Two Essays on Wine: Social Media Marketing Efforts of Tennessee Wineries and Consumer Preferences for Tennessee Quality Certified Wines

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ABSTRACT

The scope of this research includes two related projects that examine winery social media marketing strategies and consumer preferences for Tennessee wine. The first study analyzes the factors influencing social media platform use and frequency among Tennessee wineries compared to those in other states. Data were collected from 80 winery owners and managers through an online survey, and ordered probit regression models were used to estimate the factors affecting winery Facebook and Instagram posting frequency. Results show that wineries hosting music or entertainment events, offering online sales, and those located in Tennessee post more frequently on Facebook. On Instagram, wineries with fewer followers post less often, while those targeting specific audiences (e.g., wine enthusiasts, consumers aged 36 and older) post more frequently. Across both platforms, wineries that report time constraints or limited social media expertise post less often, highlighting the importance of human capital in effective digital marketing. Overall, despite operating in an emerging and rural wine region, Tennessee wineries maintain social media activity comparable to that of wineries in other states.

The second study examines consumer willingness to pay (WTP) for Tennessee wine attributes using a discrete choice experiment. An online survey of 825 consumers, including Tennessee residents and visitors, evaluated their preferences for wines carrying the Tennessee Quality Assurance Program (QAP) certification label, regional American Viticultural Area (AVA) designations, and varying alcohol content levels. Results indicate that consumers are willing to pay significant price premiums for wines carrying the QAP certification and AVA labels, suggesting that these attributes function as credible quality and origin signals. Alcohol content also influences WTP, with higher alcohol levels generally associated with higher perceived value.

Together, the findings suggest that effective use of social media marketing, credible quality certification, and regional branding can aid in improving market access and enhance the value of Tennessee wines. Practical implications include investing in social media training to address knowledge gaps and using QAP certification and regional labels as strategic marketing tools to support pricing and product differentiation.

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CHAPTER 1: INTRODUCTION

The wine industry is an important and growing component of the Tennessee agricultural sector. Within Tennessee, the wine industry has expanded considerably over the past decade. According to the U.S. Department of Labor (2025), the number of winery establishments in Tennessee increased from 43 in 2019 to 66 in 2024, representing a 53.4 percent increase. Over the same period, covered employment in the industry grew from 527 to 653 jobs (a 23.9 percent increase), while nominal wages and salaries rose from $12.7 million to $21.8 million (a 72.2 percent increase) (Hughes, Rihn, & DeLong, 2025). In 2016, Tennessee wineries generated an estimated $40 to $60 million in annual sales, including revenues from agritourism-related activities, and used approximately $5 million worth of Tennessee-grown grapes (Hughes et al., 2016). More recently, an economic impact analysis conducted in 2025 estimated that the Tennessee wine industry contributes $610 million to the state's economy, supports over 3,340 jobs, and generates approximately $62 million in state and local tax revenues (Hughes, Rihn, & DeLong, 2025). The Tennessee grape industry, which supplies the state's wineries, has experienced more mixed trends. Grape acreage in Tennessee increased from 580 acres in 2007 to 959 acres in 2017, before declining to 789 acres by 2022, representing a 17.7 percent decrease (U.S. Census of Agriculture, 2007, 2012, 2017, and 2022). The number of farms reporting grape cultivation increased slightly from 462 in 2017 to 472 in 2022, while the average farm size declined from 2.08 acres to 1.67 acres over the same period (Hughes, Rihn, & DeLong, 2025). These trends indicate that while the Tennessee wine sector has expanded in terms of establishments, it continues to face supply-side and market pressures that may influence its long-term resilience.

Tennessee has approximately 77 wineries operating across the state (Tennessee Wine and Grape Board, 2024). Many of these wineries are in non-metropolitan areas, where they are more likely to depend on tourism-driven, on-site sales (Hughes, 2016). As a result, attracting visitors and generating interest in winery experiences is critical to their success. Because these wineries are often located farther from major population centers, maintaining connections with potential customers through digital channels such as social media can help promote products, advertise events, and encourage both in-person visits and online purchases. However, rural wineries may face distinct marketing constraints. They are often smaller in scale, making marketing efforts more challenging due to limited time and financial resources.

This research addresses two related marketing decisions for wineries: evaluating marketing behavior and estimating consumer willingness to pay (WTP) for differentiated wine products. Chapter 2 focuses on winery-level marketing behavior, examining how wineries use social media platforms to promote their wines, engage consumers, and support visitation. The study uses survey data collected from winery decision-makers in Tennessee and other states to analyze social media posting frequency, winery characteristics, social media engagement and marketing objectives, and perceived marketing challenges. By comparing practices across regions and winery characteristics, this analysis provides insights into how wineries allocate marketing effort and the factors associated with variation in social media engagement. The findings contribute to the identification of best practices, common constraints, and opportunities to improve social media marketing strategies among wineries.

Chapter 3 shifts to the consumer perspective and examines preferences for Tennessee wine attributes. Using data from an online discrete choice experiment (DCE), Tennessee wine consumers, including both residents and visitors, were asked to choose among wines that varied

by Tennessee Quality Assurance Program (QAP) certification, American Viticultural Area (AVA) designation, alcohol content (7%, 12%, or 16%), and price. Responses were analyzed within a random utility framework to estimate willingness to pay (WTP) for each attribute. The results provide insight into the extent to which certification and regional labeling function as credible quality signals and whether they command price premiums, offering guidance for wineries considering investments in quality certification, regional branding, and product differentiation.

CHAPTER 2: SOCIAL MEDIA MARKETING EFFORTS OF TENNESSEE WINERIES

Background and Objective

The Tennessee wine industry has experienced considerable growth in recent years, following a major regulatory shift that expanded wine access in the state. In 2016, Tennessee implemented the Sale of Wine in Retail Food Stores Act, allowing grocery stores to sell wine and increasing retail availability and consumer convenience (Sun et al., 2025). This reform increased the number of outlets offering wine and altered the competitive landscape by introducing new sales channels beyond traditional liquor stores. After this change, the number of wineries grew from 43 in 2019 to 66 in 2024 (U.S. Department of Labor, 2024). State industry records also indicate that approximately 77 wineries were operating in Tennessee by 2023 (Tennessee Wine and Grape Board, 2024). This expansion has benefited wineries and rural communities by increasing tourism and related businesses. An economic impact report estimates that in 2024, the wine industry contributed approximately $610 million to the state's economy, supported over 3,340 jobs, and generated around $62 million in state and local tax revenues (Hughes, Rihn, & DeLong, 2025).

Notably, about 60% of Tennessee wineries are in non-metropolitan counties, where they rely heavily on tourism-driven revenue streams such as tasting room visits and direct sales (Hughes, 2016). Competition for visitors and direct-to-consumer sales remains intense, placing pressure on wineries to differentiate themselves through effective marketing strategies. These conditions highlight the need for marketing strategies that extend beyond physical location and reach consumers outside the local market. Social media platforms such as Facebook, Instagram, YouTube, and X (formerly Twitter) have transformed marketing practices across sectors, including agriculture and tourism. Social media is defined as "a group of internet-based

applications that build on the ideological and technological foundations of Web 2.0 and allow the creation and exchange of user-generated content" (Kaplan & Haenlein, 2010, p. 61). Unlike traditional one-way advertising, social media platforms enable interactive communication between users and firms, allowing content to be created, shared, and discussed in real time. These interactions produce electronic word-of-mouth communication that influences consumer perceptions and purchase decisions. According to Donthu et al. (2021), electronic word-of-mouth has grown in importance as a driver of consumer behavior in both online and offline settings. This shift is particularly relevant for products such as wine, which are characterized as high-involvement and information-sensitive. Consumers often rely on peer-generated information, shared experiences, and informal recommendations when evaluating unfamiliar wines (Thach et al., 2016). Increasingly, these information search and decision-making processes occur through social media, where user-generated content significantly influences wine tourists' perceived credibility, attitudes, and visit intentions (Alimohammadirokni et al., 2025).

In addition to promotional functions, social media supports relationship-oriented communication and aligns with customer relationship management objectives such as engaging customers and maintaining ongoing connections (Trainor, 2012; Dijkmans et al., 2015). For wineries, which rely heavily on reputation and brand image, social media serves not only as a marketing channel but also as an environment in which brand perceptions are shaped through user interaction and shared experiences (Capitello et al., 2014). Social media management involves sustained content creation, audience interaction, and strategic planning. Previous research conceptualizes firms' social media efforts in terms of volume, information richness, and responsiveness, which represent different dimensions of engagement (Chung et al., 2014). Posting frequency serves as an observable indicator of social media marketing activity, reflecting

how actively firms engage with their audiences. Studies of wineries document variation in posting behavior, suggesting that more frequent posting is associated with higher levels of engagement (Szolnoki et al., 2014; Thach et al., 2016). Maintaining an active presence can increase opportunities for audience exposure and interaction, which are central to relationship-oriented marketing communications (Trainor, 2012; Dijkmans et al., 2015). Facebook and Instagram are examined because they are among the most widely used platforms in winery marketing. Prior research identifies Facebook as a dominant platform for communication and promotion that allows wineries to share information, engage with customers, and build relationships through interactive content (Szolnoki et al., 2014; Thach et al., 2016). In contrast, more recent studies highlight the growing importance of visually oriented platforms such as Instagram, which emphasize photo and video sharing, influencer engagement, and experiential storytelling to promote wine tourism and destination appeal (Chen et al., 2023). These differences suggest that Facebook is primarily used for information sharing and customer interaction, while Instagram is more effective for visual branding and influencing consumer perceptions and travel-related decisions. Wine products are often promoted through imagery, storytelling, event announcements, and customer experiences, all of which align well with the content formats of these platforms (Canovi & Pucciarelli, 2019; Thach et al., 2016). These platforms also enable firms to share promotional content while interacting directly with consumers through comments, messages, and user-generated content (Trainor, 2012; Dijkmans et al., 2015).

Globally, research on social media adoption in the wine industry shows both widespread use and variation in implementation. Studies conducted in major wine-producing countries such as the United States, Italy, and Germany report high adoption rates of platforms like Facebook,

commonly used for event promotion, customer service, and brand community building (Galati et al., 2017; Szolnoki et al., 2014; Canovi & Pucciarelli, 2019). Within the United States, previous research has often focused on well-established wine regions such as California, where wineries operate in highly competitive environments supported by mature tourism infrastructure and strong regional brand recognition (Thach et al., 2016). However, engagement intensity, measured through posting frequency, content richness, and responsiveness, varies depending on factors such as winery size, managerial characteristics, resource availability, and market orientation (Galati et al., 2017; Thach et al., 2016). Smaller wineries may exhibit higher levels of engagement due to managerial flexibility and direct owner involvement, whereas larger wineries may demonstrate different patterns of resource allocation and online activity (Galati et al., 2017). Despite this growing body of literature, a notable gap remains in research on wineries operating in less established or predominantly rural wine-producing regions such as Tennessee. Most existing studies focus on areas with well-developed wine tourism infrastructure and strong market recognition. In contrast, wineries in emerging regions often operate with limited marketing resources, lower brand recognition, and greater reliance on direct-to-consumer sales through tourism (Hughes, 2016). Within Tennessee, where many wineries are small and rural, there is limited empirical evidence on how social media marketing intensity, measured by posting frequency on platforms such as Facebook and Instagram, compares with that of wineries in other U.S. states. While previous studies have examined social media adoption and engagement in the wine industry, including differences across countries and winery characteristics (Szolnoki et al., 2018), the existing evidence on its adoption and utilization remains limited. In particular, little is known about how winery-specific factors such as size, location, marketing objectives, resource availability, perceived barriers, and managerial

demographics influence posting behavior. Without this understanding, wineries in such regions may underutilize social media, limiting their ability to reach broader audiences and enhance visitor engagement.

This study examines the social media marketing efforts of Tennessee wineries, focusing on Facebook and Instagram posting frequency as a measure of marketing intensity. A comparative approach is used to assess differences between Tennessee wineries and those in other U.S. states, as well as across winery size categories. The study addresses two research questions. First, how do Tennessee wineries compare with wineries in other states in terms of Facebook and Instagram posting frequency? Second, what factors explain variation in posting behavior across these platforms? These questions are investigated using survey data from winery owners and managers, combined with statistical modeling to identify key determinants of posting activity. This research contributes to the literature by providing empirical evidence on social media marketing in agribusiness, identifying regional and size-related differences in marketing intensity, and offering practical insights for wineries and industry stakeholders seeking to strengthen marketing capacity in rural wine regions.

Literature Review

Social Media Marketing and the Wine Industry

Social media has shifted marketing from one-way communication toward more interactive forms of engagement in which consumers create, share, and respond to brand-related content. Kaplan and Haenlein (2010) define social media as internet-based applications that enable the creation and exchange of user-generated content, emphasizing their role in facilitating participatory and collaborative communication between users and firms. This shift has increased the importance of electronic word-of-mouth (eWOM). Cheung and Thadani (2012) review 47

peer-reviewed studies and show that online consumer communication influences outcomes such as attitudes, purchase intentions, and purchasing behavior. Trainor (2012) further argues that firms can strengthen customer relationships by integrating social media with traditional customer relationship management systems to support ongoing interactions with consumers. Charo et al. (2015) found that eWOM improves brand image and purchase intentions, with timely information and continued discussion about products helping to boost sales. Similarly, Wu and Lin (2017) identified product usefulness, ease of use, and the trustworthiness and usefulness of consumer reviews as important elements shaping consumer attitudes and purchase intentions. Wang et al. (2018) further demonstrated that the strength of eWOM ties among consumers influences purchase decisions, suggesting that top fans (highly engaged consumers) may play an outsized role in promoting wineries and their events. In addition to influencing consumer decision-making, social media engagement can shape firm-level outcomes such as customer relationships, brand visibility, and business performance. Lovrinčević et al. (2025) conducted a qualitative study using semi-structured interviews with owners of small family wineries in Croatia and found that social media serves as a low-cost marketing tool that helps wineries build direct customer relationships, enhance brand visibility, and improve overall business performance. While these studies provide general evidence on how social media influences consumer engagement and firm outcomes, research specific to the wine industry shows that these mechanisms are also relevant given the experiential and information-intensive nature of wine consumption.

Social media enables wineries to communicate experiential and place-based attributes that are central to wine consumption. Using qualitative interviews with 20 winery owners in the Langhe region of Italy, Canovi and Pucciarelli (2019) found that wineries use social media to

promote wine tourism experiences by emphasizing emotional, social, and experiential aspects of their offerings, although many do not fully exploit these platforms due to resource constraints. Similarly, Bruwer and Alant (2009) based on survey data from 304 wine tourists across 12 wineries in South Africa, show that wine consumption is largely hedonic and influenced by experiential factors such as scenic beauty, atmosphere, and social interactions, highlighting the importance of place in shaping consumer behavior. Providing evidence from the U.S. wine industry, Thach, Lease, and Barton (2016) conducted an online survey of 375 wineries and found that social media is widely used to promote events, share experiences, and engage consumers, with 87% of respondents reporting increased sales associated with social media use. These findings suggest that wineries can use social media to communicate experiential attributes such as vineyard landscapes, production processes, and events, thereby strengthening perceptions of authenticity and quality. This aligns with previous research on wine tourism, which conceptualizes wineries as both product producers and tourism destinations, reinforcing their dual role in promoting both products and place-based experiences (Getz & Brown, 2006).

Consumer Behavior and Information Search in Wine Markets

Wine represents a distinctive product category characterized by complex consumer decision-making processes. It is commonly described as a high-involvement product because consumers often invest considerable cognitive effort and actively search for information when making purchase decisions. Using a discrete choice experiment, Lockshin et al. (2006) show that consumers evaluate multiple extrinsic cues, such as brand, region of origin, price, and awards, when selecting wine, and that the importance of these cues differs across levels of consumer involvement. In contrast to routine purchases of low-involvement goods, wine selection typically involves evaluating multiple attributes, including grape variety, region of origin, production

methods, brand reputation, and perceived price-quality relationships (Lockshin and Corsi, 2012). This process can increase uncertainty, especially among less experienced consumers who may lack the expertise to assess intrinsic wine characteristics. Wine is also classified as an experience good. Nelson (1970) distinguishes between search and experience goods, explaining that some product qualities, such as taste, can only be evaluated after consumption. Product labels and packaging cues further shape consumer interpretation of wine characteristics. Using a self-administered questionnaire, Barber and Almanza (2006) find that packaging elements such as label design, bottle appearance, and closure type significantly influence purchase decisions, with consumers often relying on these cues to compensate for limited product knowledge and uncertainty. The wide assortment of available options may also contribute to choice complexity. A three-part study combining surveys, in-store observation, and post-purchase interviews by Zucker and Remaud (2014) finds that although consumers face large product assortments, there is limited evidence of choice overload, especially among frequent wine buyers. Differences between expert and non-expert evaluations further highlight the role of knowledge and experience in shaping wine preferences. In a series of controlled experiments, Hughson and Boakes (2002) show that wine experts outperform novices in recall and description tasks because they possess greater domain-specific knowledge and structured vocabulary, which enhances their ability to evaluate and describe wines.

To reduce uncertainty, consumers often rely on external information sources. Peer recommendations and social influence help guide purchase decisions by providing informal evaluations and reducing perceived risk. Using survey data from 409 U.S. consumers, Atkin and Thach (2012) find that Millennials (born between 1981-1996) are more likely to rely on recommendations from friends and family when selecting wine, especially when they have

limited product knowledge. Word-of-mouth communication further shapes consumer evaluations. In an experimental study exposing participants to different combinations of online reviews, Doh and Hwang (2009) show that the balance of positive and negative messages affects consumer perceptions, with message credibility and involvement influencing the strength of these effects. Social media extends these interactions into digital environments, where information is more accessible and widely shared. Hussain et al. (2024) employ social media analytics to examine tourism-related content and find that platforms such as YouTube serve as key sources of information that tourists rely on to learn about destinations and guide their travel decisions. Frequent wine consumers also actively engage with digital platforms. Based on a survey of 681 high-frequency wine consumers in the United States, Thach and Olsen (2015) show that consumers use online channels to search for information, compare alternatives, and seek recommendations before making a purchase. Consumers with higher levels of involvement tend to engage in more extensive information search, whereas less involved consumers rely more on simplified cues such as price, awards, and recommendations, as demonstrated in discrete choice experiments and survey-based studies of wine choice behavior (Lockshin et al., 2006; Lockshin & Corsi, 2012). These findings indicate that both interpersonal communication and digital information sources are central to reducing uncertainty and shaping wine purchase decisions.

Social Media Adoption and Marketing Intensity in the Wine Industry

The wine industry has increasingly incorporated social media into marketing strategies as wineries recognize its potential for consumer engagement, brand storytelling, and tourism promotion. Research across major wine-producing regions shows that social networking platforms, especially Facebook, are widely adopted as communication tools for engaging with

consumers. Szolnoki et al. (2014) conducted two studies to examine the use and effectiveness of social media in the wine industry: a survey of 321 German wineries and a consumer analysis comparing Facebook fans and non-fans. They find that 60% of wineries use social media to communicate with customers, with Facebook identified as the most important platform, and that Facebook fans exhibit higher purchase levels and loyalty than non-fans. More recent cross-country evidence highlights variation in adoption patterns. Szolnoki et al. (2018) investigated social media adoption and activities of wineries in Germany, the United States, New Zealand, and Australia, finding that Facebook was the most frequently used platform for engaging with consumers across all countries. However, adoption rates varied considerably, with nearly 87% of U.S. wineries using Facebook compared to only 46% in Germany and approximately 60-65% in New Zealand and Australia. Among U.S. wineries, Twitter was the second most popular platform, followed by Instagram and Pinterest. Similar to earlier findings, U.S. wineries most frequently use social media to communicate with customers, gain new customers, and provide event information. The study also found that winery size influenced social media use, with the largest and smallest wineries exhibiting the highest adoption rates.

Similarly, Galati et al. (2017), based on data collected from 45 Sicilian wineries and analyzed using a model measuring social media intensity, richness, and responsiveness, identify substantial variation in how wineries use Facebook, showing that smaller firms and those managed by more highly educated managers tend to engage more actively, while larger firms exhibit lower levels of social media activity. These findings indicate that adoption alone does not explain how wineries use these tools, as levels of engagement differ significantly across firms. Managerial and resource-related factors further influence how wineries engage with digital platforms. Canovi and Pucciarelli (2019), based on qualitative, semi-structured interviews with

20 winery owners in the Langhe region of Italy, find that while most owners recognize the social, economic, and emotional benefits of social media, many do not fully utilize its potential due to constraints such as limited time, skills, and an agricultural mindset. As a result, some wineries maintain only a limited presence without fully integrating these tools into broader marketing strategies. Evidence from the U.S. wine industry shows similar variation. Thach, Lease, and Barton (2016), based on an online survey of 375 wineries analyzed using descriptive statistics and ANOVA techniques, find that 87% of wineries report increased sales associated with social media use, with the use of multiple social media platforms associated with greater reported increases in wine sales. Overall, these studies demonstrate that while social media adoption is widespread in the wine industry, the intensity and effectiveness of its use vary considerably depending on firm characteristics, managerial capabilities, and resource availability.

To better understand these differences, the concept of marketing intensity provides a useful perspective. Rather than focusing solely on whether a winery adopts social media, this concept captures how actively and consistently it is used. Chung et al. (2014) conceptualize social media marketing efforts along three key dimensions: intensity, richness, and responsiveness, which reflect the volume of activity, the type and depth of content shared, and the extent of interaction with users. Similarly, Galati et al. (2017), based on data from 45 Sicilian wineries, apply this model to assess firms' social media efforts on Facebook. Using data collected from wineries' Facebook pages over a one-year period and applying cluster analysis, they measure intensity as posting and commenting activity relative to the number of followers, richness as the proportion of posts containing multimedia content, and responsiveness as the extent to which firms reply to user interactions. Their findings reveal substantial variation across wineries, with smaller firms and those managed by more highly educated individuals exhibiting

higher levels of social media engagement, while larger wineries tend to show lower levels of activity and rely more on traditional marketing practices. Given the experiential and tourism-oriented nature of wine consumption, marketing intensity on social media becomes particularly relevant for understanding how wineries engage with consumers. As discussed by Canovi and Pucciarelli (2019), wineries increasingly offer activities such as winery visits, wine tastings, cellar-door sales, and hospitality services, which contribute to revenue generation and customer engagement. Social media content plays an important role in communicating these experiences, allowing wineries to showcase their offerings and maintain ongoing engagement with consumers beyond physical visits. A more active use of these platforms may therefore contribute to brand image development and increased visitation, especially for wineries that depend on direct-to-consumer interactions.

Regional Context and Rural Winery Marketing

Wineries operate within geographic and economic environments that shape how they market their products and engage with consumers. Empirical research on wine tourism demonstrates that regional characteristics such as infrastructure, visitor flows, and destination development influence how wineries attract customers and position their brands. For example, Getz and Brown (2006), using survey data from wine tourists, identify destination attractiveness, regional image, and the availability of activities as key factors influencing visitation and winery success. These conditions are reflected in how wineries operate in more established wine regions. Bruwer (2003) interviewed 125 wine route enterprises in South Africa and shows that wineries rely on experiential offerings such as tastings and tourism activities, as well as relationship-building, to strengthen brand awareness and remain competitive in well-developed markets. In contrast, wineries in rural or emerging regions face different structural conditions, including

smaller local markets, lower levels of consumer awareness, limited marketing resources, and less-developed tourism infrastructure. Dodd (2000), using survey data from wineries in Texas, finds that small wineries depend heavily on direct-to-consumer sales, with a substantial share of production sold through tasting room visits and personal interaction with customers. Evidence from Tennessee reflects many of these challenges. Hughes (2016), based on an analysis of the Tennessee wine industry combining industry data with a household survey, shows that the industry is relatively small and geographically dispersed. Many wineries operate in non-metropolitan areas and face challenges related to limited consumer awareness and market development. These conditions limit market access and increase the importance of digital communication tools such as social media for reaching broader audiences.

Given these differences in regional conditions, the role and intensity of social media use may also vary across wineries. Comparing wineries in Tennessee with those in other U.S. states allows for an examination of how regional and organizational factors influence social media marketing practices. Despite the recognized importance of social media marketing in the wine industry, relatively little research compares marketing intensity across wineries operating in different geographic settings within the same national market. While prior studies often focus on specific regions or countries, fewer examine how wineries in Tennessee differ from those in other U.S. locations in terms of how frequently they engage audiences on social media. In addition, although existing research acknowledges that organizational characteristics and resource constraints influence social media use, limited evidence identifies which winery-specific factors are associated with variation in posting behavior on platforms such as Facebook and Instagram. These gaps are particularly relevant in this setting, where many wineries operate in rural areas and rely heavily on tourism-driven, direct-to-consumer sales (Hughes, 2016).

Examining how social media activity varies across regions, and identifying the factors associated with posting behavior, provides insight into how contextual and organizational conditions shape marketing practices.

Methodology

Survey Design and Data Collection

A quantitative, cross-sectional research design was employed, with primary data collected through an online survey. This approach allowed for the assessment of current marketing practices and related factors at a single point in time, enabling analysis of variation in social media posting frequency across wineries. Data were collected using a structured questionnaire covering winery characteristics, including size, location, and years in operation, as well as social media use. Measures included platforms used, posting frequency on Facebook and Instagram, follower counts, and primary engagement objectives. Additional questions addressed account management, time allocation, and perceived challenges. Managerial characteristics, such as age, education, and industry experience, were also included. The survey was administered via Qualtrics and designed to take approximately 15 minutes to complete. Prior to full distribution, the questionnaire was pilot tested with a small group of winery operators to assess clarity, relevance, and completion time, and minor revisions were made to improve wording and flow.

The target population consisted of winery owners and key decision-makers in the United States. Eligible respondents were required to be at least 18 years old and to hold a decision-making role, such as owner, general manager, or marketing manager. Data were collected from February to May 2025. Within Tennessee, email addresses of licensed wineries were obtained from the Tennessee Farm Wine Growers Association website, and the survey was distributed to these wineries using Qualtrics. The Tennessee Farm Wine Growers Association also emailed the

surveys to their members, and it was advertised at the Pick Tennessee Products Conference in February 2025. The national survey was distributed through wine associations, which shared the invitation with member wineries via email newsletters. Email addresses of wineries outside of Tennessee were also directly obtained from directories and websites and the survey was sent to those email addresses. Email invitations outlined the study purpose, assured confidentiality, and included a link to the Qualtrics survey. Institutional Review Board approval was obtained from the University of Tennessee, Knoxville (IRB #24-08085-XP). Participation was voluntary, and informed consent was obtained prior to survey initiation. No personally identifying information was collected, and responses were stored securely and reported only in aggregate form. Two reminder emails were sent at two-week intervals.

A total of 80 completed responses were obtained, including 20 from Tennessee wineries and 60 from other U.S. states. The Tennessee sample represents approximately 25% of the 77 wineries identified by the Tennessee Wine and Grape Board (2024), providing reasonable coverage of the state's wine industry. For Instagram analyses, the effective sample size was 73 wineries, as some respondents did not use the platform. The overall sample composition is presented in Table 1, and the geographic distribution of respondents is shown in Figures 1 and 2.

Table 1. Sample Composition by State

State	Number of Wineries	Percentage
Tennessee	20	25%
Arkansas	1	1.25%
California	2	2.50%
Colorado	3	3.75%
Florida	2	2.50%
Georgia	4	5%
Other States*	48	60%
Total	80	100%

Note: Other States includes wineries from 21 additional states with 1–5 responses each



Figure 1. Geographic Distribution of Survey Respondents Within Tennessee



Figure 2. Geographic Distribution of Survey Respondents in Other U.S. States

Conceptual Framework and Hypotheses

This study examines factors associated with wineries' social media marketing intensity, measured by posting frequency on Facebook and Instagram. Previous research indicates that firm characteristics, managerial factors, and marketing practices influence how actively wineries use social media (Thach et al., 2016; Galati et al., 2017). For wineries, these factors are relevant given the experiential nature of wine products and reliance on direct-to-consumer sales and tourism. Posting frequency serves as a practical indicator of marketing intensity, reflecting how much time, effort, and resources a winery allocates to maintaining an active online presence. While all wineries may maintain social media accounts, differences in posting behavior may result from variations in size, staffing, managerial capacity, perceived benefits, and regional context. Based on the literature, posting frequency for winery *i* on platform *p* (Facebook or

Instagram) can be conceptualized as a function of winery characteristics, social media engagement, perceived challenges, and respondent demographics:

$$Posting\ frequency_{ip} = (Winery\ characteristics_i + Social\ media\ engagement_i + Social\ media\ challenges_i + Respondent\ demographics_i)$$

Based on the conceptual framework, five hypotheses were developed. The first hypothesis addresses regional differences: Tennessee wineries are expected to post more frequently on Facebook and Instagram compared to wineries in other U.S. states. Given the reliance of Tennessee wineries on tourism-driven revenue (Hughes, 2016), it is anticipated that wineries in the state may exhibit distinct social media practices shaped by their dependence on attracting visitors from outside local markets. The second hypothesis focuses on winery characteristics. Wineries that are larger in size, located in tourist areas, host music or entertainment events, and offer online sales are expected to post more frequently on both platforms. These characteristics are anticipated to provide greater resources and more consistent content opportunities, which facilitate sustained social media engagement. Previous research suggests that wineries actively use social media to promote events and engage with consumers. For example, Thach and Lease (2016) find that social media is widely used for marketing and customer interaction by U.S. wineries. Similarly, Galati et al. (2017), using an analysis of Facebook activity from 45 wineries, show that firms with higher levels of social media intensity and responsiveness exhibit greater engagement. In addition, Canovi and Pucciarelli (2019), based on qualitative interviews with winery owners in Italy, find that social media is commonly used to promote wine tourism experiences such as tastings and events. These studies suggest that wineries with more customer-facing activities and marketing capabilities are likely to maintain more frequent social media activity. The third hypothesis concerns social media engagement

metrics and marketing goals. Wineries with larger follower bases, those that target specific audiences such as wine enthusiasts or older consumers (i.e., people aged 36 and older), and those that track customer engagement metrics are expected to post more frequently on Facebook and Instagram. Conversely, wineries with smaller followers on both Facebook and Instagram are expected to post less frequently. Galati et al. (2017) show that higher levels of social media intensity and responsiveness are associated with greater engagement, suggesting that firms with stronger audience interaction and clearer marketing objectives are more likely to maintain consistent posting behavior.

The fourth hypothesis addresses perceived challenges to social media use. Wineries that report time constraints and limited digital expertise are expected to post less frequently on Facebook and Instagram compared to wineries that do not report these constraints. Existing research in the wine industry indicates that resource constraints, including limited time and lack of digital expertise, can restrict how actively wineries engage with social media platforms. For example, Canovi and Pucciarelli (2019) find that many wineries do not fully exploit social media due to time limitations, lack of skills, and the time-consuming nature of these platforms. The fifth hypothesis examines respondent demographics. Posting frequency is expected to increase with higher education levels, decrease with older age, and be higher for female respondents compared to male respondents. Research in the wine industry suggests that managerial characteristics influence the extent to which firms engage with social media. For instance, Galati et al. (2017) find that firms managed by individuals with higher levels of education exhibit greater involvement in social media activities. In addition, broader research on social media use indicates that demographic characteristics such as age, education, and gender influence patterns of online engagement. Younger individuals tend to exhibit higher levels of activity on digital

platforms (Chidiac et al., 2022), while evidence also suggests that female users engage more actively with social media content, including posting and interaction (Dumford et al., 2023).

Summary of Hypotheses

H1 (Regional differences): Tennessee wineries post more frequently on Facebook and Instagram compared to wineries in other U.S. states.

H2 (Winery characteristics): Wineries that are larger in size, located in tourist areas, host music or entertainment events, and offer online sales post more frequently on Facebook and Instagram.

H3 (Social media engagement): Wineries with larger follower bases, those that target specific audiences (wine enthusiasts or older consumers, defined as people aged 36 and older), and those that track customer engagement metrics post more frequently. Conversely, wineries with smaller follower bases post less frequently.

H4 (Perceived challenges): Wineries that report time constraints and limited digital expertise post less frequently on Facebook and Instagram.

H5 (Respondent demographics): Posting frequency increases with higher education levels, decreases with older age, and is higher for female respondents.

Variables and Measurement

The dependent variables are posting frequency on Facebook and Instagram. Facebook posting frequency is measured on a four-point scale (1 = monthly, 2 = weekly, 3 = a few times per week, 4 = daily), while Instagram posting frequency is measured on a five-point scale (1 = never, 2 = monthly, 3 = weekly, 4 = a few times per week, 5 = daily). The difference in scales reflects the fact that all respondents reported using Facebook, whereas some respondents do not use Instagram. Independent variables are grouped into four categories: winery information, social media engagement, social media challenges, and respondent demographics. The $1 million

cutoff for the large variable was chosen based on the sales distribution in the sample, which shows a clear distinction between wineries below $750,000 and those above $1 million. Different follower thresholds across platforms reflect usage patterns, with Facebook pages generally having larger audiences than Instagram accounts in this sample. The age cutoff for target audience variables is determined by the survey design, which classifies consumers as either a "younger audience (21-35)" or an "older audience (36+)." These predefined categories are applied directly in the analysis. All remaining variables are defined in Table 10 (see Appendix A), which summarizes the names, definitions, and hypothesized signs for the dependent and independent variables used in the analysis.

Econometric Models

To empirically examine factors associated with wineries' social media marketing intensity, this study employs ordered probit models to analyze posting frequency. Given the ordinal nature of these dependent variables, ordered probit regression is an appropriate modeling approach, as it estimates the probability that a winery falls into a particular posting frequency category while accounting for the natural ordering of the categories.

Let y_i^* denote a latent (unobserved) propensity for winery i to post content on social media. This latent variable is specified as a linear function of observed winery characteristics, social media engagement measures, perceived challenges, respondent demographics, and a random error term. Separate models are estimated for Facebook and Instagram:

Facebook Model: $y_i^{FB*} = X_i\beta^{FB} + \epsilon_i$

Instagram Model: $y_i^{IG*} = X_i\beta^{IG} + \epsilon_i$

where X_i is a vector of explanatory variables defined in Table 3.2, β^{FB} and β^{IG} are vectors of parameters to be estimated for Facebook and Instagram, respectively, and $\epsilon_i$is an error term

assumed to follow a standard normal distribution. Estimating the models separately avoids imposing restrictive assumptions that the same factors influence posting behavior identically across platforms and is consistent with prior literature documenting heterogeneous social media use across platforms. The observed posting frequency variable y_i is related to the latent variable through a set of threshold parameters μ_j, such that:

$$y_i = j \quad if\ \mu_{j-1} < y_i^* \leq \mu_j, \quad j = 1,2, \dots, J$$

where μ_j are unknown threshold parameters to be estimated with the coefficients by maximizing the log-likelihood function. The probability of observing each posting frequency category depends on the estimated coefficients and threshold parameters.

In the Facebook model, the null hypothesis is that Tennessee wineries do not significantly differ from wineries in other states in their posting frequency ($\beta_{Tennessee}^{FB} = 0$). It is assumed that geographic context may influence social media practices due to differences in tourism patterns and industry structure. If the null hypothesis is rejected ($\beta_{Tennessee}^{FB} \neq 0$), then the location is found to have a significant impact on Facebook posting frequency. If we fail to reject the null, then Tennessee wineries' Facebook posting behavior is not statistically different from wineries located elsewhere. Similarly, in the Instagram model, the null hypothesis is that Tennessee wineries do not significantly differ from wineries in other states in their Instagram posting frequency ($\beta_{Tennessee}^{IG} = 0$). Rejection of the null hypothesis would indicate that location significantly influences Instagram posting frequency, while failure to reject would suggest no statistically significant difference between Tennessee wineries and those in other states.

Ordered probit models are estimated with marginal effects calculated to provide interpretable measures of how explanatory variables influence posting frequency. Marginal effects represent the change in probability for each frequency category associated with a change

in a given variable, holding other factors constant, and are reported for all categories across both platforms. Model diagnostics include tests for multicollinearity using collinearity diagnostic procedures. Condition indices and variance decomposition proportions are examined to identify potential multicollinearity among explanatory variables (Belsley, Kuh, & Welsch, 1980). Robust standard errors were used to address potential heteroskedasticity in cross-sectional data.

Results

Survey Descriptive Statistics

Table 2 presents summary statistics for the full sample of wineries included in the study. The Facebook sample includes 80 observations, while the Instagram sample includes 73 observations due to missing responses. On average, wineries report Facebook posting frequency of 2.58 (SD = 0.99), corresponding to posting between weekly and a few times per week, while Instagram posting frequency is slightly higher at 3.25 (SD = 1.29), indicating more frequent activity on that platform. The majority of wineries are in rural areas, accounting for approximately 78% of the Facebook sample and 75% of the Instagram sample. About one-quarter of wineries are in Tennessee, and roughly 28-29% are large (defined as wineries with annual gross sales exceeding $1 million). A substantial proportion of wineries report hosting music or entertainment events (65-67%) and offering online sales (53%). In terms of social media engagement, approximately 46% of wineries report having more than 5,000 Facebook followers, while about 41% have 1,000 or fewer Instagram followers. Most wineries report targeting wine enthusiasts (71-73%) and consumers aged 36 and older (74%), and a large share track customer engagement metrics on social media (74-78%). Regarding perceived challenges, over half of wineries report time constraints as a barrier to social media use (56-58%), while approximately one-third report limited knowledge or expertise (34-36%). Respondents have an

average age of approximately 51-53 years, and the majority have at least a bachelor's degree (85%). Female respondents account for 56% of the sample.

Table 2. Summary Statistics for the Full Sample of Wineries

	Facebook				Instagram			
Variable	Mean	Std dev	Min	Max	Mean	Std dev	Min	Max
Dependent Variable								
Facebook post frequency	2.58	0.99	1	4	-	-	-	-
Instagram post frequency	-	-	-	-	3.25	1.29	1	5
Independent Variable								
Winery Characteristics								
Tennessee	0.25	0.44	0	1	0.27	0.45	0	1
Large	0.28	0.45	0	1	0.29	0.46	0	1
Rural area	0.78	0.42	0	1	0.75	0.43	0	1
Tourist area	0.26	0.44	0	1	0.29	0.46	0	1
Music entertainment	0.65	0.48	0	1	0.67	0.47	0	1
Online sales	0.53	0.50	0	1	0.53	0.50	0	1
Social media engagement								
Facebook followers >5,000	0.46	0.50	0	1	-	-	-	-
Instagram followers <=1,000	-	-	-	-	0.41	0.50	0	1
Target wine enthusiasts	0.71	0.46	0	1	0.73	0.45	0	1
Target age 36+	0.74	0.44	0	1	0.74	0.44	0	1
Track customer engagement	0.74	0.44	0	1	0.78	0.42	0	1
Social media challenges								
Time challenge	0.56	0.50	0	1	0.58	0.50	0	1
Knowledge challenge	0.34	0.48	0	1	0.36	0.48	0	1
Respondent demographics								
Age	53	14.70	22	83	51	14.32	22	79
Gender	0.56	0.50	0	1	0.56	0.50	0	1
Education	0.85	0.36	0	1	0.85	0.36	0	1

Note: Posting frequency is an ordinal variable; means are reported for descriptive purposes only. Sample sizes vary due to missing observations. For Facebook, all variables have 80 observations, except respondent demographic variables, which have fewer observations (Age n = 74, Gender n = 77, Education n = 78). For Instagram, all variables have 73 observations, except respondent demographic variables, which have fewer observations (Age n = 67, Gender n = 70, Education n = 71).

Table 3 presents the distribution of posting frequency across Facebook and Instagram for the sampled wineries. For Facebook, the largest proportion of wineries (49%) report posting a few times per week, followed by monthly posting (21%) and daily posting (15%). For Instagram, posting behavior is slightly more varied. The largest share of wineries (41%) post a few times per week, followed by monthly posting (25%) and daily posting (15%). A smaller proportion post weekly (8%), while 11% report never posting on Instagram. Overall, these results indicate that

most wineries maintain moderate levels of social media activity, with posting concentrated in the "few times per week" category rather than daily posting.

Table 3. Distribution of Social Media Posting Frequency

Posting Frequency	Facebook (n=80)		Instagram (n=73)	
	Frequency	Percentage	Frequency	Percentage
Never		-	8	10.96%
Monthly	17	21.25%	18	24.66%
Weekly	12	15.00%	6	8.22%
Few times per week	39	48.75%	30	41.10%
Daily	12	15.00%	11	15.07%

Note: Categories are coded as ordinal variables. Facebook: 1 = monthly to 4 = daily; Instagram: 1 = never to 5 = daily.

Table 11 (Appendix A) presents descriptive statistics for winery characteristics, social media engagement, perceived challenges, and respondent demographics by geographic region (Tennessee versus other states) and winery size. Several statistically significant differences are observed across regions. Tennessee wineries are significantly more likely to be in tourist areas (50%) than wineries in other states (18%) ($p < 0.05$), while they are significantly less likely to host music or entertainment events (45% versus 72%) ($p < 0.05$). When comparing wineries by size, several significant differences emerge. Large wineries are significantly more likely to offer online sales (77%) than small wineries (43%) ($p < 0.01$) and are also more likely to host music or entertainment events (72% versus 62%) ($p < 0.10$). In addition, large wineries are less likely to be in Tennessee, with 18% of large wineries operating in the state compared to 27% of small wineries ($p < 0.10$). Differences in social media engagement by winery size are also evident. Large wineries are significantly more likely to have more than 5,000 Facebook followers (64%) compared to small wineries (40%) ($p < 0.10$), suggesting that larger operations maintain a broader social media reach. With respect to perceived challenges, only 10% of large wineries report limited knowledge or expertise as a challenge, compared to 43% of small wineries ($p < 0.01$), indicating that smaller wineries face greater limitations in digital marketing expertise.

Respondent demographics also differ by winery size. Respondents from large wineries are significantly younger, with an average age of 48 years compared to 55 years for respondents from small wineries ($p < 0.10$).

Social Media Posting Frequency

Figure 3 shows differences in Facebook and Instagram posting frequencies between Tennessee wineries and those in other states. Facebook is widely adopted, with no respondents in either group reporting non-use. The most common Facebook posting frequency is a few times per week, reported by 55% of Tennessee wineries and 47% of wineries in other states, while 15% in both regions post daily. Monthly posting shows a similar distribution between Tennessee and other states (20% versus 22%), while weekly posting is reported by 10% of Tennessee wineries and 17% of wineries in other states. On Instagram, posting a few times per week remains the most common frequency (40% in Tennessee and 42% in other states), and daily posting is reported by 15% of wineries in both regions. Monthly posting is more common among wineries in other states (26% versus 20%), while weekly posting accounts for smaller shares. Never posting is reported by 20% of Tennessee wineries and 8% of wineries in other states.

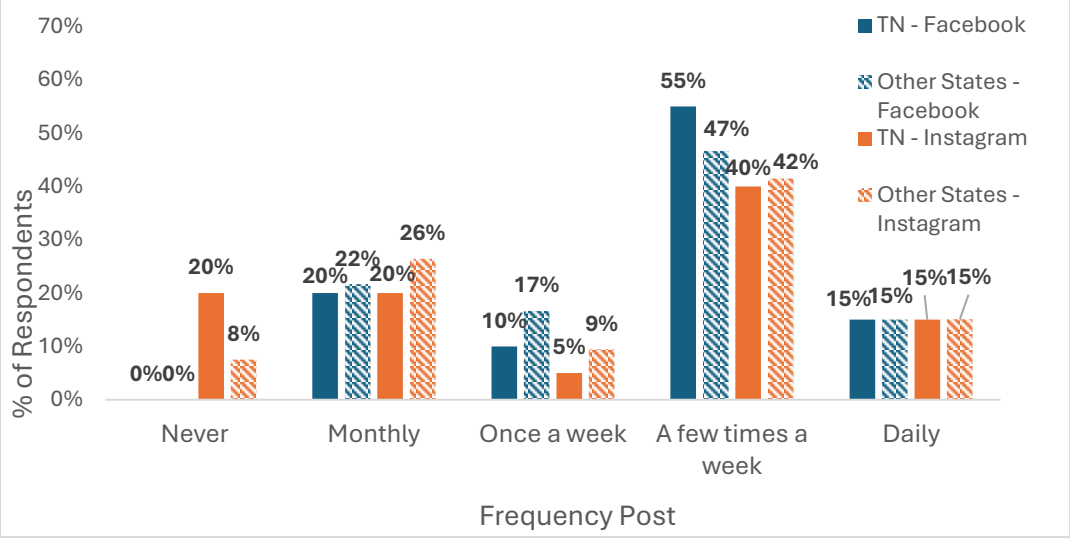

Figure 3. Posting Frequency by Region: Tennessee (n = 20) and Other States (n = 60)

Figure 4 shows the distribution of social media posting frequency on Facebook and Instagram, comparing large wineries (annual gross sales over $1 million) to small wineries. Posting frequency differs by winery size, especially on Facebook. Among large wineries, 64% post a few times per week, compared to 43% of small wineries. Small wineries are more likely to post less often, with 24% posting monthly and 17% posting once a week, versus 14% and 9% of large wineries, respectively. Daily posting rates are similar, with 14% of large wineries and 16% of small wineries posting daily. No wineries in either group report never posting on Facebook. On Instagram, large wineries are more likely to post a few times per week (52%) than small wineries (37%). Daily posting is reported by 19% of large wineries and 13% of small wineries. Monthly posting is more common among small wineries (29%) than large wineries (14%), while weekly posting is reported by 10% of small wineries and 5% of large wineries. Non-adoption rates are similar, with 10% of large wineries and 12% of small wineries never posting on Instagram. These patterns indicate that social media posting behavior varies by both geographic location and winery size. Posting frequencies on Facebook and Instagram are generally similar between Tennessee wineries and those in other states, with Facebook showing consistent usage and only modest variation in Instagram posting intensity. However, differences by winery size are more pronounced, with large wineries posting more frequently on both platforms. The econometric analysis will assess whether these differences by region and size remain after accounting for other winery characteristics, social media engagement, and respondent demographics. Ordered probit models are estimated separately for Facebook and Instagram posting frequency. Prior to interpreting the regression results, multicollinearity diagnostics were conducted using condition indices and variance decomposition proportions. The results indicate that multicollinearity is not a concern in the estimated models. The condition index for the

Facebook model is 14.32, while the condition index for the Instagram model is 15.88, both of which are below the commonly used threshold of 30 (Belsley, Kuh, & Welsch, 1980), suggesting no evidence of severe multicollinearity.

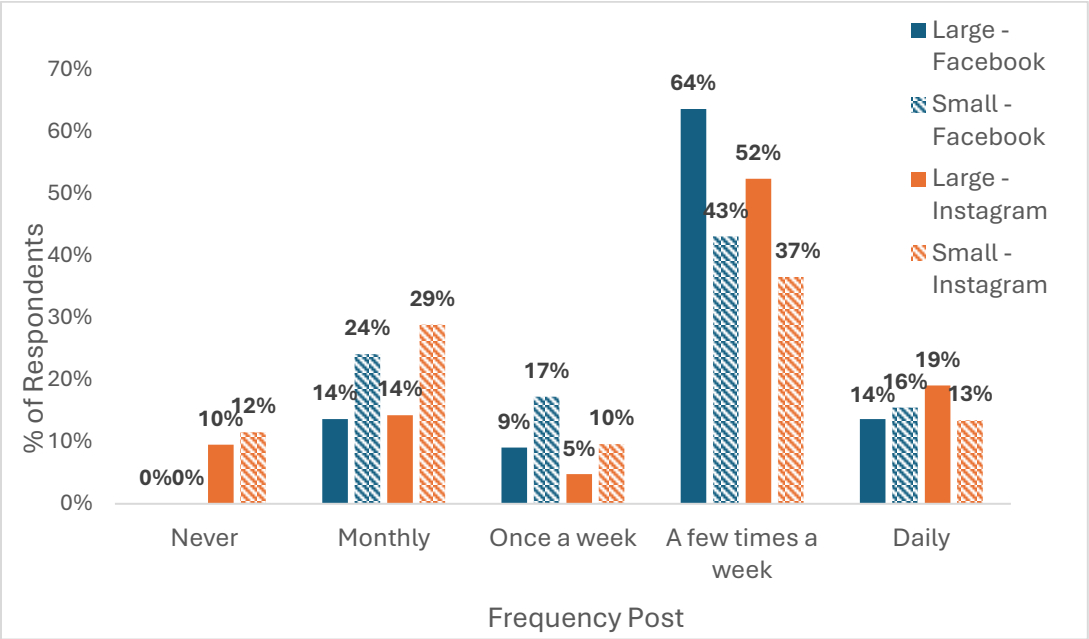

Figure 4. Posting Frequency by Winery Size: Large (n = 22) and Small (n = 58)

Ordered Probit Results for Facebook Posting Frequency

Table 4 presents ordered probit regression results for Facebook posting frequency among wineries, including coefficient estimates and marginal effects for all four posting categories. For winery characteristics, the coefficient for Tennessee is positive and statistically significant ($\beta = 0.832$, $p < 0.05$), indicating that Tennessee wineries post on Facebook more frequently than wineries in other states. The marginal effects reveal that being in Tennessee decreases the probability of posting monthly by 16% and weekly by 5%, while increasing the probability of posting a few times per week by 8% and daily by 14%. Tourist area location shows a negative and significant coefficient ($\beta = -0.840$, $p < 0.05$), suggesting that wineries located in tourist areas post less frequently on Facebook. Marginal effects show that tourist area location increases the

probability of posting monthly by 17% and weekly by 5%, while decreasing the probability of posting a few times per week by 8% and daily by 14%. Music entertainment hosting exhibits a strong positive and significant coefficient ($\beta = 1.102$, $p < 0.01$), indicating that wineries hosting music or entertainment events post significantly more frequently on Facebook. Marginal effects show that hosting music events decreases the probability of posting monthly by 22% and weekly by 7%, while increasing the probability of posting a few times per week by 10% and daily by 18%. Online sales have a positive and significant coefficient ($\beta = 0.909$, $p < 0.01$), indicating that wineries selling wine online post more frequently on Facebook. Marginal effects reveal that online sales decrease the probability of posting monthly by 18% and weekly by 5%, while increasing the probability of posting a few times per week by 9% and daily by 15. Among social media engagement variables, targeting older consumers (age 36+) shows a strong positive and significant coefficient ($\beta = 0.910$, $p < 0.01$). Marginal effects show that targeting older consumers decreases the probability of posting monthly by 18% and weekly by 5%, while increasing the probability of posting a few times per week by 9% and daily by 15%. Tracking customer engagement is positive and marginally significant ($\beta = 0.660$, $p < 0.10$), suggesting that wineries monitor engagement metrics post more frequently. Marginal effects show that tracking engagement decreases the probability of posting monthly by 13% and weekly by 4%, while increasing the probability of posting a few times per week by 6% and daily by 11%. Regarding perceived challenges, reporting limited social media expertise has a negative and statistically significant effect on posting frequency ($\beta = -0.660$, $p < 0.05$). Wineries facing knowledge constraints are more likely to post infrequently and less likely to post a few times per week or daily. Time constraints, however, are not statistically significant.

To assess robustness, respondent demographic variables were included in the model. Age is negatively associated with posting frequency ($\beta = -0.022$, $p < 0.10$), with marginal effects indicating a shift toward less frequent posting among older respondents. Gender and education are not statistically significant, suggesting that the main results are robust to these demographic controls.

Table 4. Ordered Probit Results and Marginal Effects for Facebook Post Frequency

Variables	Model Coeff	Monthly dy/dx	Once a week dy/dx	A few times/week dy/dx	Daily dy/dx
Winery Characteristics					
Tennessee	0.832**	-0.164**	-0.049**	0.077*	0.136**
Large	-0.146	0.029	0.009	-0.014	-0.024
Rural area	0.376	-0.074	-0.022	0.035	0.061
Tourist area	-0.840**	0.166**	0.050**	-0.078*	-0.137**
Music entertainment	1.102***	-0.217***	-0.065***	0.102**	0.180***
Online sales	0.909***	-0.179***	-0.054**	0.085**	0.148***
Social Media Engagement					
Facebook followers >5,000	0.136	-0.027	-0.008	0.013	0.022
Target wine enthusiasts	0.336	-0.066	-0.020	0.031	0.055
Target age 36+	0.910***	-0.179***	-0.054**	0.085**	0.149**
Track customer engagement	0.660*	-0.130**	-0.039*	0.061*	0.108*
Social media challenges					
Time challenge	-0.127	0.025	0.008	-0.012	-0.021
Knowledge challenge	-0.660**	0.130**	0.039*	-0.061*	-0.108**
Respondent Demographics					
Age	-0.022*	0.004*	0.001	-0.002	-0.004*
Gender	-0.404	0.077	0.024	-0.036	-0.065
Education (>=Bachelor's degree)	-0.206	0.039	0.012	-0.018	-0.033
Cut1	1.439				
Cut2	2.108				
Cut3	4.089				

Note: Dependent variable = Facebook posting frequency. Marginal effects (dy/dx) reported. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. The number of observations is 80 for all variables, except respondent demographic variables, which have 73 observations. Log likelihood = -75.35; LR Chi^2 (12) = 49.07 ($p < 0.001$); Pseudo $R^2 = 0.246$.

Ordered Probit Results for Instagram Posting Frequency

Table 5 presents the ordered probit results examining factors associated with Instagram posting frequency among wineries. The marginal effects show the change in probability of

falling into each frequency category (Never, Monthly, Once a week, A few times/week, Daily). For winery characteristics, hosting music or entertainment events is positively associated with posting frequency ($\beta = 0.782$, $p < 0.05$), indicating that wineries offering events tend to post more frequently on Instagram. Marginal effects show that hosting music events decreases the probability of posting monthly by 10% while increasing the probability of posting a few times per week by 8% and daily by 12%. Having a smaller Instagram audience is negatively associated with posting frequency ($\beta = -1.128$, $p < 0.01$), indicating that wineries with fewer followers post less frequently. Marginal effects show that these wineries are 13% more likely to never post and 14% more likely to post monthly. Among social media engagement variables, targeting wine enthusiasts is positively associated with posting frequency ($\beta = 0.548$, $p < 0.10$), with marginal effects indicating increased likelihood of posting daily by 8%. Similarly, targeting consumers aged 36 and older is positively associated with posting frequency ($\beta = 0.685$, $p < 0.10$). Marginal effects show that targeting older consumers decreases the probability of posting monthly by 9% while increasing the probability of posting a few times per week by 7% and daily by 11%.

Regarding perceived challenges, both time and knowledge constraints are negatively associated with posting frequency. Time challenge ($\beta = -0.751$, $p < 0.05$) reduces posting frequency, with marginal effects indicating that wineries reporting time constraints are 12% less likely to post daily and about 8% more likely to never post. Similarly, knowledge challenge ($\beta = -0.741$, $p < 0.05$) reduces posting frequency, with marginal effects showing that wineries with limited social media expertise are 11% less likely to post daily and about 8% more likely to never post. These results indicate that across Facebook and Instagram, limitations in time and expertise are the main constraints on consistent social media engagement among wineries.

Table 5. Ordered Probit Results and Marginal Effects for Instagram Post Frequency

Variables	Model Coeff	Never dy/dx	Monthly dy/dx	Once a week dy/dx	A few times/week dy/dx	Daily dy/dx
Winery Characteristics						
Tennessee	0.491	-0.055	-0.061	-0.008	0.050	0.075
Large	-0.175	0.020	0.022	0.003	-0.018	-0.027
Rural area	0.485	-0.055	-0.061	-0.008	0.050	0.074
Tourist area	-0.292	0.033	0.037	0.005	-0.030	-0.045
Music entertainment	0.782**	-0.088**	-0.098**	-0.013	0.080**	0.119**
Online sales	0.399	-0.045	-0.050	-0.007	0.041	0.061
Social Media Engagement						
Instagram followers <=1,000	-1.128***	0.127***	0.141***	0.019*	0.045	0.068
Target wine enthusiasts	0.548*	-0.062	-0.069	-0.009	0.056	0.084*
Target age 36+	0.685*	-0.077*	-0.086*	-0.012	0.070*	0.105*
Track customer engagement	0.444	-0.050	-0.056	-0.008	0.045	0.068
Social Media Challenges						
Time challenge	-0.751**	0.0847**	0.094**	0.013	-0.077**	-0.115**
Knowledge challenge	-0.741**	0.084**	0.093**	0.013	-0.076**	-0.113**
Cut1	-0.764					
Cut2	0.631					
Cut3	0.979					
Cut4	2.808					

Note: Dependent Variable = Instagram posting frequency. Marginal effects (dy/dx) reported. ***p < 0.01, **p < 0.05, *p < 0.1. Number of observations is 73. Log likelihood = -78.31; LR Chi^2 (12) = 54.13 (p < 0.001); Pseudo R^2 = 0.257.

Discussion

The results provide empirical support for key elements of the conceptual framework developed in Chapter 2, which proposes that wineries' social media marketing intensity is influenced by winery characteristics, social media engagement, perceived challenges, and respondent demographics. Consistent with Hypothesis 1 (Regional differences), Tennessee wineries post more frequently on Facebook than wineries in other states, after controlling for other characteristics. This result suggests that wineries operating in emerging or tourism-dependent regions may rely more heavily on social media to address limited brand recognition

and constrained distribution channels. Hughes (2016) shows that many Tennessee wineries are in non-metropolitan areas and depend on tourism-driven sales. Given their rural location and reliance on tourism, social media can serve as an important tool for reaching broader audiences and promoting winery experiences. Consistent with Hypothesis 2 (Winery characteristics), wineries that host music or entertainment events post more frequently on both Facebook and Instagram. This finding suggests that wineries offering on-site experiences have more opportunities to generate content and engage consumers. This result aligns with prior research. For example, Thach et al. (2016) find that social media is widely used for marketing and customer interaction, with a large majority of U.S. wineries reporting positive impacts on sales and engagement. Similarly, Galati et al. (2017) show that wineries with higher levels of social media intensity and responsiveness are more actively involved in social media activities. The results are also consistent with Canovi and Pucciarelli (2019), who find that Italian wineries' social media promotes wine tourism activities such as tastings and events but is often underutilized due to time constraints and lack of expertise. In this context, wineries hosting events may have stronger incentives to maintain an active social media presence despite these constraints.

In addition, wineries offering online sales post more frequently on Facebook, providing further support for Hypothesis 2. This finding is consistent with Thach et al. (2016), who show that social media contributes to perceived increases in wine sales, suggesting that wineries engaged in direct-to-consumer sales may rely more heavily on social media for marketing and communication. However, the negative relationship between tourist area location and Facebook posting frequency contrasts with Hypothesis 2, which predicted that wineries in tourist areas would post more frequently due to greater exposure to visitors and increased marketing

opportunities. One possible explanation is that wineries located in tourist areas may rely more heavily on in-person visits and established foot traffic, reducing the need for frequent online engagement. In contrast, wineries outside major tourist areas may depend more on social media to attract visitors and maintain customer relationships. Another possible explanation is that social media activity among wineries in tourist areas may be seasonal, with higher posting frequency during peak tourism periods or major events and lower activity during off-season periods. Because this study uses cross-sectional data, it does not capture temporal variation in posting behavior, which may mask periods of more intensive social media use. This result indicates that the role of geographic location and proximity to tourist attractions in shaping social media behavior may be more complex than initially hypothesized. Consistent with Hypothesis 3 (Social media engagement), several engagement-related factors are associated with posting frequency. The strong negative relationship between having 1,000 or fewer Instagram followers and posting frequency suggests that wineries with smaller audiences are significantly more likely to post infrequently or not at all. This pattern suggests a potential reciprocal relationship in which smaller audiences are associated with lower posting motivation, while infrequent posting may limit audience growth. Additional support for Hypothesis 3 (Social media engagement) comes from the positive relationship between targeting older consumers (age 36+) and posting frequency. Notably, this group includes Millennials, previously identified as younger consumers relying heavily on peer recommendations (Atkin & Thach, 2012). This suggests how generational behaviors may shift over time. However, this relationship shows an association and does not necessarily indicate the effectiveness of such strategies. Other factors, including content quality, platform selection, and broader marketing objectives, may also play a significant role. Wineries that target this demographic post more frequently, which may reflect efforts to engage

this age group where they are most active. Pew Research Center data indicates that adults aged 30-49 are the core audience for Facebook, while 80 percent of adults aged 18-29 use Instagram (Pew Research Center, 2025). Millennials also lead Facebook usage at 85 percent, with 74 percent active on Instagram (Pulse Advertising, 2025). Wineries targeting this cohort may be responding to these platform usage patterns by maintaining more consistent posting schedules. This may reflect the need for more deliberate communication strategies when engaging established consumer segments.

Consistent with Hypothesis 4 (Perceived challenges), resource constraints play an important role in shaping social media marketing intensity. Lack of knowledge or expertise is negatively associated with Facebook posting frequency, indicating that wineries with limited digital skills are less likely to maintain frequent posting behavior. Similarly, both time constraints and knowledge-related challenges significantly reduce posting frequency on Instagram. These findings are consistent with Canovi and Pucciarelli (2019), who, based on qualitative interviews with 20 winery owners in Italy, find that while wineries recognize the benefits of social media for promoting wine tourism, many underutilize these platforms due to time limitations and lack of technical expertise. This suggests that resource limitations not only affect adoption but also the consistency and intensity of social media activity across platforms. However, practices that streamline content management, such as sharing content across platforms, may help reduce time demands. Partial support is found for Hypothesis 5 (Respondent demographics). Age is negatively associated with Facebook posting frequency, indicating that older respondents are slightly less likely to post frequently. This finding aligns with Chidiac et al. (2022), who, based on survey analysis of technology use, show that younger individuals are more active users of digital platforms. However, this relationship is not robust across all model specifications,

suggesting that age may have a limited influence once winery characteristics and marketing factors are considered. In contrast, education and gender do not exhibit statistically significant relationships with posting frequency. Although prior research suggests that more educated managers may be more engaged in social media activities, this relationship is not supported in the present study. For example, Galati et al. (2017), based on an analysis of 45 wineries, find that higher managerial education is associated with greater social media involvement. This suggests that, within this sample, social media posting behavior is more strongly influenced by organizational characteristics and strategic factors than by individual demographic traits.

The findings from this study offer several actionable recommendations for wineries seeking to improve the effectiveness of their social media marketing. Existing offerings, such as music or entertainment events, may be leveraged not only as content opportunities but also as direct marketing tools, with wineries using social media platforms to promote events, share invitations, and facilitate customer engagement and sales. This more strategic use of social media may contribute to the higher posting frequency observed among wineries that host such events. In addition, training staff to document these experiences and establishing systems that support regular posting across platforms can help maintain consistency. Wineries with smaller Instagram followers may benefit from maintaining consistent posting activity, as posting frequency is associated with audience size in this study. Similarly, given the negative relationship between limited expertise and posting frequency, addressing knowledge gaps through training may support more active social media use. Investments in staff training, in areas such as content development, visual best practices, and platform-specific strategies, may enhance wineries' ability to engage effectively with their audiences. These resources are often available through extension programs and industry associations. Defining clear audience segments may support

more consistent and relevant content creation. Wineries that understand their target audiences, such as wine enthusiasts or older consumers, may be better positioned to tailor content to specific groups. Conducting audience research and analyzing engagement metrics may further refine this understanding. Social media activities may be more effective when treated as a structured component of winery operations rather than an informal or secondary task. Allocating dedicated time, assigning responsibility to specific staff, and using content calendars may help address time constraints and improve consistency. Finally, industry associations and extension programs can play an important role in addressing the knowledge gaps identified in this study. Targeted training through workshops, webinars, and online resources on content creation, audience targeting, and time management may support wineries across regions. In addition, peer learning opportunities, where winery owners share experiences and strategies, may help disseminate effective practices more broadly.

There are few limitations to note in this study. The relatively small sample size of 80 wineries limits generalizability and the ability to detect smaller effects. In addition, posting frequency is self-reported rather than based on observed platform data, which may introduce recall or social desirability bias. The cross-sectional design also captures winery practices at a single point in time, even though social media use and marketing strategies evolve rapidly. Future research could address these limitations by expanding the sample across more states and regions to better examine geographic differences. It could also explore additional dimensions of social media engagement beyond posting frequency, such as content quality, audience interactions, and strategic alignment. Examining how these factors influence outcomes like follower growth, website traffic, and sales would provide further insight into effective resource allocation.

CHAPTER 3: CONSUMER PREFERENCES FOR TENNESSEE QUALITY CERTIFIED WINES

Background and Objective

Quality signals play a critical role in markets where consumers cannot easily evaluate product attributes before purchase. In the wine industry, where sensory characteristics are unknown until consumption, consumers rely on extrinsic cues such as labels, certifications, and origin designations to form quality expectations and guide purchasing decisions (Lockshin & Corsi, 2012). For emerging wine markets, such as Tennessee, establishing credible quality signals is important yet challenging. Established wine regions benefit from collective reputations associated with geographic names (e.g., Napa Valley), which can influence consumer expectations of quality and generate price premiums in the market (Costanigro, McCluskey, & Goemans, 2010). Newer regions lack this accumulated reputation and must invest strategically in building consumer awareness and trust. The Tennessee wine industry has experienced considerable growth in recent years, with the number of wineries increasing substantially over the past decade. State industry records indicate approximately 77 wineries were operating in Tennessee in 2023 (Tennessee Wine and Grape Board, 2024), and an economic report estimates that the wine industry contributes approximately $610 million to the state's economy, supports over 3,340 jobs, and generates around $62 million in state and local tax revenues (Hughes, Rihn, & DeLong, 2025). As the industry expands, Tennessee wineries face increasing competition both from within the state and from established wine regions across the country. To maintain competitiveness, producers must implement effective strategies to differentiate their products and communicate quality to consumers, while ensuring consistent product standards.

In response to this challenge, the Tennessee Wine and Grape Board launched the Tennessee Quality Assurance Program (QAP) in 2023. The program was designed to certify and signal high-quality wines produced in the state (Tennessee Wine and Grape Board, 2024). Wines that meet production standards and receive recognition in established wine competitions are eligible to carry the Tennessee Quality Certified label. This certification represents a deliberate effort to build consumer trust and enhance the reputation of Tennessee wines in a crowded marketplace. However, whether consumers value this certification and how much they are willing to pay for it remains unknown. In addition to certification, geographic origin labels represent another important form of product differentiation in the wine industry. Tennessee is associated with several federally recognized American Viticultural Areas (AVAs), including the Appalachian High Country and the Mississippi Delta, which extend across multiple states, as well as the Upper Cumberland AVA, located entirely within Tennessee. More recently, the Nine Lakes of East Tennessee AVA was established (effective 2026), further expanding the number of single-state AVAs within Tennessee (Alcohol and Tobacco Tax and Trade Bureau, 2026). AVAs are federally recognized wine grape-growing regions defined by unique geographic features such as climate, soil, and elevation. Wines labeled with an AVA designation must contain at least 85% of grapes sourced from that region, providing consumers with information about the wine's geographic origin. In established wine regions, AVA designations function as place-based brands that can command price premiums (Costanigro, McCluskey, & Goemans, 2010). The extent to which Tennessee consumers recognize and value these designations has not been empirically examined.

Beyond certification and origin designations, product attributes such as alcohol by volume (ABV) can also influence consumer preferences and perceived product quality. Alcohol

content may affect the sensory characteristics of wine, including body, flavor intensity, and overall drinking experience. At the same time, alcohol content may serve as a heuristic cue for consumers when evaluating wine quality. Traditional wines typically range from 12 to 16% alcohol by volume, with higher alcohol levels often associated with fuller body and riper fruit flavors. Interest in lower-alcohol wines has increased as some consumers seek products aligned with health and moderation preferences (Bucher et al., 2020; Ford et al., 2025). Research on no- and low-alcohol wines has expanded significantly in the past decade, with the category now incorporating mid-alcohol wines (~7-10% ABV) that offer new market opportunities for wine producers (Ford et al., 2025). Experimental evidence suggests that although low-alcohol wines may receive sensory evaluations comparable to those of standard wines, consumers are generally less willing to pay equivalent prices for them (Bucher et al., 2020). Similarly, recent studies show that reduced- and alcohol-free wines appeal to some consumers because of perceived safety and health benefits and a desire to avoid alcohol, but their adoption continues to be constrained by sensory limitations (Kumar et al., 2025). Understanding how consumers trade off alcohol content against other quality signals has important implications for product development and marketing strategies. If consumers use alcohol content as a quality heuristic, wines with lower alcohol may require stronger quality signals through certification or branding to overcome negative quality perceptions.

A growing body of literature has examined consumer preferences for local and certified food products, including wine. Feldmann and Hamm (2015) reviewed 73 studies on consumer perceptions of local food and found that, across a literature dominated by quantitative methods such as conjoint analysis, choice experiments, and auctions, consumers generally expressed positive attitudes toward local food and a willingness to pay premiums for local products.

Previous research in Tennessee using 2015 survey data found that consumers were willing to pay a premium for in-state muscadine (*Vitis rotundifolia*) wine, driven primarily by beliefs that purchasing local wines supports local grape growers and the local economy (Everett et al., 2017). However, that study focused specifically on muscadine wine, a distinct product category with unique sensory characteristics, and predates the QAP program by nearly a decade. Whether similar preferences extend to the broader category of Tennessee wines made from hybrid and *Vitis vinifera* L. varieties, and whether consumers value the new QAP certification, remains unknown. Despite the potential importance of these attributes, limited research has examined consumer preferences for Tennessee wine characteristics specifically.

Several important questions remain unanswered. First, do Tennessee consumers value the QAP certification, and how much are they willing to pay for wines carrying this label? The program represents an investment by the state and participating wineries, but its economic justification depends on the consumer response. Second, do Tennessee consumers value AVA designations, and to what extent do these regional labels command price premiums among Tennessee consumers? Third, how does alcohol content influence consumer preferences, and do consumers trade off alcohol content against other quality signals such as certification and origin? Without empirical evidence, Tennessee wineries cannot determine whether investing in QAP certification, promoting AVA designation, or developing low-alcohol products is economically justified. This study addresses these gaps by estimating consumer willingness to pay for Tennessee wine attributes. The specific objectives are to estimate consumer willingness to pay for: (1) the QAP Certified Seal, (2) wines sourced from a Tennessee AVA (at least 85 percent of grapes from a recognized region), and (3) different alcohol by volume levels (7%, 12%, and 16%). Using a discrete choice experiment administered to 825 Tennessee residents and visitors,

this study provides empirical estimates of consumer preferences for these attributes in the context of the Tennessee wine industry. This study makes three contributions to understanding consumer behavior in emerging wine regions. First, it provides empirical evidence on consumer responses to a newly introduced state-level quality certification program, offering insights applicable to other states and regions considering similar initiatives. It also examines the value of AVA designations in an emerging wine market, extending the literature on place-based branding beyond established regions. In addition, the findings offer actionable guidance for Tennessee wineries by identifying which attributes command price premiums, which informs decisions about certification, branding, and product development. For industry stakeholders and policymakers, understanding the marketplace response to the QAP provides evidence on the effectiveness of this quality-based initiative and guidance for program communication and marketing.

Literature Review

Information Asymmetry and Quality Signals

A foundational explanation of information asymmetry in markets is provided by Akerlof (1970), who developed a theoretical model of the used car market to illustrate how quality uncertainty affects market outcomes. Using a formal economic model with asymmetric information between buyers and sellers, he demonstrated that when consumers cannot observe a product's quality prior to purchase, they rely on average market expectations, which can lead to adverse selection where low-quality products drive out high-quality goods. Caswell and Mojduszka (1996) developed a conceptual economic model of food quality and labeling. Drawing on Lancaster's characteristics theory, they define quality as a bundle of attributes and distinguish between search, experience, and credence attributes. Their analysis shows that when

consumers lack accurate information about food attributes, particularly credence attributes such as safety or production practices, market inefficiencies arise, and informational labeling and certification programs can improve market performance by reducing information asymmetry. In the wine industry, Lockshin and Corsi (2012) conduct a comprehensive literature review of over 100 empirical studies on wine consumer behavior published between 2004 and 2012. They find that most studies rely on quantitative methods such as surveys, discrete choice experiments, and simulated purchase tasks, and consistently show that consumers depend heavily on extrinsic cues such as price, region, brand, and awards when making purchase decisions, particularly in situations where tasting is not possible. Similarly, Sáenz-Navajas et al. (2013) use an experimental design combining incentive-compatible choice experiments, auction mechanisms, and sensory categorization tasks with 48 consumers and evaluated 24 wines to compare methods for eliciting preferences. Their results demonstrate that extrinsic attributes such as origin, denomination, labeling, and awards significantly influence perceived quality and willingness to pay, even in the absence of tasting, confirming the importance of external quality signals in wine markets.

Quality assurance programs (QAPs) represent a quality signal that has gained prominence in food and agricultural markets. Rihn, Jensen, and Hughes (2022) use an online survey of 1,216 U.S. consumers, approximately 61% of whom were Tennessee residents, combined with a mixed-process econometric model incorporating ordered probit estimation to examine perceptions of wine QAPs. Their findings show that QAPs function as signals of product quality and standardization that reduce perceived purchasing risk and increase purchase likelihood, with stronger effects among consumers with higher on-site spending and more favorable perceptions of certification. This literature establishes that when product quality is difficult to observe prior

to purchase, consumers rely on extrinsic signals such as certifications, origin labels, and other informational cues, which can reduce perceived risk and shape purchasing decisions. This theoretical and empirical foundation underlies the Tennessee QAP's potential to signal quality to consumers and reduce perceived risk when purchasing Tennessee wines.

Consumer Preferences for Quality Certification in Wine

A growing body of literature has examined consumer responses to certification and labeling in wine markets. Tait et al. (2019) conducted a discrete choice experiment using an online survey of 766 Californian Sauvignon Blanc consumers who reported purchasing this wine at least monthly to estimate willingness to pay for sustainability-related attributes (e.g., organic production, pest and disease management, water management, and social responsibility initiatives). Their results show that sustainability attributes can influence consumer choices and that consumers are willing to pay a premium for several of these attributes, including organic certification, pest and disease management, and water management practices. These findings suggest that certification-based attributes, such as sustainability labels, can serve as quality signals in wine markets. Stanco et al. (2020) used a best-worst scaling approach to examine Italian consumers' preferences for eleven wine attributes related to tradition, sustainability, and innovation. Their results indicate that the most important attributes influencing wine purchasing decisions include geographical indications, grape variety, sustainable certification, vintage, and price. In contrast, innovative attributes such as canned wine, alcohol-free wine, and vegan wine were ranked among the least important. These findings suggest that consumers place greater importance on established attributes such as certifications and origin compared to newer product innovations.

Research examining QAPs specifically provides further evidence of their potential importance. Rihn et al. (2022) analyzed survey responses from 1,216 U.S. consumers, approximately 61 percent of whom were Tennessee residents, to examine consumer perceptions of wine QAPs and their potential influence on Tennessee wine purchases. Their results indicate that consumers view QAPs as signals of ingredient quality, overall product quality, and product consistency. More than half of respondents considered QAPs to be very or extremely important when making wine purchasing decisions, while only a small percentage indicated that these programs were not important. These findings suggest that consumers may place significant value on certification programs that signal wine quality. Rihn et al. (2022) also examined how the source of a QAP influences consumer responses. Their results suggest that programs originating from industry-specific organizations have stronger positive effects on purchase decisions than programs from broader sources. Certifications associated with national or state wine associations were associated with stronger positive effects on purchase likelihood, followed by certifications associated with individual wineries or regional wine associations. These findings suggest that industry-led certification programs may be effective in signaling quality to consumers.

Consumer Willingness to Pay for Local and State-Branded Wines

Several studies have examined consumer preferences for wines produced in emerging or lesser-known regions. Everett et al. (2017) analyzed Tennessee wine consumer preferences using data from 500 survey respondents in a choice experiment comparing Tennessee and California wines. Using probit and multivariate probit models, the study evaluates both wine selection and anticipated retail outlet choice, finding that consumers are willing to pay a premium for Tennessee wines and that purchasing behavior varies across retail formats such as grocery stores, wineries, and warehouse clubs. Everett et al. (2018) further investigated consumer preferences

for Tennessee wines by examining willingness to pay for locally produced muscadine wine using the same 2015 Tennessee consumer dataset. Using a referendum-style choice experiment and probit models, they found that approximately 70% of Tennessee wine consumers had tried muscadine wine, and among those, about 84% indicated a willingness to purchase Tennessee muscadine wine. Older age, living in non-metro households, being a weekly wine consumer, and having visited a winery in the past year positively influenced the likelihood of trying muscadine wine. The importance of wines being local and the premiums consumers typically pay for local foods also positively influenced both the likelihood of trying muscadine wine and willingness to pay for Tennessee muscadine wine. While this study provides evidence that Tennessee consumers value locally produced wines, it focused specifically on muscadine wine and predates the Tennessee QAP, leaving open the question of whether similar preferences extend to the broader category of Tennessee wines and whether consumers value quality certification.

Woods et al. (2013) examined wine consumption and winery visitation behavior in four northern Appalachian states, including Tennessee. Their analysis shows that more frequent wine consumption and higher levels of wine knowledge increase the likelihood that consumers will try locally produced wine and visit local wineries. Tennessee consumers were less likely to have tried local wines than Ohio residents, a difference that may reflect variation in retail availability. These findings highlight the role of market access and distribution in increasing consumer exposure to wines from emerging regions. Related evidence from Jensen et al. (2021) further supports the importance of local preferences. Using survey data from 875 Tennessee consumers, the study finds that consumers are willing to pay a premium for locally produced hard apple cider. Preferences for locally produced foods also increase the likelihood of selecting and paying

a premium for local cider. These results suggest that preferences for local food products can extend to locally produced alcoholic beverages, including wine and ciders**.**

Geographic Origin and American Viticultural Areas

Geographic origin represents one of the most influential indicators of quality in wine markets. Stanco et al. (2020) found that geographical indications were the most important attribute among the eleven wine attributes they examined, ranking ahead of grape variety, sustainable certification, vintage, and price. Their findings suggest that geographical indications are perceived as strong signals of product quality, particularly when supported by strict production standards. Rihn et al. (2022) note that QAPs in the wine industry are often linked to origin-based systems, citing examples such as American Viticultural Areas in the United States, the Vintners Quality Alliance in Canada, and the Association of German Quality Wine Estates in Germany. This integration of origin into certification systems highlights its role as a potential mechanism for signaling quality in wine markets.

Costanigro et al. (2010) examined the economics of nested names in the wine industry and showed that collective reputations associated with regional names can influence market prices. Their analysis indicates that regional reputation depends on historical quality performance, including consistency and longevity. For emerging regions such as Tennessee, this suggests that collective efforts to strengthen regional identity, including AVA designations and QAPs, may help reinforce place-based quality signals. In Tennessee, Hughes (2020) reported that efforts were underway to establish two proposed AVAs, Nine Lakes and Cumberland Highlands, and argued that these initiatives could improve the image of the state's wine industry and support sales. Since then, several developments have occurred. The Alcohol and Tobacco Tax and Trade Bureau established the Upper Cumberland AVA, effective June 14, 2024, and more recently

approved the Nine Lakes of East Tennessee AVA (effective 2026). Official Alcohol and Tobacco Tax and Trade Bureau (TTB) records indicate that Tennessee is currently associated with both single-state AVAs, including Upper Cumberland and Nine Lakes of East Tennessee, as well as multi-state AVAs such as the Appalachian High Country and Mississippi Delta AVA. Despite these developments, no empirical research has examined whether Tennessee consumers recognize or value AVA designations, representing an important gap addressed by this study.

Alcohol Content and Consumer Preferences

Growing concerns about the health effects of alcohol have contributed to shifting consumer attitudes and behaviors. This growing importance is partly driven by heightened public health awareness and evolving consumer behavior. The World Health Organization (2023) has concluded that no amount of alcohol consumption is safe for human health. At the same time, younger generations have shown increasing awareness of health and wellness, driving changes in drinking habits. A Gallup (2025) survey reported that only 54% of U.S. adults currently drink alcohol, marking the lowest level recorded since the poll began 90 years ago. Despite this growing interest in reduced-alcohol options, product availability remains limited (Nielsen IQ, 2022; IWSR, 2023). Adding to the challenge, definitions of what constitutes "low-alcohol" or "non-alcoholic" vary across countries and among consumer groups, leading to confusion in the marketplace (Okaru & Lachenmeier, 2022). Given the combination of limited product availability and rising consumer interest, Tennessee wineries may have an opportunity to reach potential customers seeking low- or non-alcohol wine options.

Alcohol content remains a relatively understudied attribute in the wine economics literature, although recent market developments have increased its relevance. Early research established foundational insights into how consumers perceive and respond to variations in

alcohol content. Meillon et al. (2010) conducted a controlled sensory study involving 71 French wine consumers and a trained panel to assess the impact of partial alcohol reduction. Wines were dealcoholized using reverse osmosis to achieve varying alcohol levels. Wines with the greatest reduction in alcohol were also rated significantly lower in overall liking, indicating potential acceptability challenges among consumers. Saliba et al. (2013) surveyed 851 Australian wine consumers using an online questionnaire to assess interest in low-alcohol wine. Their results showed that interest in low-alcohol wine was associated with situational and health-related motivations, including the ability to drive after drinking, reduce alcohol-related effects, and consume greater quantities without intoxication. Taste remained a central determinant of consumption, reinforcing that sensory quality cannot be overlooked. Similarly, Bruwer et al. (2014) examined consumer behavior toward lower-alcohol wines in the UK market using an online survey of approximately 600 wine consumers. Their findings indicated that interest in this category is linked to health concerns, alcohol moderation, and changing consumption preferences. However, they also identify several barriers to adoption, including lower perceived quality, taste concerns, limited awareness, and uncertainty about appropriate consumption occasions.

Stanco et al. (2020) used a best-worst scaling (BWS) experiment with 419 Italian wine consumers to evaluate preferences for wine attributes and found that alcohol-free wine is ranked among the least important attributes by Italian consumers. This result suggests that lower or absent alcohol content is less valued relative to traditional attributes such as geographical indications and grape variety. Such patterns are consistent with prior research indicating that consumers may associate higher alcohol levels with greater product quality. Bucher et al. (2020) conducted a randomized controlled trial with 90 participants who evaluated Sauvignon Blanc

wines with standard (12.5% ABV) and reduced (8.0% ABV) alcohol levels under both informed and blind conditions. Their results showed that participants rated low-alcohol wines similarly to standard wines in terms of taste during blind tastings. However, willingness to pay differed significantly, with participants assigning higher value to the standard wine.

More recent research has expanded understanding of consumer responses to low- and no-alcohol wine. Shaw et al. (2023) analyzed consumer attitudes toward no- and low-alcohol wines using survey data from 712 Australian respondents and applied structural equation modeling to examine the role of consumption values. Their findings indicate that perceived functional value (e.g., product utility) plays a central role in shaping attitudes, while emotional and epistemic values influence responses among drinkers. Attitudes toward no- and low-alcohol wines were found to positively influence purchase intentions. Ford et al. (2025) conducted a systematic scoping review of 38 studies on consumer behavior toward no-, low-, and mid-alcohol wines. Their review shows that research in this area has expanded considerably in recent years and highlights the emergence of mid-alcohol wines (approximately 7-10% ABV) as an evolving segment in the market. Kumar et al. (2025) conducted a sensory evaluation study in which consumers assessed wines with different alcohol levels (12%, 6%, and 0% ABV). Their findings show that perceived quality declines as alcohol content decreases, with alcohol-free wines receiving the lowest ratings. The study also identifies health concerns and safety considerations as key motivations for choosing alcohol-free wines, while sensory limitations and cost remain important barriers to adoption. These studies indicate that alcohol content influences both consumer perceptions and purchasing behavior. However, its role as a direct heuristic for overall wine quality, particularly in interaction with other quality signals such as certification and geographic origin, remains insufficiently understood. The current study addresses this gap by

incorporating alcohol content alongside certification and origin attributes, allowing for an assessment of their relative importance and potential interactions in consumer decision-making.

Despite the growing literature on consumer preferences for wine attributes, several important gaps remain. Prior research by Rihn et al. (2022) focuses on consumer perceptions of wine QAPs and their influence on purchasing decisions, but does not estimate consumers' willingness to pay for QAP-certified wines. As a result, the economic value of certification remains unclear. This study addresses that limitation by estimating willingness to pay for the Tennessee QAP label, extending perceptual insights into an economic valuation framework. Similarly, Everett et al. (2017) show that Tennessee consumers are willing to pay premiums for wines labeled as produced within the state. However, their analysis centers on the value of the state label itself and does not consider the role of quality certification. Moreover, their study predates the implementation of the Tennessee QAP, leaving open the question of whether certification provides additional value beyond state branding and whether such effects differ across wine types, such as red and white wines. Geographic origin has also been identified as a key determinant of wine purchasing decisions. Stanco et al. (2020) find that geographical indications are among the most influential attributes, yet little is known about whether consumers value AVA designations in emerging wine regions such as Tennessee. Given the state's recent AVA developments, understanding consumer response to these regional designations is important for wineries considering whether to incorporate AVA branding into their marketing strategies. Although alcohol content has received increasing attention in recent literature (e.g., Stanco et al., 2020; Bucher et al., 2020; Shaw et al., 2023; Ford et al., 2025; Kumar et al., 2025), fewer studies examine how consumers trade off alcohol content against other quality signals, such as certification and geographic origin. This study contributes to that literature by incorporating

alcohol content as an attribute alongside certification and AVA designation within a discrete choice experiment, allowing for an assessment of their relative importance and potential interactions. More broadly, the combined effects of certification, geographic origin, and alcohol content have not been examined simultaneously in studies of Tennessee wines and remain underexplored in research on emerging wine regions. By integrating these attributes within a single discrete choice framework, the present study provides a more comprehensive understanding of consumer preferences for multiple quality signals and offers practical guidance for winery decision-making related to certification, branding, and product development.

Materials and Methods

Data Collection and Sample

Participants were recruited through a Qualtrics panel to an online survey between November and December 2025. Prior to full deployment, the survey instrument was pre-tested with a sample of 50 wine consumers to assess question clarity, comprehension of attribute descriptions, and functionality of the choice experiment design. Feedback from the pre-test resulted in minor wording adjustments to improve respondent understanding of the Quality Assurance Program (QAP) certification and American Viticultural Area (AVA) designations. Institutional Review Board approval was obtained from the University of Tennessee, Knoxville (IRB #24-08085-XP). Eligibility criteria required respondents to be at least 21 years of age and either Tennessee residents or individuals who had visited Tennessee in the past two years or planned to visit within the next two years. Additional screening criteria required respondents to use social media and to have purchased wine within the past 12 months. These screening criteria were used to ensure that respondents were relevant to the target market and had sufficient familiarity with wine purchasing behavior to evaluate the choice scenarios. Before beginning the

survey, respondents completed an attention check in which they were asked to commit to providing thoughtful and honest responses. Individuals who did not agree were screened out. Respondents then reported their age, and those under 21 were automatically excluded to comply with legal drinking age requirements. Eligible participants were presented with an informed consent statement describing the purpose of the study, participation requirements, estimated completion time, confidentiality protections, and the voluntary nature of participation. Respondents provided electronic consent before proceeding. The final survey included validation checks to ensure data quality. A total of 825 respondents met these criteria and completed the survey. Of these, 415 respondents participated in the white wine choice experiment and 410 participated in the red wine choice experiment. This sample size exceeds commonly recommended thresholds for discrete choice experiments. Following the guideline proposed by Johnson and Orme (2003), which accounts for the number of choice tasks, alternatives, and attribute levels, the minimum required sample size for this study is approximately 63 respondents, indicating that the sample is sufficient for reliable estimation of preferences and willingness to pay.

Discrete Choice Experiment Design

A discrete choice experiment (DCE) was employed to estimate consumer preferences for Tennessee wine attributes. The DCE methodology is grounded in random utility theory (McFadden, 1974), which posits that consumers derive utility (i.e., the satisfaction or benefit they receive) from the attributes of a product rather than the product itself. When presented with a choice set, consumers select the alternative that maximizes their utility. This approach is widely used in wine economics research to estimate consumer preferences for multiple product attributes simultaneously (Tait et al., 2019; Everett et al., 2017). Two separate choice

experiments were conducted for red and white wines. These wine types were selected as they represent the most widely consumed categories and allow for the assessment of whether consumer preferences differ across product types. Prior to the choice experiment, respondents were asked to indicate their wine preference (red wine, white wine, or no preference). Respondents indicating a preference for red wine were assigned to the red wine DCE, while those who preferred white wine were assigned to the white wine DCE. Respondents who indicated no preference were randomly assigned to one of the two experiments. The experimental design was generated using NGENE software to produce an efficient fractional factorial design that minimizes correlation among attributes and supports precise parameter estimation (ChoiceMetrics, 2021). The final design consisted of 36 choice sets. To reduce respondent fatigue, the choice sets were divided into three blocks of 12 choice sets each, with each respondent assigned to one block. Blocking ensures respondents complete a manageable number of tasks while maintaining the statistical efficiency of the design. The order of choice sets within each block was randomized to minimize ordering effects.

For this study, wine alternatives were described by four attributes: quality certification (Tennessee QAP label; see Figure 5), origin (AVA designation), alcohol by volume (ABV), and price. Table 6 presents the attributes and their corresponding levels.



Figure 5. Tennessee Quality Assurance Program (QAP) Label

Table 6. Wine Attributes and Attribute Levels Used in the Choice Experiment

Attribute	Levels
Alcohol by Volume (ABV)	7%, 12%, 16%
Price (per 750mL bottle)	$19.99, $24.99, $29.99
American Viticultural Area (AVA)	At least 85% of grapes sourced from a Tennessee AVA (present/not present)
Tennessee Quality Assurance Label	Present/not present

Notes: 7% was the base level and was omitted from the model for ABV. The "not present" level was omitted from the model for AVA and QAP.

To ensure respondents understood the wine attributes presented in the DCE, brief descriptions were provided prior to the choice tasks. The Tennessee QAP label was described to respondents as a certification mark introduced in 2023 by the Tennessee Wine and Grape Board. The certification identifies wines that meet specific production standards and have received recognition in established wine competitions. This certification represents a deliberate effort to build consumer trust and enhance the reputation of Tennessee wines in a crowded marketplace. The AVA attribute was described as wines made with at least 85% of grapes sourced from a federally recognized American Viticultural Area (AVA), which are grape-growing regions defined by unique geographic features such as climate, soil, and elevation. Tennessee is currently associated with four AVAs: the Upper Cumberland AVA, which was established in June 2024 and lies entirely within the state; the recently approved Nine Lakes of East Tennessee AVA (effective April 23, 2026); and two multi-state AVAs that extend into Tennessee, the Appalachian High Country AVA and the Mississippi Delta AVA (Alcohol and Tobacco Tax and Trade Bureau, 2026). Alcohol content was specified at three levels (7%, 12%, and 16%) to reflect low, standard, and higher alcohol wines observed in the market. These levels were based on alcohol-by-volume values from Tennessee winery products, which range from approximately 6.8% to 20%, and were further informed by industry input. Price levels were selected from a review of Tennessee winery offerings on winery websites. Based on 76 observations, average prices ranged from about $17.21 to $30.81 per 750 mL bottle, with a mean of $23.72. From this distribution, three

representative price levels ($19.99, $24.99, and $29.99) were chosen to reflect typical market conditions and maintain price variation.

In each choice set, respondents were presented with two wine alternatives and a 'no purchase' option. Figure 6 provides examples of a choice set as presented to respondents. To reduce hypothetical bias, the survey included a "cheap talk" script reminding respondents to consider their choices as if they were making actual purchases (Cummings & Taylor, 1999). A consequentiality statement further emphasized the potential impact of responses on industry stakeholders, which has been shown to improve the validity of stated preference data (Carson & Groves, 2007; Vossler & Watson, 2013). A hypothetical design was used due to practical constraints associated with conducting non-hypothetical experiments for alcohol products, including legal restrictions on distribution. Following the choice experiment, respondents completed additional questions related to wine purchasing behavior, perceptions of certification labels, attitudes toward local wines, and evaluations of social media advertisements. Demographic information, including age, income, education, and household composition, was also collected.

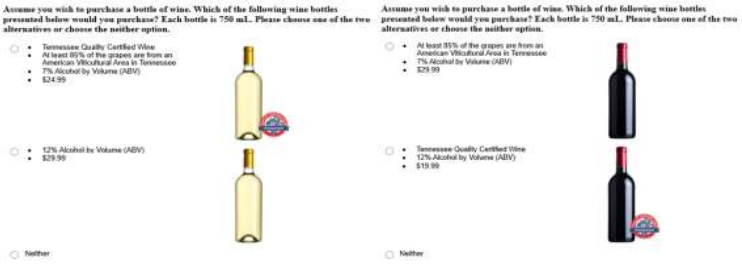

Figure 6. Example of Choice Set for White and Red Wines

Econometric Model

A random parameters logit (RPL) model was used to estimate consumer preferences for wine attributes in the DCE. The RPL model allows for random taste variation, does not impose

the independence of irrelevant alternatives assumption, and accounts for correlation in unobserved utility across repeated choices made by the same respondent (Train, 2009). Following a linear random utility framework, the utility that respondent *n* derives from choosing alternative *j* in choice situation *t* is specified as:

$$U_{njt} = \beta_p Price_{njt} + \beta_1 QAP_{njt} + \beta_2 AVA_{njt} + \beta_3 ABV12_{njt} + \beta_4 ABV16_{njt} + \beta_5 None_{njt} + \varepsilon_{njt}$$

where $Price_{njt}$ is the price of the wine alternative; QAP_{njt} is a dummy variable equal to 1 if the Tennessee Quality Certified label is present and 0 otherwise; AVA_{njt} is a dummy variable equal to 1 if the wine is labeled as sourced from an AVA and 0 otherwise; $ABV12_{njt}$ and $ABV16_{njt}$ are dummy variables indicating alcohol by volume levels of 12% and 16%, respectively, with 7% alcohol content serving as the omitted base category; and $None_{njt}$ is a dummy variable equal to 1 if the respondent selected the no-purchase option. The term ε_{njt} is an independently and identically distributed extreme value error term.

Independent normal distributions were assumed for all non-price attribute coefficients to capture preference heterogeneity across individuals. The price coefficient was specified as fixed to facilitate WTP estimation and ensure a consistent distribution of WTP measures. A panel specification was used to account for repeated choices made by respondents, and model parameters were estimated using simulated maximum likelihood with 500 Halton draws in Stata (StataCorp LLC, College Station, TX; Version 19.5) using the mixlogit command. Halton sequences enhance simulation efficiency and facilitate accurate, stable parameter estimation using a relatively small number of draws (Bhat, 2001; Train, 2009). Separate models were estimated for red and white wine to account for potential differences in consumer preferences across wine types.

Willingness to pay (WTP) for each non-price attribute was calculated as the ratio of the attribute coefficient to the negative of the price coefficient:

$$WTP_k = -\frac{\beta_k}{\beta_{price}},$$

where β_k is the estimated coefficient associated with attribute k, and β_{price} is the estimated coefficient for price. This ratio represents the marginal rate of substitution between the attribute and price and indicates the price premium consumers are willing to pay for a change in the attribute level. For binary attributes, including the QAP and AVA designations, WTP represents the premium associated with the presence of the attribute relative to its absence. For alcohol content, WTP values represent the premium associated with 12% or 16% alcohol by volume relative to the baseline category of 7%. Standard errors and confidence intervals for WTP estimates were calculated using the delta method (Greene, 2012).

Results

Descriptive Statistics of Participant Demographics

Table 7 summarizes participant demographics for the pooled sample and for the Red and White discrete choice experiment (DCE) groups. Demographic variables include age, gender, education, household income, and geographic location (Tennessee versus other states). The mean age of respondents in the pooled sample is 48.83 years. Respondents in the White DCE sample are significantly older on average (51 years) compared to those in the Red DCE sample (47 years), and this difference is statistically significant at the 1% level ($p = 0.001$). Approximately 55% of respondents are female overall, with a significantly higher proportion of female respondents in the White DCE sample (60%) compared to the Red DCE sample (50%), with the difference significant at the 1% level ($p = 0.003$). Household income is slightly higher for the

White DCE sample (mean = 8.34) compared to the Red DCE sample (mean = 7.92), and this difference is marginally significant at the 10% level (p = 0.085).

Table 7. Participant Demographics for Pooled Sample and Red and White DCE Groups

Variable	Pooled	Red DCE	White DCE
Age (mean)	48.83	46.99***	50.64***
Female (%)	54.91	49.76***	60***
Bachelor's+ (%)	61.02	60.05	61.99
Household Income (mean)	8.13	7.92*	8.34*
Tennessee (%)	36.36	37.32	35.42
N	825	410	415

Note: T-tests are used for continuous variables (age and income), and chi-square tests are used for categorical variables (gender, education, and Tennessee residence). *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

Random Parameters Logit Model Estimates for White and Red Wine

Table 8 presents the random parameters logit model estimates for white wine and red wine, respectively. The price coefficients are negative and significant for both models, indicating that higher prices decrease the probability of selection, consistent with economic theory. The alternative-specific constant for the no-purchase option (opt-out) is also negative and significant for both models, suggesting that consumers generally prefer purchasing wine over opting out. For white wine, all attribute coefficients are positive and statistically significant at the 1% level. The quality certification attribute (QAP) has the largest coefficient (β = 1.090), indicating it is the most important driver of utility for white wine consumers, followed by 16% ABV (β = 0.781) and AVA designation (β = 0.677). The 12% ABV attribute, while still positive and significant, has a smaller coefficient (β = 0.364), suggesting that consumers prefer higher alcohol content but derive additional utility from moving from 12% to 16% ABV. For red wine, all attribute coefficients are also positive and statistically significant at the 1% level relative to the base levels. Similar to white wine, quality certification has the largest coefficient (β = 0.850), followed by AVA designation (β = 0.616) and 16% ABV (β = 0.536). The 12% ABV coefficient (β = 0.197) is positive but smaller than the 16% coefficient, again indicating a preference for

higher alcohol content. Comparing across wine types, white wine consumers show larger coefficients for all attributes compared to red wine consumers, suggesting stronger average preferences for these attributes in white wine. However, the red wine price coefficient (β = -0.060) is smaller in magnitude than the white wine price coefficient (β = -0.089), indicating that red wine consumers are less sensitive to price changes.

Table 8. Random Parameters Logit Model Estimates for White and Red Wine

	White Wine		Red Wine	
Variable	Coeff.	SE	Coeff.	SE
Tennessee QAP Label	1.090***	0.078	0.850***	0.072
Tennessee AVA	0.677***	0.073	0.616***	0.063
12% ABV	0.364***	0.074	0.197***	0.065
16% ABV	0.781***	0.090	0.536***	0.078
Price per 750mL bottle ($)	-0.089***	0.006	-0.060***	0.006
Opt-out	-2.500***	0.162	-2.299***	0.157
SD				
Tennessee Quality Assurance Label	1.197***	0.074	1.146***	0.071
Tennessee AVA	1.161***	0.075	0.929***	0.065
12% ABV	0.891***	0.081	-0.665***	0.086
16% ABV	1.240***	0.093	0.999***	0.088
No. of obs.	14,940		14,760	
Log Likelihood	-3894.038		-3835.4704	
Chi^2	850.97		630.46	
Probability > Chi^2	0.0000		0.0000	

Note: *** indicates statistical significance at the 1% level relative to the base attribute levels (no label for QAP and AVA; 7% ABV).

Comparing across wine types, white wine consumers show larger coefficients for all attributes compared to red wine consumers, suggesting stronger average preferences for these attributes in white wine. However, the red wine price coefficient (β = -0.060) is smaller in magnitude than the white wine price coefficient (β = -0.089), indicating that red wine consumers are less sensitive to price changes.

The standard deviations of the random parameters are all positive and statistically significant at the 1% level for both wine types, indicating substantial preference heterogeneity across respondents. For white wine, the largest standard deviations are observed for 16% ABV

(1.240) and quality certification (1.197), suggesting that consumers vary considerably in how much they value these attributes. For red wine, quality certification shows the largest standard deviation (1.146), followed by 16% ABV (0.999) and AVA designation (0.929). These significant standard deviations justify the use of the random parameters logit model over a standard multinomial logit model and indicate that consumer preferences for Tennessee wine attributes are not homogeneous.

Willingness to Pay Estimates

Willingness to pay (WTP) for each attribute was calculated as the ratio of the attribute coefficient to the negative of the price coefficient. Table 10 presents the WTP premiums per 750mL bottle for white and red wine attributes, with no label and 7% alcohol by volume serving as the baseline for comparison, while Figure 7 provides a visual comparison of these premiums across wine types and attributes.

Table 9. Willingness to Pay Estimates for White and Red Wine Attributes

Attribute	White Wine	Red Wine
Tennessee Quality Assurance Label	$12.22	$14.08
At least 85% grapes from a Tennessee AVA	$7.59	$10.22
12% Alcohol by Volume (compared to 7%)	$4.08	$3.26
16% Alcohol by Volume (compared to 7%)	$8.76	$8.89

The results show that consumers are willing to pay a substantial premium for Tennessee Quality Certified wine relative to wines without the QAP logo, with red wine commanding a higher premium ($14.08) than white wine ($12.22). Similarly, wines sourced from a Tennessee AVA receive premiums of $7.59 for white wine and $10.22 for red wine per bottle relative to wines without the AVA designation. Alcohol content also influences consumer WTP. Compared to the baseline of 7% ABV, consumers are willing to pay an additional $4.08 for white wine and $3.26 for red wine at 12% ABV. For 16% ABV wines, the premiums increase to $8.76 for white wine and $8.89 for red wine relative to 7% ABV. Notably, while white wine consumers have

larger coefficient estimates for most attributes (Table 8), red wine consumers exhibit higher WTP in dollar terms for quality certification and AVA designation (Table 9). This is due to the smaller price coefficient (less price sensitivity) for red wine (β = -0.060) compared to white wine (β = -0.089), meaning red wine consumers are less sensitive to price changes and thus willing to pay larger premiums for desirable attributes. These findings demonstrate that QAP certification, AVA origin labels, and alcohol content all significantly influence consumer value and can inform winery pricing strategies for Tennessee wines. The substantial premiums for quality certification suggest that the Tennessee QAP has the potential to create significant value for participating wineries.

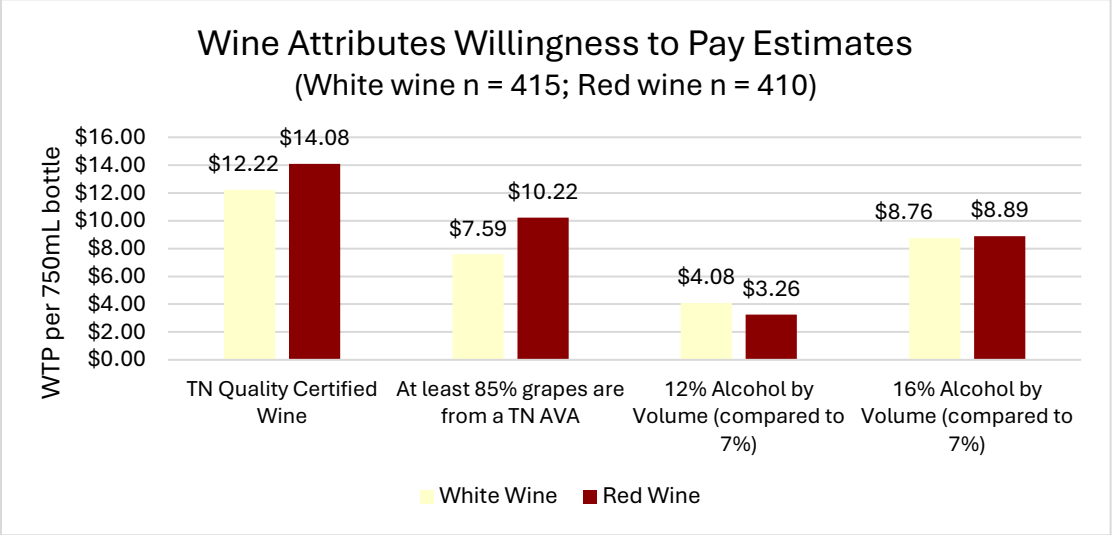

Figure 7. Willingness to Pay for Tennessee Wine Attributes

Discussion

The findings provide important insights into consumer preferences for Tennessee wine attributes and offer practical implications for the state's emerging wine industry. Consumers are willing to pay substantial premiums for wines carrying the Tennessee QAP label, with estimated premiums of $14.08 (57%) for red wine and $12.22 (48%) for white wine relative to otherwise identical uncertified wines. These values are comparable to those reported in prior studies of

specialty certifications in wine markets. For example, Tait et al. (2019) find that consumers are willing to pay significant premiums for environmental and social sustainability attributes, such as organic production, pest and disease control practices, and water management, while Rihn et al. (2022) show that QAPs are perceived as indicators of product quality and consistency. Together, these results reinforce the role of certification as a meaningful value-enhancing attribute in wine markets. The magnitude of these premiums suggests that the Tennessee QAP has strong potential to generate economic value for participating wineries. This is important for Tennessee, where wineries are often small in scale, rely heavily on direct-to-consumer sales, and may have limited recognition among consumers, making it more challenging to attract and inform buyers (Rihn et al., 2022). The results indicate that the certification functions as an effective quality signal, helping reduce uncertainty and increasing consumer confidence at the point of purchase. For wineries, these premiums provide a clear economic incentive to adopt certification, as the costs of compliance and participation may be offset through higher prices.

Consumers also place significant value on geographic origin. Wines labeled with the Tennessee AVA receive premiums of $7.56 (30%) for white wine and $9.94 (40%) for red wine over those without AVA designations. This finding is consistent with Stanco et al. (2020) in Italy, who identify geographical indications as one of the most influential attributes in wine choice, and with Costanigro et al. (2010) in the U.S., who show that regional reputation can enhance product value through collective signaling effects. For Tennessee wineries, these results suggest that emphasizing the AVA designation can strengthen perceived quality and support price premiums.

Alcohol content also significantly influences WTP, with higher-alcohol wines receiving substantial premiums relative to lower-alcohol alternatives. This pattern suggests that consumers use alcohol content as a heuristic cue, associating higher levels with fuller body and greater

perceived quality. This interpretation aligns with Stanco et al. (2020), who note negative perceptions of low-alcohol wines, although emerging segments interested in lower-alcohol products (Bruwer et al., 2014) indicate that preferences may evolve over time. The substantial preference heterogeneity observed in the random parameters model, reflected in the large and significant standard deviations for all attributes, indicates that consumer preferences for Tennessee wine attributes are not uniform. Some consumers place high value on quality certification and AVA designation, while others are less influenced by these attributes. This variation has important implications for market segmentation and targeted marketing strategies. Wineries may benefit from tailoring their messaging, emphasizing quality certification and AVA membership for quality-oriented consumers while highlighting value or other attributes for more price-sensitive segments. The presence of significant heterogeneity also supports the use of the random parameters logit model and underscores the importance of accounting for preference variation when analyzing consumer behavior. Comparing these results with prior Tennessee wine research highlights both continuity and change in consumer preferences. Everett et al. (2017) report premiums for Tennessee-labeled wines, but those estimates reflect the value of the state label alone. The larger premiums observed in this study for the QAP label suggest that certification provides additional value beyond geographic labeling. This finding supports the role of quality assurance in strengthening consumer trust and complements Rihn et al. (2022), who document positive consumer perceptions of such programs but did not estimate WTP. By quantifying these values, the present study provides more concrete guidance for pricing and marketing decisions.

For Tennessee wineries, the findings offer several practical implications. The substantial premiums associated with certification indicate that pursuing QAP participation can be

economically viable, particularly if price increases offset compliance and participation costs. Promoting the AVA designation on wine labels also appears beneficial, as geographic origin contributes positively to perceived value. Wineries sourcing grapes from Tennessee AVAs may strengthen their positioning by highlighting this information in both labeling and marketing materials. Product development strategies should also consider alcohol content, as consumers in this study demonstrate a preference for higher-alcohol wines up to 16% ABV. While demand for lower-alcohol options is growing (Ford et al., 2025), these products may require additional quality signals, such as certification, to overcome potential negative perceptions. Finally, the observed heterogeneity in preferences suggests opportunities for segmentation, with wineries potentially developing differentiated product lines targeting quality-focused and price-sensitive consumers. For the Tennessee Wine and Grape Board and other stakeholders, these results support continued investment in the QAP. The observed premiums indicate that the program is functioning as intended by signaling quality and aiding in building consumer trust. Increasing consumer awareness and understanding of the certification may further enhance its value. The findings also support ongoing efforts to establish and promote AVAs within Tennessee. Strengthening recognition of regional designations may increase their contribution to perceived quality and support both wine sales and tourism development.

Several limitations should be noted. The hypothetical nature of the choice experiment may lead to overestimation of WTP, despite efforts to mitigate bias. Future research could validate these results using non-hypothetical methods such as experimental auctions or observed market data. The analysis also does not account for the costs of certification, and future work could integrate consumer valuation with producer cost data to assess net economic benefits. In addition, the study focuses on Tennessee consumers, and preferences in broader markets remain

uncertain. The attributes examined are treated independently, although interactions among certification, origin, and alcohol content may influence consumer decisions. Future research could explore these interactions and track how preferences evolve over time. Finally, the choice experiment did not include other common market signals such as brand names, label design, or visual imagery. In actual purchasing contexts, these elements frequently serve as important quality cues and may influence or even supersede the effects of attributes such as AVA designation or QAP certification. Including these factors in future research would yield a more comprehensive understanding of consumer decision-making.

Despite these limitations, this study provides the first empirical estimates of consumer WTP for wines with the Tennessee QAP certification, AVA designations, and alcohol content. The findings show that QAP certification, geographic AVA, and alcohol content all significantly influence consumer value, with quality certification emerging as the most highly valued attribute among those studied. These results provide strong evidence that investments in quality assurance and regional branding can generate meaningful economic returns and support long-term industry development.

CHAPTER 4: CONCLUSIONS

This research is intended to help Tennessee wineries make informed marketing and production decisions in an increasingly competitive wine market. The two studies examine complementary approaches to improving market access and profitability: leveraging social media for consumer engagement and investing in quality certification and regional branding as differentiation strategies. The survey results of Tennessee wineries provide further understanding of the factors that influence social media marketing intensity. Wineries that host music or entertainment events and offer online sales post more frequently on Facebook and Instagram, suggesting that on-site activities provide valuable content opportunities. Time constraints and limited expertise consistently reduce posting frequency, highlighting the importance of human capital in digital marketing. Notably, Tennessee wineries maintain social media presences comparable to those in other states, demonstrating that operating in an emerging rural wine region need not limit digital engagement. The choice experiment results provide the first empirical estimates of consumer WTP for Tennessee QAP certification, AVA designations, and alcohol content. Consumers are willing to pay substantial premiums for QAP-certified wines, with red wine commanding 57% and white wine 48% per bottle. Wines sourced from Tennessee AVAs receive premiums of 30% for white wine and 40% for red wine, demonstrating that consumers value geographic origin as a quality signal. Alcohol content also influences preferences, with higher alcohol wines commanding significant premiums over lower alcohol alternatives.

The introduction of the Tennessee QAP and the promotion of AVAs provide wineries with tools to differentiate their products and communicate quality to consumers. The results from this research are helpful for wineries considering whether to pursue QAP certification, promote AVA

designations, or develop products at different alcohol levels. For industry stakeholders and policymakers, these findings validate investments in quality assurance and regional branding as strategies to support the continued growth and development of the Tennessee wine industry and the rural communities it serves.

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APPENDICES

Appendix A: Tables

Table 10. Names and Definitions of Dependent and Independent Variables

Variable	Description of variables	Hyp. Sign
Dependent Variable		
Facebook post frequency	How often respondent posts on Facebook with 1=monthly, 2=weekly, 3=few times per week, 4=daily	N/A
Instagram post frequency	How often respondent posts on Instagram with 1=never, 2=monthly, 3=weekly, 4=few times per week, 5=daily	N/A
Independent Variable		
Winery information		
Tennessee	1 if the winery is in Tennessee, 0 otherwise	+ (H1)
Large	1 if the winery's gross sales in 2024 exceed $1 million, 0 otherwise	+(H2)
Rural area	1 if the winery is in a rural area, 0 otherwise	+(H2)
Tourist area	1 if the winery is in a tourist area, 0 otherwise	+(H2)
Music entertainment	1 if the winery hosts music or entertainment events to attract visitors, 0 otherwise	+(H2)
Online sales	1 if the winery sells wine online or offers shipping, 0 otherwise	+(H2)
Social media engagement		
Facebook followers >5,000	1 if the winery's Facebook page has more than 5,000 followers/likes, 0 otherwise	+(H3)
Instagram followers <=1,000	1 if the winery's Instagram page has 1,000 followers/likes or less, 0 otherwise	-(H3)
Target wine enthusiasts	1 if the winery primarily targets wine enthusiasts on social media, 0 otherwise	+(H3)
Target age 36+	1 if the winery primarily targets social media users aged 36 and older, 0 otherwise	+(H3)
Track customer engagement	1 if the winery tracks customer engagement metrics (e.g., comments, shares) on social media, 0 otherwise	+(H3)
Social media challenges		
Time challenge	1 if the winery reports a lack of time to manage social media accounts as a challenge, 0 otherwise	-(H4)
Knowledge challenge	1 if the winery reports limited knowledge or expertise in social media marketing as a challenge, 0 otherwise	-(H4)
Respondent demographics		
Age	Age of the respondent in years	-(H5)
Gender	1 if the respondent is female, 0 otherwise	+(H5)
Education	1 if the respondent has a bachelor's degree or higher, 0 otherwise	+(H5)

Note: All respondents use Facebook, so a 'never' category was not included. Some do not use Instagram, requiring a 'never' option for that platform

Table 11. Summary Statistics for Independent Variables

Variable	Tennessee Mean	Other States Mean	Large Mean	Small Mean
Winery Characteristics				
Tennessee	100%	0%	18%	27%*
Large (>$1M sales)	20%	30%	100%	0%
Rural location	65%	82%	72%	79%
Tourist area	50%**	18%**	41%	21%
Music events hosted	45%**	72%**	72%	62%*
Online sales offered	55%	52%	77%***	43%**
Social media engagement				
Facebook followers >5,000	50%	45%	64%*	40%*
Instagram followers <=1,000	60%*	34%*	24%**	48%**
Target wine enthusiasts	60%	75%	68%	72%
Target older consumers (36+)	75%	73%	77%	72%
Track customer engagement	75%	73%	82%	70%
Social media challenges				
Time constraints	45%	62%	59%	57%
Lack of expertise	40%	32%	10%***	43%***
Respondent demographics				
Age (years)	54	53	48*	55*
Gender (1 = female)	41%	60%	70%	51%
Education (>=Bachelor's degree)	83%	85%	90%	83%

Note: Significance*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$ (t-tests for TN vs. Other States and Large vs. Small). Percentages are reported. Sample sizes vary due to missing responses. For Tennessee (n = 20) and other states (n = 60), all variables use the full sample, except respondent demographic variables, which have fewer observations (Tennessee: Age n = 17, Gender n = 17, Education n = 18; Other states: Age n = 57). For winery size (Large n = 22, Small n = 58), all variables use the full sample, except respondent demographic variables, which have fewer observations (Large: Age n = 20, Gender n = 20, Education n = 20; Small: Age n = 54, Gender n = 57).

Table 12. Standard Errors of Ordered Probit Coefficients and Marginal Effects

(n=80) Variables	Coeff SEM	Monthly dy/dx SEM	Once a week dy/dx SEM	A few times/week dy/dx SEM	Daily dy/dx SEM
Winery Information					
Tennessee	0.360	0.072	0.024	0.042	0.058
Large	0.336	0.066	0.020	0.031	0.055
Rural area	0.340	0.067	-0.020	0.033	0.056
Tourist area	0.366	0.072	0.025	0.042	0.059
Music entertainment	0.324	0.062	0.025	0.041	0.055
Online sales	0.320	0.061	0.023	0.036	0.055
Social media engagement					
Facebook followers >5,000	0.298	0.059	0.018	0.028	0.049
Target wine enthusiasts	0.318	0.063	0.019	0.030	0.052
Target age 36+	0.343	0.067	0.023	0.037	0.058
Track customer engagement	0.340	0.066	0.023	0.035	0.056
Social media challenges					
Time challenge	0.288	0.057	0.017	0.028	0.047
Knowledge challenge	0.323	0.063	0.021	0.034	0.054

Note: Standard errors (SEM) reported for coefficients and marginal effects (dy/dx).

Table 13. Standard Errors of Ordered Probit Coefficients and Marginal Effects for Facebook Posting Frequency (Respondent Demographics)

(n=73) Variables	Coeff SEM	Monthly dy/dx SEM	Once a week dy/dx SEM	A few times/week dy/dx SEM	Daily dy/dx SEM
Respondent Demographics					
Age	0.012	0.002	0.001	0.001	0.002
Gender	0.343	0.065	0.022	0.033	0.055
Education	0.446	0.084	0.027	0.040	0.072

Note: Standard errors (SEM) reported for coefficients and marginal effects (dy/dx).

Appendix B: Surveys

Tennessee Social Media Marketing Producer Survey

Do you consent to participate in this study?

- ○ Yes
- ○ No

Screening Questions

1. Are you at least 18 years old?
   - ○ Yes
   - ○ No
2. Is your winery located in Tennessee?
   - ○ Yes
   - ○ No
3. Are you a primary decision maker for the winery?
   - ○ Yes
   - ○ No

The next questions are about your winery.

4. In what Tennessee county is your winery located?_____
5. How would you describe the location of your winery? (select all that apply)
   - ⬭ Rural
   - ⬭ City center
   - ⬭ Outside of a city

- ○ In a tourist destination area

6. What events or promotions does your winery host to attract visitors? (Select all that apply)
   - ○ Wine tastings
   - ○ Vineyard tours
   - ○ Wine & food pairings
   - ○ Music/entertainment
   - ○ Seasonal festivals
   - ○ Private events (weddings, corporate, etc.)
7. What was the gross sales (wine, other retail, services provided such as hosting events) by your winery in 2024? (select one range)

○ $0 - $100,000	○ $4,000,001 - $8,000,000
○ $100,001 - $250,000	○ $8,000,001 - $12,000,000
○ $250,001 - $500,000	○ $12,000,001 - $20,000,000
○ $500,001 - $1,000,000	○ $20,000,001 or more
○ $1,000,001 - $2,000,000	○ If $20,000,001 or more is selected, could you please provide an exact value $_____
○ $2,000,001 - $4,000,000	○ Prefer not to answer

8. Through which channels do you primarily sell your wine? (Select all that apply)
   - ○ On-site at the winery
   - ○ Online sales/ ship wine
   - ○ Local retailers
   - ○ Regional or national distributors
   - ○ Restaurants and bars
   - ○ Wine clubs
   - ○ Events and festivals

- ○ Other _____

Next, we are interested in learning about how your operation uses social media to market your wines and/or winery. Please answer the following questions to the best of your ability.

9. How do you advertise your wines and/or winery? (Select all that apply)
   - ○ Website (i.e., website devoted to your establishment)
   - ○ Participate in the Tennessee Wines website
   - ○ Tennessee Department of Tourism Development Platforms
   - ○ Participate in the Tennessee Wine Trail
   - ○ Participate in a wine trail website (besides the TN Wine Trail) that includes your winery/wines
   - ○ Facebook
   - ○ Instagram
   - ○ Tik Tok
   - ○ X (formerly Twitter)
   - ○ Beverage Testing Institute
   - ○ Employ social media influencer(s)
   - ○ Use artificial intelligence (AI) to write ads
   - ○ Other (please explain)

     _____

10. What is the main goal of your winery's social media presence? (Select all that apply)
    - ○ Sell more wine directly to customers
    - ○ Attract more visitors to the winery
    - ○ Make more people aware of our brand

- ○ Increase social media followers and engagement
- ○ Promote events and wine tastings
- ○ Other (please specify)

  _____

- ○ I do not use social media

11. Approximately how many followers (or likes) do you have for the social media page devoted to your wines and/or winery establishment (insert "0" if you don't use the platform or leave blank)?

	# of followers/likes
Facebook	
Instagram	
Tik Tok	
X (formerly Twitter)	
Other (please include other important sites you use and likes/followers	

12. How often do you post content to the following social media platforms to advertise your winery and/or wines (including events)?

	Monthly	A couple times a month	Once a week	A few times a week	Daily	Never (don't use)
Facebook	o	O	o	O	O	o
Instagram	o	O	o	O	O	o
Tik Tok	o	O	o	O	O	o
X (formerly Twitter)	o	O	o	O	O	o

13. How much do you agree or disagree that the following attract (or would attract if you don't use them) people to purchase your wines and/or visit your wineries?

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
Facebook	O	O	O	O	O
Instagram	O	O	O	O	O
Tik Tok	O	O	O	O	O
X (formerly Twitter)	O	O	O	O	O
Google (that points people to your devoted business website)	O	O	O	O	O
Being located on a wine trail	o	O	O	O	O

14. What is the main goal of your winery's social media presence? (Select all that apply)

- ⬭ Sell more wine directly to customers
- ⬭ Attract more visitors to the winery
- ⬭ Make more people aware of our brand
- ⬭ Increase social media followers and engagement
- ⬭ Promote events and wine tastings
- ⬭ Other (please specify)

_____

- ⬭ I do not use social media

15. Who is your primary target audience on social media? (Select all that apply)

- ⬭ Local residents
- ⬭ Tourists
- ⬭ Wine enthusiasts
- ⬭ Casual drinkers

- ○ Younger audience (21-35)
- ○ Older audience (36+)
- ○ Other: _____
- ○ I don't use social media

Next, we are interested in the management of your social media presence for your winery and/or wines.

16. Approximately how much did you spend (in $'s) on social media advertising and/or management for your winery and/or wines in 2024 (insert zero if you don't use it)?

_____

17. Which metrics do you track most often to measure the success of your social media efforts (select all that apply)?

- ○ Sales
- ○ Number of followers/likes
- ○ Customer engagement (e.g., comments, shares)
- ○ Website traffic
- ○ Event attendance
- ○ Other (please specify)

  _____

- ○ I do not track social media metrics

18. What challenges does your winery face in using social media effectively? (Select all that apply)

- ○ Lack of time to manage accounts

- ○ Limited knowledge or expertise in social media marketing
- ○ Difficulty creating engaging content
- ○ Lack of budget for social media advertising
- ○ Low follower engagement or growth
- ○ Uncertainty about which platforms to use
- ○ Other: _____

19. What types of assistance would help you improve your social media marketing? (select all that apply)

- ○ Training workshops
- ○ Mentorship
- ○ Intern
- ○ Other: _____

Lastly, please provide us with some information about you. Remember, all answers are anonymous and none of the information you provide can be connected back to you.

20. What is your age? _____

21. Please indicate your gender:

- ○ Male
- ○ Female
- ○ Prefer not to say

22. Please indicate the highest level of education that you have completed.

- ○ Some high school

- ○ High school diploma / GED
- ○ Some college
- ○ 2-year / associate's degree
- ○ 4-year / bachelor's degree
- ○ Some graduate school
- ○ Graduate or professional's degree

Tennessee Consumer Preferences Survey

Consent

1. Do you consent to participating in this study?
   - ○ Yes
   - ○ No
2. What is your gender?
   - ○ Male
   - ○ Female
   - ○ Other_____
   - ○ Prefer not to answer
3. What is your educational background? Mark the box next to the highest level of education you have completed.
   - ○ High School Diploma or Equivalent

- ○ Some College
- ○ Technical School Diploma
- ○ Associate's Degree
- ○ Bachelor's Degree
- ○ Master's Degree
- ○ Doctorate
- ○ Other_____
- ○ Prefer not to say

4. What is your race? (select all that apply)

- ○ White
- ○ Hispanic
- ○ American Indian or Alaskan Native
- ○ Black or African American
- ○ Asian
- ○ Native Hawaiian or Other Pacific Islander
- ○ Middle Eastern or North African
- ○ Other_____

- ○ Prefer not to answer

5. Please indicate your projected 2025 annual household income before taxes:

- ○ Less than $10,000
- ○ $10,000 to $19,999
- ○ $20,000 to $29,999
- ○ $30,000 to $39,999
- ○ $40,000 to $49,999
- ○ $50,000 to $59,999
- ○ $60,000 to $69,999
- ○ $70,000 to $79,999
- ○ $80,000 to $89,999
- ○ $90,000 to $99,999
- ○ $100,000 to $149,999
- ○ $150,000 to $199,999
- ○ $200,000 to $249,999
- ○ More than $250,000
- ○ Prefer not to answer

Wine Preference Question

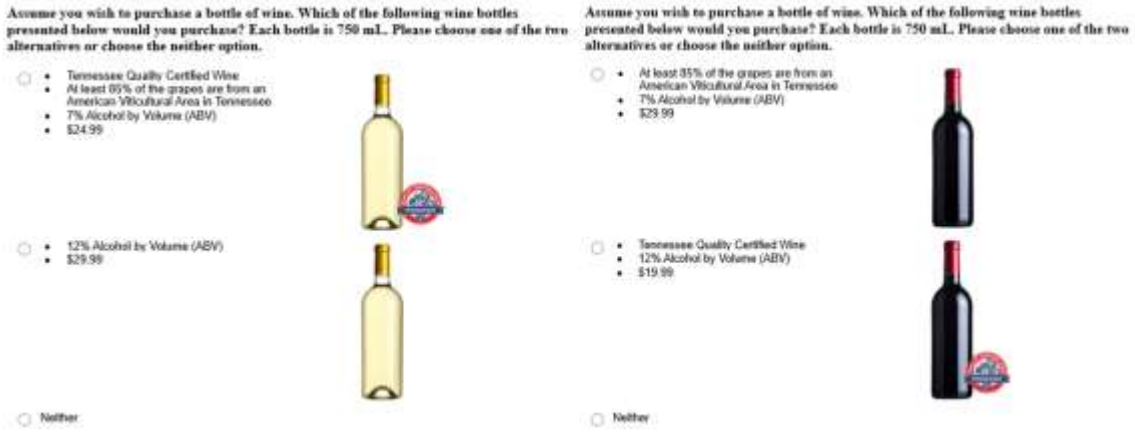
6. What kind of wine do you prefer to purchase?

   ○ Red Wine

   ○ White Wine

   ○ I prefer red and white wine equally

7. Assume you wish to purchase a bottle of wine. Which of the following wine bottles presented below would you purchase? Each bottle is 750 mL. Please choose one of the two alternatives or choose the neither option.



8. If you chose the "neither" option on any of the decision scenarios, why did you do so? (select all that apply)

   ○ I never chose the "neither" option

   ○ I make my own wine to drink

   ○ I don't believe certification programs influence wine quality

   ○ I prefer wines from outside Tennessee

- ○ I didn't find any option appealing
- ○ I am not willing to pay the prices shown
- ○ I don't prefer wine made with Tennessee grapes
- ○ Other: Please describe_____

9. When making your choices for the wine, which of these attributes factored into your decision?

	Yes	No
Price	o	o
Tennessee Quality Certified Wine	o	o
Alcohol by Volume (ABV)	o	o
At least 85% of the grapes being from an American Viticultural Area in Tennessee	o	o

10. Please indicate how important each of the following attributes is to you when you purchase wine.

	Not Important	Slightly Important	Moderately Important	Important	Very Important
Price	O	O	o	o	o
Tennessee Quality Certified Wine	O	O	o	o	o
(ABV)	O	O	o	o	o
At least 85% of the grapes are from an American Viticultural Area in Tennessee	o	O	o	o	o

Willingness to Pay

11. Would you be willing to pay more for wine carrying the Tennessee Quality Assurance

Program logo?

- ○ Yes
- ○ No
- ○ Maybe

11 How much more are you willing to pay for wine carrying the Tennessee Quality Assurance Program logo?

- ○ Less than 10% more
- ○ 10%–20% more
- ○ 20%–30% more
- ○ Over 30% more
- ○ I wouldn't pay more
- ○ I am not sure

12. Would you be willing to pay more for wine if it was made with at least 85% grapes from an American Viticultural Area (AVA) in Tennessee?

- ○ Yes
- ○ No
- ○ Maybe

13. How much more would you be willing to pay for wine if it was made with at least 85% grapes from an American Viticultural Area (AVA) in Tennessee?

- ○ Less than 10% more
- ○ 10%–20% more
- ○ 20%–30% more
- ○ Over 30% more
- ○ I wouldn't pay more
- ○ I am not sure

14. How much do you pay, on average, for your typical 750 mL bottle of wine?

- ○ Less than $15
- ○ $15–$20
- ○ $20-$25
- ○ $26–$30
- ○ $30-$40
- ○ Over $40
- ○ Do not know

15. What is your preferred alcohol content by volume (ABV) for a 750mL bottle of wine? (select all that apply)

- ○ Low (7%-9.5% ABV)
- ○ Medium (10-13.9% ABV)

- ○ High (greater than 14% ABV)
- ○ It doesn't matter
- ○ I don't know
- ○ Other, please explain_____

VITA

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