

Handbook of Research on Museum Management in the Digital Era

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Chapter 12

Novel Approaches in Profiling in Museums

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ABSTRACT

User profiling is a very important marketing strategy and should be a continuous and always updated activity as through profiling it is possible to get a perfect identikit of consumers, and this allows companies to know about their needs and undertake marketing strategies tailored to their tastes and habits. These considerations are ever more real in the cultural heritage sector: with an accurate profiling process, a personalization of the service can also be achieved in the museum context, with a communication strategy based on collaboration and adaptation between museum and visitor. The authors started from the analysis of the literature to build and propose an original managerial model for user profiling based on the joint analysis of four dimensions related to the topic (type, data collection tool, type of data collected, and levels of implementation). The findings emerged from the literature review, and the model was cross-referenced with the data relating to the MANN (National Archaeological Museum of Naples), the exploratory case study.

1. INTRODUCTION

User profiling is a very important marketing strategy as through profiling it is possible to get a perfect identikit of consumers and this allows companies, in this case museums, to know about their needs and undertake marketing strategies tailored to their tastes and habits. It is essentially a matter of gathering customers into target groups, i.e., homogeneous groups of customers who have similar characteristics to whom propose personalized offers and promotion strategies of a specific product/service, based on each target group that has been identified. The profiling activity should be continuous and always updated. In fact, when a new version of the product/service or a brand-new product/service is presented to the

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customer, it is necessary to collect feedback about it. Through the feedback collected, it will be possible to improve the quality of offerings or experience taking into account information about customers who, without profiling, would have been ignored.

These considerations are ever more real in the cultural heritage: with an accurate profiling process, a personalization of the service can also be achieved in the museum context, with a communication strategy based on collaboration and adaptation between museum and visitor (Fernandez-Lores et al., 2022). Profiling is certainly a tool that must be part of a museum's digital strategy, which needs careful planning and time to be effective (Orsini, 2020). The advent of smart museums and the internet of things (IoT) are making tools and techniques such as profiling increasingly accessible to museums (Ivanov, 2019).

There are several profiling approaches and technologies that can be adopted and used, starting from the traditional interviews, questionnaires and focus groups, arriving at more technological approaches that use social media analytics, RFID sensors and devices.

In this field, Information Communication Technology applications have a positive impact on the users' visit experience and their overall enjoyment of the journey. They also offer the possibility of a virtual visit to users who may be unable or discouraged due to physical or cultural barriers, or who are physically far from the museum, bringing them closer to art and thus collecting data on behavior also, of this segment of visitors. For cultural institutions, these tools represent an opportunity to attract even younger visitors and to forge partnerships and synergies with private companies and other stakeholders.

Further visitor studies show that visitors feel more motivated with interactive experiences, such as guided tours, compared to traditional visits between collections organized according to a taxonomic approach (Pietroni, 2019).

Over the years, the classic museum visit has changed into a real experience, in some cases highly personalized and engaging, both remotely, virtually (online) and physically (on-site). The museum's mission has therefore evolved, focusing on offering personalized services for different visitors from all over the world. To do this, it becomes vital for an institution to know its target audiences, therefore the interaction with the current and potential audience plays a central role (Karaman et al., 2016).

The importance of observing the public to grasp their behaviors, distinguishing active users from passive ones to better understand the dynamics of use, the use of quantitative and qualitative tools, allows museums to obtain useful data in this sense, precious not only for researchers but also for museum governance, for technical staff and for tourist guides, with the aim of becoming more aware and ready to face critical situations and seize the opportunities offered by digital.

However, although museum development has made many steps forward in recent years, user profiling is still not often practiced by them. Furthermore, even if the topic is of great interest in the scientific community, practical examples are still few and mainly related on basic profiling criteria, such as sex, nationality, and age which cannot let museums develop content able to satisfy a varied audience.

As some authors state "museum exhibits are often designed out of the need to target a sort of "common denominator" visitor. This necessity arises from the difficulty in understanding a priori the interests of individual visitors" (Karaman et al., 2016, p. 2). The lack of audience profiling does not allow for an understanding of the different needs of the target audience and therefore does not allow museums to hypothesize dedicated visit experience. Despite the awareness, the authors continue, that "the multimedia guides should support personalization of information delivered and should enable an experience adapted to each visitor's own pace and interests" (Karaman et al., 2016, p. 4). As a consequence, audience analysis becomes essential to provide a tailored cultural offer, satisfying the expectations of different audiences.

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Starting from the literature analysis about customers profiling in the cultural heritage sector, the aim of this chapter is to organize and categorize the state of the art about this topic and use it to create an original management model for user profiling. This model is based on four dimensions, brings together all the knowledge on user profiling, and can be used by managers to analyze how museums are positioned with respect to it: this theoretical part, in fact, is integrated with the analysis of an Italian case study in order to test the model.

The literature review starts with the analysis of the difference between traditional user profiling and more technological ones. Then another difference is presented, the one between the active profiling approach which requires users' involvement and the passive one. The chapter continues with the analysis of the different typologies of variables that can be investigated, which led to a territorial investigation as well, taking into consideration that there is a big difference between the Italian scenario and the Anglo-saxon one: while the Anglo-saxon countries, in particular some models from the United Kingdom will be presented (par.4), pay more attention to psychographic variables for user profiling, the Italian model, until now, has always preferred socio-demographic ones. Following the literature analysis, an original managerial model for user profiling is presented based on the joint analysis of four dimensions related to the topic. The theoretical part is finally integrated with the description of an Italian case study, the National Archaeological Museum of Naples, the MANN (Museo Archeologico Nazionale di Napoli) used to understand how an Italian museum is positioned as compared to the theorized model. In recent years, in Italy, with the "Franceschini reform", the Italian Ministry has dictated guidelines pushing museums to use digital, to use social media more and more, and to actively dialogue with their users and involve them in various activities. A consequence of the reform was also a greater autonomy of some museums, such as the MANN. The results of this greater bureaucratic autonomy of the museum towards the Ministry was manifested among other things by greater flexibility of management and bureaucratic streamlining, such as the possibility of hiring new staff through tenders, without going through the Ministry. This change of management has led, in particular in MANN, a modern vision, which has produced partnerships with public and private sectors, as well as a more modern perspective in museum management, which has seen its policies outlined through three-year plans and annual reports (both available to the public), also made with the support of specialists outside the museum.

2. TRADITIONAL VS TECHNOLOGICAL APPROACH

It is useful to introduce what user profiles actually are: those that are defined as user profiles are represented by a set of cognitive abilities, intellectual abilities and intentions, learning styles, preferences, and interactions with the system. User profiling is based on knowledge or behavior. When the approach we use is based only on knowledge, there is a strong risk that static user models are designed and users are automatically matched to the closest model. This knowledge of the user is usually achieved through tools such as the questionnaire and interviews. On the other hand, approaches based on user behavior, rather than on their knowledge, use the behavior of the user as a model, thanks to the use of common techniques such as machine learning, with the aim of discovering useful models. We can assert that there is a difference between profiling and user modeling. In the first case the profiles contain "raw material" acquired by a user. In the case of modeling, on the other hand, when such data are processed and used. We can also define hybrid modeling of a user when combinations of user attributes and content attributes are both used to enhance the personalization effect (Dokoohaki and Matskin, 2008).

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Regarding the methods used to carry out user profiling, a first classification can be made which is the one between the user profiling based on traditional tools and another one based on technological devices.

The first cluster, the one we can call the traditional cluster uses surveys, questionnaires, and/or paper forms consisting of questions, checkboxes, free and/or multiple-choice text boxes to profile customers, interviews, focus groups, analysis of the visitor book (guest book), observation to do user profiling, while the second cluster includes the most advanced and technological methods, which uses profiling cookies and click-monitoring activities plus RFID sensors, beacons, and cameras to analyse user’s behavior as is the passive profiling (par.3).

Table 1. Traditional vs Technological approach

| | TRADITIONAL APPROACH | TECHNOLOGICAL APPROACH |
|-----------------|---|---|
| Profiling tools | surveys, questionnaires, paper forms (questions, checkboxes, free and/or multiple-choice text boxes), interviews, focus groups, guest book. | Cookies, click-monitoring activities. RFID sensors, beacons, cameras (in relation to passive profiling - par.3) |

Source: authors’ elaboration

The survey is a structured set of questions, possibly equipped with various answers. It is a fundamental tool for collecting research data and information; sometimes it is also enriched with other instruments such as figures and scales. The order of the questions to ask is very important and there are two types of questions: funnel succession (passing from general questions to more particular questions); inverted funnel succession (passing from specific questions to more general ones). The checkbox is a graphic control with which the user can make multiple selections. They are usually found on the screen as watch faces which may contain white space, check mark, or a square. There is usually a description next to the checkbox. To reverse what has been selected on the checkbox just click on the box or on the selection. The text box is an element that allows users to highlight important information contained by inserting it in a box. Text boxes are useful for highlighting important phrases, quotes, or extrapolating texts and images that are contained in documents such as brochures or flyers.

In the interviews a dialogue is created between the interviewer and the interviewee. There can be non-directive or semi-direct interviews. A non-directive interview is completely unstructured and the interviewer creates the interview on the spot, freely taking the suggestions and indications provided by the interviewee. On the other hand, in a semi-directive interview, the interviewer has a plot in which there are topics they want to talk about during the interview.

The focus group consists of a group meeting, which lasts a few hours, during which through dialogue and projective techniques, such as free association of ideas, completion of sentences, simulation of situations and role plays, the participants express their opinions in an unstructured and instinctive way. This tool can involve different types of users such as visitors, museum experts, and museum staff. Discussions are led by a moderator. The focus groups are useful both to know the expectations and perceptions of visitors towards a product/experience and the satisfaction towards new activities and services. They represent a particularly useful tool when the topic discusses activities or experiences that are enjoyed in a social context.

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Other user profiling tools are the guest book which is a book or notebook that can be found in museums and places of worship where you can write thoughts, dedications, and sign your own name. There are also virtual guest books that collect opinions and comments left by site visitors. The observing survey consists of observing, recording, and interpreting the behavior of visitors both inside and outside the visit of the cultural property. In this type of investigation there is no form of participation by the researcher and there is no interaction between the observer and the observed. Since there are no direct relationships, there is no behavioral conditioning that might exist when there are direct interactions. Direct observation of visitor behavior is very useful for identifying visiting routes and residence times, identifying which elements within the itinerary are more attractive to visitors and which, on the other hand, are less so; examining examination fatigue; analyzing the degree of interaction with the objects present in the path undertaken; analyzing the distances between user and object, user and user, and between object and object.

The advantages of this last particular typology of users' traditional profiling which offers the possibility to observe users who act with no conditioning, have been the starting point for the passive profiling (described in the next paragraph). A novel approach of user profiling actually merges these advantages with the possibilities offered by technologies to observe and record users' habits during the visit.

As regards, instead, the most advanced and technological methods, they are related to the monitoring and recording of uses, habits, and behaviors of the interested party. Just think of the profiling cookies that record the user's activities with the aim of collecting information that allow the owner of the processing to carry out the profiling and clustering of the interested party. Profiling cookies and click-monitoring activities that are put into practice on a website or web service, i.e., an app for mobile devices, are the basis of the success of titans like Google, Amazon, and Netflix because they allow them to realize the processing necessary for each user to be presented with highly personalized content.

A typology of user profiling is the one based on cookies: these are fragments of user data stored on computers and personal devices used to improve navigation. They are created by the server and sent to the user's browser. The exchange of information allows sites to recognize the user's computer and send them personalized information according to their sessions. Therefore, cookies allow sites to offer users personalized experiences by storing a certain amount of information about them. Then we move on to the processing of the collected data which takes place through automated algorithms that analyze the information collected to extrapolate a series of characteristics, thus being able to build a highly personalized offer. These algorithms work on the basis of parameters that allow them to carry out POCs (Presumably Optimal Choices). The most modern calculations are based on parameters that progress over time and make deductions based on the data collected. The algorithms are not limited to analyzing the set of information and behaviors of a single user, but cross the data of a large sample of users, then analyze the behavioral paths that occur more frequently and propose them to a similar type of user (thus exploiting the characteristics of users who have been examined and profiled before).

We then proceed with clustering, a process that brings a potentially infinite number of users within a precise number of categories (behavioral paths) to identify the POCs of each user. This search for probable correlations is based on a certain level of approximation based on large numbers, implementing a mechanism for simplifying reality. Therefore, it is a user standardization process of large numbers of users who come from all over the world. To protect users from profiling techniques that could be incorrect, discriminatory, or harmful, the GDPR in art. 22, gives the individual the opportunity to refuse any type of decision, even partially automated.

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3. ACTIVE VS PASSIVE PROFILING

The second classification divided the approaches between active and passive: the active approach needs the interaction and the presence of the users, while the passive approach, or tacit, does not require the users active participation and thus better exploit with the modern digital technologies potentiality. Regarding the study source and the tools, there is the data obtained directly from the survey and quiz to users, besides the secondary data collected from the social networks, web analytics, RFID sensors, and cameras.

Table 2. Active vs Passive Profiling

| | ACTIVE PROFILING | PASSIVE PROFILING |
|-----------------------------|--|---|
| Users' participation | Explicit as it needs the interaction and the presence of users | Tacit as it does not require users' active participation |
| Type of data | Primary data obtained directly from the survey | Secondary data collected from social networks, web analytics and from sensors, beacons, and cameras |

Source: authors' elaboration

Therefore, in addition to the typologies of the variables investigated, the psychographic and the socio-demographic, it is possible to define different approaches to cultural profiling: a direct-active profiling approach which precisely involves the active participation and presence of the user and which uses the questionnaire as a survey tool. The indirect approach may or may not require the presence of the visitor, in an onsite (CVQ) modality, but also online. Also, this method using the visitor questionnaire, combining dependent, personal traits of the visitors (mood, style of visit, etc.), with independent traits (age, gender, and expository elements and situational factors), showing specific relationships between all of these. We then proceed initially by recovering the characteristics, user preferences, and the context of the visit, then moving on to investigate the correlation between visit elements and consumer choices as a basis for personalizing the service (Antoniou, 2017). It follows that the results include both demographic variables (age, gender, place of birth) and preferences (game choices, music, art preferences, museum themes, mood, visiting style). Other profiling models highlight the visitor's artistic interests through an interactive semantic-based approach (Rutledge model, 2006 taken from Eardley, 2016 and Martella et al., 2016) and using a mediated interaction (Carrozzino & Bergamasco, 2010). This approach involves three steps: a strong taxonomic structure is established through data and vocabularies, putting together a rich network of works of art, authors and related topics, in order to facilitate content-based links and recommendations; a basic user-profile scheme is established through an interactive User Modeling; an algorithm is applied that deduces user preferences and produces suggestions. The user has a double choice, the basic and the personalized path, and can switch between them at any time. The third step is the recommendation, which requires the system to apply content-based personalization to the properties defined by the RDF triples, which are efficiently maintained and extended via the semantic web. This approach was analyzed in relation to the secondary data, retrieved from the "Virtualfreesites" website, which collects over 300 websites in the "museums, exhibitions, places of interest" category, offering online tours (Eardley, 2016). The visitor's profile is traced taking into account a series of factors: socio-demographic characteristics (age, gender, occupation, education, impairments: "museological" char-

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acteristics), purpose of the visit (interest in the museum's topics, preferences on the subject, previous knowledge, level of commitment on the subject), type of visit (individual, group, duration of the visit, frequency of the visit), psychological factors (memory, learning style, cognitive style, style of visit). The semantic web system has elaborated what are defined as the Skills Profile or the visitor's abilities, in relation to their virtual visit experience (for example Skills_linguistic_level); the Behavior Profile, which contains behavioral information that may be useful for understanding how the user approaches the virtual visit (e.g. Behavior_personality_type); the Interest Profile, which contains information on the topics of interest to the user within a virtual gallery or museum (e.g. Interest_knowledge_level); the Preference Profile, which records the user's preferred exhibition layout (e.g. Preference_exhibiton_type). Games can also be used as a useful tool for analyzing user preferences and characteristics. Once identified, they can subsequently be used for profiling, where other data collection methods may require longer times. Social networks are also a very effective data collection tool, representing a unique opportunity to obtain information for the personalization of services to record the various behaviors and characteristics of the user (Naudet et al., 2013; Farnadi et al., 2016; Vassilakis et al., 2017). In fact, users, through their profiles, provide a large amount of audiovisual information. Many of the personal characteristics of a social media user, such as moods and emotions, even if not directly manifested, can be extrapolated from the content and become very useful for profiling. The visitor experience shared on social media can also be used by the museums themselves as a form of promotion. A last approach, passive visual profiling, makes use of semantics but does not require interaction with the visitor, but rather is based on a natural interaction (Carrozzini & Bergamasco, 2010), using motion capture devices, it is more advanced in terms of technology and therefore it will be described in the next paragraph. To carry out this type of analysis, cultural institutions exploit the potential offered by cameras: through the passive visual profiling approach, it is possible to observe the movements of visitors, the time they stay in a specific area and obtain data to build dedicated paths suggesting works, collections, and exhibitions of interest. This type of approach offers the advantage of observing visitors who act in total freedom and spontaneity, not knowing that they are being observed. Not only that, in many cases it is possible to take advantage of the camera systems already existing within the structure for video surveillance. Furthermore, these are systems that easily adapt to both small and large structures and the only effort they require over time is to update the software or integrate new features where required.

One of the systems conceived in this sense is the CHIP (Cultural Heritage Information Personalization) system which integrates observation via cameras with the satisfaction expressed by the public. On the one hand, fixed cameras and devices equipped with RFID are installed or used, which observe the behavior of the visitor during the visit to the museum and record their movements. On the other hand, museums equip themselves with mobile devices on which they upload all the information in advance, relating to their collections and program the devices in such a way as to offer the visitor the opportunity to both express a liking for the works and download content of interest to their personal device. Once the data has been collected, dedicated software intervenes that build ontologies and profiles and model the contents to be offered to visitors on the basis of the preferences and interests emerging from the movements in the structure and from explicitly expressed preferences. The software can suggest works similar to those which captured the visitor's attention for a long time, present in other rooms of the same structure or sometimes in other collections that potentially the unguided user may not even intercept. The visitor, in his dedicated space, can in fact browse and access the various resources such as stories, secrets, and insights, including the section dedicated to recommendations and suggestions. Although this approach has good potential and offers the advantages listed above, it is not free from problems, the first

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of which is related to the visitor’s pause time near a work that the software records as an expression of interest in the placed work in that area but it could also depend on other reasons. A second problem is that although the system is adaptable and flexible, concerns temporary exhibitions or the movement of works that could involve the use of resources that are too expensive to program or reprogram an ontology.

4. THE CHOICE OF VARIABLES: SOCIO-DEMOGRAPHIC, PSYCHOGRAPHIC AND HYBRID APPROACHES

Regarding the variables investigated, some differences emerged among user profiling models which take into consideration only socio-demographic variables, other ones which focus on psychographic variables and hybrid approaches.

Table 3. The types of variables for user profiling

| SOCIO-DEMOGRAPHIC | PSYCHOGRAPHIC | HYBRID |
|---|---|--|
| Age, gender, origin, ethnicity, social class, educational level, occupation | Personalities, lifestyles, interests, values, opinions, beliefs | mix of socio-demographic and behavioral data |

Source: authors’ elaboration

In this regard, the United Kingdom scenario with the choice of psychographic variables, is more innovative compared to the Italian scenario which is still related to socio-demographic data. Therefore, four approaches to the most widespread segmentation in the UK for the performing arts audience (Ashton, D., & Gowland-Pryde, R., 2019), are presented: the “Culture Segments” approach of the British firm Morris Hargreaves McIntyre, the “Arts Audiences: Insights” proposed by the Arts Council of England, “Audience Spectrum” proposed by The Audience Agency, and “Mosaic” of the Experian company. The first model, “Culture Segments” (Morris Hargreaves McIntyre, 2019), there are eight identified segments, namely Essence, Stimulation, Release, Enrichment, Expression, Affirmation, Perspective, and Entertainment and the segmentation follows a logic based on the values and motivations that drive individuals to use, as emerges from the brief presentation of each segment below (figure 1):

1. Essence: includes well-educated professionals who are very active in fruition. For them, culture is an essential resource of personal fulfillment.
2. Stimulation: segment with subjects who wish to be updated on all initiatives and offers because they are always looking for challenges and stimulating experiences.
3. Release: includes individuals who are particularly dedicated to family and work life and who therefore must be encouraged to participate in order to distract themselves from the busy life they lead.
4. Enrichment: segment of people who choose cultural activities based on their interests and their nature, therefore highly motivated by the experience of the visit because it enriches their existence.
5. Expression: segment for which culture offers opportunities for self-expression and connection with people with the same interests and values.

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6. Affirmation: which includes individuals who wish to be perceived as participating in cultural activities to affirm their identity.
7. Perspective: individuals for whom the cultural offer must broaden their points of view and offer new perspectives.
8. Entertainment: segment open to a wide variety of leisure offerings and particularly dedicated to spending time in a pleasant way with their acquaintances.

Figure 1. Audience Spectrum Profiles

Source: <https://www.theaudienceagency.org/audience-spectrum>



The second segmentation model, “Arts Audiences: Insights” is based on the ACE’s assertion that not all people are the same or share the same behaviors, opinions, and motivations on cultural use (Arts Council of England, 2011). This model uses three groups of color codes based on the degree of engagement: highly engaged, some engagement, and not currently engaged. As we will see in the “Mosaic” model, this segmentation also proposes subgroups within each segment. The third model, “Audience Spectrum”, identifies 12 profiles on the basis of geographical variables, age, and on the basis of individu-

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als' predisposition towards cultural participation with respect to what they love to do in their free time. These profiles are: Metroculturals which includes frequent visitors to artistic realities; Commuterland Culturebuffs considered the "commuters of culture" for whom cultural participation is an integral part of social and family life and are strongly attracted to particular activities. They consider time precious and have the possibility to take part in them; Experience Seekers that include singles and young couples from 20 to 30 years old without children with a wide but not always deep engagement; Digital natives, well informed and available to the many alternatives on offer because they are always looking for new experiences to feed their social lives; Dormitory Dependables very large segment that includes families who have a predisposition to art and culture, but who participate little because they live in suburban and rural areas and which if encouraged could potentially have a great effect on the audience of an institution; Trips and Treats which includes young people who approach culture for mainly social and educational reasons, to be encouraged with pleasant activities and educational projects; Home and Heritage, elderly people who tend to live far from urban centers and who are not particularly involved for reasons of accessibility; Up our Street segment that includes subjects who live in the suburbs who could be introduced to cultural use by other members of their community and therefore should be involved with social and territorial initiatives; Facebook Families or young families under 50 with a degree of partial involvement, who often participate in cultural activities based on needs and availability; Kaleidoscope Creativity group of very different subjects, who prefer to take part in innovative artistic initiatives in places far from traditional cultural enjoyment; Heydays segment that includes retirees with a low inclination towards engagement, who participate in cultural activities once a year or even less and who, however, could reconsider cultural participation if they are offered a personalized experience that overcomes access barriers. Finally, the fourth segmentation model, "Mosaic", pushed more towards a hybrid profiling logic and is considered the solution to classify consumers in cross-channel marketing. It is a model that operates on existing trends such as "boomerang generation", "mid-life singles" and "retired people" to group the public using 15 classifications coded with letters and colors (from A - City Prosperity to O - Rental Hubs) each further broken down for a total of 62 classifications; however, strong limits have emerged in adapting the 62 categories identified with the existing socio-demographic descriptions of the public (Maitland, 2000).

Some other models are very suitable for use in museum profiling. The Bristol City Council Cultural Team used a model for user segmentation and analysis called the CACI Acorn model. Three subdivisions were therefore analyzed: Core Audience (already acquired people who have no problems in the museum experience), Priority Audience (underrepresented groups due to obstacles that prevent interaction with the museum), Niche audience (not interested, they can interact occasionally with the museum). One of the classic examples of public tests is the direct approach to the visit by a researcher with questions on a particular topic, usually during the exit phase of the visit. Using the CACI Acorn segmentation model it was therefore possible to obtain the proportions of the public of the museums analyzed by type, for example in the context of the Priority Audience it was possible to divide the public into three segments, Striving Families, Young Hardship and Struggling Estates.

5. DISCUSSION: THE PROPOSAL OF A MANAGEMENT MODEL

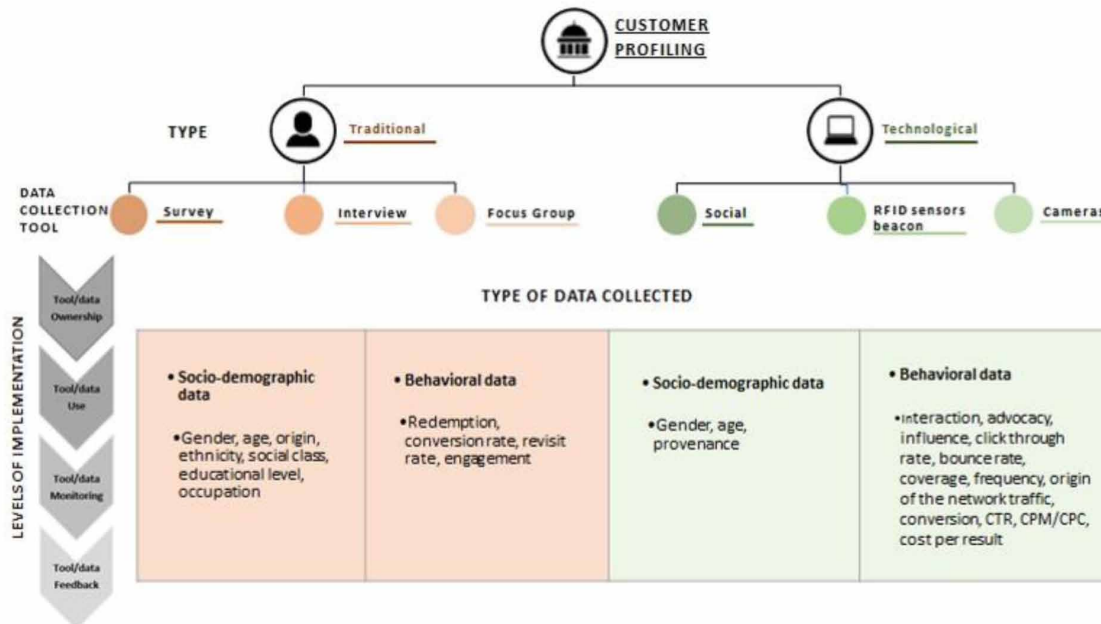
The analysis of the literature about customer profiling brought out some particularities and differences among the activities carried out by the organizations. Looking at the phenomenon from a managerial

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point of view, it has been possible to build a model which includes all the possibilities offered and implemented on the topic. Figure 2 summarizes and organizes the actual know-how on customer profiling strategies and activities.

Figure 2. The managerial model for customer profiling

Source: authors' elaboration



The model takes into account and puts together four dimensions of customer profiling: a first dimension regards the type of approach chosen, the second one is about the data collection tools which can be used by an organization through four levels of implementation (third dimension); finally, the last dimension is the one about the type of data collected, which is directly linked to the choice of variables to investigate (par.4).

First of all, about the first dimension, it emerged that there can be two different macro types, which we called approaches (par.2), in customer profiling: a traditional approach and a technological type.

The choice of the approach is relevant because the tools for data collection and, in part, the variables to investigate, depend on it. Going more in depth, this means that the third dimension about the levels of implementation is the only one in common between the two types of customer profiling.

In any case, it is important to underline that one approach is not exclusive: indeed, it is better for an organization to have both and to fill in as many parts of the model as possible. The ideal situation is when an organization can use both of them and cross the data collected to get more specific information.

The second dimension, as stated before, is the one related to the data collection tools that can be used. In the first approach, the traditional one, the literature speaks about three tools: the survey (we can anticipate here, that this one is the most used in Italy - par.6), the interview, and the focus groups.

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The data collection tools which can be used for a more technological customer profiling type are social media, RFID sensors, and beacons and cameras.

The different typologies of data collection tools have been investigated in the literature in relation to a more active customer profiling which involves users and a more passive one which observes users who do not know they are being observed (par.3).

The third dimension, as anticipated, is the only one in common between traditional and technological approaches and is represented by an arrow as it includes four levels of implementation of data collection tools: the first basic level requires the organization to be in possession of the data collection tools; the second that organizations make use of them, the third level that the use of data collection tools is monitored and, finally, the last level that, in addition, feedback on the use of them is collected.

The managerial model includes the type of data collected: a first classification can be done between socio-demographic and behavioral data. Both of the approaches collect both types of data with some differences: the traditional approach offers a more detailed socio-demographic identikit being able to collect information about gender, age, origin, social class, ethnicity, occupation and educational level while the technological/passive one can collect just three of them (gender, age, and provenance). On the contrary, the technological approach can be more detailed with behavioral data such as interaction, advocacy, influence, click through rate, bounce rate, coverage, frequency, origin of the network traffic, and conversion, while the traditional type of customer profiling can collect just a few of them. These observations further strengthen the idea that both approaches must be used in convergence with each other to maximize the potential.

6. NATIONAL ARCHAEOLOGICAL MUSEUM OF NAPLES (MANN): CASE STUDY

The National Archaeological Museum of Naples (MANN) is among the world's most important museums in the archeological field. The building that hosts the museum is from the nineteenth century and its collection includes works from Greek, Roman, and Renaissance times, and from the archeological site of Pompeii. The analysis of the annual reports and the strategic plan, point out how the museum is involved in some profiling activities. First evidence shows that the MANN partially takes up the first classification identified in the literature between traditional and technological approaches in user profiling (par.2).

6.1 MANN's Current Profiling Activities

From 2017, regarding a holistic strategy vision based on analysis and knowledge of their public, the museum started a sample investigation, what we could call a traditional profiling activity, in order to know some of the visitor's socio-demographic features (gender, age, origins). After the first trial at the end of 2017, for which there is no data collected, the investigation became stable from 2018 so it has been possible to collect more complete data about the audience.

The sample divided for gender, points out that, for both years, the women visitors were a higher percentage than men. Regarding the anagraphic division, the investigation found three ages of macro-classes (youths, adults, and elders). In 2019, the youth class had a decrease compared to the previous year: from 26.80% to 23.48%. The same happened for the elder's class: from 8.40% in 2018 to 6.58% in 2019. The minor presence of these two classes is balanced by the visitors of the adults' class, from 64.80% to 69.94%.

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As regards the macro-geographical origin areas of the MANN visitors, it is possible to note that, in both years, more than half of visitors are represented by Europeans; those coming from the rest of the world recorded a very slight decrease in 2019 compared to the previous year.

Both in 2018 and 2019, the most represented visitors to the MANN in terms of nationality seem to remain constant. In fact, excluding the Italian ones, French, American, British, and German visitors recorded the best performances. Compared to 2018, MANN nevertheless recorded an increase in French and German visitors in 2019.

As for the Italians, on the other hand, the provinces most represented in terms of entrances are those of Naples, Rome, Milan, Turin. The fifth place, on the other hand, in 2018 was occupied by the province of Bologna (3.9%), while in 2019 by the province of Bari (2%).

Concerning visitors from Campania, there is a large predominance of those residing in the province of Naples, which go from 84.90% in 2018 to 90.50% in 2019. Attendance from the province of Avellino is in sharp decline, which in 2019, recorded a decline of 3.2 percentage points; the same goes for the provinces of Benevento and Caserta. A slight increase in presence was recorded by the province of Salerno which went from 2.40% to 2.90%.

Some data about audience behavior has also been collected during the years. As for the paid services that the museum makes available to visitors, as in previous years, also in 2019 the most used service was the booking service (which recorded an increase of 111% from 2016 to 2019), followed by the guided tour service, whose sales from 2016 to 2019 more than doubled and, finally, the audio guides, which in the same period recorded an increase in requests and sales of 37%.

Finally, by comparing the data on paid services to the number of admissions, it is possible to observe that the usage rate goes from 18.27% in 2016 to 25.96% in 2019 (+ 7.69%) for bookings; the rate of use of the audio guide service goes from 4.39% in 2016 to 4.06% in 2019 (-0.33%), after a peak recorded in 2018. Finally, the use of the guided tour service passes from 2.81% to 4.23% (+ 1.42%).

As a technological form, MANN uses only the profiling online which captures information on the users in a passive way (par. 3). In 2019, the trend, which began in 2016, is confirmed, which sees the increase in users of the site and their interactions with it, with over 1.3 million accesses since it went online. In addition, in 2019, the site recorded the visit of just over 392,000 new users from Italy and the world, with over 140,000 new users compared to the previous year and over 250,000 new users more than in 2017.

As regards the demographic characteristics of the site's users, in the two-year period 2018 - 2019 there was a prevalence of male users over female. As for the geographical origin of the site's users, they mainly connect to Italy, with over 66% of accesses in 2017 and 71% in the two-year period 2018-2019.

The museum pursues the goal of increasing its degree of digital accessibility through intense activity on the main social networks. In 2019, the official profile of the MANN on Facebook recorded just over 45,800 fans (+ 40% compared to 2018 and + 227% compared to 2016), with a rating of 4.7 / 5 and a rather high capacity for involvement.

In the last four years, Facebook users who follow the MANN profile have been predominantly women (with an average of 66%, compared to 34% of men) and belong to younger age groups, confirming the museum's ability to attract the curiosity of those segments of the public that are usually more difficult to intercept by the cultural offer of a museum.

Finally, as regards the geographical origin of the museum's fans, the ten most represented cities see Naples at the top, then Rome and Milan, up to the tenth position occupied by Aversa, in the province of

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Caserta. At an international level, excluding the Italians, MANN fans are mostly Spanish, American, French, and Brazilian, up to the tenth position occupied by Mexicans.

Regarding the analysis of the museum’s social contents, thanks to the information obtained, it is possible to outline a digital strategy of the museum on its social media. In 2019, the museum strongly believed in the communicative power of images. In fact, the Instagram profile of the MANN records just over 63,000 followers (+ 77% compared to the same period in 2018 and + 600% compared to 2016), with a monthly average of posts rising to 11.8, starting from 7.3 in 2016. Finally, in the last three years, the museum’s Instagram profile has seen a very significant increase in the average comments and “likes” per post.

The MANN has also been on Twitter with its own official profile since December 2013, with the nickname @MANNapoli. On this profile the MANN in December 2019 recorded 8,761 followers (+ 39% compared to 2018 and + 338% compared to 2016).

The museum has been present on YouTube since 2019, with its own channel with 123 videos posted and 12,891 views and with an average of about 105 views per video. Among the YouTube users of the MANN channel there is a prevalence of women in the age segment between 18 and 54 years old.

On TripAdvisor, also in 2019, the museum obtained the “Certificate of Excellence” (issued to attractions that constantly get very positive reviews from travelers) and the overall reviews went from 3,400 in 2016 to 8,879 in 2019. In particular, the “excellent” reviews went from just over 600 in 2016 to over 5,430 in 2019. A similar increase was recorded by the “very good” reviews. Finally, the photos taken by visitors went from 1,666 in 2016 to 7,434 in 2019, recording a very significant increase. Finally, even on Google in 2019 there were almost 17,836 reviews (almost double compared to 2018), and against just 3,700 in 2017.

Table 4. MANN’s current profiling activities

| | Investigation | Paid services | Profiling online |
|--|--|--|---|
| Traditional vs technological approach | Traditional (counts on entries) | Traditional (counts of sales for service) | Technological approach (on social media) |
| Active vs Passive Profiling | Active (done by staff members) | Passive (obtained by the services data) | Passive (obtained looking to the data analysis) |
| The choice of variables: socio-demographic, psychographic and hybrid approaches | socio-demographic (gender, age, origins) | Psychographic (the type of services purchased) | socio-demographic (gender, origins) |

Source: authors’ elaboration

The summary table shows how the MANN stands regarding the profiling strategy examined. The investigation carried out on revenues is an action that involves a problem in terms of continuity: having dedicated staff represents a very demanding resource and done too partially, it can represent a risk of having a sample visitor that is too superficial to be able to derive significant and reliable data. A solution could be to use technologies that, thanks to sensors (for example cameras) and special software, can record the inputs and divide them into gender and age groups. However, this too would entail some limitations. The first limitation is represented by the difficulty in inferring the age of visitors: a software could at most make a division between children and adults, based on height. Knowing precisely how

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many children enter the museum would not be trivial information, but there would be a difficulty in determining the intermediate age segment, which is not clear whether they should be considered adults or children. In addition, adults who are too short could be detected as children. The height threshold to be set should therefore be very low to limit errors. The second limitation of this technological approach is represented by the impossibility of deducing the geographical origin and the language, which could perhaps be deduced at the time of issuing the ticket by providing the information brochures of the requested language. In this way, based on how many brochures were given and in what language, this information could be deduced. Consequently, it seems convenient to propose a hybrid model, active and passive, traditional and technological, which integrates different characteristics. Profiling done on paid services, such as the booking service, guided tour service, and the audio guides, can be further improved with very small surveys in the case of the booking service, which could provide socio-demographic data (gender, age, origins). The audio guides, if carried out with recent technological tools, could detect the languages used by visitors. Online profiling is carried out effectively, making information useful and complete. It could be implemented with a type of qualitative analysis on individual posted content.

6.2 The Improvement of MANN’s Profiling Activities

Reading the museum’s three-year plan, it is possible to analyze in detail how the institution wants to improve its profiling activity in the coming years (tab.2):

Table 5. How MANN will improve its digital strategy

| Actions | Tools | Objectives |
|---|------------------------------|---|
| Improve the data collections | Museum digital resources | Optimize the use of digital advertising campaigns for specific events |
| | Performance screening | |
| | Online reputation evaluation | |
| To do it, identifying the digital users’ typologies, to which the museum intends to address. | | |
| Recognize the importance of differentiating the message according to the subjects and the relative choice of tools. | | |
| ↓ | | |
| Use of the Internet of Things to detect preferences and cognitive relationships between works. | | |

Source: authors’ elaboration

In this perspective, there must be an improved technological profiling approach, with the use of a system to collect data relating to the use of the museum’s digital resources, to monitor the performance achieved as well as to evaluate the online reputation of the museum’s brand (for example, through Sentiment Analysis), also in order to optimize the possible use of digital advertising campaigns, to be carried out on the occasion of large exhibitions or events of particular importance. In the production and dissemination of digital content, it is therefore necessary to have in mind the characteristics and expectations of the different types of digital users to whom the museum intends to address. As in the case of visitors, it is no longer possible to consider the public of museums as an indistinct audience towards which it is possible to convey an undifferentiated message, but it is necessary to analyze and distinguish

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the different categories of users to whom the museum decides to address, refining their communication and the tools used precisely in accordance with their respective wishes.

Through the exploitation of the potential offered by the IoT and Artificial Intelligence, an automatic system for detecting the preferences can also be implemented, which, following an active profiling approach with the users, can allow the identification of the cognitive relationships that each user establishes between one work and another, paving the way for new paths of exploration of the permanent collections, following the psychographic variable into the user profiling process.

The museum must also provide for forms of periodic survey of the opinions and preferences of visitors, also through the administration of online questionnaires, linking the data collected with those collected in a systematic way by the ticket office staff during the access phase to the structure.

Table 6. The MANN profiling actions

| Preferences detection | |
|-----------------------|---------------------------------------|
| Online survey | Data collected from the ticket office |
| Data crossing | |

Source: authors' elaboration

Supporting the life of digital communities represents, for the MANN, a fundamental action in terms of audience development and must therefore be considered of equal importance compared to the other loyalty actions of its audiences. The creation of specific digital communities can also be linked to special projects.

The MANN will be able - and will have to - compete in the near future with many technological areas; among these, it seems possible to consider the possibility of promoting the implementation of projects that consider, even in combination with each other, three different areas: that of the IoT, the one related to the production and use of Big Data; that is connected to the domain of Artificial Intelligence.

Table 7. The MANN future aim in digital

| | Technological areas | Big Data | Artificial intelligence |
|---------------|---|--|-------------------------------------|
| Target | Supporting systems for the users' decisions (focus between the works relations) | Improving the cultural offer of fruition | Support IoT |
| How | BYOD – Bring Your Own Device | Extract data (e.g., socio-demographic) for entries, choices about services, or purchases | Give advice, even through a chatbot |

Source: authors' elaboration

In the first case, it is possible to imagine the development of support systems for the visitor's decision-making process, through the use of portable and/or wearable devices and sensors placed in support of the exhibited works. Activating a constant communication between the personal device of each visitor (therefore, according to the BYOD model - Bring Your Own Device) and the finds and materials of the permanent collections allows to continuously feed a dataset, through which to reconstruct the set of experiential relationships generated by the fruition behavior of each person visiting. In this way, it is

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possible to imagine the creation of an expert system that, also thanks to chatbots powered by Artificial Intelligence algorithms, can “recommend” customized tour itineraries, adjusting them in real time according to the behavior detected, maximizing the level of visitor satisfaction.

This information could also constitute the initial core of the Big Data heritage, to be integrated with other information sources: for example, those of a socio-demographic type to be collected during the access phase to the museum or the data generated by the use of social networks rather than by purchase choices of goods and services offered to accompany the user experience. The analysis and interpretation of these data could make it possible to further improve the effectiveness of the museum’s cultural programming, developing predictive activities of the future use behavior of its visitors.

For this reason, the Museum is aimed at visitors and users of all ages, incomes, backgrounds and origins, planning visit experiences, and innovative ways of use that stimulate the understanding of our origins and the awareness of our common roots.

The Mission of the Museum specifies that it intends to address not only visitors but also its users, who can have remote relationships with the museum and its scientific staff, to access the vast wealth of knowledge that the museum has. The social dimension of a museum also has a promotional value, as it increases the reputation and visibility of the institution, as well as the activities and events that it promotes and carries out within its spaces. MANN is therefore investing both in its own institutional presence, through a deeply revised site, which will be structured in an innovative way, using the new visual identity of the Museum; and also on its digital relational dimension, thanks to an information flow constantly conveyed through the various social networks, which the museum already uses or which it will decide to use in the near future. The Museum is currently present on social networks with its own Facebook profile, with a vote of 4.5 out of 5, 394 reviews and over 10,000 likes. There are also active channels on YouTube, Instagram, and Twitter (with over 2,000 followers). Digital resources relating to the Museum are also present on WikiMedia and on Flickr, with over 2,000 photos taken by users.

On TripAdvisor, the museum has obtained the “Certificate of Excellence” (issued to attractions that constantly get very positive reviews from travelers) and there are 3,400 reviews, with an average rating value of over 4 (613 reviews of excellence and 242 very positive judgments), out of a maximum value of 5. The Museum currently ranks twenty-second in the ranking of “things to do in Naples”. There are also 1,666 photographs taken by visitors. There are also numerous reviews on Google, with an average rating value of 4.3 stars.

It is the conviction of the Museum that the forms of cognitive accessibility must be progressively extended to the greatest number of types of public possible, in terms of use of languages and learning paths, also in consideration of the particular attitude and experience of the MANN, and specifically of its Didactic Service, to deal with the interculturality topic. In terms of digital accessibility, the Museum intends to carry out a general redefinition of its digital strategy, in order to optimize its online presence and to structure this presence in an integrated way, through an integrated design of the institutional website and social media.

The use of several communication channels must in fact respond to principles of technical and functional coherence in order to ensure that a clear and understandable, highly dynamic message is conveyed, capable of appropriately reaching the most diverse types of users and to allow them a fruitful interaction with the staff of the Museum.

The MANN assigns great importance to the need to adequately develop existing relationships with its public, whether current or potential. In this respect, the Museum intends to create a Permanent Observatory for its public, being aware of the need to introduce systems for detecting the quality of the user

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experience, so as to be able to promptly identify the presence of any critical issues from the perspective of visitors. In addition, the Museum is carefully considering the opportunity to periodically carry out survey activities on specific topics, in order to be able to focus on some aspects related to the visit experience, identified from time to time. Alongside this, there is the need to monitor with due attention the presence of the MANN on social media, also by collecting the various requests that will be addressed through the various digital communication channels that the Museum intends to use through a process of constant monitoring of the visit experience, and through field surveys conducted with different data collection methods (questionnaires, focus groups, observing surveys, etc.).

First of all, a new plan for the use of the collections and the building will be developed, through the design of new and innovative tour itineraries, which will be developed not only with reference to specific thematic areas, but also taking into account the different types of Museum public and their needs, based on the findings of field surveys and listening activities. The itineraries will therefore take into account the specificities of visitors from a demographic point of view (children, teenagers, young adults, adults, seniors), the different level of cultural preparation (newbies, enthusiasts, experts), and the specific needs of particular types of users (visitors with visual and/or hearing impairments), for which specific mediation tools will be created.

Particular attention will be paid to the younger public, providing not only specific visits and laboratory activities, but also spaces for discussion in order to investigate their point of view on the Museum and collect information on topics to be developed or explored either on exhibition methods and communication areas to be privileged (MANN4KIDS project). In this respect, MANN is studying the possibility of creating a video game aimed at making the exploration of the Museum emotionally engaging, with the aim of combining educational intentions with the active participation of the child during his or her experience of use.

In conclusion, compared to the model proposed, the case analysed, the MANN museum seems to consistently use many of the tools proposed, such as questionnaires, interviews, and the analysis of data relating to social media. Further improvements could be made with the establishment of focus groups and the use of cameras and RFID sensors and beacons to better get into the specifics of some topics thanks to a hybrid choice of variables both socio-demographic and psychographic, and to do that, MANN will need to increase both human and technological resources.

7. CONCLUSION AND FUTURE RESEARCH

The analysis of the profiling approaches applied to the museum sector, made it possible to draw a map of the most useful ones and to build a holistic model related to them. From a theoretical point of view, this chapter, by the categorization of the literature review, offers a detailed and comprehensive contribution to the scientific community creating links between independent and distant studies. The management model proposed is both useful for researchers who are looking for an organized summary about the topic and for managers and practitioners who need to analyse and test user profiling strategies carried out by museums. This original model offers the possibility to check how many user profiling tools have been used, or at which level of implementation the strategy is and fill the gap or build improvement paths. Certainly, from a practical point of view, profiling is an operation that requires an important use of resources from the museum institution, but it can provide essential information to guide the policies and management of cultural institutions. Intercepting new audiences and consolidating the relationship

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with the acquired public is something fundamental for cultural subjects. It is precisely for this purpose that profiling is an important tool, because a modern museum will be able to attract its public more by involving it as much as possible and to do so, profiling seems an indispensable tool. Regarding future research, studies could focus on other businesses or fields of science and profiling studies could better integrate traditional tools and technological devices, with the aim of analyzing visitors' behavior even more, and therefore giving greater attention to both socio-demographic and psychographic variables, filling a gap in the audience profiling related to hybrid approaches not yet tested. In conclusion, the use of this model in other fields of science could offer the possibility to detect other elements, perhaps not detected in the cultural heritage sector, and improve the model and the knowledge about user profiling, essential for customizing the service and developing the audience.

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