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Promoting Wine Tourism through Digital Communication: Insights from Spanish Protected Designations of Origin

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Abstract: Spain has 97 Protected Designations of Origin (PDOs) for wine production, many of which are adopting wine tourism to boost rural development. This article analyses the role of digital communication in promoting wine tourism, focusing on how PDOs use websites and social media to improve visibility and engagement. Based on a mixed-methods approach and structural equation modelling (SEM), the study explores the relationship between digital engagement and the presence of wine tourism services. Results show that PDOs offering wine routes or participating in wine cities tend to have more dynamic and effective digital communication strategies. The findings highlight the value of online platforms for connecting local heritage, territory and tourism. The article contributes new empirical evidence on the impact of digital tools in enhancing the positioning of wine-producing areas and fostering more sustainable and competitive rural tourism models. The insights are relevant for researchers, tourism boards and policy-makers interested in innovation in wine regions

Keywords: Wine tourism; Digital communication; Social media; Protected Designations of Origin; Structural equation modelling

Impulsar el enoturismo a través de la comunicación digital: aprendizajes desde las Denominaciones de Origen Protegidas en España

Resumen: España cuenta con 97 Denominaciones de Origen Protegidas (DOP) vinculadas a la producción vitivinícola, muchas de las cuales están recurriendo al enoturismo como vía de desarrollo rural. Este artículo analiza el papel de la comunicación digital en la promoción del enoturismo, centrándose en el uso de sitios web y redes sociales por parte de las DOP para mejorar su visibilidad y conexión con los visitantes. A partir de un enfoque mixto y del uso de modelos de ecuaciones estructurales (SEM), el estudio examina la relación entre la presencia de servicios enoturísticos y su presencia digital. Los resultados evidencian que las DOP integradas en rutas del vino o ciudades del vino presentan estrategias de comunicación digital más activas y eficaces. El análisis subraya el potencial de las herramientas digitales para fortalecer el vínculo entre patrimonio, territorio y turismo, aportando evidencias empíricas relevantes para impulsar modelos turísticos más sostenibles y competitivos en el medio rural. Las conclusiones resultan de interés para investigadores, organismos de gestión turística y responsables de políticas públicas involucrados en la innovación en regiones vitivinícolas.

Palabras Clave: Enoturismo; Comunicación digital; Redes sociales; Denominaciones de Origen Protegidas; Modelos de ecuaciones estructurales

1. INTRODUCTION

The country singer Kenny Chesney in his song *Summertime* (2005) put into words the opportunity that wine as a product offers to the tourism industry: “it’s a smile, it’s a kiss, it’s a sip of wine ... it’s summertime”. The tourism industry is using wine to deal with its seasonal business dependency (Serra-Cantalops, 2021). The aim of this article is to study the use of digital channels in Spain to communicate wine tourism. Spain is one of the largest wine producers and a world-leading destination. Additionally, wine has always been a fundamental element in the culture of the inhabitants of the Iberian Peninsula (López-Guzmán, Vieira-Rodríguez, & Rodríguez-García, 2014). Spanish wine production is organized in 97 wine Protected Designations of Origin – (PDOs). The PDOs are a geographical denomination applied to the wine product that comes from a particular geographical area, which clearly aligns and identifies the product's specific characteristics with the area. PDOs are collective labels that signal to consumers that the product comes from a particular place and has specific characteristics. Both Vesela & Malacka (2015) and Correia & Brito (2016) agree that wine tourism can be a vital component of regional development. In addition, wine tourism is also related to a sustainable agenda that is becoming more topical in the current climate crisis. In this context, wine routes are identified as a particularly effective means to leverage sustainable development (Serra-Cantalops et al, 2021). For this reason, it is pertinent to analyze the PDOs digital communication strategy to promote and strengthen wine tourism in these territories as an element of regional development.

According to the characterization of the Spanish Wine Report, 80% of consumers consider themselves habitual wine drinkers, which means that 18 million Spaniards regularly consume wine. Most of these consumers declare themselves consumers of wine with Designation of Origin (10.1 million people). Something similar occurs with the demand for wine tourism since the areas with a consolidated collective brand (PDO) have been able to attract more visitors seeking an experience related to wine than those that do not benefit from one of these collective marks. According to the latest report published on the analysis of

tourist demand for Spanish Wine Routes (ACEVIN, 2023), wines made in the PDO areas are among the main drivers that lead wine tourists to visit wine routes. Therefore, it is appropriate to consider this factor when preparing tourist packages to attract tourists. Additionally, research provided by Wine Tourism Spain in the United States, Belgium, Germany, and the Netherlands, showed that each year 14 million tourists to these countries define themselves strictly as wine tourists and of even greater interest, 82 million, try to organize a wine activity during their holidays (Tafel, Szolnoki, 2020). This type of tourism presents a potential for diversification of the wine tourism offering (Gu et al., 2018; Scorrano et al., 2018). Recent research has emphasized the role of wine tourism in shaping territorial narratives through communicative practices that integrate landscape, local identity, and cultural memory (De Jesús-Contreras, Thomé-Ortiz & Medina, 2020).

Building on these findings, this research pursues two main objectives. The first is to investigate whether the PDOs that offer wine tourism engage with digital communication, specifically through the medium of websites and social media, more efficiently than those that do not offer this tourist service. Certainly, wine tourism can be considered as a generator of enhanced digital communication given that the target of these services is a younger, more urban, and ultimately more digital savvy audience (Kim et al., 2021; Festa et al., 2023). The second objective is to analyze whether a wine tourism product in the PDO mediates the relationship between wine tourism and digital communication. All 97 Spanish PDOs registered in the year 2022 in Spain were analysed considering the above objectives. The economic value of wine sales from these combined PDOs amounted to more than 3.5 billion euros in 2022.

The questions and lines of research raised in two previous seminal works were fundamental in developing this current line of research. The first of a more general nature, investigated the influence of the use of ‘Smart Technologies’ on the tourist experience. This research, based around a Chinese museum attraction (Shen, Sotiaridis, & Zhan, 2020), confirms the presence of an impact on expectations before the visit on the level of success of the actual experience related to the level of tourist prior engagement with Smart Technologies - web and social media-. The second work relates to a review of literature on wine tourism. This research (Zamarreño-Aramendia, Cruz, & Hernando, 2021) identifies a significant lack of research on the digital experience linked to wine tourism. This study addresses this gap with a caveat. The use of more enhanced digital technologies such as virtual reality (VR), augmented reality (AR) or QR codes still have an insignificant presence. In the contextual space of wine tourism have not been considered within the objectives of this research which has purely considered the use of websites and social media. Studying the connection between digital communication and wine tourism is significant for the industry since product-linked tourism has become a vital component within tourism in the last decade.

Based on the above, the following research question emerges: How is digital communication affecting the development of wine tourism in Spain?

Answering this research question is useful since previous research (Gómez et al. 2021) highlights the competitive efficiency advantages of strengthening the synergies between wine production and tourism. Precisely, digital communication can reinforce these synergies.

2. METHODOLOGY

This study employs a mixed-methods approach to analyze the relationship between digital communication and the development of wine tourism in Spain's Protected Designations of Origin (PDOs). A total of 97

Spanish PDOs registered in 2022 were analyzed. Data collection was carried out through the review of PDO websites and social media, as well as surveys with PDO managers. The PDO tags the agricultural or food product linked to the specific characteristics of the environment from a geographical area. According to Barco Royo (2007), since their origin in the 19th Century, PDOs have performed, from an economic perspective, at least three different economic functions: defense against fraud (Sellers-Rubio & Más-Ruiz, 2013), product differentiation (Marco-Lajara et al., 2022), and regional development (Ferrer et al., 2022)

The research hypotheses are as follows:

- H1: Spanish PDOs offering wine tourism conduct more efficient digital communication through websites than those that do not offer tourism services.
- H2: Spanish PDOs offering wine tourism conduct more efficient digital communication through social media than those that do not offer tourism services.
- H3: The existence of a wine tourism product (route or city) mediates the relationship between wine tourism and digital communication through websites in the context of Spanish PDOs.
- H4: The presence of a wine tourism product (route or city) mediates the relationship between wine tourism and digital communication through social media in the context of Spanish PDOs.

Social media marketing has been accepted as pivotal in the business development role of an organization since its inception at the beginning of the 21st Century and is routinely seen as crucial to its success (Borsellino et al., 2023). It is often investigated from a functionality perspective (increasing sales; brand awareness; increasing user interactivity amongst others) (Gao et al; 2018) but also from an effectiveness perspective (social media ratings, for example) (Moore et al., 2015). This is no different when looking at the research concerned with social media which has evolved within the context of tourism and the wine industry. Within tourism itself, there are many studies related to the importance of online reviews for the development of a tourist destination (Yu et al., 2021). More particularly, wine tourism itself related to the digital arena, has received attention, both from an academic and industry perspective. Alebaki et al. (2022) explored the beneficial role of social media in fostering collaborative practices among wineries from specific regions after the Covid-19 pandemic altered wine consumption patterns (Dubois et al., 2021). Additionally, industry reports (Ridoff, 2022) found that digital engagement helped wine growers overcome the negative effects of the pandemic's disruption to wine tourism. It was also stated that Spain reported the lowest percentage in recovery of wine tourism (1% recovery compared to 11% in Germany and 22% in Australia) following the pandemic which may in part be related to the level and depth of engagement with the digital arena. Previous research and industry reports indicate that the relationship between digital engagement and wine tourism is more complex than just marketing or communication strategies. This study aims to explore and clarify this important relationship. Social media marketing is a significant topic for winery operators and local wine tourism bureaus, as more wine tourists use social media to find information about wine tourism destinations. However, there is a lack of research on the impact of social media on wine tourism. Most existing studies focus on specific wineries or regions (Aramendia et al., 2021). This study adds to the existing literature on wine tourism by analyzing all registered Spanish PDOs. It serves as a starting point for improving theoretical understanding in this field.

2.1. Wine tourism and digital communication

Wine tourism (also known as enotourism, winery tourism, or vinitourism) is a unique form of tourism that enhances local culture and creates business opportunities for local and regional communities (Dixit, 2022). It involves visiting vineyards, wineries, wine festivals, and wine shows, where grape wine tasting and experiencing the characteristics of a wine region are the main attractions for visitors (Hall et al., 2011, p.3). Digital communication has become the primary way to promote wine tourism. The shift from the static Web 1.0 to the interactive Web 2.0, including blogs and social media, has greatly enhanced connectivity. According to the report on the "Analysis of Tourist Demand for Spanish Wine Routes" (ACEVIN, 2023), about 30% of wine tourists discovered destinations through digital media (18.8% via websites and social media, and 11.9% through the Internet), while 25.9% found them through recommendations from family or friends.

Digital communication has made it possible for smaller PDOs to be visible and transmit their differential identity to potential customers (Orduña et al. 2021). Meanwhile the web and social media have empowered the wine consumer. Until now, wine was a world essentially controlled by experts who had access to the general and specialized media and who used their knowledge to guide the industry's decisions.

According to Cristófol et al. (2020) wine tourism has acquired great relevance within the international tourism panorama, as it involves a series of activities that include visits to wineries and events and festivities related to wine. Social media promotes products in a more informal and direct way, alluding to the personal experience. This kind of strategy has a great influence on the consumer decision (Dolan & Goodman, 2017; Gómez Rico et al, 2023). Social media is a digital environment in which the potential consumer has a holistic experience during the three stages of the enotourism: pre-visit, visit and the post-visit (Nella & Cristou, 2021).

In this sense, wine tourism has become a potential instrument for influencer marketing by offering an experience that can be shared on social media. The pictures and comments shared by winery visitors are useful to make a direct promotion based on the experience. This type of message is much more credible than traditional advertising (Ramos et al. 2019). This is especially important considering that the web and social media are among the main channels through which wine tourists discover wine routes (ACEVIN, 2023). It is important to note that over half of wine tourists are between 18 and 45 years old, a demographic that typically consumes content on social media and other digital platforms.

2.2. Mediation effect of wine tourism product on the relationship between “wine tourism” and “digital communication” in Spain

It is essential to define the scope of the wine tourism product discussed in this article, particularly in the context of the Spanish wine industry. A key function of wine tourism is to explore wine and the regions where it is produced. To achieve this, it is necessary to design routes or itineraries that facilitate and guide this experience. In Europe, wine tourism has largely been developed in the form of official wine routes (Hall et al., 2011), based on the concept of cultural routes supported by a PDO that certifies the quality of its wines. In this context, a wine route can be defined by the presence of vineyards, wine production facilities, and wineries (Alebaiki & Iakovidou, 2010). These routes, in turn, have been further promoted by the development of gastronomy (mainly based on local products and traditional cuisine but in many cases with relevant innovations), culture (such as wine museums, exhibitions, etc.), and the relationship between

culture, gastronomy, and wine. Therefore, wine routes not only guide tourists on their journey, but also offer a wide range of wine activities (Escolar & Morueco, 2011) and are potential vehicles for tourism development (Loiodice, 2015). In Spain, the main approach to organizing wine tourism has been to create itineraries or routes that include quality wine-producing areas (wine routes) and cities where wine production has historically been a key part of the local economy (wine cities). Therefore, in the context of this work, the wine tourism products considered are the Spanish wine routes and wine cities.

Official wine routes in Spain were developed following a government initiative in 2000: the Comprehensive Plan for Quality in Spanish Tourism 2000-2006. The plan included ten specific programs, one of which is called "Quality Tourism Products". The program aimed to design, create and develop tourism products to diversify and reduce the seasonality of the existing tourism offer in Spain. One of these products was the "Wine Routes of Spain" (López-Guzmán et al., 2014). At the time of writing, the official designation of "Wine Routes of Spain" includes a total of 35 routes (<https://wineroutesofspain.com/rutas-del-vino/>), compared to only 18 routes in 2014. Thus, in just a decade, 17 new routes have been developed, confirming that Spain's wine routes are becoming increasingly consolidated (Ruiz-Romero, Zamarreño, & Cruz, 2020).

Figure 1. Wine Routes in Spain.



Source: ACEVIN

These routes, shown geographically on Image 1, complement the local traditions and festivals that until recently were the main touristic attraction in many regions (Privitera, 2010). These traditions have historically been grouped around the gastronomic, scenic, and cultural offerings of the territory. However, they had the disadvantage of being very limited to one or two specific times of the year, which also often

coincided with summertime (Laing, 2018). In this sense, wine tourism and the wine routes that articulate the offer not only represent an exceptional opportunity for building a brand image for the PDOs and the associated wineries (Getz, 2000), but also help to de-seasonalise the tourist offer.

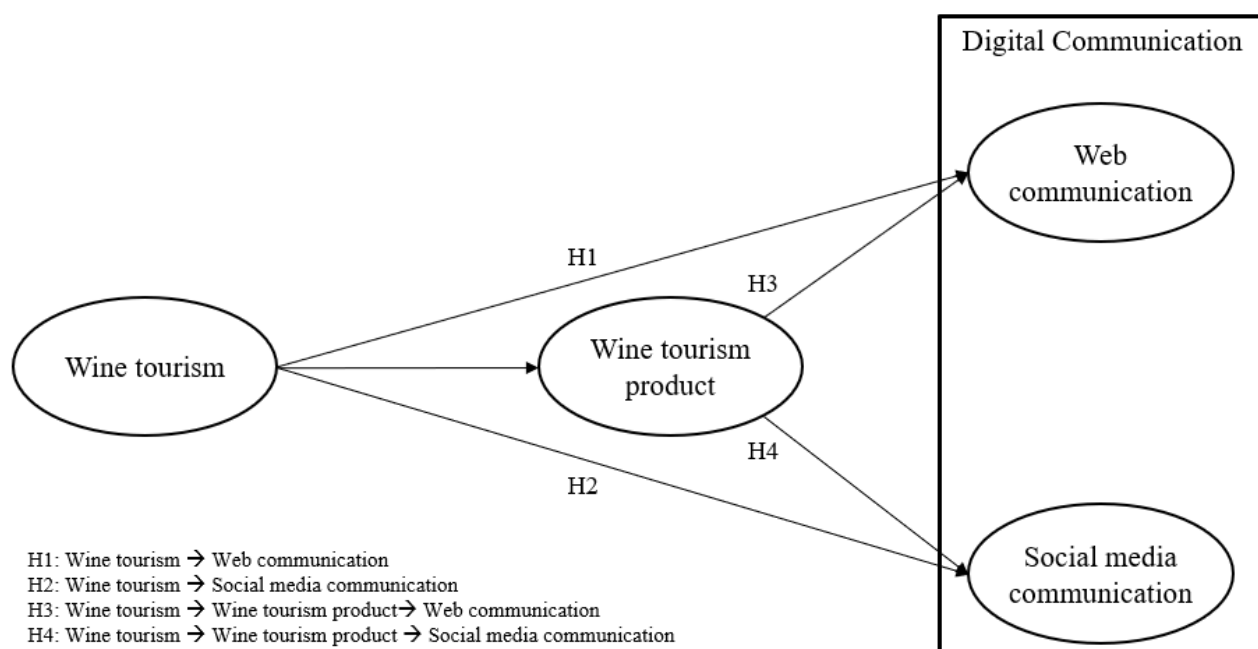
Wine cities are characterized by the predominance of the wine industry in their economy, influencing everything from the urban and landscape profile to the structure of the labour market and the culture of the community, giving it a unique identity. In Europe, recognizing the potential of wine tourism and the success of the first wine routes launched in 2000, the European Network of Wine Cities (RECEVIN) was established as a non-profit association based in Strasbourg. RECEVIN currently includes 11 countries (Germany, Austria, Bulgaria, Slovenia, Spain, France, Greece, Hungary, Italy, Portugal, and Serbia), representing nearly 800 towns across Europe. The members commit to developing actions aimed at "promoting wine tourism by bringing together existing and potential tourism resources and services of interest from the different wine-growing regions under a common thematic approach." According to the Spanish Association of Wine Cities (ACEVIN), there are currently 43 wine cities in Spain. In this context, it is worth highlighting the importance of the European continent for the wine sector. The European Union is the largest wine exporter in the world and Spain is the third-largest producer after Italy and France (Katunar et al., 2021). At the tourism level, Spain is the country that receives the most tourists in the world after France and the United States, according to UNWTO data in 2019. This specialization in tourism is underpinned by the fact that since 2013, ten cities have been named European Wine Cities and three of them were Spanish by the time this work was completed: Jerez (2013), Cambados (2018), and Aranda del Duero (2022), only Italy has the same number of European wine cities. Spanish PDOs thus lead one of the largest wine producers in the world in a country that has the third-largest tourism power in this context.

2.3. Description of the sample and data collection

To validate the hypotheses, a model is proposed that examines the correlations between the presence of a wine tourism product and the communication that PDOs (Protected Designations of Origin) engage in via the web and social media. The data collected encompass the entire population studied—97 PDOs—and include four dimensions with a total of 23 items: Wine Tourism (5 items), Wine Tourism Products (3 items), Web (6 items), and Social Media (9 items). The results were derived from the analysis of 2231 coded data points.

Regarding the above, Figure 2 summarizes the relationships between the dimensions analyzed in the proposed model.

Figure 2. Theoretical model



The sample used in this study includes 97 Spanish wine PDOs, which corresponds to the total number of wine PDOs registered in Spain in 2022. The 97 PDOs for wine are represented in 16 of the 17 Spanish regions, three of which are supra-regional, i.e. their territory is divided into more than one region. Table 1 shows the distribution of the sample by regions.

Table 1. Distribution of the sample (PDOs) by regions

Region	Number	Percentage
More than one region*	3	3.1%
Andalusia	8	8.2%
Aragón	5	5.2%
Asturias	1	1.0%
Canaries	11	11.3%
Cantabria	0	0.0%
Castile-La Mancha	20	20.6%
Castile and Leon	13	13.4%
Catalonia	11	11.3%
Extremadura	1	1.0%
Galicia	5	5.2%
Balearic Islands	2	2.1%
La Rioja	0	0.0%
Madrid	1	1.0%
Murcia	2	2.1%
Navarra	4	4.1%
Basque Country	3	3.1%
Comunidad Valenciana	7	7.2%
Total	97	100%

Note: *The PDOs in more than one region are Cava, Jumilla and Rioja.

Research data was obtained from the 97 supervisory authorities, the governing bodies of PDOs in Spain. Other secondary sources were also used, as informational sources, such as the Wine Routes in Spain (<https://wineroutesofspain.com/>) and the Spanish Association of Wine Cities (<https://www.acevin.es/>).

2.4. Variable measurement

This section explains how we measured the variables or constructs proposed for hypothesis testing. The study includes four variables: two related to digital communication (web communication and social media communication) as dependent variables, one related to tourism products developed from the wine industry (wine tourism product) as a mediator variable, and one that differentiates between PDOs that offer wine tourism and those that do not (wine tourism) as an independent variable.

-Wine tourism. This variable was measured using various indicators that indicate whether the PDO area provides wine tourism services^[1]. More specifically, it measured whether the PDO communicates the wine tourism services on the landing page, distinguishing between gastronomic, cultural, natural heritage and educational.

-Wine tourism product. This variable measures whether the PDO area has the following tourism products: Wine Routes of Spain and/or Wine Cities. As detailed above, the main formula for organising wine tourism in Spain is to create itineraries or routes made up of quality wine producing areas (wine routes) and cities where wine growing has historically been the basis of the local economy (wine cities).

-Web communication. This variable is the result of the analysis of different indicators that measure the level of engagement and efficiency of digital communication via the web. Specifically, it measured whether

the PDO has a website, if it is optimized (loading time and functionality for mobile devices), how it is positioned, the audiovisual resources on the landing page, the existence of updated news and/or events agenda, whether there is a retail function on the landing page and if it is translated into other languages (Wirtz & Zimbres, 2018).

-Social media communication. This variable was measured by a set of indicators representing the level of engagement and efficiency of digital communication via social media (Orduna-Malea & Alonso-Arroyo, 2017). Precisely, it measured whether the PDO has social media connected to the landing page and if the social media (which can include Instagram, Facebook, YouTube, Twitter, Twitch, LinkedIn, TikTok and/or Podcast) are updated, as well as the number of followers.

2.5. Analysis technique

In this research, the partial least squares (PLS) method was used for data analysis. This structural equation modelling approach explains the variance in the dependent variables. Much of the increasing use of PLS can be attributed to the ability of this method to overcome problematic modelling issues that regularly arise in social sciences (Hair et al., 2017). We consider it appropriate to use PLS in our research given that our research question is about solving a problem in the social sciences domain and that the sample exceeds the minimum recommended sample size for the use of PLS in a model with five relationships. All data have been processed with the statistical software SmartPLS in version 3.2.8.

3. RESULTS

This section presents the preliminary results of the research. Firstly, we note that almost all wine PDOs in Spain (95.9%) have a website whilst only 74.2% of Spanish wine PDOs are active on social media. Regarding the results of the analysis of the most relevant social media used by PDOs, the use of Facebook, Twitter, and Instagram stands out. More than half of PDOs have these social media, they are regularly updated and have followers. LinkedIn and TikTok, on the other hand, are only represented to a small extent, while the social media platform, Twitch, is not used at all.

Table 2 shows the distribution of the social media analyzed according to whether the PDO has the specific social media, keeps it updated, and has followers. These results are consistent with previous studies. According to the annual study of social media 2022 (IAB, 2022), produced by IAB Spain, Facebook continues to be the most important social media, followed by Instagram, YouTube, and Twitter. TikTok continues to gain importance and ranks sixth among the most used social media.

Table 2. Distribution of social media used by wine PDOs in Spain

Social Media	In use	Updated	Followers
Facebook	0.784	0.763	0.784
Twitter	0.711	0.557	0.711
Instagram	0.639	0.608	0.639
YouTube	0.423	0.278	0.423
LinkedIn	0.062	0.052	0.062
TikTok	0.010	0.010	0.010
Twitch	0.000	0.000	0.000
Podcast	0.052		

Structural equation modelling (SEM) based on variance helped us test the proposed hypothesis. Once the model was built (Figure 1), we evaluated it following the two essential steps in PLS models (Hair et al., 2017): measurement model evaluation and structural model evaluation. The overall evaluation of the proposed model shows a SRMR of $0.078 < 0.08$ (Hu & Bentler, 1998), indicating an adequate overall model fit.

Before we tested the hypotheses, the measurement model was reviewed to confirm the reliability and validity of our variables. The variables appear as reflective constructs in the model. The first stage was assessed by analyzing both the individual reliability of the indicators and the reliability and validity of the scale. The individual reliability of the indicators was assessed through the value of their loadings (λ) and all loadings exceeded the value recommended in the literature (>0.7). The scale was evaluated using Cronbach's α index, the composite reliability index, and the Dijkstra-Hernseler indicator (ρ_A). For its part, the examination of extracted mean-variance (AVE) served to verify the existence of convergent validity. Table 3 shows that the alpha value, composite reliability, and ρ_A exceeded the critical value of 0.7 for each variable, while the AVE value also exceeded 0.5 (Fornell and Larcker, 1981), showing that each construct has adequate convergent validity. Finally, discriminant validity must be checked in measurement model analysis (Kline, 2011). As shown in Table 4, the findings confirm discriminant validity.

Table 3. Construct reliability and validity

Construct	Cronbach's α	ρ_A	Composite reliability	AVE
Wine tourism	0.816	0.837	0.869	0.571
Wine tourism product	0.899	0.924	0.936	0.829
Web	0.792	0.795	0.848	0.549
Social Media	0.850	0.885	0.880	0.511

Table 4. Construct discriminant validity

	Wine tourism	Wine tourism product	Websites	Social Media
Criterion Fornell-Larcker				
Wine tourism	0.756			
Wine tourism product	0.340	0.911		
Web	0.380	0.215	0.699	
Social Media	0.379	0.654	0.387	0.678
Heterotrait-Monotrait Ratio (HTMT)				
Wine tourism				
Wine tourism product	0.343			
Web	0.437	0.233		
Social Media	0.435	0.686	0.504	

To evaluate the structural model, the first step consisted of assessing collinearity and the second involved assessing the path coefficients between the latent variables of the model. In this study, the Variance Inflation Factor (VIF) values were not higher than the maximum value [(VIF) >5] (Hair et al., 2017) in any case. To assess the significance of these coefficients, the bootstrapping technique was used with 5,000 samples to obtain both t-statistics and confidence intervals.

Four out of five direct effects described in Figure 1 were significant. The 'wine tourism' variable positively influences ($H\beta=0.340$, $p<.001$) on wine tourism product. The 'wine tourism product' variable positively influences ($\beta=0.594$, $p<.001$) on social media communication, while it has no influence ($\beta=0.097$, $p>.05$) on web communication. Finally, the two primary relationships ($H1$ and $H2$) were positive and significant. Thus, the 'wine tourism' variable positively influences ($\beta=0.347$, $p<.001$) on web communication and positively influences ($\beta=0.177$, $p<.05$) on social media communication, confirming both hypotheses. These results suggest that the PDOs that offer wine tourism carry out more efficient digital communication through the web and social media than those that do not offer tourist services based on the wine activity of the territory.

We assessed the value of determination coefficient for 'wine tourism product', 'web communication', and 'social media communication' ($R^2=0.116$, 0.152 , and 0.456 , respectively). The structural model was also assessed with the Stone-Geisser test (Q^2) following a blind folding procedure (Chin, 1998). The results of the analysis confirm that the proposed model has appropriate predictive relevance for each dependent variable ($Q^2>0$). Table 5 outlines the results of the model and Figure 2 shows them graphically.

Table 5. Effects on endogenous variables

Effects on endogenous variables	Direct effect	t-Value (Bootstrap)	Percentile 95% confidence interval (bias-corrected)	Explained variance (%)
Wine tourism product				
$R^2=0.116/ Q^2=0.084$				11.6%
Wine tourism	0.340***	3.968	[0.174; 0.506] Sig.	
Web communication				
$R^2=0.152/ Q^2=0.053$				15.2%
Wine tourism	H1: 0.347***	4.595	[0.215; 0.502] Sig.	
Wine tourism product	0.097	1.165	[-0.086; 0.245] ns.	
Social media communication				
$R^2=0.456/ Q^2=0.164$				45.6%
Wine tourism	H2: 0.177*	2.068	[0.027; 0.368] Sig.	
Wine tourism product	0.594***	5.690	[0.314; 0.734] Sig.	

Note: * $p <.05$; ** $p <.01$; *** $p <.001$.

Based on the proposed research model (Figure 1), H3 and H4 represent mediating relationships, which address the extent to which an independent variable -wine tourism- affects two dependent variables -web and social media communication- through a mediating variable -wine tourism product- (Preacher & Hayes, 2008).

By introducing mediating variables into a model, the total effect can be divided into direct and indirect effects (Hayes, 2009). In our case, the total effect of wine tourism on web communication and social media communication is estimated as the sum of direct and indirect effects, the latter estimated by the product of the coefficients of each mediating path. The significance of indirect effects was tested using the bootstrapping method. To test the mediation effects (H3 and H4) we used the analytical approach proposed

by Hayes and Scharkow (2013). Table 6 shows the total, direct and indirect effects when the mediating variable is introduced in the model.

Table 6. Results of the mediation effects test

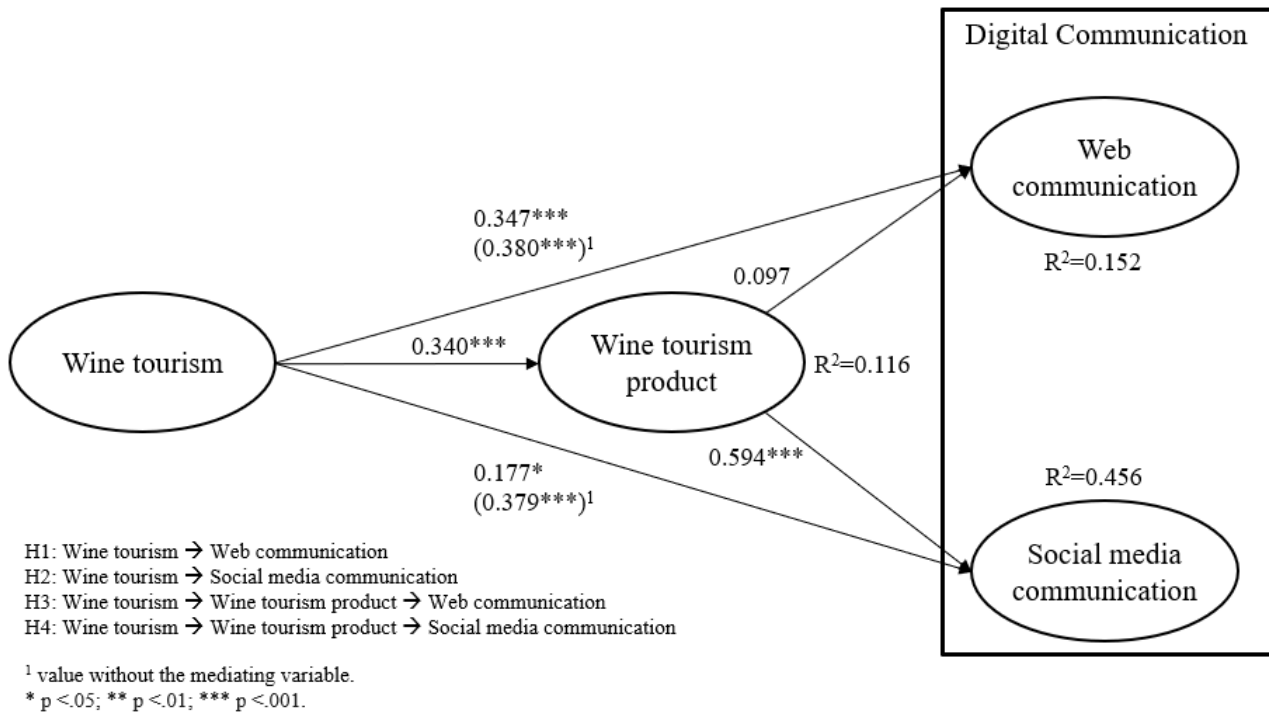
Total effect of wine tourism on the web		Direct effect of wine tourism on the web		Indirect effect of wine tourism on the web		
Coef.	t-value	Coef.	t-value		Estimated point	Confidence interval, percentile 95%
0.380***	5.526	0.347***	4.595	<i>H3</i>	0.033	[-0.027; 0.096] ns.

Note: * $p < .05$; ** $p < .01$; *** $p < .001$.

Figure 3 and Table 6 reveal that wine tourism has a significant total effect on web and social media communication. Wine tourism continues to significantly affect web communication (*H1*) and social media communication (*H2*) when introducing the mediating variables. Results also show that the variable 'wine tourism product' is a mediator between wine tourism and social media communication. Therefore, now the total effect breaks down into a direct effect ($\beta=0.177$; $p<0.05$ -wine tourism on social media communication-) and an indirect effect ($\beta=0.202$; $p<0.01$ -wine tourism on social media communication through wine tourism product-), which confirms hypothesis *H4*. However, results also show that the variable 'wine tourism product' does not act as a mediator between wine tourism and web communication.

The estimation of the Variance Accounted For (VAF) provides evidence of the type of mediation, obtaining a VAF value of 0.532 for *H4*. A value below 0.8 allows us to confirm that the mediation is partial and complementary in so far as the values of wine tourism on social media communication (0.177), wine tourism on wine tourism product (0.340), and wine tourism product on social media communication (0.594) show the same positive direction. Therefore, we can confirm mediating hypotheses (*H4*).

Figure 3. Results model



The results reveal a significant positive impact of digital communication on the promotion of wine tourism within Spain's PDO's, corroborating findings from recent literature that highlight digital engagement as a crucial factor in tourism development. However, compared to Shen et al. (2020) and Zamarreño Cruz & Hernando (2021), our study delves deeper into the specifics of digital strategies employed by PDOs, offering a nuanced understanding of how different digital platforms contribute to wine tourism's appeal.

Furthermore, the mediation analysis provided a novel insight into the role of wine tourism products in enhancing the effectiveness of digital communication. This finding aligns with the theoretical framework proposed by Gomez Pratt & Molina (2019) and Zamarreño et al. (2021), which suggest that the synergies between wine production and tourism can be significantly strengthened through strategic digital communication. Our study advances this discourse by empirically demonstrating the mediating effect of wine tourism products, a facet previously underexplored in the literature.

Considering the comparative lack of research on the digital experience in wine tourism identified by Zamarreño Cruz & Hernando (2021), our study fills a critical gap by providing concrete evidence of the benefits associated with digital engagement.

4. DISCUSSION AND CONCLUSIONS

The Spanish wine PDOs use of the web as a tool for digital communication is widespread. The use of social media, whilst inferior, is still within relatively high usage levels. Nevertheless, there are significant differences when considering the type of social media platform. The majority of PDOs use Facebook (78.4%), Twitter (71.1%) and Instagram (63.9%). YouTube (42.3%) is less frequently used, whilst LinkedIn (6.2%), TikTok (1.0%) and Twitch (0.0%) present less significant usage levels. Only 5.2% of the PDOs offer content through Podcasts.

The absence of a recognizable strategy is most striking when analyzing the social media of PDOs in Spain. The various social media platforms are not recognized and treated as individual entities, but we are dealing with a cross-media communication model (Galán, Serrano, & Felici, 2018), where content is replicated between platforms with little adaptation to the specific characteristics of each medium.

According to the results obtained, we can conclude that the PDOs that offer wine tourism carry out more efficient digital communication through the web (*H1*) and social media (*H2*). There are two elements to be considered here, first, wine tourism falls under the category of 'tourism development product'. Here the link between land/heritage/attributes of the environment has to be allied in the first place to the product and in the second to the tourist or aficionado attention and consciousness. This can be achieved through the targeting of information and the creation of a story surrounding the relationship. An example of this type of relationship, is the development of the use of storytelling surrounding whisky and white spirit within Scotland. During this process, the Scottish landscape and heritage have been shown to be directly linked to social media and e-commerce (Kellershohn, 2022). This has resulted in a vast increase in both revenue and tourism. The second element to be inferred from the connection between wine tourism and digital communications is that the two-pronged approach of web, in relation to e-commerce and storytelling with social media is essential for developing both these areas: wine tourism and digital communication. Therefore, it can be concluded that there is a connection between the development of wine tourism and digital communication, which answers our first research question: a sip of wine with digital communication enhances the tourism industry smile.

The results of the mediation analysis, confirm that the wine tourist product, Spanish wine routes and cities, influences the relation between wine tourism and digital communication. However, this only applies to social media (*H4*), not to the Web (*H3*). Those PDOs with a recognized wine route or a city in their territory carry out more effective digital communication through social media. However, this connection does not occur with digital communication through the web. Neither does this confirm that the wine tourist product influences the relationship between wine tourism and digital communication through the web (*H3*). If we recognize the functions of these different areas of communication, the web has developed into an informational platform. The web has been identified as a tool for e-commerce. Social media, although also informational in nature, has a much higher function related to increasing desire and motivation in terms of linking the attributes of the land region with the product.

This research project has shown a lack of integrated digital communication strategy between the agents involved in wine tourism. There is insufficient coordination between the entities and policymakers involved in the promotion, support, and commercialization of wine tourism. The analysis confirms that several of the PDOs that offer wine tourism do not communicate the tourist offer on their websites. Similarly, whereas the communication of the PDOs seems more oriented to the image and preparation of the wine, in many cases, they do not pay the same attention to tourist activities or the ever-important creation of that storytelling aspect linking the land/ the people/the history and culture with the product.

The research spotlights the transformative potential of digital communication in promoting wine tourism, highlighting its implications for societal development and sustainability. By fostering an enhanced understanding and engagement with wine tourism through digital platforms, this study points towards a future where digital integration can contribute to economic growth, cultural preservation, and environmental sustainability in wine-producing regions. It suggests a paradigm where digital strategies drive tourism and

encourage a more sustainable and inclusive approach to cultural heritage, offering valuable insights for policymakers, industry stakeholders, and communities.

The promotion and protection of tourism is a key driver for economic and cultural development. Our results can be of significant interest to industrial managers, regional councils and policymakers. The digital communication of PDOs could contribute to strengthening Spanish wine as a crucial product with the capacity to articulate the culture and heritage of the whole territory and ultimately increase and diversify its tourism offering. In terms of impact, these results demonstrate that the development of wine routes and cities is a stimulus to digital communication through social media. This evidence is also crucial to higher education institutions and regional councils, when considering, the added value derived from the adoption of communication practices linked to their wine tourism strategy. The study highlights the deficient coordination between the entities and policymakers involved in the wine tourism sector. Our findings should be an incentive for the wine and tourism industry to significantly improve the impact of their communication strategy.

Our research's principal findings and societal implications are concisely encapsulated in Table 7, which provides a structured overview of the transformative effects of digital communication strategies on the Spanish wine tourism industry and its broader impact on economic, cultural, and environmental dimensions.

Table 7

Table 7. Implications and findings in the different areas

Area	Implications and Findings
Economic Growth	Digital communication through PDOs enhances economic growth by expanding and diversifying Spain's wine tourism offerings.
Cultural Preservation	The digital promotion of PDOs articulates the culture and heritage of Spanish territories, contributing to cultural development.
Environmental Sustainability	Digital platforms encourage sustainable tourism practices, minimizing environmental impact while promoting wine routes.
Stakeholder Engagement	Findings emphasize the need for improved coordination between policymakers, industry stakeholders, and communities for effective digital strategy implementation.
Tourism Diversification	Developing wine routes and cities stimulated by digital communication increases tourism diversity
Higher Education and Policy Impact	The evidence is crucial for educational institutions and regional councils to value communication practices linked to wine tourism strategy.
Communication Strategy	The study identifies a gap in communication coordination, suggesting an opportunity for the wine and tourism industry to significantly improve the impact of their communication strategies.

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