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Author: Panos E. Kourouthanassis Patrick Mikalef Ilias O. Pappas Petros Kostagiolas



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**EXPLAINING TRAVELLERS ONLINE INFORMATION
SATISFACTION: A COMPLEXITY THEORY APPROACH ON
INFORMATION NEEDS, BARRIERS, SOURCES AND
PERSONAL CHARACTERISTICS**

Panos E. Kourouthanassis¹, Patrick Mikalef, Ilias O. Pappas and Petros Kostagiolas

Panos E. Kourouthanassis
Department of Informatics
Ionian University
Corfu, Greece
pkour@ionio.gr

Patrick Mikalef, Ilias O. Pappas
Department of Computer and Information Science
Norwegian University of Science and Technology (NTNU)
Trondheim, Norway
{ilpappas, patrick.mikalef} @ idi.ntnu.no

Petros Kostagiolas
Department of Archives, Library Science and Museology
Ionian University
Corfu, Greece
pkostagiolas@ionio.gr

¹Corresponding author

EXPLAINING TRAVELLERS ONLINE INFORMATION SATISFACTION: A COMPLEXITY THEORY APPROACH ON INFORMATION NEEDS, BARRIERS, SOURCES AND PERSONAL CHARACTERISTICS

Abstract

This study explores the online information-seeking behaviour of travellers aspiring to accumulate travel-related information during their vacation planning. A theoretical model comprising information needs, online information sources, information barriers and personal characteristics is proposed to explain high degrees of information satisfaction in the online information space. Our theoretical propositions are validated through a survey (N = 764). The results of a configurational analysis, based on fuzzy-set qualitative comparative analysis, pinpointed 13 behavioural paths that equally explain travellers' online information satisfaction. The paper includes a critical discussion on the theoretical and practical implication of the findings.

Keywords: online information search, tourism, fsQCA, information needs, trust

1. Introduction

The research related to the impact of online information and of information-seeking preferences on tourist destination choices is rather extensive [1]. This area of knowledge is rich because of the internalized highly competitive and complicated nature of the tourism industry, which requires the extensive exploitation of online information technologies by individuals and tourism organizations [2]. Tourism is an information-intensive industry because of its intangible and experiential nature. Indeed, high uncertainties are involved as tourists' experience cannot be evaluated prior to the 'purchase' [3]. The information provided online through various websites [4] and the extensive information sharing among individuals [5] has become a decisive factor related to the tourists' destination choices [6]. Online resources have a number of noteworthy advantages when compared with the conventional offline and counterparts, and hence, their popularity increases [7].

In fact, online information seeking in the context of tourism products and services involves experience sharing and dissemination, and it becomes synonymous to individuals' tourism destination exploration. People generate and share information through a wide range of tourism web applications and online tourists' communities to make decisions for choices regarding places, experiencing and seeing the world [8]. Nowadays, more than ever, people can make informed decisions regarding their tourist product preferences. They are, however, faced with an unregulated information environment, which creates challenges but also offers many new alternatives.

Indeed, the wide portfolio of online information resources may act as both a facilitator and a barrier within a traveller's vacation decision-making process. For example, online social media have emerged as a primary information source that affects destination choice [9-11]. However, the abundance of information within social networks may lead to information

overload [12] and often incorporate misleading or unreliable information [13]. In effect, the online information-seeking process of travellers is rather complex; travellers are motivated to select and use multiple online information sources based on inherent travel-related information needs that relate to the vacation planning decision-making [14]. In this process, several factors intervene, such as trust on the accumulated information from the online information source [15] and personal elements (e.g. age, gender and online information literacy capacities [16–18]), which impact the selection of information sources and the overall satisfaction of information needs. Extant tourism information-seeking studies have concluded that information search may be conceptualized as a series of interrelated activities (e.g. [14, 19, 20]); nevertheless, modelling the interrelationships of these factors and exploring their combined effects on information satisfaction remains largely unexplored.

Especially for practitioners in the tourism industry, there is a growing need to understand how tourists interact in the online medium and receive travel-related information to explore ways to leverage it. Such efforts may serve the basis for the development of more effective online communication strategies. In effect, our study differentiates from extant literature by capturing the interrelations between travel-related information needs, online information sources and personal information barriers to explain satisfaction stemming from the online information search process of travellers. On the basis of the above, the paper addresses the following research question: *What configurations of information needs, information sources, information barriers and personal traits lead to satisfied travellers when they search for travel-related information online?*

We build on complexity theory and implement a fuzzy-set qualitative comparative analysis (fsQCA) [21] to identify pertinent configurations leading to increased information satisfaction of vacation-planning information needs. fsQCA has received increased attention during the last years in various fields, because it allows researchers to gain a deeper understanding of the phenomenon under scrutiny [22, 23]. The contribution of the paper lies in identifying the level of agreement between information needs, information sources utilization, information barriers and overall information satisfaction and, therefore, assist tourism marketers to develop better strategies for providing information desired by potential travellers. To our knowledge, this is the first research that adopts this investigation stance in the context of online tourism. The outcomes of this effort are encapsulated in alternative traveller search profiles that equally lead to satisfied travel-related information needs.

The structure of the paper is organized as follows. Section 2 presents the related work on capturing the online information-seeking behaviour of travellers and articulates the research propositions. Section 3 outlines the research methodology and sampling process. Section 4 presents the research findings. Finally, Section 5 concludes the paper with a summary of the theoretical and practical implications of our research.

2. Related Work

2.1 Capturing travellers' online information search process during travel planning

Travel planning reflects a specific type of information search and an important component of any trip experience since it involves all traveller activities pertaining to the collection of information in order to develop a travel plan [20]. Travellers and potential visitors always employ different information resources and/or channels as their search strategies, which often

complement or even replace each other [20]. Such sources include the Internet, travel consultants or agents, their family and friends, and offline literature/media pertaining to the destination under consideration [3]. Specifically in the online domain, such individuals are seeking information in order to explore specific travel experiences and tourist destination attributes which suite their travel expectations, socioeconomic and cultural profiles [24], and certain lifestyle backgrounds [25]. In order to do that, a number of *information needs* are generated, different *information resources* are employed and certain *information barriers* are faced. The symmetric and/or asymmetric impact of the distinct information resources on tourism information choice is related to the individuals' information-seeking profiles and preferences [26].

The information needs and information-seeking preferences literature in the tourism context include numerous theoretical and empirical studies all striving to capture individuals' search behaviour by identifying travellers' needs and sources' preferences (e.g. [14, 16, 27, 28]). In these studies, emphasis is being paid to identify *why* travellers search online and *what* type of websites they frequently access in order to pinpoint prospective online traveller profiles accounting also for demographic information, such as age and gender (e.g. [14, 29]). However, these efforts mostly reflect *partial snapshots* of the online information-seeking behaviour since they do not relate the information sources' usage with particular information needs, nor do they examine whether such relation led to satisfaction of travellers' information needs.

In effect, the different information-seeking profiles differentiate the way groups of people with distinct socioeconomic backgrounds search for information, evaluate and analyse it, manage tourism information, use it and reuse it for specific travel decisions and the way they effectively share and communicate it to others. Moreover, individuals' affective and cognitive state change during the information-seeking process while the existing information structures are constantly enriched due to the person's exposure to more information [20]. Depending on whether the information needs of individuals have been met by the information accumulated through the online resources used, the information search process will lead to a positive (or negative) perception of *information satisfaction*. Information satisfaction in the context of online tourism is a highly complex and multi-dimensional phenomenon and involves a large stream of literature emphasizing the central role of online resources utilization [30] ranging from the flow of interactions with the website [31, 32] to the receipt of customized information to individuals' unique needs [33]. At the core of the information search process are information needs; they are the drivers that initiate the information search process [16, 31] and forge expectations to travellers pertaining to the accumulation of sufficient information that will satisfy these needs. Scholars agree that information needs in the context of tourism are primarily functional: they serve the purpose of providing utility to decision-making before the actual trip and reducing the uncertainty of destination selection choices [34–36]. Online information search queries range from destination-specific inquiries (e.g. local attractions, restaurants and accommodation information) to transport options (e.g. flights to the destination), and other tourists' testimonials [9, 27, 37].

To satisfy information needs, individuals visit different online information sources that contribute to formulating the perceived image of a destination [38, 39]. Online information sources in the context of tourism may be classified based on their formality [27]: Formal (or impersonal) online information sources include online travel agents, online travel guides and

travel organizers to name but a few popular information sources; informal (or personal) online information sources include blogs and online social networks. In the remainder of this paper, we also follow this classification of online information sources.

The type and selection of a particular information source is dependent on the information needs of the traveller (e.g. the stage of the travel planning process and the element of the planned travel that is searched) and the inherent barriers that the information source and/or the individual entail. Moreover, they represent parts of travellers' online search strategies both actively and passively [40]. For example, travellers tend to primarily visit formal online information sources to get informed about renowned destinations [35]. However, to lower risk and uncertainty in ambiguous selection choices travellers make extensive use of informal information sources (i.e. blogs, online social networks and websites that include customer reviews) to collect other travellers' experiences as the tourism product is highly experiential in nature [27, 37]. At the same time, online visitors rarely complete their travel-related search in one session nor do they devote the same time in each information source [41]. Likewise, travellers tend to use online information sources during different stages of their information search process. Search engines are favoured in the early stages of the information search, whereas websites of tourism suppliers, destination management organizations and review websites are preferred during the later stages of information seeking to compare or corroborate the accumulated information [42]. It should be noted that studies in the context of online tourism analyse the different types of information sources separately, without considering their combined weight for determining the images of tourist destinations in the form of accumulated information satisfaction and value (e.g. [11, 43, 44]). Nevertheless, within this information cosmos, the totality of available tourism information sources is 'competing' in a sense that some information sources are supplementing or substituting other sources depending on the information needs they intend to cover [45].

In this process, a number of factors, which can be perceived as either barriers or facilitators, intervene between information needs generation and information needs satisfaction through the employment of various online information sources. These are conditioning factors that influence the information search strategy. *Trust* is a predominant factor that has been extensively reported to influence the selection of information sources and user satisfaction in the context of tourism [46, 47]. Trust on the information source is defined as the degree of confidence in the source's intent to provide reliable and accurate information [48]. Trust plays an influential role in information source selection for travellers, although findings are mixed in terms of the degree of trustworthiness for available information sources and their effects on information satisfaction. Specifically, there are concerns about the credibility of information provided by websites that provide user-generated content, such as reviews because of the anonymity and questionable motives of information providers, which could result in posts of fake or biased reviews [49, 50]; however, online customer reviews are considered, in principle, more reliable and truthful as an information source compared to information provided by company websites [15]. Nevertheless, such websites, although more trustworthy, have been reported to be less informative compared to editorial content providers [51]. Still, there is a positive association between trust and information satisfaction. Travellers will perceive higher degrees of satisfaction for their information needs, as well as selection preference, towards information that they trust [52, 53].

Along this line, personal factors, in the form of travellers' information literacy (e.g. language barriers, confidence in using the Internet to search for information), have been reported to drive both the selection of alternative information sources and/or lead to different degrees of information satisfaction [30, 54]. For example, senior travellers tend to favour online information sources that provide consolidated travel information to minimize search costs [55]. Similarly, age has been coined as a determining factor for information sources usage [40, 56]. Based on the above, it is evident that the information search process of travellers during vacation planning is a complex practice, which requires scholars to shed light in the relations between the interweaved constituting components. The following section presents our theoretical propositions and the methodological approach that guides this research.

2.2 Research propositions

Our work is based on the premise that online information resources enable travellers to become more informed and empowered during their travel planning information search activities. Furthermore, our work seeks to explore paths towards tourism information needs satisfaction as a result of utilization of online information resources that influence travel decisions and the information obstacles related to the information-seeking process. This is central if we consider that literature reveals that individuals utilize a combination of different online information resources to satisfy their information needs for a travel product or service [14, 16] and that the selection of these resources is driven by the formulation of specific information needs [20, 29] and influenced by situational and/or personal factors (e.g. personality traits [57, 58]). Hence, there is an interaction between the constituent components of the online information-seeking behaviour of travellers (i.e. information needs, information sources and information barriers/facilitators), which makes it unclear whether we can assume that a particular combination of them may warrant information satisfaction.

In this research, we posit that although the aforementioned components of the online information-seeking behaviour matter individually for each traveller, the synergetic nature between them creates a complex, multi-dimensional phenomenon, in which the configuration of these components is more important than the individual component. The discrete influence of each component with information satisfaction has been substantiated in past studies. First, there is a positive association between traveller expectations from the information search process (i.e. information needs) and the satisfaction they receive as an end result [59]. This observation stems from the disconfirmation theories stance in which satisfaction occurs as the discrepancy between beliefs pertaining to the expected and actual performance of an information system or service [60] and has been validated in the context of tourism [61]. Second, out of the plethora of online information sources, individuals attribute increased importance, and consequent usage intensity, on those sources that better satisfy their inherent travel-related information needs [16, 20, 62]. The selection of information sources and the degree of accumulated satisfaction are also dependent on several factors that induce barriers (or facilitating conditions) to the information search process. Trust perceptions on the information source and personal traits, in the form of individuals' age, gender and information literacy skills, have been reported to influence both the selection of information sources and the resulting satisfaction beliefs from the consumed information [13, 52, 62].

Our study proposes that travellers may achieve information satisfaction through combinations of groups of information needs, utilization of specific online information sources and interventions of specific information obstacles/facilitators. This line of reasoning leads to a conceptual framework to explain and better understand travellers' online information-seeking behaviour on the basis of complexity theory. Such an approach has not been applied in extant literature to capture the online information-seeking behaviour of individuals seeking travel information and may be employed to develop new traveller profiles.

Complexity theory incorporates the principle of equifinality; an outcome of interest may be explained similarly by alternative sets of causal conditions that combine in sufficient configurations for the outcome [63, 64]. In our case, high information satisfaction may equally be attained through multiple combinations of information-seeking behaviour factors. The previous section provided indicative examples pertaining to the applicability of different information sources to satisfy different information needs. Moreover, personal or contextual factors, such as age, gender and trust predisposition towards an information source, may influence the selection of sources and, ultimately, the degree of accumulated information satisfaction [15, 16, 20, 25, 30, 37, 65]. It should be noted that these complex interactions between the information-seeking behaviour components and their combined influence to information satisfaction may not be examined through the employment of traditional variance-based analysis methods, such as regression analysis and structural equation modelling.

Moreover, complexity theory proposes the manifestation of causal asymmetry [63, 64]. Causal asymmetry implies that different values of the same causal condition may appear in combinations that explain overall information satisfaction depending on these conditions combining with each other. For example, high information satisfaction may be achieved through the utilization of both formal and informal information sources depending on the information needs covered, the information barriers met and personal characteristics of individuals. A variance-based analysis approach would reveal only one optimal configuration of outcomes that would explain information satisfaction. Complexity theory surpasses this limitation and provides additional depth to the analysis by revealing multiple recipes (i.e. combination of causal factors) that equally explain the outcome of interest.

From the aforementioned argumentation, we formulate the following research propositions:

Proposition 1. *There is not an optimal configuration of travellers' information needs, selection of information sources and associated information barriers that lead to high information satisfaction; instead, multiple and equally effective configurations exist, which include combinations of causal factors.*

This proposition suggests that travellers' information satisfaction may not be universally achieved through a single combination of information-seeking behaviour constituents. Extant studies document that individuals searching for travel-related information online may be satisfied through different ways on the basis of their inherent (travel-related) information needs that, in turn, drive the selection of alternative online information sources through the filter of specific information barriers [16, 20, 27, 35]. Although the end result is the same (i.e. high satisfaction of their information needs), the path towards this end result is different. For example, individuals searching online for logistics-related destination information, such as hotels and restaurants, may visit online social networks or online travel guides to collect

information and satisfy these information needs [14, 28]. However, trust perceptions regarding the credibility of online information may guide them either to prefer a particular information source compared to another [15, 52] or to influence the accumulated information satisfaction from the information search process [66].

Proposition 2. *Single information-seeking behaviour conditions (i.e. information needs, information sources and information barriers) may be required to be present or absent within configurations that explain perceptions of travellers' high information satisfaction from online travel information sources, depending on how they combine with each other.*

The second proposition practically suggests that travellers do not commonly follow the same perceptions pattern within the configurations space that explains their satisfaction from the online information search process. Instead, these perceptions may vary depending on the interactions among the information search process components. For instance, travellers that primarily visit formal online resources (e.g. online travel guides) and travellers that primarily visit informal online sources (e.g. online social networks) may equally satisfy the same information needs. The difference in their selection preference might be attributed to the existence (or absence) of inherent information barriers.

Figure 1 reflects the conceptual framework of the study by employing a Venn diagram to illustrate the possible interactions between the examined information-seeking behaviour factors to explain information satisfaction.

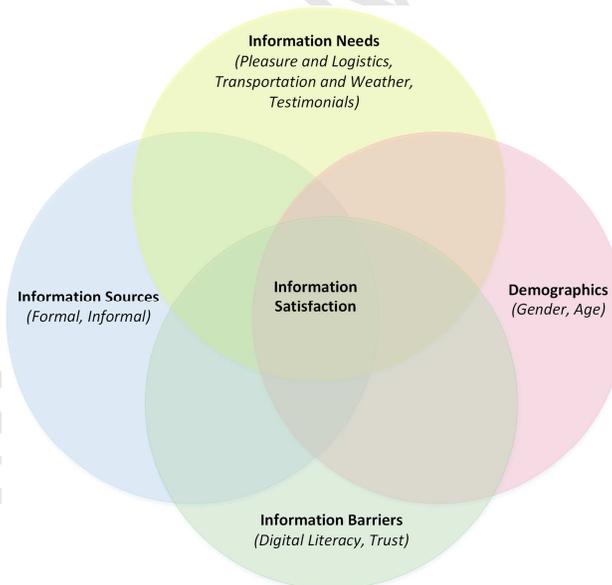


Figure 1. Conceptual framework

3. Methods

3.1 Data

A survey was developed and administered to customers of a major travel agency in Greece to collect data and measure the constructs of the research model. The survey was provided to respondents through an online questionnaire that was sent by email. The mailing list included information of 3,718 clients or users that had registered to receive newsletters from the travel

agency. To confirm whether all questions included in the questionnaire were clear and well defined, a group of five experts was assembled. The group of experts made comments on the questions and provided suggestions to increase clarity of what was actually asked. Following the clarification of the survey instrument, an initial invitation was sent to respondents. In addition, three reminder emails were sent out with a two-week interval between them. The data-gathering process was initiated on February 2015 and ended on June 2015, lasting approximately 5 months. The total number of responses received was 807, of which 764 were usable yielding an effective response rate of 20.54%.

To test for non-response bias, early (first two weeks) and late responses (last two weeks) were compared through *t*-tests for each variable with no significant difference found. The final set of responses present an almost equal number of responses in terms of gender, while the largest proportion of answers is from the age group 18–24 (42.9%). Respondents are also quite well educated because the vast majority had a graduate degree, while in terms of occupation, there is almost equal distribution between categories. Table 1 presents the profile of the respondents.

Variable	Value	Frequency (<i>n</i>)	Frequency (%)
Gender			
	Female	368	48.2
	Male	396	51.8
Age			
	<18	26	3.4
	18–24	327	42.9
	25–30	103	13.5
	31–36	64	8.4
	37–45	127	16.6
	46–60	99	12.9
	>61	18	2.3
Education			
	Primary school	14	1.8
	Secondary school	167	21.9
	Graduate degree	478	62.6
	Post-graduate degree	91	11.9
	Doctoral degree	14	1.8
Occupation			
	Student	149	19.5

Unemployed	130	17.0
Civil servant	148	19.4
Private sector employee	180	23.6
Self-employed	105	13.7
Pensioner	52	6.8

Table 2. Profile of respondents

3.2 Variable definition and measurement

To form profiles of respondents', two demographic variables were used. *Gender* was coded as a binary variable with 1 representing male and 2 representing female. *Youth* tourists were formed from the three first age-group categories of demographics up to the age of 30 [67].

Information needs are measured through three constructs that represent the types of needs experienced by potential travellers: *Pleasure and logistics*, *Transportation and weather*, and *Testimonials* [68]. All three constructs are developed as latent reflective variables. More specifically, *pleasure and logistics* comprise six indicators, *transportation and weather* five indicators, and *testimonials* two indicators [19]. Respondents were asked to evaluate on a nine-point Likert scale (1—not at all, 9—totally) the degree to which they expected their various information needs to be fulfilled through online sources.

Online information sources are divided into two main types/constructs: *formal* and *informal* [27]. The former describe online sources that are solely concerned with providing travel-related information, while the latter include online media that build on social interaction of users and are not exclusively oriented towards travel and tourism. Respondents were asked to evaluate on a nine-point Likert scale (1—never, 9—all the time) the extent to which they used several online sources (provided in random order).

Barriers faced when navigating online sources were measured by using two constructs: *digital literacy* and *trust* towards online information [69, 70]. Respondents were asked to assess on a nine-point Likert scale (1—not at all, 9—totally) how much they agreed or disagreed with several sentences regarding barriers when seeking online information.

Overall *Information Satisfaction* was quantified from adapted measures of several past empirical studies [71, 72]. Respondents were asked to evaluate on a nine-point Likert scale (1—not at all, 9—totally) the degree to which they were satisfied from using online information sources. The operationalization of constructs is illustrated in Table 2.

Construct	Definition/Explanation	Construct Dimensions	Source
<i>Information Needs</i>	Measures the expectations of individuals to meet specific issues and topics when seeking online for travel-related information.	Pleasure and logistics Transportation and weather Testimonials	[68]
<i>Information Sources</i>	Measures the degree to which specific online information resources are employed by individuals when seeking online for travel-related information.	Formal online information sources Informal online information sources	[27]
<i>Information Barriers</i>	Measures the perceived obstacles when individuals are seeking online travel-related information.	Trust Digital literacy	[69, 70]
<i>Information Satisfaction</i>	Measures the overall perceived satisfaction of individuals' travel information needs through the consumption of information from online information sources.	Overall information satisfaction	[71, 72]

Table 3. Operationalization of model constructs

3.3 Measurement model

First-order reflective latent variables were subjected to reliability, convergent validity and discriminant validity tests. Reliability was evaluated at both the construct and item level, with the former being assessed through Cronbach's alpha (CA) values, while the latter by examining if construct-to-item loadings are above the threshold of 0.70. The lowest observed CA value was 0.74, while all construct to item loadings were above 0.72, thus confirming reliability. Convergent validity was assessed by examining if AVE scores were above the threshold of 0.50 [73].

All AVE scores exceeded the value of 0.53, establishing convergent validity. Discriminant validity was assessed by two means by examining whether each construct's AVE square root was greater than its highest correlation with any other construct (Fornell-Larcker criterion) and by testing whether each indicators outer loadings on its assigned constructs was greater than its cross-loadings with other constructs [74]. The outcomes of these analyses, as shown in Table 3, demonstrate that all measures are valid to work with and that items are good indicators of their respective latent variables. Appendices A and B present the descriptive statistics of the instrument variables and the results of the confirmatory factor analysis.

	1.	2.	3.	4.	5.	6.	7.	8.
1. Pleasure and logistics (PLE)	0.72							

2. Transportation and weather (TRA)	0.71	0.75						
3. Testimonials (TES)	0.48	0.57	0.88					
4. Formal information sources (FIS)	0.27	0.32	0.34	0.83				
5. Informal information sources (IIS)	0.28	0.20	0.26	0.41	0.79			
6. Digital literacy (DLIT)	-0.1	-0.1	-0.0	0.04	0.01	0.97		
7. Trust (TST)	0.08	0.02	-0.0	0.05	-0.0	0.16	0.73	
8. Satisfaction (SAT)	0.42	0.39	0.34	0.11	0.18	-0.2	-0.2	0.80
Mean	6.81	6.77	5.95	4.67	5.07	4.74	2.90	6.66
Standard Deviation	1.37	1.57	1.79	2.07	2.11	1.63	2.43	1.31
Cronbach's alpha	0.88	0.74	0.73	0.85	0.80	0.95	0.74	0.84
AVE	0.52	0.56	0.78	0.69	0.63	0.95	0.54	0.64

Table 4. Assessment of convergent and discriminant validity of reflective constructs

4. Analysis

4.1 Methodology and calibration

To extract the online-seeking strategies of various profiles of users that lead to high satisfaction, this study employs a fsQCA. FsQCA analysis follows the configuration theory paradigm, which enables the examination of holistic interplays between elements of a messy and non-linear nature [63]. The main difference of fsQCA with other methods of QCA is that it allows for outcome and predictor variables to be on a fuzzy scale (continuous) rather than on just a dichotomous scale (binary). FsQCA seeks patterns of elements that lead to a specific outcome rather than just identifying correlations between independent and dependent variables. In addition, it enables the reduction of elements for each pattern, so configurations only include necessary and sufficient conditions.

The first step in performing the fsQCA analysis is to calibrate dependent and independent variables into fuzzy sets. The values of the fuzzy sets range from 0, which denotes an absence of set membership, to 1, which indicates full set membership. Hence, values range on a continuous scale of [0–1]. The procedure of calibration is grounded on the method proposed by Ragin [75]. According to this procedure, the degree of membership for each variable is defined by setting three anchors. These are a value for full membership (fuzzy score = 0.95), full non-membership (fuzzy score = 0.05) and the crossover point (fuzzy score = 0.50) [64]. As this study uses a nine-point Likert scale to measure constructs, the procedure described by Ordanini et al. [76] is employed to transform them into fuzzy sets. Full membership thresholds are set at values over 7.5, the crossover points at 4.5, and full non-membership values at 2.5. Youth tourism is set as a crisp variable, with 1 denoting respondents under the age of 30 and 0 denoting older respondents. The gender is also set as a crisp set, with 1 assigned to males and 0 to females.

4.2 Fuzzy-set qualitative comparative analysis

By applying the fsQCA algorithm, a truth table of 2^k rows is produced, where k represents the number of predictor elements, and each row indicates a possible combination. According to Ragin's recommendation, a consistency threshold should not be less than 0.75 [77]. In this study, we set the consistency threshold at 0.90. Consistency measures the degree to which a

subset relation has been approximated. Thus, solutions that do not adhere to this threshold are not included in the analysis. Because of the large sample size, a minimum of five cases for each solution is set [77]. Having set these parameters, the fsQCA analysis is performed using information satisfaction as the dependent variable. The results of the fuzzy set analysis for high levels of satisfaction are presented in Table 3. In the solutions presented vertically, the black circles (●) denoted the presence of a condition, crossed-out circles (⊗) indicate an absence of it, and blank spaces denote a ‘do not care’ situation in which the condition may be either present or absent [75]. Core elements of a configuration are marked with large circles (prime implicants), while peripheral elements with small ones. Please note that as demographics have been operationalized as crisp variables, Table 4 denotes whether a solution suggests the presence or absence of a particular dichotomous value for the examined condition. A black circle in the condition ‘Males’, which examines the gender of the sample, implies that the solution requires the presence of male travellers. A white circle in the same condition implies that the solution is applicable for female travellers (i.e. ‘absence’ of males). The same principles apply for the condition ‘Young Travellers’; black circles suggest that the solution applies to travellers of up to the age of 30 years, whilst white circles suggest that the solution applies to travellers over 30 years of age.

Configuration		Solution												
		1	2a	2b	3a	3b	4a	4b	4c	5	6	7a	7b	8
Demographics														
Males		●	●	●	⊗	⊗	⊗	⊗		⊗		●	●	●
Young travellers		●	●	●	⊗	⊗	●	●	●	●	●	⊗	⊗	●
Information Needs														
Pleasure and logistics		●	⊗	●	●	●	⊗	●	●	⊗	●	●	●	●
Transportation and weather		●	⊗	●	●	●	⊗		●	⊗	●	●	●	⊗
Testimonials			●	●	●	●	⊗	⊗	⊗	⊗	●	●	●	⊗
Use of Information Sources														
Formal information sources		⊗	⊗	●		●	●	●		●	●	●	●	●

Informal information sources	⊗	●	●	⊗	●		●	●	⊗	●	⊗	⊗	●
Information Barriers													
Digital Illiteracy	⊗	⊗	●	⊗		●	⊗	⊗	●	⊗	●	⊗	
Mistrust on online travel information	⊗	⊗	●	⊗	⊗	●	●	●	●	⊗	⊗	⊗	⊗
Consistency	0.906	0.956	0.955	0.953	0.935	0.926	0.971	0.956	0.908	0.971	0.974	0.987	0.962
Raw Coverage	0.046	0.018	0.023	0.041	0.036	0.019	0.027	0.044	0.016	0.042	0.104	0.014	0.015
Unique Coverage	0.025	0.011	0.011	0.013	0.021	0.007	0.003	0.009	0.008	0.012	0.065	0.007	0.005
Overall Solution Consistency	0.938												
Overall Solution Coverage	0.326												

Table 5. Configurations for achieving high levels of satisfaction from online sources regarding travel planning

The outcomes of the analysis present some diversity and demonstrate that achieving the same state of information satisfaction is attainable in multiple circumstances, therefore validating the first theoretical proposition of the study. Although in our research we focus on pinpointing the solutions that lead to high degrees of information satisfaction (i.e. values over the threshold 7.5), the same method may be employed to explore the combinations that lead to different perceptions of information satisfaction (e.g. conditions that explain unsatisfied individuals). The core solutions of the analysis are limited to eight, while some have different combinations of peripheral elements raising the total number of solutions to 13. From these 13 solutions, the first three describe combinations that are applicable to males, while the next two are for female travellers. Solutions 4_{a,b,c} and 5 apply to younger tourists, while the remaining four provide alternative combinations where gender and age are not core elements. Likewise, solutions 2_{a,b} and 8 profile the usage of informal online information sources, whilst solutions 4_{a,b,c} and 6–8 relate to the conditions that support the selection of formal information sources. Overall, results demonstrate that both formal travel websites and informal websites are significant contributors to user satisfaction yet for different types of information and for different profiles of users. From the solutions space, we can observe that a condition is not universally present in all configurations that explain high information satisfaction. Instead, the presence or absence of a condition is subject to its interrelations with other conditions, thus validating the second proposition of the study. The final section attempts to discuss in more detail the theoretical and practical implications of these findings.

5. Conclusions and Discussion

5.1 Summary of theoretical contribution

To date, there has been no comprehensive study investigating the relationship between information needs, sources, barriers/facilitators and user satisfaction within the context of online tourism. Extant research confirmed the complexity of travellers' online information search process and documented the necessity of devising informed decision aids to mitigate risks and uncertainty during travel-related online information seeking [14, 27, 28]. This study answers this challenge by providing an explanatory lens on the conditions leading travellers to choose among different online information sources to satisfy their travel planning information needs. Our findings validate scholars' consensus that travellers combine different online information sources to satisfy their information needs [16, 70]. In effect, expectations on satisfying these information needs dictate the selection of online information sources. Previous tourism information search studies have endorsed this relation to explain travellers' information channel preferences (i.e. selection of offline versus online information spaces) [20, 78]. Our research validates this viewpoint in the online information environment and extends it to also consider how this matching of information needs with specific types of online information sources may also warrant high information satisfaction.

To do so, our study develops additional linkages between information needs, information sources and information satisfaction under the prism of information barriers and personal characteristics. Scholars have recognized the importance of both trust perceptions on the quality/reliability of travel information that is published on the Internet [52], especially for information posted on online social networks [15, 53], and of personal characteristics (i.e. gender, age and information literacy [16, 68]) on the selection and usage intensity of online information sources. This research corroborates these claims and sheds additional light on the relation of these factors with information satisfaction.

This paper differentiates from the majority of previous studies on the area of online travel information seeking that use symmetric methods (e.g. multiple regression analysis) to analyse and explain an individual's online information-seeking behaviour. Specifically, we employ configurational analysis to examine asymmetric relationships among the constituents of the online information search process. This approach has recently received scholars' attention in the Information Systems discipline [79], and coupled with complexity theory, it may help in theory building [80]. Extant studies on the antecedents of satisfaction in online travel-related information seeking focus on the average effects of single variables rather than on the effects of combinations (sets) of several variables [11, 16, 20, 27, 35, 70, 81]. Thus, from a methodological standpoint, this study is the first to apply configurational analysis to explain information satisfaction in the context of online tourism. From a theoretical standpoint, our findings indicate complex patterns among travellers' information-seeking behaviour components and verify the proposed asymmetric relationships that may lead to high degrees of information satisfaction. Hence, this research paves the ground for the development of a traveller-centred theoretical model through the identification of alternative 'recipes' that may be considered as 'atypical' traveller profiles, which equally predict information satisfaction from consuming online travel information.

5.2 Elaboration on the information satisfaction paths

The information satisfaction paths disclose a number of interesting conclusions, which may be used by travel information stakeholders for the design of more traveller-centred search/display means within online information sources. Starting from the information needs, our study advocates that travellers searching for transportation and weather information visit formal online information sources (i.e. online travel agents, online travel guides and excursion organizers), whilst travellers seeking testimonials of other tourists tend to visit informal online information sources (i.e. tourist blogs, social media and review websites). These findings demonstrate the applicability of these types of information sources to meet specific information needs and confirm the documented information-seeking patterns in extant literature [5, 9, 82].

Moreover, travellers seeking for local information and attractions give equal priorities in both formal and informal online information sources. We attribute this behaviour to the two-stage information accumulation approach that usually characterizes the online information search process [28, 83]. Travellers seeking information pertaining to a particular destination tend to initially get informed through information aggregators, which outline the highlights of the destination under scrutiny and, then, confirm or expand their information space through reviewing other travellers' experiences. Interestingly, our study discloses a mutual exclusion between the formulation and expected satisfaction of information needs related to other tourists' experiences and the selection/utilization of formal online information sources. This observation questions the provision of social media features by formal information source providers and requires further investigation by scholars in future studies.

Our study also showcases the role of trust in the selection and consumption of online travel information. In effect, travellers that raise concerns regarding the accuracy and validity of provided information on the Internet prefer to use formal online information sources. This finding confirms the reported trust-related alarms regarding information posted on non-regulated online social networks [15, 52, 53]. Nevertheless, travellers that consider the available online travel information as trustworthy exhibit a mixed behaviour. One cluster (represented by solutions 3a and 3b) is rather indifferent in its information sources preferences and comprises female travellers over 30 years old. A second cluster (solutions 7a, 7b and 8), comprising male travellers, prefers to satisfy the accumulated travel information needs through formal information sources. This atypical profiling based on trust perceptions provides helpful insights regarding possible redirections of online travellers to candidate information sources to warrant high information satisfaction. Information literacy, as a barrier, seems to influence the selection of particular online information needs as indicated by solution 5. Specifically, individuals that report information literacy inadequacies also do not trust the information on the Internet and they do not expect to satisfy any of their travel planning information needs. As such, these individuals, comprising young travellers, will never use informal information sources. This creates a noteworthy niche paradox against the documented high utilization of informal information sources (e.g. blogs and online social networks) by young people [84]. Our findings suggest that even in younger people, the unstructured layout and organization of information within social media may create obstacles to individuals that do not possess the necessary information processing and search skills.

Finally, our study also confirms the influence of gender and age in the online information-seeking profiles of travellers [18, 68]. Males tend to prioritize satisfaction of information needs related to destination information (in terms of transportation and weather) through informal information sources; females also emphasise on transportation and weather travel information, but they do not attribute any core preference to a specific type of online information source. As mentioned earlier, travellers of younger ages do not seem to trust the available online travel information; thus, they do not expect to satisfy information needs related to learning about other visitors' experiences.

5.3 Implications for stakeholders in tourism development

The study findings reinforce the argument that travellers should be treated as 'hybrid' information consumers, relying on multiple information sources to meet their information needs. As such, tourism service providers and destination management organizations may devise appropriate marketing strategies that utilize the optimal mix of online information sources to reach out to their target audience and have higher rates of exposure. In effect, the fsQCA information satisfaction paths establish the generic search patterns that travellers follow when they seek for travel-related information on the Internet. Because the information-seeking patterns relate travel information needs with specific online information sources and demographic/personal traits, stakeholders in tourism development may exploit these traveller profiles to understand the underlying rationale of travellers' decisions and, ultimately, use more efficiently the different online information sources to develop more effective traveller-centric communication strategies and influence travellers' decision-making.

For example, our findings may inform the design of search engine marketing campaigns and/or search filters used by travel websites to better meet visitors' information needs. Search engine marketing comprises a strategic tool for online destination marketing by tourism industry stakeholders [85]. The fsQCA solutions describe how travellers select between different information sources according to their specific information needs and personal properties. Online marketers may link these needs and properties with product offerings and promotion campaigns within a website, employ them to adjust their search engine optimization practices, or use them for redirecting travellers to specific websites as part of organic or paid listings in search engines.

The information satisfaction paths that were identified through the fsQCA analysis may also serve as the basis for improving the functionality and interfaces of existing travel websites. Specifically, the produced traveller profiles may inform the development of personalization and recommender systems in the context of tourism information providers. Because such systems employ user modelling techniques [86], our methodology may help website designers to adapt the provided information based on the unique combinations of information needs, information source preferences, information barriers and personal characteristics of website visitors. An example of personalization feature that may be included in travel websites includes predictive search elements based on the information needs of travellers. Furthermore, the difficulties that visitors encounter with the search process may be fully

captured and understood and, as such, website designers may subsequently improve their online search experiences.

5.4 Summary of limitations

As with any empirical research, our findings should be interpreted with consideration of our study limitations. In effect, our survey variables were measured through self-reported items. As such, the calibration process of the information-seeking behaviour conditions and the outcome reflects the sample's subjective opinions. Future research may employ observed measures (e.g. measurement of information needs based on travellers' search patterns in online information sources, measurement of information literacy based on travellers' errors during the online search process, etc.). Moreover, the sample population was from a single travel agent in Greece and was dominated by young travellers (up to 30 years old). Extending the sample with more senior travellers and an international sample will certainly provide additional insights, even in the form of additional paths towards information satisfaction, in the online information search behaviour of travellers. Finally, our study adopted a utilitarian perspective on travel information needs. We acknowledge that travel information needs also have a hedonic element (e.g. pleasure from viewing destination images or videos on travel websites) [87]. Future research may incorporate these elements to the conceptual model and investigate their interactions with the information-seeking behaviour constituents and their effects on information needs satisfaction.

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Appendix A. Questionnaire

Variables	Items	Mean	S.D.
Pleasure and logistics (PLE)	<i>To what extent do you expect your information needs will be fulfilled in the following areas? (1 – not at all, 9 – totally)</i>		
[PLE_1]	Attractions	7.09	1.72
[PLE_2]	Events	6.53	1.92
[PLE_3]	Accommodation	7.36	1.62
[PLE_4]	Package tour	6.30	2.09
[PLE_5]	Entertainment	6.74	1.76
[PLE_6]	Activities	6.59	1.78
[PLE_7]	Local information	6.86	1.86
[PLE_8]	Flight	7.44	2.18
[PLE_9]	Restaurants	6.44	2.07
Transpiration and weather (TRA)	<i>To what extent do you expect your information needs will be fulfilled in the following areas? (1 – not at all, 9 – totally)</i>		
[TRA_1]	Weather	7.38	1.69
[TRA_2]	Map	7.45	1.80
[TRA_3]	Transportation	6.71	2.18
[TRA_4]	Rental cars	5.56	2.74
Testimonials (TES)	<i>To what extent do you expect your information needs will be fulfilled in the following areas? (1 – not at all, 9 – totally)</i>		
[TES_1]	Testimonials	5.71	2.22
[TES_2]	General information	6.20	1.81
Formal information sources (FIS)	<i>How frequently do you use the following sources for searching travel information online? (1 – never, 9 – all the time)</i>		
[FIS_1]	Travel guides	5.63	2.30
[FIS_2]	Travel agencies	4.56	2.63
[FIS_3]	Tourist offices (website)	4.50	2.49
[FIS_4]	Excursion organizers	4.01	2.50
Informal information sources (IIS)	<i>How frequently do you use the following sources for searching travel information online? (1 – never, 9 – all the time)</i>		
[IIS_1]	Social networks	5.62	2.75
[IIS_2]	Forums	4.96	2.49
[IIS_3]	Video-sharing websites	5.10	2.76
[IIS_4]	Encyclopaedias	4.58	2.61

Digital Literacy (DLIT)	<i>How much do you agree with the following sentences regarding the barriers faced when seeking online travel information? (1 – not at all, 9 – totally)</i>			
	[DLIT_1]	I am not confident with using a computer	4.04	2.09
	[DLIT_2]	I am not familiar with searching information online	4.30	2.01
Trust (TST)	<i>How much do you agree with the following sentences regarding the barriers faced when seeking online travel information? (1 – not at all, 9 – totally)</i>			
	[TST_1]	Online sources that provide travel information are untrustworthy	2.85	2.49
	[TST_2]	There are online information travel sources with inaccurate information	2.96	2.48
Satisfaction (SAT)	<i>How much do you agree with the following sentences regarding the satisfaction perceived when seeking online travel information? (1 – not at all, 9 – totally)</i>			
	[SAT_1]	I am happy with the information I receive when searching travel information	6.58	1.55
	[SAT_2]	In sum, I am satisfied with the information I find when looking for travel-related topics	6.65	1.54
	[SAT_3]	I general terms the information I find satisfies my needs	6.68	1.53
	[SAT_4]	I am unhappy with the travel information I find from online sources (R)	6.71	1.84

Appendix B. Measurement Model Statistics

	PLE	TRA	TES	FIS	IIS	TST	DLIT	SAT
[PLE_1]	0.738	0.564	0.350	0.193	0.101	0.181	-0.114	0.323
[PLE_2]	0.706	0.428	0.202	0.170	0.095	0.109	-0.098	0.223
[PLE_3]	0.731	0.577	0.332	0.149	0.114	0.064	-0.122	0.316
[PLE_4]	0.743	0.442	0.296	0.201	0.259	-0.034	-0.066	0.237
[PLE_5]	0.745	0.375	0.271	0.195	0.289	0.064	-0.070	0.265
[PLE_6]	0.778	0.457	0.338	0.206	0.300	0.073	-0.096	0.277
[PLE_7]	0.728	0.620	0.433	0.212	0.199	0.088	-0.139	0.363
[PLE_8]	0.760	0.635	0.447	0.221	0.277	-0.025	-0.185	0.397
[PLE_9]	0.705	0.559	0.408	0.181	0.163	-0.010	-0.167	0.355
[TRA_1]	0.508	0.707	0.305	0.220	0.130	0.070	-0.048	0.224
[TRA_2]	0.612	0.764	0.390	0.205	0.142	0.065	-0.191	0.382
[TRA_3]	0.621	0.817	0.485	0.245	0.220	-0.010	-0.124	0.365
[TRA_4]	0.418	0.706	0.491	0.275	0.112	-0.058	-0.090	0.206
[TES_1]	0.492	0.542	0.843	0.347	0.183	-0.030	-0.091	0.299
[TES_2]	0.380	0.484	0.929	0.272	0.266	-0.077	-0.019	0.313
[FIS_1]	0.285	0.299	0.326	0.706	0.324	-0.011	-0.053	0.171
[FIS_2]	0.203	0.304	0.270	0.866	0.337	0.042	0.044	0.091
[FIS_3]	0.173	0.226	0.265	0.894	0.329	0.100	0.057	0.052
[FIS_4]	0.228	0.234	0.268	0.867	0.371	0.085	0.087	0.052
[IIS_1]	0.174	0.111	0.150	0.259	0.745	0.006	-0.016	0.075
[IIS_2]	0.277	0.194	0.260	0.354	0.816	-0.069	-0.066	0.269
[IIS_3]	0.168	0.122	0.215	0.334	0.867	-0.044	0.061	0.086
[IIS_4]	0.268	0.203	0.184	0.340	0.750	-0.004	0.044	0.109
[TST_1]	-0.071	-0.081	-0.158	0.140	-0.023	0.755	0.317	-0.409
[TST_2]	0.143	0.066	0.002	0.007	-0.041	0.928	0.069	-0.123
[DLIT_1]	-0.159	-0.145	-0.057	0.027	-0.008	0.172	0.977	-0.262
[DLIT_2]	-0.159	-0.145	-0.049	0.052	0.019	0.187	0.979	-0.271
[SAT_1]	0.475	0.448	0.346	0.260	0.307	-0.086	-0.130	0.822
[SAT_2]	0.467	0.439	0.357	0.247	0.316	-0.066	-0.154	0.837
[SAT_3]	0.498	0.451	0.384	0.268	0.320	-0.067	-0.152	0.822
[SAT_4]	0.121	0.100	0.135	-0.159	-0.109	-0.393	-0.307	0.719

Table 5. Factor loadings (bolded) and cross-loadings of reflective constructs

Panos E. Kourouthanassis is an Assistant Professor at the Ionian University, Corfu, Greece. His main research interests lie in the areas of electronic government, electronic commerce, pervasive computing and information systems management. He has published more than 50 articles in international journals, edited volumes and international conferences including the *Journal of Business Research*, the *Journal of Strategic Information Systems*, the *Journal of Information Technology* and the *International Journal of Electronic Commerce*.

Patrick Mikalef is a Marie Skłodowska-Curie post-doctoral research fellow in the area of Information Systems Strategy. He received his B.Sc. in Informatics from the Ionian University, M.Sc. in Business Informatics from Utrecht University and his Ph.D. in IT Strategy from the Ionian University. His research interests are on strategic use of information systems and IT-business value in turbulent environments.

Ilias O. Pappas holds a Ph.D. in business management and informatics and is currently a post-doc fellow at the Department of Computer and Information Science, NTNU, Norway. His research activities focus on the areas of strategic university-industry R&D partnerships, technology transfer and commercialization, technological entrepreneurship, innovation, Internet marketing, and information technology adoption. He has published articles in international journals and international conferences including *Journal of Business Research*, *Electronic Markets* and *International Journal of Retail and Distribution Management*.

Petros A. Kostagiolas is an Assistant Professor of information services management at the Department of Archives, Library Science and Museology, Faculty of Information Science and Informatics, Ionian University, Greece. He holds a Ph.D. in production management from the University of Birmingham, UK. His research interests include information services management, quality management, and user information behaviour in various settings.