EXTENDED ABSTRACT

EVALUATION OF THE ATTRIBUTES OF THE CHATBOTS THAT MOST EFFECTIVELY INTERACT WITH THE TOURIST: CASE STUDY OF THE CHATBOT "VICTORIA LA MALAGUEÑA"

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1. INTRODUCTION

Information technologies have caused important changes in travel processes (Xiang *et al*., 2015a) and in the tourist management of destinations (Buhalis and Amaranggana, 2013; Gretzel *et al*., 2015). Smart destinations are complex ecosystems that apply Smart Tourist Technologies [STTs] (Boes *et al*., 2016; Gretzel *et al*., 2015) to create personalized communication with tourists, in real time, and generate more satisfactory tourist experiences (Buhalis and Amaranggana, 2013; Ivars-Baidal *et al*. 2019; Pai *et al*., 2020). Thus, STTs are adopted in tourist destinations with the aim of improving the tourist experience (Ivars-Baidal *et al*., 2019).

Currently, tourism service providers and destinations have begun to use dialog systems for communication with travellers. One such example is chatbots. This technology interacts with users through natural language conversations (Shawar and Atwell 2007), either in the form of text or voice commands or both. As such, chatbots generate appropriate responses to user queries (Khan and Das, 2018), responding in a flexible and interactive way in conversations with humans (Chaves and Gerosa, 2019).

The implementation of chatbots generates benefits for hotels, restaurants, airlines (Buhalis and Yen, 2020), tourist attractions (Sano *et al*., 2018) and tourist destinations (Arteaga *et al*., 2019). However, academic studies on chatbots in tourism are still scarce (Ivanov and Webster, 2017). They have focused solely on the design and development of the system architecture (Sano *et al*., 2018 and Clarizia *et al*., 2019). In fact, there is a research gap in tourist behaviour when using chatbots, that is, the perception they have concerning the usefulness of their attributes. Some researchers have measured the effectiveness of STTs at destinations (Lee *et al*., 2018; No and Kim, 2015; Yoo *et al*., 2017). To

achieve this, they categorized the STTs according to four unique attributes, such as informativeness, interactivity, accessibility and personalization. Based on these studies, this research also examines the role of the empathy attribute, which is key in tourist-chatbot interactions. Thus, the purpose of this paper is to measure the effectiveness the attributes of the STTs in a destination chatbot to find out the perception of the tourist during its use.

2. LITERATURE REVIEW

Tourism service chatbots are found throughout the destination value chain, for example, in restaurants (Hsu *et al*., 2017), hotel chains (Lasek and Jessa, 2013), transportation (Negi *et al*., 2009). Airline companies like KLM, Austrian Airlines, SWISS, or companies like Kayak use chatbots to fulfil flight booking requirements. There are also chatbots that specialize in travel planning and updating reservations in tourist services [Hello Hipmunk and Mezi].

In the very near future, chatbots will be the interface of preference for many of the activities that tourists are currently accustomed to doing on a web page or a specific application, facilitating and making interactions and experiences more comfortable (Følstad and Brandtzæg, 2017). However, to achieve this, chatbots must have the ability to generate effective responses to user requirements. Their interface should be easy to use and share and displaying emotional cues and empathic cues during a conversation will create a more positive perception of the interaction and help improve the user experience. Therefore, it is essential to understand the quality of chatbots' attributes.

STTs are disrupting the tourism industry in terms of communication, travel experience and customer service (Hew *et al*., 2018), that is, they are the new actors that bring competitiveness and sustainability to the destination (Jeong and Shin, 2020). STTs could be defined as the set of both general and specific applications that can improve the tourist experience (Pai *et al*., 2020) and generate added value (Neuhofer, Buhalis and Ladkin, 2015).

Informativeness refers to the synergy between the quality and reliability of the information provided by STTs in tourist destinations (Huang *et al*., 2017; No and Kim, 2015). Informativeness in this study refers to the tourist's perception of receiving relevant, reliable and quality information from the chatbot during a conversational session. In formativeness is an antecedent that influences the user's confidence in using chatbots (Yen and Chiang, 2020) and a reason that impacts the willingness of travellers to adopt and use travel chatbots (Hamed, 2021)

Interactivity is the level of continuous and immediate communication that a tourist has during the trip, using an intelligent technology system (No and Kim, 2015). In this study, interactivity is understood as perceptions in terms of responsiveness and the ease with which the content generated during interaction with the chatbot can be shared. Interactivity is an attribute that positively influences the continued use of chatbots (Li *et al*., 2021).

Accessibility is the degree of ease with which a tourist accesses the information source during the trip using as mart technology system, such as the internet or mobile applications (No and Kim, 2015). In this study, accessibility refers to the ease that the user has in terms of use to the content of the chatbot. It is the most influential attribute in the tourist experience with technologies (Pai *et al*., 2020). It is a factor that determines the usability of STTs (Muhtaseb *et al*., 2012) and an essential attribute to measure the service quality of a chatbot (Meerschman and Verkeyn, 2019).

Now, developments in accessibility for software and applications are not undergoing major technological progress (Torres *et al*., 2018), that is, achieving accessibility in STTs has not been an easy task. Therefore, tourism technologies could have a negative impact if they do not reach a high level of accessibility. Thus, previous studies have shown that accessibility was not a main factor for tourists to maximize a memorable experience in the destination (Jeong and Shin, 2020). Similarly, Melián-González *et al*. (2021) showed that ease of use had a negative effect on the intention to use a chatbot. Lastly, accessibility turns out to be less important for tourist satisfaction and service experience at the destination (Lee *et al*., 2018).

In the field of technology, empathy is the humanoid ability to identify, understand, and react to the thoughts, feelings, behaviours and experiences of others (Murray *et al*., 2019). In the case of chatbots, empathy is an affective mode of understanding that involves emotional resonance (Hu *et al*., 2018). In this study, empathy refers to the ability of the chatbot to respond to the user in an empathetic way.

The empathic characteristic is an essential attribute when trying to appraise the quality of service of a chatbot (Johari and Nohuddin, 2021). Various studies have focused on understanding the effects of empathy and the emotions generated in human-chatbot communication (Portela and Granell-Canut, 2017, Ho, Hancock and Miner, 2018, Alam, Danieli and Riccardi, 2018). A chatbot that uses an empathetic tone has significant effects on user satisfaction and reduces negative emotions such as anxiety, frustration, and sadness (Hu *et al*., 2018). Furthermore, chatbots must have social skills and empathy to gain the trust of users (Zhou *et al*., 2020).

3. METHODOLOGY

The case study focused on the tourist destination chatbot "Victoria la Malagueña". The research was based on an experiment with students from the Universitat Rovira i Virgili, Spain, between October and November 2019, applying the convenience sampling technique. The experiment comprised three phases: the first consisted of explaining to various groups of students the use of smart technologies in tourism and especially chatbots. In the second phase, the participants had to interact with the "Victoria la Malagueña" chatbot for 5 minutes, during which time they made inquiries about the destination Malaga regarding tourist activities and services there. In the third phase, after experiencing the conversational session with the chatbot, the participants were asked to fill out a questionnaire about their experience using this STT.

The questionnaire was developed from previous studies and contained 20 items in total. The items that measured STTs' informativeness, accessibility and interactivity were adapted from previous studies (Luo and No; Kim, 2015; Pavlou *et al*.; 2007, Lee *et al*., 2018); and those that measured perceived empathy were designed by the authors based on the studies by Chaves and Gerosa (2019); Paiva *et al*. (2017) and Zhou *et al*. (2020). All items were measured on a seven-point Likert scale (1=strongly disagree, 7=strongly agree). A pilot study was carried out with 25 participants that served to make minor adjustments to the questionnaire.

For data analysis, the SPSS 25 and AMOS 24 statistical software tools were used, such as univariate descriptive analysis, exploratory and confirmatory factor analysis.

4. RESULTS

The main topics that the participants in the experiment asked the chatbot "Victoria la Malagueña", according to a ranking of interest, were gastronomy, tourist routes, museums, transport and monuments. Most of the participants were aged between 18 and 24 years old (96.4%) (See Table 1). In relation to gender, 29.1% were men and 70.9% women. Four out of ten participants spend three hours a day browsing the internet in search of entertainment, followed by 28.7%, who spend five hours a day doing so. More than half of the participants (51.4%) travel for tourism once a year, with a higher percentage of women. While 22.3% do so twice a year, in this case it is men who travel the most. Therefore, there were statistically significant differences in relation to gender and frequency of tourism.

The Kaiser-Meyer-Olkin value of the data was 0.887. Bartlett's sphericity test obtained as a result (χ^2 = 2698.610, p < 0.001). In order to obtain significant and interpretable factors, the principal axes extraction and factorization method and the promax oblique rotation technique were selected. As a result of the EFA, it was found that the model forms a structure of four dimensions: informativeness, empathy, accessibility, and interactivity.

For the CFA, the maximum likelihood method was used. Statements INT2, EMP5, and EMP6 had to be removed because their standardized factor loading did not exceed the suggested limit of 0.40 (Ford, Mac Callum, and Tait, 1986). After rectification of the model, the AMOS output reflected a better fit of the model, as suggested by Hair *et al*., 2010 χ^2/df = 2.146, CFI = 0.943, RMSEA = 0.068, IFI = 0.943, SRMR 0.074).

The individual reliability analysis of the indicators exceeded 0.5, which is acceptable (Hair *et al*., 1998). The internal consistency of the constructs was analysed with Cronbach's alpha and Composite Reliability, which were greater than 0.70 (Fornell and Larcker, 1981). The values of the mean variance extracted from all the attributes were close to the limit of 0.05. All standardized factor loadings on the latent construct exceeded 0.6 and were statistically significant (p < 0.001). Thus, our scale demonstrated convergent validity (Hair, Black, Babin and Anderson, 2010)

Discriminant validity was confirmed because the diagonal of the correlations between the intra-constructs were values lower than the square root of the AVE (Fornell and Larcker, 1981). This means that the study indicators explain the construct to which they belong and not other constructs.

In formativeness was the attribute scored highest by users after their conversation with the destination chatbot "Victoria la Malagueña". (INF1: λ = 0.848, p <0.001); but they valued even more highly the fact that this information was useful to them (INF4: λ = 0.883; p <0.001), that the information provided in the answers was detailed (INF3: λ = 0.883; p <0.001), and that it was relevant information for what they were looking for at that moment in the destination (INF6: λ = 0.883; p <0.001).

The results show that the second most rated attribute by the users of the study chatbot was empathy, with an explained variance (EV= 12.357; eigenvalue = 2.348) and presenting reliability, convergent and discriminant validity. This means that users perceived empathy in the responses generated by the "Victoria" chatbot. Users perceived a degree of positive impression or satisfaction when the "Victoria" chatbot answered them with affective words (EMP2: λ = 0.758; p <0.001), arousing an emotional state of

fun (EMP1: λ = 0.760; p <0.001), which led them to state that they enjoyed talking to "Victoria" (EMP4: λ = 0.726; p <0.001).

The third most highly valued attribute of the "Victoria" chatbot by users was accessibility. This factor obtained an explained variance (EV= 8.354; eigenvalue = 2.051). The results showed that the ease of logging in at any time (AC1: λ = 0.953; p <0.001) was what users valued the most regarding accessibility, at some distance from the rest of the items. This aspect ids followed by the chatbot's visual and intuitive interface that simulates a natural conversation between two people (AC2: λ = 0.752; p <0.001). Finally, they valued that the chatbot did not involve a complicated registration process, that is, that the registration process was easy (AC3: λ = 0.653; p <0.001).

Interactivity was the fourth attribute of the STTs rated by users in this study with respect to the "Victoria" chatbot. It obtained an explained variance (EV= 6.056; eigenvalue = 1.721). In our study, users rated first the ease of sharing information with other users (INT3: λ = 0.739; p <0.001), followed by response speed (INT1: λ = 0.752; p <0.001) and the fact that the chatbot always answered the tourists' questions (INT2: λ = 0.634; p <0.001).

5. CONCLUSIONS

The study shows that of the four attributes of the STTs analysed, in formativeness was the attribute most valued by users in the conversation with the target chatbot. It is the factor that users perceive as the most important when looking for tourist information using a chatbot. These results coincide with previous studies, which showed that quality information helps tourists with organizing their trip and making decisions (Yoo *et al*., 2017) and helps to generate satisfactory tourist experiences (Wang and Lin, 2012).

Empathy is the second highest rated attribute and thus proves to be a very important feature of chatbots. The high assessment of the empathy attribute is the main theoretical contribution of this research, since it demonstrates the need to add empathy to the attributes of the STTs found by No and Kim, 2015.

The study shows that the third most valued attribute in the destination chatbot is accessibility. The participants agree that chatbots are a new channel for accessing tourist information online and are used to search for information during the trip. What they value most is being able to access this information system 24/7 from any mobile device. The study shows that destination chatbots offer the tourist an intelligent support and information system, which can suggest in real time where to go or what activity to do, encouraging visitors to better explore the destination (Gretzel *et al*., 2015).

Finally, it has been shown that interactivity is also an important attribute that is highly valued by users or tourists. This study corroborates studies that previously showed that high interactivity increases user cognitive satisfaction (Kim, Son and Suh, 2012) and leads to more positive perceptions of information technologies (Berthon, Pitt and Watson, 1996).

This research is of great interest to the creators of chatbots, who must prioritize or pay special attention when designing them to the aspects most valued by users. The study is also very useful for destination marketers, because it will help them offer tourism information and services via chatbots according to user demand and with high levels of personalization.

A limitation of the study is the sample of the participants in the experiment, which is mostly a young audience. Future work could analyse the chatbots of tourist services for the purpose of validating the scale. Likewise, it would be interesting to measure the impact of the attributes of destination chatbots on the user's intention to visit (Chung *et al*., 2015); or the image formation of destinations.