are interesting and show that the average satisfaction is of 3.04 on a Likert Scale from 1 (not satisfied) to 4 (extremely satisfied). However, while reading the details of the answers, 74% of the respondents declared to had made no use of digital tools and 54% of respondents of not using the technology. The overall satisfaction of the visit to the museum was instead of 3.5 (on a 1 to 4 Likert Scale).

Museum Beta
This museum belongs to the "late majority" cluster, having implemented only two digital technologies. Also in this case, the technologies implemented are site uncentered and comprise the website and social media. The website has been renewed in 2016 after the decree that provided autonomy to this institution. With reference to social media, the museum is active on 5 different social pages: Facebook with almost 30,000 followers, Twitter with more than 7,000 followers, Instagram with almost 7,000 followers. The least active pages include google+ and Pinterest that do not reach 1,000 followers.

With reference to the digital strategy, the museum does not have a digital plan, but the social media strategy is detailed and defined within the communication plan. The annual document, periodically updated, details the target audience, the type of posts and their frequency. There is not an explicit reference to digital strategy within the stature or annual report. The director explained this issue as follow:

> *"Digital technologies are central nowadays to get engaged and improve the value of the museum. Yet, we are a new constituted reality and we are now reorganizing our structure to face this new change. We*

need first to assess ourselves and then we'll clarify our digital strategic priorities. Right now, this remain a central issue, to be addressed just after the reorganization". (Director)

This sentence by the Director underlines the role of digital technologies as an added value for the museum although they are not driving the reorganization. However, while analysing their new organizational chart, two different functions are emerging in charge to deal with digital technologies: the communication and the IT office. There are no areas entirely devoted to digital technologies. Social media are in charge of the communication office with one organizational role entirely devoted to social media management, while the upcoming onsite digital technologies in charge of the IT office.

The perception of technologies by users is positive with an average value of 3.06. however, almost the 70% of respondents did not use the website, while the overall satisfaction of the visit was of 3.54 (on a 1-4Likert Scale).

Museum Gamma

This museum belongs to the "early majority" cluster with five digital technologies implemented. The museum has a website, social media and a virtual tour among the site uncentered technologies, while it has tablet and an application within the site centered technologies.

The website is traditional in its structure with no interactive pages. However, some elements of the collection are available online and the user can see and read outside the museum some of the pieces belonging to the museums' collection: paintings, canvas, sculptures, plasters, decors and furniture are available online. A video is also available through a YouTube link that allows a virtual tour of the museum together with a guide (available in 5 different languages). In terms of social media, the museum has a Facebook page with more than 3,000 followers that is constantly updated and a Twitter page with more than 2,000 followers. The site centred technologies comprise tablet available to visitor to support their onsite tour and an App. However, with reference to the App that was conceived as an alternative to the traditional captions beside elements of the collection, it is available and it is promoted while accessing the museum. Yet, there is not wifi connection inside the museum that makes difficult for the interested visitors to download before starting the onsite tour.

With reference to the digital strategy, the museum does not have a digital plan and not even mention digital technologies within its statutes or annual reports. When asking the director her perception of the role of digital technologies, not lastly given the adoption of 5 different tools, she explained:

"Digital technology has become now a "must", something that you need to have to attract your visitors and to stay in contact with them. The majority of the visitors did not appreciate a canvas with their eyes, but through the screen on a mobile phone while making a picture. If you want to attract visitors and create engagement with them, you need to rely on novel digital technologies. And we are moving in this direction" (Director)

Although the acknowledgement of digital technologies as a tool to create engagement with users, the director also underlines the difficulties in achieving this mission mainly attributable to performance pressures from the central government. The scarce resources available that oblige the director herself to pose the attention on different matters, where these matters are related to the production of document to certify performances for the central government. This has resulted into a freezed organization that has not change the organization nor its activities to address and manage the introduction of new technologies. Indeed social media and website are managed by an administrative assistant out of her many duties. The Application is present but no one is in charge to care continuously or periodically about it as well as tablet that are available at requests at the central desk of the museum.

This limited attention and centrality of technologies in the everyday working life is perceived by users as visible in the responses to the customer satisfaction survey. Results show that the average satisfaction of digital technologies is of 3.16 on a Likert Scale from 1 (not satisfied) to 4 (extremely satisfied). Although this positive evaluation, while reading the details of the answers, only the 7% of respondents declared a very positive perception of digital tools. The interesting insight is that the 78% has declared they did not use any digital device, the 75% of them declared they did not use the social media page of the museums and the 58% of them of not using the website. Finally, the overall satisfaction about the visit was of 3.5 (on a 1 to 4 Likert Scale).

Discussion and conclusion

The analysis conducted, both survey analysis and case studies, provided some insights about the role of digital technologies in museums and their ability to affect the relationship with users.

While the survey showed a slow approach to digital technologies by Italian museums, the three cases studies underlined that the implementation of technology, even with five different technologies adopted, does not automatically result into a digital organization and not even into a changed relationship with the users. Paradoxically, the museum with 5 technologies adopted was found as those in which users are less willing to use such technologies.

Museum	Technologies	Strategy	Implementation
Alpha	Early majority (three site uncentered technologies)	Digital technologies as a medium No digital plan	No changes, erratic
Beta	Late majority (two site uncentered technologies)	Digital technologies as a further value for the museum Digital strategy included in the communication plan	Slow change: dedicated organizational roles although within the communication office

Gamma	Early majority (three site uncentered technologies and two site centrered technologies)	Digital technology as a tool to create engagement with visitors No digital plan	No changes, erratic No ad hoc competences

Table 3: Museums comparison about technology implementation

The first insight that can be derived from this study is that technology per se does not allow to change the paradigm from a user un-centric to a user centric role. A change of the mindset is required. This is visible when a technology is introduced but the organization of the institution does not change and the way through which the public good is accessed is the same. The introduction of a new technology is expected to be associated with a change of the strategy, that should reflect the new orientation towards the digital innovation and a change in the organizational roles involved.

A second insight is related to the role and perception of technology by service users. The customer satisfaction survey showed that in the majority of the cases users did not make use of the technology. During one interview an informant said: "people purchase their ticket online, but then they come with the printed page of the ticket. This is useless". This underline the importance to consider, not only the digital attitude of the public institution, but also the digital attitude of the users that need to perceive the museum in a different way and need to be able to use the technology (this is not always given)

The third insight is related to the measurement of the digital technologies. None of the respondent was able to clearly quantify the impact associated with the introduction of the new technology. Their answers were based on their perception and on what they see everyday. Their measurement system is limited on the preparation of budget and annual report. This is an important gap: if museums declare they are embracing a digital strategy and are changing their activities, how can they understand the effectiveness of their actions with no measurement systems in place?

These thee insights can serve practitioners, not only of museums, but at a more general level of public institutions, when implementing a digital technology. This analysis should make them aware that the adoption of digital technologies is not directly associated with a change in the relationship with the users; users need to be guided and educated towards digital technologies as well; the implementation of digital technologies inevitably should pass through a change in the strategy, organizational roles and processes.

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