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Determinants of intentions to use a pilgrimage app: a cross-cultural comparison

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The main aim of this study is to examine which features pilgrims from six nationalities walking the Camino de Santiago most value in a pilgrimage app and to determine which ones most influence intentions to use it. Data were collected through an online questionnaire. The 911 responses were analysed using ANOVA and PLS-SEM. The features related to general information are the strongest predictor of intentions to use a pilgrimage app and there is only one significant difference among nationalities regarding the determinants of intentions to use it. The findings of the study are useful for the development of pilgrimage apps.

Key Words: Camino de Santiago, cross-cultural, mobile Apps, multi-group analysis, pilgrimage, PLS

Introduction

Smartphones and mobile applications (apps) have become a regular part of modern daily life. According to Statista (2018a), the number of smartphone users worldwide will reach 2.87 billion in 2020. It is estimated that by 2020, mobile apps will generate around 189 billion U.S. dollars in revenue via app stores and in-app advertising (Statista, 2018b). As a result, it is not surprising that tourism-related firms and organisations are increasingly developing mobile apps in order to provide additional services to tourists and increase revenues. It is predicted that by 2021, half of all digital travel sales will be mobile (eMarketer, 2017). Travel apps are not only useful for bookings, they also provide a wide range of resources, from information on the destination to itinerary planning.

Due to their importance, the use of mobile apps has attracted tourism researchers' attention. For instance, there is research focusing on the factors that most influence travel apps adoption (e.g. Lai, 2015; Lu *et al*., 2015), on how the use of travel apps has changed tourists' behaviour and even their emotional states (Wang *et al*., 2012). Law *et al*. (2018) evidence the growing interest in mobile technology research by the increasing number of publications in tourism-related journals.

It has been acknowledged that apps can also be very useful to pilgrims, a specific type of tourists for example, by indicating the best route to take, where to stay, or points of interest (Antunes & Amaro, 2016b). Pilgrims can be considered tourists (Collins-Kreiner, 2010; Collins-Kreiner & Gatrell, 2006; Olsen & Timothy, 2006) that may have specific needs for a pilgrimage app. However, research addressing the use of apps by pilgrims is scarce.

Therefore, this study examines which features most influence pilgrims' intentions to use a pilgrimage app. Furthermore, it compares if these features differ regarding the nationality of the pilgrims (American, Brazilian, German, French, Portuguese, and Spanish). Pilgrims on the popular pilgrimage route of Santiago de Compostela (Camino de Santiago) were selected for the purpose of the study. The findings provide useful insights to app developers and to Camino de Santiago stakeholders, such as the Government of Galicia, accommodation and service providers, and non-governmental organisations that want to communicate with pilgrims from different nationalities using new technologies.

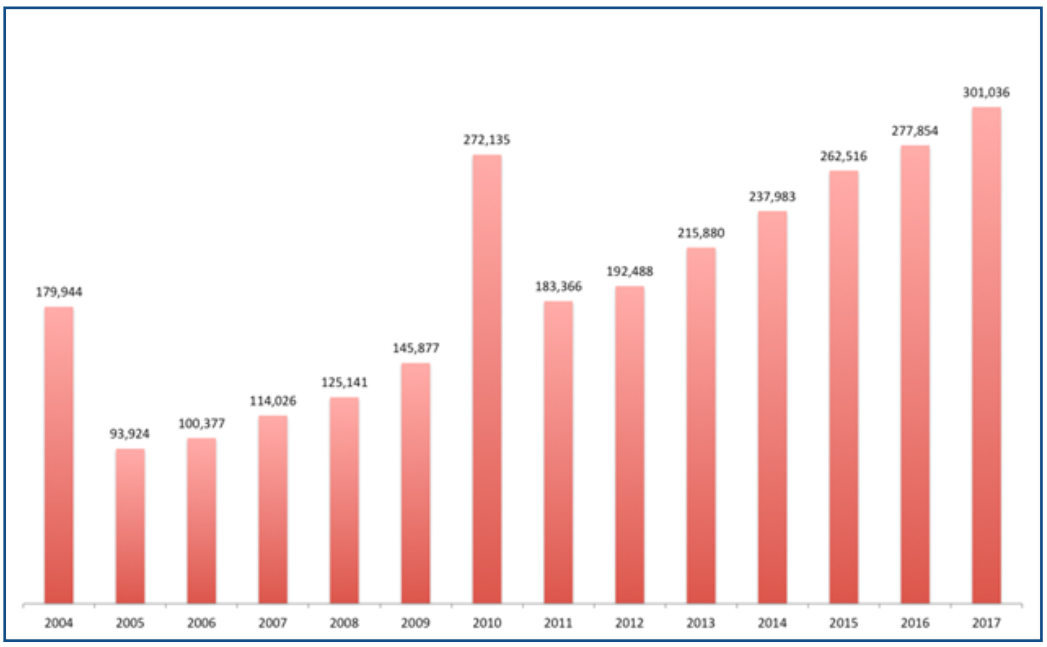
Literature Review

Camino de Santiago

The Camino de Santiago, known in English as the Way of Saint James, is a pilgrimage route that leads to the shrine of Saint James in Santiago de Compostela, in the north-western area of Spain. It is one of the oldest religious routes as its origin goes back to the 9th century, after the discovery of the remains of Saint James the Apostle (Correia *et al*., 2017). After a period of crisis of pilgrimage in the 16th century, it was only at the end of the 20th century that an important revitalisation of the route happened (Santos, 2002). Santiago de Compostela's historical centre was recognised as World Heritage Site by UNESCO in 1985 and in 1987 the Way of Saint James was considered the first European Cultural Route. These accomplishments, along with strategies and initiatives to promote the way as a tourism route, have led to a significant increase of pilgrims over the years. Lois-González *et al*. (2018) argue that cinema, literature, TV shows and social media have had an undeniable role in spreading the Santiago phenomena. Figure 1 demonstrates the increase in the number of pilgrims arriving to Santiago de Compostela in the past 15 years, in particular in the Holy Years, the years in which St. James day (July 25th) falls on a Sunday. The most recent Holy Years displayed in figure 1, were 2004 and 2010. It is interesting to note is that in 2016 and 2017, the number of pilgrims surpassed the number of pilgrims of the previous Holy Year (2010), which clearly illustrates the significant growth in the number of pilgrims on the Camino de Santiago. Being a pedestrian route, most of the pilgrims (90%) arrive on foot. By stimulating religious tourism, the Camino de Santiago has turned tourism into one of Galicia's main economic activities (Santos, 2002).

There are many ways to reach the Cathedral of Santiago de Compostela, but the most travelled ones are the French Way (62%), the Portuguese Way (17%) and the Northern Way (6%) (Pilgrim's Welcome Office, 2018). To accredit the completion of the route, pilgrims are awarded a certificate called the *Compostela*. In order to receive it, pilgrims must walk or ride on horseback at least the last 100 kilometres or cycle the last 200 kilometres, and collect at least two stamps each day on their credential (obtained, for example, where they sleep or at others places they visit such as churches). Another condition is to have made the pilgrimage for religious reasons (Pilgrim's Welcome Office, 2018), which may falsify the real motivations for making the pilgrimage. The official statistics show that in 2017, more than 90% claim religious motivations (Pilgrim's Welcome Office, 2018). However, despite the route's original religious essence, recent research has shown that Santiago's pilgrims are now mostly motivated by spiritual aspects

Figure 1 – Number of Pilgrim Arrivals to Santiago de Compostela between 2004 and 2017



Source: Own elaboration based on data from the Pilgrim's Welcome Office (2017)

Table 1 – Pilgrims of the Camino de Santiago by nationality in 2017

Nationality	Number of Pilgrims	%
Spanish	132,479	44.01%
Italian	27,073	8.99%
German	23,227	7.72%
American	17,522	5.82%
Portuguese	12,940	4.30%
French	8,835	2.93%
Irish	6,643	2.21%
English	5,768	1.92%
Brazilian	5,113	1.70%
Other countries	61,436	20.41%
TOTAL	301,036	100%

Source: Pilgrim's Welcome Office (2017)

and are searching for new experiences (Amaro *et al*., 2018). With such a rich and diverse heritage, this route satisfies the needs of all pilgrims, irrespective of their motivations and expectations (Correia *et al*., 2017). It also attracts pilgrims from many different countries as can be seen in Table 1.

Pilgrims on the *Camino de Santiago* are mostly Spanish, followed by Italians, Germans and Americans. Considering the past three years, the growth rate of American, German and Brazilian pilgrims has been very significant. In fact, the increase in the total number of pilgrims over the past years, as seen in Figure 1, is due to other nationalities and not due to the Spanish that actually registered fewer pilgrims in 2017 when compared to 2014. In 2014, other nationalities represented 17% of the total number of pilgrims, while in 2017 they represented 35%.

Technology usage in Travel

New technologies have undeniably revolutionised the way travellers plan, purchase, and travel. In particular, the development of mobile apps has transformed the tourism industry, with more than 66% of travellers having at least one travel app installed on their smartphone (Travelport Digital, 2017). Travellers can easily use mobile apps to search for a nearby restaurant, get weather updates or navigate with GPS. In fact, travellers prefer apps rather than mobile websites due to their speed, additional functionalities and better overall user experience (Travelport Digital, 2017).

The motives for travellers to adopt mobile technologies for travel-related purposes have been extensively studied and actually represent the most popular research topic in the mobile technology literature pertinent to hospitality and tourism (Law *et al*., 2018).

One of the factors that affect traveller's adoption of mobile technologies is utilitarian factors, such as perceived usefulness and ease of use. Indeed, usefulness (e.g. 'I would find the smartphone / travel app useful in my travel activities' and 'Using the smartphone / travel app enables me to accomplish tasks more quickly') are the most influential determinants of travellers' use of smartphones for their travel activities (No & Kim, 2014). Several studies have evidenced the importance of perceived usefulness on intentions to use mobile travel technology (Kim *et al*., 2008; Lai, 2015; Lu *et al*., 2015; Oh *et al*., 2009; Peres *et al*., 2011). Not only should they be useful, but they should also be relevant. Kim *et al*. (2013) found that consumers' usage intention of travel mobile services was influenced by the information quality they provided (e.g. 'Offers accurate tour information' and 'Offers information that the tourist needs'). Ease of use has also been found to be important to adopt travel mobile technology, however its impact is much lower than perceived usefulness (e.g. Kim *et al*., 2008; Lai, 2015; No & Kim, 2014; Oh *et al*., 2009).

Hedonic factors have also been found to influence the adoption of mobile-related technology in the tourism field (Law *et al*. 2018). For instance, Lai (2015) found that entertainment was one of the most important determinants of intentions to adopt a mobile tour guide.

Pilgrims' use of Technology

Despite the extant literature addressing the use of mobile technology in the hospitality and tourism field, research regarding the use of technologies in religious settings is not abundant. Despite the scarce research, this does not reflect that they can also be a resourceful instrument in these settings. For instance, Narbona & Arasa (2016) analysed the features of a religious app created for the beatification of Álvaro del Portillo which occurred in Madrid in 2014. They concluded that the app provided useful information to support the attendees (spiritual, touristic, organisational) and overall it improved their spiritual and touristic experience. In a different study, Brubaker & Haigh (2017) found that individuals that engage with religious content on Facebook obtain spiritual benefits from the faith-based contents that other users share. The study also showed that other benefits included obtaining religious information and entertainment that was relaxing. These studies demonstrate that technologies are being used for religious purposes and can be a useful resource. It should be noted, however, that some researchers have pointed out that using new technologies have a negative impact on pilgrims' spiritual experience (e.g. Qurashi & Sharpley 2017).

In the specific context of pilgrims' use of technology during their pilgrimage, one of the first published studies to address this issue was conducted by Nickerson *et al*. (2014). They examined the diffusion of mobile technology and smartphone apps among pilgrims on the Camino de Santiago. Despite 77% of the respondents reporting that they had brought mobile devices, only 19% used a Camino specific app. Furthermore, they found that those who recognise that mobile technology fits well with the way they will walk the Camino and those who feel that it will make it easier to walk the way are more likely to carry a mobile device. The results of their study seem to suggest that although few pilgrims are using pilgrimage apps, a high percentage do take their mobile devices with them. Therefore, there is an opportunity to enhance pilgrim's potential use of pilgrimage related apps.

Mohandes (2015) discusses the advantages of using the technology of Near Field Communication (NFC) while performing Hajj, a pilgrimage that involves millions of people from around the world to Saudi Arabia. NFC enables electronic devices, such as mobile phones, to establish communication. For instance, using this technology during Hajj allows pilgrims to download an audio file to guide them if necessary or to assist them in finding their camp if they get lost (Mohandes 2015).

Nickerson & Eng (2017), considering pilgrims on the Camino de Santiago, focused on which features were more important for a pilgrimage app. The eight most important features were 'Accuracy / currency of information', 'Usability', 'Listings of albergues', 'Route maps', 'Ability to use offline', 'Town maps', 'Cultural and historical information', and 'Listings of hotels / inns'. Most of these features are related to the utilitarian facet, which is a major reason why travellers, in general, adopt mobile technology, as discussed in the previous section. Indeed, just like travellers, pilgrims use mobile technology not only due to its utilitarian benefits but also because of its hedonic features. This can be seen in Antunes & Amaro's (2016b) study that found performance expectancy, a concept similar to perceived usefulness, and hedonic motivates were important determinants of intentions to use a pilgrimage app. That study also found that effort expectancy (similar to 'ease of use') and social influence affected pilgrims' intention to use a pilgrimage app.

A different study conducted by the same authors (Antunes & Amaro, 2016a) examined which features were more important in a pilgrimage app. The study performed a factor analysis and found that the 24 features considered could be grouped into 3 factors: General, Leisure, and Religious. The study concluded that all factors are important to adopt the app, but the most significant one is General features.

One of the main aims of the current study is precisely to extend Antunes & Amaro's study (2016a) by comparing the importance given to possible features of a pilgrimage app among the different nationalities. In the tourism field, several studies have shown that nationality influences travellers' behaviour in many ways. For instance, it influences information search behaviour (Gursoy & Umbreit, 2004), social media use for travel purposes (Amaro & Duarte, 2017) and adopting mobile augmented reality at cultural heritage sites (Jung *et al*., 2018).

Regarding pilgrims, Nickerson & Eng (2017) compared American and European pilgrims and found that the former rated all of the 19 features presented for a Camino de Santiago app higher than the latter, and for 17 features the differences were significant.

Based on the literature review and on the fact that there are limited studies regarding pilgrimage apps, the aims of this study are to:

- Compare the importance given to 24 pilgrimage app features among different nationalities
- Examine which type of features most influence intentions to use a pilgrimage app and if they differ by nationality, for which the following hypotheses are proposed:

  H1: General information features in a pilgrimage app affect pilgrims' intention to use the app

  H2: Leisure features in a pilgrimage app affect pilgrims' intention to use the app

  H3: Religious features in a pilgrimage app affect pilgrims' intention to use the app

  H4: Determinants of pilgrims' intention to use a pilgrimage app differ regarding nationalities

Methodology

An online questionnaire was designed to assess the importance of 24 possible features for a pilgrimage mobile app. The complete list of the items is provided in the appendix. Respondents were asked to rate the importance of these features on a 5-point Likert scale, where 1= Not Important and 5= Very Important. The questionnaire also included two questions to measure pilgrims' intention to use a pilgrimage app using a 5-point Likert scale, where 1= Totally Disagree and 5= Totally Agree.

The questionnaire was distributed online, aimed at people who had walked the Camino de Santiago at least once and was available in several languages (English, Spanish, Portuguese and German). Links to the questionnaire were posted in Camino de Santiago Facebook Groups and the Association of Pilgrims shared the survey among pilgrims.

With the 911 valid responses received, a descriptive analysis was performed on the 24 pilgrimage app features individually, and in addition, differences among nationalities were examined. ANOVA (Analysis of Variance) was used to compare the importance given to these features by nationalities.

To be consistent with the previous work by Antunes and Amaro (2016a) on the same data, the current analysis uses the results of the factor analysis conducted by the authors to test the capability of the dimensions to predict the acceptance of a mobile app. The three dimensions used are general information, leisure, and religious.

The hypotheses were tested using PLS with SmartPLS 3 (Ringle *et al*., 2015). A Multi-Group Analysis (MGA) was employed to test H4 and compare the intentions to use a pilgrimage app by pilgrims from six nationalities.

Results

A total of 1,140 responses was received, from 43 nationalities. To make the comparison useful only the most represented nationalities in the sample were included. By examining the cumulative distribution of responses it was established that only nationalities with at least 65 responses would be considered for the purpose of this study as they represent 80% of the total number of responses of the initial sample. As a result, 911 responses were used, representing Americans

Table 2 – Sample characterization

Nationality	Gender		Education level					Marital Status			
	Female	Male	Basic Level	High School	Under-graduate	Graduate	PhD	Single	Mar-ried	Divorced	Living Together
Brazilian	44.1%	55.9%	2.9%	23.5%	39.7%	26.5%	7.4%	19.1%	63.2%	16.2%	1.5%
German	51.4%	48.6%	29.4%	25.7%	22.1%	19.9%	2.9%	36.8%	55.6%	6.9%	0.7%
Spanish	34.8%	65.2%	27.8%	19.7%	38.4%	9.1%	5.1%	28.9%	58.3%	11.3%	1.5%
French	40.6%	59.4%	27.3%	13.6%	28.8%	22.7%	7.6%	13.0%	72.5%	11.6%	2.9%
Portuguese	34.3%	65.7%	35.2%	4.6%	40.6%	15.0%	4.6%	34.1%	55.1%	10.2%	0.6%
American	69.2%	30.8%	3.1%	6.2%	50.8%	33.8%	6.2%	29.2%	49.2%	18.5%	3.1%
Total	40.8%	59.2%	27.2%	13.5%	37.0%	17.3%	5.0%	30.3%	57.4%	11.1%	1.2%

Table 3 – Intention to use a Pilgrimage app

Nationality	The probability of using a pilgrim route app will be high.		I intend to use a Saint Jame's Way app.	
	Mean	SD	Mean	SD
Brazilian	3.87	1.35	3.81	1.43
German	2.92	1.41	2.67	1.47
Spanish	3.83	1.33	3.68	1.41
French	2.87	1.55	2.86	1.63
Portuguese	3.68	1.28	3.69	1.28
American	3.78	1.34	3.40	1.47

(n=65), Brazilians (n=68), French (n=69), German (n=144), Portuguese (n=361) and Spanish (n=204).

Table 2 illustrates that women represent 40.8% of the respondents. German and American are the only nationalities were the number of women surpassed the number of men. Regarding education level, the majority have an undergraduate qualification, followed by a graduate degree. Portuguese are the ones displaying the largest number of people with only the basic level of education (35.2%). Pilgrims on the Camino de Santiago are mainly married, followed by single. With respect to age, the most represented groups are the 35-44 (25.5%), 45-54 (26.5%) and 55-64 (21.7%), with Portuguese and Spanish showing a slight tendency to be younger.

To assess the intention to use a pilgrimage mobile app, a set of two questions were used. The results of the descriptive statistics in Table 3 show that Brazilians are more willing to adopt a pilgrimage app, followed by the Spanish, Americans, and Portuguese. Germans and French are the pilgrims exhibiting the lowest intention to use an app.

The statistical significance of the differences among the means of the intention to use an app was assessed with ANOVA (Table 4) and the Scheffe posthoc test due to the unequal sample sizes. The results reveal that there is no support to claim that French and German are different from each other but together they are different from all other nationalities.

The analysis of the importance attributed by the respondents to the 24 possible features (Table 5) indicates that Germans and French have the lowest mean on all the items. The highest means are unevenly distributed throughout the other nationalities, with Brazilians having the highest mean on eleven of the 24 items.

Figure 2 shows that the importance placed on each individual feature by German and French pilgrims is lower for all variables when compared to other pilgrim nationalities.

To test for the equality of means and to assess the differences between pairs of means, a one-way ANOVA with multiple comparisons was conducted. The Levene's Test was used to check the assumption

Table 4 – Assessment of equality of means on the intention to use the app

ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
The probability of using a pilgrim route app will be high.	Between Groups	122.19	5	24.44	13.58	.000
	Within Groups	1628.98	905	1.80		
	Total	1751.17	910			
I intend to use a Saint Jame's Way app.	Between Groups	153.37	5	30.67	15.75	.000
	Within Groups	1762.21	905	1.95		
	Total	1915.58	910			

Table 5 -Descriptive Statistics

Variable	Descriptive Statistics											
	Brazilian		German		Spanish		French		Portuguese		American	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
V16.1A	4.21	1.19	*2.91*	1.38	**4.27**	1.08	3.41	1.60	4.09	1.14	4.03	1.25
V16.2B	4.00	1.30	*3.00*	1.36	**4.19**	1.11	3.00	1.51	3.96	1.17	3.89	1.34
V16.3C	3.97	1.29	*3.20*	1.44	**4.07**	1.20	3.26	1.49	3.89	1.26	4.02	1.31
V16.4D	**4.40**	1.01	3.39	1.29	4.31	1.05	3.19	1.58	4.30	0.99	4.06	1.22
V16.5E	**4.29**	0.99	2.97	1.31	4.24	1.01	3.33	1.50	4.10	1.10	3.91	1.22
V16.6F	**4.34**	1.09	3.27	1.37	4.29	1.08	3.41	1.55	4.17	1.09	4.14	1.27
V16.7G	**4.31**	1.19	3.26	1.40	4.26	1.17	3.35	1.52	4.23	1.14	4.06	1.38
V16.8H	3.88	1.28	2.60	1.16	3.51	1.38	2.71	1.46	**3.92**	1.14	3.51	1.37
V16.9I	3.18	1.46	1.76	0.91	2.44	1.39	1.62	0.88	**3.28**	1.30	2.97	1.45
V16.10J	3.62	1.36	2.52	1.21	3.70	1.28	2.64	1.49	3.68	1.20	3.58	1.37
V16.11K	3.31	1.42	2.47	1.36	3.69	1.30	2.29	1.36	3.45	1.32	3.31	1.55
V16.12L	2.84	1.42	1.67	0.92	2.79	1.42	1.93	1.28	**2.97**	1.35	2.51	1.50
V16.13M	2.94	1.46	1.74	1.08	2.95	1.44	2.01	1.23	**3.07**	1.36	2.58	1.47
V16.14N	3.35	1.41	2.58	1.18	3.56	1.30	2.68	1.37	3.46	1.27	**3.57**	1.26
V16.15O	**4.07**	1.21	2.92	1.24	3.85	1.19	2.97	1.41	3.85	1.11	3.71	1.26
V16.16P	**4.06**	1.26	3.10	1.38	3.84	1.27	3.29	1.62	3.95	1.21	3.66	1.41
V16.17Q	**4.16**	1.15	3.05	1.37	3.97	1.24	3.20	1.61	4.01	1.18	3.74	1.38
V16.18R	**3.72**	1.27	2.67	1.27	3.17	1.36	2.71	1.41	3.56	1.24	3.28	1.43
V16.19S	**3.71**	1.32	2.55	1.35	2.70	1.47	2.33	1.50	3.23	1.39	3.22	1.62
V16.20T	**3.75**	1.25	2.56	1.39	3.14	1.43	2.28	1.49	3.56	1.32	3.42	1.52
V16.21U	4.06	1.31	3.28	1.39	4.15	1.21	3.59	1.50	**4.21**	1.10	3.82	1.37
V16.22V	**4.47**	1.04	3.67	1.48	4.20	1.18	3.43	1.68	4.29	1.07	4.02	1.35
V16.23W	4.47	1.04	3.85	1.47	4.32	1.17	3.88	1.61	4.40	1.08	**4.55**	1.00
V16.24X	4.21	1.25	3.47	1.50	4.25	1.18	3.52	1.68	**4.30**	1.12	4.12	1.32

Values in Bold represent the highest mean among the nationalities and values in italic represent the lowest mean

Figure 2 – Mean value for feature importance by nationality

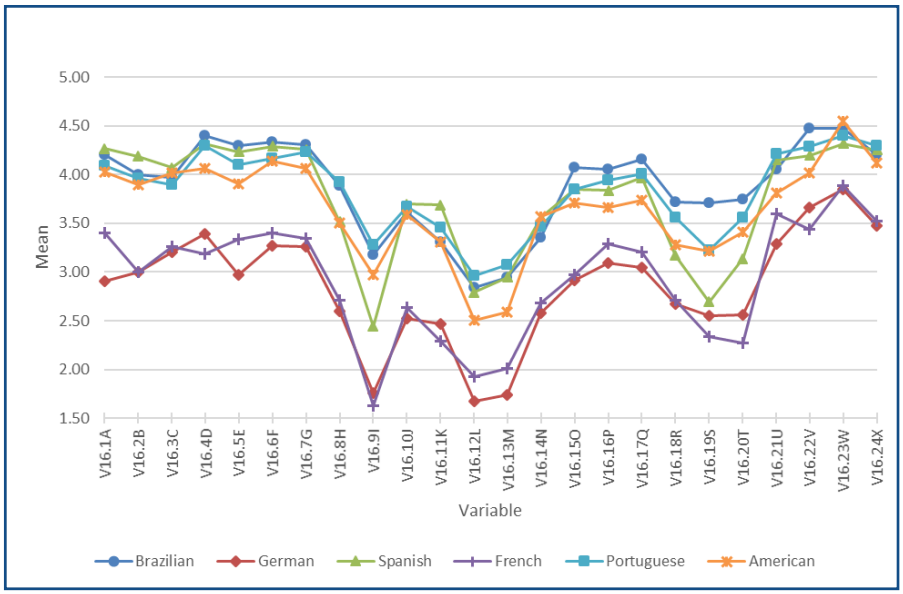


Table 6 - Homogeneous subsets based on features differences among nationalities

Variable	Homogeneous subsets					
	Brazilian	German	Spanish	French	Portuguese	American
V16.1A	B	A	B	A	B	B
V16.2B	B	A	B	A	B	B
V16.3C	B	A	B	A	B	B
V16.4D	B	A	B	A	B	B
V16.5E	B	A	B	A	B	B
V16.6F	B	A	B	A	B	B
V16.7G	B	A	B	A	B	B
V16.8H	B	A	B	A	B	B
V16.9I	C	A	B	A	C	B/C
V16.10J	B	A	B	A	B	B
V16.11K	B	A	B	A	B	B
V16.12L	B	A	B	A	B	A/B
V16.13M	C	A	C	A/B	C	B/C
V16.14N	B	A	B	A	B	B
V16.15O	B	A	B	A	B	B
V16.16P	C	A	B/C	A/B	C	A/B/C
V16.17Q	C	A	C	A/B	C	B/C
V16.18R	B	A	A/B	A	B	A/B
V16.19S	D	A/B	A/B/C	A	C/D	B/C/D
V16.20T	C	A/B	B/C	A	C	C
V16.21U	B/C	A	B/C	A/B	C	A/B
V16.22V	C	A/B	B/C	A	C	A/B/C
V16.23W	C	A	A/B	A	A/B	C
V16.24X	B	A	B	A	B	B

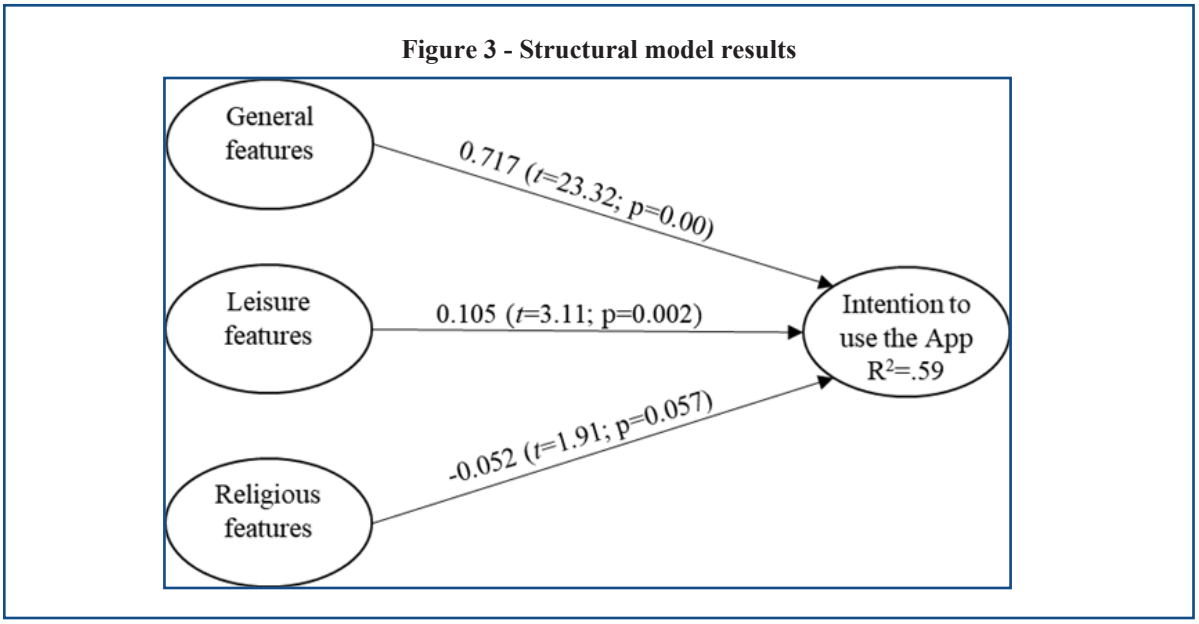
of homogeneity of variance across the six groups, showing that it was not significant ($p>.05$) only for the variables V16.11K, V16.14N, and V16.18R. For all other variables, the test was significant. Therefore, since the equal variance assumption has been violated the Games-Howell test was used to explore the differences among nationalities. The results indicate that Germans and French are similar in their evaluation of the app's features that are quite different from all other nationalities (Table 6).

Based on the fact that users tend to evaluate apps based on a global evaluation and not on each and every feature, and on the results from the factor analysis conducted by Antunes & Amaro (2016a), revealing the existence of three dimensions (general, leisure, and religious) the PLS-Path model was defined to test hypotheses H1, H2 and H3. Measurement model adequacy was checked to assure statistical significance of the loadings, internal consistency, and discriminant validity (Table 7).

Table 7 - Measurement model adequacy measures

Construct	Cronbach's Alpha	Composite Reliability	Average Variance Extracted (AVE)	Discriminant Validity (Fornel-Larcker Criterion)			
				General	Intention to Use	Leisure	Religious
General features	0.961	0.965	0.648	0.805			
Intention to use	0.938	0.970	0.942	0.767	0.970		
Leisure features	0.904	0.926	0.676	0.781	0.635	0.822	
Religious features	0.896	0.935	0.827	0.616	0.450	0.579	0.909

Figure 3 - Structural model results



The heterotrait-monotrait ratio of correlations (HTMT), a new method for assessing discriminant validity that outperforms classic approaches to discriminant validity assessment in partial least squares structural equation modelling, were calculated to be certain that the results confirming hypothesised structural paths are real. The maximum value computed for the HTMT ratio was .827, thus confirming discriminant validity

The results for the structural model (Figure 3) reveal that General features is the strongest predictor of intentions to use a pilgrimage app followed by the availability of leisure features. These results provide support for both H1 and H2. H3 was not supported, meaning that religious features do not seem to affect pilgrims' intention to use a pilgrimage app.

To test H4, a Multi-Group Analysis (MGA) was conducted to check for differences among the path coefficients for pilgrims from the six nationalities. The results of the bootstrap procedure with 5000 samples indicate that only one statistically significant difference exists between Americans and Spanish regarding the effect of religious features on intentions to use the app (diff.=0.986; *t*-value=2.103; *p*=0.036). In the original sample, Americans show a higher negative effect (-0.188) when compared to Spanish pilgrims (0.052) regarding the impact of the religious features on the intention to use the pilgrimage app.

Discussion and Conclusion

The results show that the features related to general information on the route are the strongest predictor of the intention to use an app, followed by the leisure-related features. Religious features, however, do not have a statistically significant effect on the intention to use a pilgrimage app. The importance placed on utilitarian features, as motivators for adoption of mobile technology, had been previously highlighted by several authors (e.g. No & Kim, 2014; (Kim, Park, & Morrison, 2008; Lai, 2015; Lu *et al*., 2015; Oh, Lehto, & Park, 2009; Peres, Correia, & Moital, 2011). The current study also confirms the importance of utilitarian factors but in this instance, for pilgrims. This adds to the debate on how pilgrims can be considered tourists (Olsen & Timothy, 2006). Furthermore, the current findings expand the reach of the existing knowledge by showing that the importance placed on the utilitarian dimension, especially the ease of use and perceived usefulness as stated by Travelport Digital (2017), which is almost identical across nationalities. In fact, looking at the differences of the three dimensions among nationalities only one significant difference emerged between Americans and Spanish pilgrims regarding the effect of the Religious features factor on intentions to use a pilgrimage app.

Analysis of the twenty-four individual features reveals interesting facts. Brazilians have the highest mean on half (8 out of 16), comprising the General features factor and show also the highest means for the Religious factor. Brazilian pilgrims seem particularly interested and excited with the potential benefits provided by mobile apps. The cultural context of the place of origin, and coming from an overseas continent seem to be relevant when evaluating the importance of an app's features. For example, Americans seem interested in the ability to use the app off-line, probably due to differences in mobile service providers. Brazilians seem to value all kinds of

information, with a strong emphasis on emergency contacts, and being available in different languages. A possible explanation for these preferences could have to do with the cultural distance between the two countries, but also the need to feel secure and be confident that if something should happen to them they have the means and the information to know who to contact to get help. The Portuguese, being geographically close to Santiago, place more importance on the leisure dimension. German and French pilgrims are the ones placing the lowest importance on all the individual features. Since these two nationalities are also the ones less likely to use a pilgrimage app, a possible explanation for these results may be that they are not very enthusiasts regarding the use of mobile technologies during pilgrimages. Further investigation is needed to shed some light on this issue. Brazilians also score high on the importance given to the Religious dimension feature, however, this is not a surprising fact in view of the religious nature of the Brazilians.

Multi-group analysis (MGA) indicates that only one statistically significant difference exists, which is between Americans and Spanish regarding the capability of religious features to predict the intention to use the app. Based on this finding it seems that there is no need for the developers to further customise the dimensions of pilgrimage apps. However they have to provide accurate, complete and quality information as noted by Nickerson & Eng (2017), especially in relation to features associated with the General dimension as once more it is proved to be a determinant for users to adopt the use of mobile apps.

The findings of the study are useful for the development of pilgrimage mobile apps, in particular for the Camino de Santiago, as it reveals the most valuable features for pilgrims of each nationality. At the same time it shows at an aggregate level that the importance placed on the sets of features related to general, leisure and religious information to predict the intentions to use does not significantly differ among the nationalities.

The results provide useful insights on the understanding of the crucial factors to use a pilgrimage app, which is currently limited. Hence, this contributes to the scare academic literature on pilgrims' use of apps. Based on the cumulative importance placed by all nationalities on the individual features, pilgrimage app developers must provide relevant functionalities such as the ability to be used offline and the use of GPS for local identification, and provide detailed information on public services, accommodation, transportation to all nationalities. Pilgrims also desire to have the information available in more than one language, most probably in their native language. Developers can personalise some features of the app according to nationality since several significant differences were found when examining the features individually. The notification functionality could be harnessed to deliver timely personalised information based on the preferences of pilgrims from a specific nationality and their exact location on the Camino de Santiago.

These findings provide useful insights for Camino de Santiago's stakeholders, such as the Government of Galicia, accommodation and service providers, and non-governmental organizations that may consider disseminating information to pilgrims through the app. For instance, the government of Galicia extensively promotes the Camino de Santiago route in order to attract more tourists. The government could support the app, so that it could be free, contributing to the promotion of the route and pilgrims' satisfaction.

Limitations and Future Research

Although the sample includes five of the top six nationalities of pilgrims of Santiago (Spanish, German, American, Portuguese and French), it does not include Italians, the second nationality with more pilgrims to Santiago after the Spanish. This is due to the small number of Italians in our sample. Future research should try to collect a significant number of responses from Italian pilgrims to be consistent with the pilgrimage statistics for the route. It would also be important to include more nationalities in the analysis to check if the behaviour portrayed by French and German is shared by other countries' pilgrims.

A future line of research could be to consider the acceptance of a pilgrimage app with storytelling. Im *et al*. (2013) argue that apps can include local stories in a narrative, where empathy and immersion are created and this can generate user satisfaction. Since the use of augmented reality continues to grow, future studies could also investigate if pilgrims value this in their pilgrimage app.

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Appendix : Complete list of features

Variable	Description
V16.1A	Information about stages of the pilgrimage
V16.2B	Information about degree of difficulty of stages
V16.3C	Suggest alternative ways (for example, bad condition of route due to rain)
V16.4D	Information about public services contacts or emergency (for example, police, fire station, hospital)
V16.5E	Information about places nearby
V16.6F	Information about hostels, guesthouses or hotels
V16.7G	Information about availability of hostels
V16.8H	Look for new places off of my route, but nearby
V16.9I	Look for different places of leisure
V16.10J	Suggestions about local points of interest according to the weather
V16.11K	Get photos of the pilgrim route
V16.12L	See videos about pilgrim route
V16.13M	Virtual tour about some parts of the Way
V16.14N	Cultural guides
V16.15O	Learn about local history/monuments and symbols
V16.16P	Suggest cheaper places to stay and sleep
V16.17Q	Suggest cheaper places for meals
V16.18R	Information about religious places
V16.19S	Information about mass schedule in the villages of the Way and in Cathedral of St. James
V16.20T	Information about pilgrim rituals, for example, what should be done in Holy Year
V16.21U	Information about return transport (railway, bus, airplane)
V16.22V	Available in different languages (Portuguese, English, French, Spanish, Italian, German)
V16.23W	Ability to use app without a cellular connection (off line)
V16.24X	Location identification through GPS