

Wine tourism apps as wine destination branding instruments: content and functionality analysis

Wine tourism
apps

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Abstract

Purpose – The purpose of this study is to evaluate the competitiveness through brand enhancement of the Douro wine tourism apps in light of their content and functionality in comparison to international wine tourism apps.

Design/methodology/approach – The content and functionality features of both the Douro and international wine apps are evaluated to determine any statistically significant differences between items. A frequency analysis and chi-square are calculated at item and variable levels, a Shapiro–Wilks test is used to test normality and an independent t-test is deployed to examine the differences in customer ratings and number of downloads.

Findings – There is a significant difference between the Douro and international wine apps on an item level, although there is no significant difference between the groups with regard to their content and functionality features in general.

Research limitations/implications – By focussing only on the Douro region, 13 other demarcated Portuguese wine regions have been excluded.

Practical implications – Wine tourism apps could influence destination branding, as they can inform about the wine region and wine-related activities. A clear layout makes it easier to move through the app, and the use of social media and entertainment enhances user experiences, especially for younger generations.

Social implications – Practical guidelines are proposed for wine tourism marketers and managers wishing to upgrade their destination brand image and its services to satisfy demanding wine tourists.

Originality/value – The study contributes to the literature about mobile apps in tourism with a content and functionality analysis of wine apps as variables in the technology acceptance model and of their impact on destination branding.

Keywords Functionality, Destination, Branding, Wine, Content, Douro, Android

Paper type Research paper

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摘要

研究目的 – 本论文旨在评估Douro葡萄酒旅游app的品牌营销竞争力。本论文通过对比国际葡萄酒旅游app对其内容和功能方面进行分析。

研究设计/方法/途径 – 研究通过对Douro和国际葡萄酒旅游app在内容和功能上的比较评估来判定是否其之间有显著差别。本论文在内容和功能多个方面上进行频率分析和chi square分析，本论文还采用Shapiro-Wilks测试来对其样本的做正态分布检查，通过独立样本t检验来评估消费者评分和下载数量之间的差异。

研究结果 – 研究结果表明Douro和国际葡萄酒旅游app在每个细节方面上都有显著差异，但是在整体内容和功能方面并没有显著差异。

研究理论限制/意义 – 本论文只局限在研究Douro地区，葡萄牙其他十三个葡萄酒区域未纳入研究样本。

研究实践意义 – 葡萄酒旅游app能够影响旅游目的地品牌营销，其app能够为游客提供葡萄酒区域和葡萄酒相关活动的信息。App清晰结构能够使得消费者更容易找到相关内容，社交媒体和娱乐性能的运用能够提高消费者整体体验，特别是对年轻消费者。

研究社会意义 – 研究结果对有意提高其目的地品牌形象和服务升级的葡萄酒旅游营销商和管理者来说，提出了很多管理启示，满足葡萄酒旅游消费需求。

研究原创性/价值 – 本论文通过葡萄酒app的内容和功能方面的分析，其中涉及的变量是技术接受模型（TAM）的经典变量，以及其变量对目的地品牌营销的作用，因此研究结果对旅游移动app的文献有着显著贡献。

关键词：内容、功能、葡萄酒、旅游目的地、品牌营销、Douro

Introduction

The wine sector can benefit immensely from an increased exposure to information and intensified promotion afforded by the use of modern technologies, notably smartphones and mobile apps (Alonso *et al.*, 2013). Yuan *et al.* (2004) suggested that information technologies streamline the marketing process of the total wine tourism experience. Nevertheless, little research has been undertaken to understand the implications of information and communication technology in the wine tourism sector (Alonso *et al.*, 2013), and no prior work has focussed only on wine tourism-related apps. In addition, a limited number of studies have investigated the importance of branding in the wine tourism destination context (Gómez *et al.*, 2015) and the potential role that wine tourism apps could play.

This paper evaluates and compares the content and functionality aspects of wine tourism apps for the Douro wine region (Portugal) with those for other international wine regions to improve the Douro wine destination branding, considering global trends and customer demands.

Literature review

In 1989, Davis introduced the technology acceptance model (TAM) (Davis, 1989), enabling to predict and describe the most significant aspects of user acceptance, namely, the “perceived ease of use” and “perceived usefulness” (Kim *et al.*, 2008; Xia *et al.*, 2018). Davis (1989, p. 320) defined the “perceived ease of use” as “the degree to which a person believes that use of a particular system would be free of effort”, and “perceived usefulness” was described as “the degree to which a person believes that use of a particular system would enhance his or her job performance”. Both are internal variables, and in a mobile app environment, the “perceived ease of use” could be evaluated through app functionality features, while “perceived usefulness” could

be examined through the accompanying content features. Kim *et al.* (2008) extended the TAM by introducing an external variable, “information system quality”, which is divided into “information quality” and “system quality”. In the context of mobile apps, “information quality” could be seen as another content feature, and “system functionality” could be regarded as a mobile app functionality feature. Given that the TAM variables (both internal and external) of wine tourism apps have been neglected in the literature, and in light of the relevance of content and functionality features for app users (Cantoni *et al.*, 2007), the analysis of these features within a wine tourism context is the central aspect of the current article.

Content has been referred to as the information presented in the form of text, pictures, audio or video (Lizzi *et al.*, 2013) and, according to Goh *et al.* (2010), should concentrate on generic services, such as providing information about transportation, accommodation and food. App developers should provide sufficient and accurate information through a content management system to enhance the traveller’s experience (Kennedy-Eden and Gretzel, 2012). With a constant increase in mobile content for every new smartphone (Kim and Alder, 2011), wine tourism companies need to publish appropriate material, which will enhance visitor engagement and, in turn, influence the branding of the wine region.

Functionality involves an action that can be performed by an app user, such as searching or sharing (Lizzi *et al.*, 2013), and some authors (Wang *et al.*, 2012; Dickinson *et al.*, 2014) have interpreted this recent positive evolution as a crucial innovation in mobile technology. A focus on functionality is usually adopted to understand how the smartphone alters human interactions with other people, places, objects and information (Dickinson *et al.*, 2014), which, in a mobile app context, includes vividness, novelty, motivation, control, customisation, feedback and multi-platforming (Kim *et al.*, 2013).

The role of mobile apps in destination marketing has increased rapidly since the start of the new millennium (Soteriades, 2012; Li *et al.*, 2017). Llodrà-Riera *et al.* (2015) emphasised the importance of analysing the impact of mobile apps on destination image formation and tourist behaviour. Oliveira and Panyik (2014) noted in their Portugal study that a significant change in tourism behaviour has integrated mobile apps and the destination branding process. Scolari and Fernández-Cavia (2014) demonstrated a relationship between mobile apps and destination branding by evaluating and comparing 66 mobile apps from various tourist destinations in Spain.

Mobile apps are, thus, seen as suitable instruments with which to improve the destination branding process of wine tourism, broadening the awareness of potential or loyal tourists to the most significant attractions and activities. The content and functionality elements of wine tourism apps are capable of enhancing the destination image and demand for real-life experiences and, furthermore, dramatically impact on the wine region brand. The major gap in the existing literature is in the use of mobile apps in wine destination branding, suggesting a need to focus on the way content and functionality features can give impetus to current and future destination branding activities.

This study evaluates and compares Douro wine tourism apps with apps representing some of the most significant wine regions in the world to guarantee that future wine region branding activities for the Douro region, which use mobile apps, are planned and implemented in accordance with global praxis. Based on the importance of the content and functionality features of wine tourism apps for wine destination branding, four key research questions were proposed to guide this study:

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- RQ1.* How could differences on an item level in the content features of the Douro and international wine tourism apps be beneficial for destination branding?
- RQ2.* How could differences on an item level in the functionality features of the Douro and international wine tourism apps be beneficial for destination branding?
- RQ3.* How could differences at the variable level in the content and functionality features of the Douro and international wine tourism apps be beneficial for destination branding?
- RQ4.* How could the evaluation of significant differences in customer ratings and the number of downloads for the Douro and international wine tourism apps be beneficial for destination branding?

Methodology

The methodology for the current work was opted from earlier studies regarding the use of smartphone apps in various contexts (Abroms *et al.*, 2013; Kim *et al.*, 2013; Leung *et al.*, 2013). Most notably, Kim *et al.* (2013) specified that the comprehensive examination of mobile apps involves analysis of both content and functionality features. By applying this strategy specifically to wine tourism apps, the current article aims to improve their content and functionality features, and thereby the wine destination branding process as a whole.

Sampling

The sampling phase intended to gather a large sample of wine tourism apps promoting a specific region for comparison with those of their international competitors. A few criteria to collect comparable data sets were predetermined in the sampling procedure, notably that the apps represent a wine region. Also, the apps should be downloadable in the Google Play Store, free of charge and in the English language. Only Android apps were selected, mainly because more Android smartphones are in circulation than iPhones (Forni and Van der Meulen, 2016), as well as because the content and functionality features of Android apps are reportedly superior to those of iPhone apps (Arruda-Filho and Lennon, 2011). Apps that had not been downloaded at least once were marked as irrelevant and excluded from the analysis.

In the first sampling round, the Douro apps were selected. The keywords *Douro* and/or *Douro wine tourism* – in accordance with the wine region of focus in this research – were introduced in a web search engine. Using *Douro* as a keyword in the Google Play Store provided a list of 177 apps, while the phrase *Douro wine tourism* gave 101 search results. After eliminating apps for local restaurants, hotels, events and municipalities, the final Douro selection was reduced to four apps. The Douro Doc app could not be opened, so only three apps were analysed: Douro wine tourism, Douro alliance and Douro and port wine.

In the second sampling round, apps presenting international wine regions were selected. Increasing the geographical angle required a slightly adapted search methodology. A search using the term *wine tourism* resulted in 247 apps, and that using *wine region* yielded 251 apps. After a detailed comparison and evaluation of both lists, 38 apps were identified for further analysis. Again, the majority of the apps were excluded because they were not focussed on a wine region, but rather on local restaurants, hotels, events and municipalities. The other predetermined criteria could only be properly checked when the remaining 38 apps were installed on a mobile phone and analysed. Finally, 3 apps were eliminated as they

did not correspond to their descriptions in the Play Store, leaving 35 international wine apps constituting the international wine tourism app sample.

Wine tourism apps

Coding scheme and procedure

Items identified as content (information presented in the form of text, pictures, audio or video) and functionality features (actions that can be performed by the user) were selected based on the relevant literature (Amaro *et al.*, 2010; Kim *et al.*, 2013; Lizzi *et al.*, 2013; Schieder *et al.*, 2013; Chen *et al.*, 2016), and were slightly adjusted for the purposes of the study. Some content items specifically related to the wine tourism context were aggregated into the newly created category “wine route/region”.

The content features of the apps were evaluated by examining the following categories: general information, accommodation, other tourism information, wine route/region and wine offer. Each category included several items, ranging from 5 (wine route/region) to 14 (general information), as shown in Table I.

The functionality features were evaluated by examining the following categories: social media, multimedia, entertainment, general features/settings, additional features and functions, control and customisation and aesthetics. The number of items per category ranged from 2 (entertainment) to 10 (control and customisation), as shown in Table II.

A panel group within the project team was first formed to clarify each of the features to be evaluated. A preliminary pilot study that involved both the authors and coders was undertaken to further illuminate any unresolved issues, precisely explain how each item should be interpreted and simplify and improve the accuracy of the coding process, thereby increasing the validity of the results from the non-author coders (analysis phase).

Non-author coders executed the main analyses. At least two coders were appointed to secure reliability and provide the most objective insight for each app assessment. To achieve highly relevant results, 13 coders were assigned to the Douro wine apps, which were low in number, while the international apps were evaluated by 69 coders. This process guaranteed that all apps were evaluated by at least 2 coders. In one case (Mendoza Bodegas), the results of both coders were identical, so it was decided to count them as a single result.

Intercoder reliability was checked by using Krippendorff's (1980) alpha on a set of apps that were also coded by the authors and compared to the non-author coders' results, suggesting a satisfactory intercoder reliability, ranging from 80.5 to 100 per cent, above the required threshold of 80 per cent (De Swert, 2012). The intercoder reliability coefficient was 0.88 for all the samples and was lower for the content (0.85) than functionality (0.91), possibly because content features are more difficult to code, owing to their subjective interpretation, whereas functionality features are more precise and so more easily assessed.

The coders reviewed the presence of each item by marking them with 1 (*yes* or *present*) and 2 (*no* or *absent*). The answers were later recoded to correspond to percentages, thereby providing a normal distribution for the answers and an improved understanding of the prevalence of the content and functionality features.

The authors also evaluated the apps in the context of the customer feedback information, such as customer ratings and the number of downloads, by using the data the Google Play Store furnishes for each of their online apps. All data were singled out and, later, used for a more advanced comparison between the Douro and international wine apps.

Analytical method

The following data analyses were completed with the Statistical Package for Social Sciences (version 20.0): frequency analysis, descriptive statistics, Shapiro–Wilks test, chi-square statistics and an independent *t*-test. The frequency analysis allowed identifying the

Table I.
Content analysis of
the Douro and the
international wine
tourism apps on an
item level

[illegible]

Table I.

Variables and items	Douro wine apps N = 13		International wine apps N = 69		χ^2	p
	Yes N (%)	No N (%)	Yes N (%)	No N (%)		
Wine route/region logo	7 (53.8)	6 (46.2)	29 (42)	40 (58)	0.620	0.431 ^{ns}
Map of demarcated wine route/region	9 (69.2)	4 (30.8)	27 (39.1)	42 (60.9)	4.024	0.045 ^{**}
Links to wine route/region coordinator	2 (15.4)	11 (84.6)	9 (13)	60 (87)	0.052	0.820 ^{ns}
Links to other members of wine route or wine tourism companies	2 (15.4)	11 (84.6)	42 (60.9)	27 (39.1)	9.101	0.003 ^{**}
<i>Wine offer</i>						
Information about company offer	12 (92.3)	1 (7.7)	58 (84.1)	11 (15.9)	0.682	0.409 ^{ns}
Wine production and storage information	7 (53.8)	6 (46.2)	32 (46.4)	37 (53.6)	0.245	0.621 ^{ns}
Wine sales (Online store) or link to online store	2 (15.4)	11 (84.6)	11 (15.9)	58 (84.1)	0.003	0.960 ^{ns}
Information about wines	12 (92.3)	1 (7.7)	50 (72.5)	19 (27.5)	2.841	0.092 [*]
Awards received and press releases	2 (15.4)	11 (84.6)	3 (4.3)	66 (95.7)	1.819	0.177 ^{ns}
Possibility to subscribe to newsletters	0 (0)	13 (100)	4 (5.8)	65 (94.2)	1.419	0.234 ^{ns}
Ethical issues (legal drinking age and message drink with moderation)	1 (7.7)	12 (92.3)	7 (10.1)	62 (89.9)	0.079	0.779 ^{ns}
Suggestions about wine and food pairing	5 (38.5)	8 (61.5)	10 (14.5)	59 (85.5)	3.603	0.058 [*]

Notes: ^{***} Statistical significance at the 0.01 level; ^{**} statistical significance at the 0.05 level; ^{*} statistical significance at the 0.1 level; ^{ns} non-significant

Table II.
Functionality
analysis of the Douro
and the international
wine tourism apps on
an item level

Variables and items	Douro wine apps, <i>N</i> = 13		International wine apps, <i>N</i> = 69		χ^2	<i>p</i>
	Yes <i>N</i> (%)	No <i>N</i> (%)	Yes <i>N</i> (%)	No <i>N</i> (%)		
<i>Social media links to</i>						
Facebook	2 (15.4)	11 (84.6)	39 (56.5)	30 (43.5)	7.405	0.007**
Twitter	2 (15.4)	11 (84.6)	29 (42)	40 (58)	3.693	0.055*
YouTube	0 (0)	13 (100)	6 (8.7)	63 (91.3)	2.159	0.142 ^{ns}
Foursquare	1 (7.7)	12 (92.3)	3 (4.3)	66 (95.7)	0.234	0.629 ^{ns}
Instagram	0 (0)	13 (100)	7 (10.1)	62 (89.9)	2.537	0.111 ^{ns}
<i>Multimedia (Is there access to...?)</i>						
Photo gallery/slide show	10 (76.9)	3 (23.1)	22 (31.9)	47 (68.1)	9.325	0.002**
Audio material	0 (0)	13 (100)	6 (8.7)	63 (91.3)	2.159	0.142 ^{ns}
Audio guide (to explain stuff during your visit)	0 (0)	13 (100)	3 (4.3)	66 (95.7)	1.057	0.304 ^{ns}
Video material/YouTube channel	1 (7.7)	12 (92.3)	8 (11.6)	61 (88.4)	0.185	0.667 ^{ns}
Virtual tour	2 (15.4)	11 (84.6)	2 (2.9)	67 (97.1)	2.697	0.101 ^{ns}
Augmented reality	4 (30.8)	9 (69.2)	0 (0)	69 (100)	15.917	0.000***
<i>Entertainment (Does it have ...?)</i>						
Games	0 (0)	13 (100)	2 (2.9)	67 (97.1)	0.700	0.403 ^{ns}
Music player	0 (0)	13 (100)	0 (0)	69 (100)	/	/
<i>General features/Settings</i>						
Language choice (how many languages are offered)	6 (46.2)	7 (53.8)	20 (29)	49 (71)	1.418	0.234 ^{ns}
Information on app provider/developer	6 (46.2)	7 (53.8)	41 (59.4)	28 (40.6)	0.787	0.375 ^{ns}
App feedback tools for developers to improve the user experience; Contact information (Report error/Suggestions)	2 (15.4)	11 (84.6)	34 (49.3)	35 (50.7)	5.102	0.024**
App settings	2 (15.4)	11 (84.6)	16 (23.2)	53 (76.8)	0.416	0.519 ^{ns}
<i>Additional features and functions</i>						
News/info	2 (15.4)	11 (84.6)	33 (47.8)	36 (52.2)	4.706	0.030**
QR code scanner	0 (0)	13 (100)	4 (5.8)	65 (94.2)	1.419	0.234 ^{ns}
Submit your story	0 (0)	13 (100)	4 (5.8)	65 (94.2)	1.419	0.234 ^{ns}
World clock	1 (7.7)	12 (92.3)	0 (0)	69 (100)	3.750	0.053*
Newspapers	0 (0)	13 (100)	2 (2.9)	67 (97.1)	0.700	0.403 ^{ns}
<i>(continued)</i>						

(continued)

Variables and items	Douro wine apps, <i>N</i> = 13		International wine apps, <i>N</i> = 69		χ^2	<i>p</i>
	Yes <i>N</i> (%)	No <i>N</i> (%)	Yes <i>N</i> (%)	No <i>N</i> (%)		
<i>Control and customization:</i>						
Has a "Home" button	7 (53.8)	6 (46.2)	42 (60.9)	27 (39.1)	0.224	0.636 ^{ns}
Has a "Back" or "Cancel" button	5 (38.5)	8 (61.5)	53 (76.8)	16 (23.2)	7.088	0.008 ^{**}
Has a "Next" button	4 (30.8)	9 (69.2)	11 (15.9)	58 (84.1)	1.442	0.230 ^{ns}
Has a pinch-and-zoom feature	2 (15.4)	11 (84.6)	35 (50.7)	34 (49.3)	5.517	0.019 ^{**}
Has a sign in/log in feature (link to user account)	1 (7.7)	12 (92.3)	20 (29)	49 (71)	3.175	0.075 [*]
Has a keyword search feature	4 (30.8)	9 (69.2)	41 (59.4)	28 (40.6)	3.626	0.057 [*]
Has a push notification (message that pops up)	0 (0)	13 (100)	5 (7.2)	64 (92.8)	1.786	0.181 ^{ns}
Possibility to add personal notes	0 (0)	13 (100)	19 (27.5)	50 (72.5)	7.563	0.006 ^{**}
<i>Aesthetics</i>						
Animation (moving images)	6 (46.2)	7 (53.8)	5 (7.2)	64 (92.8)	10.828	0.001 ^{***}
Nice graphic image	10 (76.9)	3 (23.1)	52 (75.4)	17 (24.6)	0.015	0.904 ^{ns}
Background sound	0 (0)	13 (100)	0 (0)	69 (100)	/	/
Notes: ^{***} Statistical significance at the 0.01 level; ^{**} statistical significance at the 0.05 level; [*] Statistical significance at the 0.1 level; ^{ns} non-significant						

Table II.

Wine tourism
apps

prevalence of both content and functionality features in the Douro and international wine tourism apps. Chi-square statistics were then applied to observe differences between content and functionality at the item and variable levels. The Shapiro–Wilks normality test determined whether the sample data were normally distributed, and the independent *t*-test was deployed to identify significant differences in the customer ratings and number of downloads between the Douro and international wine tourism apps.

Results

The core of this article is a set of analyses of the content and functionality features of the Douro and international wine apps. To understand the similarities and differences between both groups, notes were made for each of the four research questions proposed, which are addressed below:

RQ1: Differences in content features at an item level

This research question invites an analysis of frequencies at an item level and an examination of any significant differences in these frequencies between the Douro and international wine apps.

The frequency of the coded items indicated that the items with the lowest presence within the Douro wine apps were “weather forecast”, “links to other members of wine route or wine tourism companies”, “awards received and press releases” and “ethical issues”. The item “possibility of subscribing to newsletters” was non-existent (Table I). In the international apps, as with the Douro wine apps, the items labelled “weather forecast”, “awards received and press releases” and “possibility of subscribing to newsletters” were the least present. The items “booking and reservation” and “loyalty program; discount” showed a low presence of content (Table I).

Implementing the approach used by Kim *et al.* (2013), a difference-of-proportions test was undertaken to compare the observations between the Douro and the international apps on a content item level. There was a significant difference for 16 items. Most of these items were present in “general information” (five items), and the categories “other tourism information” and “accommodation” had the highest percentage of significant items in comparison to the total number of items. The “contact phone number” item had the highest level of significant difference between the observed apps (Table I).

RQ2: Differences in functionality features on an item level

The results of the second research question suggested that many items were missing from the Douro wine apps, such as “YouTube”, “Instagram”, “audio material”, “audio guide”, “games”, “music player”, “QR code scanner”, “submit your story”, “newspaper”, “has a push notification”, “possibility to add personal notes” and “background sound”. “Entertainment” was the only category that was absent from the functionality element of the Douro wine apps. Conversely, all items in the “general features/settings” category were coded as present (Table II). Only a few items were absent from the international apps, such as “augmented reality”, “music player”, “world clock” and “background sound” (“aesthetics”). No items were coded as fully present, however (Table II).

There was a significant difference for 13 of the functionality items based on the difference-of-proportions test, which compared observations between the Douro and international apps on an item level. Five of these items were in “control and customisation”, while the “entertainment” category did not show any statistically different items. The “augmented reality” item had the highest level of significant difference between the observed apps (Table II).

RQ3: Significant differences in content and functionality between app sets

A chi-square analysis was deployed to determine whether there was a significant difference between the Douro and international wine apps. This test was chosen because the data were expressed as percentages and were normally distributed according to the Shapiro–Wilk test. Normality is an important assumption for a chi-square analysis, so the Shapiro–Wilk normality test was chosen, as it is recommended for small samples (Ghasemi and Zahediasl, 2012). The chi-square analysis highlighted the differences in the content and functionality dimensions between the two sets of wine apps (Table III). Although there was no significant difference for either dimension, in general, differences existed within the content (“accommodation” and “other tourism information”) and functionality dimensions (“social media”, “general features/settings”, “additional features and functions”, “control and customisation” and “aesthetics”). The highest statistical difference was found within the “control and customisation” features. International wine tourism apps showed a higher presence of the “social media”, “general features/settings”, “additional features and functions” and “control and customisation” categories, whereas “accommodation”, “multimedia” and “aesthetics” were more prevalent in the Douro apps. In general, Douro wine apps were more focussed on content, and international wine apps were more concerned about functionality. Finally, the results suggested that the Douro and international wine apps could be perceived as equal in terms of content and functionality features, regardless of minor differences.

RQ4: Significant differences in customer ratings and number of downloads between apps

In the Google Play Store, the customer feedback information considers two variables that users can consult before downloading the app: “customer ratings” and “number of downloads”. A Shapiro–Wilks test was applied and confirmed data normality for each category. A subsequent independent *t*-test indicated that there was no significant difference in the customer ratings and number of downloads between the Douro and international wine tourism apps, despite a considerably higher average number of downloads per app in the international wine tourism sample (Table IV).

Variables	Douro wine apps (%)	International wine apps (%)	χ^2
General information	64	62	14.316 ^{ns}
Accommodation	43	26	18.612 ^{**}
Other tourism information	55	45	14.316 ^{**}
Wine route/region	38	39	1.067 ^{ns}
Wine offer	39	32	7.792 ^{ns}
<i>Content</i>	48	41	13.863 ^{ns}
Social media	8	24	11.465 ^{**}
Multimedia	22	10	6.802 ^{ns}
Entertainment	0	1	0.700 ^{ns}
General features/settings	31	40	10.418 ^{**}
Additional features and functions	5	12	7.424 ^{**}
Control and customisation	22	41	19.792 ^{**}
Aesthetics	41	28	13.310 ^{***}
<i>Functionality</i>	18	22	19.408 ^{ns}

Notes: ***Statistical significance at the 0.01 level; **statistical significance at the 0.05 level; ^{ns}non-significant

Table III.
Chi-square analysis
of the differences
between the Douro
and the international
wine apps

Discussion and concluding remarks

Conclusions

Although mobile apps have become an integral part of the tourism experience (Gupta *et al.*, 2018), studies that examine the role of mobile apps in wine tourism are not represented in the existing theory. The current research expanded the existing knowledge with a content and functionality analysis of wine apps as variables in the TAM and their impact on destination branding. Wine tourism apps are a new channel in destination marketing activities and, accordingly, have great potential as branding instruments for wine regions. In this context, this work simultaneously reflects the real-life impact of wine tourism apps. If meaningful and total wine tourism experiences are supported by quality content and ease of use in wine apps, the brand-building process will be equally as smooth and lead to success.

Overall, there were only minor differences between the two sets of apps, implying that the Douro wine apps could be perceived as fully competitive in an international context of wine destination branding. Hence, in future (wine) tourism apps, a correct mix of both functionality and content items deserves the best attention.

Theoretical implications

In line with the proposed conceptual framework, this article investigated two of the most significant dimensions of wine apps: content and functionality.

The study focussed its initial attention on an evaluation of TAM variables. More precisely, internal ("perceived ease of use" and "perceived usefulness") and external variables ("information system quality": "information quality" and "system quality") were assessed, thereby addressing all aspects related to content and functionality within the Douro and international wine tourism mobile apps. This research approach filled the gap in the tourism literature about the use of TAM variables in a mobile app (or more specifically, within a wine tourism mobile app) context.

The content and functionality features were examined individually and on a variable level. The evaluation of the Douro and international wine apps started with a determination of the presence of items within the apps. A lack of presence was noted for "weather forecast" in both sets of apps. As wine tourism is weather-dependent – vineyard tours need to be organised outdoors – weather forecast awareness is an important aspect of destination branding and, consequently, needs to be introduced in wine apps (Balakrishnan, 2009). Relative to their international counterpart, the Douro apps presented a higher awareness level of accommodation possibilities because their approach considers not only visits to a winery but also stay-overs; namely, they aim for the "total wine tourism experience", as proposed by Beames (2003).

The study next focussed on customer ratings, as these can identify problems with the content and functionality of an app (Thach, 2009), and number of downloads, a determinant

Table IV.

Independent *t*-test of the differences of the customer ratings and number of downloads between the Douro wine apps and the international wine apps

	Douro wine apps, Mean (SD)	International wine apps, Mean (SD)	<i>t</i> -statistics
Customer ratings	4.19 (1.38)	4.02 (1.38)	0.786 ^{ns}
Number of downloads	67	2.572	−0.498 ^{ns}

Note: ^{ns}Non-significant

of an apps popularity/importance (Hyrynsalmi *et al.*, 2016). No significant difference was noted between the Douro and the international wine tourism apps, according to these criteria.

Finally, this study provided valuable guidelines on how to use mobile apps for wine destination branding by assessing the presence of specific content and functionality features. Mobile apps have been recognised as a useful channel for destination branding, which relies on appropriate information. For example, the newly introduced Terravin mobile app acts as a branding tool that endeavours to list Croatia as a wine destination – a land of wine – worth visiting (Jukić, 2017).

While the international apps are focussed on offering company information as part of their customer-oriented strategy (Famularo *et al.*, 2010) within their destination branding efforts, the Douro wine apps pay more attention to the historical and geographical aspects of the region. This approach is most common when a wine region is unique and recognised on a global scale. Cai (2002) argued that in these instances, the name of a destination brand is usually closely related to the geographical name of the location. In this context, the Douro's unique geographical environment and abundant history represent useful tools to drive favourable destination branding. The Douro wine apps also emphasise the attractions, activities and practical tourist information, in comparison with their international counterparts, and assign more visibility to wine-specific details, suggesting wine and food pairing possibilities. This finding is consistent with Alonso and Liu (2011), who concluded that the symbiosis between wine and regional gastronomy is pivotal for the branding of a wine region.

Practical implications

Practical tips for wine tourism marketers and managers wishing to upgrade their services, to satisfy their ever-more-demanding customers and enhance a competitive brand have been included throughout this article. The most important are regrouped below, starting with the general positive characteristics that all mobile wine tourism apps should offer, and ending with brand-related advice, once more comparing the Douro reality with that of other well-known wine regions.

Wine apps should not only provide access to varied, condensed information about the wine region, the wineries and the wines (general description of the wine region, a map of a demarcated region specifying its national location, presentation and prices of the wines, explanations about how the wines should be stored and served, etc.) but also inform about wine-related activities (wine tours, cellar visits, tastings, etc.). As wine tourists must eat and stay somewhere overnight, indications about nearby restaurants and hotels are highly appreciated on the same app. Many wine tourists are interested in complementary options, so general tourist information, such as a weather forecast, cultural tourist attractions or the contact details of the local destination management organisation, would be useful.

An appealing layout, “go back” and “home” buttons, neat images and succinct text facilitate app navigation. Wine tourism promoters should prioritise these items in their apps, guaranteeing easy access to as much-detailed and up-to-date information as possible.

International apps tended to highlight functionality features and have a high awareness of the importance of social media in wine tourism (Facebook and Twitter), in concurrence with earlier findings (Szolnoki *et al.*, 2014). It would be worthwhile for Douro apps to offer additional opportunities to connect their users to social media apps, such as Instagram and Snapchat. Douro wine apps need to exploit the full capacity of social media as branding instruments (Oliveira and Panyik, 2014; Buhalis and Foerste, 2015).

Entertainment, another non-present category within Douro wine apps, is an additional dimension that must not be neglected. The entertainment dimension gains importance if the users of the apps are young people who are used to entertaining themselves (playing music and games) with their mobile phone. [Amaro et al. \(2010\)](#) proposed that additional efforts need to be invested into improving this element, as entertainment offers an opportunity to expand the visibility of the wine region. [Hudson and Hudson \(2006\)](#) even recommended using entertainment content (branded entertainment) more consciously as an effective means of brand communication in the destination (regional) marketing strategy.

The Douro wine apps, however, present a high awareness of “multimedia” issues, specifically for the items “photo gallery/slide-show” and “augmented reality”. By helping tourists to immerse themselves in the wine region through multimedia features before, during or after their visit, a connection and, consequently, loyalty to a specific wine brand will be guaranteed ([Murphy, 2006](#); [Yovcheva et al., 2013](#)).

Overall, this article offered meaningful insight into how wine regions can be branded using mobile apps with strong content and functionality characteristics and thereby opens new horizons, providing valuable feedback to both customers and destination marketers.

Limitations and future research

The Douro demarcated wine region is a globally recognised wine region, so benchmarking its wine apps with those of other well-established wine regions in the world is justified. Future studies comparing the content and functionality features of wine apps will benefit from overcoming two limitations of this study. First, customer reviews were not included in the analysis, yet could provide more detailed insight into tourists’ perception of wine apps. The second limitation is that by focussing on only one wine region in Portugal, 13 other demarcated wine regions in the nation were neglected.

Future research in Portugal might focus on the implementation of a content and functionality analysis at a national level to examine the differences between all the Portuguese wine regions and their correlated wine apps. Future attention could also be paid to clustering the most significant international wine apps and their features to propose new subcategories within the wine tourism app category on a global scale.

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