Assessing Consumer Value through Willingness-To-Pay for Varying Attributes within a Kansas Agritourism Wedding Event Space for the Application of a Business Modeling Decision Tool

by

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Abstract

Given decreased farm profitability over last several years, this research focused on alternatives that farm operators can sustain or increase farm incomes while potentially creating economic relief for a returning generation. Decreased profits have caused younger generation farmers to consider moving away from the farm and rural communities. Economic conditions of these communities have deteriorated due to shift in population from rural toward more urban areas. With fewer members of society directly associated with agriculture, a disconnect has been created generating distrust in modern farming practices. Agritourism in general and specifically event space used as a wedding venue, has been a rapidly developing opportunity that may meet the above-stated objectives. Just like any new business undertaking, an understanding of how consumers make decisions are pertinent for the analyst to model the business as well as planning how to efficiently market the business. Using conjoint analysis, a choice-based conjoint (CBC) survey was developed and deployed regarding varying combinations of attributes related to wedding venues at specific price points. Data regarding consumer choices were evaluated using mixed logit regressions. Using the regression output, willingness to pay (WTP) values were calculated to represent utility value. Once the consumer side was analyzed, the producer side was considered for operators interested in implementing this research on their farms. An operations research business modeling decision tool was parameterized with the WTP values to represent values that can be added to the prices charged for the space if that respective option were added to the event space. The producer's decision-making tool was built within a spreadsheet (Microsoft Excel) such that potential users will be able to find the profit maximizing bundles of the varying sizes in venue space, capacity, amenities provided, etc. A profit value is calculated based on the user's set of parameters taking into consideration the following values: price per event, number of

events per year, construction costs, and the monthly/yearly costs associated with operating the venue. This information is crucial to understand for any farmers interested in agritourism, specifically wedding venue space. If the profit value is sufficiently high, wedding venues could be used as an additional enterprise to keep younger generations on the farm and assist rebuilding rural communities.

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Chapter 1 - Introduction

Decreasing net farm income has been a concern within the agricultural community for several years. Relatively low crop prices and increased operating expenses are associated factors. Net farm income has been a common metric for the agricultural community to measure profits, financial stability, and progress of an operation. Another commonly used metric is net cash farm income. Net cash farm income is similar to net farm income but does not include the value of non-cash items such as inventories, depreciation and rental income. Over the past four years, net cash farm income has decreased. The USDA claims that for 2019, "every resource region of the country is forecast to see farm business average net cash farm income decline" (Dreibus, 2018, p. 4). Along with reduced incomes, farm debt levels are at an all-time high. Figure 1.1 shows the increase in farm debt over the past years and how real estate debt has been the main cause to this increase in farm debt. Non real estate debt has remained relatively constant with regard to the values for the past few years (Newton, 2018).

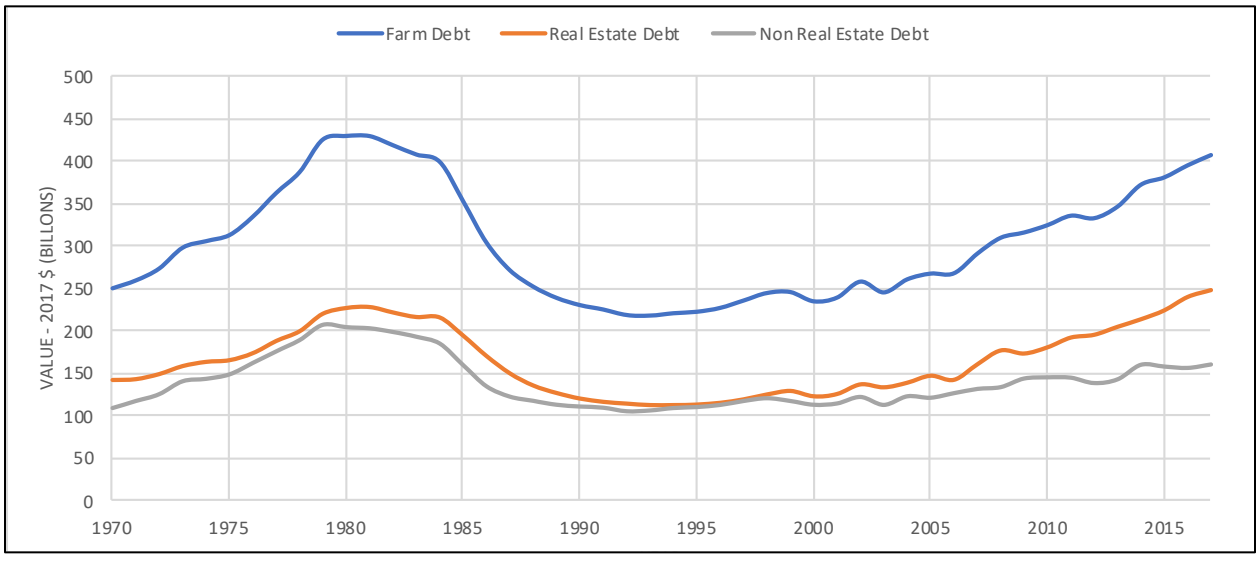

Figure 1.1 - Farm Debt, Real Estate Debt, and Non Real Estate Debt from 1970-2017 (in 2017 dollars) (Source: USDA)

Many farmers have been fortunate enough to be able to operate in such conditions while still facing large cash flow issues. Operators are being forced to mortgage their high-valued assets, specifically land, to be able to operate the farm for another season. Even multi-generational operations, those who have never had to do so for quite some time, are experiencing financial stress. Farmers are also having to rely upon their savings built up over time, causing them to postpone retirement (Dreibus, 2018).

Younger Generation Leaving Farms/Rural Communities

These aforementioned struggles have had a secondary negative effect on the farm. Instead of the next generation having the desire to return to take over the farm, they are leaving the operation for less risky, more lucrative careers. Farming does not have the same appeal as it previously did for the now "tech-driven, millennial generation" (Walansky, 2018, p. 1). Costs are not the only facet which draw individuals away from taking part in a farming operation. The stigma and image created of the typical farmer deters young adults from pursuing a career in farming. Jeremiah McElwee, senior vice president of merchandising and product development of Thrive Market, an online retailer that sells natural and organic food products at reduced costs states, "Many people still have an impression of farmers as older men wearing overalls that work from sun up to sun down, make very little money and are uneducated." It becomes obvious that the true image of the modern farmer has not been accurately communicated by the media (Walansky, 2018, p. 3). Young professionals are finding other opportunities to be somewhat involved in agriculture off-farm if they desire to still be a part of the agricultural community. But this does not provide sufficient effort toward being able to feed the ever-growing population.

Those that do decide to pursue a career in farming are mainly drawn to the profession as it is something which is instilled in them. But with the number of total farming operations in the US declining, and operations simply getting bigger in size, it causes issues for these individuals to be involved. Smaller family run operations are being bought out by larger family sized or even corporate farming operations. Figure 1.2 shows that since the land being used within farming operations is holding steady, and that since the number of farms within the US has continued to decrease, this can only lead to an increase in the average size of each operation (Koba, 2014). Also, with the adoption of many new precision agricultural technologies, machines are now able to take the place of human labor by being able to perform many of the same necessary daily tasks faster and more efficiently.

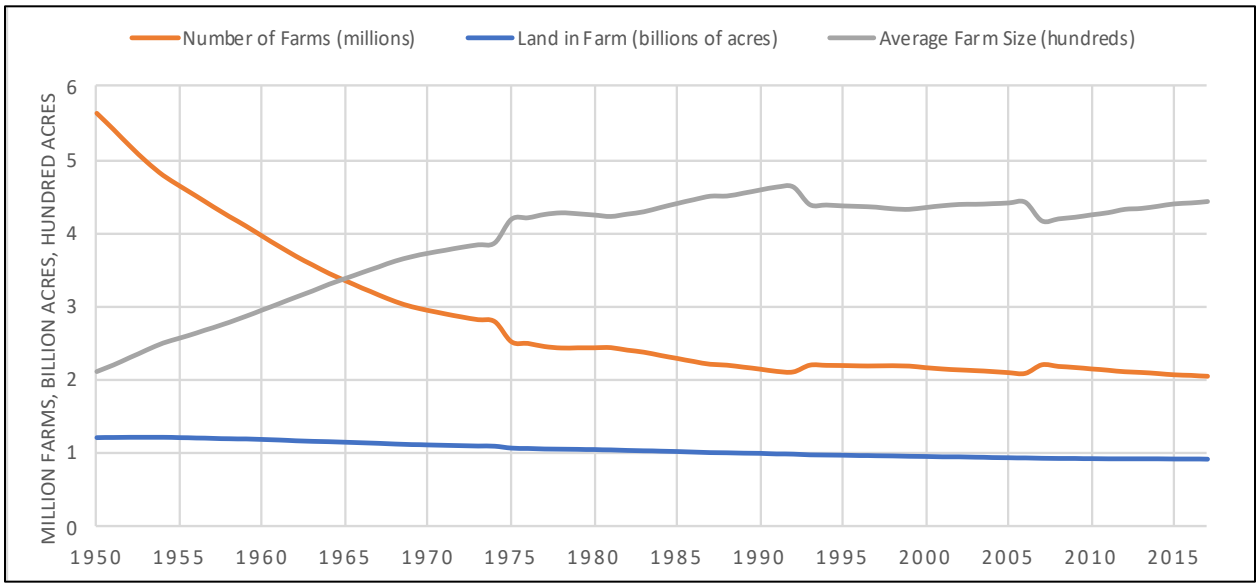

Figure 1.2 - Number of Farms, Land in Farms, and Average Acres per Farm (1950-2017) (Source USDA)

Aging Populations of the US Farmer

Another issue plaguing the farming community is the average age of the US farmer. Due to the younger generation leaving farming operations for other careers, the average age of farmers continues to increase. In 2017, the average age of the US farmer was 58 years old (USDA NASS). When these producers decide to retire, a void will be present in regard to those who are responsible for producing the food which feeds the world (Koba, 2014). According to National Young Farmers Coalition, "It is estimated that between now and the year 2030, half a million (one-quarter) of American farmers will retire" (Shute, 2011, p. 9). Figure 1.3 shows that for every farmer aged 25-35, there are six farmers aged 65+. Ever since the early-1950's the number of farmers 65+ has outnumbered the younger generation (Shute, 2011). With these statistics, a lot of consideration needs to be put into answering the question of who will be producing the food which feeds the world after the older individuals retire.

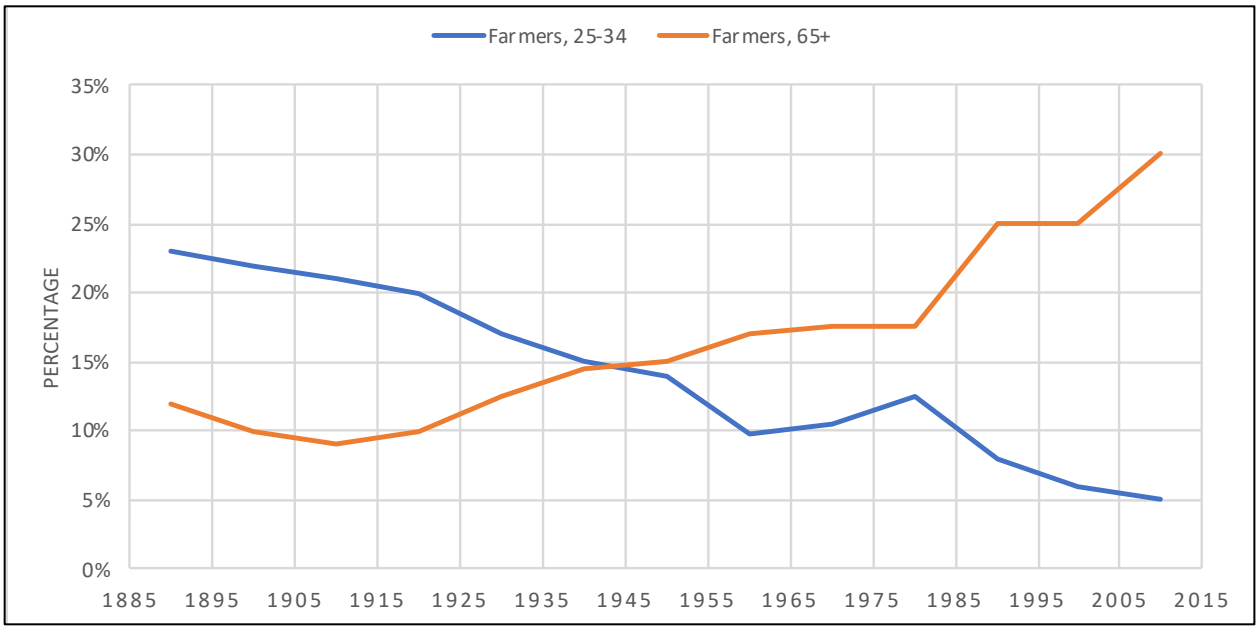

Figure 1.3 - Percentage of Farmers over 65, and between the ages of 24-34 (Source: USDA)

Rural Communities Suffer

As the number of individuals taking part in rural farming operations continues to dwindle, a negative effect spills over to the rural communities. If individuals leave farming, many of them leave rural communities for more metropolitan areas. Figure 1.4 shows the population change for both metro and nonmetro counties and the total population change within the US from 1976 to 2017 (USDA). Since the mid-1990's, nonmetro population change has been increasing at a decreasing rate compared to metro areas, except for a small time in the early to mid-2000's. Since 2010, the change in nonmetro areas has been a negative change showing a loss in population. In summary, since the early 1980's, even though the non-metro area is increasing in population, it is always less than the increase in the metro areas (Kumar, 2018).

Young people are leaving these nonmetro areas due to many different reasons. A lack of economic and academic opportunities is the main concern. Higher educated individuals hailing

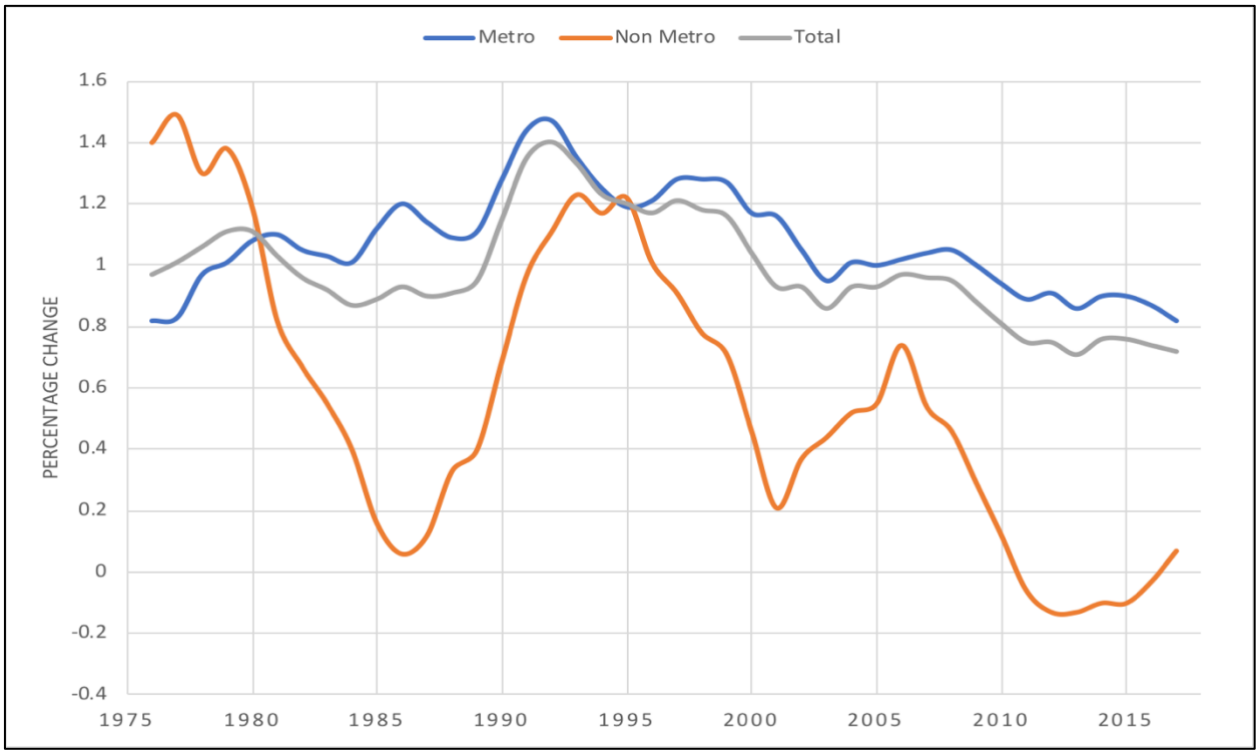

Figure 1.4 - Population Change by Status - Metro, Non Metro, & Total (Source: USDA)

from nonmetro areas choose to stay in metro areas. A University of Pennsylvania study calls this cause-effect relationship "brain drain" and decreases the "intellectual capital" within the rural communities. Many problems are seen in these rural communities due to this migration taking place. Local governments lose their tax base which forces them to cut spending. This creates a rolling downward spiral effect on the community. By cutting spending, infrastructure within the community is hurt with a main set back being seen within the public-school systems. Within these communities, property values drop as the desire to live in these communities becomes less and less appealing. Many elderly Americans rely on their property equity to feed their savings upon retirement. By losing value in their homes, they lose the ability to sell their home and they become trapped dealing with poor healthcare systems and living in communities alone as their children and grandchildren leave for larger cities with more opportunity. Each one of these negative effects in-turn feeds the downward spiral of more and more individuals choosing to leave these struggling communities (Kumar, 2018).

Current Disconnect Between Society and Agricultural Producers

With the population decreasing in rural communities, a disconnect is created between farming operations and the rest of society. Almost all individuals in the US have had some sort of connection to a farm, but over the generations, they have become more and more separated from the lifestyle. When considering over 40% of the US population was directly involved in agricultural production in 1900 compared to just 2% in 2013, there is no doubt in disputing Wes Ishmael's article "Ignorance is Ag's Biggest Challenge When Connecting with Consumers" published by BEEF Magazine (Ishmael, 2013, p. 2). Ishmael states,

> Most Americans today are so far removed, generationally, from direct agricultural production experience that they have no reason to question the glaring falsehoods spouted by activist groups and well-meaning urban ecologists. It would be like someone telling me that infrared ultra-draconian frequencies emitted by today's power stations cause cancer. I know what a power station is, and I know what power lines look like. I'm busy. I won't check the veracity of the claim. That's not fair. It's not even rational. It's reality.

This shows there is little understanding or appreciation for the efforts being made by farmers today to successfully feed the world. These falsities negatively affect crop prices and increase the negative criticism modern farmers receive which decreases the desire for young individuals to be involved in the profession. By increasing the population base within rural communities though, the gap can be bridged as more of the public is surrounded by agricultural practices. The term "common ground" is used a lot by pro-agriculture activist groups as they are aware the conversation cannot be a one-way conversation. Producers are willing to listen to consumers wants and needs, but there needs to be more of an understanding of what it takes to meet those demands. Farmers are one of largest groups of individuals which care the most about human safety, biodiversity, water quality, soil health, and environmental sustainability. To have the trust of the consumer and the rest of society would help rejuvenate the image of today's modern farmer (Percy, 2018).

Potential Solution(s)

Considering everything discussed so far, the initiated research may ask what alternatives may alleviate these aforementioned issues within farming and ag communities. If there is an option that younger generations can be incentivized to either return to an existing farming operation, or

be able to start one on their own, steps can be made toward solving several of the issues mentioned. Income and costs associated with the profession of farming are shown to be the biggest obstacles deterring a younger generation from taking part in one of the oldest and what many believe to be one of the most important career paths. The amenities and infrastructure which are lacking in the rural US communities as well as the current "bad rap" which comes with being a farmer also deter young professionals from staying or returning to rural farming communities. This goes without saying that there are plenty of individuals who want to be involved within the field of agriculture but are afraid of the current difficulties which are associated with the industry.

There are many suggested techniques or solutions to rebuild the countries rural communities and to help motivate young professionals to be a part of this rebuilding effort. Government policies can help to create businesses, generate jobs and boost the local economies. As many of the individuals who would be returning are mostly likely well-educated, this can help to reverse the "brain drain" effect previously mentioned. These educated individuals can help serve on local boards, build new local businesses, increase the cash flow to the local governments by paying taxes, and most importantly have children and raise them with thought of continuing to rebuild these small rural communities (Kumar, 2018).

Many states have already made efforts toward incentivizing young professionals to move to rural communities. Kansas provides income tax breaks to out-of-state students if they choose to move to a rural Kansas town. Nebraska is currently experimenting with the idea of enterprise zones which encourage business development where populations have shown a constant decline over time (Kumar, 2018). Local governments need to understand these trends to be able to allocate their resources effectively and efficiently. A 2017 publication from the group Young Professionals for

Agricultural Development highlights nine ways youth can be engaged in agriculture (YPARD, 2017):

1) Link between social media and agriculture
2) Improve agriculture's image
3) Strengthen higher education within the field of agriculture
4) Higher use/integration of Information and Communications Technologies
5) Motivate younger individuals to speak up about their thoughts
6) Easier access to land and credit
7) Integrate agriculture within school curriculum
8) Larger public investment in agriculture
9) Make agriculture more profitable

With willingness to understand these trends, efforts can be made to rejuvenate rural communities and increase the number of young professionals who are interested in the field of agriculture.

Summary

Through this research, focus will be put on the industry known as Agritourism. Agritourism will be highlighted with the intention of being seen as a reasonable way to 1) increase the appeal of a profession related to agriculture through new and interesting enterprises and 2) increase the income for the operator of the enterprise. By motivating a new generation to be involved in agriculture, efforts can be made to help bridge the gap between what modern-day society believes regarding modern farming practices and the truth of how farmers are responsibly producing healthy, environmentally-friendly food for the world. To help answer these questions and concerns, a focus will be put on the area of on-farm wedding/event venues. This enterprise has

become a hot bed for current farmers to easily repurpose space on their farm to host weddings, corporate events, birthday parties, and anniversary parties just to name a few.

More specifically, answer the research question – "What is the optimal combination of varying attributes within the event space which maximizes profits for the operator"? When new product or service offerings are being introduced in any industry, a producer's understanding of how a consumer makes choices between the available options is crucial when being able to market their new product effectively and efficiently. Even for existing products or services currently on the market, analysis into the decision-making process of the consumer can help give their product the upper-hand in a world filled with substitutable goods. Through the implementation of a choice-based conjoint survey analysis, and by performing regressions of the data, willingness-to-pay values will be calculated for the different attributes being studied. This will help analyze the consumer's point-of-view by understanding the maximum value they put on these varying attributes. This will be one piece of the puzzle needed to analyze the demand side of the industry and by understanding how consumers make choices regarding event spaces will help the producers properly market and price their services.

Next, once the consumer side has been analyzed through WTP values for the event spaces, the producer point of view must be considered. By building an operations research model to reflect the producer's point-of-view, and by gathering data related to costs, the model can be run and profit values can be calculated to better assist those interested in entering this type of industry and allow for better financial security when deciding if the enterprise would be a smart and feasible endeavor or not. This will be a key point within this study as it will complete the circle and provide the user with a general individualized plan or direction to be able to move forward. Considering current event spaces in Kansas and using information gathered through interviews regarding their

own revenue and costs, linear programming methods will help to find the profit maximizing combination of varying amenities as well as values for the optimal sizing of the space.

A business like this is a great example of an interesting twist on agriculture that can allow individuals to be a part of agriculture and can create enough income to sustain a lifestyle in one of these rural communities.

Chapter 2 - Literature Review

Agritourism may be a new term to many people, especially those who are new to the agricultural community. Research needs to be performed to better understand the term agritourism, where this industry fits into the US economy, and how this may be a fit for Kansas farmers. According to Bernardo, Valentine, and Leatherman (2004), agritourism is defined as "A commercial enterprise at a working farm, ranch or agricultural plant conducted for the enjoyment of visitors that generates supplemental income for the owner" (page 1). The following are potential agritourism enterprises:

1) Outdoor Recreation (Fishing, Hunting, Wildlife Study, Camping)

2) Educational Experiences (Ag in the Classroom, Cooking Classes, Wine Tasting)

3) Entertainment (Barn Dances, Concerts, Festivals, Wedding Venue)

4) Hospitality Services (Farm-to-Table Restaurants, Bed and Breakfast, Outfitter Services)

5) On-Farm Direct Sales (U-Pick Operations, Roadside Stand)

Why consider Agritourism?

Globally, the US is behind in the development of the industry known as agritourism. European countries such as the United Kingdom have been engaged in this industry for decades with over one-third of all farming operations participating in non-traditional agricultural enterprises. France and Italy have an even larger percentage of farmers offering these services (Bernardo et al., 2004). This creates enough rationale for furthering research which hopefully shows that the industry can be very rewarding if there is a demand for such services within the United States.

In general, individuals within the agricultural community love sharing their knowledge and passion for agriculture with those who may not be as experienced. They have an appreciation for

the land they live on, for the way they spend their days, and for the impact they have on the world. Like any farming operation, these non-traditional farm enterprises not only have a positive effect on the operation itself, the impact had on neighboring communities and complementary services can be just as significant. According to the US Census Bureau, between July 2015 and July 2016, the rural population has declined by over 21,000 people and has been on a steady decline for the past 6 years (USDA, 2017). To be able to keep the countries rural communities alive, rural development is needed to attract a number of the population to the rural setting.

The demand for agritourism is present within the United States. Tourists, both local and from afar, are constantly looking for new authentic experiences that can either link them to their past family history or give them the ability to learn something new. Agritourism is viewed as a way for tourists to truly relax as they are enveloped by a stress-free environment compared to their normal everyday life. Visitors are more than willing to pay for these experiences if they find the prices to be reasonable and see the value in the services or experiences which are being offered (Ochterski et al., 2008) The supply is there too as farmers and ranchers are looking for ways to increase income within their operation. Agritourism allows for an increase in income through diversified services which allows them to handle the fluctuations within today's agricultural markets. Like any type of business endeavor though, it comes with not only benefits, but challenges for the operator (Travel Oregon, 2017).

Benefits of Agritourism

When the concept of agritourism was first introduced it mainly began as a way for producers to increase their business income, but over the years, operators have come to enjoy many of the other benefits related to an agritourism business. The following is a list of general benefits

which can be found to be associated with being a part of an agritourism business (Travel Oregon, 2017):

1. **Additional/Supplemental Income**

The most obvious benefit for starting an agritourism business is the increase in supplemental income from such endeavors. Many farming or ranching operations have certain periods within the farm business cycle where more time is available to devote to additional operations or tasks. Depending on the type of agritourism the operator becomes involved in, they can increase their markets in the commodities or services they are already producing. When considering this in terms of economics, producers can turn into a price-maker versus a price-taker and they can participate in direct-to-consumer marketing techniques to increase the price they receive for their products or services they offer. By being a part of direct-to-consumer marketing techniques, operators can capture dollars not only associated with the agricultural or food products being sold, they can also capture dollars spent by consumers for entertainment and recreational purposes.

2. **Sharing the way of life and the value associated with agriculture**

The fact of the producer being able to share what they do on a daily basis with the general public brings some individuals a sense of satisfaction and enjoyment. Being able to educate tourists on the practices which take place on a modern-day farm to help feed the world. The lack of connection between most of society and agricultural practices has never been as severed as it is right now, especially regarding how producers today truly possess an appreciation for the land they use to grow their crops and want to do all that they can to protect the world's natural resources. Sharing the lifestyle associated with rural living and the agricultural industry

can help to improve government agricultural policies. Agritourism allows a bridge to be built amongst the general public and the agricultural community.

3. Family opportunities

As previously mentioned, the farming industry is struggling to keep the younger generation around on the farm. A lot of this is due to the fact that extra funds are not available to support another individual within the operation. By starting an agritourism entity within their farming operation, operators can make room for the younger generation to return to the farm. Supplemental income can pay for the additional individual without taking away from the current operator. This also allows for the operation to stay within the family and for family ties with the operation to continue for future generations.

4. Extra value from current assets

Certain agritourism entities permit operators the ability to gain value from particular existing assets. For example, land is a main asset within the farming industry. If the operator used some of their existing crop or pasture land to start a small produce operation, they may be able to increase their profits per acre by taking part in a more lucrative production system. By reusing an already owned asset for a different purpose, it allows for the opportunity to build new businesses and add income from already existing resources.

5. Improves economic condition of surrounding communities

Adding an agritourism business within a farming operation can have external benefits as well. The farming industry as a whole can be improved by the introduction of an agritourism business. By gaining exposure with the public about modern-day farming practices, this can have a positive effect on agricultural as a whole. By drawing tourists to an agritourism business, it provides economic relief to other business which surround these agritourism

businesses. Tourists need places to eat, stay the night, fill up their vehicle with fuel, just to name a few, and by enticing tourists to visit these rural areas, steps are being taken to rebuild the countries rural communities.

Challenges of Agritourism

However, these attempts to add additional income, to share the way of life associated with the agricultural community, to create opportunity for future generations to join the farm, to gain extra value from current assets and to rebuild the rural communities through agritourism do not come without their risks or trade-offs.

1. Extra Workload

When taking on another entity, more work will be required to make the business run efficiently and effectively to be profitable. The business may grow to the point where employees need to be hired which will require a higher level of management skills. Other skills besides managements skills may be required to be developed as well. Extra work will be required to keep the property clean and safe for tourists, which could lead to taking away from the primary operations of the farm (Travel Oregon, 2017).

2. Higher Risk

Like any small business, some survive, yet many end up failing. According to The Office of Advocacy within the Small Business Administration, over one-third of small business will fail within the first two years of operation and only one-half will still have their doors open after 5 years of service (Small Business Administration, 2012). Some individuals may seek opportunities elsewhere if the opportunity costs are too high within these endeavors. Another factor to consider is that these types of businesses are very management heavy. This

requirement may be easy to meet regarding agritourism, especially if started by an individual(s) with a strong business or management background in their previous professional career, but this may not always be the case. Another issue the operator must consider is liability. Whenever allowing land to be used for public use, certain liabilities should be considered regarding potential injury or possible death which the manager could be legally responsible for. All of these risks would need to be considered before making the decision to take part on any sort of on-farm public enterprise (Bernardo et al., 2004). Regulations need to be considered and can vary from one area to the next. At times, there may be extra up-front cost to adhere to the local regulations regarding the agritourism business. Some areas want to promote agritourism, so they assist operators in helping handle some of the liability issues they may encounter. In Kansas for example, the Kansas Agritourism Promotion Act was signed into law in 2004. This law was put into effect to allow for the growth of the agritourism industry and each business by being registered with the Kansas Department of Wildlife, Parks, and Tourism, as well as limiting liability through properly placed signs reminding the business' visitors of the possible dangers (TravelKS, 2018). Discussions with neighbors would need to be had to make sure conflict is avoided due to any extra noise or an increase in traffic.

3. Always Busy

One positive regarding the farming industry is that during certain times of the year, there is extra down time. Many farmers use this time to catch up on paperwork or perform maintenance/repairs which need to be done or simply take a break from all of the hard work and spend time with friends and family. If the operation was to take on another entity to create some extra income, their down time could be consumed by this new agritourism business. As already discussed, many of these agritourism businesses are management heavy. Full and

constant attention will be required to make them run properly. A loss of privacy may be incurred by allowing tourists or visitors the right to come on to the farm's property. The trade-offs need to be considered to make sure the necessary tasks which need to be performed within the primary business are taken care of and not being ignored by the introduction of a new business.

4. Location Planning

Depending on the location of the business, discretionary income which can be used for these types of activities can vary from place to place as well. Having an understanding of the individuals who would most likely be visiting the business is imperative. The population density in a certain mile radius can vary which can affect the number of visitors one would come to expect on a yearly basis.

5. Weather

Weather is a large factor which needs to be considered with any agritourism business. Most of the activities which tourists would be partaking in are outdoors. And even those which are indoors, the temperature can be an issue for some tourists. The argument can be made that tourists are interested in agritourism to get back to a simpler life but making sure to have proper protection from the elements as well as some of the common creature comforts society comes to expect is a must.

Agritourism in Kansas

With some basic understanding of the industry known as agritourism as whole, how does it fit into Kansas agriculture? According to Bernardo, Valentine, and Leatherman (2004), Kansas' agritourism industry could be characterized as in the infant developmental stage in the year 2004.

According to the 2002 Census of Agriculture, the number of farms in the state of Kansas which reported income from "on-farm recreational services" was 1,290 farms (Bernardo et al., 2004). There has been a decline in the participation as the number in the 2012 Census dropped to 1,000 farms. (NASS, 2018). In the year 2004, the Kansas Department of Commerce and Housing initiated discussion surround agritourism and established the Kansas Agritourism Advisory Council. Senate Bill 334, the Kansas Agritourism Promotion Act, was passed later that year to promote state-backed growth for this industry (TravelKS, 2018).

Wedding Statistics

With the focus of this research regarding profitability of on-farm wedding venues as a part of agritourism, a brief understanding of the current wedding market would be beneficial when trying to move forward with starting such a business. Answering questions surrounding the ideas that "barn weddings" are or are not a trend which is going to go away or that couples are spending more or less money on their wedding compared to previous years are just a few key points which should be considered.

To answer questions regarding barn wedding venues being a trend or not, research was gathered through Google Trends to compare different terms which are being searched for over a five-year period. Figure 2.1 is a chart showing the trends related to three different search terms through the search engine, Google. The blue line represents data related to the search term, "barn wedding". The orange line represents the term, "farm wedding". The grey line represents, "church wedding". This comparison was performed to show the trends related to searches from individuals for different wedding venue locations and their popularity across those who searched for wedding venues. The chart represents interest over time with the time being on the x-axis and the percentage

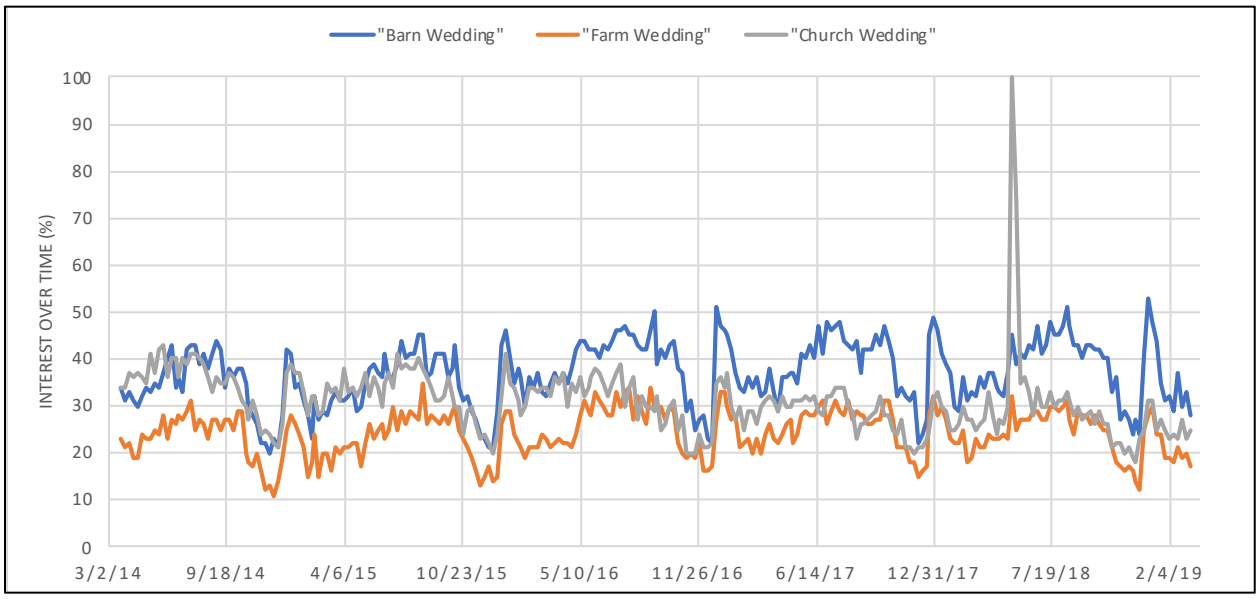

Figure 2.1 - Google Trends: Interest Over Time (Source: Google Trends)

of interest being on the y-axis. Google Trends defines the term "Interest over time" as the following: "Numbers represent search interest relative to the highest point on the chart for the given region and time. A value of 100 is the peak popularity for the term. A value of 50 means that the term is half as popular. A score of 0 means there was not enough data for this term" (Google Trends).

An interesting fact regarding the data collected through Google Trends, every year around Christmas and New Year's, there is a spike in searches for wedding venues. This goes to show that many individuals happen to get engaged around that time of the year and instantly start searching for wedding venues to have their venue location locked in. This would be key to understand when trying to market the business. Have an understanding of when individuals are searching for wedding venues can help increase business and ultimately, in the end, increase profits. A point to consider as to why the term "church wedding" is lower than the others could be that devout church attenders already know they want to get married in their home church dismissing the fact of having to search for a wedding venue.

Table 2.1 gives the breakdown of the different search terms and the average popularity. Understanding the trends affiliated with these search terms is beneficial when it comes to better marketing the product or services being offered.

Table 2.1 - Google Trends Interest over Time Breakdown of Terms Searched (Source: Google Trends)

SEARCH TERM	AVERAGE POPULARITY
BARN WEDDING VENUES	37%
FARM WEDDING VENUES	24%
CHURCH WEDDING VENUES	31%

Other than internet searches regarding wedding venues, a popular online wedding planning website, TheKnot.com recently performed a study to better understand how couples make decisions regarding where to host their wedding. The study showed the in 2017, 15% of couples chose to host their wedding at a barn, ranch, or farm. This number was up from 2% in 2009. On the other hand, more traditional wedding locations are dropping in popularity. Banquet Hall locations dropped from 27% in 2009 to 17% in 2017 while hotel receptions have dropped from 18% to 12% in the same timeline. Gabrielle Stone, an urban wedding planner based out of Boston was quoted within the study stating, "Even if a couple isn't actually getting married in a barn, there's a good chance they'll make it look like one. There is this term that people use now: *rustic chic*" (Kitchener, 2018, p. 1-2).

When it comes to cost, engaged couples are not afraid of spending the money either. According to the same study performed by TheKnot.com, the average cost of a wedding as steadily been increasing since 2011 to 2017. The average cost in 2011 was $27,021 with the average cost in 2017 being $33,391. That is a difference of over $6,300 in six years with no signs of dropping or even plateauing in the future. However, even though the cost has been increasing, this does not always equate to more extravagant locales to host their wedding. As the average age of couples

getting married is on the rise, they search out locations which agree with their casual, laid-back lifestyle they live on the daily basis. Many of the traditional, formal wedding styles of the past are now considered to be showy, stuffy, and old-fashioned: chill's antithesis. The demographic of the couples who are making these decision's now-a-days are mainly made up of the millennial generation. The couple's desire to have a casual wedding setting where friends can gather, share a heartfelt experience, break bread, and eliminate any pressure related to a formal setting can almost always be found at the top of their must-have list. And as the research shows, it seems a barn wedding can do just that (Kitchener, 2018).

Chapter 3 - Data and Methods

Research across differing aspects of the farm operation is needed to facilitate the decision making process of an agritourism endeavor. Agritourism, much like any other industry, requires a deep understanding of both the supply and demand points of view. To better comprehend the demand side, a Choice-Based Conjoint (CBC) Survey was built. Data gathered through the survey compiled utility, attribute importance values while willingness-to-pay (WTP) values were calculated using Stata Statistical Software (Sawtooth, 2019). In the context of this research, the utility is the level of satisfaction one receives from the event space possessing each attribute. The attribute importance value represents the relative level of importance for each attribute in comparison to the other attributes within the research study. The WTP values can be viewed as the maximum value one would be willing to pay for that certain attribute. When implementing the WTP value into the operations research portion of this research, the WTP value is the additional price which the operator can charge for the event space if that attribute becomes available to the customer. Using a non-linear programming model, a profit value is calculated based on the revenues from the amenities which are being offered as well as deducting the costs associated with offering those additional amenities. Knowing how these variables interact with one another is crucial in modelling a potential business and most importantly, being able to calculate the financial gain from taking advantage of an opportunity.

Choice-Based Conjoint Analysis Defined

With one goal of this research being to obtain values related to the willingness-to-pay for varying attributes within an agritourism wedding venue, research regarding which economic method to use was considered. Within this research, the approach known as choice-based conjoint

analysis was used. Choice-based conjoint (CBC) analysis, or sometimes referred to as discrete-choice conjoint analysis, is the most common form of conjoint analysis. Data collection is performed through a survey where respondents are asked to choose their most preferred choice out of a set number of choices. The different sets of choices will differentiate based on the characteristics of each choice set. The survey is meant to represent a true shopping experience where the respondents have a certain number of options in front of them that would satisfy the same need while choosing the one they feel satisfies that need the most. A choice-based conjoint analysis survey is built using different attributes or characteristics regarding the choice set. The attributes being compared will be constant or consistent from one choice to the next. Within each attribute, there are varying levels which is where the choice sets will vary. Figure 3.1 is an example of a choice-based conjoint analysis survey question comparing different cellphone choices. The attributes would be the different line items on the far-left column (brand, price, resolution, and size). The levels however are the different choices within each attribute. For example, for the attribute, cost, the levels would be $300, $400, and $500 (Survey Analytics, 2019). Respondents are asked a series of questions, or tasks, with the same attributes but with varying levels of each attribute within each task. Through each response to the tasks, the level of importance or preference for each respondent can be calculated allowing the researcher the ability to put a value to each

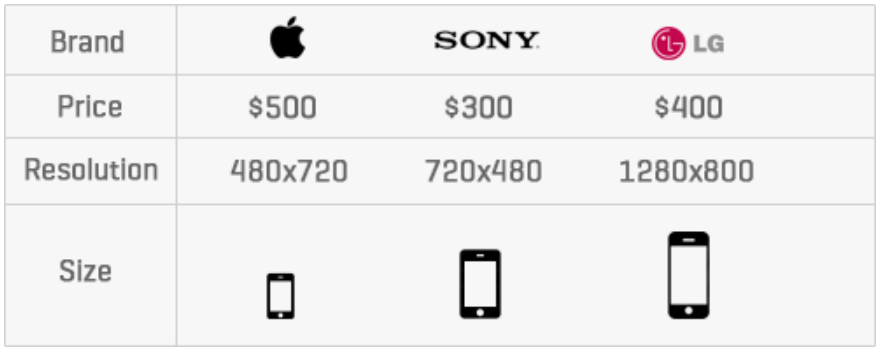

Figure 3.1 - Example of a Choice Based Conjoint Analysis Survey Question (Source: Survey Analytics)

attribute for each respondent as well as average them out across all respondents. According the popular survey software company, Qualtrics, CBC analysis provides excellent estimates for the importance of each of the features, especially when discussing the idea of pricing. Respondent's results estimate the value of each level and allows the researcher the ability to find the arrangement of attributes/levels to create an optimal product. Simulators related to the results account for both preference and value of the choice as well as the percentage of share that choice would have compared to other choices (Qualtrics, 2019).

Software Choice

The first step in building the CBC Analysis survey was to choose a software platform that met the needs of the research. After a thorough online search, and discussions with researchers with expertise in CBC, the decision was made to use Sawtooth Software's Lighthouse Studio: Choice-Based Conjoint (CBC) Program (Sawtooth, 2019). This program is Sawtooth's Windows-based survey authoring program which allows the user the ability to both predict and understand consumer choices. Within the program, surveys were designed to help users price products more efficiently to improve their profitability and market share within their respective industry. Surveys are designed through the desktop-based program but can be hosted via Sawtooth's online server and dispersed to respondents via URL (Sawtooth, 2019).

Survey Building

There are two main portions within a CBC Analysis survey: preliminary questions and choice questions. They are both crucial to include as they both allow for the researcher to gain insightful information regarding the research topic.

Preliminary Questions

Within the survey, preliminary questions were asked to gain insight into the demographics of each respondent. These questions were asked to be able to group together the respondents to better analyze the data. Table 3.1 represents the varying preliminary questions along with each respective answer.

Table 3.1 - All Preliminary Questions asked in the CBC Survey with all possible responses

PRELIMINARY QUESTION	RESPONSE
GENDER	Male
	Female
	Prefer Not to Say
AGE	18-25
	26-30
	31-40
	41-50
	51-60
	61+
ARE YOU EITHER CURRENTLY PLANNING A WEDDING, OR HAVE PLANNED A WEDDING WITHIN THE LAST 3 YEARS?	Yes
	No
IF SO, WERE YOU OR WILL YOU BE THE INDIVIDUAL WRITING THE CHECK FOR THE EVENT SPACE?	Yes
	No
ARE YOU EITHER CURRENTLY MARRIED OR HAVE YOU BEEN MARRIED PREVIOUSLY?	Yes
	No
ZIPCODE	(Fill in the Blank)

CONTACT INFORMATION (TO ENTER INTO DRAWING)	(Fill in the Blank)

Choice Questions

When building a CBC analysis survey, especially with this software, the main consideration is building the choice questions. Making sure to know what the number of attributes is as well as the number of levels per attribute. An attribute is a specific characteristic the researcher is wanting to gain more information about through the survey. In the case of this research, the attributes were – Capacity of the Event Space, Distance from the Hometown of the Respondent, Timeline of Space Access, Availability of Differing Ceremony Spaces, Amenities to be Provided, Availability of Bridal Party Dressing Suites, Restroom Availability, Regulations Regarding Alcohol Use, and Price. The levels within each attribute are the varying points that can be chosen for each attribute. For example, in the attribute "capacity", the levels were – <50 people, 50-175 people, 175-300 people, and 300+ people. Table 3.2 depicts each attribute as well as all of the possible levels within each attribute.

Table 3.2 - All Attributes and Levels that were used within the CBC Analysis Survey

ATTRIBUTES	LEVELS
CAPACITY	<50
	50-175
	175-300
	300+
DISTANCE FROM HOMETOWN	<30 Miles
	30-60 Miles

	60-100 Miles
	100+ Miles
TIMELINE OF SPACE ACCESS	12-Hour Time Slot
	24-Hour Time Slot
	36-Hour Time Slot
	48-Hour Time Slot
AVAILABILITY OF CEREMONY SPACE	Indoor Only
	Outdoor Only
	Both Indoor & Outdoor
AMENITIES PROVIDED	Tables and Chairs
	A/V Equipment
	Decorations
	All (Table & Chairs, A/V Equipment, Décor)
	Nothing Provided
BRIDAL PARTY DRESSING SUITES	Yes
	No
RESTROOM AVAILABILITY	Porta Potty
	Single-Stall Uni-Sex Restrooms
	Multiple-Stall Men's and Women's Restrooms
ALCOHOL USE REGULATIONS	Venue Provided Service/Cash Bar
	Bring in Own Alcohol/Open Bar
	No Alcohol Allowed
PRICE	$1500
	$3000
	$4500

	$6000

After the respondents were asked the preliminary questions, the 12 choice questions began. Figure 3.2 is a screenshot of the survey illustrating the first choice question. In this part of the survey, the respondents were asked, "If these were your only options, which would you choose?". They were presented with 4 options, all with a different combination of levels within each attribute,

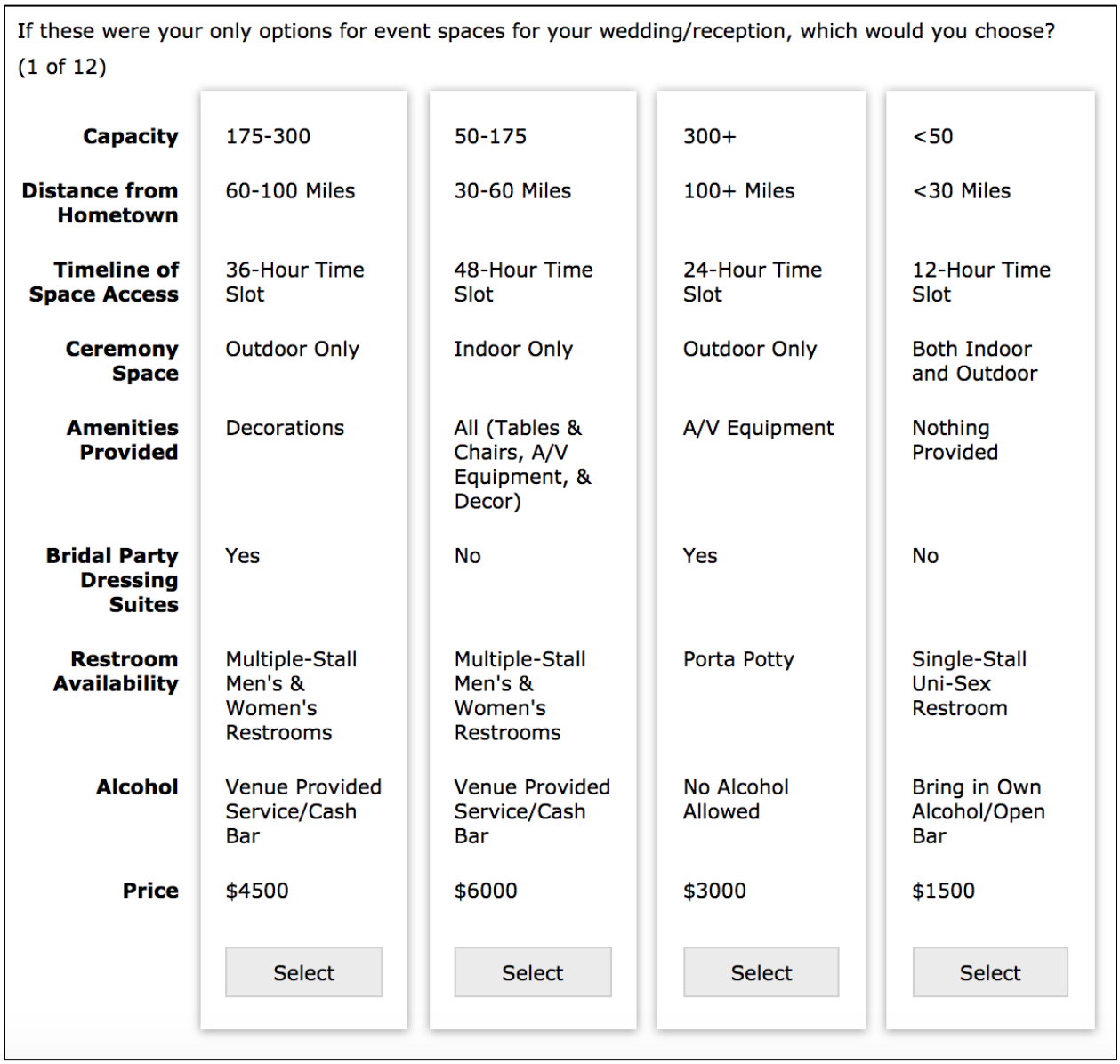

Figure 3.2 - Screenshot of the first task/question asked within the CBC Analysis Survey

and a price that is associated with that combination. Due to the number of attributes and the number of levels within each attribute, there was a possibility of 69,120 combinations of choices which could have been asked to the respondents. Out of the 69,120 possible combinations, 48 were chosen by the software to be considered the optimal combinations which when asked to the respondents would allow for the proper comparison and analysis of the varying attributes within the survey. A partial profile design was implemented to reduce the number of combinations needed to properly analyze the variables. Within a partial profile design, certain levels within certain attributes were left constant across all choices within one task to reduce respondent fatigue and to allow for easier decision-making for each task.

The purpose of a choice question is to force the respondent to make a choice and to think of a price they would be willing to pay for each of the different combinations. An optional feature within all CBC analysis surveys is to add a "None" option for each task to better imitate real-world decisions. Currently, there is a certain acceptable threshold of 5%-15% of the total responses being selected as "None" after all of the responses are gathered (Sawtooth, 2019). This threshold is present to prevent the results from being skewed by not having enough "non-None" options chosen to properly analyze the attributes in question. A high enough confidence level was not present to ensure enough responses would be gathered to prevent the "None" option from being selected too often, so it was decided to not include this as an option within the survey.

Data Collection

Once the survey was built, it was spread through many different facets. At first, the survey was spread through varying listservs within Kansas State University's email server. The link was sent out in a timely fashion in which the data collected could be timestamped to have an

understanding of which data came from which group. The first listserv was to the Department of Agricultural Economics. After a period of two weeks and four days, the survey was then spread to the listserv with the KSU sorority Kappa Kappa Gamma. One week and five days later, data gathering came from various forms of social media (i.e. Facebook, Twitter, etc.). In total, 165 responses were gathered in just over one and a half months' time with 142 of the 165 responses

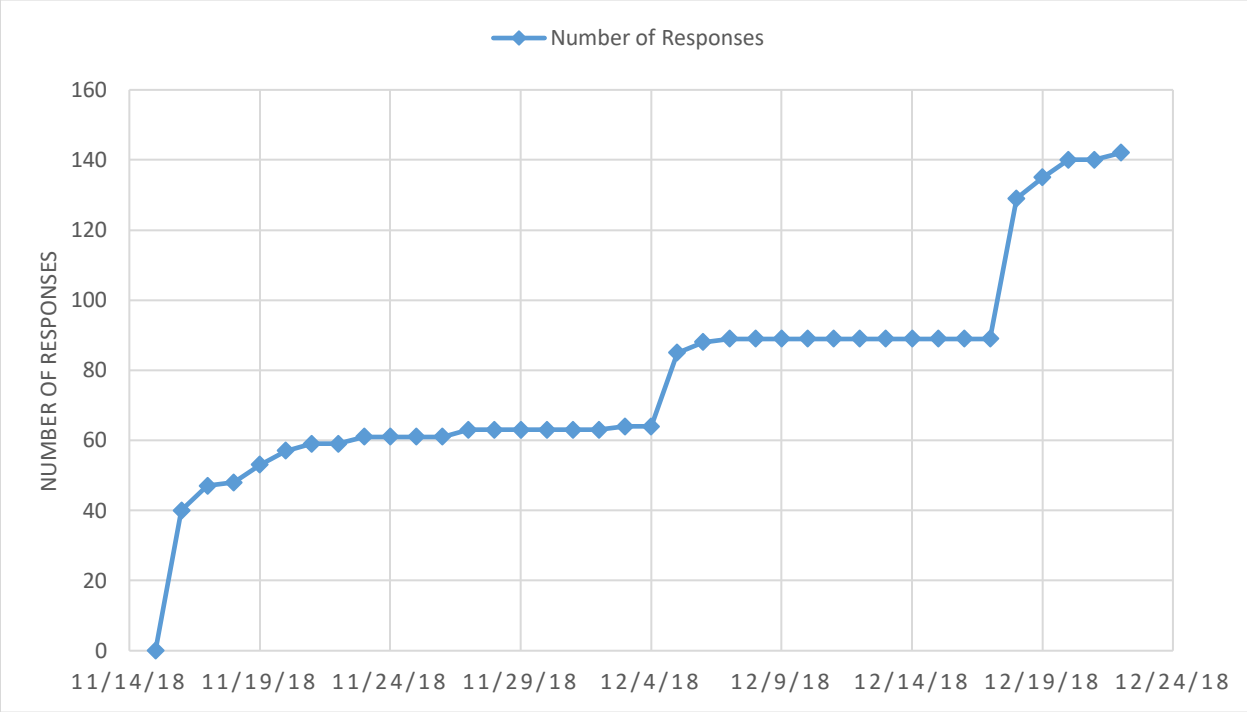

Figure 3.3 - Timeline of Survey Responses Over Time

being complete usable responses. Figure 3.3 represents the timeline of when survey responses were gathered. As expected, three spikes can be seen representing the three times the survey was introduced to a new audience. Due to the fact the number of responses after each spike plateaus until the next spike of responses, it can be assumed the responses within each of the three main periods can be specifically attributed to the group which was currently "most active". If this assumption is made, there were 64 responses (45%) through the KSU Department of Agricultural Economics listserv. 25 responses (18%) were gathered from the Kappa Kappa Gamma listserv with the remaining 53 responses (37%) collected through various forms of social media.

The purpose of this was to try and reach individuals who would make up a reasonable audience and possibly be familiar with the decisions which would need to be made regarding this subject of research. Ideal respondents would have been recently married individuals or individuals who are currently planning a wedding. These individuals would be aware of the current costs associated with planning a wedding, specifically event space rental, to be able to host their wedding and/or reception. An attempt to reach respondents within the age group 18-25, and Female respondents was also made. If enough responses were available to meet sample size requirements, these different data set could be analyzed separately from all of the responses. This method of collection was chosen as an effort to ensure a proper amount of useful responses were gathered to prevent issues related to sample size requirements.

However, this attempt to receive responses related to a certain population doesn't come without sampling limitations. Sampling bias could be considered to be present within the study as certain populations were targeted to receive responses while other populations may have had limited access to the survey not allowing for proper breakdown of responses.

Within the Appendix, Figure A.1 - Figure A.5 display the breakdown of the dataset related to the preliminary demographic questions presented within the survey. Figure A.1 represents the respondents based on their gender. Figure A.2 represents the respondents based on their age. Figure A.3 symbolizes the differences in wedding planning experience. Figure A.4 shows the comparison between which individuals would be or would not be the ones making the payment on the event space. The last figure, Figure A.5 separates the individuals by marital status by indicating those who are married vs the ones who are not married.

Data Cleaning

Data were collected through Sawtooth's online server and when data collection was complete, the dataset was downloaded as a comma delimited *.csv file. Initially, the dataset was given on a per respondent basis. All responses were given in a numerical format. For example, if given three choices as answers to the first question, if the respondent chose the first choice, the dataset would show this response as a 1. If the second choice was chosen, it would show a 2 and a 3 for the third, final choice. For the preliminary questions, data cleaning was performed to transform the numerical answers into text to better understand the demographic of each respondent.

Regarding the choice questions, the only information given through the final dataset was the information related to only the choice which was made by the respondent. No information was given in the dataset regarding the other possible choices they had to choose from. This information was able to be found by linking together the survey design .csv file with the final dataset. Much like the preliminary questions, the answers to the choice questions were shown in a numerical format. Detail was not given regarding the attribute/levels which were being represented within each choice. Further data cleaning needed to be performed to properly show all of the information related to the attributes and levels for each choice. The initial dataset was 142 rows of data. Upon all data cleaning to show all of the information needed to run the regression and find WTP values, the dataset was 48 times larger (12 questions X 4 choices/question) in size.

After all of the information necessary to perform the regression was available, the data were transformed into a binary format. Within each section of the choice questions representing an attribute, a "1" was used to indicate the level which was being represented in each specific choice. A "0" was used to show the levels which were not shown in that choice. By following this

format, the statistical software could recognize the characteristics related to each of the possible choices. It is necessary to not only understand the characteristics related to the choice which was chosen but being able to know the characteristics of the choices which were not chosen gives the statistical software the ability to properly run a regression. A proper regression shows how each respondent makes choices and the level of importance each respondent puts onto each level within each attribute given through the survey.

WTP Analysis

Mixed logit regression was run to analyze the data collected from the surveys. The dataset was split into varying groupings of data based on the preliminary questions that were asked within the survey. The groupings were as follows: gender, age, wedding planning experience, venue payment details, and marital status. Due to software requirements, some of the groupings did not have a sufficient number of respondents within the group, so a regression would not have given true results. In total, 17 groupings were made from the preliminary questions including a grouping of the entire dataset, and 11 of the groupings allowed for regressions to be run. Table 3.3 illustrates the varying groupings of data from the survey as well as whether a regression was run for that grouping.

Table 3.3 - Varying groupings of data based on whether a regression was run or not

PRELIMINARY QUESTION	CHARACHTERISTIC	REGRESSION RUN
ALL RESPONSES	-	YES
GENDER	Male	YES
	Female	YES

	Prefer Not to Say	NO RESPONSES
AGE	18-25	YES
	26-30	NO
	31-40	YES
	41-50	NO
	51-60	NO
	61+	NO
ARE YOU EITHER CURRENTLY PLANNING A WEDDING, OR HAVE PLANNED A WEDDING WITHIN THE LAST 3 YEARS?	Yes	YES
	No	NO
IF SO, WERE YOU OR WILL YOU BE THE INDIVIDUAL WRITING THE CHECK FOR THE EVENT SPACE?	Yes	YES
	No	YES
	Not Planning	YES
ARE YOU EITHER CURRENTLY MARRIED OR HAVE YOU BEEN MARRIED PREVIOUSLY?	Yes	YES
	No	YES

Since the dataset was transformed into binary form, regressions were able to be run using the "mixlogit" command within STATA. Regressions find the relationship the data has in relation to all of the variables being analyzed. There are many types of regression models which can be used to show the relationship between the dependent and independent variables. Mixed logit modelling within the statistical software Stata has been shown to be the top choice amongst CBC analysis experts when wanting to calculate WTP as it overcomes many of the issues associated with either a logit or conditional logit model. According to Tonsor, Schroeder, Pennings, and

Mintert, "Mixed logit allows for random taste variation within the surveyed population, is free of the independence of irrelevant alternatives (IIA) assumption and allows correlation in unobserved factors over time, thus eliminating three limitations of standard logit models" (Tonsor et al., 2007, p.9). The mixed logit model allows for the coefficients within the model to vary for each of the respondents within the survey compared to compiling all of the results into an average. This method can allow for more precise recording of utilities associated with the regression results as they are based on each respondent separately and implies that each decision maker will make decisions differently and will have different preferences (Hole, 2009).

The coefficients within the regression represent the utility value or satisfaction received by having a certain level of the attribute within the event space. The utility *(U)* is representative of the option *j* for individual *i* and is defined by:

(1) $$U_{ij} = \beta'_i x_{ij} + \varepsilon_{ij}$$

where x_{ij} are observed variables that relate to the alternative and decision-maker, β'_i is a vector of coefficients of these variables for person n representing that person's tastes, and ε_{ij} is a random term that is i.i.d. extreme value (Train, 2003).

To be able to run the "mixlogit" command, the issue regarding collinearity needed to be addressed. To solve the issue surrounding collinearity, one level within each of the attributes needed to be dropped from the regression to create a base line scenario. Deciding which level to drop does not affect the final results, but some of the intermediary numbers will differ. The base model used within the study was chosen to be based on using the level with the lowest level of utility within each attribute bundle. Since the utility values were not known, a hypothesis was made regarding which level would provide the lowest level of utility for each attribute. Table 3.4

illustrates the variables which were dropped to solve for collinearity within the regressions which were run.

Table 3.4 - Variables which were dropped from regressions to solve for collinearity

ATTRIBUTE	LEVEL
CAPACITY	<50 Capacity
DISTANCE FROM HOMETOWN	100+ Miles
TIMELINE OF SPACE ACCESS	12-Hour Access
CEREMONY SPACE AVAILABILITY	Outdoor Only
BRIDAL PARTY SUITE AVAILABILITY	Not Available
RESTROOM AVAILABILITY	Porta-Potty's
ALCOHOL REGULATIONS	No Alcohol Allowed

By choosing to drop the levels with the lowest utility, the expectation was for all of the necessary WTP values to be positive for the remaining levels which were analyzed within the regression. Since the utility values for all of the variables were expected to be positive, by adding that level within that attribute to the analysis, the average respondent would have a positive gain in utility and would be willing to spend more money to have that level of the attribute as a characteristic of the event space. This step would allow for ease of analysis by knowing that the base line model would resemble a basic event space.

The CBC Analysis allows for the ability to attach a utility value to the varying attributes within a research study. These utility values can be used to calculate an economic value associated with the attributes, known as the willingness-to-pay (WTP). The calculations become less precise when it comes to calculating a WTP value as more error is added with these calculations. When calculating the economic values of varying attributes, measures relating to the demand of the

product and attribute are considered. Measures related to supply of the product are not. Pseudo-WTP is a measure used by many researchers to convert part-worth's of a product or attribute and turn them into a dollar amount which are defined on ratio scales. (Allenby, 2013). Using a dummy coding approach, to calculate the WTP value requires using the difference in the respective part-worth's. Pseudo - WTP is found by the following equation:

$$WTP = \frac{\beta_k}{-\beta_c} \quad (2)$$

where β_k is equal to the utility coefficient for the attribute x_k being analyzed and β_c is equal to the cost coefficient. These coefficients are equal to the utility coefficients calculated through Equation 1 when calculating the utility of the attribute. The Stata command "wtp" is used within the software to calculate the WTP values for each of the attributes (Hole, 2007). The WTP values are important as they tell the maximum value/price that an individual is willing to pay for that specific amenity or feature. If the price for each respective amenity is pushed even one dollar over the WTP value, then the "client" would not feel that amenity is worth the money. Operators need to keep these values in mind to try and increase their profits as much as possible by charging as much as possible for the space by having these amenities but making sure the price they charge is not more than the consumer is willing to pay.

A secondary measure which is helpful in understanding the interaction between the different attributes is the attribute importance values. After regressions were run, this provided utility values which allowed for the ability to calculate attribute importance values. Calculating the attribute importance values within the study followed the following three-step process:

Step 1: Calculate the Attribute Utility Range for each Attribute

The attribute utility range is the range between the smallest and largest utility value for each respective attribute.

Step 2: Calculate Total Attribute Utility Range

The total attribute utility range is the sum of the range for each of the attributes.

Step 3: Calculate Relative Attribute Importance Values

By dividing the utility range for each attribute by the total utility range for all attributes, the relative attribute importance values can be calculated.

The attribute importance values permit the researcher the ability to understand where attributes stand in comparison to each other. Having an understanding of the level of importance allows for better planning and marketing of the venue.

Decision Tool Building

Another main goal of this research was to find the profitability related to an on-farm wedding venue as a part of agritourism. The main way of modeling profitability is through building either a linear or non-linear programming model which examines the revenues and costs associated with the different variables of the scenario being analyzed. The choice between linear and non-linear is based on how the variables interact with one another. Within agriculture, linear programming is used when deciding how to optimally allocate available resources in production planning to either maximize farm profits or minimize input costs based on certain restrictions or constraints such as land, capital, and labor. Linear programming, a form of operations research models, began being used within agriculture in the 1950's. They were mainly used by nutritionists when creating livestock rations with the goal of optimizing the nutritional value of the feedstuff while reducing the costs associated with the ration. Since then, many other forms of operations research models have been adopted within the industry of agriculture (Sofi et al., 2015). The WTP values calculated allow for a deeper understanding of the consumer point-of-view within this

study. Within this research study, to better understand the producer or operator point-of-view, an operations research decision tool model was created. Excel Solver was the program of choice.

To begin building the decision tool within Excel, data needed to be collected from the existing event spaces in Kansas. Through communication with the director of Kansas Agritourism within the Kansas Department of Wildlife, Parks and Tourism (KDWPT), a list was compiled of over 50 wedding venues that qualify as agritourism. 6 spaces across the state were chosen and phone interviews were performed and information regarding yearly revenue, fixed costs such as construction costs and costs to purchase the varying amenities, variable costs such as utilities and insurance premiums, as well as physical details regarding the barn itself such as capacity, square footage, style, etc. was gathered. The interviews were performed in a similar fashion and questions were asked the same way to all individuals to receive similar information from each respondent. Prices were discussed regarding the typical charge with the amenities each location currently offers.

To be able to compare all of the current event spaces fairly as well as being able to compare to the base model which was being used within the operations research portion of the research study, a base charge was calculated by subtracting the WTP values found through the CBC Analysis for the attributes each respective event space offers. For example, the Collingwood Barn charges $5500 for their event space. They offer tables and chairs and allow 48-hour access. The WTP values related to “Tables and Chairs” and “48-Hour Space Access” was subtracted from $5500. Table 3.5 below reflects these price transformations as well as information related to the capacity and square footage of each space analyzed.

Table 3.5 - Locations of current event spaces used as examples for data within decision tool

BARN	LOCATION	BASE PRICE WITHOUT AMENITIES	CAPACITY	SQUARE FOOTAGE
JM COLLINGWOOD	Pretty Prairie, KS	1639	667	10000
BELLWETHER BARN	Scott City, KS	1139	293	4400
SHANNON CREEK BARN	Manhattan, KS	389	187	2800
BARN @ SCHWINN PRODUCE FARM	Leavenworth, KS	889	116	1739
FRESH AIR FARM	Kansas City, KS	889	133	2000
EMMA CREEK BARN	Hesston, KS	389	154	2304

Using the information from Table 3.5, a logarithmic equation was able to be found showing the relationship between the capacity of the space to the base price of the space. Square footage could be interchanged for capacity as the industry standard relationship between the two is simply:

(3) $$Square\ Footage = 15 * Capacity$$

This relationship covers the space needed for tables, dance floor, bar, and serving area. The minimum suggested square footage is 1200 square feet. The data collected from the current event spaces was inputted into Excel to find the average relationship between the square footage of the spaces and the base price of the space. Figure 3.4 shows the relationship graphically. The equation was found to be:

(4) $$Base\ Price/Event = 1309.9 * \ln(Capacity) - 5825.9$$

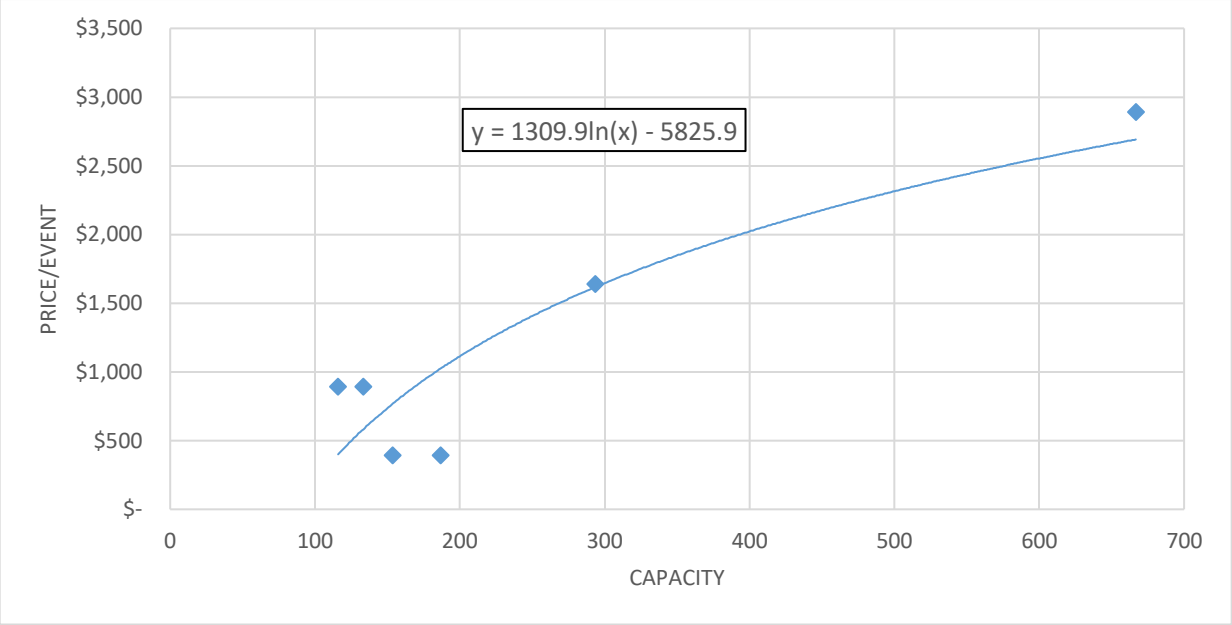

Figure 3.4 - Relationship between the base price for existing event spaces and the capacity of the space

A logarithmic relationship was chosen because as the capacity or square footage of the space increases, the return, in terms of increase in price of the space, increases at a decreasing rate. There is a threshold where potential customers have enough space for their party and see no value in having a larger space, so they will not want to pay more for that space. Due to demand for only a certain amount of space, if the size of the space doubles, the price that can be charged for the space will not simply double. This is especially true if the size of the space was already big enough for the user's needs. The JM Collingwood Barn is a good example of this as the space is 10,000 sf, up to five times the size of some of the other spaces and is only charging less than double of those other spaces. Now that the relationship is found between the base price being charged for the space and the capacity of the space, as well as the WTP values for the amenities analyzed, the estimated revenue values can be found. By adding the WTP values for the amenities provided to

the base price and multiplying that figure by the number of events per year, the total yearly revenue was calculated.

Next was to assess the costs associated with operating the space. To examine the costs associated with operating a wedding venue, values were gathered from the interviews and averaged. Table 3.6 is the average costs associated with each space that were used within the decision tool.

Table 3.6 - Breakdown of Expenses used for calculations used within the decision tool

EXPENSE	EXPENSE TIMELINE	COST
UTILITIES	Monthly	$1,500
INSURANCE PREMIUM – WITH LIQUOR LICENSE	Monthly	$750
INSURANCE PREMIUM – WITHOUT LIQUOR LICENSE	Monthly	$500
TABLES & CHAIRS	One-time	$73.50/Head
A/V EQUIPMENT	One-time	$15,000
CONSTRUCTION COSTS	One-time	$100/sf
BRIDAL PARTY SUITE CONSTRUCTION COSTS	One-time	$20,000
LIQUOR LICENSE FEE	Yearly	$2,500

The next step was to obtain the objective function and constraints associated with this problem. Knowing the goal was to maximize total yearly profits, the equation *Profit = (Revenue – Costs)* was used. To build upon the 'revenue' part of the equation, *Revenue = (Price/Event * Number of Events/Year)*. Equation 4 represents the Price/Event if no amenities were being offered. Simply the price related to the space itself. The amenities were built in as binary variables into the decision tool so if the binary has a value of 1 for a specific amenity, then the WTP value associated

with that amenity would be added to the Price/Event and increase total revenue. When discussing costs, all of the variables were binary variables except for the construction costs of the building, utilities, and payment for the loan to build the building. The building will be constructed no matter how the rest of the variables turn out and all bills will have to be paid to keep the business operational. Considering all of the costs analyzed and the potential revenue associated with this type of business, the following objective function was found:

Objective Function:

$$\boldsymbol{Max\ Z} = \Bigg(\Bigg(\Bigg(\Big(\big(1309.9 * LN(Capacity)\big) - 5825.9\Big) + (WTP1 * CS1\ Binary) + (WTP2 * CS2\ Binary) + (WTP3 * TC\ Binary) + (WTP4 * AV\ Binary) + (WTP5 * D\ Binary) + (WTP6 * BPS\ Binary) + (WTP7 * RR\ Binary) + (WTP8 * BAR\ Binary)\Big) * \#\ of \frac{Events}{Year}\Bigg) - \Big(\big((I1\ Premium * I1\ Binary) + (I2\ Premium * I2\ Binary) + Monthly\ Utilites + Loan\ Payment\big) * 12\Big) + (LL\ Yearly\ Cost * LL\ Binary)\Bigg)$$

Constraints:

Budget Constraint:

$$(Price/SF * Size) + (CS1\ Binary * CS1\ Price) + (CS2\ Binary * CS2\ Price) + (TC\ Binary * TC\ Price) + (AV\ Binary * AV\ Price) + (D\ Binary * D\ Price) + (BPS\ Binary * BPS\ Price) + (RR\ Binary * RR\ Price) + (BAR\ Binary * BAR\ Price) \leq Max\ Loan$$

Square Footage to Capacity Ratio:

$$(-15 * Capacity) + (Square\ Footage) = 0$$

Square Footage Minimum Requirement:

$$Square\ Footage \geq 1200$$

Liquor License: YES = Insurance Policy w/LL:

$$(-1 * I1\ Binary) + (1 * LL\ Binary) = 0$$

Liquor License: NO = Insurance Policy w/o LL:

$$(I2\ Binary) + (LL\ Binary) = 1$$

If Venue Provides Alcohol: YES = Liquor License:

$$(-1 * LL\ Binary) + (BAR\ Binary) = 1$$

Minimum Profit:

$$\Bigg(\Bigg(\Bigg(\Big((1309.9 * LN(Capacity)) - 5825.9\Big) + (WTP1 * CS1\ Binary) + (WTP2 * CS2\ Binary) + (WTP3 * TC\ Binary) + (WTP4 * AV\ Binary) + (WTP5 * D\ Binary) + (WTP6 * BPS\ Binary) + (WTP7 * RR\ Binary) + (WTP8 * BAR\ Binary)\Big) * \#\ of \frac{Events}{Year}\Bigg) - \Big(\big((I1\ Premium * I1\ Binary) + (I2\ Premium * I2\ Binary) + Monthly\ Utilites + Loan\ Payment\big) * 12\Big) + (LL\ Yearly\ Cost * LL\ Binary)\Bigg) \geq Minimum\ Profit\ Amount$$

Once the objective function and constraints were specified, the decision tool was built to be user-friendly such that each user could input their own values related to specific variables within

the analysis or have the ability to input different possible scenarios. Then, the Solver program could be run to find the profit maximizing combination of square footage/capacity, choice of insurance premium, liquor license and alcohol regulations, whether or not to include an indoor or outdoor ceremony space, whether to provide tables & chairs, A/V equipment, décor, and bridal-party suites or not, and the configuration regarding the restrooms.

Within the decision tool, the cells which require user input are highlighted in yellow. All of the cells are linked to either an objective function coefficient value or are used within a constraint equation. Functions/formulas are pre-designed to allow changes from user to user to still calculate the proper optimal values. The cells which the users can change are related to the following:

1) Number of Weekend Weddings/Year
2) Loan Details
    a. Maximum Available Loan Amount ($)
    b. Interest Rate (APR %)
    c. Length of Term (Months)
3) Minimum Square Footage
4) Square Footage Required/Attendee
5) Minimum ROI (%)
6) Construction Costs (per sf)
7) Cost/Construction Costs of Amenities
    a. A/V Equipment
    b. Décor
    c. Tables & Chairs

i. Cost of Round Tables

ii. Persons/Round Table

iii. Cost of Rectangle Tables

iv. Persons/Rectangle Table

v. Cost per Chair

vi. Percentage of Round Tables

d. Bridal Suites

e. Outdoor Ceremony Space

f. Dedicated Indoor Ceremony Space

i. Price/SF for Indoor Ceremony Space

ii. SF Requirement in Separate Ceremony Space/Head

iii. SF Requirement in Separate Ceremony Space or Walkway

iv. SF Requirement in Separate Ceremony Space for Alter

g. Cost of Multiple-Stall Restroom Upgrade

8) Yearly Cost of Liquor License

9) Monthly Insurance Premium

a. W/ Liquor License

b. W/o Liquor License

10) Monthly Utilities

11) Minimum ROI (%) for Solver $/Event Charge

12) Minimum ROI (%) for Estimated $/Event Charge

Assumptions

Now that all of the data and methods are laid out related to the research study, before analyzing the results, some assumptions had to be made for the decision tool to be as user-friendly as possible and to accurately compare the data collected from the different sources. Table 3.7 shows the assumptions which were made within this study.

Table 3.7 - Assumptions made within the study and why they were necessary to assume

ASSUMPTIONS	WHY IT'S NECESSARY
ALL RESPONDENTS WOULD BE THE ONE'S PAYING FOR THE SPACE	Being forced into making payment on said choices can distort the thought process on proper WTP values
WTP VALUES CALCULATED ARE FOR MAXIMUM CAPACITY (300 CAPACITY)	WTP for each level within each attribute would vary based on the size of the space.
CURRENT VENUE PRICING IS 100% EFFICIENT/PRICED AT MAXIMUM OF WHAT CUSTOMERS WOULD PAY FOR EACH RESPECTIVE SPACE	The assumption needed to be made to be able to compare all current event spaces fairly and to be able to calculate the base charge for just the space without any amenities
NO COMPETITION BUILT INTO MODEL	When calculating the WTP values, the survey respondents' responses were based on them only having the available options as options. This would draw the WTP higher than they may realistically be, in turn increasing the price/event and profit within the operations research portion.
NO EFFECT HAD ON NUMBER OF EVENTS BOOKED PER YEAR DUE TO LOCATION/MARKET SHARE OR PRICE CHARGED FOR THE EVENT	No matter what the price is, the number of events per year denoted by the user will happen

INSURANCE PREMIUMS HELD CONSTANT	Insurance Premiums will vary from location to location and from individual to individual
OWNER-OPERATED	No Labor Costs

Chapter 4 - Results and Discussion

With the goal of the research to better understand both the consumer and producer points-of-view with regard to an agritourism wedding event space, WTP values were calculated through a regression of CBC Analysis survey data. The data were representative of the consumer points-of-view and allowed for the ability to better understand the supply side of the study. The WTP values were utilized within a profit maximization operations research model as the additional value varying amenities provide to the price which could be charged per event. By creating this model, better decisions can be made by those who are interested in learning more about the potential revenues and costs associated with starting a wedding venue.

Regression Results

The regressions run within this study were critical points to answer the main research questions being asked. The values associated with the results were used within various calculations and were needed when comparing different groupings of data. The coefficients within the regression outputs for the varying attributes represent the utility value or level of satisfaction the average respondent gained from each attribute which was analyzed. As previously mentioned, due to "mixlogit" command requirements related to minimum number of responses, only 11 regressions were able to be run from the 17 total data sets. Of the 11 regressions, only four met the sample size requirements related to sufficient CBC Analysis. These four groupings were: All Responses, Age: 18-25, Gender: Female, Marital Status: Not Married. The data sets were further analyzed to find the following:

1) **Utility Values:** When analyzing the utility measures, the higher the value, the more value the level of each attribute has to the particular population. A value of zero equates

to a neutral standpoint where a negative utility value is viewed as a negative significance in terms of demand. All utility measures are zero-centered forcing the utility measures to denote which attributes are more pleasing compared to others. The actual number value is not as important to understand compared to the relationship of the utility values within a certain attribute. Figure 4.1 details the regression output for the four of 11 groupings which were further analyzed to calculate WTP values due to having a sufficient number of responses. The coefficients related to each variable is equal to the respective utility measurement. If the coefficient is followed by an asterisk, a single asterisk (*) denotes a p-value of less than 0.1. Two asterisks (**) denotes a p-value of less than 0.05. Three asterisks (***) denotes a p-value of less than 0.01. The smaller the p-value, the higher the chance of the result happening if the null hypothesis is true. The price coefficient looks to be equal to 0.000, but is actually non-zero. Since STATA limits data being transferred to Excel to three decimal places, the value in that coefficient was lost. The true value for the price coefficient is equal to 0.0002085. Figure A.6, Figure A.7, and Figure A.8 within the Appendix illustrate the regression outputs all of the 11 regressions which were run.

Stata Run #	1.1	1.2	1.9	1.12
Stata Run Description	All Responses	18-25	Female	Married = NO
VARIABLES	Coefficient	Coefficient	Coefficient	Coefficient
Price	-0.000***	-0.000***	-0.000***	-0.000***
	(0.000)	(0.000)	(0.000)	(0.000)
50-175	0.973***	0.925***	0.913***	0.946***
	(0.108)	(0.128)	(0.119)	(0.125)
175-300	1.253***	1.259***	1.221***	1.312***
	(0.109)	(0.132)	(0.118)	(0.130)
300+	1.093***	1.146***	1.044***	1.172***
	(0.122)	(0.145)	(0.134)	(0.143)
<30 Miles	0.711***	0.720***	0.796***	0.760***
	(0.105)	(0.125)	(0.121)	(0.128)
30-60 Miles	0.607***	0.659***	0.703***	0.675***
	(0.098)	(0.117)	(0.108)	(0.117)
60-100 Miles	0.360***	0.454***	0.387***	0.431***
	(0.104)	(0.120)	(0.118)	(0.124)
24-Hour Time Slot	0.242**	0.310***	0.267**	0.277**
	(0.097)	(0.116)	(0.107)	(0.116)
36-Hour Time Slot	0.143	0.141	0.127	0.116
	(0.097)	(0.116)	(0.109)	(0.114)
48-Hour Time Slot	0.260***	0.308***	0.227**	0.297***
	(0.097)	(0.112)	(0.107)	(0.112)
Indoor Only	0.172*	0.203*	0.161	0.134
	(0.090)	(0.107)	(0.098)	(0.106)
Both Indoor & Outdoor	0.489***	0.455***	0.512***	0.462***
	(0.088)	(0.105)	(0.098)	(0.103)
Tables & Chairs	0.284***	0.280***	0.260***	0.259***
	(0.075)	(0.087)	(0.078)	(0.089)
A/V Equipment	0.021	0.023	-0.020	0.052
	(0.073)	(0.090)	(0.082)	(0.084)
Décor	0.118	0.086	0.090	0.067
	(0.075)	(0.087)	(0.084)	(0.088)
Yes	0.252***	0.300***	0.204**	0.260***
	(0.073)	(0.082)	(0.080)	(0.082)
Single-Stall Uni-Sex	1.075***	1.109***	1.059***	1.059***
	(0.103)	(0.124)	(0.119)	(0.124)
Multiple-Stall Men's and Women's	1.368***	1.259***	1.415***	1.193***
	(0.111)	(0.128)	(0.127)	(0.130)
Venue Provided	1.696***	1.859***	1.867***	1.831***
	(0.116)	(0.145)	(0.132)	(0.137)
Bring in Own Alcohol	1.900***	2.059***	2.154***	2.106***
	(0.136)	(0.159)	(0.155)	(0.162)
Respondents	142	105	117	107
Standard errors in parentheses				
*** p<0.01, ** p<0.05, * p<0.1				

Figure 4.1 – Screenshot of regression output for the four groupings which had enough responses to calculate WTP values

2) A**ttribute Importance Values:** Attribute importance values are simply a transformation of the utility measurements. These values were given through an analysis portion of the Sawtooth Program which was used to gather the survey data. Table 4.1 illustrates the attribute importance values for the four groupings which were analyzed. The attribute importance value is found by using the range of the utility measurements for each attribute. By summing up the range of each attribute, a relative importance value is found by dividing each attribute's range by the total range for all attributes.

Table 4.1 - Breakdown of the Attribute Importance Values based on the varying groupings of data

ATTRIBUTE	ALL RESPONSES	18-25	FEMALE	NOT MARRIED
CAPACITY	16.13%	18.48%	17.24%	17.60%
DISTANCE FROM HOMETOWN	9.43%	10.33%	8.58%	9.88%
TIMELINE OF SPACE ACCESS	3.40%	4.47%	4.46%	4.45%
CEREMONY SPACE	5.99%	5.50%	5.92%	5.65%
AMENITIES PROVIDED	5.57%	5.36%	5.76%	5.39%
BRIDAL PARTY DRESSING SUITES	3.31%	3.59%	3.18%	3.67%
RESTROOM AVAILABILITY	17.92%	14.82%	17.22%	15.76%
ALCOHOL	25.20%	27.70%	24.63%	28.28%
PRICE	13.05%	9.76%	13.00%	9.34%

When examining the attribute importance values, in every grouping, the attribute of alcohol had the highest level of importance. The next important attribute was capacity

for all of the groupings except for the *All Responses* dataset. Shortly behind was the restroom availability attribute for the other three groupings where it was capacity for the All Responses dataset. This part of the analysis is more qualitative than it is quantitative. Having an understanding of which attributes are the most important compared to the others allows the operator the ability to try and please the customers to the best of their ability by making sure to pay closer attention to the results relating to the higher valued attributes. Figure 4.2, Figure 4.3, and Figure 4.4, Figure 4.5 illustrate the breakdown related to the attribute importance for the groupings All Responses, 18-25, Female, and Not Married, respectively.

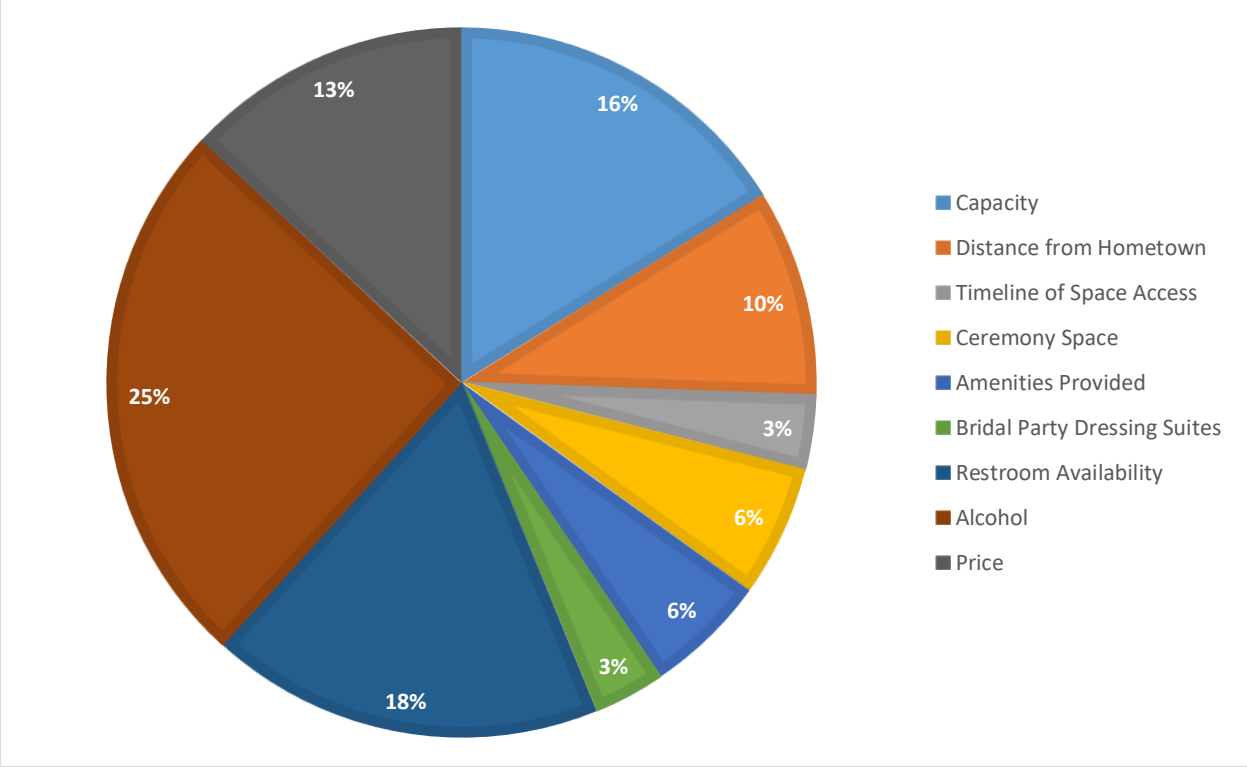

Figure 4.2 - Attribute Importance Values by Attribute for data set All Responses

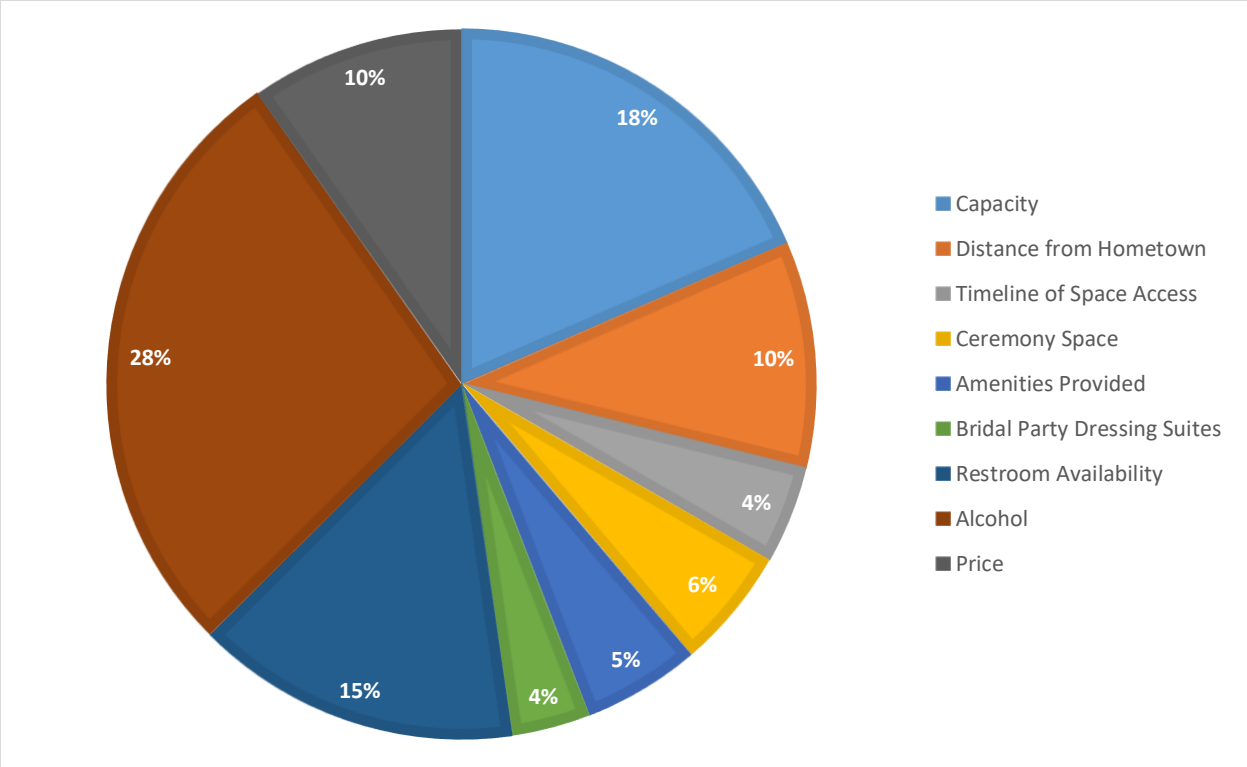

Figure 4.3 - Attribute Importance Values by Attribute for data set Age: 18-25

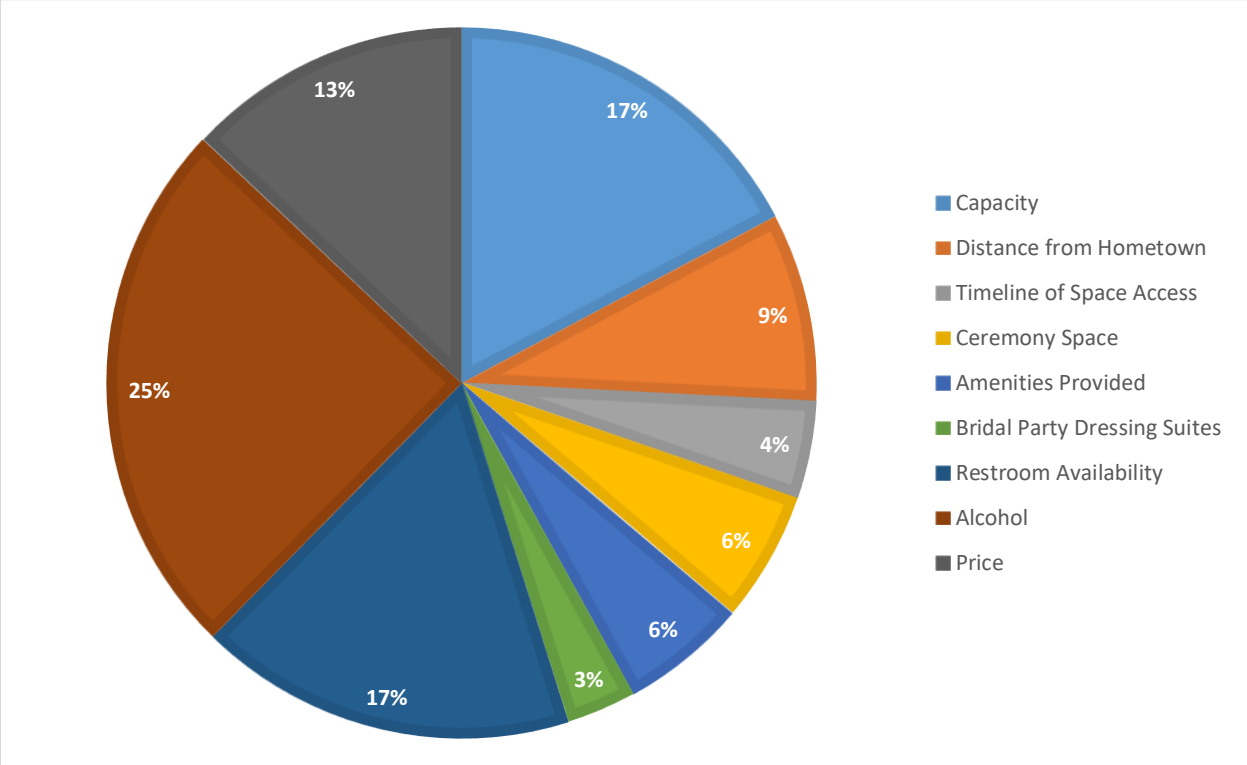

Figure 4.4 - Attribute Importance Values by Attribute for data set Gender: Female

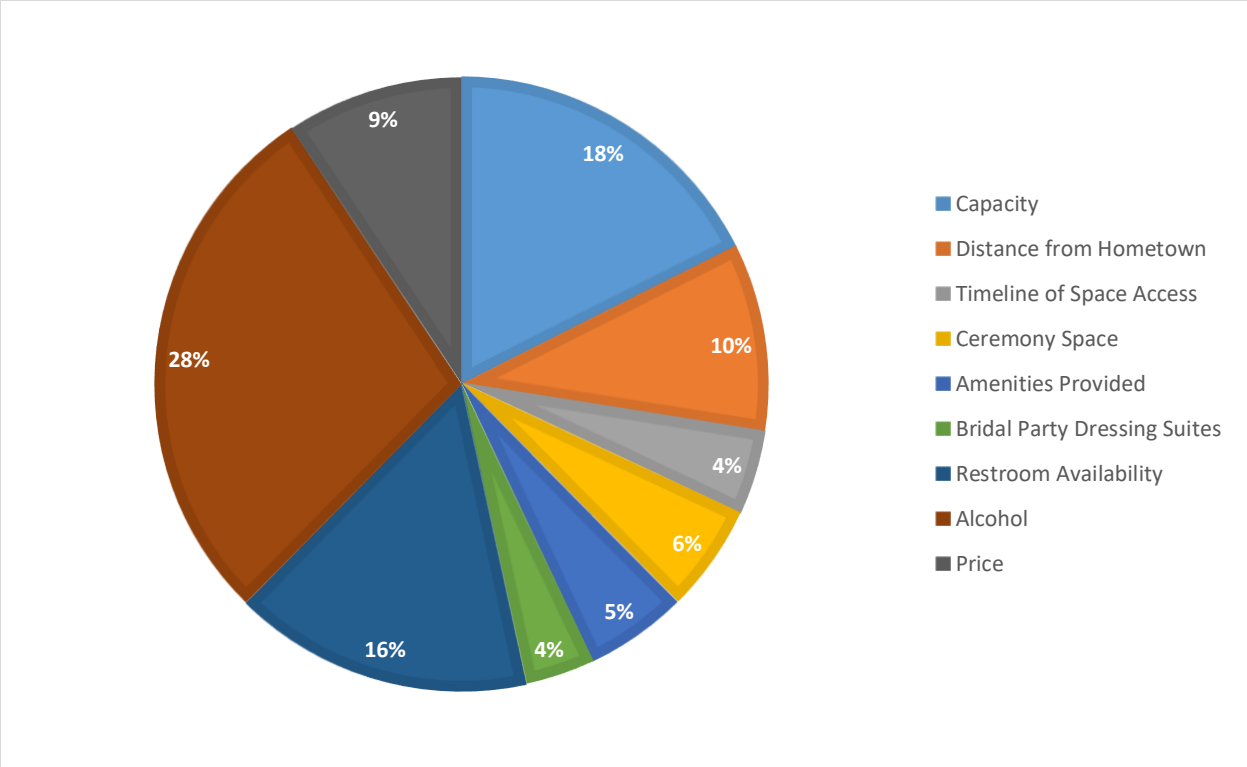

Figure 4.5 - Attribute Importance Values by Attribute for data set Marital Status: Not Married

3) **WTP values:** By using the utility values as coefficients for each attribute, WTP values were found by dividing the coefficient for each attribute by the cost/price coefficient found through the regressions. For example, when looking at the coefficient related to Tables and Chairs 0.2844996 and using the price coefficient value of 0.0002085, the WTP value for Tables and Chairs is equal to $1,364. Table 4.2 shows the WTP values for the four groupings which were analyzed within the study.

Table 4.2 - Willingness-To-Pay Values for each level analyzed by grouping of data

VARIABLE	1.1 – ALL RESPONSES	1.2 – AGE: 18-25	1.9 – GENDER: FEMALE	1.12 – NOT MARRIED
50-175	4664	5549	4249	5965
175-300	6006	7557	5687	8271

300+	5241	6881	4858	7389
<30 MILES	3408	4321	3706	4791
30-60 MILES	2908	3952	3273	4256
60-100 MILES	1725	2724	1802	2717
24-HOURS	1161	1861	1241	1743
36-HOURS	684	845	593	733
48-HOURS	1247	1845	1056	1871
INDOOR ONLY	822	1220	749	845
BOTH INDOOR & OUTDOOR	2343	2731	2385	2915
TABLES & CHAIRS	1364	1683	1208	1633
A/V EQUIPMENT	98	140	-93	325
DÉCOR	567	515	420	425
BP SUITES: YES	1209	1802	950	1638
SINGLE-STALL	5153	6654	4930	6680
MULTIPLE-STALL	6559	7556	6587	7522
VENUE PROVIDED BAR	8132	11159	8691	11545
GUEST PROVIDED BAR	9112	12361	10028	13281

Figure 4.6, Figure 4.7, Figure 4.8, and Figure 4.9 are graphical representations of the WTP values for the groupings All Responses, 18-25, Female, and Not Married, respectively.

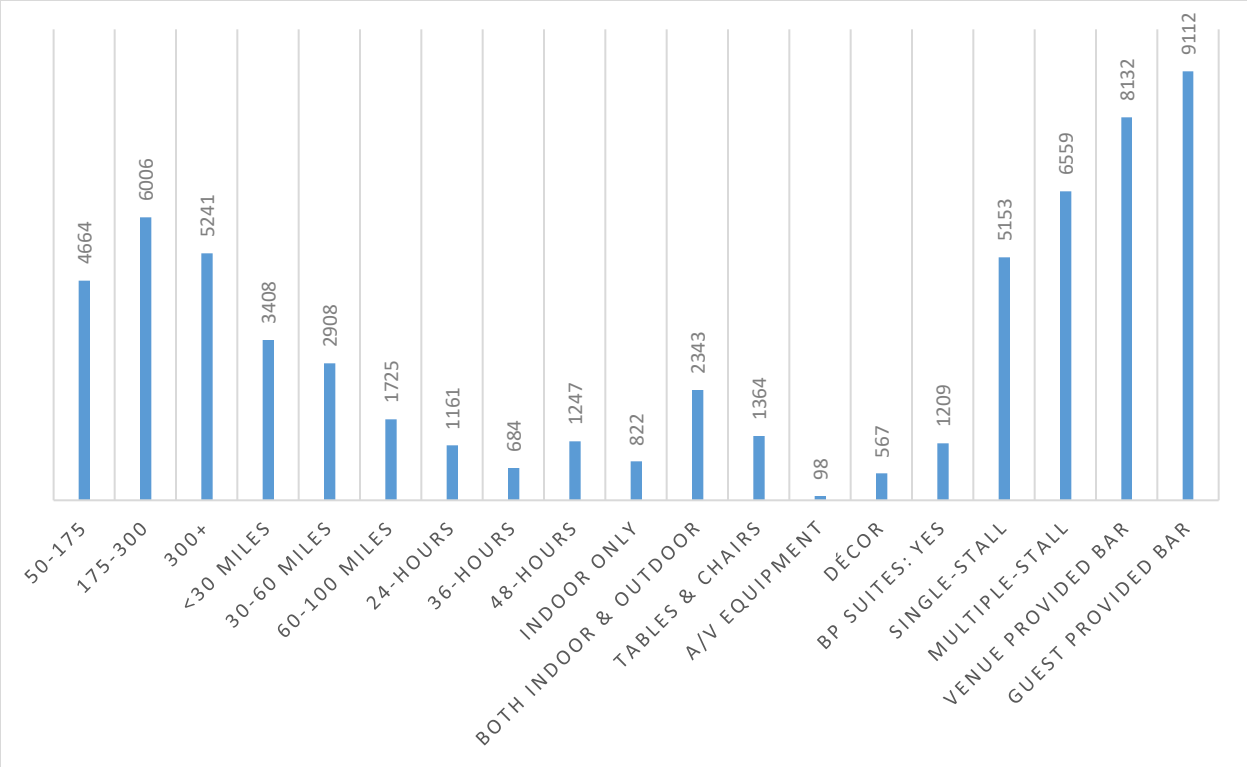

Figure 4.6 - WTP Values for each level for data set All Responses

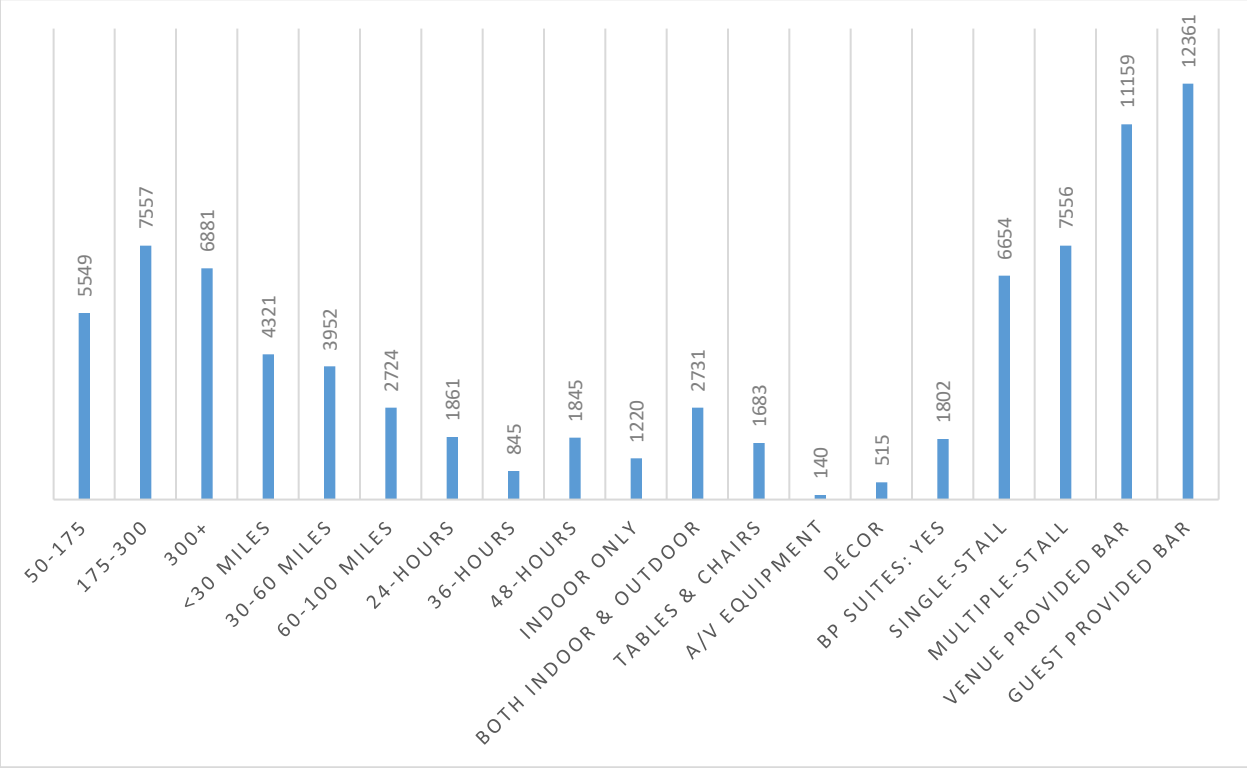

Figure 4.7 - WTP Values for each level for data set Age: 18-25

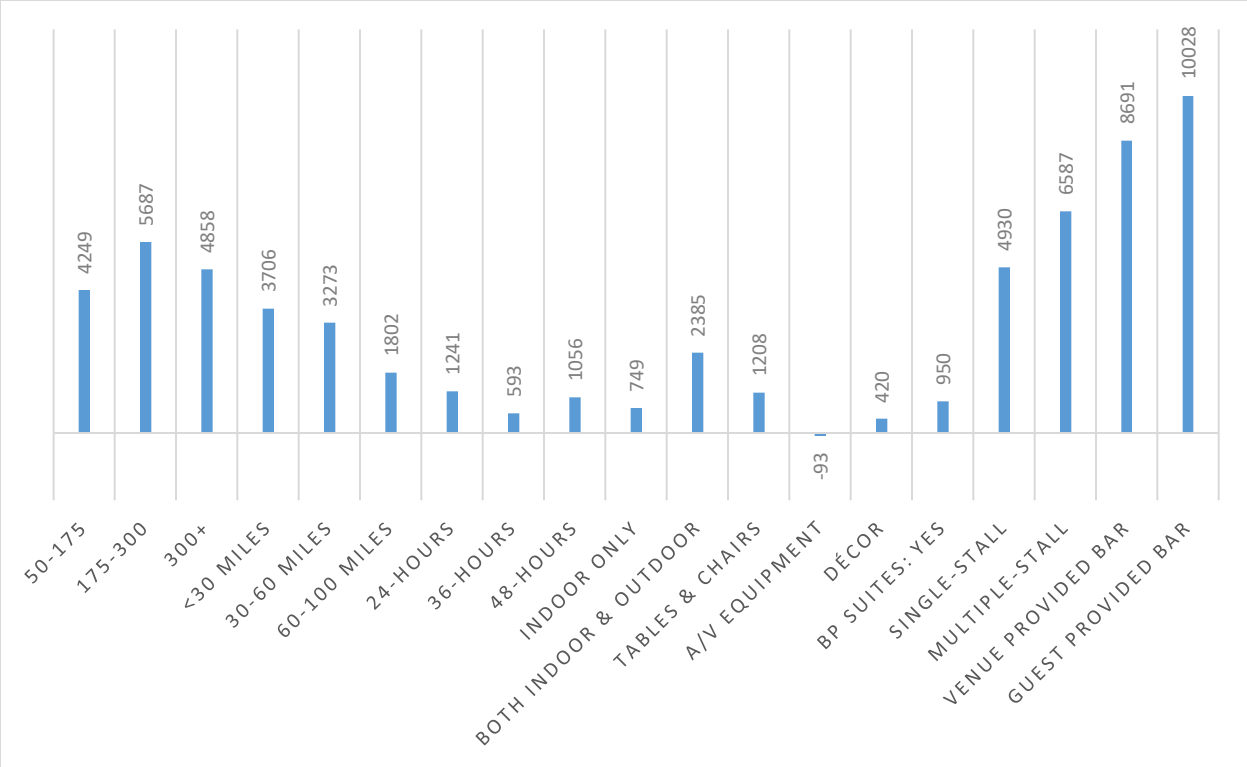

Figure 4.8 - WTP Values for each level for data set Gender: Female

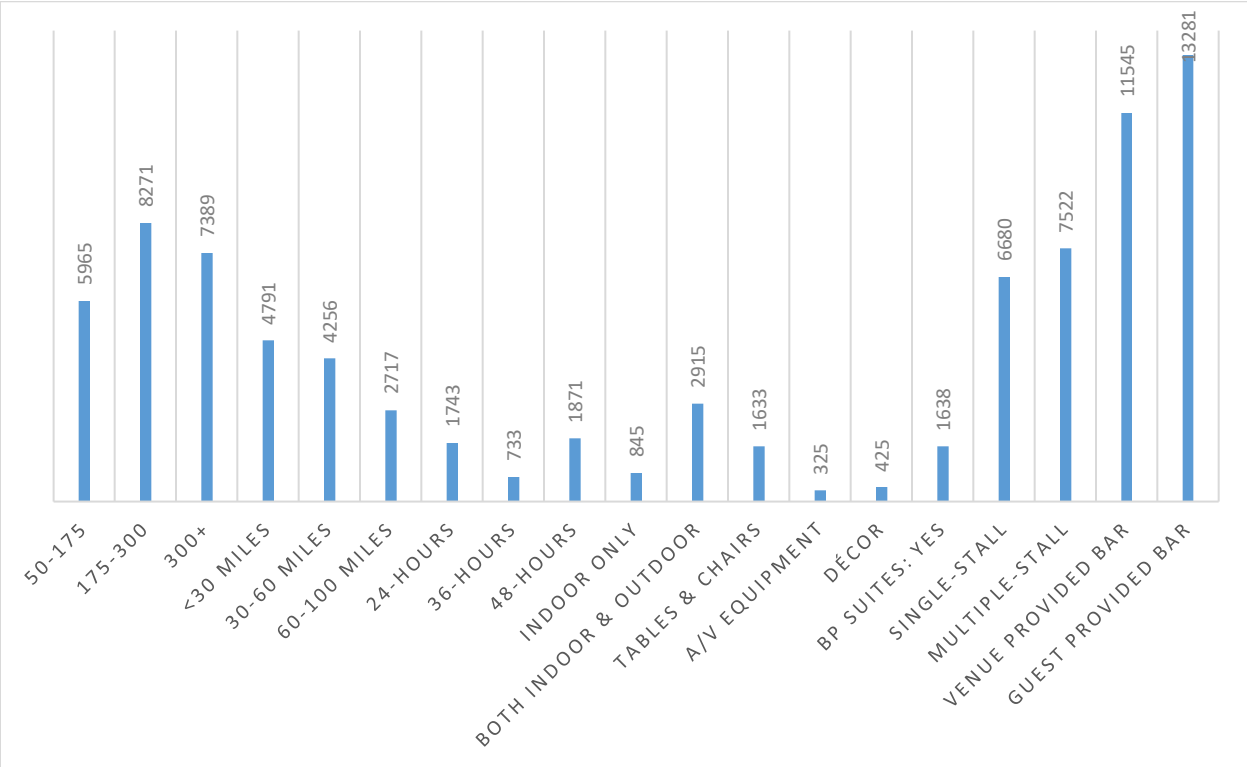

Figure 4.9 - WTP Values for each level for data set Marital Status: Not Married

Willingness-To-Pay Discussion/Issues

After all of the WTP calculations were made, certain values stood out as rather large in value which required more attention. For all four of the groupings analyzed, WTP values associated with capacity, distance, restrooms, and alcohol regulations seemed unrealistic regarding an event space, especially when having an understanding regarding the current status quo of wedding event spaces. Upon further research, one explanation showed that by providing a range instead of a concrete number within a CBC Analysis survey, it can have a different interpretation from one respondent to the next. For example, when the attribute, capacity, with the level, 300+ was used within the survey, one respondent could view that as 300 while another could view that as 5000 or 1,000,000 capacity. The researcher's interpretation was that a range provided a maximum level which could attend the venue. A level of 50-175, to the researcher, meant capacity of 175. Even through the trial run, which was run before the final survey was sent out to gather data, this was overlooked. This same issue plagued the data related to the "distance" attribute as well, as ranges were used instead of concrete measures. The WTP values are useful when being used as a relative comparison from one level to the next within the same attribute, but it was decided that they should not be used within the operations research portion of the study.

To alleviate the issue regarding the capacity attribute, data was gathered from current event spaces regarding the size in square feet and the price they would charge if all they offered was the space itself. This allowed for a function to be found relating the size of the space to a baseline charge. When discussing the distance attribute, it was found that dropping the data related to this attribute would be best. There was no way to repurpose or save the data in a way that would not skew the remaining dataset.

The other concern was within the restrooms and alcohol attributes. The WTP values are large when being compared to the base line combination used for the WTP calculations. This may be due to the fact that what was used for the baseline (Porta-Potty's and No Alcohol Allowed) is so undesirable that it inflates the WTP for the other options/levels for that attribute. Also, by looking at the attribute importance figures for the groupings which were analyzed, alcohol regulations and restroom availability were always ranked highly compared to the other attributes. It was decided that the baseline would change to one of the other levels and the current baseline level was dropped from being considered a true possible option. The WTP values for alcohol regulations and restroom availability became a lot more realistic. Another point to consider for this concern was the fact that these calculations were made based on the fact of no competition. It can be said that these respondents would almost always choose an event space which allowed alcohol in some fashion and had permanent restrooms rather than choosing a space which does not allow it at all and that has portable restrooms. The remaining WTP values were assumed to be satisfactory and were used within the operations research portion of the study as the coefficients for the binary decision variables relating to alcohol and restroom configuration.

Profit Maximization Results

Within the "world of economics", no model should ever be used as a full decision tool. The results can help aide the decision-making process but relying fully on the results of the model as the absolute way to move forward would be illogical. Since the decision tool was built to be open ended and user friendly, the results which could be calculated from the model are endless. By simply changing one of the input variables, the combination and overall profitability of the user's inputs could change drastically. For example, two scenarios listed below in Figure 4.10 show the

differences in two situations where the only input value changed was the pricing related to the construction of the bridal party suites.

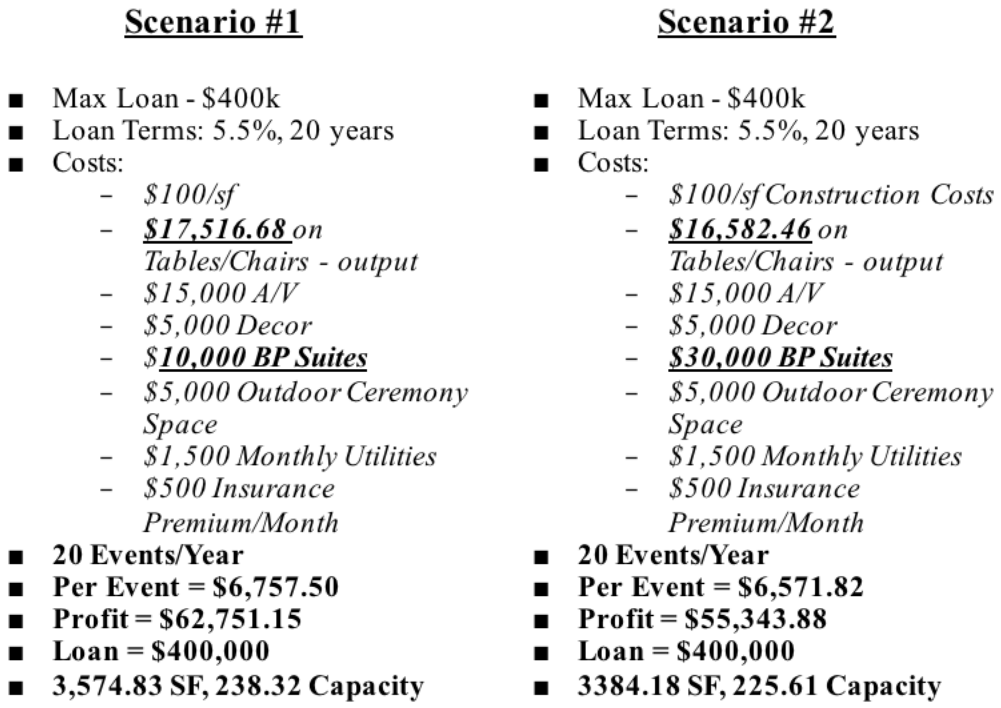

Figure 4.10 - Two Scenarios of Solver output showing how a single change such as a change in BP Suites cost can affect the Solver results

Comparing the two scenarios shows that even with a minor change by increasing the construction cost associated with the bridal party suites takes away from the allowable funds to build a bigger building as you are using the max budget amount in both scenarios and lowers the overall profits associated with this enterprise. This goes to show how the size/capacity of the space is the highest dictator in increasing profits.

Due to their being four groupings for which WTP values were calculated, four runs were performed within the operations research model. While keeping all of the other figures constant from run to run, and changing the WTP values, the profit values can be calculated to understand how varying groupings of respondents would affect the profitability of the event venue.

Table 4.3 - Inputs which were kept constant for the four runs of the varying data sets within the decision tool

INFORMATION	VALUE
NUMBER OF WEEKEND WEDDINGS/YEAR	30
MAX AVAILABLE LOAN AMOUNT	$ 400,000.00
INTEREST RATE	6%
TERM LENGTH (MONTHS)	120
MINIMUM SQUARE FOOTAGE	1200
SQUARE FOOTAGE REQUIRED PER PERSON IN ATTENDANCE	15
MINIMUM ROI (%)	10%
CONSTRUCTION COST PER SF	$ 100.00
COST OF A/V EQUIPMENT	$ 15,000.00
COST OF DÉCOR	$ 5,000.00
PRICE PER ROUND TABLE	$ 280.00
PEOPLE/ROUND TABLE	8
PRICE PER RECTANGLE TABLE	$ 200.00
PEOPLE/RECTANGLE TABLE	8
COST PER CHAIR	$ 42.00
PERCENTAGE OF ROUND TABLES	65%
COST OF BRIDAL PARTY SUITES	$ 20,000.00
COST OF OUTDOOR CEREMONY SPACE	$ 5,000.00
PRICE/SF FOR INDOOR CEREMONY SPACE	$ 50.00
SF REQUIREMENT IN SEPARATE CEREMONY SPACE/HEAD	8
SF REQUIREMENT IN SEPARATE CEREMONY SPACE OR WALKWAY	600
SF REQUIREMENT IN SEPARATE CEREMONY SPACE FOR ALTER	300
COST OF MULTIPLE-STALL RESTROOM UPGRADE	$ 5,000.00
YEARLY COST OF LIQUOR LICENSE	$ 2,500.00
POLICY W/LIQUOR LICENSE	$ 750.00
POLICY W/O LIQUOR LICENSE	$ 500.00

UTILITIES	$ 1,500.00
MINIMUM ROI (%)	10%
ESTIMATED S/EVENT	$ 4,500.00
MINIMUM ROI (%)	10%

To utilize the operations research model, estimations were made regarding the user inputted information which allows the model to calculate a profit function. Table 4.3 illustrates the values which were used for all four runs of the model.

Figure 4.11 is a screenshot of the Excel file for the grouping of All Responses to the survey. When discussing the results from the profit maximization of the dataset with all of the survey responses, the model suggests to not hold a liquor license. This would equate to an open bar situation where any legal liability related to alcohol consumption would be put upon the guest of the venue. This results in the binary choice of the insurance policy without the liquor license. Due to the costs associated with constructing a secondary indoor space for holding the ceremony, the model projected revenues would not counteract the associated costs. The model suggests the outdoor ceremony space will allow for the highest increase in profit as the return gained from offering an outdoor space outweighs the costs associated with having that offering. Regarding amenities, the model suggests Tables & Chairs and Décor to be offered with the space. The return on providing A/V equipment was not high enough to counteract the costs associated with offering that amenity. Constructing bridal party suites was recommended as well as upgrading the restrooms to multiple-stall facilities instead of a single-stall unisex facility.

After considering the binary variables, the size of the facility must be examined. The model advises for a 3,479 square foot facility to be built which would have a capacity of around 232 guests. With regards to price, of the $400,000 maximum allowable budget, all of the budget is consumed. $347,950 would be used in relation to the construction of the facility. The remaining

$52,050 would be used for the binary upgrades which were selected through running the model. The suggested price to charge/event was calculated to be $6,757.50. This would equate to a revenue of $202,705. Costs equal $76,092.66. The final profit value equates to $126,632.34.

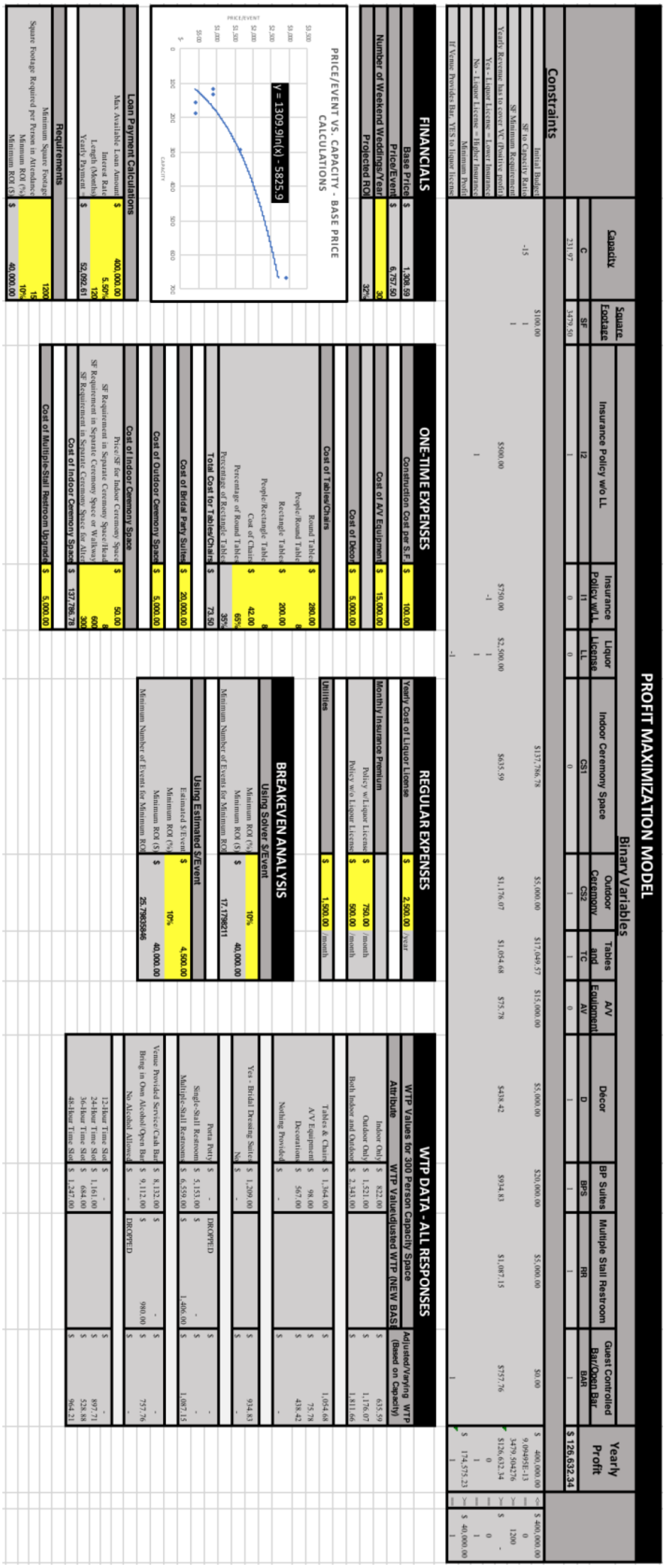

Figure 4.11 - Screenshot of the Decision Tool utilizing the data set All Responses

Again, with any decision tool, the results are meant to be used as a guide through the decision-making process. Assuming the results from the decision tool as being 100% efficient would not be wise. The effect of adding competition within the model would result in a decrease in the price which could be charged for the space and decrease the overall profitability of the event space. Also, certain expenses were not included as sufficient data was not collected to analyze those costs. Costs associated with labor, marketing, property and income taxes, and any other hidden fees were not implemented in this model.

Within the Appendix, Figure A.9 is a screenshot for the grouping 18-25. Following is Figure A.10, a screenshot for the grouping Female. Lastly, Figure A.11 is a screenshot of the Excel file for the grouping Not Married. With these other runs, the main effects do not differ from the results relating to the data set with All Responses. The size of the space stayed the same, the amenities which were chosen as binary variables to be included in the space were the same, and all of the costs stayed the same. However, since all of the data sets had different WTP values, the price to charge per event varied which in turn affected the overall profitability of the space. Table 4.4 illustrates the different prices to charge per event space for all of the data sets and the profit values which was found through the model.

Table 4.4 - Calculated Price/Event and Profit Value for all four data sets

DATA SET	PRICE/EVENT	PROFIT VALUE
ALL RESPONSES	$6,757.50	$126,632.34
AGE: 18-25	$7,196.69	$139,808.03
FEMALE	$6,881.99	$130,366.98
NOT MARRIED	$7,760.37	$156,718.42

The model was built to be able to approach the results from two different angles. As already discussed, to allow for proper estimation regarding the profit of the event space, the assumption had to be that the market share was 100% efficient and that the market would always be available no matter the price of the event space. Another analysis would need to be run to more deeply analyze the current supply situation instead of the demand side like in this study.

The first approach was to maximize the profit of the event space by making the assumptions previously discussed. This allowed for an output to be calculated regarding which of the varying attributes to include, the price to charge per event, all of the costs associated with the event space, and ultimately, a profit value. The second approach was to analyze the event space from a required Return-on-Investment percentage (ROI %). The charge/event could also be adjusted to better fit the attributes which were included if the operator happens to understand the market they are in and recognizes a reasonable price/event other than the price the model calculated. By inputting a minimum ROI % and adjusting the price charged per event, the analysis was run backwards to find the minimum number of events which would be required to meet the ROI requirement. This measurement could be helpful when wanting to analyze the worst case scenario and for the operator to be reassured when deciding whether or not to start an enterprise like this.

Chapter 5 - Conclusion

In conclusion, due to low profit margins wreaking the United States farming industry over the past decade, a large number of the younger generation are stepping away. They are looking elsewhere for more lucrative careers off the farm. This has a cause-effect relationship on the rising average age of the of the US farmer. With so many young people moving away from rural communities for more urban environments, our rural communities begin to suffer. With the decline in population within the countries rural communities, a disconnect is created between society and the ag industry. Much distrust is currently had by the world's population about the farming practices taking place in the United States and the level of healthiness at which food for human consumption is being produced. Considering all of the issues above, steps need to be made to try and increase profits on the farm. To entice more of the younger generation to participate with the farming community. And most importantly, reconnect society with agriculture.

Agritourism is a growing industry within Kansas agriculture and could be a profitable enterprise for individuals seeking something to add to their operation. An understanding of the demand related to consumer choices and the supply from producers within an industry is crucial in producer/operator decision making. By building a choice-based conjoint survey and through regression analysis of the CBC survey data, willingness-to-pay values can be calculated to gauge a respondent's value for the different attributes within the survey and research. Upon completion of finding the WTP values, an operations research model/decision tool was constructed to analyze the profit maximizing combination of varying input variables that are part of an agritourism wedding venue. By building the model to be user friendly and open-ended for the user to personalize the results to their own current situation, the optimal results are endless.

Limitations

As previously mentioned in terms of assumptions which had to be made within this study, there were limitations to the usage of the results. Other relationships that would be beneficial in adding would be a relationship between the price charged per weekend event and the number of events booked throughout the year. The relationship between price and number of events booked is important to consider because as the price of the space decreases, the likelihood of having more traffic and increasing the number of bookings will most likely increase. For example, the operator would most likely want to book the space 20 weekends at $3,000 for a total revenue or $60,000 compared to 10 weekends at $4,000 for a total revenue of $40,000. A better understanding of this relationship may either open up time for the operator if there is no return on lowering the price to book more events or increase the total revenue for the operator by booking a larger number of events at a slightly lower charged cost.

As previously mentioned, sampling bias could be considered present within the research study. Due to efforts in trying to gather enough responses from a response group which would be familiar with the research study, data from certain populations may have been inadvertently left out from the analysis. Sampling bias could have led to the results being skewed toward a certain population base.

Another limitation within the study was regarding the survey design. In most cases, the fact of using a "None" option as a possible choice within the survey can help to better reflect real-world decisions. However, within this research study, the "None" option was not given due to the fear of the choice being chosen too often. If the "None" option is chosen too often, this can negatively affect the survey's ability to properly analyze the utility measurements related to the attributes in question. If more confidence is present in guaranteeing a large amount of responses

will be gathered, a "None" option would be beneficial to include within a CBC Analysis as it better reflects real-world decisions. An acceptable range of "None" responses within the survey results is said to be 5%-15% (Sawtooth, 2019.

Location is another factor which was not added into this model. Factors which affect location are the population density in a certain radius from the suggested location, the availability of lodging in a certain radius from the space, and accessibility for the guests. Many individuals want these venues to be in rural locations, but not far from family, a metropolitan area which has lodging available, and to be able to access them without driving on rural, unmaintained roads. Additional variables which could be added into the model could be risk/chance or paying cash to start the business versus having to take a loan.

Future Work

Even though steps were made to have a respondent group which was aware of the decisions which would be made regarding a wedding event space, a better audience or respondent group would always be helpful in increasing the legitimacy and accuracy of the results. Gathering data from individuals who are not familiar with this industry can skew the results quite heavily.

In regard to the linear programming model and decision tool, there are multiple facets that would be helpful in either strengthening or adding into the model. A stronger relationship between the capacity of the space and base price of the venues would help to improve the logarithmic equation. Since only 6 venues were analyzed, and only 1 space was an outlier to be extremely larger in size with not a huge increase in price, the relationship has room for improvement. However, the theory and principle behind the idea of the decreasing rate of increasing returns is still believed to be true.

Lastly, turning this into a whole-farm Linear Programming model could be the next step to understand the effect this enterprise has on the farm as a whole. By including labor instead of assuming a labor cost of $0, as was done in this study, could help to make the results more realistic. Also, the profit created from this enterprise could be cycled through the farming operation as whole and show how the farm can grow at a faster rate by utilizing this additional income.

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Appendix A - Supplemental Information

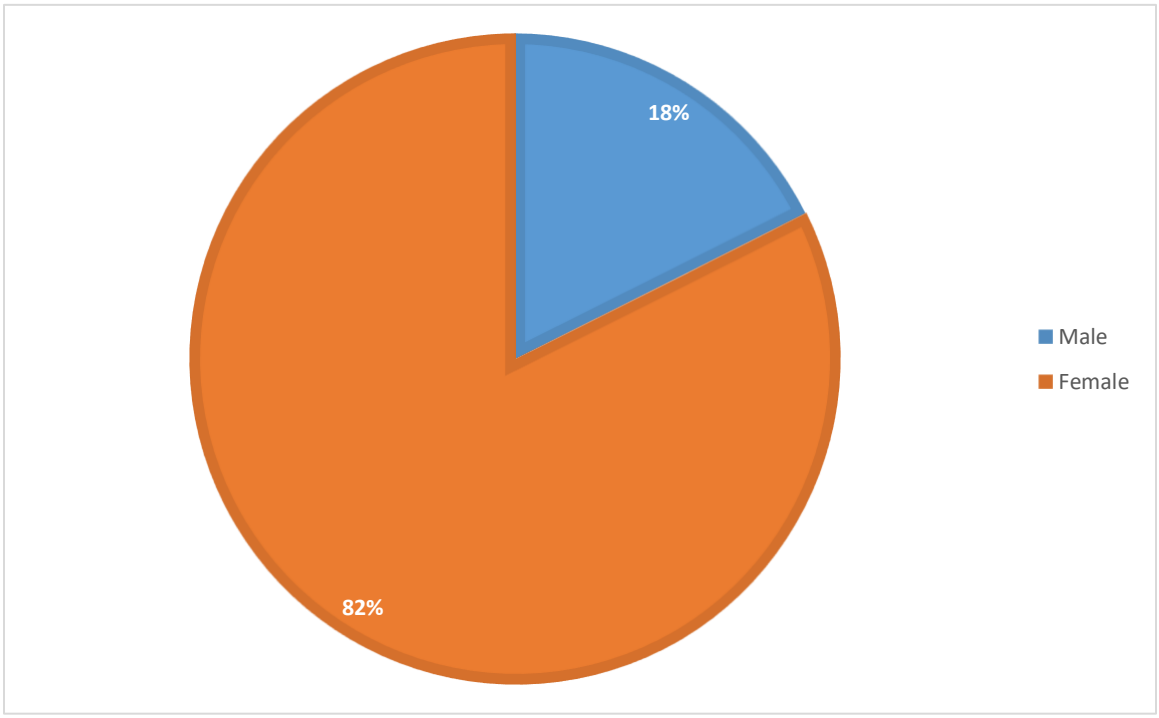

Figure A.5.1 - Demographics of Respondents: Gender

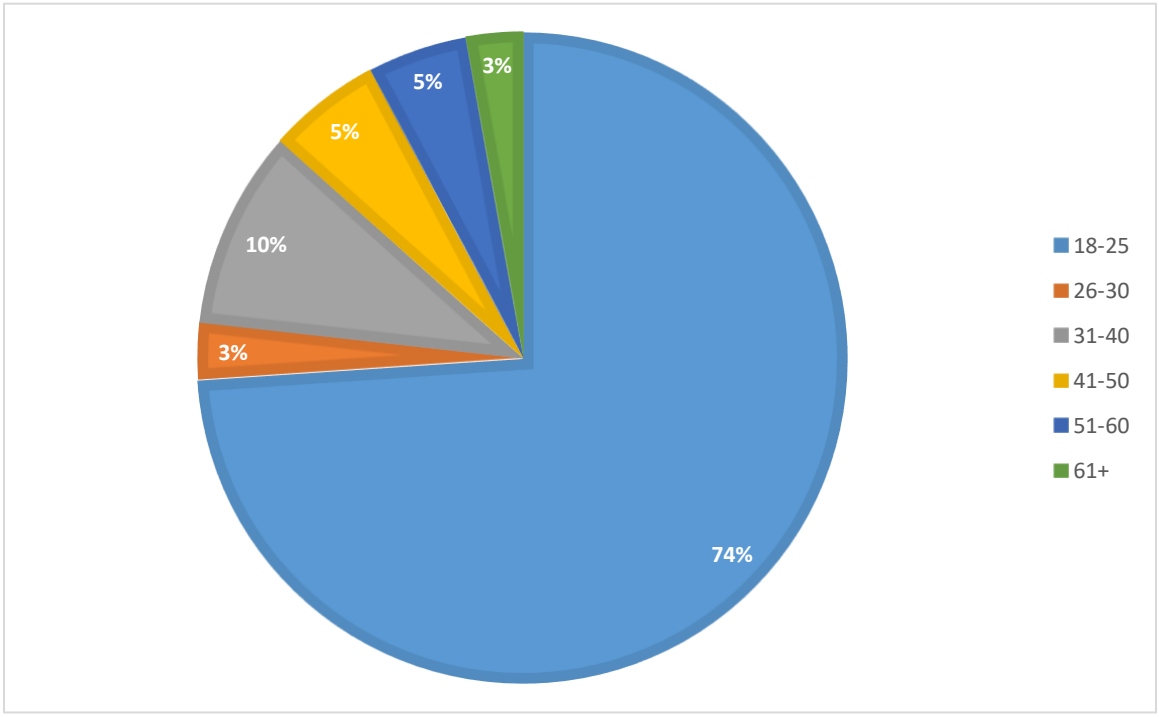

Figure A.5.2 - Demographics of Respondents: Age

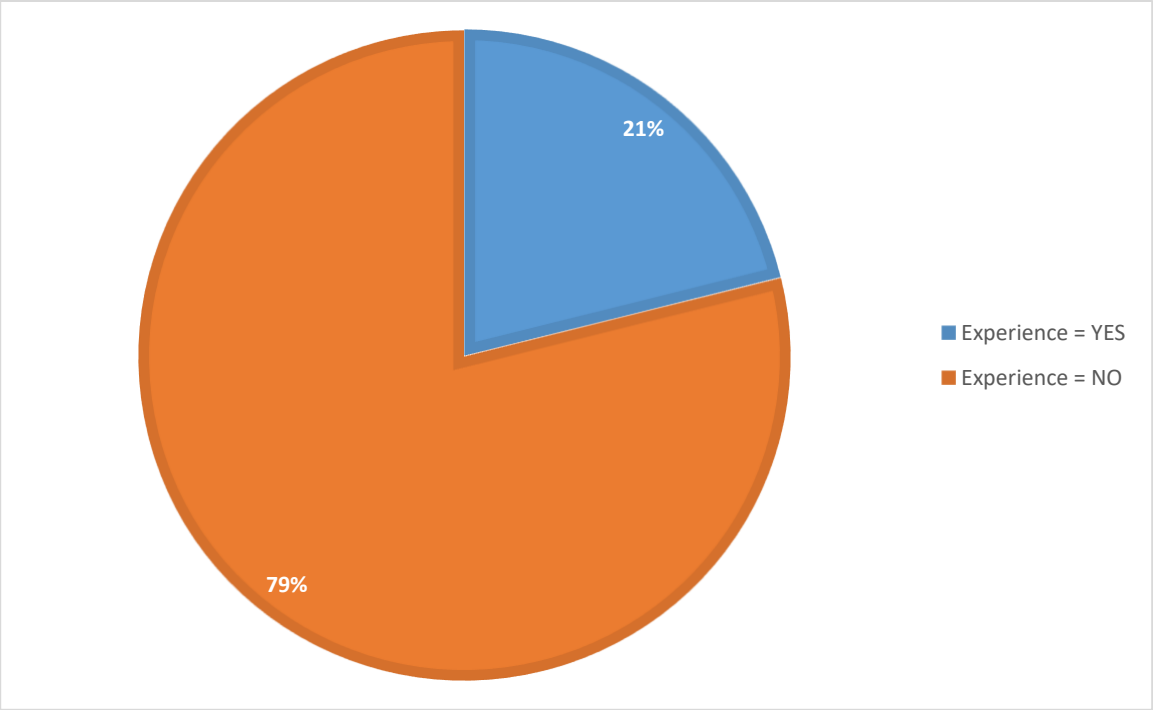

Figure A.5.3 - Demographics of Respondents: Wedding Planning Experience

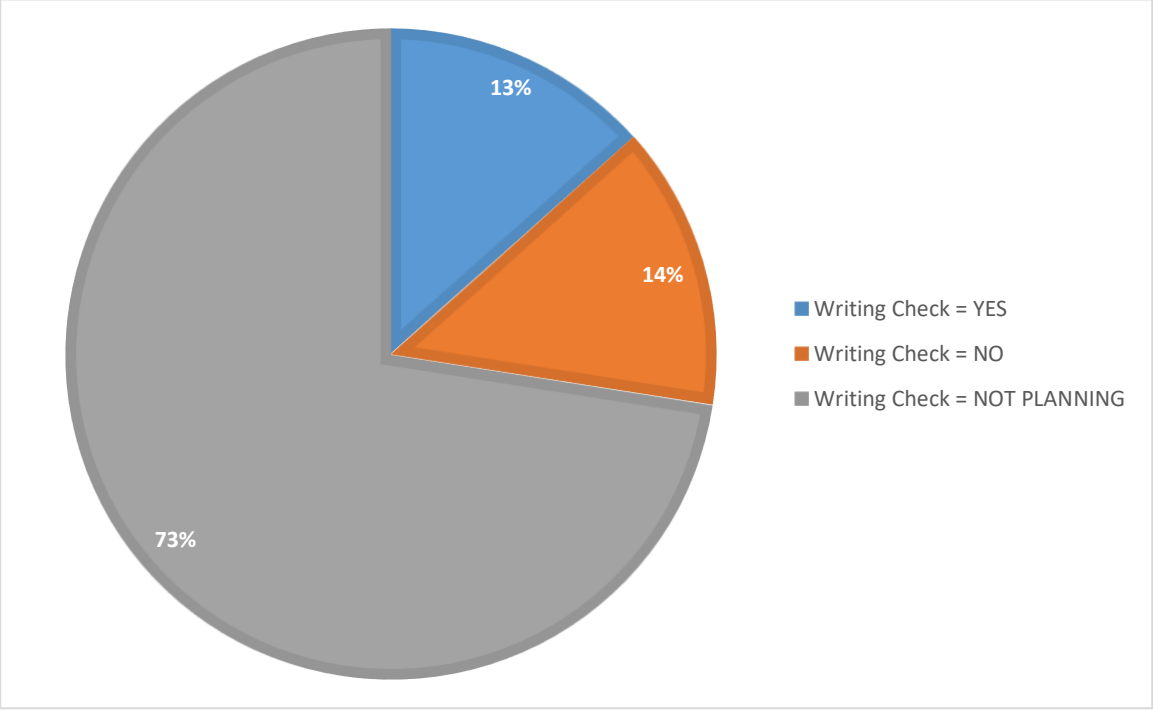

Figure A.5.4 - Demographics of Respondents: Payment Details

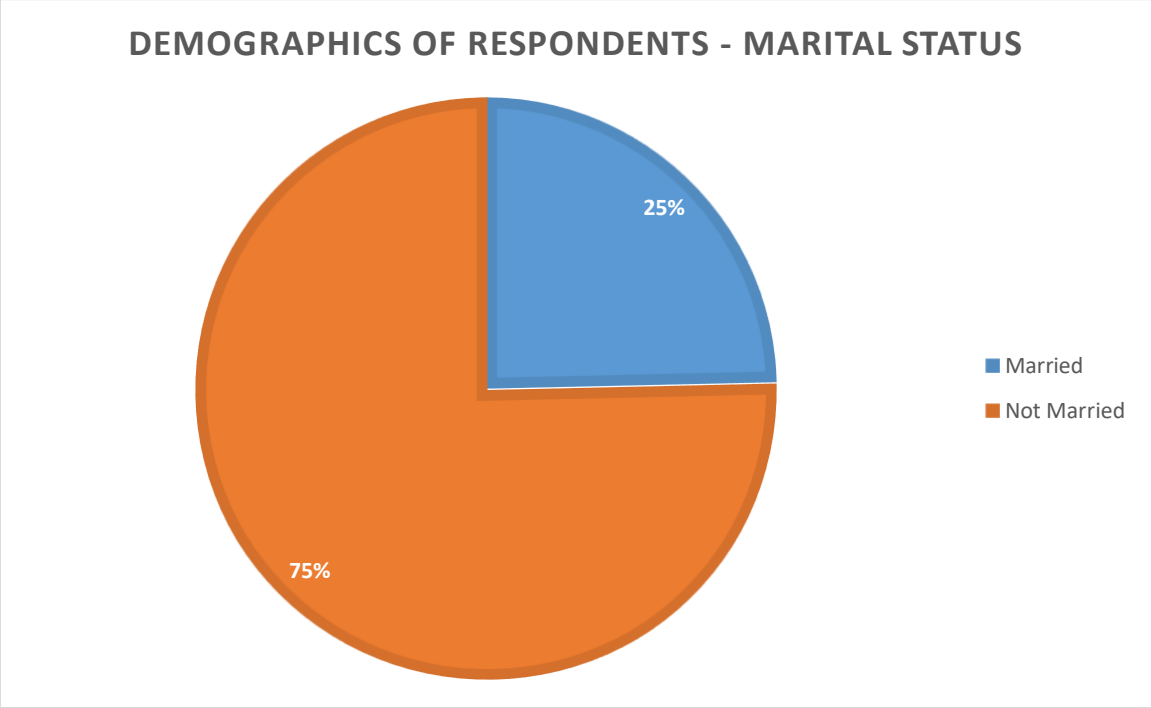

Figure A.5.5 - Demographics of Respondents: Marital Status

Stata Run #	1.1	1.2	1.4	1.8
Stata Run Description	All Responses	18-25	31-40	Experience = YES
VARIABLES	Coefficient	Coefficient	Coefficient	Coefficient
Price	-0.000***	-0.000***	-0.001***	-0.000***
	(0.000)	(0.000)	(0.000)	(0.000)
50-175	0.973***	0.925***	3.415***	0.988***
	(0.108)	(0.128)	(0.920)	(0.278)
175-300	1.253***	1.259***	4.086***	1.354***
	(0.109)	(0.132)	(1.008)	(0.265)
300+	1.093***	1.146***	3.667***	1.047***
	(0.122)	(0.145)	(1.053)	(0.248)
<30 Miles	0.711***	0.720***	1.758**	0.767***
	(0.105)	(0.125)	(0.784)	(0.286)
30-60 Miles	0.607***	0.659***	1.332*	0.860***
	(0.098)	(0.117)	(0.697)	(0.251)
60-100 Miles	0.360***	0.454***	-0.579	0.250
	(0.104)	(0.120)	(0.703)	(0.256)
24-Hour Time Slot	0.242**	0.310***	-1.313*	0.647***
	(0.097)	(0.116)	(0.695)	(0.239)
36-Hour Time Slot	0.143	0.141	-1.527**	0.543**
	(0.097)	(0.116)	(0.742)	(0.275)
48-Hour Time Slot	0.260***	0.308***	0.378	0.591**
	(0.097)	(0.112)	(0.553)	(0.262)
Indoor Only	0.172*	0.203*	-0.988	0.394
	(0.090)	(0.107)	(0.674)	(0.251)
Both Indoor & Outdoor	0.489***	0.455***	1.880***	0.860***
	(0.088)	(0.105)	(0.658)	(0.230)
Tables & Chairs	0.284***	0.280***	1.768***	0.094
	(0.075)	(0.087)	(0.682)	(0.216)
A/V Equipment	0.021	0.023	-2.118**	-0.061
	(0.073)	(0.090)	(0.954)	(0.199)
Décor	0.118	0.086	0.782	-0.364
	(0.075)	(0.087)	(0.611)	(0.230)
Yes	0.252***	0.300***	0.401	-0.060
	(0.073)	(0.082)	(0.394)	(0.182)
Single-Stall Uni-Sex	1.075***	1.109***	2.674***	1.121***
	(0.103)	(0.124)	(0.922)	(0.245)
Multiple-Stall Men's and Women's	1.368***	1.259***	4.478***	1.328***
	(0.111)	(0.128)	(1.221)	(0.263)
Venue Provided	1.696***	1.859***	4.604***	1.985***
	(0.116)	(0.145)	(1.146)	(0.317)
Bring in Own Alcohol	1.900***	2.059***	6.598***	1.999***
	(0.136)	(0.159)	(1.589)	(0.337)
Respondents	142	105	14	30
Standard errors in parentheses				
*** p<0.01, ** p<0.05, * p<0.1				

Figure A.5.6 - Regression output for STATA Run 1.1, 1.2, 1.4, and 1.8

Stata Run #	1.9	1.10	1.11	1.12
Stata Run Description	Female	Male	Married = YES	Married = NO
VARIABLES	Coefficient	Coefficient	Coefficient	Coefficient
Price	-0.000***	-0.000***	-0.000***	-0.000***
	(0.000)	(0.000)	(0.000)	(0.000)
50-175	0.913***	1.706***	1.452***	0.946***
	(0.119)	(0.402)	(0.289)	(0.125)
175-300	1.221***	1.855***	1.484***	1.312***
	(0.118)	(0.445)	(0.278)	(0.130)
300+	1.044***	2.079***	1.053***	1.172***
	(0.134)	(0.445)	(0.305)	(0.143)
<30 Miles	0.796***	0.586*	0.960***	0.760***
	(0.121)	(0.305)	(0.295)	(0.128)
30-60 Miles	0.703***	0.424	0.732***	0.675***
	(0.108)	(0.342)	(0.243)	(0.117)
60-100 Miles	0.387***	0.221	0.191	0.431***
	(0.118)	(0.363)	(0.260)	(0.124)
24-Hour Time Slot	0.267**	0.332	0.214	0.277**
	(0.107)	(0.361)	(0.251)	(0.116)
36-Hour Time Slot	0.127	0.346	0.352	0.116
	(0.109)	(0.324)	(0.272)	(0.114)
48-Hour Time Slot	0.227**	0.557*	0.146	0.297***
	(0.107)	(0.333)	(0.267)	(0.112)
Indoor Only	0.161	0.646	0.334	0.134
	(0.098)	(0.504)	(0.246)	(0.106)
Both Indoor & Outdoor	0.512***	0.452*	1.100***	0.462***
	(0.098)	(0.269)	(0.289)	(0.103)
Tables & Chairs	0.260***	0.601*	0.526***	0.259***
	(0.078)	(0.327)	(0.182)	(0.089)
A/V Equipment	-0.020	0.211	-0.061	0.052
	(0.082)	(0.229)	(0.188)	(0.084)
Décor	0.090	-0.068	0.286	0.067
	(0.084)	(0.420)	(0.201)	(0.088)
Yes	0.204**	0.570***	0.128	0.260***
	(0.080)	(0.210)	(0.172)	(0.082)
Single-Stall Uni-Sex	1.059***	1.785***	1.426***	1.059***
	(0.119)	(0.439)	(0.262)	(0.124)
Multiple-Stall Men's and Women's	1.415***	1.560***	2.515***	1.193***
	(0.127)	(0.347)	(0.345)	(0.130)
Venue Provided	1.867***	1.186***	2.311***	1.831***
	(0.132)	(0.318)	(0.369)	(0.137)
Bring in Own Alcohol	2.154***	1.420***	1.881***	2.106***
	(0.155)	(0.330)	(0.373)	(0.162)
Respondents	117	25	35	107
Standard errors in parentheses				
*** p<0.01, ** p<0.05, * p<0.1				

Figure A.5.7 - Regression output for STATA Run 1.9, 1.10, 1.11, and 1.12

Stata Run #	1.13	1.14	1.15
Stata Run Description	Writing Check = YES	Writing Check = NO	Writing Check = Not Planning
VARIABLES	Coefficient	Coefficient	Coefficient
Price	-0.000***	-0.000***	-0.000***
	(0.000)	(0.000)	(0.000)
50-175	0.870**	1.712***	1.009***
	(0.362)	(0.368)	(0.134)
175-300	1.109***	2.221***	1.270***
	(0.342)	(0.361)	(0.142)
300+	0.607	1.907***	1.143***
	(0.431)	(0.346)	(0.157)
<30 Miles	0.117	0.889***	0.872***
	(0.331)	(0.310)	(0.138)
30-60 Miles	0.078	1.146***	0.698***
	(0.352)	(0.310)	(0.126)
60-100 Miles	-0.255	0.631**	0.449***
	(0.324)	(0.303)	(0.140)
24-Hour Time Slot	0.173	0.070	0.271**
	(0.426)	(0.282)	(0.119)
36-Hour Time Slot	0.777*	-0.020	0.125
	(0.414)	(0.281)	(0.119)
48-Hour Time Slot	0.920***	-0.329	0.305***
	(0.351)	(0.338)	(0.118)
Indoor Only	0.264	0.596**	0.028
	(0.301)	(0.300)	(0.108)
Both Indoor & Outdoor	1.248***	0.956***	0.371***
	(0.423)	(0.263)	(0.113)
Tables & Chairs	0.094	0.380	0.326***
	(0.239)	(0.244)	(0.094)
A/V Equipment	0.023	-0.123	0.038
	(0.249)	(0.263)	(0.090)
Décor	-0.060	-0.334	0.219**
	(0.258)	(0.279)	(0.089)
Yes	0.295	0.042	0.291***
	(0.308)	(0.204)	(0.083)
Single-Stall Uni-Sex	1.142***	0.520*	1.352***
	(0.339)	(0.269)	(0.150)
Multiple-Stall Men's and Women's	2.374***	0.475*	1.602***
	(0.502)	(0.271)	(0.143)
Venue Provided	1.686***	2.002***	1.864***
	(0.358)	(0.312)	(0.150)
Bring in Own Alcohol	1.912***	1.974***	2.286***
	(0.367)	(0.352)	(0.204)
Respondents	19	20	103
Standard errors in parentheses			
*** p<0.01, ** p<0.05, * p<0.1			

Figure A.5.8 - Regression output for STATA Run 1.13, 1.14, and 1.15

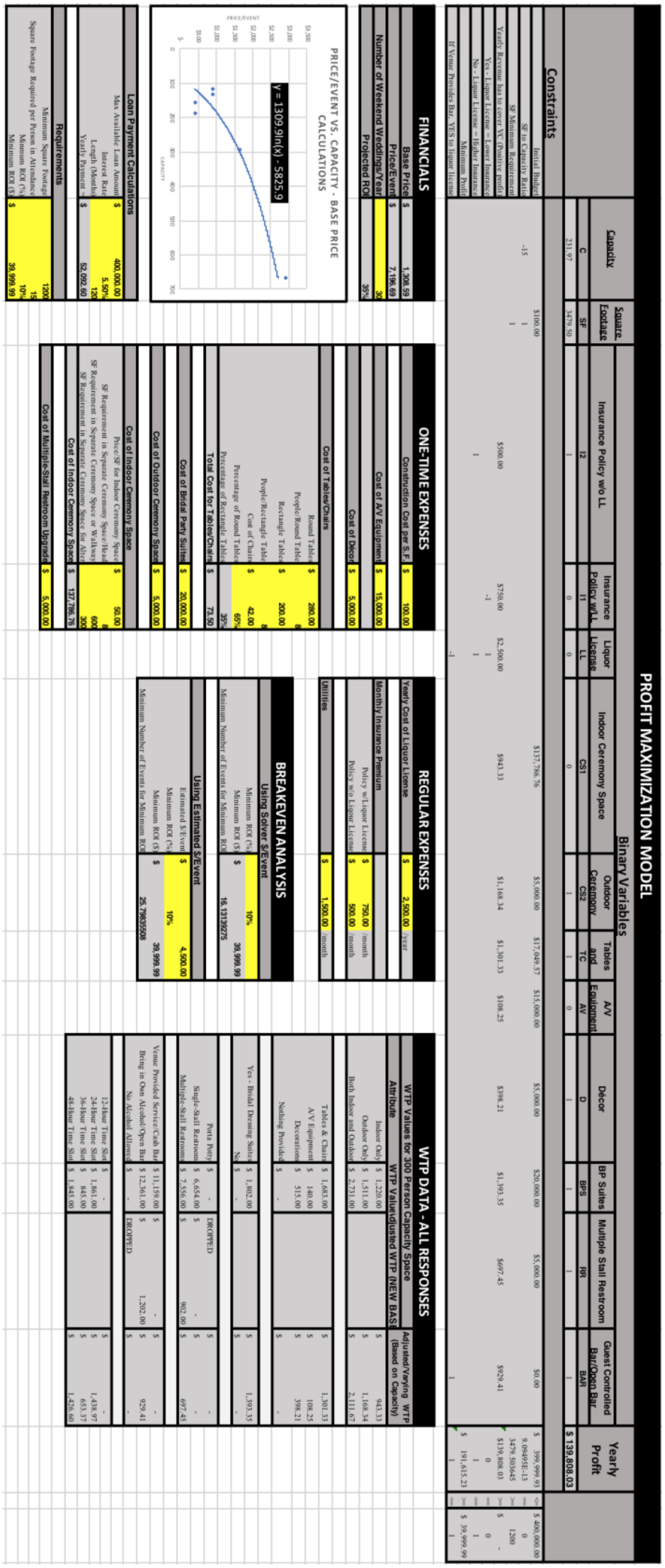

Figure A.5.9 - Screenshot of the Decision Tool utilizing the data set Age: 18-25

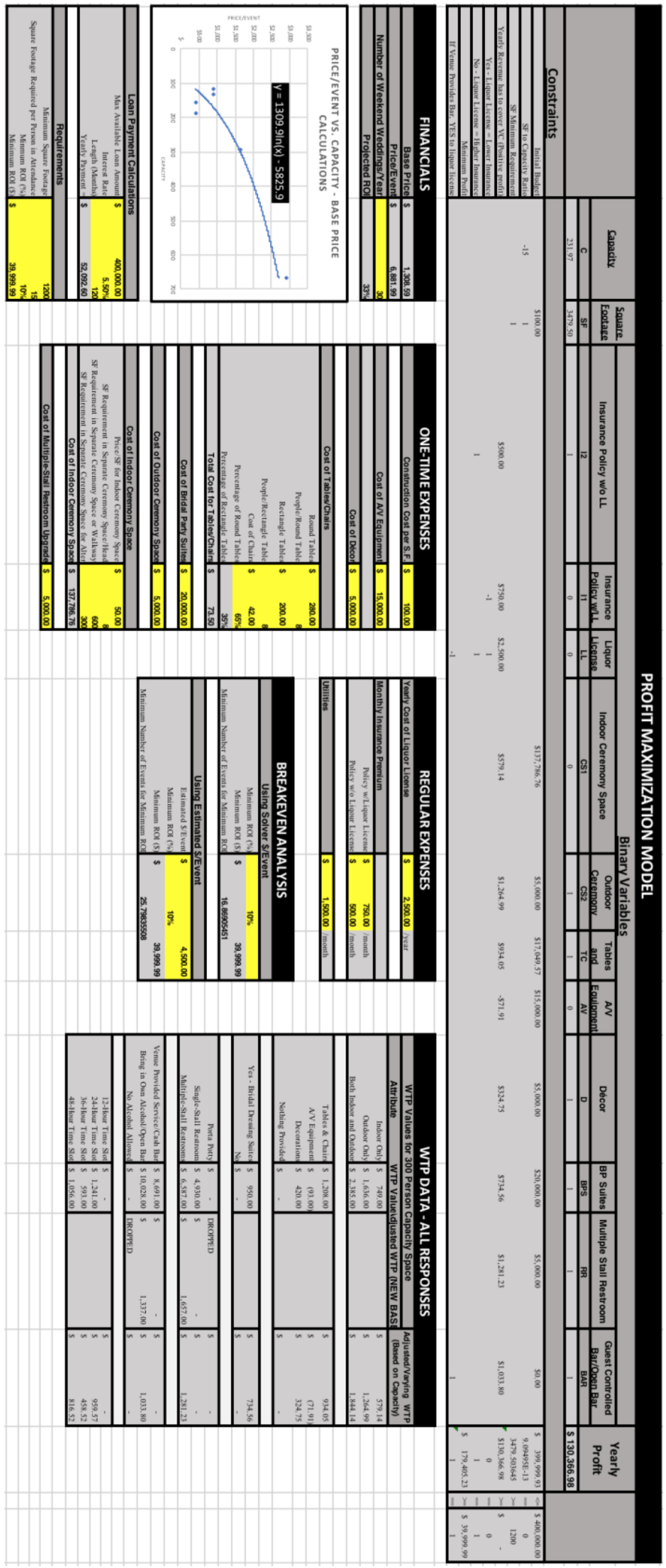

Figure A.5.10 - Screenshot of the Decision Tool utilizing the data set Gender: Female

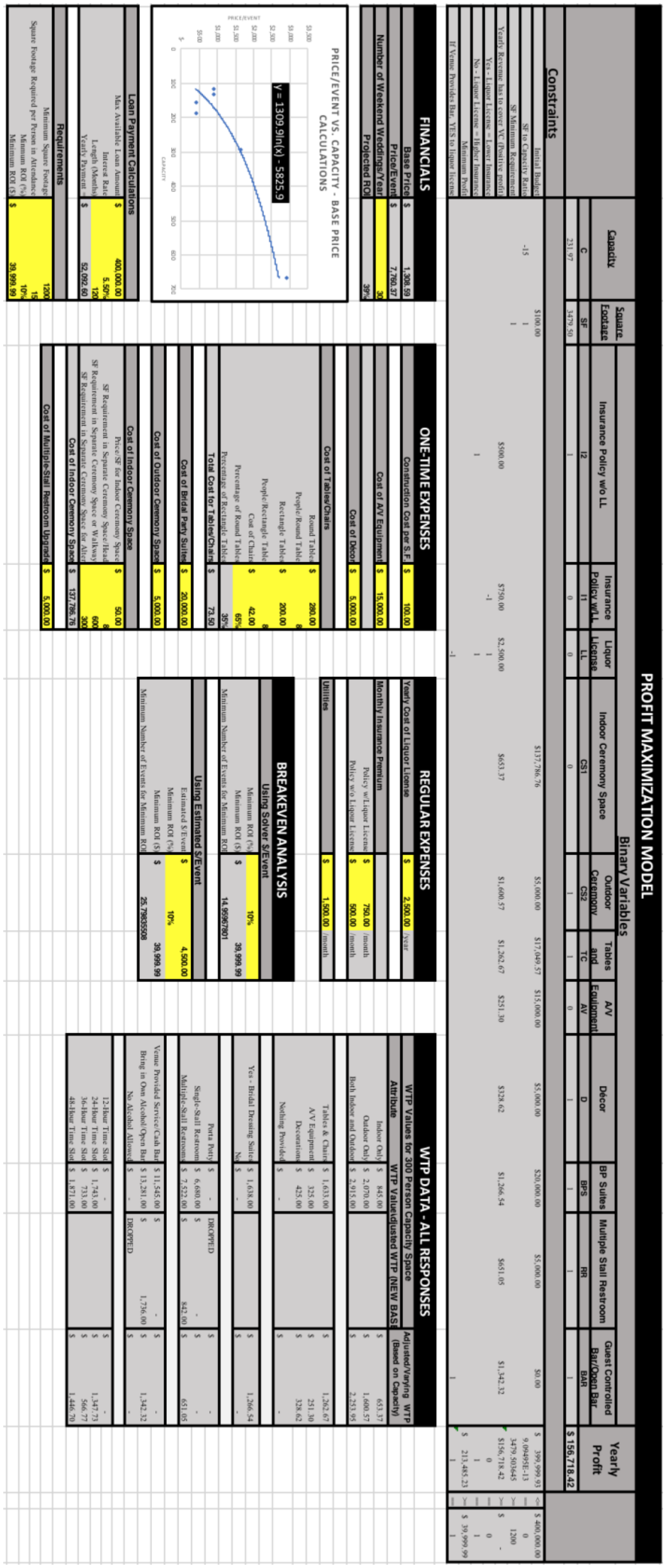

Figure A.5.11 - Screenshot of the Decision Tool utilizing the data set Marital Status: Not Married

```
*TRIAL #1.1 - ALL RESPONSES (142 Responses - YES)****

clear

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Data/ThesisStataData.csv"

list, sepby(gid)

global randvars "capacity2 capacity3 capacity4 distance1 distance2
distance3 timeline2 timeline3 timeline4 ceremony1 ceremony3
amenities1 amenities2 amenities3 suites1 restroom2 restroom3
alcohol1 alcohol2"

mixlogit response price, rand($randvars) group(gid) id(version)
nrep(500)

outreg2 using regression_results, replace excel dec(3)

wtp price $randvars


*TRIAL #1.2 - AGE (18-25: 105 Responses - YES)****
clear

insheet using "/Users/jaredcullop/Desktop/THESIS/Stata
Data/ThesisStataData - AGE (18-25).csv"

list, sepby(gid)

global randvars "capacity2 capacity3 capacity4 distance1 distance2
distance3 timeline2 timeline3 timeline4 ceremony1 ceremony3
amenities1 amenities2 amenities3 suites1 restroom2 restroom3
alcohol1 alcohol2"

mixlogit response price, rand($randvars) group(gid) id(version)
nrep(500)

outreg2 using regression_results, append excel dec(3)

wtp price $randvars


*TRIAL #1.3 - AGE (26-30: 4 Responses - NO)
clear

insheet using "/Users/jaredcullop/Desktop/THESIS/Stata
Data/ThesisStataData - AGE (26-30).csv"
```


Figure A.5.12 - STATA Code (page 1/5)

```
58
59  mixlogit response price, rand($randvars) group(gid) id(version)
    nrep(500)
60
61  outreg2 using regression_results, append excel dec(3)
62
63  wtp price $randvars
64
65
66  *TRIAL #1.5 - AGE (41-50: 8 Responses - NO)
67  clear
68
69  insheet using "/Users/jaredcullop/Desktop/THESIS/Stata
    Data/ThesisStataData - AGE (41-50).csv"
70
71  list, sepby(gid)
72
73  global randvars "capacity2 capacity3 capacity4 distance1 distance2
    distance3 timeline2 timeline3 timeline4 ceremony1 ceremony3
    amenities1 amenities2 amenities3 suites1 restroom2 restroom3
    alcohol1 alcohol2"
74
75  mixlogit response price, rand($randvars) group(gid) id(version)
    nrep(500)
76
77  outreg2 using regression_results, append excel dec(3)
78
79  wtp price $randvars
80
81
82  *TRIAL #1.6 - AGE (51-60: 7 Responses - NO)
83  clear
84
85  insheet using "/Users/jaredcullop/Desktop/THESIS/Stata
    Data/ThesisStataData - AGE (51-60).csv"
86
87  list, sepby(gid)
88
89  global randvars "capacity2 capacity3 capacity4 distance1 distance2
    distance3 timeline2 timeline3 timeline4 ceremony1 ceremony3
    amenities1 amenities2 amenities3 suites1 restroom2 restroom3
    alcohol1 alcohol2"
90
91  mixlogit response price, rand($randvars) group(gid) id(version)
    nrep(500)
92
93  outreg2 using regression_results, append excel dec(3)
94
```


Figure A.5.13 - STATA Code (page 2/5)

```
118
119  list, sepby(gid)
120
121  global randvars "capacity2 capacity3 capacity4 distance1 distance2
     distance3 timeline2 timeline3 timeline4 ceremony1 ceremony3
     amenities1 amenities2 amenities3 suites1 restroom2 restroom3
     alcohol1 alcohol2"
122
123  mixlogit response price, rand($randvars) group(gid) id(version)
     nrep(500)
124
125  outreg2 using regression_results, append excel dec(3)
126
127  wtp price $randvars
128
129
130  *TRIAL #1.9 - FEMALE (117 Responses - YES)****
131  clear
132
133  insheet using "/Users/jaredcullop/Desktop/THESIS/Stata
     Data/ThesisStataData - Female.csv"
134
135  list, sepby(gid)
136
137  global randvars "capacity2 capacity3 capacity4 distance1 distance2
     distance3 timeline2 timeline3 timeline4 ceremony1 ceremony3
     amenities1 amenities2 amenities3 suites1 restroom2 restroom3
     alcohol1 alcohol2"
138
139  mixlogit response price, rand($randvars) group(gid) id(version)
     nrep(500)
140
141  outreg2 using regression_results, append excel dec(3)
142
143  wtp price $randvars
144
145
146  *TRIAL #1.10 - MALE (25 Responses - YES)
147  clear
148
149  insheet using "/Users/jaredcullop/Desktop/THESIS/Stata
     Data/ThesisStataData - Male.csv"
150
151  list, sepby(gid)
152
153  global randvars "capacity2 capacity3 capacity4 distance1 distance2
     distance3 timeline2 timeline3 timeline4 ceremony1 ceremony3
     amenities1 amenities2 amenities3 suites1 restroom2 restroom3
```


Figure A.5.14 - STATA Code (page 3/5)

```
177
178  *TRIAL #1.12 - MARRIED = NO (107 Responses - YES)****
179  clear
180
181  insheet using "/Users/jaredcullop/Desktop/THESIS/Stata
     Data/ThesisStataData - Married - NO.csv"
182
183  list, sepby(gid)
184
185  global randvars "capacity2 capacity3 capacity4 distance1 distance2
     distance3 timeline2 timeline3 timeline4 ceremony1 ceremony3
     amenities1 amenities2 amenities3 suites1 restroom2 restroom3
     alcohol1 alcohol2"
186
187  mixlogit response price, rand($randvars) group(gid) id(version)
     nrep(500)
188
189  outreg2 using regression_results, append excel dec(3)
190
191  wtp price $randvars
192
193
194  *TRIAL #1.13 - WRITING CHECK = YES (19 Responses - YES)
195  clear
196
197  insheet using "/Users/jaredcullop/Desktop/THESIS/Stata
     Data/ThesisStataData - Writing Check - YES.csv"
198
199  list, sepby(gid)
200
201  global randvars "capacity2 capacity3 capacity4 distance1 distance2
     distance3 timeline2 timeline3 timeline4 ceremony1 ceremony3
     amenities1 amenities2 amenities3 suites1 restroom2 restroom3
     alcohol1 alcohol2"
202
203  mixlogit response price, rand($randvars) group(gid) id(version)
     nrep(500)
204
205  outreg2 using regression_results, append excel dec(3)
206
207  wtp price $randvars
208
209
210  *TRIAL #1.14 - WRITING CHECK = NO (20 Responses - YES)
211  clear
212
213  insheet using "/Users/jaredcullop/Desktop/THESIS/Stata
     Data/ThesisStataData - Writing Check - NO.csv"
```


Figure A.5.15 - STATA Code (page 4/5)

```
    amenities1 amenities2 amenities3 suites1 restroom2 restroom3
    alcohol1 alcohol2"
234
235 mixlogit response price, rand($randvars) group(gid) id(version)
    nrep(500)
236
237 outreg2 using regression_results, append excel dec(3)
238
239 wtp price $randvars
240
```


Figure A.5.16 - STATA Code (page 5/5)

KANSAS STATE UNIVERSITY | University Research Compliance Office

TO: Dr. Terry Griffin
Agricultural Economics
331C Waters Hall

Proposal Number: 9510

FROM: Rick Scheidt, Chair
Committee on Research Involving Human Subjects

DATE: 10/31/2018

RE: Proposal Entitled, "Cullop M.S. Thesis. Working Title: "Optimal Characteristics and Profitability of Agri-tourism Wedding Event Space as Additional On-Farm Income""

The Committee on Research Involving Human Subjects / Institutional Review Board (IRB) for Kansas State University has reviewed the proposal identified above and has determined that it is EXEMPT from further IRB review. This exemption applies only to the proposal - as written – and currently on file with the IRB. Any change potentially affecting human subjects must be approved by the IRB prior to implementation and may disqualify the proposal from exemption.

Based upon information provided to the IRB, this activity is exempt under the criteria set forth in the Federal Policy for the Protection of Human Subjects, **45 CFR §46.101, paragraph b, category: 2, subsection: ii.**

Certain research is exempt from the requirements of HHS/OHRP regulations. A determination that research is exempt does not imply that investigators have no ethical responsibilities to subjects in such research; it means only that the regulatory requirements related to IRB review, informed consent, and assurance of compliance do not apply to the research.

Any unanticipated problems involving risk to subjects or to others must be reported immediately to the Chair of the Committee on Research Involving Human Subjects, the University Research Compliance Office, and if the subjects are KSU students, to the Director of the Student Health Center.

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Figure A.5.17 - University Research Compliance Office/IRB Approval Form