

## **DRIVING TRAFFIC TO THE MUSEUM: THE ROLE OF THE DIGITAL COMMUNICATION TOOLS**

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## **Abstract**

The emergence of new technologies is revolutionizing the way organizations communicate and interact with consumers, and the tourism industry, including museums, is no exception. Thus, the use of digital communication tools has become widespread, significantly expanding the horizons of communication. Previous studies show that museums use different digital communication tools to enhance the user experience and generate visitor traffic to the museum. However, they focus on a single digital communication tool, such as a website or social networks. This research aims to analyze the combined impact of websites, social networks and virtual communities as traffic generators to museums. Using a qualitative comparative analysis technique (fsQCA), a sample of 17 international museums was analyzed. The results show that social networks and virtual communities together play a significant role in visitor footfalls in museums. This research contributes academically to the knowledge and explanation of the effects of digital communication tools. Finally, both theoretical and managerial implications are considered.

**Keywords:** digital communication tools; museum traffic; cultural tourism; new communication technologies; fsQCA.

## **1. INTRODUCTION**

Cultural heritage is considered a product of the tourism industry that has enormous potential for commercialization (Kabassi, 2019). Museums are among the most socially valued cultural institutions, and since the late 1980's, the number of visitors have been increasing (Poulot, 2005). These institutions qualify as experiential settings because they offer their visitors several social and experiential benefits (Kotler, 2001; Manna and Palumbo, 2018).

For most of the 20th century, museums were regarded as institutions that collected, preserved, researched, interpreted, and displayed social material culture. By the end of the 20th century, museums had changed from collection-driven institutions to visitor-

centered ones (Samis and Michaelson, 2016), competing in an expanding leisure market (Pallud and Straub, 2014). Museum visitors seek entertainment and new experiences (Davidson and Sibley, 2011), and their behavior as consumers of culture is similar to that of consumers of other leisure products. Furthermore, recent studies have shown that not all museum visitors have strong cultural interests (Coghlan, 2018); in fact, their behavior as consumers of cultural attractions is part of their consumption of entertainment products.

In the digitalized society, the Internet has changed the way organizations communicate with their audiences, and museums are no exception. The Internet has generated a wide range of tools for communication and public relations; although they initially functioned as mass media, fundamentally, they are tools that facilitate interaction and relationship-building between organizations and their public through interactive and collaborative resources and platforms (Cuomo et al., 2021). Among others, digital media has been proposed to be a key element in the engagement and satisfaction of higher visitors (Light et al., 2016; Zollo et al., 2021). These media are becoming outstanding, affordable, and interactive communication tools for museums due to the high consumer engagement that arises through electronic word-of-mouth (eWOM) and networked interaction (Li et al., 2021). Using digital communication tools, museum experience and communication as well as visitor engagement can be significantly enhanced. In addition to this, social media is valuable for the museum's brand value as well as visitor satisfaction and engagement (Manna and Palumbo, 2018). These efforts made through digital communication will aim to increase the awareness and attractiveness of the museum and to potentially increase the traffic to the museum, both physical and virtual (Claes and Deltell, 2019). Given the importance of digital media communication—which has only been studied individually in the context of museums so far—this research aims to shed light by addressing their effects on visitor traffic.

Museums are thus challenged to adopt the most appropriate tools of communication technology to meet the needs and expectations of their users (Mas and Monfort, 2021). Despite most museums having adapted to the new formats by progressively implementing interactive sources, different studies indicate that many museums still have a low level of interactivity on their websites, both regarding the tools used to present information and the resources available for interaction with virtual visitors (Capriotti et al., 2016; Garcia-Madariaga et al., 2019). Essentially, museums are not taking full advantage of the

potential of digital media, and their communication with visitors is still relatively backward (Li et al., 2021).

In the current context, where there is an increase in visitors with a strong digital profile and no major cultural interests, there has been a growing interest in analyzing the factors that explain the affluence of visitors to museums. In this regard, the evaluation of digital communication tools, such as online museum websites (Garcia-Madariaga et al., 2019), social networks (Camarero et al., 2018), and virtual communities (Fernández-Hernández et al., 2020) have become a trend and an indispensable tool for the management of museums (Kabassi, 2019). Although there is abundant literature that analyzes each of the digital communication tools individually, to the best of our knowledge, no previous research has analyzed the combined impact of digital communication tools used by museums on physical visits.

The objective of this research is to identify which combinations of digital communication tools are the most appropriate for generating traffic to the physical museum. This paper specifically analyzes the joint impact of websites, social networks, and virtual communities on museums. This study is relevant for two important reasons. First, the relevance of digital communication in all sectors to generate a connection with the public favors its capacity to influence the decision process and increase reputation. Second, the challenge facing the cultural industry, and the museum industry in particular, is to implement digital tools that meet the needs of visitors as the industry competes with other increasingly competitive leisure activities.

This paper is organized into three parts. It begins with a review of literature and then formulates the research questions. Next, the design of the study and methodology are described. Finally, the results, discussion, and conclusions are presented.

## **2. LITERATURE REVIEW**

Previous research on the tools for digital communication has incorporated different well-known theories to explain the personal and social behavior of Internet users (Ngai et al., 2015). In this regard, the social influence theory (Kelman, 1959) has been applied in a large number of studies to analyze the social behavior in a wide variety of settings. Social influence is defined as the change in an individual's thoughts, feelings, communication, or behavior resulting from the thoughts, feelings, communication, or behavior of one or

more people (Kim and Hollingshead, 2015). At present, consumers rely more on the anonymous opinions of peers (subjects, known or unknown, perceived as equals) who share information and experiences through the Internet. Social influence comes in many forms and represents a key factor in the decision-making process according to Book et al. (2016) and Oliveira et al. (2020).

Regarding personal behavior, the theory of planned behavior (TPB) (Ajzen, 1991), which is an extension of the theory of reasoned action (TRA) (Ajzen and Fishbein, 1980), has been one of the most influential and well-researched theories for explaining a wide range of behaviors (de Graaf et al., 2019). According to TPB, the main determinant of a behavior is behavioral intention; this, in turn, is determined by attitude, subjective norms, and perceived behavioral control. According to Brown et al. (2010) and Joo et al. (2020), the Ajzen TPB theory has been validated through multiple research works to explain the impact of social network on the purchase intention of consumers, including in the field of tourism.

These theories form the foundation for understanding the effects of digital tools on the behavior of Internet users in a wide variety of situations, including visits to museums. However, the literature suggests that not all digital tools generate the same effects or with the same strength, and most of the previous studies reviewed focused only on the effects of a single digital tool.

The following sections will discuss the main digital tools studied in museum literature.

## 2.1. Website

A museum website plays an important role in attracting future visitors, both physical and virtual (Kabassi, 2019; Pallud and Straub, 2014). In recent years, museums have begun to develop their websites actively to generate a more collaborative and interactive relationship with their various audiences and to enhance visitor interaction with their virtual and physical collections (Capriotti et al., 2016; Lopatovska, 2015). In fact, often, the most common reason for visiting a museum website is to plan an upcoming visit to the physical museum (Villaespesa, 2018).

Virtual visitors expect museum websites to enable and promote learning as well as to be functional, easily navigable, visually pleasing, and enjoyable (Lin et al., 2012). In this

regard, the websites of organizations have been in constant evolution for two decades, changing from the informative instruments of the beginning to the conversation or dialogue tools of the present (Capriotti and Pardo, 2012). This evolution has facilitated access to wider and more diverse user groups and led to a significant increase in the number of visitors to museum websites (Johnson, 2008).

Despite efforts, many museums have had difficulties with a large number of users visiting their sites but staying only briefly. For example, Walsh et al. (2020) found that approximately 60% of the users leave the website within ten seconds. To improve interest and access, many museums are adopting a user-centered approach that will help them better understand their online visitors and recognize that different types of users use the website differently, with the main user groups being "the general public" and "non-professional" visitors who comprise approximately 76% of the total visitors (Walsh et al., 2020).

The quality of a museum's website generates a significant positive effect on visitor attitudes and, consequently, attitudes on behavioral intentions (Li et al., 2021). On the other hand, Wang et al. (2015) found that website quality has a positive influence on the perceived trust of users. Similarly, Garcia-Madariaga et al. (2019) emphasized the importance of website quality as a driver of e-loyalty and trust in museum websites.

Regarding website design, past research indicates that websites with effective design attributes attract more traffic than those with poorly designed elements (Hasan, 2016). Pallud and Straub (2014) concluded that aesthetics are the most important design criteria for experiential interfaces and that website design influences the intention of visiting a physical location. Moreover, the authors found a direct relationship between intention to return to the website and intention to visit the museum. This suggests that visitors who have a good experience with a museum website and intend to return to this website develop a greater interest in the museum's collection. This result also supports Kotler's notion (2001, p.422) that "building well-designed websites is another avenue for museum experiences beyond the museum walls." In fact, museum websites represent an alternative for people who may be interested in museum content but are unable or unwilling to visit the physical environment.

In short, in the current "experience economy" (Pine and Gilmore, 1999), museums are redesigning their websites to emphasize the differentiation of their services, improve

interaction with visitors, and increase user loyalty. With regard to this, different studies have evaluated the transition process of museum websites from static spaces for the dissemination of information (Web 1.0 sites) to platforms for interaction and dialogue between museums and the public (Web 2.0 sites) (Capriotti et al., 2016).

## 2.2. Social networking sites

Social networking sites are a valuable tool for encouraging user participation and user-generated content (Baker, 2017) to engage with organizations. Organizations use social networks to optimize the functions they perform, mainly dissemination, by interacting and sharing information with their audiences (Waller and Waller, 2019). Social networks enable institutions to manage client relationships as well as generate and maintain a brand-based community (Camarero et al., 2018). They favor a participatory communication model based on dialogue and conversation between museums and their target audiences while allowing interaction between audiences and other users (Bertacchini and Morando, 2013).

Cultural organizations, specifically museums, must ensure that they communicate their content and provide enjoyable experiences for audiences (Sundar et al., 2015). Communication through this digital tool can focus on two main aspects. One is disseminating the museums' own content, such as collections, exhibitions, and activities that encourage a more interactive, collaborative, and conversational relationship. The other is to promote dialogue and interaction with their audiences and among them (Capriotti and Losada-Díaz, 2018), which has favored the rapid development and implementation of these platforms in cultural institutions.

The implementation of these technologies in museums is in its nascent stages, so there are only a few studies that have focused on how social networks influence museum audiences to go on a physical visit (Griffiths et al., 2008; Loran, 2005). However, other studies have analyzed their influence on visitor engagement (Romolini et al., 2020) or how users associate their life experiences with those of others (Russo et al., 2009). This shows the growing importance of social networks as a communication tool that museums can use to relate to their audiences, collect their comments, get to know them personally, and establish future relationships to know their preferences (Claes and Deltell, 2019).

User-generated content can help generate statistics that provide the museum with additional information for strategic decision-making (De la Peña Aznar, 2014).

Of all the present social networks, Facebook is the predominant platform in terms of the number of users, with over 2,449 million active users worldwide per month (Statista, 2020). Recent studies have shown that museums' communication strategies on Facebook that encourage visitor participation (Camarero et al., 2018) and establish a dialogue with them (Capriotti and Losada-Díaz, 2018) are quite effective. The second most-used social network in relation to museums is Twitter. Since most Twitter users are between the ages of 18 and 29, it offers museums a way to connect and interact with a population that rarely visits museums (Baker, 2017). The brevity of the contents shared on Twitter helps it connect with a younger public looking for concrete and easily assimilated data (Expósito et al., 2017). There is a growing interest among museums in exploring the use of Twitter to attract visitors and improve public engagement (Kydros and Vrana, 2021).

### 2.3. Virtual communities

Virtual communities emerge as digital tools on the Internet, generating social reputation and engagement. People are interested in participating in these virtual communities to meet their needs and expectations (Zheng et al., 2013), with the aim of interacting, communicating, and collaborating to feel like they are a part of a collective that receives and gives as well as to generate a sense of belonging since they have common interests, desires, or experiences (Owens, 2012).

In recent years, consumer-generated content in virtual communities have become increasingly important as part of the decision-making process of purchases. In this regard, consumers actively seek the opinion of others in situations where the decision-making process is compromised by the abundance of alternatives and the lack of time and capacity to examine all data or compare all options to manage the perceived risks in decision-making (Fernandez-Lores et al., 2020).

The remarkable contribution of virtual communities to museums lies in the influence of eWOM, which acts as a powerful and durable communication mechanism that individuals can access from different places through the Internet. This makes it possible for different users to transmit their ratings simultaneously on the same website (Reimer and Benkenstein, 2016).

Earlier research on the impact of eWOM has found that it affects users through attitude formation (Doh and Hwang, 2009), purchase intent (East et al., 2017; Mahmud et al., 2020), product sales (Lee and Choeh, 2020; Li et al., 2019), and the reputation of organizations (Nisar et al., 2020).

TripAdvisor is a good example of this new reality of virtual communities that are used to share experiences, emotions, opinions, evaluations, images, and diverse information (Peng et al., 2018), representing a new means to encourage eWOM communication through the Internet (Rodríguez-Díaz et al., 2018). The TripAdvisor virtual community has become a worldwide reference for anyone who wants to organize their leisure time and the places to visit in that time (Sann et al., 2020). At the museum level, users share experiences and rate them, which can influence the decision of other users to visit museums (Lamb et al., 2020; Zanibellato et al., 2018). Thus, eWOM shows the behavioral response of the public regarding their satisfaction or experience during their physical visit.

Although research on eWOM in service industries has increased in recent years (Sann et al., 2020), few studies have explored the impact of eWOM in museum marketing literature until recently (Zanibellato et al., 2018). This is surprising considering that user opinions about museum experiences are constantly increasing and that there is a growing trend of generating content about museums and theaters in popular virtual communities (Hausmann and Poellmann, 2016). Few studies in the literature in recent years analyze the attributes of museums that impact the experience and satisfaction of visitors and its effects on the generation of eWOM in visitors (Conti et al., 2020; Orea-Giner et al., 2021). Meanwhile, Lamb et al. (2020) focused on analyzing the impact of the cultural differences of visitors on the generation of online reviews.

In short, social media plays a fundamental role in the tourism and leisure industry, in which virtual communities—such as TripAdvisor—are very important. Consumers qualify, score, and, above all, freely transmit their own feelings and experiences, motivating other consumers and generating confidence in them (Jeacle and Carter, 2011).

The literature review shows that museums use different digital communication tools to improve the experience of their users and generate traffic to the physical museum. However, most of the research conducted has been focused on a single digital tool and has often not explored its impact on physical visits to the museum. In particular, the studies that reviewed the website focused mainly on exploring the impact of factors such

as the quality or design of the website on the user experience. As for social networks, the literature review shows the relevance of this communication tool to relate to their audiences, enhance engagement, and attract visitors. Finally, most of the studies related to virtual communities focus on identifying the impact of eWOM and exploring the factors that influence content generation. Essentially, despite the growing number of studies that analyze digital tools in museums, there are few studies that identify the impact of these communication tools on physical visits to museums. Furthermore, we have not found studies that analyze the joint impact of these tools. From this perspective, we formulate the following research questions: How do different digital communication tools work together to drive visitor traffic to the museums? How are they combined? Are there combinations of digital communication tools that have greater impacts on generating visitor traffic to museums?

### **3. METHODOLOGY AND DESIGN**

Fuzzy-set qualitative comparative analysis (FsQCA) is a "configurational approach" primarily developed by Charles Ragin (Ragin, 2000) to solve an essential problem presented by cross-case analyses; it preserves the heterogeneity of cases as complex configurations of causal factors while concurrently allowing for the systematic examination of similarities and differences in causal factors across many cases. Additionally, fuzzy sets provide a flexible translation between qualitative and quantitative characteristics because discrete variables are transformed into a continuous degree of "belonging" or "membership" while continuous variables are reinterpreted as the presence or absence of a specific feature. According to Woodside and Zhang (2013), fsQCA bridges quantitative and qualitative examination to enable contributions explaining complexity at the case level and generality across cases. Social researchers, in the broadest sense, are showing an increasing interest in fsQCA because this method eases case comparison through quantitative reasoning.

According to Abbate et al. (2019), the three following features make fsQCA appropriate for addressing our research questions and analyzing our cases:

a) It offers a systematic way to analyze complex causality and logical relations between causal factors and outcomes (Misangyi and Acharya, 2014).

b) It combines detailed within-case analysis and formalized systematic cross-case comparisons. In doing so, it reveals patterns of association across sets of cases, which provide support for the existence of such causal relations (Ragin, 2000).

c) It comprises an analytical approach and set of research tools that have been usefully applied to small and medium-sized research designs (Ragin, 1987).

Accordingly, fsQCA seems appropriate to analyze, on the one hand, the combinations of conditions that produce a specific level of visitors to the museum and, on the other, the groups of cases or projects our small-N nature sample share in a given combination of conditions.

The present study uses fsQCA to identify configurations of conditions that support high and low levels of affluence of visitors to museums in the following three steps (Ragin, 2000, 1987):

a) Based on an existing theory, we identified outcome measures and conditions.

b) Thereafter, we coded cases and calibrated the set membership from “0” to “1” to indicate full membership, full non-membership, and the crossover point.

c) Finally, we constructed the truth table with  $2^k$  rows, where  $k$  is the number of causal conditions used in the analysis. We then reduced the number of truth table rows based on minimum acceptable solution frequency and minimum acceptable consistency to generate the simplified combinations.

The analysis was conducted with the fsQCA 2.5 software package (free version).

### 3.1. Sample and data source

To properly define the case studies that comprise the sample, the six most-recognized international rankings were screened: two with professional rankings (The Art Wolf and TEA/AECOM), two from user opinions (TripAdvisor and Minube), and two from informative cultural magazines (National Geographic and Muy Interesante). A total of 47 museums were cited at least once in these rankings. To consolidate the six rankings, a single list was constructed, assigning a score to each museum according to its position. The first 20 positions on this new list were pre-selected as a sample, out of which two were eliminated due to lack of data and a third was eliminated because it was not a museum but a memorial. Thus, the definitive sample included 17 international museums (Table 1).

Table 1. Museums included in the study

<b>MUSEUM</b>	<b>CITY (COUNTRY)</b>
Louvre	Paris (France)
The Metropolitan Museum of art	New York (U.S.A.)
British Museum	London (Great Britain)
Vatican Museums	Vaticano (Vatican)
State Hermitage	St. Petersburg (Russia)
National Gallery	London (Great Britain)
Museo del Prado	Madrid (Spain)
Tate Modern	London (Great Britain)
Acropolis Museum	Athens (Greece)
Musee d'Orsay	Paris (France)
National Gallery	Washington (U.S.A.)
The Egyptian Museum	Cairo (Egypt)
Uffizi Gallery	Florence (Italy)
Museum of Modern Art (MOMA)	New York (U.S.A.)
National Palace Museum	Taipei (Taiwan)
Santa Sofía	Istanbul (Turkey)
Museo Reina Sofía	Madrid (Spain)

To understand the role of the three main digital tools, five representative metrics were included as conditions in the study (Table 2). Data for 2019 was collected using the SEMrush software—a digital analysis tool—along with the information available in official museum profiles on social networks and annual reports.

Table 2. Conditions and outcomes

<b>Conditions</b>	<b>Label</b>	<b>Sources</b>
Web Visits	WAUDIENCE	SEMrush
Pages/visit	WTIME	SEMrush
Reviews on Tripadvisor	REWTRIP	Tripadvisor profile
Likes in Facebook	LIKESFB	Facebook profile
Followers in Twitter	FOLLTW	Twitter profile
<b>Outcome</b>		
Visitors	TRAFFIC	Museum annual report

### 3.2. Calibration of set memberships

The use of fuzzy sets requires the calibration of the values into fuzzy values between 0 and 1. This process is based on the degree of membership of the conditions using three breakpoints (Ragin, 2000): 0.95 marks the point of full membership; 0.05 is the point of full non-membership; and the cross-over point is 0.5. Value 0 indicates that the condition is fully outside the set, value 1 indicates full membership of the set, and 0.5 usually is considered the point of maximum ambiguity.

For each calibration, following Misangyi and Acharya (2014), we set the thresholds based on the direct method of calibration in the fsQCA software to transform measures into set memberships. In this study, there was no prior knowledge; we used the 75th and 25th percentiles as cut-offs to determine full presence and full absence, respectively, and the 50th percentile was used to establish the point of maximum ambiguity (Nieto-Aleman et al., 2018). Table 3 summarizes the underlying measures used to capture each of the various digital communication tools: the calibration thresholds for each fuzzy set and selected descriptives of the underlying measures.

Table 3. Summary data for independent variables (conditions) and outcomes

<b>Conditions (Label)</b>	<b>Fuzzy set calibration</b>			<b>Measure descriptives</b>		
	<b>Fully in</b>	<b>Crossover</b>	<b>Fully out</b>	<b>Mean</b>	<b>Median</b>	<b>SD</b>

Web Visits (WAUDIENCE)	1800000	749200	361800	1375215.79	749200	1468941.97
Pages per visit (WTIME)	3.79	3.15	2.74	3.25	3.15	1.14
Reviews on Tripadvisor (REWTRIP)	54581	36775	10205	34275.05	36775	26960.19
Likes in Facebook (LIKESFB)	1189256	517091	72252	802729.15	517091	793023.99
Followers in Twitter (FOLLTW)	2000000	723900	194	1289115.74	723900	1743410.43
<b>Outcome</b>						
Visitors (TRAFFIC)	6770000	4426000	3400000	5008085.05	4426000	2676433.25

#### 4. RESULTS

Table 4 presents an analysis of the necessary conditions. All the antecedent conditions are below the threshold of 0.90; as such, none of the conditions are necessary for the outcome of interest (high or low level of visitors to the museum, TRAFFIC, and ~TRAFFIC). Nevertheless, the values suggest that the present (or high levels) of likes in Facebook (LIKESFB) and absence (or low levels) of pages or visits (~WTIME) are more closely related to high levels of visitors (TRAFFIC). Regarding the absence of visitors (or a low level of them, ~TRAFFIC), the figures are not clearly related with any condition.

Table 4. Analysis of necessary conditions

CONDITION	TRAFFIC		~TRAFFIC	
	Consistency	Coverage	Consistency	Coverage
WAUDIENCE	0.607820	0.621065	0.453271	0.469734
~WAUDIENCE	0.481043	0.464531	0.634346	0.621281
WTIME	0.337678	0.405983	0.634346	0.773504
~WTIME	0.811611	0.686373	0.512850	0.439880

REWTRIP	0.577014	0.570926	0.529206	0.531067
~REWTRIP	0.526066	0.524203	0.572430	0.578512
LIKESFB	0.760616	0.603412	0.536215	0.489339
~LIKESFB	0.432464	0.479003	0.565421	0.635171
FOLLTW	0.632701	0.632702	0.476636	0.483412
~FOLLTW	0.483412	0.476635	0.637851	0.637850

Note: According to the current convention, uppercase letters signify the presence of a condition or outcome, while uppercase letters preceded by the symbol ~ show the absence or the negation of a condition or outcome.

Once the necessary conditions were analyzed, the truth table was determined. The truth table has 32 rows ( $2^5$  because five different causal conditions are present). Following Ragin and Fiss (2008), fsQCA reports present three solutions to each truth table analysis: (1) a "complex" solution that avoids using any counterfactual cases (rows without case "remainders"); (2) a "parsimonious" solution that permits the use of any remainder that will yield simpler (or fewer) recipes; and (3) an "intermediate" solution that uses only the remainders that survive counterfactual analysis based on theoretical and substantive knowledge, which is inserted by the user. Intermediate solutions are usually the most interpretable, but parsimonious solutions show which conditions are essential for distinguishing between positive and negative cases. Those attribute configurations that are part of both intermediary and parsimonious solutions are referred to as core conditions, whereas those present in intermediate but not in parsimonious solutions are referred to as complementary conditions. Eventually, the presence of a condition is indicated by a black circle "●", whereas its absence is indicated by an open circle with a cross "⊗".

Table 5 shows each of the three causal combinations that can lead to the same result: high levels of traffic to the museums (TRAFFIC) and low levels of traffic to the museums (~TRAFFIC). Measure of consistency and coverage are reported using the parsimonious solution (presence of traffic, TRAFFIC) and intermediate solution (absence of traffic, ~TRAFFIC).

Table 5. Analysis of the conditions supporting high or low level of visitors

	TRAFFIC*			~TRAFFIC**		
	M1	M2	M3	M4	M5	M6
WAUDIENCE				⊗	●	●
WTIME	⊗	⊗	⊗	⊗	⊗	●
REWTRIP	⊗	●	●	⊗	●	●
LIKESFB	⊗	●		⊗	⊗	●
FOLLTW			●	●	⊗	●
Raw Coverage	0.252	0.447	0.444	0.10	0.12	0.15
Unique Coverage	0.183	0.014	0	0.07	0.09	0.13
Consistency	0.763	0.891	0.964	0.92	0.94	0.94
Total Coverage	0.643			0.34		
Total Consistency	0.817			0.944		

\* Parsimonious solution is presented. \*\* Intermediate solution is presented.

On examining the presence of high levels of traffic to the museums (TRAFFIC), the coverage of the overall parsimonious solution is equal to 0.643, which explains the percentage of observations that can be explained by a particular combination of conditions. The consistency of the overall solution is 0.817, indicating the reliability of the model. Both indicators show adequate values in their coefficients (Muñoz and Kibler, 2016). On the other hand, both complex and intermediate solutions for TRAFFIC present the same three models. The coverage for both solutions is 0.597, and the consistency is 0.942. In general, the consistency and coverage of the general solutions are very reasonable.

Similarly, on analyzing the absence of high levels of traffic to the museums (~TRAFFIC), the results for the intermediate solution show three models. The coverage of the overall solution is 0.34, and the consistency is 0.944.

The analysis of the three models leading to high levels of traffic to the museum (TRAFFIC) indicates that a low time spent on the website (~WTIME) is a condition for achieving the outcome. Virtual community (REWTRIP) is present in two of the three models, specifically in the two most explanatory ones (M2 and M3). Meanwhile, the social network alternate is either Facebook (LIKESFB) in M2 or Twitter (FOLLTW) in M3. It is remarkable that the absence of WTIME, REWTRIP, and LIKESFB conditions also lead to a high level of visits to the museum, albeit with a lower explanatory power. Finally, the number of visits to the web (WAUDIENCE) does not seem to be a condition for driving visitor traffic to the physical museum.

Regarding the models explaining low levels of traffic to the physical museum (~TRAFFIC), in contrast to the previous models, all five conditions included in the analysis are considered. Thus M6—the most explanatory model—includes the presence of all conditions. Surprisingly, contrary to M6, M4—the model with the least explanatory power—includes the absence of all conditions except the presence of Twitter. In other words, both the combination of all the conditions present and the absence of all of them except Twitter explain the low levels of physical traffic to the museum. Finally, M5 combines the presence of a high number of visits to the website (WAUDIENCE) and reviews on Tripadvisor (REWTRIP) with low levels (absence) on Facebook (~LIKESFB) and Twitter (~FOLLTW), giving low levels of physical traffic to the museum.

An examination of the museums that present membership in each configuration can also bring some insights. For instance, the Egyptian Museum (Egypt) and Museo Reina Sofia (Spain) are included in the first configuration (M1). The Louvre (France), the Metropolitan Museum of Art (U.S.A.), and the British Museum (Great Britain) are in the second configuration (M2). The third configuration (M3) includes the National Gallery in London (Great Britain), and the fourth configuration (M4) consists of the National Gallery in Washington (U.S.A.). Musee d'Orsay in Paris (France) is present in M5, and Museo del Prado in Madrid (Spain) is present in M6.

## **5. DISCUSSION**

This study contributes to a better understanding of the role of different digital communication tools used by museums to improve the experience of visitors and generate traffic to the physical museum. Specifically, this research focuses on how different digital

communication tools work together by combining their effects. This research seeks to ascertain whether the use of a museum's own website, different social network profiles, and presence in virtual communities can provide an explanation for the high or low levels of traffic to the physical museum.

The results suggest that two of the three digital tools studied, i.e., social networks and virtual communities, can be important in driving visitor traffic to museums, whereas the website does not seem to play the same role. The configurations for high levels of visitors to the museum include high levels of these two digital tools but low levels of pages per visit to the website. Surprisingly, the number of visitors to the museum's website does not contribute to the generation of traffic. This may be explained by the kind of effect generated by the tools studied. Thus, social networks and virtual communities are the propitious place where social influence is created and exercised, which triggers eWOM and engagement. However, websites, with their informative content, seem to focus on generating an attractive aesthetic experience that promises a good physical experience, thus encouraging visits. This insight advances the understanding of different roles played by digital tools in managing the communication of museums.

In addition to these findings, first, virtual communities play a remarkable role by appearing in the most explanatory models (M2 and M3). This result is consistent with previous research that highlighted the power of social influence and reinforced the use of such tools. Second, it is interesting to note that social networks contribute to the generation of traffic but in an individualized way (or Facebook or Twitter), as M2 and M3 indicate. Finally, despite the large differences in the number of users between Facebook and Twitter, both produce a similar effect with almost equal explanatory capacity. It is likely that this effect is related to user profiles: Facebook is used by older people with a more generalist orientation as compared to Twitter, which is used by younger people with a more specific usage. Hence, virtual communities and social networks are indispensable references for future visitors and are supported by peer opinions. This result relates to the existing literature on the planning of visits to museums (Baker, 2017; Fernández-Hernández et al., 2020).

However, websites do not seem to have attained the importance that literature assigns to them with regard to the behavior of future visitors. Although the benefits of adopting information and web technologies in museums have been highlighted by many researchers (Garcia-Madariaga et al., 2019; Lopatovska, 2015), the use of technology is

not successful sometimes. In fact, in our study, none of the web-related conditions seem to play a positive role. On the one hand, its role of expanding the audience seems to have a negative effect as high numbers of web visitors do not appear in the models with higher physical traffic. This questions the previous research that claimed that by widening the audience of museums through websites, the number of physical visits would grow. On the other hand, short web visits appear as a condition in high traffic models, and conversely, long web visits appear in low physical traffic models. This calls into question the role of web design and experience as a potential driver of physical visits (Hasan, 2016; Pallud and Straub, 2014), but it also slots into previous research as Walsh et al. (2020), pointed to patterns of use that are purely informational rather than cultural in nature (Coghlan, 2018). Accordingly, previous studies indicate that most museums have a very low level of interactivity without exploiting the potential of the web to foster the interaction and active participation of users (Capriotti et al., 2016). Therefore, website as a communication tool seems to be far from the desirable relationships of collaboration and interactivity between museums and visitors. Many researchers have, hence, highlighted the need to evaluate and improve factors such as usability, design, or interactivity of museum websites to provide the visitors with more than just information on their website (Pallud and Straub, 2014; Kabassi, 2019).

Similarly, the results highlight the existence of contrasting models in the management of digital communication tools; however, these generate the same results (for example, M1 versus M2 and M3 or M4 versus M6). This disparity of combinations with identical results reinforces the need to analyze and adapt the communication strategy and tools to be used. As our results indicate, the inclusion of all possible tools does not always provide successful results. An in-depth analysis of each of these options and the cases they include will help museum managers identify the ideal formula for their museum.

## **6. CONCLUSIONS**

Literature on museums and user behavior has developed considerably in recent years, building on the expanding leisure markets and visitor-centered museums. The Internet has changed the way organizations communicate with their audiences, and museums are no exception. A wide range of digital communication tools have emerged, including interactive and collaborative platforms in which social influence emerges, impacting the visitor behavior.

Various digital media are becoming outstanding, affordable, and interactive communication tools for museums that are aiming to increase their awareness and attractiveness to facilitate a potential increase in traffic to the museum, both physical and virtual. The results of this study contribute to improving their understanding. Furthermore, it fills a research gap by providing information about the joint effects of several digital tools that can be useful in improving the business strategies of museums.

This research has highlighted the importance of digital communication tools such as social networks and virtual communities in generating traffic to the museums, both individually and jointly, showing that they work in combination. A thorough understanding of these joint effects is of vital importance for the proper management of a museum's communication strategy.

These findings have implications for both researchers and practitioners. From a theoretical standpoint and drawing on various approaches taken from the academic literature (social influence theory and theory of planned behavior), this research reaffirms the role of social influence and peer reviews in fostering behavior in the context of museums to highlight the power of the combination of social network and virtual community, as opposed to the effect of social networks alone. Additionally, this research highlights the importance of analysis and segmentation in planning the tools since not using all of them achieves the best results. Therefore, it emphasizes the search for efficiency in communication. Researchers should include the different digital tools used by museums in their future studies to better understand how they combine, overlap, or neutralize their effects since there is no single recipe for success.

Museum practitioners should improve the experience of visitors by managing their digital communication policy in a more global and efficient way and by getting closer to the needs and expectations of their visitors. For instance, analyzing and segmenting your potential visitors to understand their traits and behavior ensure effective communication with your visitors in your digital roadmap. Furthermore, the variety of models found to achieve the same objective highlights the strategic role played by the tailoring of communication. Museum managers must, therefore, prepare themselves for a much more demanding and professionalized task.

The current study suffers from some limitations. The main digital communication tools have been studied, but some others that are not so widely used by museums, such as

newsletters, blogs, etc., could be added to complete the potential mix of tools as well as their joint effects. Other limitations include the use of secondary sources for the collection of the part of the data used, which is not exempt from possible inaccuracies as well as certain limitations in terms of availability and access.

Further research is needed. In fact, deepening the understanding of the different types of content present in the digital tools studied as well as the opinions of the users about these tools will help improve the comprehension of their role. Similarly, it would be interesting to include other variables that may generate traffic to museums, such as the type of collections shown, the size of the exhibition, the location, the number of tourists who visited the city or country, or the size of the city where it is located. Further research along these lines would allow us to not only better understand the factors that drive visitors to museum buildings but also to identify categories of museums according to these characteristics.

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