Online Marketing Effectiveness - the influence of information load and digital literacy, a cross-country comparison

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Abstract

The objective of much promotional material is to create attitudes about a product or service with existing and prospective consumers. The effectiveness of the promotion in generating such attitudes is partly dependent upon the ability of these actual and prospective consumers to process the information provided in the promotional material, which then impacts on their decision. The aim of this research is to analyze the effectiveness of a promotional website under different information load conditions, for consumers from countries that differ in their digital information literacy. To achieve this goal, an experiment was conducted which was designed to manage the amount of information shown to participants from two different countries (the United Kingdom and Spain). The results suggest that both the main and interaction effect of information load and digital literacy have an impact on a website's effectiveness. This implies that promotional websites need to be not only culturally but also cognitively adapted.

Keywords Website effectiveness · Information load · Digital literacy · Tourism

JEL classification M30

Introduction

The impact of the variety and amount of information on the effectiveness of decision-making has interested academics, educators and practitioners for quite some time (Jacoby 1977; Malhotra 1982). Marketers are particularly concerned with information load, as it has an impact on the effectiveness of advertisements and promotions intended to inform and persuade consumers (Goodwin and Etgar 1980).

A specific concern related to information load for marketing professionals is the increase in the amount of information being made available through the Internet— especially the ease with which it can be viewed due to a proliferation in the ways by which it can be easily accessed (Lee and Lee 2004). This increase has been in both 'time of access', because of an expectation of 24/7 availability, and 'place of access', as a result of the increasing availability of mobile technology. It has been recognized that, due to this combination of variety, quantity and ease of access of information made available through the Internet, consumers experience information overload (Eppler and Mengis 2004). This is especially the case amongst those with little experience of the medium (Ahuja and Webster 2001) and those who are digital immigrants, rather than digital natives (Prensky 2001). This problem of possible information overload is exacerbated by the opportunity for low-cost information searches that the Internet provides (Biswas 2004).

With the growth in the importance and influence of the Internet as both an information source and promotional tool, there is a need to understand the impact it has on decision-making (Hargittai 2005). Lee and Lee (2004) identified that there was a correlation between increasing volumes of information and poorer quality decisions. The solutions identified and used to reduce the effect of information overload involve managing the amount and type of information made available. However, little attention has been given to the influence of personal characteristics on information overload (Eppler and Mengis 2004). It is generally considered that the information overload boundary is

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specific to each individual, and is related to characteristics such as personal skills (Jackson and Farzaneh 2012).

A personal skill important in explaining a person's information processing capacity is their information literacy (Bawden and Robinson 2009). Information literacy is defined by the United States National Forum on Information Literacy as "the ability to know when there is a need for information, and to be able to identify, locate, evaluate, and effectively use that information for the issue or problem at hand" (see Chatterjee 2016). In higher education there is growing advocacy for research into the impact of information literacy on learning (Ivanitskaya et al. 2006; Webber and Johnston 2000). Educational policies have a significant impact on information literacy; consequently, as such policies differ between countries, there are differences in information literacy between populations (Frau-Meigs et al. 2017).

As a consequence of the the Internet traditional linear models of understanding information processing are no longer suitable. These models are generally based on some variation of the following stages: recognizing a need for information; choosing the best sources; accessing information; evaluating information; organizing and storing information; communicating and using information. However these models do not acknowledge the reality of the newfound complexity of information behavior, and ignore the interactive search for information that characterizes what actually occurs (Bawden and Robinson 2009). According to these authors, the strategies that emerge for increasing and improving information literacy are unlikely to be purely 'informational'; rather, information itself will comprise only part of a solution involving much wider areas, including digital literacy (Koltay 2011).

The aim of this study is to analyze how consumer levels of digital information literacy—developed through the education systems of their respective home countries—moderate the effect that the amount of information provided has on the attitudes formed during the consumer's information processing phase. The attitudinal consequences in this research comprise both attitude toward the website (advertisement) and attitude toward the promoted destination (brand)— an adaptation of the traditional variables of advertising effectiveness (MacKenzie et al. 1986). This study has been developed using an experimental environment within the tourism sector.

The tourism sector, one of the earliest adopters of digital technologies, has become one of the most prominent users of these technologies for the promotion and distribution of products and services (Buhalis and Law 2008), and has therefore been used as the basis for this project. This study researched the impact of information load on two groups of prospective tourists: those from a country whose educational system has a high capacity to develop digital skills, and another group from a country with a lower capacity to advance such skills. For both groups, the information load effect on attitude toward the website, and toward the promoted destination, was controlled by an experimental design.

This research is timely because, although the consequences of information load have been systematically documented in the literature, including research on information load and the Internet, there has been no empirical research as yet evaluating the critical role and relative importance of digital information literacy specifically in *high information load conditions*. The necessity of such research is supported by Bawden and Robinson (2009) who identified that, in order to reduce the incidence of information overload, there was a need for more attention to be given to digital literacy.

Literature review

Where the situation is complex and uncertain, making global rationality impossible, consumers' decision-making processes can be explained by the theories of either optimization or of satisficing (Simon 1972). Optimization occurs when the degree of complication is reduced, through radical simplification of the real-world situation, to a level that the decision maker can handle. Satisficing (a portmanteau of *satisfy* and *suffice* coined by Simon 1956) on the other hand retains more of the detail of the real-world situation, and handles the complexity and uncertainly by opting for a satisfactory, rather than optimal, solution. It is hard to predict which of the two approaches will lead to a better real-world decision.

Decision-making is also impacted by the Level of Processing (LOP) involved (Craik and Lockhart 1972; Olson 1980). With a foundation in psychology and cognitive science (Nelson et al. 1977), LOP theory argues that the level of access to an individual's memory is dependent upon the level of cognitive processing required. This means that in response to external stimuli, individuals process incoming information at different levels of mental encoding, ranging from 'shallow' sensory encoding to 'deep' semantic encoding.

In addition to LOP, decision-making is also impacted by the amount of information that working memory is able to retain at one time, also known as Cognitive Load Theory (Sweller 1994). A number of studies have highlighted the effect of information load on an individual's available cognitive processing capacity—which can vary from low to high—and bounded cognitive processing ability (Bettman, 1979; Lee and Lee 2004; Miller 1994). Based on the notion of limited human processing capacity, when consumers are provided with too much information at a given time, such that it exceeds their processing limits, overload occurs (Lee and Lee 2004).

There are several approaches to objectively approximating information load, the most common of these being the multiplication of the number of alternatives by the number of attributes (e.g. Malhotra 1982). Additional alternatives and attributes increase the quantity of information to be processed, which can lead to individuals experiencing information overload (Lee and Lee 2004; Rodríguez-Molina et al. 2015).

The consequences of information load

The significance of information load lies in its impact on information processing. Eppler and Mengis (2004) identified the inverted U-curve effect of information processing: during information under-load the decision maker experiences increased information processing, with the opposite being the case when experiencing information overload. Therefore during information overload decision processing is suboptimal, and decreases further the greater the amount of information provided. This is significant as it suggests that, past a certain information load, diminished levels of information processing will negatively impact decision-making.

The implications of information overload on the decision maker have an impact in three broad areas: psychological, attitudinal and behavioral (Roetzel 2018). First, when the decision maker is experiencing an information overload situation, they often display symptoms of anxiety, stress, confusion, demotivation and other such negative consequences (Eppler and Mengis 2004; Bawden and Robinson 2009). Secondly, information overload has a negative impact on the user's affective reactions, including attitudes toward the product or website (Sicilia and Ruiz 2010), perceived destination image (Frias et al. 2008) and advertising effectiveness (Wang et al. 2007). In terms of behavioral effects, the most important consequence of information overload is that the decision-making process is likely to result in a less-than-optimal decision being made (Wan et al. 2009). Other consequences include choice-related experiences such as regret, disappointment, decreased motivation to make a choice, or making no choice (Eppler and Mengis 2004; Schwartz 2004). Some authors have used the term "choice overload" when their aim is to study these behavioral symptoms (Scheibehenne, Greifeneder and Todd, 2009; Schwartz 2004; Sthapit 2018; Thai and Yuksel 2017).

The complexity of the decision-making task is impacted by both the number of attributes and the number of alternatives (Payne 1982). Up to a certain point, as the number of alternatives and attributes per choice increase, there is a parallel increase in both the processing activity of the consumer and the decision quality. However, after a certain point, the processing activity and decision quality begin to decrease (Payne et al. 1993).

Because of its marketing implications, the behavioral impact of information overload has received significant levels of attention and analysis (see Scheibehenne et al. 2010). Online product presentations with high information load may consume a significant portion of cognitive processing capacity, which can result in poor behavioral outcomes (Nelson et al. 1977), though this proposition has yet to be theoretically and empirically verified with different types of information.

There are conflicting perspectives with regard to the impact of information load. One proposition is that a high information load facilitates information processing, leading to a more knowledgeable decision (Chewning Jr and Harrell 1990), while the alternative proposition is that a high information load depletes the bounded cognitive capacity of consumers, thus impeding their processing of product attributes, which subsequently results in poor purchase decisions (Jacoby et al. 1974b). There is therefore a need to investigate the influence of information load on product information processing and consumer decision-making in online shopping (Lee et al. 2016).

An immediate result of the consumer's information processing phase is the formation of a set of attitudes toward the elements involved in the choice (MacKenzie and Lutz 1989). Traditional models used to evaluate advertising effectiveness utilize two key attitudinal constructs: attitude toward the advert and attitude toward the brand (MacKenzie et al. 1986). As websites are considered a form of advertising, due to their conceptual similarity, physical appearance and functionality (Singh and Dalal 1999) these models have been adapted to evaluate website effectiveness. It is for this reason that studies of the effectiveness of websites include measurement of users' attitudes toward the website (Castaneda et al. 2009; Karson and Fisher 2005).

The effect of information load on both attitude toward a website and toward the brand it is promoting, is an under-researched area (see Voorveld et al. 2009). With regard to consumer attitudes toward a website, Sicilia and Ruiz's (2010) research identified that the influence of the amount of information provided does not in fact follow an inverted U-shaped curve. Instead, their research identified a positive relationship between the amount of information provided and the attitude toward the website, though this correlation was only observed under conditions of low and medium amounts of information. These findings contradict those of other studies: for example, Wang et al. (2007) tested how different advertising components (text, graphics, animated graphics, video and hyperlinks) impacted the effectiveness of online advertisements. The researchers measured effectiveness using several variables (attitude toward the website, attitude toward the brand, and purchase intention) and concluded that, although some components reinforce advertisement effectiveness, upon further examination it appears that the greater the number of components (overload by reiteration of information using different formats), the less effective the advertisement.

Within the tourism sector, Rodríguez-Molina et al. (2015) identified that when information load on a website is increased to the point of information overload, there is a reduction in the positive perception of the image of the destination. For hotel services, Furner and Zinko (2017) found that purchase intention increases with the information load in online reviews, until that information load becomes excessive, at which point purchase intention begins to decrease.

Bearing in mind that information load is composed of the combination of several alternatives and attributes, it is proposed that:

H1. Higher levels of information load lead to lower levels of (tourist) destination website effectiveness.

More specifically,

H1a. A higher number of alternatives reduces the website's effectiveness in terms of attitude toward the website and attitude toward the destination.
H1b. A higher number of attributes reduces the website's effectiveness in terms of attitude toward the website and attitude toward the destination.

Digital literacy skills

With an increase in services and information relevant to daily life (e.g. financial services, product information, government forms) being made available online, literacy with regard to the Internet is becoming ever more important. Hargittai (2005) asserts that, as an increasing portion of the population uses the Internet, it is important to measure not just simple access, but also how information processing is impacted by digital literacy. It is therefore important to evaluate the impact of the Internet on access to information, and further how the resulting increase in information load impacts on decision-making.

In their book *Digital Literacy*, published at the end of the 20th Century, Gilster (1997) claims to provide "Internet novices with the basic thinking skills and core competencies they'll need to thrive in an interactive environment… fundamentally different from passive media such as television or print." He defines the literacy needed for this interactive digital environment as "the ability to understand and use information in multiple formats from a wide range of sources when it is presented via computers." Eshet (2004) develops this definition further, moving beyond the mere ability to use software or operate a digital device, to include a framework that includes photo-visual literacy, reproduction literacy, branching literacy, information literacy, and socioemotional literacy. This line of mixing the technological and sociocultural aspects of digital literacy was further expanded to consider defining, delimiting and discussing the concept by scholars such as Lankshear and Knobel (2008).

With the objective being to differentiate between different types of literacy, Catts and Lau (2008) distinguish between ICT—skills such as the use of digital technology, communications tools or networks, which essentially indicate a competence in handling information in a particular setting, context or format—and information literacy, or the capability to recognize when information is needed and to locate, evaluate, and effectively use it once gathered (ALA 1989). Individuals with higher digital information literacy combine both high ratings in ICT skills with a higher capability for information management (Bawden and Robinson 2009).

Taking into consideration the diversity of definitions for Digital Literacy, Bawden (2008) described the concept as composed of four components: traditional skills (literacy per se, and ICT literacy); background knowledge derived from living in a world of information; central competencies similar to Gilster's (1997) core competencies (e.g. understanding digital formats, communicating digital information, information literacy, evaluation of information) and, finally; attitudes toward independent learning and the development of moral, social and ethical behavior in a digital environment.

There have been a number of developments, specifically geared toward students and employees, intended to evaluate and score levels of Digital Literacy (e.g. The IC3 Digital Literacy Certification; Northstar Digital Literacy Assessment; Microsoft Digital Literacy Assessment). In a broader perspective, the European Union has developed policies intended to develop the digital competence of its citizens. The European Parliament and Council (2006) stated that digital competence involves the confident and critical use of Information Society Technology (IST) for work, leisure and communication. This is underpinned by basic skills in ICT: the use of computers to retrieve, assess, store, produce, present and exchange information, and to communicate and participate in collaborative networks via the Internet (p. 6). These were incorporated into the Digital Agenda for Europe's Digital Scoreboard (European Commission 2014), which provided a mechanism to evaluate the digital competencies of EU citizens, and set policies to increase it. The operationalization of the digital literacy construct is through what Bawden (2008) identified as a set of central competencies.

Regarding ICT skills, van Dijk (2006) states that operational skills (related to technology device use), must work together with information skills (e.g. information evaluation, knowledge assembly) and strategic skills (the capacity to use computer and network sources as a means for achieving particular goals). Poor computer (ICT) literacy on the part of the user may reduce the perceived usefulness of a website (Liao et al. 2010). The development of these skills relies heavily on a society's educational systems (Bawden and Robinson 2009; Warschauer 2009). The OECD's PISA survey is regarded as the world's most comprehensive and authoritative evaluation of information management skills. The survey, started in the year 2000 and conducted every three years, tracks the performance of students from approximately 70 countries in mathematics, reading and science as well as evaluating their capabilities in problem solving. Across the students that have completed the survey, PISA has identified important differences by country in ICT access/use and digital competences. These differences support Hargittai's (2005) advocacy for research into the implications and impacts such disparities may have on the understanding of information provided through the Internet.

Performance in decision-making is usually represented as the relationship between the difficulty of a task (i.e., the amount of information to be handled) and the capacity of the decision maker to process the information (Wickens 1991). The decision maker's processing capacity is a nested concept of information literacy, comprising the time it takes an individual or system to seek, filter and extract the required information (Jackson and Farzaneh 2012). It is likely that a person with a higher information processing capacity can cope with more information (Miller 1994) and that the higher the information processing capacity of an individual, the less likely information overload is to occur. Taken together, both variables will determine the point of information overload in consumers (Eppler and Mengis 2004). A particularly heavy cognitive load taxes the resources in the working memory—necessary in processing incoming data—which for many people may lead to poorer quality decisions and a greater number of negative responses (Im and Ha 2011; Ko et al. 2015).

The capacity to process information is also conditioned by the skills of the decision maker, related to their use of ICT (Chen et al. 2011). Given that using ICT requires the individual to divide their cognitive resources between using the device (browsing the web, open links, scrolling, etc.) and information processing, when both are required simultaneously there is a high probability that information overload will occur (Frias et al. 2008). Loh and Kanai (2016) conducted a more in-depth review of how the Internet has altered the cognitive behaviors and structures involved in information processing, suggesting that those individuals that are more familiar with the Internet develop an information processing protocol more suited to the digital environment which can alter the point of information overload for decisions made using the Internet.

Therefore, the amount of information provided interacts with the ability of the individual to process that information, resulting in a modification of the point of overload, and affecting the consumer's opinions (Wang et al. 2007). Specifically, consumers with high information literacy skills can cope with high levels of information whilst consumers with low level information literacy skills, exposed to the same level of information, will express a lower opinion of a website and

destination, due to their decreased capacity to process all the information. In this regard, we propose:

H2. The effect of information load upon the effectiveness of a website is moderated by the digital information skills of the population in each country.

More specifically,

H2a. For tourists with lower digital information literacy skills, websites with a lower amount of information are more effective, in terms of attitude toward the website and attitude toward the destination, than websites with higher amounts of information.
H2b. For tourists with higher digital information literacy skills, websites with both lower and higher information loads provoke similar levels of attitude toward the website and toward the destination.
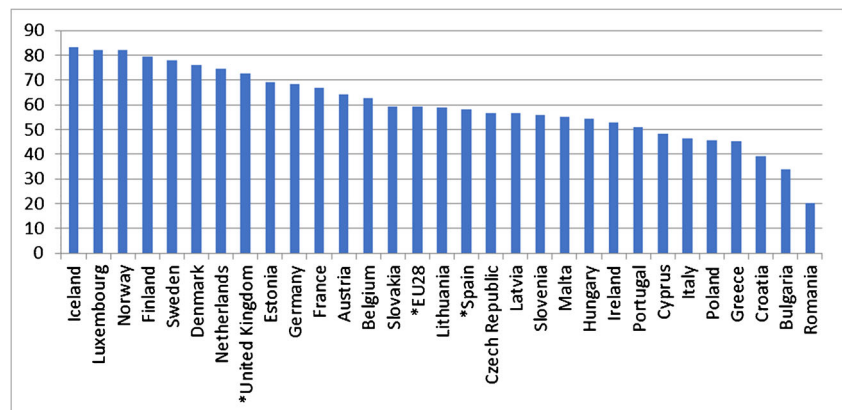
Methodology

Sample and procedures

According to the Digital Agenda for Europe's Digital Scoreboard (European Commission 2014), among European countries there are significant differences in digital literacy between populations. Focusing on two countries, the United Kingdom and Spain, there appear to be highly divergent levels of digital skills (Fig. 1). Taking as a reference point the EU28 mean (59.2%), the UK population shows a significantly higher proportion of individuals with basic or above basic digital skills (72,8%), whilst for Spain this percentage is below the EU28 mean (58.2%) (Fig. 1).

The chosen methodology for data collection was experimentation. The sample were selected by engaging with a different third-party Internet panel both in the UK and in Spain. Internet user panels (Ipsos; https://www.ipsos.com/ipsos-

Fig. 1 Individuals with basic or above basic digital skills. Source: European Commission 2014

Table 1 Socio-demographics

		Spain	Spain official data[a]	United Kingdom	UK official data[b]
Gender	Male	51.8%	50.16%	43.9%	49.63
	Female	48.2%	49.84%	56.1%	50.37
Age	18-29	23.2%	21.37%	18.2%	25.93%
	30-44	45.7%	41.43%	31.9%	32.88%
	Over 45	31.0%	36.70%	49.8%	41.19%

[a] INE, 2017

[b] UK Office for National Statistics 2017

mori/en-uk) provide access to a representative sample of the target population, and thus help facilitate the fieldwork. Furthermore, as the research was constructed to identify differences or similarities between two different groups based around Internet information load, a user panel recruited via the Internet provides a sample that are conversant with Internet use.

In addition to being au fait with using the Internet, in order to be considered an appropriate participant for the research, subjects were required to fulfill two criteria, namely that they were of a legal age (18) and habitually took holidays, i.e. at least once a year. The sample comprised a similar number of participants from each country (285 from the UK and 280 from Spain). This produced a total sample of 565 participants. The socio-demographic characteristics reflected to a high degree the tourist profile in each country (see Table 1).

The panel initially contacted prospective participants by email and invited them to take part in the research. The experiment, hosted online, included a range of stimuli intended to simulate different information load situations. Participants were asked for their help in evaluating a website for a tourist destination. The experiment was conducted in three sequential phases. Initially, through a questionnaire, information was collected to ascertain the characteristics of each participant regarding their tourism motives. Then, before being allowed to access the destination website, each participant was given details as to what was expected of them. These instructions stated the need for the participant to undertake typical tourist activities, such as booking a return flight, reserving a hotel room and booking a table at a restaurant. This requirement ensured that the participants, in addition to visiting all sections of the website, would experience high levels of involvement with the site. The same amount of time (seven minutes) was given to each participant to browse the destination website. After five minutes each participant was given a reminder of what was required of him or her. Giving subjects a time limit within an artificial environment can help to induce a state of overload (Lurie 2004). After the completion of this task, the final phase of the experiment involved the participant being redirected away from the experimental website to a second survey. This final component required participants to respond to the dependent variables of the research; namely their attitude toward the website and their attitude toward the destination.

To ensure semantic equivalence between countries, both experimental stimuli and questionnaires were conducted in the national language of each participant's country (Spanish for Spain participants and English for British participants). The translation-back-translation method was applied by accredited translators specializing in market research and marketing (Hult et al. 2008). The original Spanish version (i) of both the stimuli and questionnaires was translated into English (ii). This English language version was then translated back to Spanish (iii) and was then compared with the original Spanish version to identify any translation discrepancies. This two-step process was repeated until convergence between the two versions of the stimuli and questionnaires was achieved.

Stimuli

A website promoting an imaginary tourist destination called the island of Buyuada was developed (see Appendix 1). Information provided by the website included general tourist information including the island's geography, history, governance, gastronomy, climate and currency. In addition, the site provided useful travel information such as flights, hotels, restaurants, etc. In the field of consumer behavior, using fictitious elements such as those used in the design of this experiment is standard practice (Petty et al. 1983). Furthermore, this approach ensures that there is no scope for the individual to find additional online information about the location in question. To ensure 'Buyuada' or something similar did not exist as a tourist destination a thorough check was made to confirm that the name was unique.

In order to manipulate information load, the most common approach is the multiplication of the number of alternatives by the number of the attributes (e.g. Malhotra 1982; Rodríguez-Molina et al. 2015). By producing four versions of the website it was possible to manipulate the information load experienced by participants (high vs low number of attributes x high vs low number of alternatives). This produced a minimum number for each country of 60 cases for each of the four treatments and a maximum of 78 (Table 2).

Table 2 Cases per treatment by country

	Low number of alternatives	High number of alternatives	Low number of alternatives	High number of alternatives
Low number of attributes	60	74	70	70
Higher number of attributes	73	78	70	70

The number of alternatives for flights, hotels and restaurants on one version of the website was seven, whilst the other doubled the number of options, offering 14 alternatives—doubling the number of alternatives is an established method of increasing information load (Malhotra 1982). A pre-test, conducted before the start of the experiment, confirmed that those who were exposed to double the number of alternatives did experience greater information load than those who experienced the lower number of alternatives. All alternatives were displayed within each web page, in order to ensure that participants in the larger alternative group had full access to all the applicable different alternatives.

By altering the amount of information displayed on the website, the attribute variable was manipulated. This was achieved by a method similar to that used by Jacoby, Speller and Berning (1974a) and Sicilia and Ruiz (2010), namely, using the two different versions of the website to display different numbers of paragraphs of information through all sections of the marketing information on the website.

Two different countries, the UK and Spain, were selected because they provided the opportunity to produce a block variable. The populations of these two countries, as identified in previous paragraphs, display very different levels of digital information literacy.

Measures of dependent variables

The dependent variables for this experiment consisted of tourist attitude toward the website and tourist attitude toward the destination. To measure these variables, three items on a seven-point semantic differential scale from Muehling (1987) were adapted to each reference object (bad/good; negative/positive; unfavorable/favorable). Cronbach's alpha was used to measure the internal consistency of the scales. In both cases it was identified that the values were greater than

those recommended by the literature ($\alpha = 0.93$ Attitude toward the website; $\alpha = 0.95$ Attitude toward the destination). On this basis, we calculated the average score for each scale.

Results

In this section we analyze whether the manipulation of the factors has been effective and test the proposed hypotheses.

Manipulation checks

We anticipated that, by increasing the number of alternatives and attributes, we could increase the information load experienced by the subjects. Using one single measure ('There was a lot of information in the website') with a score ranging from 1 to 7, the results show that the perceived information load was higher when the subjects were exposed to more alternatives and to more attributes (Table 3).

Furthermore, according to the Digital Agenda for Europe's Digital Scoreboard, Spain and the United Kingdom show significant differences in each population's digital information literacy. Given that digital information literacy includes both general information skills and specific skills to locate the information online (Bawden and Robinson 2009), two items were measured: 'I felt overwhelmed by the amount of information' (Info_skills); 'The information in the website was organized logically' (Online_skills). A MANOVA, using attitude toward the website and attitude toward the destination as dependent variables, and the tourist's country as factor (Model A), identified that tourist country had a significant effect on the dependent variables. Next, we introduced into the analysis items related to information literacy as a covariate (Model B). The main effect of the tourist country then becomes

Table 3 Mean of the volume of information by experimental factors

	Alternatives			Attributes		
	Low number of alternatives	High number of alternatives	ANOVA p-value	Low number of attributes	High number of attributes	ANOVA p-value
Spain	4.90	5.51	0.00	4.85	5.58	0.00
United Kingdom	3,52	3,84	0.05	3.38	3.96	0.00
Overall	4.23	4.64	0.00	4.13	4.73	0.00

Table 4 Manipulation check for the information literacy factor (country selection)

	Model A		Model B	
	Pillai's Trace (F) df1=2; df2=560	p-value	Pillai's Trace (F) df1=2; df2=558	p-value
Intercept	6435.50	.00	1142.56	.00
Info_skills	--	--	5.91	.00
Online_skills	--	--	38.03	.00
Country	16.55	.00	1.13	.32

nonsignificant, indicating that in Model A country includes the digital literacy effect (Table 4).

These results allow us to conclude that the factors have been correctly applied and reflect information load and digital information literacy respectively. This confirms that the manipulation worked correctly in the experiment.

Testing the hypotheses

Given the experimental nature of the research, a multivariate analysis of variance was conducted. The dependent variables were the two attitudes reflecting website effectiveness: attitude toward the website and attitude toward the destination. The two variables used to manage the information load to which subjects were exposed (number of alternatives and attributes) were taken as independent variables. Furthermore, as our aim was to analyze the moderating role of digital

Table 5 Multivariate analysis of variance for website effectiveness

		Value	F	Df1	Df2	p-value
Intercept	Pillai's Trace	.96	6570.09	2	554	.00
	Wilks' Lambda	.04	6570.09	2	554	.00
	Hotelling's Trace	23.72	6570.09	2	554	.00
	Roy's Largest Root	23.72	6570.09	2	554	.00
Alternatives (ALT)	Pillai's Trace	.03	7.47	2	554	.00
	Wilks' Lambda	.97	7.47	2	554	.00
	Hotelling's Trace	.03	7.47	2	554	.00
	Roy's Largest Root	.03	7.47	2	554	.00
Attributes (ATT)	Pillai's Trace	.02	4.45	2	554	.01
	Wilks' Lambda	.98	4.45	2	554	.01
	Hotelling's Trace	.02	4.45	2	554	.01
	Roy's Largest Root	.02	4.45	2	554	.01
Digital_literacy	Pillai's Trace	.06	18.16	2	554	.00
	Wilks' Lambda	.94	18.16	2	554	.00
	Hotelling's Trace	.07	18.16	2	554	.00
	Roy's Largest Root	.07	18.16	2	554	.00
Alternatives * Attributes	Pillai's Trace	.00	.08	2	554	.93
	Wilks' Lambda	1.00	.08	2	554	.93
	Hotelling's Trace	.00	.08	2	554	.93
	Roy's Largest Root	.00	.08	2	554	.93
Alternatives* Digital_literacy	Pillai's Trace	.01	1.69	2	554	.18
	Wilks' Lambda	.99	1.69	2	554	.18
	Hotelling's Trace	.01	1.69	2	554	.18
	Roy's Largest Root	.01	1.69	2	554	.18
Attributes* Digital_literacy	Pillai's Trace	.00	.64	2	554	.53
	Wilks' Lambda	1.00	.64	2	554	.53
	Hotelling's Trace	.00	.64	2	554	.53
	Roy's Largest Root	.00	.64	2	554	.53
Alternatives * Attributes * Digital_literacy	Pillai's Trace	.02	4.78	2	554	.01
	Wilks' Lambda	.98	4.78	2	554	.01
	Hotelling's Trace	.02	4.78	2	554	.01
	Roy's Largest Root	.02	4.78	2	554	.01

information literacy in the effect of information load on website effectiveness, the tourist's country was included in the analysis as a blocking variable (Table 5).

H1 states that higher levels of information load lead to lower levels of destination website effectiveness. The MANOVA demonstrated that the factors relating to information load (number of alternatives and number of attributes) were statistically significant (see Table 5). Individual ANOVAS revealed that, as predicted in H1a, the website with a high number of alternatives is less effective, in terms of attitudes toward the website and attitudes toward the destination, than the website with a low number of alternatives (Aweb_LowALT=5,38 vs. Aweb_HighALT=4,94; p-value<.01; Adest_LowALT=5,77 vs. Adest_HighALT=5,57; p-value=.05). In the same vein, as proposed by H1b, the website with a high number of attributes is less effective (Aweb_LowATTR=5,34 vs. Aweb_HighATTR=4,98; p-value<.01; Adest_LowATTR=5,76 vs. Adest_HighATTR=5,58; p-value = .05) than the website with a lower number of attributes. Overall, these results support H1.

With regard to digital information literacy, no hypothesis is proposed as to its main effect, only an interaction effect is hypothesized. Nonetheless, the results show digital information literacy does have an effect on website effectiveness. In particular, British tourists show a higher mean attitude toward the website (Aweb_UK=5,52 vs. Aweb_Spain=4,80; p-value<.01) and attitude toward the destination (Adest_UK=5,90 vs. Adest_Spain=5,44; p-value<.01) than the Spanish tourists. Given that the website is designed to induce overload in the subject, including a time limit imposed on making decisions, those tourists with higher digital information literacy were more adept at managing such a task, which leads to higher website effectiveness. Furthermore, the results show a significant interaction effect of digital literacy with the number of alternatives and the number of attributes (Pillai's Trace=0.02; p-value = 0.01). Analyzing this result more closely (Figs. 2 and 3), when we focus on Spanish tourists, who have low population-level digital information literacy, there are significant differences in the attitude toward the website (5.21 vs. 4.14; p-value <0.01) and marginal differences in attitude toward the destination (5.56 vs. 5.00; p-value=.09) comparing the low load information condition (low number of alternatives x low number of attributes), with the high load information condition (high number of alternatives x high number of attributes). Consequently, the website is more effective for Spanish tourists when they are exposed to low information load, due to their low population-level digital information literacy. This result provides support for H2a.

Analyzing the attitudes toward the website and toward the destination which were generated by different versions of the website, the results suggest that the effect of information load is less evident in British Tourists. There are no significant differences in website effectiveness between the conditions of low information load (low number of alternatives x low number of attributes) and high information load (high number of alternatives x high number of attributes) (Figures 4 and 5). This result gives support to H2b.

In summary, the results support the hypotheses proposed, specifically, the moderating effect of digital information literacy on the effect of information load in website effectiveness (H2).
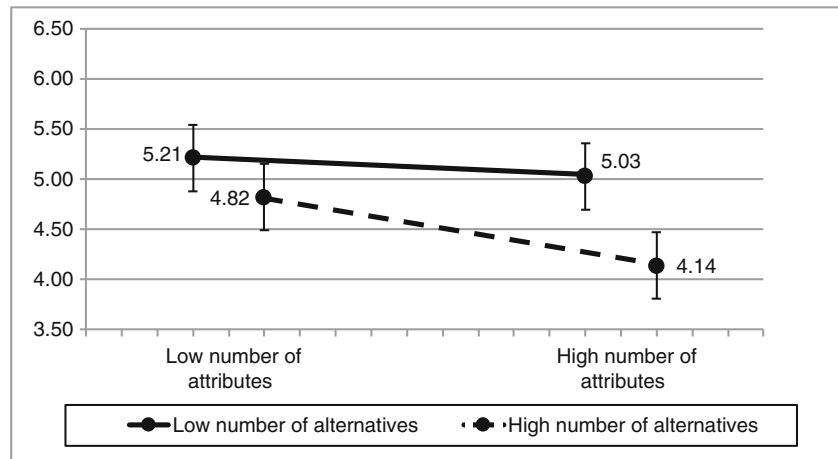
Discussion

This paper analyses how digital information literacy moderates the effect of information load on the attitudes formed during an individual's information processing phase. It is well known that increasing the level of online information presented to a subject creates an overload situation (Lee and Lee 2004). Our results confirm a similar effect for the tourism sector in respondents from different countries. In particular, when the information load increases, the effectiveness of the website as a communication media tool decreases (lower attitude toward the website and lower attitude toward the destination). In a similar vein, Rodríguez-Molina et al. (2015) found a negative effect of information load on destination image. Nonetheless, our results indicate that this effect is not the same for every purchase situation and varies depending on a consumer's personal characteristics (Eppler and Mengis 2004).

Educational systems develop the information literacy of their populations differently, resulting in significant disparities between countries (Bawden and Robinson 2009). Even the subjects of different nationalities can vary in their digital literacy (European Commission 2014). Since Gilster (1997) published *Digital Literacy*, several papers have been published showing a strong link between education and digital skills development (e.g. Knobel and Lankshear 2006; Hobbs and Jensen 2009). The present paper shows that a population's level of digital literacy impacts the point of information overload and thus the formation of attitude. Tourists with high digital literacy can cope with more information and, consequently, are less adversely affected by the high levels of information on the Internet. Similar results were found by Birru et al. (2004) in adults seeking online health information, but no similar papers have been found which discuss the effect of digital literacy on consumer decisions (some exceptions refer to general literacy such as reading skills, e.g. Jae et al. 2011).

Given that we can link digital literacy competency with an educational system, these results are valuable to sectors such as tourism that operate in international markets. Knowing the digital information literacy level of a target market population, destination management organizations can adapt their online promotional materials.

Fig. 2 The effect of information
load on attitude toward the
website for Spanish tourists

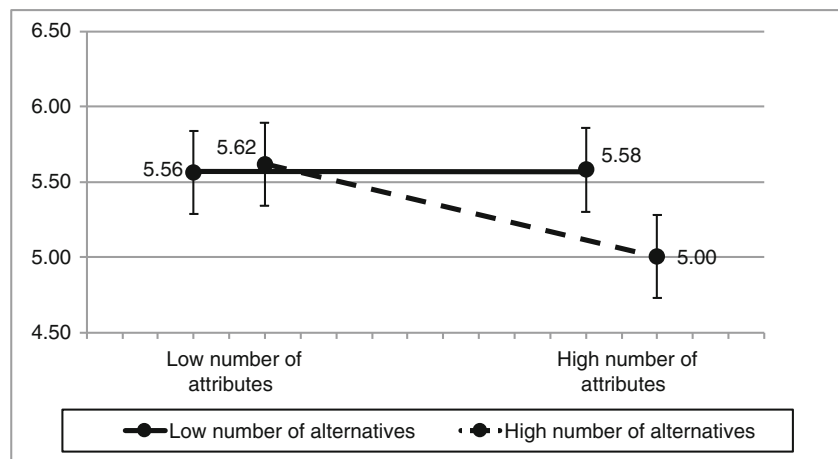## Conclusions and implications

The results of the present paper identify the relevance of a
tourist's digital information literacy in the effectiveness of a
tourism website, with website effectiveness being reflected by
a subject's attitude toward the website and toward the
destination.

Taking two countries that differ in their educational sys-
tems' capacity to develop skills related to digital information
management (UK vs. Spain), the results show that tourists
educated in a country with low digital information literacy
(Spanish tourists) develop poorer attitudes toward the website
and associated promoted destination when they are exposed to
high information load. Conversely, tourists educated in a
country with higher digital information literacy (British tour-
ists) do not exhibit significant differences in the mean level of
attitudes generated by varying the information load.

The main implication of the results of this research is relat-
ed to the level of adaptation required for websites and other
such digital promotional material, depending on the country
from which consumers are accessing them. The literature

suggests that the most convenient adaption relates to lan-
guage, symbols, content and even the structure of the website
(Cyr 2008). However the most cited adaptation noted in the
literature is in terms of cultural values (Singh et al. 2005). The
results of this paper go a step further, suggesting that adapta-
tion of the amount of information is also necessary, relative to
the level of digital information skill in the population of a
particular country. As we can see in the PISA survey
(OECD 2015) and the Digital Agenda for Europe's Digital
Scoreboard (European Commission 2014), educational sys-
tems differ in their capacity to develop general information
management skills and, more specifically, digital information
skills. These differences affect the capability of a population in
managing information. Website developers and tourist mar-
keting professionals should bear in mind the need to select
and display only the most relevant information to consumers
in countries that exhibit lower levels of digital information
literacy (see Garcia-Retamero, Cokely and Ghazal, 2014 for
a review of information skills in 29 countries). Other interest-
ing suggestions relate to the inclusion on websites of a recom-
mendation system, which would allow the user to select the

Fig. 3 The effect of information
load on attitude toward the
destination for Spanish tourists

Fig. 4 The effect of information load on attitude towards the website for British tourists

amount of information most suited to their specific requirements (Xiao and Benbasat 2007), which is correlated to their ability to manage information load.
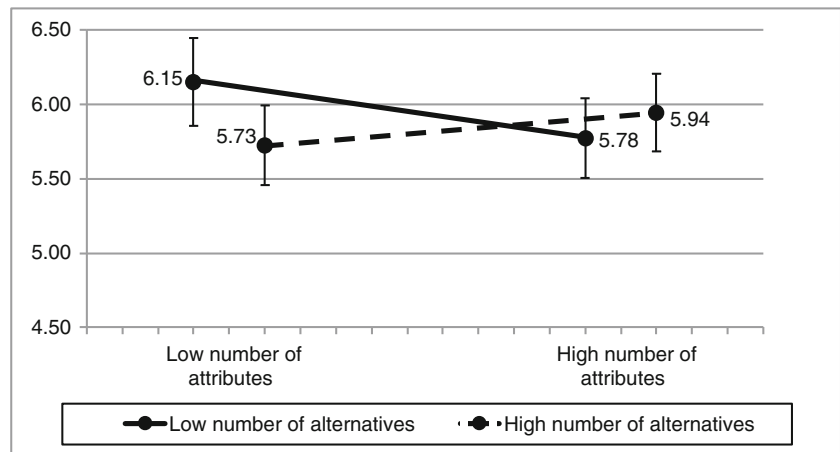
From the point of view of public institutions, the results of this paper highlight the necessity of developing educational curricula in order to improve population levels of digital information literacy, in order to take advantage of electronic communication tools (the Internet, mobile apps, wearable technology and similar future developments). Where the population in a country has lower levels of digital skills, they will be limited in taking advantage of ICT opportunities (Madon 2000).

In terms of academic implications, this research goes a step forward in considering the effect of digital information literacy on consumer behavior. Although personal factors interact with information load in conditioning consumer decision processing (Jackson and Farzaneh 2012), to the best of our knowledge, this is the first study to empirically test the interaction between information load and consumer digital literacy. Furthermore, the majority of information literacy research has been conducted in only two subject areas: students and

patients (e.g. Iannuzzi 2000; Kessels 2003). The tourism sector is one where the electronic channel for disseminating information and providing options predominates, and where there is no intermediary between this information and the consumer. It is under such circumstances that the tourist can become overburdened by the large amount of information available (Rodríguez-Molina et al. 2015).

Finally, as with every research project, there are some limitations to the current research. First, the digital information literacy variable was limited to two countries. Further research could include additional countries in order to generalize the results. Second, the proposition of the present research is based on a digital information literacy score by country using a well-reputed study (the Digital Agenda for Europe Digital Scoreboard). This score is a mean of the population; the actual level of digital literacy for each subject is not known, and could have an impact on the point at which the subject experiences information overload; a further study could elicit the actual digital information literacy of each respondent. Finally, the present study tests the moderating role of digital information literacy in a high involvement situation (booking tourism

Fig. 5 The effect of information load on attitude towards the destination for British tourists

Appendix 1

Sample Fly information

	Outward Saturday 10 August					Return Friday 16 August			
	From airport of origin >> to Buyuada					From Buyuada >> to airport of origin			
	Departs	**Arrives**	**Flight time**	**Price**		**Departs**	**Arrives**	**Flight time**	**Price**
⊙	9:55 Origin	11:50 Rome	1h:55min	$220.30	⊙	10:35 Buyuada	11:40 Istanbul	0h:55min	$119.20
	13:15 Rome	14:45 Buyuada	1h:30min	$234.44		13:00 Istanbul	16:20 Origin	3h:20min	$289.10
	Total flight time		4h:50min			Total flight time		5h:45min	
	Total price (not including taxes of $95.50)			$454.74		Total price (not including taxes of $97.20)			$408.30

Sample Hotel information

Hotel Paradise 5*
　Address: Paradise Beach, Plot 18, Buyuada.
　Telephone: 733 723 100
　Fax: 733 723 300
　Hotel type: Beach and business
　Guest rating: ★★★★⯪

Thanks to its excellent sea-front location, this beach hotel, built in 2002, has spectacular sea views on one side, and mountain views on the other. In total it has 488 rooms of which 422 are twin/double and 66 are junior suites. Located in the main hall are the 24-hour reception, a currency exchange service, a lounge area and a bar. Other facilities include lifts, other bars, buffet-style restaurant (non-smoking), three a la carte restaurants (Italian, international and Japanese), and Internet access (charged separately). Additional features include room service and laundry service, car park and garage. The hotel also offers a Kids Club (for children between 4 and 12 years old), and a play area where tots can play safely.

Rooms

Rooms are luxurious and elegant, each with en suite bathroom with hairdryer. All have direct telephone line, Internet connection, mini-bar, fridge, central heating and safety deposit box.

Entertainment and sports

The hotel's elegant exterior is equally well cared-for and boasts a large bathing area with two swimming pools and a pool for children, sun loungers, sun shades and a bar. Also available are a sauna, solarium, gymnasium and a professional massage service (the latter charged direct to your room). Alongside the hotel complex is a thalassotherapy spa and pampering suite. Other activities include aerobics, beach-ball and (for a small surcharge) billiards, mini-golf and tennis (there are two courts). Water sports are organised on the beach (charged to your room). To round off the range of services and facilities, the hotel provides a varied programme of activities for guests of all ages, with live shows and music.

Methods of payment

Visa, Mastercard and Diners Club

Accommodation	Low season	Mid-season	High season
Standard double room including breakfast	$95	$125	$136

Sample Restaurant information

Art & Curio
JL. Raden Raya, 47, Buyuada.

📞 315 06 46 (24-hour advance booking necessary)

International cuisine is what characterizes this restaurant, based on a blend of creative Mediterranean-style cooking and French technique. Presentation is imaginative and meticulous. Cuisine is based on creative, Mediterranean-style cooking and French technique. The restaurant is open continuously from 11.30am in summer. The rest of the year it is open from 11.30am to 5pm and from 7pm to midnight. The average price per head is $70.00. The establishment has two spacious lounges and an external terrace. Circular tables help the conversation flow. The décor is discrete and well maintained.

In a recent poll amongst two diners the Art & Curio was awarded a rating of 4 out of 5.

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