MID-ATLANTIC WINE INDUSTRY CONSUMER MARKET ANALYSIS

By

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ABSTRACT OF THE THESIS

MID-ATLANTIC WINE INDUSTRY CONSUMER PREFERENCE AND MARKET ANALYSIS

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The United States Mid-Atlantic wine production region is experiencing a rapid expansion that raises the demand for market segmentation and a consumer needs study. However, only a few studies target the Mid-Atlantic region, creating a shortage in local consumer market analysis. To respond to the demand from the industry, this research employed an Internet based consumer survey as the primary source of data to understand the behaviors and needs of consumers living in the New Jersey, New York, and Pennsylvania. A wine drinking frequency based market segmentation strategy was implemented to identify frequent wine consumers and the target markets in the region. The potential of wine tourism was also evaluated.

Using descriptive statistics, I found that Mid-Atlantic wines were considered table wines for everyday consumption. Consumers in the Mid-Atlantic states preferred marketing through interpersonal communication, especially through their social networks. However, the perceived quality of Mid-Atlantic wines was low, causing a low consumer

retention rate in this region. With the use of logistic regression and decision trees, my results demonstrate that super core wine consumers (consumers who drank wine more than once a week) are males; married; and age 45 years old or above; and reside in New Jersey. On the contrary, Mid-Atlantic wine target markets are young (<45 years old) super core consumers who are also wine enthusiasts (those who actively collect information about wines). Hence, both the super cores and the Mid-Atlantic wine target market consumers express a great interest in wine tourism. Specifically, winery tours are popular among older males and consumers who learn about wine through winery tasting staff. Based on the results, I suggest that wine business owners in the Mid-Atlantic Region continue to improve the perceived quality of their wines and build a positive image of the Mid-Atlantic wine production area. It is recommended that wine business owners in Mid-Atlantic region develop unique distinguishing features that will enable them to target consumers and differentiate themselves from the general wine market.

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1.1 Market Potential of Mid-Atlantic Wine Production Area

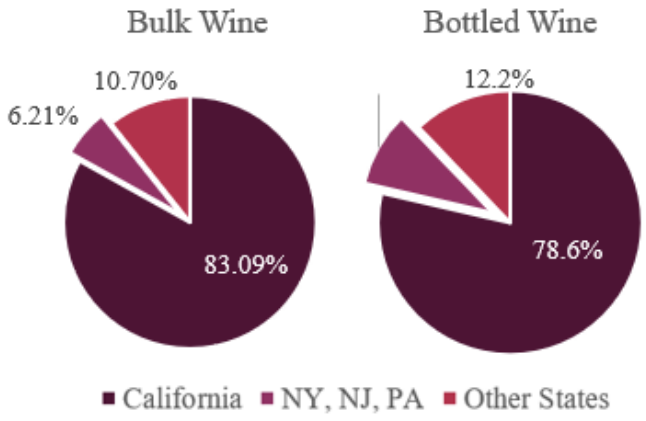
The United States is famous for its California wines, especially those from Napa Valley. Along with its popularity, California has well developed wine research institutes, wine enterprise associations, and educational programs. In comparison, the Mid-Atlantic region, including New York, Pennsylvania and New Jersey, receives much less attention. Although the Mid-Atlantic region does not have a dominating market share, its market potential is still high and worth exploring.

The Mid-Atlantic Wine Production Region, unlike Europe and California, is undergoing a rapid development. New Jersey had over 50 wineries and 2000 acres of wine grapes in 2014 (New Jersey Center for Wine Research and Education, 2017) when compared to 22 wineries in 2004 and 500 acres in 2002. For Pennsylvania, the number of wineries increased from 60 in 2000 to 159 in 2010 and wine production for Pennsylvania from 559,637 gallons in 2000 to 1.81 million gallons in 2010 (Dombrosky and Gajanan, 2013). Because of its rapid growth, New York, Pennsylvania, and New Jersey now have a considerable national market share among states other than California. According to the Alcohol and Tobacco Tax and Trade Bureau, Department of The Treasury (2016), California (rank #1) contributed 83.1% of the total domestic still bulk wine production in 2015 (bulk wines are usually cheap, low-quality wines that are shipped in bigger containers, rather than in bottles). For Mid-Atlantic states, New York State (rank #3) had 4.0%, while Pennsylvania (rank #4) had 2.0%. Although New Jersey (rank #14) only had 0.2% of the

market in wine production, New Jersey had a high volume of wine production considering its geographic size. A similar pattern can be seen in bottled still wine production (California rank #1, 78.6%; New York rank #2, 4.9%; Pennsylvania rank #4, 4.2%; New Jersey rank #18. 0.2%). In addition, New York-Northern New Jersey-Long Island as the most populous area (Mackun and Wilson, 2011) also provides a promising local market. The development and the market potential of Mid-Atlantic region triggers the demand for wine consumer behavior studies that can help local wineries develop cost-effective business strategies.

Figure 1: 2015 U.S. Still Wine Production Breakdown

Source: Alcohol and Tobacco Tax and Trade Bureau, Department of The Treasury (2016)



1.2 Wine Tourism

The Mid-Atlantic states are also suitable for wine tourism because of the nearby metropolitan areas such as New York City and Pennsylvania. Wine tourism is a special

form of agritourism (Gold and Thompson, 2011; Wicks and Merrett, 2003). In wine tourism, the participants can taste the wines, evaluate the quality, and make immediate purchasing decisions based on their experience and preference. Thus, they can greatly eliminate the risk in purchasing wine with attributes that they do not like (Speed, 1998; Lockshin and Hall, 2010). Tours around a winery and a vineyard also enable wine tourists to understand and appreciate the unique cultural and geographical attributes of a winery (Assembly of European Wine Regions, 2015). Therefore, wine tourists can acquire wine knowledge and wine related experiences as well as build relationships with other wine drinkers in the wineries they visit (Shor and Mansfeld, 2009).

On the other hand, wine tourism can serve as a marketing opportunity for wine producers to communicate with and even sell directly to their potential consumers. Previous studies discover that winery owners can strengthen consumer loyalty and deliver a positive brand image through on-site activities (Zamora and Bravo, 2005). Additional benefits such as diversifying the source of winery income and increasing the profit margin were also investigated by other researchers (Govindasamy and Kelley, 2014).

1.3 Research Design

Recognizing the high market potential, Mid-Atlantic wine industry urges wine market research on consumer preferences, to make cost-effective decisions. Although wine market research is an affordable option for some of the large wine enterprises; however, small or mid-sized wine enterprises most likely will not have access to consumer data specific to

their market due to lack of financial support. This study serves as a guide to help wine enterprises in the Mid-Atlantic region understand their target market and develop business strategies through the use of market segmentation based on wine consumption frequency.

Some previous studies perform market segmentation based on demographic, psychographic, and behavioral traits, but few of the studies focus on the Mid-Atlantic region. Even though Kelley *et al*. (2015) tried to categorize the residents of the Mid-Atlantic region into super core, core, and marginal wine consumers based on wine drinking frequency (including all national and imported wines), little is known specifically for wines produced in Mid-Atlantic states. However, considering its market share and reputation, the Mid-Atlantic wine industry needs to find its uniqueness and differentiate itself from the general wine market to stay competitive in the market. Simply targeting the general super cores can be misleading and less cost-effective. In comparison, this study profiles the target market specifically for wines that are produced by Mid-Atlantic states.

This research is comprised of three parts: I first follow the previous literatures, and segment the market based on frequency of wine consumption of all wines by profiling the super core wine consumers (wine drinkers who consume all kinds of wine more than once a week). Secondly, for each of New York, New Jersey, and Pennsylvania, I evaluate the current status and identify the target market for the local wine industry. When comparing the three states, I distinguish the differences between the states, extract the unique traits of the region, and make business suggestions for the Mid-Atlantic wineries. Finally, I examine

consumers' interests in winery tourism since wine tourism is one main wine marketing strategy. The objectives of the study are listed below:

- To profile the super core wine consumer who lives in the Mid-Atlantic region (consumers who drink wine from both Mid-Atlantic region and out of the region at least once a week) and then to examine the wine drinking and purchasing behaviors of these super core wine consumers.
- To profile the target market of each state of New York, New Jersey, and Pennsylvania, and then to find out the best grape variety and the best marketing strategy to reach the target market.
- To identify the characteristics of consumers who are interested in vineyard tours and then to investigate how each individual characteristic impacts a consumer's likelihood ratio to participate in such activities.

SECTION 2. LITERATURE REVIEW

2.1 Wine Market Segmentation

Although wine is a special product that is strongly associated with experience attributes prior to purchasing decisions (Speed, 1998; Lockshin & Hall, 2010), its primary marketing strategies are not much different from general marketing principles. According to Kotler (2003), wine marketing should use the most cost-effective way to communicate the brand's distinctive values with their target market. An effective wine marketing, thus, should deliver the proper product to the most suitable target population using the right channel and brand image. This triggers many wine marketing segmentation studies that are based on a consumer's demographic or geographic factors, behaviors (i.e. the frequency of drinking), and psychographic traits (i.e. wine drinking occasions and motivation) (Kotler and Keller, 2012).

Demographics is the easiest approach to identify and reach the target market. However, the results of this approach can hardly be explained (Kotler, 2003). Gjonbalaj *et al.* (2009) used this approach and concluded that variables such as gender, work status, geographic location, and income levels are statistically significantly associated with the frequency of wine purchase. Other studies support and extend Gjonbalaj's study and found that men, especially older men, consume wine much more frequently (Fotopoulos *et al*., 2002; Gjonbalaj *et al*., 2009, Guirao *et al*., 2001). Galloway *et al.* (2001) found that larger families consume less wine than those families that consist of two or three members.

In addition to the demographic approach that lacks a theory to explain the results, need groups showed a better understanding of the consumers. Need groups are built based on both demographic and psychographic characteristics (Kotler, 2003). Spawton (1991) identified four major segments based on consumer's expectations and risk-reduction strategies that could guide the wine industry to find their target consumers. The categories are *connoisseurs* (regular wine drinkers with higher level of wine knowledge and brand loyalty), *aspirational drinkers* (consumers how generally concerned about the social aspect of wine drinking), *beverage wine consumers* (wine consumers who only drink wines from their "safety brands" and are not likely to explore new options), and *new wine drinkers* (who do not have an established preference and are greatly influenced by their parents and peers). Bruwer *et al.* (2001) took a lifestyle approach and segmented the markets into five different types of consumers: "purposeful inconspicuous premium wine drinkers", "ritual oriented conspicuous wine enthusiasts", "enjoyment seeking social wine drinkers", "fashion/image oriented wine drinkers", and "basic wine drinkers".

Using a behavioral approach to segment the market, market analysts can make business suggestions based on common characteristics of each group. Kelley *et al.* (2015) performed market segmentation based on wine consumption frequency that separates the market into "super core" (more than once a week), "core" (about once a week), and "marginal" (less than once a week). Riviezzo *et al.* (2012) combined demographic factors into behavioral research, and segmented the market based on occasion and reasons to drink into 4 sectors:

- *Home Hedonists* are social-oriented consumers who are mainly middle-aged (34-55 years old) women, and received a tertiary education. They usually stay with their safety brands.
- *Image-Oriented Drinkers* are young (< 34 years old) male or female wine consumers who drink wine at restaurants and in public places. When they select wines, they pay attention to the places of origin and food pairing options and believe a positive relationship between wine quality and price. They actively searching for information and they are greatly influenced by the opinion leaders.
- *Eclectic Consumers* are usually well-educated middle aged (45-54 years old) wine consumers who drink wine as a natural and genuine habit. They usually have 2-3 safe brands and they make their purchase decision based on their past experience.
- *Conservative Consumers* are elder (>45 years old), lower educated wine consumers who drink wine very frequently. Consumers in this sector only drink wine from the same domestic brand and they do not seek information.

In addition to these traditional market segmentation studies, several factors that can determine purchase decisions are also studied. In their survey based research, Chrea *et al.* (2011) found that wine production region is the most important attribute followed by grape variety. In addition, they discovered that price and history of winning a wine competition are important factors for consumers, especially with limited knowledge. On the other hand, the level of wine knowledge is another important variable that has a direct relationship with wine consumption frequency. Consumers with high wine expertise purchase and drink

wine more frequently than those with less knowledge (Johnson and Bastain, 2007). Sources of wine knowledge have also been evaluated by previous literatures. Relying on the press as a source of wine knowledge shows a significant relationship with wine consumption while using TV/Radio programs does not (Gjonbalaj *et al.*, 2009).

Although previous studies perform market segmentation, few of these studies are geared toward Mid-Atlantic states. Although Kelley *et al.* (2015) performed a market segmentation based on wine drinking frequency, the study fails to succeed in highlighting the uniqueness of the region. This may not provide effective guide on the local industry.

2.2 Wine Tourism

Previous studies employ different approaches to studying wine tourism. Studies based on demographics found that the profile of wine tourists is similar to wine consumers. (Shor and Mansfeld, 2009). Mitchell, Hall, and McIntosh (2000) found that wine tourists are usually 30-50 years old, from moderate or higher income groups, and live close to wine regions. However, they also highlighted the potential difference in demographics in cultures and value systems. Thus, this study focuses directly on the local market of Mid-Atlantic region that eliminates differences in cultural background. Several other studies were conducted specifically to explore the difference among generations. Tavares and Azevedo (2011) suggested potential Generation X winery visitors from Napa Valley have higher expectations for the quality of wine. Both Generation X and Y value winery staff and interior of the winery rooms as the most important attributes. Wolf, Carpenter, and

Qenani-Petrela (2005) found Generation Y are more likely to purchase new world wines while Generation X and Baby Boomers prefer prestige brands. In addition, studies show family composition and social group affiliation also affect wine tourism participation. Winery visitors are usually couples without children, especially when their spouses are also wine lovers and are members of wine organizations (Shor and Mansfeld, 2009).

Some other factors relating to wine tourism are also discussed by previous studies. Involvement with wine is a critical aspect when understanding consumer behaviors in wine tourism (Yuan *et al.*, 2008). Previous studies show there is a positive relationship between the level of wine knowledge and involvement with wine. Johnson and Bastain (2007) found that high wine expertise consumers purchase more wine and drink wine more frequently than those with less knowledge. Individuals who drink wine on a regular basis and have an average or extensive level of wine knowledge usually engage in wineries visits several times a year (Mitchell *et al*., 2000). Several studies investigate the relationship with wine tourism (Lockshin and Spawton, 2001; Mitchell *et al.*, 2012). Mitchell and Hall (2004) found winery visitors with intermediate or advanced wine knowledge have higher brand loyalty while wine organization involvement and consumer personal cellar sizes are also associated with the level of knowledge (Mitchell and Hall, 2001).

Nella and Christou (2014) found that previous wine tourism experiences and on-site purchases are associated with wine involvement. Additionally, highly involved visitors are more likely to make a repeat visit to the winery. A study conducted by Shor and Mansfeld (2009) on Israel wine supports Nella and Christou's argument. They found most of the

winery visitors have previous experience with winery tourism and they drink wine frequently (on average 2.83 glasses a week). The top three wine drinking occasions of a winery visitor are also identified as festive meals, meals at restaurants, and at family or special events.

Stoddard and Clopton (2015) compared new and repeat visitors in their study. They found that older winery visitors who seek relaxation or visits family or friends are more likely to become a repeat visitor while a first-time visitor will explore more activities. Winery websites tend to be more influential to new winery visitors, while magazines, publicity, and wine brochures were more effective toward returning visitors. Comparable results were shown in previous studies (Gitelson and Crompton, 1984; Oppermann, 1997).

Although wine tourism is studied internationally, few studies have been conducted in the Mid-Atlantic wine production region. An industry assessment that was conducted in Pennsylvania on agritourism found that winery/brewery tours are the most popular agri-educational activity among 311 survey respondents (Ryan *et al.*, 2006). Most agritourism participants are from a 50-mile radius and use Internet as the primary source of knowledge when they plan a trip.

Govindasamy & Kelley (2014) conducted an econometric analysis of Delaware, New Jersey and Pennsylvania wine tasting activities. They found individuals who are aged above 50 years old, higher educated, and self-employed are more likely to participate in on-site wine tasting events. The newspaper is an effective media source to reach these

agritourism activities participants. They also found that wine tourists think that products which are sold “on-farm” offer better variety and prices.

In summary, previous studies use demographics, involvement with wine, level of wine knowledge, previous experience with wine tourism and wine drinking occasions to explain behaviors of wine tourism participants. Many of these studies made business suggestions to wineries within the region of their study. However, because of the limited number of studies, little is understood in Mid-Atlantic wine production region. Seeing the need of wine tourism participants studies, I specifically focused and uses market segmentation towards the specific Mid-Atlantic region.

SECTION 3. METHODOLOGY

3.1 Source of Data

A consumer survey approach is token in this study. The data was collected through two, separate 15-minute Internet surveys designed and distributed by Pennsylvania State University: 20-25 September 2013 (phase I) and 22-24 October 2014 (phase II). The two phases are two distinguished, cross-sectional data that each had different survey questions, objectives, and survey participants. The second stage is the one used in this study.

The survey was administered to Survey Sampling International, LLC (Shelton, CT) panelists residing in three states (New Jersey, New York, and Pennsylvania) in the Mid-Atlantic region. Panelists were screened for the following features, not being a member of the wine industry, being at least 21 years old, residing in one of the targeted states, and having purchased and drank wine at least once within the previous year. Surveys were pre-tested on a subset (n=98) of the target consumers. During survey distribution, 1,280 participants opened and attempted the survey, with 977 qualifying and completing the survey. A one-dollar incentive was offered to encourage participation.

3.2 Two-way Contingency Tables and Chi-square Tests for Independence

Two-way contingency tables and chi-square test for independence are used to explore and identify the characteristics of super core wine consumers because most of the variables are categorical. A two-way contingency table provides a clear, straightforward representation of data that can be easily interpreted. A chi-square test for independence

investigates the relationship between demographic, behavioral and knowledge attributes of an individual and role as they play super core wine consumer.

The chi-square test for independence can be applied to nominal and ordinal data that are discrete and have limited number of categories. It can be done through a two-way contingency table. Assuming in a $r \times c$ table, there are N samples in total. The expected frequency $E_{i,j}$ of the cell in the ith row and jth column is given by:

$$E_{i,j} = N p_i p_j$$

Where p_i and p_j are the probability of the ith row and jth column. The probabilities based on the observation frequency O can be calculated from:

$$p_j = \sum_{j=1}^{c} \frac{O_{i,j}}{N}$$

for the row by summing the columns together, and

$$p_i = \sum_{i=1}^{r} \frac{O_{i,j}}{N}$$

for the column. To test for independence, the χ^2 is calculated by:

$$\chi 2 = \sum_{i=1}^{r} \sum_{j=1}^{c} \frac{(O_{i,j} - E_{ij})^2}{E_{ij}}$$

$$= \sum_{i=1}^{r} \sum_{j=1}^{c} N p_i p_j \frac{\left(N \left(\frac{O_{i,j}}{N}\right) - N p_i p_j\right)^2}{(N p_i p_j)^2}$$

$$= \mathrm{N} \sum_{i,j} p_i p_j \left(\frac{\left(\frac{O_{i,j}}{N}\right) - p_i p_j}{p_i p_j} \right)^2$$

where $\chi 2 = 0$ if and only if $O_{i,j} = E_{i,j}$ for all i and j.

3.3 The Logistic Regression Model

Logistic regression models are used to identify the profile of super core wine consumers and those who are interested in wine tourism. The use of logistic regression model is because 1) the dependent variables are binary; 2) the causal relationship between the independent variables and the dependent variable need to be examined for each model; 3) it is possible to predict the effects of changes in independent variables on the probability of the dependent variables; and 4) comparing to the simple probabilistic model, a logistic regression model can restrict the predicted probability between one and zero (Govindasamy and Kelley, 2014).

Logistic regression model converts the dependent variable into its logarithmic odd ratios. Assume the probability of a binary dependent variable Y to be true is P_Y, and the probability for Y to be false is $1\text{-}P_Y$, then a logistic regression model can be written in a relationship with k independent variables x and coefficients β of the independent variables:

$$F(x) = logit(Y) = ln\left(\frac{P_Y}{1 - P_Y}\right) = \beta_0 + \sum_{i=1}^{k} \beta_i x_i + \varepsilon$$

A logistic regression model estimates the coefficients β of the independent variables in a linear way. Estimated coefficients should best explain the dependent variable given the current independent variables. Once the coefficients are estimated, a predicted value based on independent variable values of each sample can be calculated. For the jth sample of the total n samples, the predicted value can be calculated:

$$\widehat{F(x)}_j = logit\left(\widehat{Y}_j\right) = ln\left(\frac{P_{\hat{Y}_j}}{1 - P_{\hat{Y}_j}}\right) = \beta_0 + \sum_{i=1}^{k} \beta_i x_{ij} + e$$

With the predicted value of $\widehat{F(x)}_j$, $P_{\hat{Y}_j}$ can also be observed using the following equation:

$$P_{\hat{Y}_j} = \frac{\exp(\widehat{F(x)}_j)}{1 + \exp(\widehat{F(x)}_j)} = \frac{1}{\exp\left(-\widehat{F(x)}_j\right) + 1}$$

However, marginal effect of x_i on $P_{\hat{Y}_j}$ remains unclear. In fact, the margin can be calculated through,

$$\frac{\delta P_{\hat{Y}_j}}{\delta x_{ij}} = \frac{\beta_i \exp\left(-\widehat{F(x)}_j\right)}{\left(1 + \exp\left(-\widehat{F(x)}_j\right)\right)^2}$$

or if the independent variable is discrete,

$$\frac{\delta P_{\hat{Y}_j}}{\delta x_{ij}} = P_{\hat{Y}_j}\left(x_{ij} = 1\right) - P_{\hat{Y}_j}\left(x_{ij} = 0\right).$$

3.3.1 Super Core Wine Consumer Logistic Regression Model

The design of the framework for the model is based on factors that are learned from the literature review with minor justification based on the survey design. The factors include: demographics and geographical location ("Demographics"), sources of wine knowledge ("Knowledge"), wine drinking occasions ("Occasion"), and wine purchasing behaviors ("Behaviors"). Each factor serves as a group of independent variables (names in parentheses are the category names). Specifically, group "Demographics" includes aspects such as gender, age, annual household income, marital status, level of education, health limitation to drink wine and the primary residency of a survey respondent from the New York, New Jersey, Pennsylvania tristate area. Category "Behaviors" includes household wine purchasing behaviors (*Purchase*), percentages of purchase that are made in different sizes of bottles (*Bottle*) and types of wine (red, white, and rose) (*Type*), and previous

purchase of wine because part of the profit was donated to a non-profit organization (*Donation*). Sources of wine knowledge (or category "Knowledge") are used as a substitute to level of wine knowledge. The different wine drinking occasions in category "Occasion" represents a wine consumer' lifestyle. The detail for wine drinking occasions and source of wine knowledge is provided in the results section.

This model is built and analyzed in LIMDEP Nlogit software.

$$logit(\text{super core}) = ln\left(\frac{P_{super\ core}}{1-P_{super\ core}}\right) = \alpha + \delta_1 Gender + \delta_2 Age + \delta_3 Income + \delta_4 Marital\ Status + \delta_5 Education + \delta_6 Residency + \delta_7 Limit + \sigma_i Occasion + \gamma_k Knowledge + \beta_1 Purchase + \beta_2 Bottle + \beta_3 Type + \beta_4 Donation + \varepsilon$$

3.3.2 Wine Tourism Logistic Regression Model

The purpose of this model is to identify characteristics of Mid-Atlantic vineyard tourism target consumers. The dependent variable, *Tour,* is a binary variable which indicates whether a consumer is interested in winery or vineyard tours. Based on the objectives and previous studies on wine tourism and wine consumer behaviors, five groups of independent variables are selected from the survey data. The groups are listed with their names in parentheses: demographics ("Demographics"), wine consuming occasions ("Occasion"), sources of wine knowledge ("Knowledge"), wine purchasing and drinking behaviors ("Behaviors"), and past experience with a New Jersey, New York, or a Pennsylvania winery ("Experience"). Group "Demographics" includes gender, age, income, marital status, the level of education, and primary residency of a respondent.

Similar to the super core model, category "Knowledge" is used in place of the level of wine knowledge. Category "Behaviors" covers a range of different purchasing behaviors of a respondent. Variable *Purchase* indicates the occasions when wine purchases are made for households. *Bottle* and *Type* are two variables which indicate the percentage of purchases that are made in different bottle sizes and in different wine types (red, white, and rosé). Wine drinking frequency (*Frequency*) of a respondent is also included in the "Behaviors" category. Detail of variables that are selected for group "Knowledge", "Occasion", and "Experience" will be provided in the results section. In addition, an interaction term between variable *Purchase* and one variable (which represents whether a consumer drinks wine as an everyday beverage) from group "Occasion" is also created to eliminate collinearity between the two variables.

When constructing the logistic regression model, I used software NLogit, a premier statistical package for logistic model estimation from LIMDEP.

$$\text{logit}(Tour) = \ln\left(\frac{P_{TOUR}}{1-P_{TOUR}}\right) = \alpha + \delta_1 Gender + \delta_2 Age + \delta_3 Income + \delta_4 Marital\ Status + \delta_5 Education + \delta_6 Residency + \sigma Occasion + \gamma Knowledge + \beta_1 Purchase + \beta_2 Bottle + \beta_3 Type + \beta_1 Donation + \beta_1 Frequency + \theta Purchase \times Occation + \varepsilon Experience + \varepsilon$$

3.4 The Decision Tree Model

In addition to descriptive statistics, to characterize the target market for each of the three states, decision tree approach is used. Decision trees use learning algorithms that

define the best splits at each internal node. A decision tree is graphically presented by levels of nodes. The tree starts from a root node that usually stays at the top, and then splits into two or more children nodes (subgroups). Each child can become a parent node that allows further separation. A node becomes a leaf node when it cannot be separated anymore. Each leaf node is at the bottom of the tree and has exactly one parent and no children.

A classical approach to construct the tree and define the splits at each internal node is to use information criteria. This approach requires the training data to well represent the population. With statistical inferences, a learning algorithm can extract features of the training data that allows prediction in the future. It evaluates and compares the quality of a variable through a measure of information content. Mathematically, if each there are *n* different values in *v* and $P(v_i)$ is the probability where the *i*th value of v will occur, then the information content is calculated by

$$I\big(P(a_1)\dots P(a_n)\big) = \sum_{i=1}^{n} -P(a_i)\log_2 P(a_i)$$

The decision tree learning algorithm simply uses percentage when approximating the probability of each attribute. Assume the dependent variable only has two categories (true and false). if there are *t* examples where the dependent is true and *f* examples where dependent is false in the training group, then the information provided is calculated by

$$I\left(\frac{t}{t+f},\frac{f}{t+f}\right) = -\frac{t}{t+f}\log_2\frac{t}{t+f} - \frac{f}{t+f}\log_2\frac{f}{t+f}$$

When constructing the decision tree, the classical classification algorithm tries to maximize information gain, the amount of information acquired by employing one

additional variable. Assume that after selecting variable *v*, the data needs to be further split into subsets depending on *k* different values of *v'*. If the *j*th value of *v'* has t_j cases that makes the dependent be true, and f_j cases that makes the dependent be false, then the information gain is calculated by

$$Gain(v') = I\left(\frac{t}{t+f}, \frac{f}{t+f}\right) - \sum_{j=1}^{k} -P\left(\frac{t_j + f_j}{t+f}\right) \log_2 P\left(\frac{t_j + f_j}{t+f}\right)$$

A decision tree is specialized in handling categorical data. Compared to a logistic regression model, a decision tree brings huge advantages. One major advantage is its fast implementation. The variable selection is completely automatic at the same time when fitting a decision tree model to its training data (Deshpande, 2011). Additionally, decision trees require much less efforts in data preparation. Missing data are also well handled. Normalization or scaling is not required prior to fitting the tree. The model is also insensitive to outliers as the splits are made based on proportion of samples instead of on absolute values (Deshpande, 2011). When working with survey data, the tree can also eliminate the creation of excessive dummy variables for multinomial data as each category are assigned to the subgroup that optimize the model. Moreover, the model does not assume linear relationships between the variables in oppose to the requirement of a logistic model.

The decision tree model makes as good prediction just as what a logistic regression can do. Unlike some other machine learning algorithm (i.e. neuron networks), decision

trees are highly interpretable. Its graphical representation also enables non-technical audience to understand (SPSS Decision Trees, 2016).

Despite its enormous advantages, a decision model has a risk of being overfitting. Overfitting happens when the model is over fit the current training set that fails to generalize. Several pruning methods are designed to avoid the appearance of overfitting. In this work, I chose to chi-pruning and cross-validation as ways to avoid overfitting.

I use SPSS as the primary software to construct the decision tree as SPSS has one of the best graphical representation of the tree. Exhaustive CHAID (Exhaustive Chi-squared Automatic Interaction Detection) is chosen to be the growing method. A growing method is an algorithm that determines how the nodes are chosen on a decision tree. According to SPSS official website, there are four growing methods they offer: CHAID, Exhaustive CHAID, C&RT, and QUEST. Amongst, CHAID (Chi-squared Automatic Interaction Detection) and Exhaustive CHAID are very similar, while Exhaustive CHAID is "a modification of CHAID algorithm which examines all possible splits for each predictor" (SPSS Decision Trees, 2016). Both CHAID and Exhaustive CHAID use chi-squares to suggest information gain and they allow fast computation. They are also able to generate non-binary trees that impossible for C&RT and QUEST. Allowing multi-way growth can generate interesting results when the predictor variables (i.e. age, income, education, etc.) have more than two categories. If some categories show no differences in the outcome, then they are collapsed together (IBM Knowledge Center, 2012). Compared to CHAID, Exhaustive CHAID explores all possible splits for every predictor. The tree will be more

comprehensive and more hidden characteristics can be entitled. On the other hand, Classification and Regression trees (C&RT) construct "a complete binary tree algorithm that partitions data and produces accurate homogeneous subsets" (SPSS Decision Trees, 2016) while QUEST "selects variables without bias and builds accurate binary trees quickly and efficiently" (SPSS Decision Trees, 2016). I did not choose C&RT and QUEST primarily because 1) Exhaustive CHAID is still a very time efficient algorithm; 2) I value Exhaustive CHAID as a multi-way tree algorithm, which is not allowed in C&RT and QUEST. Table 1 compares different growing methods. Notably, I used the same algorithm and predictors, for better comparison between the models.

Table 1: Features of Decision Tree Growing Methods

Source: IBM Knowledge Center. (2012).

Feature	**CHAID[1]**	**CRT**	**QUEST**
Chi-square-based[2]	X		
Surrogate independent (predictor) variables		X	X
Tree pruning		X	X
Multiway node splitting	X		
Binary node splitting		X	X
Influence variables	X	X	
Prior probabilities		X	X
Misclassification costs	X	X	X
Fast calculation	X		X

* **Notes**: 1. Includes Exhaustive CHAID.
2. QUEST also uses a chi-square measure for nominal independent variables.

When configuring the decision tree model, I let the tree fully grow to observe more characteristics of the target market. I set the maximum depth of the tree at 100 levels. Both the minimum parent and child size are 30, which is the number of samples required

to become statistically significant. To avoid overfitting, I used cross-validation that could significantly improve the model.

The decision model generally follows the structure of the Super Core Logistic Regression model despite some minor modifications. The dependent variable, $Target_{state'}$ indicates whether a consumer lives in New Jersey, New York, or Pennsylvania belong to the target wine market from the specified state. The target market of a state consists of consumers who drink wine from that state for more than or equal to once a month. The target market is defined as such because: 1) once a month is the optimal point that can evenly split the respondents into two groups (target market and non-target market); and 2) once a month is also one of the most reasonable options that define wine drinking frequency. Among the three states, New York produces the most wine which constitutes about 4% of total wine production in 2016**.** Assuming all target market of New York wine are super core wine consumers and they drink one bottle each time, there would be only 0.62 bottle per month coming from New York if each wine drinker buys wine based on U.S. wine production by state. Similarly, New Jersey and Pennsylvania, which produce less wine, can greatly benefit from targeting consumers who drink their wine once or more than once a month. For the independent variables, Super Core, dependent variable of the first approach to the model. Instead of using continuous data for percentage purchased in difference bottle sizes and types of wine, the following binary variables are used instead:

$$\text{Bottle}_{\text{750ml or less}} = \begin{cases} 1 & \geq 50\% \text{ of sum of percentage purchase in 750ml bottles and smaller} \\ 0 & otherwise \end{cases}$$

$$\text{Type}_{red} = \begin{cases} 1 & \geq 50\% \text{ of purchase is red wine} \\ 0 & otherwise \end{cases}$$

$$\text{Type}_{rose} = \begin{cases} 1 & \geq 50\% \text{ of purchase is rose wine} \\ 0 & otherwise \end{cases}$$

$$\text{Type}_{white} = \begin{cases} 1 & \geq 50\% \text{ of purchase is white wine} \\ 0 & otherwise \end{cases}$$

Integrating the independent and dependent variables together, the model is:

$$\text{Target}_{State} = f(SuperCore, Bottle, Type, Knowledge, Occasion, Gender, Age, Residency, MaritalStatus, Education, Income, Limitations, Family_{DrinkWine}, Donation, SuperCore)$$

Table 2: Decision Tree Dependent Variable Selection

Source: Author

Times Drinking Wine/ Week	**Times Drinking Wine/ Month**	**Times NJ Wine / Week (at NJ Wine Market Share)**	**Times NY Wine / Week (at NY Wine Market Share)**	**Times PA Wine / Week (at PA Wine Market Share)**
7	28	0.01	1.12	0.02
6	24	0.01	0.96	0.02
5	20	0.01	0.80	0.02
4	16	0.01	0.64	0.01
3	12	0.01	0.48	0.01
2	8	0.00	0.32	0.01
1	4	0.00	0.16	0.00
Average	16	0.01	0.64	0.01

SECTION 4. RESULTS

4.1 Descriptive Statistics

4.1.1 Survey Profile

Of the 977 participants who met the criteria and completed the survey, responses to demographic questions include: 62% were female (Table 3), with a nearly equal distribution among age ranges. Most respondents resided in New York (48%), and, of those who provided a response to the question regarding marital status, 60% were married or in a partnership. When answering the question regarding their level of education and household income, 39% (n=972) had a bachelor's degree and 18% had a master's degree or above, while more than half of the participants had an annual household income of less than $76,000 (n=971).

4.1.2 Super Core Consumer Profile and Characteristics

Two-way contingency tables and chi-square tests for independence are used when profiling super core wine consumers (Table 4). The chi-square test shows that gender, age, marital status, and income were strongly associated with being a super core wine consumer ($p<0.05$), while residency is only significant at 10% significant level. Education, unfortunately, does not show a significant relationship with being a super core consumer. When looking at the horizontal percentage (because super core and non-super cores are evenly distributed), males (56% of all male participants) appear to be more likely to be a

super core wine consumer than females (44% of all female participants). This finding agrees with Fotopoulos (2002), Gjonbalaj (2009), and Guirao (2001).

Table 3: Survey Respondents Demographic Profile

Source: Author

	Freq.	%
Gender (n=977)		
Female	372	38.10%
Male	605	61.90%
Age Groups (n=977)		
21 - 24 years old	175	17.90%
25 - 34 years old	215	22.00%
35 - 44 years old	204	20.90%
45 - 64 years old	208	21.30%
> 65 years old	175	17.90%
Residency (n=977)		
New Jersey	235	24.10%
New York	465	47.60%
Pennsylvania	277	28.40%
Marital Status (n=970)		
Married or in a partnership	588	60.60%
Single	285	29.40%
Separated or Divorced	69	7.10%
Widower	28	2.90%
Education (n=972)		
Some high school	140	14.40%
Some college/technical school	187	19.20%
Associate degree/technical school graduate	97	10.00%
Bachelor's degree	374	38.50%
Master's degree or higher	174	17.90%
Annual Income (n=971)		
< $25,000	99	10.20%
$25,000 - $ 49,999	200	20.60%
$50,000 - $75,999	210	21.60%
$76,000 - $99,999	150	15.40%
$100,000 - $150,000	189	19.50%
$150,000 - $200,000	71	7.30%
> $200,000	52	5.40%

In terms of age, participants with age 25 to 64 are more likely to be super core wine consumers since super core consumers are dominating these categories. Category “Age 45 to 64 years old” has the most super core consumers percentagewise (7.69% difference between super cores and non-super cores). Pertaining to residency, participants who live

in New Jersey are more likely to be super core wine consumers (7% difference), while New York (-3% difference), and Pennsylvania (-13% difference) are non-super core dominating.

Table 4: Super Core Cross-tab with Demographic Variables

Source: Author

	Super Core		Non-Super Core		Difference[2]	χ^2
	Freq.	%[1]	Freq.	%[1]		
Gender						
Male (n=372)	207	55.65%	165	44.35%	11.29%	12.579
Female (n=605)	266	43.97%	339	56.03%	-12.07%	(0.000)
Total (n=977)	473	48.41%	504	51.59%	-3.17%	
Age Groups						
21 - 24 years old (n=175)	61	34.86%	114	65.14%	-30.29%	19.905
25 - 34 years old (n=215)	113	52.56%	102	47.44%	5.12%	(0.001)
35 - 44 years old (n=204)	109	53.43%	95	46.57%	6.86%	
45 - 64 years old (n=208)	112	53.85%	96	46.15%	7.69%	
> 65 years old (n=175)	78	44.57%	97	55.43%	-10.86%	
Total (n=977)	473	48.41%	504	51.59%	-3.17%	
Residency						
New Jersey (n=235)	126	53.62%	109	46.38%	7.23%	5.037
New York (n=465)	226	48.60%	239	51.40%	-2.80%	(0.081)
Pennsylvania (n=277)	121	43.68%	156	56.32%	-12.64%	
Total (n=977)	473	48.41%	504	51.59%	-3.17%	
Marital Status						
Married or in a partnership (n=588)	314	53.40%	274	46.60%	6.80%	14.779
Single (n=285)	118	41.40%	167	58.60%	-17.19%	(0.002)
Separated or Divorced (n=69)	27	39.13%	42	60.87%	-21.74%	
Widower (n=28)	11	39.29%	17	60.71%	-21.43%	
Total (n=970)	470	48.45%	500	51.55%	-3.09%	
Education						
Some high school (n=140)	64	45.71%	76	54.29%	-8.57%	7.426
Some college/technical school (n=187)	80	42.78%	107	57.22%	-14.44%	(0.115)
Associate/technical school graduate (n=97)	41	42.27%	56	57.73%	-15.46%	
Bachelor (n=374)	194	51.87%	180	48.13%	3.74%	
Master (n=174)	92	52.87%	82	47.13%	5.75%	
Total (n=972)	471	48.46%	501	51.54%	-3.09%	
Annual Household Income						
> $25,000 (n=99)	35	35.35%	64	64.65%	-29.29%	21.461
$25,000-$49,999 (n=200)	84	42.00%	116	58.00%	-16.00%	(0.002)
$50,000-$75,999 (n=210)	100	47.62%	110	52.38%	-4.76%	
$76,000-$99,999 (n=150)	81	54.00%	69	46.00%	8.00%	
$100,000-$150,000 (n=189)	111	58.73%	78	41.27%	17.46%	
$150,000-$200,000 (n=71)	32	45.07%	39	54.93%	-9.86%	
> $200,000 (n=52)	29	55.77%	23	44.23%	11.54%	
Total (n=971)	472	48.61%	499	51.39%	-2.78%	

*** Notes**: 1. Percentage of rows. 2. The difference in percentage of the row between super core and non-super core consumers. 3. Sum of Super Core and Non-Super Core consumers equals to numbers of survey participants in table 3.

In the case of marital status, married couples are more likely to become super core consumers (7% difference) while the other categories in marital status have more non-super core consumers than super core consumers percentage wise. In term of level of education, despite its insignificant association, participants with a master's degree or above are most likely to be super core wine consumers (6% difference), followed by consumers with a bachelor's degree (4% difference). Participants with educational level less than having a bachelor's degree are more likely to be non-super core consumers. Besides education, higher income groups also have more super core survey participants. Most super core consumers are in the range of $100,000-$150,000 (17.6% difference) percentagewise, followed by $200,000 or greater (11.54% difference), and $76,000-$99,999 (8.00%). Other income categories had a negative difference between the percentage of super core wine consumers and non-super core wine consumers.

In addition to demographics, behavioral attributes are also investigated. These attributes include: how sources of wine knowledge, wine drinking occasions, and purchase preference can influence the likelihood of being a super core wine consumer. There are strong associations ($p<0.05$) detected between sources of wine knowledge and being a super core wine consumer. According to the two-way contingency table, learning about wine by reading wine magazines leads to a more super core wine consumers (40% difference), while those who do not read wine magazine are more likely to be non-super core wine consumers (-16% difference). Wine consumers who use food and cooking magazine as a source of wine knowledge (11% difference) are more likely to be super core

wine consumers compared to those who do not use the magazines as a source (-10% difference). Interestingly, fewer super core wine consumers learn about wine from their family and friends (-7.8% difference). Participants who obtain wine knowledge from winery tasting staff (7% difference) or newspaper articles (31% difference) are also more likely to be super core wine consumers compared to those who do not use these two sources (-11% and -9 % difference, respectively). Learning about wine through wine and liquor store employees ($p=0.370$), social media ($p=0.109$), or through TV or a radio program ($p=0.424$) do not show a strong association. Local or regional magazines ($p=0.052$) have the association at 90% confident level.

Except for drinking wine for special occasions ($p=0.201$), all other wine drinking occasions have a significant ($p<0.05$) relationship with being a super core wine consumer. The two-way contingency table shows that less super core consumers than non-super core consumers drink everyday wine (-0.1% difference) or give out wines as gifts (-1.7%) proportionally. For Bring Your Own (BYO) wine restaurants, a higher proportion of super cores are seen.

In terms of wine purchasing behaviors, attribute profit donation has a significant chi-square value ($p=0.000$). More super cores (20% difference) have purchased a bottle of wine in which part of the proceeds of the wine were ear marked for a non-for-profit organization in the past. On the other hand, category “purchase for household wine” shows a higher proportion of super cores in everyday wine purchase only (10% difference) and both everyday wine purchase and for special occasion (7% difference)

wines for their households. Making purchase of wines for household for special occasions only produces a less super core consumers than non-super cores (-74% difference). Purchase for household wine also has a significant relationship with being a super core consumer.

Table 5: Sources of Wine Knowledge Cross-tab with Super Core

Source: Author

	Super Core		Non-Super Core		Difference[2]	$\chi 2$
	Freq.	1%	Freq.	%[1]		
Through Wine Magazines						
Yes (n=220)	154	70.00%	66	30.00%	40.00%	58.73
No (n=757)	319	42.14%	438	57.86%	-15.72%	(0.000)
Through Food and Cooking Magazines						
Yes (n=316)	176	55.70%	140	44.30%	11.39%	12.818
No (n=661)	297	44.93%	364	55.07%	-10.14%	(0.002)
Through Family and Friends						
Yes (n=744)	343	46.10%	401	53.90%	-7.80%	6.686
No (n=223)	130	55.79%	103	44.21%	11.59%	(0.035)
Through Wine and Liquor Store Employee						
Yes (n=532)	257	48.31%	275	51.69%	-3.38%	1.989
No (n=445)	216	48.54%	229	51.46%	-2.92%	(0.370)
Through Winery Tasting Staff						
Yes (n=426)	228	53.52%	198	46.48%	7.04%	20.234
No (n=551)	245	44.46%	306	55.54%	-11.07%	(0.000)
Through Local or Reginal Magazines						
Yes (n=133)	77	57.89%	56	42.11%	15.79%	5.918
No (n=844)	396	46.92%	448	53.08%	-6.16%	(0.052)
Through Newspaper Article						
Yes (n=141)	92	65.25%	49	34.75%	30.50%	21.305
No (n=836)	381	45.57%	455	54.43%	-8.85%	(0.000)
Through Social Media						
Yes (n=180)	96	53.33%	84	46.67%	6.67%	4.424
No (n=797)	377	47.30%	420	52.70%	-5.40%	(0.109)
Through TV or Radio Program						
Yes (n=130)	56	43.08%	74	56.92%	-13.85%	1.715
No (n=847)	417	49.23%	430	50.77%	-1.53%	(0.424)
Total (n=977)	473	48.41%	504	51.59%	-3.17%	

Table 6: Wine Drinking Occasion Cross-tab with Super Core

Source: Author

	Super Core		Non-Super Core		Difference[2]	$\chi 2$
	Freq.	**%[1]**	**Freq.**	**%[1]**		
Everyday Wine (n=919)	459	49.95%	460	50.05%	-0.11%	37.650 (0.000)
Wine for Special Occasion (n=952)	460	48.32%	492	51.68%	-3.36%	3.209 (0.201)
Give Out Wine as Gifts (n=942)	463	49.15%	479	50.85%	-1.70%	6.299 (0.043)
Brings Wine to Bring Your Own (BYO) Restaurants (n=904)	457	50.55%	447	49.45%	1.11%	39.366 (0.000)
Total (n=977)	473	48.41%	504	51.59%	-3.17%	

* **Notes:** 1. Percentage of rows. 2. The difference in percentage of the row between super core and non-super core consumers.

Table 7: Wine Purchasing Behaviors and Preferences Cross-tab with Super Core

Source: Author

	Super Core		Non-Super Core		Difference[2]	$\chi 2$
	Freq.	**%[1]**	**Freq.**	**%[1]**		
Purchase due to Profit Donation						
Yes (n=263)	158	60.08%	105	39.92%	20.15%	21.397
No (n=700)	310	44.29%	390	55.71%	-11.43%	(0.000)
Total (n=963)	468	48.60%	495	51.40%	-2.80%	
Purchase for Household Wine						
"Everyday" wine only (n=167)	92	55.09%	75	44.91%	10.18%	72.969
Special occasions only (n=125)	16	12.80%	109	87.20%	-74.40%	(0.000)
Both "everyday" and special occasion (n=685)	365	53.28%	320	46.72%	6.57%	
Total (n=977)	473	48.41%	504	51.59%	-3.17%	

* **Notes**: 1. Percentage of rows. 2. The difference in percentage of the row between super core and non-super core consumers.

To summarize, gender, age, marital status, income, sources of learning about wine, occasions to drink wine, and wine purchase preferences are all strongly associated with being a super core wine consumer. The results suggest that males and married participants are more likely to become super core wine consumers. On the other hand, as age increases, consumers are more likely to become super core wine consumers; however, when they reach 65 years old, one is more likely to become a non-super core wine consumer. In terms

of annual household income, higher income leads to a higher proportion of super core consumers.

4.1.3 New York, New Jersey, Pennsylvania Wine Target Market Profile and Characteristics

Table 8 illustrates the distribution of New York, New Jersey, and Pennsylvania wine drinking frequency. Among all participants who indicated they consumed wines from New Jersey, New York, and Pennsylvania, about half of the respondents drank less than once a month for each of the three states. This indicates that separating the target market by drinking frequency once a month fits the data. In addition, New York wines consumers drink more frequently than the other two states.

Table 8: New York, New Jersey, and Pennsylvania Wine Drinking Frequency by State

Source: Author

	New Jersey		**New York**		**Pennsylvania**	
	Freq.	**%[1]**	**Freq.**	**%[1]**	**Freq.**	**%[1]**
Daily	32	4%	26	3%	20	3%
A few times a week	41	6%	92	12%	52	7%
About once a week	57	8%	89	12%	69	10%
Two to three times a month	78	11%	125	17%	89	12%
About once a month	77	11%	113	15%	99	14%
A few times a year	189	26%	206	27%	180	25%
About once a year	245	34%	100	13%	213	30%
Total	719	100%	751	100%	722	100%

The demographic profile of New York, New Jersey, and Pennsylvania wine target market shows similar distribution as the survey profile. Females, living in New York State,

married, with a bachelor's degree are the most common categories. Similarly, age and income also are evenly distributed regardless of small differences.

Table 9: New York, New Jersey, and Pennsylvania Wine Target Market Profile

Source: Author

	NJ Target Market		NY Target Market		PA Target Market	
	Freq.	**%**	**Freq.**	**%**	**Freq.**	**%**
Gender						
Female	155	0.544	263	0.591	183	0.556
Male	130	0.456	182	0.409	146	0.444
Total	285		445		329	0.556
Age Groups						
21 - 24 years old	66	0.2316	94	0.2112	74	0.2249
25 - 34 years old	87	0.3053	111	0.2494	98	0.2979
35 - 44 years old	69	0.2421	99	0.2225	81	0.2462
45 - 64 years old	40	0.1404	78	0.1753	47	0.1429
> 65 years old	23	0.0807	63	0.1416	29	0.0881
Total	285		445		329	
Residency						
New Jersey	91	0.3193	71	0.1596	58	0.1763
New York	133	0.4667	274	0.6157	141	0.4286
Pennsylvania	61	0.214	100	0.2247	130	0.3951
Total	285		445		329	
Marital Status						
Married or in a partnership	178	0.6268	274	0.6185	210	0.6442
Single	91	0.3204	131	0.2957	96	0.2945
Separated or Divorced	12	0.0423	28	0.0632	15	0.046
Widower	3	0.0106	10	0.0226	5	0.0153
Total	284		443		326	
Education						
Some high school	43	0.1509	69	0.1551	53	0.1611
Some college/technical school	51	0.1789	80	0.1798	61	0.1854
Associate degree/technical school graduate	30	0.1053	42	0.0944	36	0.1094
Bachelor's degree	119	0.4175	180	0.4045	135	0.4103
Master's degree or higher	42	0.1474	74	0.1663	44	0.1337
Total	285		445		329	
Annual Income						
< $25,000	29	0.1018	55	0.1236	29	0.0884
$25,000 - $ 49,999	57	0.2	85	0.191	72	0.2195
$50,000 - $75,999	62	0.2175	93	0.209	82	0.25
$76,000 - $99,999	56	0.1965	81	0.182	58	0.1768
$100,000 - $150,000	55	0.193	85	0.191	59	0.1799
$150,000 - $200,000	16	0.0561	29	0.0652	15	0.0457
> $200,000	10	0.0351	17	0.0382	13	0.0396
Total	285		445		328	

Survey participants were surveyed about their opinion towards New York, New Jersey, and Pennsylvania wines. Table 10 lists the responses from consumers who belong to the target market (drink wine from each Mid-Atlantic state for more than once a month). In terms of consumer retention rate, 47% of New Jersey target respondents indicate they will continue to purchase New Jersey wines, which is much lower than the rate of New York wines (70%). Pennsylvania wines have a 53% retention rate.

The associated effects of New Jersey low consumer retention rate (<50%) can also be seen in respondents' answers to other questions: only 36% will recommend New Jersey wine to others (rank #5), and 28% of the target consumers consider New Jersey wine as their favorites (rank #7). This shows New Jersey wine does not have a high level of consumer loyalty nor does it have a good reputation. New York, by contrast, has much better results: 58% claim they will recommend New York wine, and 57% say they would consider New York wine as among their favorites. The difference in New Jersey and the two other states (about 10% from Pennsylvania and 20% from New York) wine consumer loyalty suggests the problems New Jersey wine industry is facing.

When looking at the rank of the responses to each question, the category "continue to purchase" ranks the highest across all three states. Following this category, target consumers of New Jersey are more likely to serve New Jersey wines to others (rank #2, 43%) or order New Jersey wines in a restaurant (rank #3, 40%). Similarly, category "serving wine to others" (67%) has also the second rank for both New York and Pennsylvania wines. However, for New York wines, more target consumers (rank#3, 62%)

of New York wines have visited a New York winery before. In addition to the top three responses, there is potential to market New York wine through social networks as 58% of the target market claim they will recommend New York wine to others (rank #4). All other categories also have a rate over 50% for New York Wines. On the other hand, as opposed to the other two states, category "recommending Pennsylvania wines to others" (46.5%) ranks number three, followed by "giving Pennsylvania wines as gifts" (45%).

Table 10: Target Markets Consumer Responses to New York, New Jersey, and Pennsylvania Wine

Source: Author

	New Jersey (N=285)		**New York (N=445)**		**Pennsylvania (N=329)**	
	%[1]	**Rank**	**%[1]**	**Rank**	**%[1]**	**Rank**
Continue to Purchase Wine from This State	47.0%	1	69.7%	1	53.2%	1
Recommend Wine from This State to Others	36.1%	5	58.4%	4	46.5%	3
Consider Wine from This State as Favorites	27.7%	7	56.6%	6	40.4%	7
Serve Wine from This State to Others	42.8%	2	67.0%	2	50.5%	2
Order Wine from This State in a Restaurant	39.7%	3	55.7%	7	44.4%	5
Give Wine from This State as a Gift	36.8%	4	58.0%	5	45.3%	4
Visited a Winery from This State Before	32.6%	6	61.8%	3	42.9%	6

* **Notes**: 1. % of Target Consumer Answered "Yes"

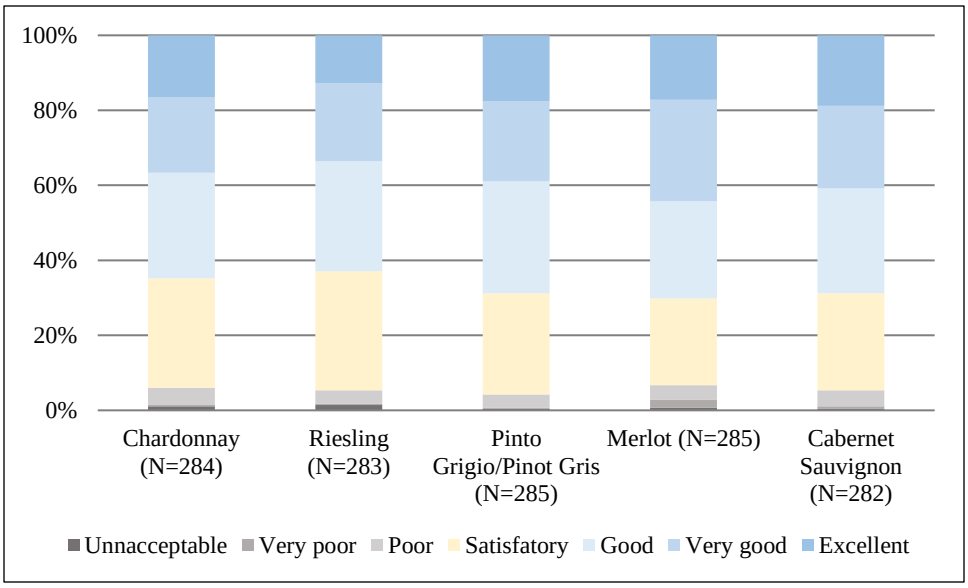
"Serve wine from this state to others" being the second most popular category implies that Mid-Atlantic wines are usually recognized as table wines that are served or ordered in a restaurant. With higher consumer retention rate and recommendation rate, New York and Pennsylvania wines can be promoted through target consumers' social network. By contrast, New Jersey wines have a low consumer retention rate and a low recommendation rate.

Not many target consumers of New Jersey or Pennsylvania have visited a winery in that state (New Jersey rank #6, 33%; Pennsylvania rank #6, 43%). By contrast, New York wines have a much high rate of winery visits (rank #3, 61.8%). Considering New York's high consumer retention rate, frequent winery visits may result in consumer loyalty.

Knowing consumers' overall responses to New York, New Jersey, and Pennsylvania wines, I further examine consumer perceived quality to wines that are made with different major grape varieties. Figure 2 demonstrates how the target market perceives quality of New Jersey wines. After summing up the percentages of positive attitude categories (good, very good, and excellent), Merlot has the best perceived quality (70% of the target market has a positive attitude), followed by Cabernet Sauvignon (69%), and Pinto Grigio/Pinot Gris (69%) (Table 10). Chardonnay and Riesling has less positive rates (65% and 63%). The results from Table 11 shows that more target consumers buy red wines (45%, N=280) than white wines (33%, N=276). Thus, I highly recommend that New Jersey wine makers produce mainly Merlot and Cabernet Sauvignon. However, most notably, Merlot also has the highest percentage of target consumers who think the wine is unsatisfactory. Therefore, Merlot can be risky compared other varieties. On the other hand, in whites, Pinot Grigio/Pinot Gris is the more welcomed variety. It also has the lowest share of the target market thinking that the quality was poor, very poor, or unacceptable. Therefore, producing some Pinot Grigio could help reduce risk and generate better income.

Figure 2: New Jersey Wine Quality by Variety Based on the Target Market's Response

Source: Author

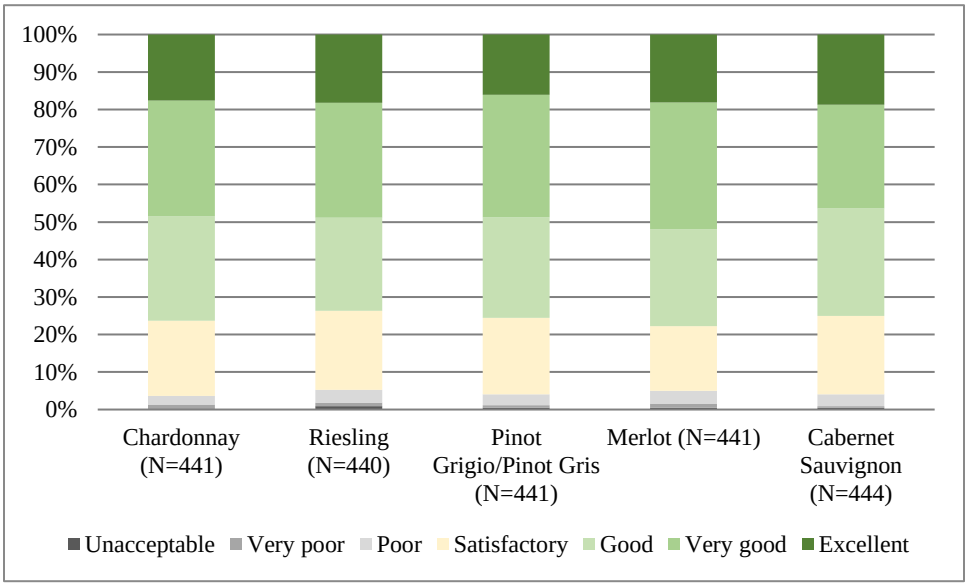


Among all New York white wines (Table 11), Chardonnay is the most widely appreciated variety since 76% of the total target market say it is good or better, followed by Pinot Grigio/Pinot Gris (76%) and Riesling (74%). Notably, the differences in quality between the white varieties are very minimal. Among the red varieties, Merlot (78%) has a better quality compared to Cabernet (75%). When examining all varieties together, Merlot elicits the most positive responses, followed by Chardonnay. Compared to New Jersey whose red wines are better than its white wines, all New York wines are highly rated. For this reason, New York wine makers should produce Merlot for red wines, and Chardonnay or Pinot Grigio/Pinot Gris for white wines. However, because all varieties have a positive response rate of over 70%, instead of finding the most accepted grape

variety, New York wine makers may want to focus more on product differentiation as a way to reduce the level of competition.

Figure 3: New York Wine Quality by Variety Based on the Target Market's Response

Source: Author



Pennsylvania wine grape varieties generally have similar positive responses (excellent, very good, and good) when compared to New York wines. Based on the positive responses from Pennsylvania target consumers, the most recognized grape varieties for Pennsylvania wines is Merlot in red and Chardonnay and Pinot Grigio/Pinot Gris in white wines (since the difference between these two wines is very small). However, Pinot Grigio/Pinot Gris has lower negative response rate (2.4%) - 1% less than any other varieties. For this reason, I recommend that Pennsylvania wine producers focus on Merlot in red wines, but also produce Pinot Grigio/Pinot Gris to reduce risks. When

deciding between Chardonnay and Pinot Grigio/Pinot Gris, wine makers should also pay more attention to the negative responses since the positive response rates are very similar.

Figure 4: Pennsylvania Wine Quality by Variety Based on the Target Market's Response

Source: Author

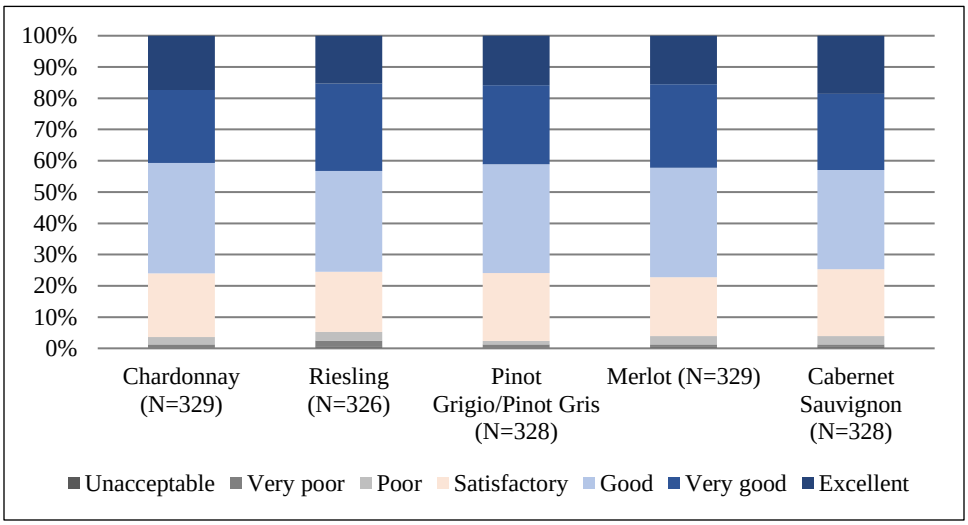


Table 11: New York, New Jersey, and Pennsylvania Target Market Positive Response Rate to Wine in Different Grape Variety

Source: Author

	New Jersey			New York			Pennsylvania		
	%[1]	N	Rank	%[1]	N	Rank	%[1]	N	Rank
Merlot	70.18%	285	1	78%	441	1	77.20%	329	1
Cabernet Sauvignon	68.79%	282	2	75%	444	4	74.70%	328	5
Pinto Grigio/Pinot Gris	68.77%	285	3	76%	441	3	75.91%	328	3
Chardonnay	64.79%	284	4	76%	443	2	75.99%	329	2
Riesling	62.90%	283	5	74%	440	5	75.46%	326	4

* **Notes**: 1. % of target consumer think wine of this variety is good, very good, or excellent from the state.

In terms of percentage of purchase in different types of wines and sizes of bottles, 750ml is the most popular size of containers for target market in all three states, followed by the larger containers (1.5L and 3L), and then smaller containers (less than 750 ml). Red wine is the most popular type of wine for all three states. However, the difference between white wines and red wines is not high (5%-10%). Rose wines only represent 20% of the market.

Table 12: Descriptive Statistics of New York, New Jersey, and Pennsylvania Target Consumer Purchase in Different Sizes of Bottles and Types of Wines

Source: Author

	New Jersey			New York			Pennsylvania		
	N	Mean (%)	Std. Deviation	N	Mean (%)	Std. Deviation	N	Mean (%)	Std. Deviation
750 mL containers	277	50.94	30.684	434	56.18	32.048	321	52.8	30.961
1.5 L containers	267	30.68	23.164	413	28.29	24.217	303	29.75	22.326
>= 3 L containers	253	16.28	17.787	386	14.73	19.18	289	16.12	18.942
< 750 mL containers	243	8.56	11.356	372	7.12	11.13	279	8.17	10.985
Red	280	43.89	25.224	439	45.64	27.039	323	46.34	26.14
White	276	38.12	21.831	432	37.64	23.093	320	36.37	22.94
Rose	272	20.92	17.056	427	18.98	17.394	313	20.11	16.011

In terms of occasions for drinking wines from each state, New Jersey and New York show the same rank of the surveyed occasions. However, New York has much higher percentage of target market claiming they will drink New York wine for each of the occasions. Drinking wine from New Jersey and New York for everyday consumption is the most popular occasion followed by bringing wines from New York and New Jersey to restaurants with a BYOB policy. Pennsylvania varied from this ranking. The most

popular occasion is bringing Pennsylvania wine to BYOB and the second is drink as everyday wine. However, the difference between these two occasions is only about 2%.

Based on the results from drinking occasion, wines from New York, New Jersey, and Pennsylvania are categorized as every day table wines. However, the rates of drinking their wines under each occasion for New Jersey and Pennsylvania are both about 10% lower than New York wines. This difference can be also seen in the consumer responses to continue purchasing. Thus, the most urgent task for New Jersey and Pennsylvanian wine markets is to establish a reputation and increase its consumer loyalty.

Table 13: Occasions When New Jersey, New York, and Pennsylvania Target Market Drink Wine from The State

Source: Author

	New Jersey (N=285)			**New York (N=445)**			**Pennsylvania (N=329)**		
	%[1]	**N**	**Rank**	**%[1]**	**N**	**Rank**	**%[1]**	**N**	**Rank**
For Everyday Consumption	56.70%	275	1	75.3%	429	1	59.9%	319	2
Bring Wine to BYO Restaurants	54.60%	269	2	70.9%	419	2	61.9%	307	1
Give Out Wines as Gifts	52.00%	273	3	67.1%	429	3	59.2%	316	3
Drink Wine for Special Occasions	46.70%	274	4	67.0%	433	4	54.9%	317	4

* **Notes**: 1. % of Target Market consume wine from this state during the occasion.

Finding the most effective marketing channel is essential for this research when making business suggestions for the local markets. Using source of wine knowledge to assess the effectiveness of the marketing channels, the descriptive statistics suggests the ranks of sources of wine knowledges are the same across all three states. The best marketing channel is through *interpersonal marketing*, marketing a product mainly

through communications between people since learning from family and friends is the primary source of wine knowledge (NJ 68%, NY 74%, PA 72%). The second channel is through wine and liquor store staff (NJ 52%, NY 54%, PA 51%) followed by winery tasting staff (NJ 45%, NY 51%, PA 49%). Although the survey cannot explain the reasons behind the rank, I hypothesized that some of the reasons for future studies to examine. “Family and friends” is the primary source of wine knowledge because frequent Mid-Atlantic wine drinkers are probably associated with other frequent wine drinkers. Wine and liquor store staff is not as influential as friends and family members of the target market because of the limited shelf space of Mid-Atlantic wines in the retailing stores. Not many of the Mid-Atlantic wine target consumers have ever visited a New Jersey or a Pennsylvania winery can also lead to limited access to learning from winery tasting staff. For this reason, I strongly recommend Mid-Atlantic wine producers market their wines through personal networks. Maintaining a good relationship with the wine consumers as well as holding events that can strengthen connections between the customers are also desired business strategies for Mid-Atlantic wine producers.

However, indirect marketing is also necessary when wineries wanted to increase their awareness among their consumers. The best indirect marketing channel is through food and cooking magazines (NJ 38%, NY 36%, PA 37%) as Mid-Atlantic wines are mainly used as table wine: being served to others or ordered in a restaurant. For this reason, wineries can recommend wine pairings for recipes in food and cooking magazines. Wine magazines, surprisingly, are in the second place (NJ 33%, NY 28%, PA

32%). Social media, an inexpensive marketing approach ranks the third among all indirect marketing, with about 25% of respondents in the target markets across all three states claiming they would use this source. Local magazines (NJ 18%, NY 18%, PA20%), newspapers (NJ 18%, NY 16%, PA 17%), and TV/radio programs (NJ 15%, NY 16%, PA 15%) were not very effectively, potentially because these sources rarely had wine related topics.

Table 14: Marketing Channel Ranked Based on Target Consumers' Response

Source: Author

	New Jersey (N=285)		**New York (N=445)**		**Pennsylvania (N=329)**	
	% Usage[1]	**Rank**	**% Usage[1]**	**Rank**	**% Usage[1]**	**Rank**
Family and Friends	68.1%	1	73.7%	1	71.7%	1
Wine and Liquor Store Employee	51.6%	2	53.9%	2	50.8%	2
Winery Tasting Staff	45.3%	3	51.0%	3	49.2%	3
Food and Cooking Magazines	37.5%	4	35.7%	4	37.1%	4
Wine Magazines	32.6%	5	27.6%	5	31.6%	5
Social Media	25.6%	6	23.8%	6	24.9%	6
Local or Reginal Magazines	17.9%	7	17.8%	7	20.4%	7
National or Local Newspaper Article	17.5%	8	16.2%	8	17.3%	8
TV or Radio Program	15.4%	9	15.7%	9	15.2%	9

* **Notes**: % of Target Market Use This Market Channel

4.1.4 Consumers Who Are Interested in Wine Tourism Profile and Characteristics

In order the show the potential of wine tourism, Table 15 indicates the percentage of super core or Mid-Atlantic target market respondents who are interested in wine tourism. More than 65% of the super core and the target markets of Mid-Atlantic states expressed their interest in winery tourism, compared to the low winery visit rates in the previous

section. These percentages indicate winery tourism is an accessible strategy that wine business owners in Mid-Atlantic states should implement.

Table 15: Super Cores and Mid-Atlantic Target Markets Interested in Winery Tourism

Source: Author

	Not Interested in Winery Tours	Interested in Winery Tours	N
Super Core	33.0%	67.0%	460
NJ Target Market	34.5%	65.5%	278
NY Target Market	30.9%	69.1%	433
PA Target Market	31.9%	68.1%	323

Table 16: Consumer Interests in Winery Activities

Source: Author

	Interested		Not Interested	
	Freq.	%	Freq.	%
Wine Tasting (n=951)	618	65.00%	333	35.00%
Tour of the Winery or Vineyard (n=949)	577	60.80%	372	39.20%
Food Vendors (n=952)	520	54.60%	432	45.40%
Holiday Events (n=941)	449	47.70%	492	52.30%
Concerts (n=954)	397	41.60%	557	58.40%
Painting Part/Class (n=946)	209	22.10%	737	77.90%
Book Clubs (n=945)	129	13.70%	816	86.30%

Before the logistic regression analysis, survey respondents who are interested in wine tourism are profiled (Table 17). Demographic categories that the greatest number of participants selected are: female (61%, n=577), married or in a partnership (62%, n=575), New York residency (49%, n=577), with a bachelor's degree (40%, n=576) or a master's degree or higher (18.2%). Regarding age range and household income, the distribution is nearly even among the categories presented.

Table 17: Respondents who were Interested in Vineyard Tours Demographic Profile

Source: Author

	Respondents who Are Interested in Vineyard Tours	
	Freq.	**%**
Gender		
Female	352	61.0%
Male	225	39.0%
Total	577	
Age Groups		
21 - 24 years old	96	16.6%
25 - 34 years old	135	23.4%
35 - 44 years old	115	19.9%
45 - 64 years old	137	23.7%
> 65 years old	94	16.3%
Total	577	
Residency		
New Jersey	133	23.1%
New York	282	48.9%
Pennsylvania	162	28.1%
Total	577	
Marital Status		
Married or in a partnership	358	62.3%
Single	166	28.9%
Separated or Divorced	33	5.7%
Widower	18	3.1%
Total	575	
Education		
Some high school	83	14.4%
Some college/technical school	103	17.9%
Associate degree/technical school graduate	54	9.4%
Bachelor's degree	231	40.1%
Master's degree or higher	105	18.2%
Total	576	
Annual Income		
< $25,000	50	8.8%
$25,000 - $ 49,999	121	21.2%
$50,000 - $75,999	125	21.9%
$76,000 - $99,999	86	15.1%
$100,000 - $150,000	112	19.6%
$150,000 - $200,000	48	8.4%
> $200,000	29	5.1%
Total	571	

In addition to winery and vineyard tours, the survey asked the participants about their interest in a variety of winery activities (Table 16). Among the activities investigated, more than half are interested in wine tastings (65%, n=951), tour of the winery or vineyard (61%, n=949), and wine tasting rooms with food vendors (55%, n=952).

Activities that are selected by fewer than half of the participants are: holiday events (48%, n=941), concerts (42%, n=954), painting party/class (22%, n=946), and book clubs (14%, n=945).

Table 18: Consumer Response to Events Held in Wineries based on Distance from Their Home and Day of a Week

Source: Author

	Free Events		Events with A Fee	
	Freq.	**%**	**Freq.**	**%**
Less than 20 miles				
During a weekday	291	34.2%	225	30.3%
During a weeknight	284	33.4%	226	30.4%
During a weekend day	184	21.6%	184	24.8%
During a weekend night	92	10.8%	108	14.5%
Total	851		743	
21 - 40 miles				
During a weekday	131	17.0%	94	15.0%
During a weeknight	190	24.7%	144	23.0%
During a weekend day	298	38.8%	244	38.9%
During a weekend night	150	19.5%	145	23.1%
Total	769		627	
41 - 60 miles				
During a weekday	54	8.4%	38	7.1%
During a weeknight	48	7.4%	55	10.3%
During a weekend day	361	56.0%	276	51.9%
During a weekend night	182	28.2%	163	30.6%
Total	645		532	
61 - 80 miles				
During a weekday	41	7.8%	28	6.7%
During a weeknight	24	4.6%	25	6.0%
During a weekend day	284	54.3%	229	55.2%
During a weekend night	174	33.3%	133	32.0%
Total	523		415	
80 miles or above				
During a weekday	32	7.5%	28	8.4%
During a weeknight	30	7.0%	25	7.5%
During a weekend day	224	52.6%	169	50.6%
During a weekend night	140	32.9%	112	33.5%
Total	426		334	

Questions based on distances survey participants willingness to travel to a tasting room to participate in an event on weekdays and/or weekends revealed some interesting results.

Regardless of whether an event is offered for free or there is a fee, as travel distance increases, survey respondents' interest in visiting a winery decreases (Table 18). In general, most consumers prefer free events to those with a fee to attend. For free events, weekdays (34%, n=851) and weeknights (33%) are preferred by those who are willing to travel less than 20 miles. When the travel distance is between 21 to 40 miles, 39% of 769 survey respondents indicate they would attend an event if held during the day on a weekend, with slightly fewer willing to travel this distance to attend an event offered on a weeknight (25%). Events held on weekend days are preferred when attendees need to travel 41 to 60 miles and 61 to 80 miles, with more participants preferring weekend nights if they have to travel 61 to 80 miles (33.3%) and 80 or more miles (32.9%) to attend. Similar results can be detected for willingness to attend events when a fee would be charged.

Survey participants were also asked to evaluate factors that would influence their decision to travel to a winery tasting room to attend an event. Among all valid participants who answered this question (n=949), distance needed to travel is the most important factor, as selected by 79% of these respondents, followed by cost associated with participating (76%), and time of a day or day of a week (73%) (Table 19). Over half of the respondents indicate that their attendance will be based on their personal interested in the type of event offered. Other factors that have less impact on their decision to attend include: discounts offered to individual members of the association or group sponsoring the activity or event (33%), available of accessible parking near the event (32%), if age appropriate activities are offered for adults and children (19%), and if child care service are available (11%).

Table 19: Factors that Survey Respondents Consider When They Make Decisions About Participating in Winery Tourism Activities

Source: Author

	Include as a Factor		Not a Factor	
	Freq.	**%**	**Freq.**	**%**
Distance to travel	745	78.50%	204	21.50%
Costs associated with participating	721	76.00%	228	24.00%
Time of day or day of a week	691	72.80%	258	27.20%
Personal Interest	552	58.20%	397	41.80%
Discounts offered to individual members of the association or group sponsoring the activity or event	312	32.90%	637	67.10%
Accessible parking near the event	301	31.70%	648	68.30%
Age appropriate activities for adults and children	178	18.80%	771	81.20%
Child care service	104	11.00%	845	89.00%
None of the above	41	4.30%	908	95.70%

* **Notes**: Participants could select more than one response. All attributes in this table have a sample size of 949.

Event promotional strategies are also investigated in the survey (Table 20). Strategies that most of the survey participants say will encourage them to participate in a winery tasting room event are: sale section of merchandise (72% of 906 respondents), followed by the tasting fee being applied to wine purchases (68%, n=901), and a new wine featured and available at a discounted price each month (67%). Promotional strategies that appeal to half of participants include: educational workshops (55%, n=854), ability to keep the glass from the tasting as a souvenir (55%, n=904), local entertainment and music (55%, n=902), and that there is a wine club with special incentives offered if visitors joined (50%, n=903). Less than half of the respondents selected premade gift baskets that include wine (40%, n=904) and activities available to entertain children (28%, n=907) as being promotions that encourage them to participate in a winery event.

Table 20: Consumer Response to Winery Event Promotions

Source: Author

	Will Encourage Attendance		Will Not Encourage Attendance	
	Freq.	**%**	**Freq.**	**%**
Sale section of merchandise (n=906)	655	72.20%	276	30.50%
The tasting fee will be applied to the bottles of wine you purchase (n=901)	615	68.30%	286	31.70%
A new wine available for purchase at a discounted price each month (n=917)	618	67.40%	252	27.80%
Educational workshops (e.g. how to make wine, how to select wine) (n=854)	472	55.30%	382	44.70%
Keep the glass from the tasting as a souvenir (n=904)	497	55.00%	407	45.00%
Local entertainment (music) (n=902)	495	54.90%	407	45.10%
Wine club availability and special incentives to join (n=903)	454	50.30%	449	49.70%
Premade gift baskets that include wine (n=904)	364	40.30%	540	59.70%
Activities available to entertain children (n=907)	252	27.80%	655	72.20%

* **Notes**: Participants were allowed to select more than one response.

4.2 Super Core Wine Consumer Logistic Regression Model

After careful selection of the independent variables, 34 were included in the super core logistic regression model. A detailed list of the independent variables is presented in Table 21. Notably, variables in bottles and types are from constant sum questions. Thus, B_750LESS, B_750ML, and B_1.5L are used in the model and B_3L is dropped to avoid perfect collinearity in the independent variables. Similarly, T_RED and T_WHITE are used and T_ROSE is dropped.

The logistic regression model includes 742 samples. The sample size is smaller than the total number of valid survey respondents because of missing values. With 70.89% correct prediction, 19 independent variables are significant at 90% confident level. The results are listed in detail in Table 22 for coefficient estimation and Table 23 for correct prediction.

Table 21: Super Core Logistic Regression Dependent and Independent Variables

Descriptive Statistics

Source: Author

		N	Mean	S.D.[1]
Dependent Variable				
SUPERCORE	1 = Being a super core wine consumer; 0 = otherwise	977	0.48	0.5
Wine Drinking Occasions				
O_EVERY	1 = Drinks everyday wine; 0 = otherwise	977	0.94	0.24
O_GIFT	1 = Gives Out Wine as Gifts; 0 = otherwise	977	0.97	0.16
O_SPEC	1 = Drinks wine for special occasions; 0 = otherwise	977	0.96	0.19
Sources of Wine Knowledge				
K_WINEM	1 = Learn about wine through wine magazines; 0 = otherwise	977	0.23	0.42
K_FOODM	1 = Learn about wine through food and cooking magazines; 0 = otherwise	977	0.32	0.47
K_FRIEND	1 = Learn about wine through family and friends; 0 = otherwise	977	0.76	0.43
K_STORE	1 = Learn about wine through wine/liquor store employee; 0 = otherwise	977	0.54	0.5
K_WINERY	1 = Learn about wine through winery tasting staff; 0 = otherwise	977	0.44	0.5
K_LOCALM	1 = Learn about wine through local or reginal magazines; 0 = otherwise	977	0.14	0.34
K_NEWS	1 = Learn about wine through newspaper articles; 0 = otherwise	977	0.14	0.35
K_SMS	1 = Learn about wine through social media; 0 = otherwise	977	0.18	0.39
K_TV	1 = Learn about wine through TV or radio program; 0 = otherwise	977	0.13	0.34
Demographics				
GENDER	1 = Male; 0 = female	977	0.38	0.49
AGE34LOW[2]	1 = Age is below 35 years old; 0 = otherwise	977	0.40	0.49
AGE35_44	1 = Age is between 35 and 44 years old; 0 = otherwise	977	0.21	0.41
AGE_45UP	1 = Age is 45 years or older; 0 = otherwise	977	0.39	0.49
GEO_NJ	1 = Primary residence is located in New Jersey; 0 = otherwise	977	0.24	0.43
GEO_NY	1 = Primary residence is located in New York; 0 = otherwise	977	0.48	0.5
GEO_PA[2]	1 = Primary residence is located in Pennsylvania; 0 = otherwise	977	0.28	0.45
MARRIED	1 = Married or in a partnership; 0 = otherwise	977	0.6	0.49
EDU_NOBA[2]	1 = Below Bachelor's degree; 0 = otherwise	972	0.34	0.47
EDU_BACH	1 = Bachelor's degree; 0 = otherwise	972	0.38	0.49
EDU_MAST	1 = Master's degree; 0 = otherwise	972	0.18	0.38
IN_25LESS	1 = Annual household income less than $25,000; 0 = otherwise	971	0.10	0.3
IN_25_49	1 = Annual household income from $25,000 to $49,999; 0 = otherwise	971	0.21	0.41
IN_50_75	1 = Annual household income from $50,000 to $75,999; 0 = otherwise	971	0.22	0.41
In_75up[2]	1 = Annual household income $76,000 or above; 0 = otherwise	971	0.48	0.50
LIMIT	1 = Has limitations that may prohibit consuming wine; 0 = otherwise	973	0.06	0.24
Wine Purchasing Behaviors and Preferences				
P_1	1 = Purchase wine only for everyday consumption for the household; 0 = otherwise	977	0.17	0.38
P2	1 = Purchase wine only for special occasions for the household; 0 = otherwise	977	.13	.334
P_12	1 = Purchase wine both for everyday consumption and for special occasions for the household; 0 = otherwise	977	0.7	0.46
D_B	1 = Have purchased a bottle of wine due to profit donation; 0 = otherwise	963	0.27	0.45
SKINNY	1 = Drank wine that had less than 10% alcohol and/or fewer than 80 calories per 5 oz. serving in the past 12 months; 0 = otherwise	974	0.25	0.43
B_750LES	Percentage purchase made in bottles less than 750ml	936	5.14	12.2
B_750ML	Percentage purchase made in 750ml bottles	969	61.34	34.43
B_1_5L	Percentage purchase made in 1.5L bottles	954	24.01	26.75
B_3L[2]	Percentage purchase made in 3L or larger bottles	976	10.34	19.25
P_RED	Percentage purchase of red wines	953	48.76	28.79
P_WHITE	Percentage purchase of white wines	945	37.39	25.42
P_ROSE[2]	Percentage purchase of rose wines	977	16.06	19.20

*** Notes**: 1. S.D. stands for Standard Deviation 2. Dropped category

Table 22: Super Core Logistic Regression Coefficient Estimation

Source: Author

	Coefficient	Standard Error	t value	p value	Marginal Effect
Constant	-2.86974273	1.02127767	-2.81	0.0050	
Wine Drinking Occasions					
O_EVERY	0.76194824	0.56572089	1.347	0.1780	
O_GIFT**	1.48752249	0.68792214	2.162	0.0306	0.30886
O_SPEC**	-1.83049999	0.85319122	-2.145	0.0319	-0.35548
Sources of Wine Knowledge					
K_WINEM***	0.94499398	0.22067775	4.282	0.0000	0.22182
K_FOODM	0.16656663	0.19272394	0.864	0.3874	
K_FRIEND**	-0.45228293	0.21266396	-2.127	0.0334	-0.1019
K_STORE*	-0.33499793	0.17609982	-1.902	0.0571	-0.08051
K_WINERY	0.15189882	0.17851031	0.851	0.3948	
K_LOCALM	-0.16620264	0.26495791	-0.627	0.5305	
K_NEWS***	0.72105512	0.27023918	2.668	0.0076	0.16017
K_SMS	0.37974905	0.23273341	1.632	0.1027	
K_TV**	-0.58665548	0.27469702	-2.136	0.0327	-0.13669
Demographics					
GENDER*	0.31220716	0.18753522	1.665	0.0960	0.0817
AGE35_44	0.24873348	0.23735919	1.048	0.2947	
AGE_45UP*	0.41036263	0.21853859	1.878	0.0604	0.09116
GEO_NJ***	0.66856309	0.24579636	2.72	0.0065	0.1576
GEO_NY	0.32926205	0.20775689	1.585	0.1130	
MARRIED***	0.5136494	0.18750656	2.739	0.0062	0.12975
EDU_BACH	0.0685038	0.20174786	0.34	0.7342	
EDU_MAST	0.07908596	0.26229689	0.302	0.7630	
IN_25LESS	-0.25928497	0.3393001	-0.764	0.4448	
IN_25_49	0.06877482	0.25011314	0.275	0.7833	
IN_50_75	-0.06096235	0.22246335	-0.274	0.7841	
LIMIT	-0.4709374	0.36957426	-1.274	0.2026	
Wine Purchasing Behaviors and Preferences					
P_1***	1.80780691	0.38890632	4.648	0.0000	0.37684
P_12***	1.63549112	0.35934364	4.551	0.0000	0.35655
D_B*	0.38045074	0.20631946	1.844	0.0652	0.09879
SKINNY***	0.6673559	0.21192619	3.149	0.0016	0.18142
B_750ML***	-0.01275021	0.00488374	-2.611	0.0090	-0.00302
B_1.5L*	-0.00964459	0.00584367	-1.65	0.0989	-0.00255
B_750LES	-0.01048124	0.00927487	-1.13	0.2584	
P_RED**	0.01360676	0.00533034	2.553	0.0107	0.00321
P_WHITE	0.00759203	0.00585788	1.296	0.1950	

* **Notes**: ***Significant at 1% ** Significant at 5%; * Significant at 10%; N = 742

Table 23: Super Core Logistic Regression Correct Predictions

Source: Author

Actual Value	Predicted Value		Total Actual
	0	1	
0	270 (36.4%)	102 (13.7%)	372 (50.1%)
1	114 (15.4%)	256 (34.5%)	370 (49.9%)
Total	384 (51.8%)	358 (48.2%)	742 (100.0%)

Looking at independent variables in groups, all wine drinking occasions are significant except for everyday consumption. O_GIFT has a positive relationship with SUPERCORE while O_SPEC has a negative one. The marginal effect of O_GIFT shows there is a 31% increase in the likelihood of a consumer being a super core wine consumer if the consumer gives out wine as a gift to others. In contrary, drinking for special occasions can decrease the likelihood by 36%.

Among sources of wine knowledge, K_WINEM and K_NEWS are significantly positively associated with SUPERCORE, while K_FRIEND, K_STORE, and K_STORE have negative relationships. Between the two with positive relationships, K_WINE has a greater contribution (22% increase in the likelihood) compared to K_NEWS (16%). The greatest decline will happen if a wine consumer obtained his or her wine knowledge from TV (14% decrease in likelihood), followed by family and friends (10%).

Demographics provide a profile of super core wine consumers with additional marginal effects on the likelihood. Unfortunately, only GENDER, AGE_45UP, GEO_NJ, and MARRIED out of the twelve independent variables in demographics are significant. Discounting the insignificant variables, all four variables were positively associated with SUPERCORE. Specifically, being a male increases the likelihood by 8%. If a consumer is old (> 45 years old), the likelihood increases for about 9%. Living in New Jersey compared to Pennsylvania leads to an increase in the likelihood for about 16%. Being in a partnership or married also causes an increase in the likelihood by 13%.

Seven out of nine were significant in the group “wine purchasing behaviors and preferences”. Specifically, P1 and P12, two variables in household wine purchasing occasions, are positively associated with SUPERCORE. In marginal terms, if a consumer only purchase wines for everyday consumption for his or her household, then the likelihood of the consumer being a super core wine consumer will increase by 38% comparing to those who only purchase wines for special occasions. However, a 36% increase will occur instead if a consumer buys wines for both everyday consumption and for special occasions for their household.

When comparing purchase of wine in different bottle sizes, purchasing wines in 3L bottles will increase the likelihood of being super core consumers compared to purchases in 750ML or 1.5L bottles. This is evident from the negative signs of the coefficients for B_750ML and B_1.5L. Holing percentage purchase in less than 750 ML bottles and 1.5L bottles constant, for each percentage increase in wine purchase in 750ML bottles and a percentage decrease in 3L bottles, 0.3% decrease in the likelihood will occur. Similarly, there is a 0.25% decrease in the likelihood if there is a percent increase of purchase in 1.5L bottle and a percent decrease in 3L bottles, holding the rest constant. The result means a super core wine consumer is more likely to purchase wine in 3L bottles compared to non-super core wine consumers because of its positive association with SUPERCORE. However, this does not mean the super core consumers drink mostly wines in 3L bottles.

When comparing percentage purchases in different types of wines, only P_RED is significantly and positively associated with SUPERCORE. A 0.3% increase in the

likelihood will occur for every percentage increase in purchase of red wines instead of rose wines. Super core wine consumers are also more likely to drink skinny wines (low calorie wines). A 18% increase in the likelihood is brought by this factor. Finally, having purchased a bottle of wine that was advertised as having part of its profit goes towards the support of non-profit organizations can also increase the likelihood of being a super core wine consumer for about 10%. This means wineries should take social responsibility or support non-profit organizations to attract super core consumers.

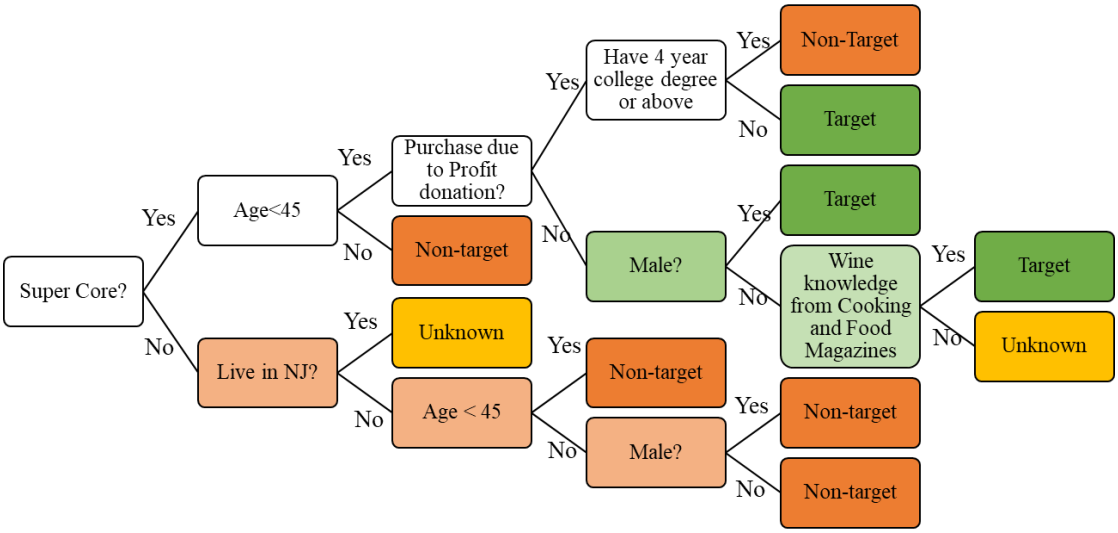
4.3 Mid-Atlantic Wine Target Market Decision Tree Model by State

4.3.1 New Jersey Decision Tree

The New Jersey decision tree model demonstrates the decision-making process a New Jersey wine producer should follow when he or she tries to understand the target market. The model starts with 719 respondents in total, with 434 (60%) non-target consumers and 285 (40%) target consumers. The first and most important question that separates the data into two sub-groups (Node 1 and Node 2) is whether a consumer is a super core wine drinker or not. If the consumer is a non-super core wine consumer (Node 1), then that consumer is not very likely to become the target market of New Jersey wine. Terminal leaf nodes of non-super core sub-tree shows evidence to this conclusion: Node 4 (49% are target market, N=68), Node 8 (9%, N=103), Node 12 (40%, N=40), Node 17 (33%, N=67), and Node 18 (12% are target market, N=59). Therefore, non-super core wine consumers are not the target market for New Jersey wines.

Figure 5: Simplified New Jersey Wine Target Consumers Decision Tree

Source: Author



On the other hand, if a wine consumer is a super core wine consumer (Node 2), then that consumer has the potential to become part of the target market of New Jersey wine. The data is then separated based on age: if a super core wine consumer is 45 years old or elder, then the consumer is not very likely to become the target market of New Jersey wine (Node 6). However, if the super core wine consumer is young, (between 21 and 44 years old), then the next question is whether the consumer has ever bought a bottle of wine because part of its profits is donated to a non-profit organization. If a male consumer answers yes, then he will be in the target market (Node 16, 92.7% are target consumers, N=41). If a female consumer answers yes, then she would be in the target market if she uses food and cooking magazines to acquire wine knowledge (Node 19, 84% being target consumers, N=31). If she does not learn from food and cooking magazines instead (Node 20, 55% are target consumers, N=33), I cannot draw a

conclusion as the difference is too small. When a young, super core wine consumer never purchases a wine because of some profits are donated to non-profit organizations, then those with a bachelor's degree or above are not in the target market (Node 13, 41% being target consumers, N=83) while those do not have a four-year college degree will be in the target market (Node 14, 71%, N=49).

When comparing the quality of different leaf nodes, Node 16 provides the most information as it has the highest target to non-target ratio. With a sample size of 41 (5.7% of total number of samples), Node 16 contains 38 samples of target consumers (13.3% of total number of target consumers). Node 19 is in the second place: it illustrates 9.1% of total number of target consumers (26 cases) using 4.3% of total numbers of samples (N=31). Node 14 is the third most important: 6.8% of total number samples (N=49) gives 12.3% of total number of target consumers (35 cases).

The model has an overall 71.5% correct prediction with the five layers of nodes (discounting the top first). The results in conclusion suggested that: 1) New Jersey wine producers should target young (< 45 years old) super core wine consumers who have bought a bottle of wine before because profits were donated to a non-profit organization; 2) if a young, super core wine consumer did not buy wine that has its profit donated, then New Jersey wine producers should targeted him or her if the consumer did not go to college; 3) New Jersey wine producers should avoid targeting non-super core wine consumers and old (> 45 years old) super core wine consumers.

Figure 6: Complete Decision Tree for New Jersey Wine Target Consumers

Source: Author

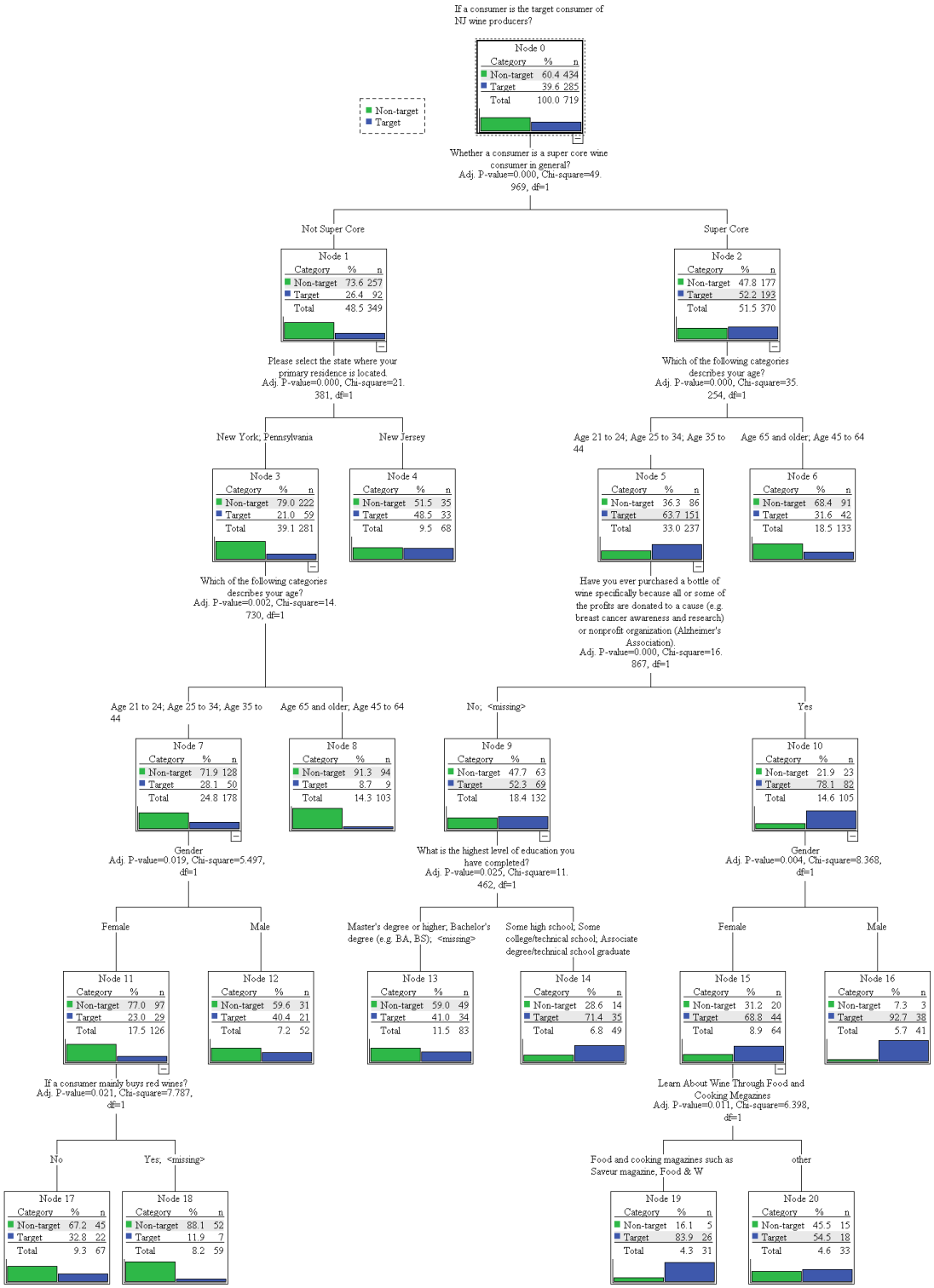


Table 24: New Jersey Decision Tree Node Gains

Source: Author

Node	Node		Gain		Response	Index
	N	%[1]	N	%[2]		
16	41	5.7%	38	13.3%	92.7%	233.8%
19	31	4.3%	26	9.1%	83.9%	211.6%
14	49	6.8%	35	12.3%	71.4%	180.2%
20	33	4.6%	18	6.3%	54.5%	137.6%
4	68	9.5%	33	11.6%	48.5%	122.4%
13	83	11.5%	34	11.9%	41.0%	103.3%
12	52	7.2%	21	7.4%	40.4%	101.9%
17	67	9.3%	22	7.7%	32.8%	82.8%
6	133	18.5%	42	14.7%	31.6%	79.7%
18	59	8.2%	7	2.5%	11.9%	29.9%
8	103	14.3%	9	3.2%	8.7%	22.0%

* **Notes**: 1. % of all respondents in the decision tree model.
2. % of target markets of the state.

Table 25: New Jersey Decision Tree Correct Prediction

Source: Author

Observed	Predicted		Percent Correct
	Non-target	Target	
Non-target	397	37	91.50%
Target	168	117	41.10%
Overall Percentage	78.60%	21.40%	71.50%

4.3.2 New York Decision Tree

Unlike the New Jersey decision tree, the first question of the New York decision tree is about residency: whether a consumer lives in New York (Node 1) or in New Jersey or Pennsylvania (Node 2). If the consumer resides in New York, the next question is: whether the consumer is a super core wine consumer in general? If the consumer is a New York super core wine consumer, then he or she will be a target consumer. This is demonstrated by Node 9 with 77.0% being in the target market (N=113), Node 15 with 84.6% (N=39), and Node 16 with 100% (N=32) of target consumers. If the consumer is a

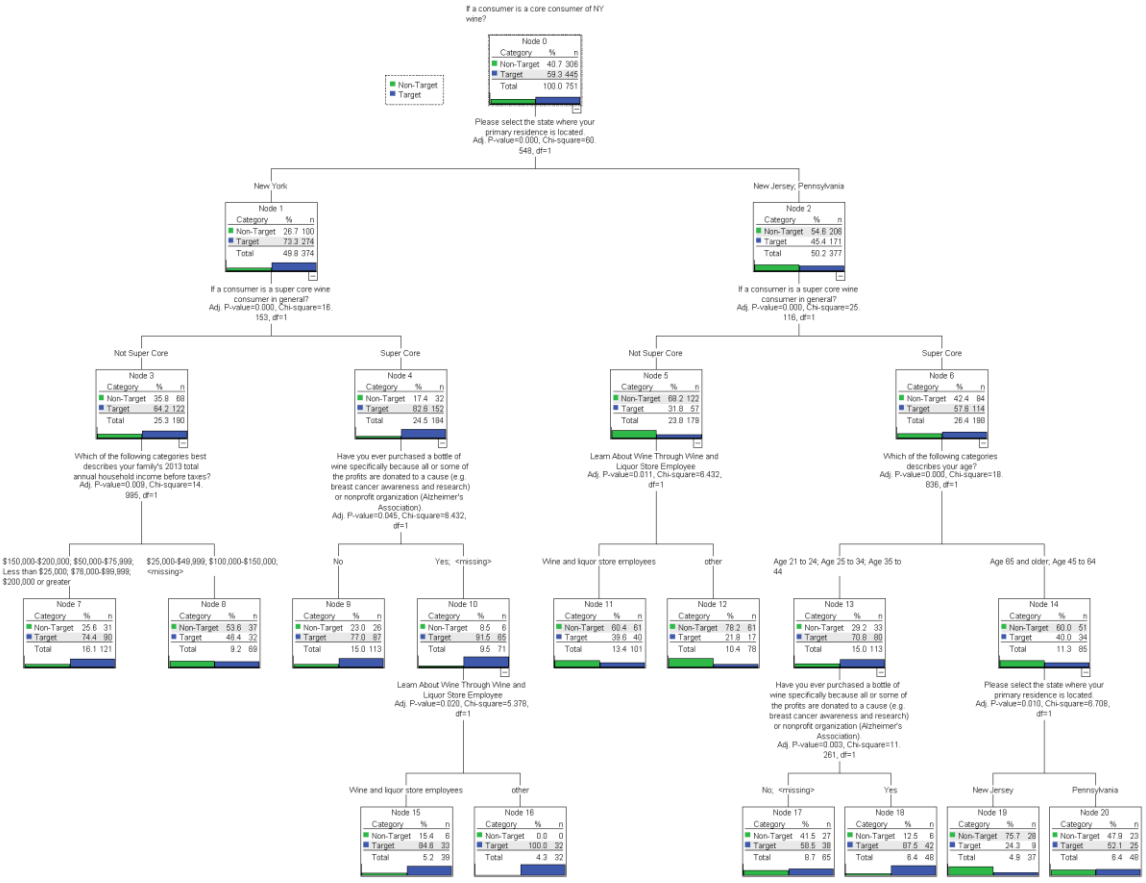
New York non-super core wine consumer, then he or she is still very likely to become the target market, supported by Node 7 (74.4% being in the target market, N=121) while Node 8 is not decisive (only 46.4% are the target consumers, N=69). Therefore, a New York non-super core wine consumer was the target consumer if the consumer is not in the $25,000-$49,999 or $100,000-$150,000 annual income group. If he or she is in the income range, no conclusion can be drawn.

For those who live in New Jersey and Pennsylvania, they need to be further separated based on if are super core wine consumers. From End Node 11 (38.0% being in the target market, N=129), and Node 12 (16.0%, N=50), one can observe that consumers who are non-super core New Jersey and Pennsylvania residents are not in the target market of New York wines. However, non-New York super core wine consumers whose ages are below 45 are in the target market (Node 17, 58.5% being in the target market, N=65; Node 18, 87.5%, N=48), while old (> 45 years old) super core non-New York consumers were not (Node 19, 24.3% being in the target market, N=39; Node 20 52.1%, N=48, indecisive).

Therefore, the target markets of New York wines are: 1) New York residents; and 2) New Jersey and Pennsylvania young super core wine consumers. New York wines were more widely accepted since New Jersey and Pennsylvania young consumers are included in the target market in addition to New York consumers. For those live in New York, the difference between super cores and non-super cores is relatively small. New York wine generally have a bigger market than New Jersey.

Figure 7: Decision Tree for New York Wine Target Consumers

Source: Author



Statistically, the model has 71.1% overall correct prediction rate. In term of quality of the nodes, Node 16 is the best: 100% of the 32 Node population (4.3% of total population) are target consumers, contributing 7.2% of total number of target consumers. Node 18 follows, with 42 target consumers out of 48 Node population (or 87.5%), contributing 9.4% of total number of target consumers using 6.4% of total number of

respondents. Node 15 stays in the third place with 84.6% being in the target market. Node 9 (77.0%), and Node 7 (74.4%) also have more than 70% target consumers.

Figure 8: Simplified New York Wine Target Consumers Decision Tree

Source: Author

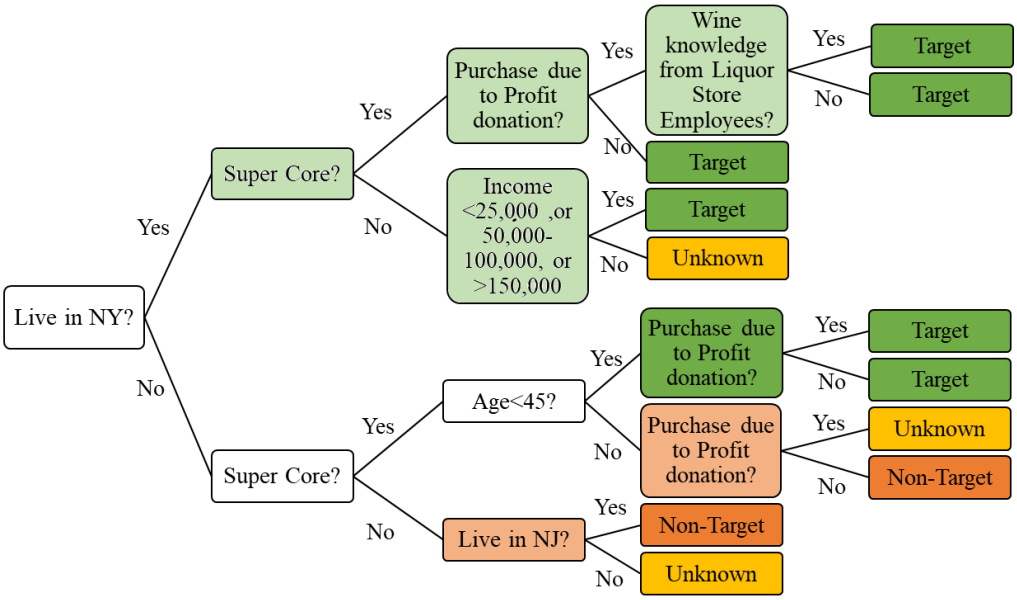


Table 26: New York Decision Tree Node Gains

Source: Author

Node	Node		Gain		Response	Index
	N	%[1]	N	%[2]		
16	32	4.30%	32	7.20%	100.00%	168.80%
18	48	6.40%	42	9.40%	87.50%	147.70%
15	39	5.20%	33	7.40%	84.60%	142.80%
9	113	15.00%	87	19.60%	77.00%	129.90%
7	121	16.10%	90	20.20%	74.40%	125.50%
17	65	8.70%	38	8.50%	58.50%	98.70%
20	48	6.40%	25	5.60%	52.10%	87.90%
8	69	9.20%	32	7.20%	46.40%	78.30%
11	101	13.40%	40	9.00%	39.60%	66.80%
19	37	4.90%	9	2.00%	24.30%	41.10%
12	78	10.40%	17	3.80%	21.80%	36.80%

* **Notes**: 1. % of all respondents in the decision tree model.
2. % of target markets of the state.

Table 27: New York Decision Tree Correct Prediction

Source: Author

Observed	Predicted		Percent Correct
	Non-Target	Target	
Non-Target	187	119	61.10%
Target	98	347	78.00%
Overall Percentage	37.90%	62.10%	71.10%

4.3.3 Pennsylvania Decision Tree

The model for Pennsylvania target market suggests that the most important question that separates the target market from the non-target market is whether a consumer is a super core wine consumer. This question separates all the respondents into two subgroups, Node 1 and Node 2. If a consumer is a non-super core wine drinker, then the consumer is not in the target market unless the age of the consumer is less than 45 and the consumer lives in Pennsylvania (Node 8, 56.9% being target consumers, N=65; Node 14, indecisive). Except for Node 8 and Node 14, all other end nodes on this branch shows non-super core wine consumers are not in the target market. These nodes represent non-super core wine consumers whose ages are above or equal to 45 (Node 4, 18.6% being target consumers, N=129) and young (age<45), New Jersey or New York non-super core wine drinkers who have never bought a bottle of wine because partial of its profit was donated to a not-for-profit organization (Node 13, 28.4% target consumers, N=109).

Figure 9: Decision Tree for Pennsylvania Wine Target Consumers

Source: Author

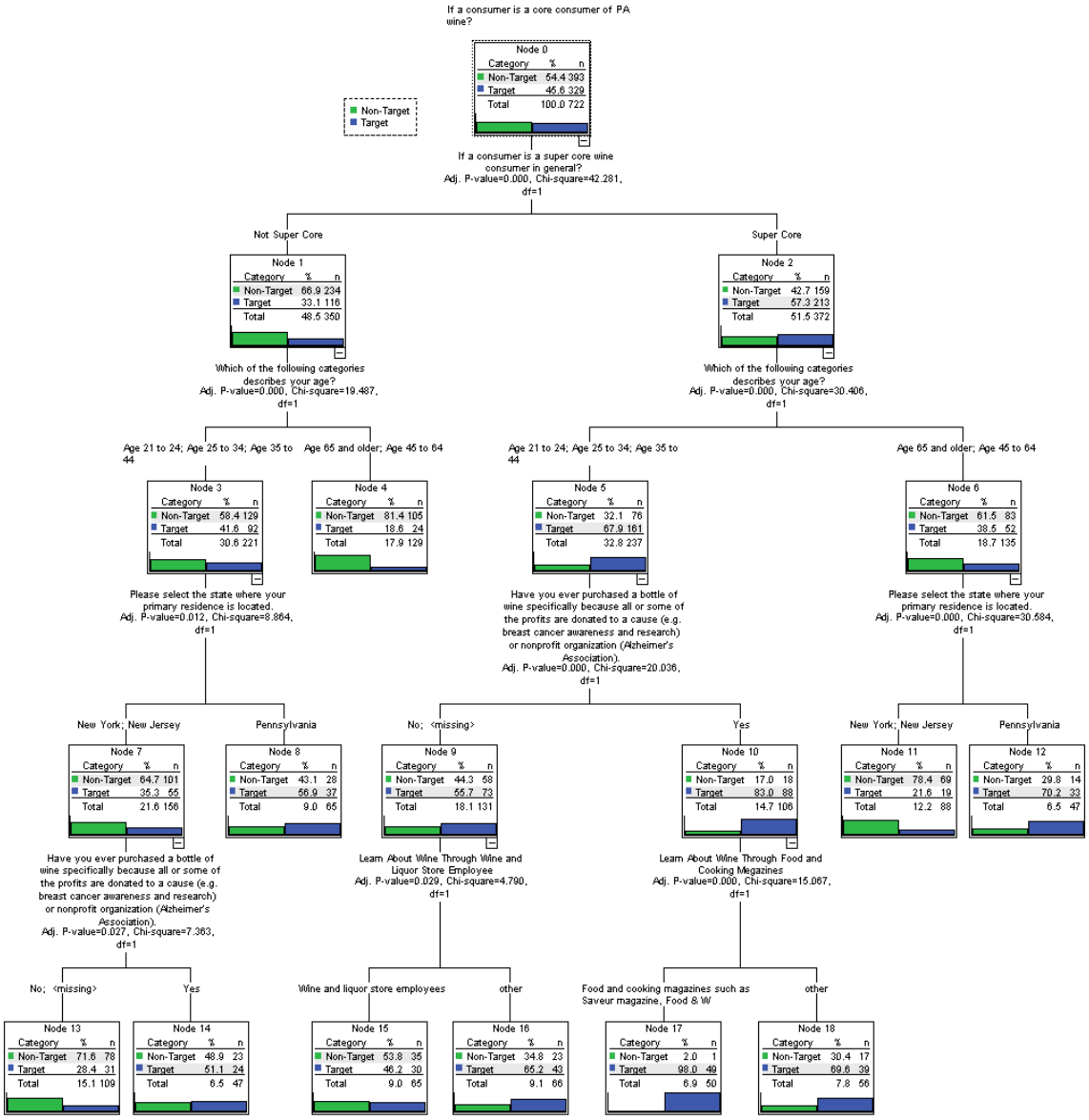


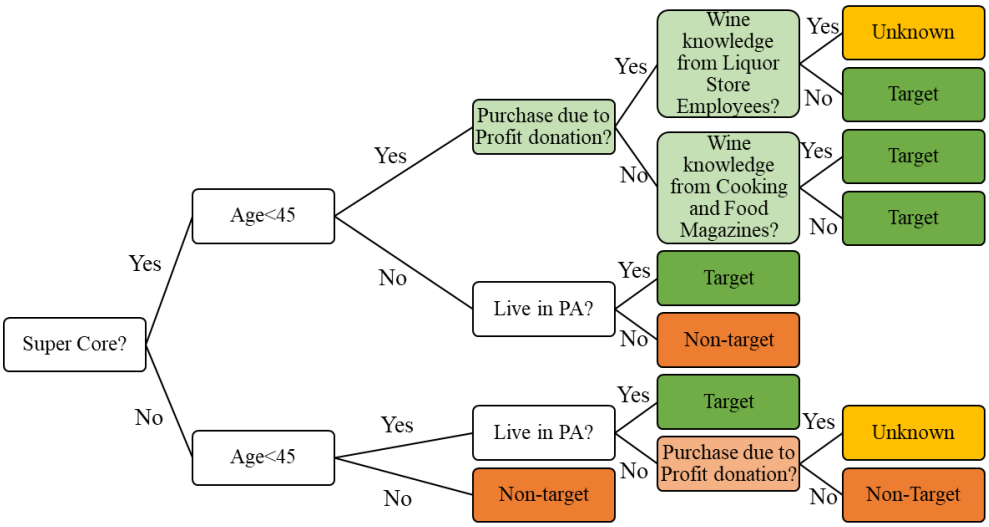
Table 28: Pennsylvania Decision Tree Correct Prediction

Source: Author

Observed	Predicted		Percent Correct
	Non-Target	Target	
Non-Target	287	106	73.00%
Target	104	225	68.40%
Overall Percentage	54.20%	45.80%	70.90%

Figure 10: Simplified Pennsylvania Wine Target Consumers Decision Tree

Source: Author



The Pennsylvania wine decision tree has an overall 70.9% correct prediction rate. Among all nodes, Node 17 has the best quality, followed by Node 12, Node 18, and Node 16 (where percentage of target consumers is over 60% for each of the nodes). Notably, all the best four nodes are in the super core sub-tree. Three nodes are under subgroup age below 45 within super core sub-tree, meaning a young (age<45) super core wine consumer being the target consumer has the most statistical support except for Node 15. On the other hand, being an elder (age>45) Pennsylvania super core wine consumer also plays an important role, compared to the non-super core branch.

Table 29: Pennsylvania Decision Tree Node Gains

Source: Author

Node	Node		Gain		Response	Index
	N	%[1]	N	%[2]		
17	50	6.9%	49	14.9%	98.0%	215.1%
12	47	6.5%	33	10.0%	70.2%	154.1%
18	56	7.8%	39	11.9%	69.6%	152.8%
16	66	9.1%	43	13.1%	65.2%	143.0%
8	65	9.0%	37	11.2%	56.9%	124.9%
14	47	6.5%	24	7.3%	51.1%	112.1%
15	65	9.0%	30	9.1%	46.2%	101.3%
13	109	15.1%	31	9.4%	28.4%	62.4%
11	88	12.2%	19	5.8%	21.6%	47.4%
4	129	17.9%	24	7.3%	18.6%	40.8%

* **Notes**: 1. % of all respondents in the decision tree model.
2. % of target markets of the state.

4.4 Wine Tourism Logistic Regression Model

The logistic regression model for wine tourism uses 736 samples and 30 independent variables in the estimation. A list of all independent variables and explanations are provided in Table 31 along with the descriptive statistics. Sample size was reduced due to missing values. The model has an overall correct prediction rate of 70.245%, with 17 significant independent variables in total. Table 30 provides the predictive accuracy and coefficient estimation is listed in Table 32.

Table 30: Winery Tourism Logistic Regression Correct Prediction

Source: Author

Actual Value	Predicted Value		Total Actual
	0	1	
0	138 (18.8%)	144 (19.6%)	282 (38.3%)
1	75 (10.2%)	379 (51.5%)	454 (61.7%)
Total	213 (28.9%)	523 (71.1%)	736 (100.0%)

When comparing different groups, the estimated coefficients show that most of the independent variables in drinking occasion, source of knowledge, and past experience have a significant relationship with the likelihood of participants being interested in participating in vineyard tours. Demographics and purchasing behaviors do not have as many significant explanatory variables. The interaction term is significant at the 5% level, representing the possible collinearity between P12 and O_EVERY.

When looking at specific groups, the two selected drinking occasion variables are both significantly positively associated with TOUR. This suggests that if a potential winery visitor drinks wine as an everyday beverage, he or she is 33% more likely to be interested in a tour around the vineyard. Likewise, a potential winery visitor is 39% more likely to be interested in winery or vineyard tours if he or she gives out wine as gifts.

In terms of sources of wine knowledge, all sources included in this model are positively related to TOUR except newspapers (K_NEWS) and TV or radio programs (K_TV). In all the positively related knowledge sources, source “winery tasting staff” has the highest influence on the likelihood of a consumer being interested in winery or vineyard tours at 16%, followed by source “wine magazines” at 15%, and “local magazines” at 14%. Influence of other sources does not reach the 10% level, but still increases the likelihood ratio. However, if a survey participant gains wine knowledge from reading newspaper articles, he or she is 2% less likely to be interested in such activity due.

Table 31: Wine Tourism Logistic Regression Dependent and Independent Variables

Descriptive Statistics

Source: Author

		N	Mean	S.D.[1]
Dependent Variable				
TOUR	1 = Interested or very interested in vineyard or winery tours; 0 = otherwise	949	0.61	0.49
Occasions				
O_EVERY	1 = Drinks everyday wine; 0 = otherwise	977	0.94	0.24
O_GIFT	1 = Gives Out Wine as Gifts; 0 = otherwise	977	0.96	0.19
Source of Knowledge				
K_WINEM	1 = Learn about wine through wine magazines; 0 = otherwise	977	0.23	0.42
K_FOODM	1 = Learn about wine through food and cooking magazines; 0 = otherwise	977	0.32	0.47
K_FRIEND	1 = Learn about wine through family and friends; 0 = otherwise	977	0.76	0.43
K_WINERY	1 = Learn about wine through winery tasting staff; 0 = otherwise	977	0.44	0.5
K_STORE	1 = Learn about wine through wine and liquor store employee; 0 = otherwise	977	0.54	0.5
K_LOCALM	1 = Learn about wine through local or reginal magazines; 0 = otherwise	977	0.14	0.34
K_NEWS	1 = Learn about wine through newspaper articles; 0 = otherwise	977	0.14	0.35
K_TV	1 = Learn about wine through TV or radio program; 0 = otherwise	977	0.13	0.34
Demographics				
GEO_NJ[2]	1 = Primary residence is located in New Jersey; 0 = otherwise	977	0.24	0.43
GEO_NY	1 = Primary residence is located in New York; 0 = otherwise	977	0.48	0.5
GEO_PA	1 = Primary residence is located in Pennsylvania; 0 = otherwise	977	0.28	0.45
GENDER	1 = Male; 0 = female	977	0.38	0.49
AGE21_24	1 = Age is between 21 and 24; 0 = otherwise	977	0.18	0.38
MARRIED	1 = Married or in a partnership; 0 = otherwise	977	0.6	0.49
EDU_HITE[2]	1 = Below Associate degree; 0 = otherwise	972	0.34	0.47
EDU_ASSO	1 = Associate degree; 0 = otherwise	972	0.1	0.3
EDU_BAMA	1 = Bachelor's degree or Above; 0 = otherwise	972	0.56	0.5
IN_75LOW[2]	1 = Annual household income below $76,000; 0 = otherwise	971	0.5242	0.50
IN_76_99	1 = Annual household income is between $76,000 - $99,999; 0 = otherwise	971	0.15	0.36
IN_100UP	1 = Annual household income above $100,000; 0 = otherwise	971	0.32	0.47
Purchasing and Drinking behaviors				
P1[2]	1 = Purchase wine only for everyday consumption for the household; 0 = otherwise	977	0.17	0.38
P2[2]	1 = Purchase wine only for special occasions for the household; 0 = otherwise	977	0.13	0.334
P12	1 = Purchase both everyday wine and for special occasions; 0 = otherwise	977	0.7	0.46
D_B	1 = Have purchased a bottle of wine due to profit donation; 0 = otherwise	963	0.27	0.45
B_750LESS	Percentage purchase made in bottles less than 750ml	781	6.16	13.12
B_750ML	Percentage purchase made in 750ml bottles	950	62.57	33.64
B_1.5L	Percentage purchase made in 1.5L bottles	871	26.32	26.89
B_3L[2]	Percentage purchase made in 3L bottles	971	10.42	19.30
T_RED	Percentage purchase of red wines	953	48.76	28.79
P_WHITE[2]	Percentage purchase of white wines	975	36.24	25.84
P_ROSE[2]	Percentage purchase of rose wines	975	16.1	19.205
FREQ	1 = Drink wine once a week or more frequently; 0 = otherwise.	977	0.22	0.41
Past Experience with Winery Tourism				
VISIT_NY	1 = Have visited a winery in New York; 0 = otherwise	977	0.29	0.45
VISIT_PA	1 = Have visited a winery in New Pennsylvania; 0 = otherwise	977	0.48	0.5
VISIT_NJ	1 = Have visited a winery in New Jersey; 0 = otherwise	977	0.21	0.41
Interaction term				
P12EVERY	1 = purchase everyday wine and for special occasions and consume everyday wine at the same time; 0 = otherwise	977	0.69	0.46

* **Notes**: 1. Standard Deviation 2. Dropped category

Table 32: Winery Tourism Logistic Regression Coefficient Estimation

Source: Author

	Coefficient	Standard Error	t value	p value	Marginal Effect
Constant	-3.2606	0.925	-3.525	0.0004	
Occasions					
O_EVERY***	1.3084	0.4646	2.816	0.0049	0.3159
O_GIFT***	1.6848	0.6294	2.677	0.0074	0.3943
Source of Knowledge					
K_WINEM***	0.7115	0.2322	3.064	0.0022	0.1529
K_FOODM**	0.4007	0.1946	2.059	0.0395	0.0902
K_FRIEND**	0.405	0.2017	2.008	0.0446	0.0955
K_WINERY***	0.689	0.1852	3.721	0.0002	0.156
K_STORE**	0.3938	0.1724	2.285	0.0223	0.0909
K_LOCALM**	0.6536	0.2748	2.378	0.0174	0.1388
K_NEWS*	-0.5007	0.27	-1.855	0.0637	-0.1195
K_TV	0.453	0.2828	1.602	0.1092	
Demographics					
GEO_NY	0.121	0.2321	0.521	0.6021	
GEO_PA	0.0494	0.262	0.189	0.8504	
GENDER*	0.3084	0.1859	1.659	0.0971	0.07
AGE21_24**	-0.492	0.236	-2.085	0.0371	-0.117
MARRIED	0.1692	0.1895	0.893	0.372	
EDU_ASSO*	-0.5705	0.3045	-1.873	0.061	-0.1374
EDU_BAMA	-0.0442	0.2002	-0.221	0.8253	
IN_76_99	-0.27	0.26	-1.038	0.299	
IN_100UP	-0.0878	0.2117	-0.415	0.6785	
Purchasing and Drinking behaviors					
P12**	2.3148	1.1106	2.084	0.0371	0.5206
D_B	0.3023	0.2081	1.452	0.1464	
B_750LESS	-0.0083	0.0087	-0.949	0.3426	
B_750ML*	-0.0083	0.0049	-1.698	0.0895	-0.0019
B_1_5L	-0.0091	0.0059	-1.55	0.1211	
T_RED	0.0029	0.0031	0.932	0.3516	
FREQ	0.2044	0.2061	0.992	0.3212	
Past Experience with Winery Tourism					
VISIT_NY*	0.3242	0.1872	1.732	0.0834	0.0744
VISIT_PA**	0.4693	0.2222	2.112	0.0347	0.1045
VISIT_NJ	-0.1128	0.2398	-0.47	0.6381	
Interaction term					
P12EVERY**	-2.4881	1.1295	-2.203	0.0276	-0.454

* **Notes**: ***Significant at 1% ** Significant at 5%; * Significant at 10%; N = 736

Variables that describe demographics suggest a profile of "who" would be interested in a winery or vineyard tour, although only three variables are significant. Discounting the insignificant variables, GENDER is positively associated with TOUR while AGE21_24 and EDU_ASSO have a negative relationship. This implies that men are 7% more likely to

be interested in vineyard tours than women. Young adults, between 21 and 24 years old, are 12% less likely to be interested in these tours than participants in older age groups. In terms of educational levels, EDU_BAMA is cannot be interpreted because it is not significant. Thus, a participant whose highest level of education consists of either an associate degree or was a technical school graduate is 14% less likely to be interested in winery or vineyard tours compared to those who had less of an education.

Among all purchasing and drinking behaviors, two are significant. P12 has a positive relationship with TOUR indicating consumers who buy both everyday wine and wines served when entertaining and during special occasion are 52% more likely to be interested in vineyard tours compared to those who only buy for one of the two occasions. Additionally, the interaction term suggests that if participants drink everyday wine (variable from drinking occasions), then the likelihood will decrease by 45%, correcting the overlapping effects on TOUR. On the other hand, for each percentage increase in purchase of wine in 750ml bottles by giving up wine in 3L bottles, the likelihood will decrease by 0.2%.

Past experience can lead to interests in future winery tours. Having visited a winery in New York and Pennsylvania in the past increases the likelihood of being interested in a winery or vineyard tour by 7% and 11% respectively, despite New Jersey being insignificant.

SECTION 5. DISCUSSION

The expanding Mid-Atlantic region requires enhanced wine making techniques as well as a deeper understanding of the consumers. Knowing the market potential of the Mid-Atlantic region, this study on consumer preference can facilitate the development of local wine industries. Taking a wine consuming frequency market segmentation approach, I clearly profile the super core wine consumers and the target market of the local wine industry. Through a logistic regression analysis, demographics and other factors are not only identified but also evaluated based on their impact on the likelihood of being the super core wine consumer. Using a decision tree approach, characteristics of target consumers of each state are scored and ranked while the differences and similarities between the states were identified. With such information, winery owners can design products and business strategies that eventually benefit the consumers.

5.1 The Super Core Approach

From the study of super core consumers, a strong association with being a super core consumer is found in gender, age, residency, marital status, and income, whereas education does not show a significant relationship. Sources of wine knowledge, occasions to drink wine, purchase because of profit donated to a non-profit organization and household wine purchase preferences also are significantly related to be a super core consumer. Specifically, consumers who are married individuals; males; aged over 45 years; had annual household

income over $100,000; lived in New Jersey; are more likely to become super core wine consumers. In addition to demographic factors, giving out wine as gifts, and gaining wine knowledge from wine magazines and newspaper articles can also increase the likelihood of being a super core wine consumer whereas drinking wine for special occasions, and learning knowledge about wine from family and friends, store employees, and local magazines will decrease. Super core consumers also favor wineries taking social responsibilities and donating part of their profit to a non-for-profit organization. When speaking about the wine itself, super core consumers prefers skinny wines red wines, and wines in 3L bottles compared to non-super core wine consumers.

The super core model suggests business owners in New Jersey, New York, and Pennsylvania should target New Jersey married males whose age is over 45 years old. Red wines should be the product provided to the target market. Winery owners can also provide wines that had less than 10% alcohol and/or fewer than 80 calories per 5 oz. serving and wines in 3L bottles if they want to provide some unique products to standout in the market. Advertising on wine magazines and through newspaper articles can reach super core consumers effectively. Additionally, providing gift wraps, cooperating with a charity, and showing the image of being social responsible are also appropriate strategies that are likely to attract super core wine consumers. These findings generally agree with Spawton's (1991) connoisseurs market segment (regular wine drinkers with higher level of wine knowledge and brand loyalty). Results in demographics support findings in previous studies: older males are more likely to consume wine more frequently (Fotopoulos *et al.,* 2002; Gjonbalaj

et al., 2009). Findings in sources of wine knowledge expand Gjonbalaj *et al.* (2009)'s conclusion in which media "press" has a significant relationship with wine consumption frequencies while "TV/Radio programs" does not.

However, the super core approach only explores the frequent consumers of wines in general, not of New Jersey, New York, or Pennsylvania wine. Since the Mid-Atlantic region is not dominating the market, only looking at the super core wine consumers does not provide much guidance to the local winery owners. Differences in the wine consumer behaviors remain unexplored. Fortunately, he second approach of this research resolves the problem.

5.2 New Jersey Wine Market

The New Jersey decision tree model finds that New Jersey wine target market are 1) young (less than 45 years old) super core wine consumers have purchased a bottle of wine because part of the profit is donated to a non-profit organization and 2) young super core wine consumers who do not have a four-year college degree and has not purchased a bottle of wine because partial profit donated. New Jersey wine producers should avoid targeting non-super core wine consumers and old (45 years old or elder) super core wine consumers. The results generally agree with findings from descriptive statistics. New Jersey wines are usually served as table wines (served to others and ordered in a restaurants). New Jersey target market drinks New Jersey wine mainly as everyday wine. The target market also brings New Jersey wines to BYO restaurants. Red wines are also

more popular than white wines. The popular New Jersey red wines varieties are Merlot and Cabernet Sauvignon and the most popular white variety is Pinot Grigio/Pinot Gris. The most effective marketing channel to reach the target market is through interpersonal communications: family and friends, wine and liquor store employees, and winery tasting staff. Indirect marketing is less efficient. The best indirect marketing strategy is advertising through food and cooking magazines. Local magazines, newspaper, and TV/radio programs should be avoided because less target markets used these sources.

Because New Jersey wines are usually treated as table wines for consumptions, displaying food pairing suggestions especially on food and cooking magazines is a good wine marketing strategy. New Jersey wineries also can hold joint events with local restaurants since many New Jersey target market consumers order local wines in a restaurant. However, the study is not able to distinguish wine ordering in a local restaurant from a restaurant outside of New Jersey. For this reason, the effectiveness of this strategy cannot be predicted precisely. I suggest future studies measure how local restaurants can promote New Jersey wines.

New Jersey wine target market is basically younger wine super core consumers who also pay attention to wine and food pairing options. This agrees with Riviezzo, De Nisco & Garofano (2011)'s group "Image-Oriented Drinkers". These wine consumers are also greatly affected by the opinion leaders. This suggests that New Jersey wine makers should guarantee good quality wines and then let the wines be critiqued by some wine professionals. The wine reviews can be published on food and cooking magazines or

wine magazines as a good wine to market the wines to the target market. At the same time, New Jersey wine makers can develop new wines flavors (or maybe their unique wine flavors) within the everyday wine price range.

Consumer retention rate (willing to continue purchase rate) is not very high among New Jersey wine consumers. For this reason, New Jersey wine industry should focus on increasing loyalty to the production area by increasing perceived quality of wines.

5.3 New York Wine Market

New York wine industry has many similarities to New Jersey wine industry. Results suggest consumers value effectiveness of marketing channels in the same order with New Jersey wines. Both New Jersey and New York wines can be categorized as everyday table wines based on the wine drinking occasions. However, the study also highlights some of the differences in New York wine market. The New York decision tree model suggests New York wines has a broader target market than New Jersey. This target market includes New York super cores wine consumers, New York non-super core wine consumers (despite the two income groups are indecisive), and New Jersey and Pennsylvania young super core wine consumers. Thus, New York wines are well recognized by residents outside of state and non-super core wine drinkers. Meanwhile, New York wines have a much better consumer loyalty: over 70% of the respondents in the target market. Visiting a New York winery (over 60%) is also popular among the target market unlike New Jersey. All grape varieties of New York wines are perceived to

have better quality than New Jersey and Pennsylvania. Hence, the differences between the varieties are minimal. For this reason, product differentiation is possible and can be profitable. Given the fact that New York wines has a good consumer retention rate, individual wine-makers in New York should focus on building their own brand loyalty rather than build reputation of the production region first. Considering the size of New York wine industry and the level of competition of U.S. wineries, product differentiation can reduce the level of price competition by turning a nearly perfect competition market into a monopolistic competition in the market.

On the other hand, there remain some contradictions in the study that future studies should explore. Although most of the target consumers learn about wine from their family and friends, the rates of recommending New York wines to others is still relatively low. This may possibly because New York wines are still not as competitive as wines produced outside of the Mid-Atlantic region. Certain policies and E-commerce may also have an effect that cannot be observed in this study.

Another contradiction is that although a lot of New York target consumers have visited a New York winery in the past, they do not value learning wine knowledge from the winery staff as much as expected. One reason can be the winery staff intend to market their products that the consumers are not interested. Thus, the knowledge consumers get from the tasting staff can be biased and inaccurate. In addition, the survey fails to stress how frequently a target consumer visits the winery that future studies should include.

5.4 Pennsylvania Wine Market

Among the three states, performance and perceived quality of Pennsylvania wines are in between of New Jersey and New York. Pennsylvania wines, thus, share some common traits of New Jersey and New York wines. Considering the current state, Pennsylvania wines have more similarities to New Jersey wines than New York wines. Same with New York and New Jersey wines, Pennsylvania wines are perceived as every day table wines. Unfortunately, like New Jersey, Pennsylvania wine target consumers do not have as high consumer loyalty. Slightly different from the other two states, bring your own (BYO) restaurant is the most popular drinking occasion among Pennsylvania wine target consumers, while drinking Pennsylvania wines as everyday wine is the second. Like New York and New Jersey, Pennsylvania target consumers prefer red wines and those in 750ml bottles. Merlot in red and Chardonnay and Pinot Grigio/Pinot Gris in white, like New York, are three varieties that have the highest ratings. Marketing channels also have the same order with New York and New Jersey: word of mouth (family and friends) is the most effective; “food and cooking magazines” is the most effective indirect market tool but the rate is much lower than interpersonal marketing.

Like New Jersey but different from New York, Pennsylvania wine should target its own residents. Being a super core wine consumer, age, and previous purchase because of profit donation are three important variables used to identify the target market. Wine in this state can attract young (age<45) non-super core wine consumers and older (age above 45) super core wine consumers from Pennsylvania. Among young (age<45) super

core residences, those who have purchased a bottle of wine due to profit donation should be pertained. Avoid learning wine knowledge from wine and liquor store staff encourages a young Pennsylvania, super core wine consumer who have not purchased a bottle of wine due to profit donation to be part of the target market.

The limited geographical spread of target consumer is similar to New Jersey. However, Pennsylvania wine production ranks number 4 in size in the United State. With such a high wine production volume, promoting Pennsylvania wines to the local residents can be challenging when facing the competition with New York, California, imported wines, etc. Combining results from descriptive statistics, I suggest Pennsylvania wine makers 1) cooperate with the local restaurants and highlight local wine in state; 2) increase consumer loyalty to Pennsylvania as a wine production area and market a positive image of Pennsylvania wines by joining wine competitions or festivals with the best quality wines. Pennsylvania wines can also try to penetrate markets of another state (i.e. New Jersey, Virginia, etc.) due to its high production volume. To be more competitive in the market, Pennsylvania wine producers should work together to improve the overall reputation and consumer retention rate of the production region by creating a positive consumer experience with their wines.

Similar suggestions are made towards Pennsylvania wines when determining marketing channels. Because Pennsylvania target consumers have high participation rate in recommending wines to others, referral discounts can be beneficial to Pennsylvania wine makers. Wineries should also focus on increasing brand loyalty by providing good quality

wines to consumers and motivate the consumers to write positive reviews or share positive experiences with others. On the other hand, as food and cooking magazine is the best in indirect marketing, food pairing suggestions on both labels and food magazines are strongly recommended. However, since not many of the target market choose to order Pennsylvania wines in a restaurant, cooperating with local restaurants may not be necessary.

5.5 Similarities and Differences between New Jersey, New York, and Pennsylvania

The three states, New Jersey, New York, and Pennsylvania, in Mid-Atlantic region are under similar situations despite some minor differences. Comparing the three states can greatly help us identify key characteristics and strategies that can be generalized and applied to all Mid-Atlantic region.

The target markets of wines from the three states have many similarities. The three key factors for a consumer being in the target markets are being a super core wine consumer, age less than 45 years old, and reside in the state where the wine is produced. Compared to New Jersey and Pennsylvania, New York wines are more widely accepted that also attracts New York non-super core wine consumers and young (age<45) super core wine consumers from New Jersey and Pennsylvania. Similarly, the most important factor that identifies the target market for New York is residency, different from New Jersey and Pennsylvania that are super core.

On the other hand, several differences are revealed. New York wines are more widely accepted, and its perceived quality are also higher than the two other states. Perceived

quality of Pennsylvania wine is slightly lower than New York wine but much higher than New Jersey wines. However, none of the states has very high positive response rates to perceived quality (max of the three states is 78% from New York). In terms of the most attractive types of wine, Merlot has the highest rank across all three states. Chardonnay is the most welcomed white variety except for New Jersey. Notably, red wines are also more popular than white wines. All target consumers from the three states prefer wines in 750ml bottles. Bottles that are smaller than 750ml are not popular across the three states.

Based on the wine drinking occasions, everyday tables wines from these three states are preferred. However, the states also have some differences: New York had higher percentage of the target market drinking its wine than New Jersey and Pennsylvania.

All three states have the same ranking for marketing channel effectiveness. Word of mouth (family and friends) is the best source of marketing to reach target consumers. However, this source requires positive experience with and high quality of the wines. “Food and cooking magazines” is the most effective indirect marketing channel, agreeing with the characteristics of being everyday table wines.

New York also has relatively higher winery visiting rate compared to New Jersey and Pennsylvania. Winery tours are great opportunities that can introduce the target markets to the local wines because wine is an experience based product.

5.6 Comparison Between Super Core Consumers and Mid-Atlantic Target Markets

The Mid-Atlantic target market decision tree models show that young (<45 years old) super core consumers should be targeted by the Mid-Atlantic States. However, the super core model suggests older (>45 years old) wine drinkers were more likely to be super core consumers. The contradiction between the two approaches indicates the difference between the Mid-Atlantic wine industry and the general wine industry.

Some other differences in addition to age are also detected. Buying wines in 3L bottles shows significant positive relationship with being a super core consumer. However, size of bottle is not even selected by the decision tree models in the Mid-Atlantic wine market study. On the other hand, a significant positive relationship is seen between learning about wine through wine magazines and being a super core. For the Mid-Atlantic wine study, cooking or food magazines are more effective when wine makers market their wines to the target market. The difference in the source of wine knowledge show the differences in behaviors and primary purpose of wine consumption. Super core wine consumers treat wine as a hobby so that they read wine magazines and acquire wine specific knowledge more frequently than the Mid-Atlantic wine target market.

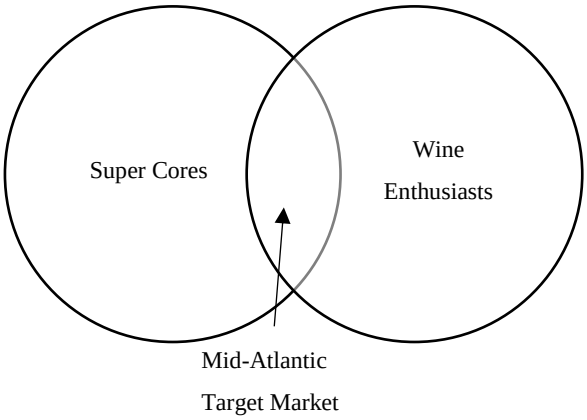
However, some similarities can be also seen between the above two approaches. Both Mid-Atlantic target market models and the super core model suggest males should be targeted. Super core consumers and the Mid-Atlantic target consumers also drink more red wines. Partial profit donated to a non-profit organization as a marketing strategy is also

effective to reach the super core consumers and Mid-Atlantic target consumers. The two approaches both suggest everyday wines are preferred.

Some previous studies provide some guidance when defining the characteristics of Mid-Atlantic wine target market. Considering the reputation and current market share of Mid-Atlantic wines, target market of this production region need actively seek for information to notice the existence of the market and become interested. There are groups defined by different researchers who search for wine information actively. *Connoisseurs* (Spawn, 1991) are like the super core consumers who frequent wine drinkers who treat wine as a hobby, but they tend to have high brand loyalty to wines that they always drink. Due to the high brand loyalty, this group of consumers hardly can be converted to become a loyal consumer of Mid-Atlantic wines. The other group, Image-Oriented Drinkers (Riviezzo *et al.*, 2012) are young wine consumers who drink at restaurants and in public places and will pay attention to places of origin and food pairing options. The Image-Oriented Drinkers has a lot of similarities to the Mid-Atlantic target market. However, Riviezzo *et al.* failed to mention the level of involvement with wine. Combing the two groups and results from this study, a more generalized model can be proposed: the target market for Mid-Atlantic wines should be both a frequent wine drinker (a *super core* consumer) and someone who would treat wine as a hobby and would be willing to explore new types of wines (a *wine enthusiast*) at the same time. The following diagram illustrates the relationship.

Figure 11: Generalized Target Market for Mid-Atlantic Region

Source: Author



5.7 Mid-Atlantic Wine Consumers' Interests in Winery Tours

By studying Mid-Atlantic survey respondents' interest in winery tours, the top three wine tourism activities respondents interested are identified as wine tasting, winery tours, and food vendors. Wine tourists evaluate distance to travel, cost, and time of a day or day in a week as the three most important factors when they decide to go for wine tourism. The results show wine tourists prefer affordable cost of activities and convenient time and location of the events. They also pay a lot of attention to available purchases on-site. One possible reason behind on-site purchase is wine was an experience based product. After wine tasting, consumer can purchase the product they like to reduce risk in wine purchasing.

Results from the two-way contingency table agree with Mitchell, Hall, and McIntosh (2000) where individuals with higher education (bachelor's degree or above) have higher

interest in vineyard tours. The logistic regression model shows that males tend to be more interested in taking a tour around a winery or a vineyard, possibly because more males have higher involvement with wine (Fotopoulos *et al*. 2002; Gjonbalaj *et a*l. 2009). Young individuals (21 to 24 years old) are less likely to be interested in winery or vineyard tours, which agrees with Mitchell, Hall, and McIntosh (2000). Consumers with an associate degree are less likely to be interested in wine tourism compared to those who has a lower educational level (may because of the insignificant variable that represents having a bachelor's degree or above). This result agrees with Govindasamy and Kelley (2014).

In addition, sources of wine knowledge have significant and positive relationships with interest in winery tours except for newspaper and TV/radio. Newspaper has a negative relationship with the likelihood because newspaper was not a popular source of wine knowledge compared to channels such as wine magazines (results from the New York, New Jersey, and Pennsylvania target market study), unlike for agritourism (Govindasamy and Kelley, 2014). Winery tasting staff, wine magazines, and regional or local magazines have the top three influences on the likelihood of being interested in winery tourism, primarily because the first two are strongly associated with wine and the last one is associated with local activities. All occasional variables are positively significant suggesting everyday wine and gift wines are preferred by markets. Consumers with previous winery tourism experience also show higher likelihood to be interested in future winery tourism. Consumers were more likely to be interested in winery tourism if

they purchased everyday wine and for special occasions, suggesting the market potential in the long-term.

SECTION 6. CONCLUSION

The research follows the theory proposed by previous studies and additionally highlights the unique characteristics of the Mid-Atlantic wine production region. By studying super core consumers, the profile of general frequent wine consumers can be clearly shown. With such knowledge, target market of each state of the Mid-Atlantic region is identified. Through descriptive statistics, target markets' preferences for grape variety, drinking occasions, and marketing channels are quantified. These results, thus, provide direct guidance for wineries in the region. Winery tours are also studied and examined as a business strategy to generate addition profit and maintain relationship with the target market.

The target market of the Mid-Atlantic states should be young super core consumers, who are married males, and be more likely to live in New Jersey. More importantly, the target market of the Mid-Atlantic region should be both 1) super core consumers who drink wine frequently, and 2) wine enthusiasts who are able to try new wines living in the state of production. This is because of the relatively small market share of Mid-Atlantic states. The intersection between the two groups implies targeting young super core male consumers for Mid-Atlantic wines.

Comparing the states, New York wines have a better consumer retention rate and an overall perceived quality than wines from New Jersey and Pennsylvania. However, all three states need to continue improving their perceived quality. Notably, the physical

quality of wines from Mid-Atlantic states may not be necessarily bad, but it is the reputation of the wines demands improvement. Consumer will rate the quality of the wines from Mid-Atlantic states based on their experience. To avoid consumers having a negative image of this production area, wine producers in Mid-Atlantic states should unify together and improve the overall quality and consumer experience. By improving the quality, a better image of the wine production region can be established. On the other hand, Mid-Atlantic wine producers should develop their unique traits instead of simply imitating California or European wines. More varieties should be experimented with, and the wineries should communicate the results of this experimentation.

In terms of marketing strategies, indirect marketing is not as effective as direct marketing. Having some profit donated to a non-profit organization can be an attractive marketing strategy to target consumers of the Mid-Atlantic states. Word of mouth, again, is the best way to reach the target market for Mid-Atlantic states. Promoting a wine through family and friends is also cost-effective. However, the target market consumers of Mid-Atlantic states are not very likely to recommend the wines, possibly because of the low perceived quality. A consumer would only recommend the wine when he or she has a positive experience with the wine. For this reason, wineries in Mid-Atlantic region should keep working on improving their qualities to have better marketing channels.

Unfortunately, there are several limitations of the study. The Internet based survey method causes a selection bias. The survey also does not contain certain variables that should be evaluated: perceived quality of an award-winning wine, perceived quality of a

wine with positive or negative professional critiques, and the level of wine knowledge of a consumer. On the other hand, some popular wine grape varieties such as Cabernet Franc are also missing in the survey. Some varieties that are unpopular but had positive reputations should also be included to help the Mid-Atlantic states wine industries find their unique products so that they can differentiate themselves from the world wine market.

Despite the limitations of the study, wineries in the Mid-Atlantic region can see a promising future if they implement the core business strategies that are proposed by this study. Developing unique, target market attractive traits can help set the brand of the production region that attracts more potential consumers of the Mid-Atlantic wines. With persistent improvement on the perceived quality, wineries from the Mid-Atlantic region can see a net profit increase with higher volume of sales and less resources spent on marketing campaigns. A well-established brand image of high quality promises the potential for Mid-Atlantic wines to penetrate the U.S. and the world wine market. A long-term relationship between the wineries and the consumers can also be built and make the Mid-Atlantic wineries more competitive in the wine market.

REFERENCES

Alant, K., & Bruwer, J. (2004). Wine Tourism Behaviour In The Context Of A Motivational Framework For Wine Regions And Cellar Doors. *Journal Of Wine Research*, *15*(1), 27-37.

Alebaki, M., & Iakovidou, O. (2010). Segmenting The Greek Wine Tourism Market Using A Motivational Approach. *New Medit*, *9*(4), 31-40.

Assembly Of European Wine Region (2015), Wine Tourism: Which Strategy Should AREV Adopt? Retrieved April 9, 2017 From Http://Www.Arev.Org/En/News/Wine-Tourism-Which-Strategy-Should-Arev-Adopt

Barber, N. (2009). Wine Consumers Information Search: Gender Differences And Implications For The Hospitality Industry. *Tourism And Hospitality Research*, *9*(3), 250-269.

Bruwer, J., Li, C., & Reid, M. (2001). Wine-Related Lifestyle Segmentation Of The Australian Domestic Wine Market. *Australian And New Zealand Wine Industry Journal*, 16(2):104-108

Bruwer, J., Li, E., & Reid, M. (2002). Segmentation Of The Australian Wine Market Using A Wine-Related Lifestyle Approach. *Journal Of Wine Research*, *13*(3), 217-242.

Chaney, I. M. (2000). External Search Effort For Wine. *International Journal Of Wine Marketing*, *12*(2), 5-21.

Chrea, C., Melo, L., Evans, G., Forde, C., Delahunty, C., & Cox, D. N. (2011). An Investigation Using Three Approaches To Understand The Influence Of Extrinsic Product Cues On Consumer Behavior: An Example Of Australian Wines. *Journal Of Sensory Studies*, *26*(1), 13-24.

Dodd, T. H., Laverie, D. A., Wilcox, J. F., & Duhan, D. F. (2005). Differential Effects Of Experience, Subjective Knowledge, And Objective Knowledge On Sources Of Information Used In Consumer Wine Purchasing. *Journal Of Hospitality & Tourism Research*, *29*(1), 3-19.

Dombrosky, J. And Gajanan, S. (2013). Pennsylvania Wine Industry–An Assessment. *The Center For Rural Pennsylvania.* Retrieved March 28, 2013 From*:* Www.Rural.Palegislature.Us/Documents/Reports/Pa_Wine_Industry_2013.Pdf

Fisher, C. (2011). Review Of The Industry: US Wineries Grow 9% To 6,785. *Wine Business Monthly*, Vol. 20 No. 5, Pp. 70-37.

Fisher, C. (2013), 2013 WBM/SVB Tasting Room Survey Report, *Wine Business Monthly*, Vol. 18 No. 2, Pp. 46-54.

Fotopoulos, C., Krystallis, A. And Ness, M., (2002). "Consumers' Motivations In Purchasing 'New Wines' In Greece With Emphasis On Wine Produced By Organic Grapes1: A Means-End Chains Approach". *Zaragoza (Spain)*, 28, P.31.

Friedl, M. A., & Brodley, C. E. (1997). Decision Tree Classification Of Land Cover From Remotely Sensed Data. *Remote Sensing Of Environment*, *61*(3), 399-409.

Galloway, G., Mitchell, R., Getz, D., Crouch, G., & Ong, B. (2008). Sensation Seeking And The Prediction Of Attitudes And Behaviours Of Wine Tourists. *Tourism Management*, *29*(5), 950-966.

Getz, D, & Brown, G (2006), "Critical Success Factors For Wine Tourism Regions: A Demand Analysis", *Tourism Management*, 27, Pp. 146-158, Sciencedirect, Ebsco*host*, Viewed 10 April 2017.

Getz, D., & Brown, G. (2006). Benchmarking Wine Tourism Development: The Case Of The Okanagan Valley, British Columbia, Canada. *International Journal Of Wine Marketing*, *18*(2), 78-97. Emerald Insight, Ebsco*host*, Viewed 10 April 2017.

Gjonbalaj, M., Miftara, I., Pllana, M., Fetahu, S., Bytyqi, H., Gjergjizi, H., & Dragusha, B. (2009). Analyses Of Consumer Behavior And Wine Market In Kosovo. *Agriculturae Conspectus Scientificus (ACS)*, *74*(4), 333-338.

Govindasamy, R, & Kelley, K (2014), "Agritourism Consumers' Participation In Wine Tasting Events: An Econometric Analysis", *International Journal Of Wine Business Research*, 2, P. 120, Emerald Insight, Ebsco*host*, Viewed 8 April 2017.

Hall, J., & Winchester, M. (2001). Empirical Analysis Of Spawton's (1991) Segmentation Of The Australian Wine Market. *AP-Asia Pacific Advances In Consumer Research* Volume 4, Retrieved April 25, 2017 From Http://Acrwebsite.Org/Volumes/11373/Volumes/Ap04/AP-04

Hall, J., Lockshin, L., & Barry O'Mahony, G. (2001). Exploring The Links Between Wine Choice And Dining Occasions: Factors Of Influence. *International Journal Of Wine Marketing*, *13*(1), 36-53.

Hall, J., Lockshin, L.(2003) Consumer Purchasing Behaviour For Wine: What I Know And Where I Are Going. *International Colloquium In Wine Marketing 2003*, 1-21.

Higgins, L, & Wolf, M (2016), "Millennials As Luxury Wine Buyers In The United States?", *International Journal Of Wine Business Research*, 28, 3, P. 190-205, Scopus®, Ebsco*host*, Viewed 9 April 2017.

History Of NJ Wine. (2016). Retrieved November 10, 2016, From Https://Njvines.Rutgers.Edu/About/History-Of-Nj-Wine/

Huei-Ju, C, & Sasias, M (2014), "Tourist Segmentation In Taiwan's Wineries: A Cultural Perspective", *Social Behavior & Personality: An International Journal*, 42, 2, Pp. 223-236, Academic Search Premier, Ebsco*host*, Viewed 7 April 2017.

IBM Knowledge Center. (2012). Retrieved March 01, 2017, From Https://Www.Ibm.Com/Support/Knowledgecenter/En/SSLVMB_22.0.0/Com.Ibm.Spss.Statistics.Help/Spss/Tree/Idh_Idd_Treegui_Main.Htm

IBM Knowledge Center. (2012). Retrieved March 01, 2017, From Https://Www.Ibm.Com/Support/Knowledgecenter/SS3RA7_15.0.0/Com.Ibm.Spss.Modeler.Help/Chaidnode_General.Htm

James, J. S., Rickard, B. J., & Rossman, W. J. (2009). Product Differentiation And Market Segmentation In Applesauce: Using A Choice Experiment To Assess The Value Of Organic, Local, And Nutrition Attributes. Agricultural & Resource Economics Review, 38(3), 357.

Johnson, T, & Bastian, S (2007), "A Preliminary Study Of The Relationship Between Australian Wine Consumers' Wine Expertise And Their Wine Purchasing And Consumption Behaviour", *Australian Journal Of Grape And Wine Research*, 13, 3, Pp. 186-197, Science Citation Index, Ebsco*host*, Viewed 10 April 2017.

Kelley, K., Hyde, J., & Bruwer, J. (2015). Usage Rate Segmentation: Enriching The US Wine Market Profile. *International Journal Of Wine Research, Vol 2015*, 49-61.

Kotler, P. (2003). *Marketing Insights From A To Z: 80 Concepts Every Manager Needs To Know*. Hoboken, N.J.: John Wiley & Sons.

Kotler, P. (2003). *Marketing Management: An Asian Perspective* (3rd Ed.). Singapore; New York: Pearson/Prentice Hall.

Kotler, P., & Caslione, J. A. (2009). *Chaotics: The Business Of Managing And Marketing In The Age Of Turbulence*. New York: American Management Association.

Kotler, P., & Keller, K. L. (2012). *Marketing Management* (14th Ed].). Upper Saddle River, N.J.: Prentice Hall.

Lee, N., & Kotler, P. (2016). *Social Marketing: Changing Behaviors For Good* (Edition 5.). Thousand Oaks, California: SAGE.

Lockshin, L., Cohen, E., & Goodman, S. (2008). Overcoming Measurement Errors: Segmenting Wine Consumers Across 11 Countries. *Ehrenberg-Bass Institute For Marketing Science, Wine Marketing Group. URL Http://Www. Winepreferences. Com/Resources/Page56/Files/Page56_1. Pdf*.

Lockshin, L., Jarvis, W., d'Hauteville, F., & Perrouty, J. P. (2006). Using Simulations From Discrete Choice Experiments To Measure Consumer Sensitivity To Brand,

Region, Price, And Awards In Wine Choice. *Food Quality And Preference*, *17*(3), 166-178.

Lockshin, L., & Spawton, T. (2001), "Using Involvement And Brand Equity To Develop A Wine Tourism Strategy", *International Journal Of Wine Marketing*, 1, P. 72, Emerald Insight, Ebsco*host*, Viewed 10 April 2017.

Lunardo, R., & Guerinet, R. (2007). The Influence Of Label On Wine Consumption: Its Effects On Young Consumers' Perception Of Authenticity And Purchasing Behavior. *International Marketing And Trade Of Quality Food Products*, 279.

Marshall, R. S., Akoorie, M. E., Hamann, R., & Sinha, P. (2010). Environmental Practices In The Wine Industry: An Empirical Application Of The Theory Of Reasoned Action And Stakeholder Theory In The United States And New Zealand. *Journal Of World Business*, *45*(4), 405-414.

Mackun, P. And Wilson, S. (2011), *2010 Census Briefs. Population Distribution And Change: 2000 To 2010*, U.S. Department Of Commerce, Economics And Statistics Administration, Available At: Www.Census.Gov/Prod/Cen2010/Briefs/C2010br-01.Pdf (Accessed 9 April 2017).

Marlowe, B, Brown, E, & Zheng, T (2016), "Winery Tasting-Room Employee Training: Putting Wine First In Oregon", *Journal Of Quality Assurance In Hospitality And Tourism*, 17, 2, P. 89-100, Scopus®, Ebsco*host*, Viewed 9 April 2017.

Mitchell, R, Charters, S, & Albrecht, J (2012), "Cultural Systems And The Wine Tourism Product", *Annals Of Tourism Research*, 39, Pp. 311-335, Sciencedirect, Ebsco*host*, Viewed 10 April 2017.

Mitchell, R., Hall, C.M. And Mcintosh, A., (2002). "Wine Tourism And Consumer Behaviour". Hall M., *Wine Tourism Around The World: Development, Management And Markets*, Routledge, New York, P.115-135.

Molina, A, Gómez, M, Esteban, Á, & González-Díaz, B (2015), "Market Segmentation In Wine Tourism: Strategies For Wineries And Destinations In Spain", *Journal Of Wine Research*, 26, 3, P. 192-224, Scopus®, Ebsco*host*, Viewed 8 April 2017.

Nella, A, & Christou, E (2014), "Segmenting Wine Tourists On The Basis Of Involvement With Wine", *Journal Of Travel & Tourism Marketing*, 31, 7, Pp. 783-798, Social Sciences Citation Index, Ebsco*host*, Viewed 8 April 2017.

NJ Wine Grape Quick Facts (2016). Retrieved November 10, 2016, from https://njvines.rutgers.edu/grape-growing/site-selection/quick-facts/

Perez, G. G., Fernandez, V. C., Yurda, M. L., & Donate, M. R. (2002). Socioeconomic Factors And The Consumption Of Wine In Tenerife. *Zaragoza (Spain)*, *28*, 31.

Power, C., Rodgers, B., & Hope, S. (1999). Heavy Alcohol Consumption And Marital Status: Disentangling The Relationship In A National Study Of Young Adults. *Addiction, 94*(10), 1477-1487.

Quester, P. G., & Smart, J. (1996). Product Involvement In Consumer Wine Purchases: Its Demographic Determinants And Influence On Choice Attributes. *International Journal Of Wine Marketing*, *8*(3), 37-56.

Quester, P. G., & Smart, J. (1998). The Influence Of Consumption Situation And Product Involvement Over Consumers' Use Of Product Attribute. *Journal Of Consumer Marketing*, *15*(3), 220-238.

Rao, J. N., & Scott, A. J. (1981). The Analysis Of Categorical Data From Complex Sample Surveys: Chi-Squared Tests For Goodness Of Fit And Independence In Two-Way Tables. *Journal Of The American Statistical Association*, *76*(374), 221-230.

Riviezzo, A., De Nisco, A., & Garofano, A. (2011). Understanding Wine Purchase And Consumption Behavior: A Market Segmentation Proposal. *Bordeaux: Bordeaux Management School*.

Russell, S. J., & Norvig, P. (1995). LEARNING FROM OBSERVATIONS. In *Artificial Intelligence - A Modern Approach* (Pp. 542-579). Englewood Cliffs, NJ: Prentice-Hall. Http://Stpk.Cs.Rtu.Lv/Sites/All/Files/Stpk/Materiali/Mi/Artificial%20intelligence%20a%20modern%20approach.Pdf

Rutgers New Jersey Center For Wine Research And Education (2015). "History Of NJ Wine". Available At: Https://Njvines.Rutgers.Edu/About/History-Of-Nj-Wine/ (Accessed April 11, 2017).

Ryan, S., Debord, K. And Mcclellan, K., (2006). *Agritourism In Pennsylvania: An Industry Assessment*. Center For Rural Pennsylvania, Available At Http://Www.Rural.Palegislature.Us/Agritourism2006.Pdf (Accessed 9 April 2017).

Shor, N, & Mansfeld, Y (2009), "Between Wine Consumption And Wine Tourism: Consumer And Spatial Behavior Of Israeli Wine Tourists", *Tourism (13327461)*, 57, 4, P. 381, Supplemental Index, Ebsco*host*, Viewed 8 April 2017.

Simpson, K, Bretherton, P, & De Vere, G (2004), "Lifestyle Market Segmentation, Small Business Entrepreneurs, And The New Zealand Wine Tourism Industry", *Journal Of Quality Assurance In Hospitality & Tourism*, 5, 2-4, Pp. 157-188, Business Source Premier, Ebsco*host*, Viewed 7 April 2017.

Sparks, B (2007), "Planning A Wine Tourism Vacation? Factors That Help To Predict Tourist Behavioural Intentions", *Tourism Management*, 28, Pp. 1180-1192, Sciencedirect, Ebsco*host*, Viewed 10 April 2017.

Spawton, T. (1991). Of Wine And Live Asses: Wine Economy And State Of Wine Marketing. *European Journal Of Marketing*, 25(3), 6-48.

Speed, R. (1998), Choosing Between Line Extensions And Second Brands: The Case Of The Australian And New Zealand Wine Industries, *Journal Of Product & Brand Management*, 6, P. 519.

SPSS Decision Trees. (2016, January 01). Retrieved March 01, 2017 From Http://Www-03.Ibm.Com/Software/Products/En/Spss-Decision-Trees

Stoddard, J, & Clopton, S (2015), "Exploring The Differences Between New And Repeat Visitors To North Carolina Wineries: Implications For Winery Marketing Strategy Development", *Journal Of Wine Research*, 26, 3, Pp. 225-240, Academic Search Premier, Ebsco*host*, Viewed 7 April 2017.

Tavares, C, & Azevedo, A (2011), "Generation X And Y Expectations About Wine Tourism Experiences: Douro (Portugal) Versus Napa Valley (USA)", *Tourism & Management Studies*, 1, P. 259, Supplemental Index, Ebsco*host*, Viewed 10 April 2017.

Thomas, A., & Pickering, G. (2003). The importance of wine label information. *International Journal of Wine Marketing*, *15*(2), 58-74.

U.S. Department Of The Treasury, Alcohol And Tobacco Tax And Trade Bureau (2016), "Statistical Report - Wine", Available At Https://Www.Ttb.Gov/Statistics/15winestats.Shtml (Accessed April 9, 2017)

Wine: World Markets And Trade (Publication). (2010, April). Retrieved May 5, 2016, From Foreign Agricultural Service/USDA Website: Http://Usda.Mannlib.Cornell.Edu/Usda/Fas/Wine//2010s/2010/Wine-04-06-2010.Pdf

Wolf, M, Carpenter, S, & Qenani-Petrela, E (2005), "A Comparison Of X, Y, And Boomer Generation Wine Consumers In California", *Journal Of Food Distribution Research*, 36, 1, Pp. 186-191, Business Source Premier, Ebsco*host*, Viewed 10 April 2017.

Woods, T, Nogueira, L, & Yang, S (2013), "Linking Wine Consumers To The Consumption Of Local Wines And Winery Visits In The Northern Appalachian States", *International Food And Agribusiness Management Review*, 16, 4, Pp. 181-205, Science Citation Index, Ebsco*host*, Viewed 8 April 2017.

Yuan, J, Cai, L, Morrison, A, & Linton, S (2005), "An Analysis Of Wine Festival Attendees' Motivations: A Synergy Of Wine, Travel And Special Events?", *Journal Of Vacation Marketing*, 11, 1, P. 41-58, Scopus®, Ebsco*host*, Viewed 9 April 2017.

Yuan, J, Morrison, A, Cai, L, Dodd, T, & Linton, S (N.D.), "Chapter 10: Segmenting Wine Festival Visitors Using Their Personal Involvement With Wine", *Food And*

Wine Festivals And Events Around The World, Pp. 146-165, Sciencedirect, Ebsco*host*, Viewed 13 April 2017.

Zamora, J. And Bravo, M., (2005). "Wine, Product Differentiation And Tourism: Exploring The Case Of Chile And The Maule Region". *Universum (Talca)*, 20(2), Pp.298-315.