**AEM 6700 Economics of Consumer Demand, spring 2016**

**Practice Problem Set: Factor Analysis and Data Reduction Methods**

**Due date: December 9, 2016**

Go to Blackboard and use the following files: 1) Winery\_tasting\_scores.do (syntax file) and 2) Winery\_tasting\_scores.csv (data file). Also, in pages 2-4 of this document you will find the original in-class assignment, which includes the survey instrument with the relevant variables included in the excel spreadsheet. Your task is the following:

1. Employ the syntax provided to run

* The factor analysis using principal components for the five factor solution
* Compute the 5 factors (tentative names are provided in the syntax) as the average scores of the variables included in each factor
* Run the regression of OVERALL\_CS on the 5 factors
* Run the regressions of various measures of winery sales performance (PURCHASE, BOTTLES, DOLLARS, COME\_BACK) on OVERALL\_CS and consumer demographics.

2. Answer the following questions:

* Provide a rationale for why we need to use factor analysis in this case
* Explain how we employ the rotated factor matrix to identify the variables associated (i.e. that load) in each factor?
* Please interpret the KMO statistic.
* Consider the regression of OVERALL\_CS on the 5 factors. What are the main factors driving customer satisfaction? Please provide precise interpretations to the coefficient estimates.
* Consider now the impact of OVERALL\_CS on the various measures of sales performance (PURCHASE, BOTTLES, DOLLARS, COME\_BACK). Based on the parameter estimates, of these regressions, interpret the impact of bringing a customer from 4 to 5 in terms of her customer satisfaction scores. To do this, please complete cells highlighted in yellow in the following table:

**Impact of Converting a Visitor from “Satisfied” (score=4) to “Highly Satisfied” (score=5) on Various Measure of Sales Performance:**

|  |  |  |
| --- | --- | --- |
| **Performance Measure** | **Sample Average** | **Impact** |
| Probability of purchase | 70% | 8.65 pp. |
| Average number of bottles purchased | 4.5 |  |
| Average amount of purchase ($) | $62 | \_\_\_\_\_\_\_\_ |
| Probability of repurchase | 88% | \_\_\_\_\_\_\_\_ |

Customer satisfaction (CS) is critical to a firm’s success. There is agreement among wine marketers and managers that tasting room experiences have a strong influence on CS, repurchase intentions, tasting room sales and, ultimately, on winery profits. The tasting room experience is influenced not only by consumers’ perceptions of wine quality and prices, also by the tasting room atmosphere, the characteristics and attitudes of wine pourers, ancillary services provided by the winery and the attitudes of employees in the tasting room, among others. Therefore, identifying the tasting room attributes that drive CS can help winery owners and managers make profit-maximizing decisions about their tasting rooms, from tasting room design to employee selection/training to product selection.

Many NYS winery operators have made substantial investments in their tasting rooms and virtually all of them rely on winery visitors for an important portion of their total sales. In addition, a positive experience in the tasting room can contribute to a stronger customer relationship with buyers that live far from the winery, including more out-of-state customers as restrictions to interstate direct sales of NYS wine are relaxed. To shed light on these issues, you collaborated with several wineries in the Finger Lakes region on a survey and subsequent analysis to identify the drivers of CS, measure the impact of these drivers on overall satisfaction of tasting room visitors, and measure linkages between CS and tasting room sales performance.

In the next page you will find the survey instrument with the relevant variables included in the excel spreadsheet (*winery\_tasting\_scores*). The survey asked tasting room visitors to rate their perception of the twenty four CS attributes related to their tasting room experience. Customers rated the tasting room performance of these attributes on a scale from 1 (poor) to 5 (excellent). Respondents were also asked to rate their overall satisfaction with the tasting room visit using the same scale. The survey included questions about intention the purchase or not, the amount of money spent during the tasting room visit, the number of bottles purchased during the visit, and the intention to re-purchase in the future. In addition, the survey collected relevant demographic information.

Your task is to use these data to address the following questions: 1) what are the drivers of customer satisfaction in wine tasting rooms? 2) What is their influence of these drivers on Overall Customer Satisfaction? 3) What is the impact of customer satisfaction on sales performance?

Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Winery:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Greetings!  As part of a research project at Cornell University, we are conducting a survey on customer satisfaction and performance in tasting rooms of New York State Wineries.  As a visitor to this winery, it is important to understand your experience at the winery to better identify ways to make your visit better.  The survey will take no more than 5 minutes.  No personally identifiable information (such as name, address or phone number)\* will be requested or recorded at any time.  Your participation in this survey is completely voluntary and you can stop the survey at anytime.

Thanks for your help.

Please check the box that most closely reflects your opinion about the following characteristics:

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | Poor | Fair | Good | Very Good | Excellent | Does Not Apply |
| 1 | Overall tasting room cleanliness | 1 | 2 | 3 | 4 | 5 | empty |
| 2 | Impression of the grounds/view | 1 | 2 | 3 | 4 | 5 |  |
| 3 | Ambience of the tasting room | 1 | 2 | 3 | 4 | 5 |  |
| 4 | Lighting in the tasting room | 1 | 2 | 3 | 4 | 5 |  |
| 5 | Sounds in the tasting room | 1 | 2 | 3 | 4 | 5 |  |
| 6 | Friendliness of Pourer | 1 | 2 | 3 | 4 | 5 |  |
| 7 | Wine knowledge of Pourer | 1 | 2 | 3 | 4 | 5 |  |
| 8 | Appearance/Presentation of Pourer | 1 | 2 | 3 | 4 | 5 |  |
| 9 | Flexibility in the choice of wines tasted | 1 | 2 | 3 | 4 | 5 |  |
| 10 | Space (elbow room) available for tasting | 1 | 2 | 3 | 4 | 5 |  |
| 11 | Waiting time for tasting to start | 1 | 2 | 3 | 4 | 5 |  |
| 12 | Waiting time between samples | 1 | 2 | 3 | 4 | 5 |  |
| 13 | Availability of wine for purchasing | 1 | 2 | 3 | 4 | 5 |  |
| 14 | Presentation/Display of wine for purchasing | 1 | 2 | 3 | 4 | 5 |  |
| 15 | Quality of wine | 1 | 2 | 3 | 4 | 5 |  |
| 16 | Wine prices | 1 | 2 | 3 | 4 | 5 |  |
| 17 | Discounts available for wine purchase | 1 | 2 | 3 | 4 | 5 |  |
| 18 | Helpfulness of tasting room staff | 1 | 2 | 3 | 4 | 5 |  |
| 19 | Availability of non-wine gift items | 1 | 2 | 3 | 4 | 5 |  |
| ~~20~~ | ~~Cleanliness of restrooms~~ | ~~1~~ | ~~2~~ | ~~3~~ | ~~4~~ | ~~5~~ |  |
| 21 | Ease of finding the winery due to signage | 1 | 2 | 3 | 4 | 5 |  |

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | Too Little | More Variety Need | Perfect | Less Variety Needed | Too Many to Consider | Does Not Apply |
| 22 | Variety of the wines tasted | 1 | 3 | 5 | 3 | 1 |  |
|  |  |  |  |  |  |  |  |
|  |  | Way Too Little | More Needed | Just Right | More than I Needed | Way Too Much | Does Not Apply |
| 23 | Amount of wine served | 1 | 3 | 5 | 3 | 1 |  |
|  |  |  |  |  |  |  |  |
|  |  | Way Too Expensive | Too Expensive | Perfect | Too Cheap | Way Too Cheap | Does Not Apply |
| 24 | Cost of the tasting | 1 | 3 | 5 | 3 | 1 |  |
|  |  |  |  |  |  |  |  |
|  |  | Way Too Few | Too Few | Perfect | Too Many | Way Too Many | Does Not Apply |
| 25 | Number of wines tasted | 1 | 3 | 5 | 3 | 1 |  |

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | Poor | Fair | Good | Very Good | Excellent | Does Not Apply |
| 26 | Overall tasting room experience | 1 | 2 | 3 | 4 | 5 |  |

|  |
| --- |
| 33. Are you planning to (or did you) purchase any wine after the tasting? ⁭ Yes **=1**⁭ No **=0**  34. If yes, how many bottles do you plan on purchasing (or did you purchase)?  35. How much do you intend to spend (or did you spend) on your wine purchase?  36. What is your gender? ⁭ Female ⁭ Male  **36\_F = 1 if Female, 0 otherwise**  39. What is your age? ⁭ 21-30 **=1** ⁭31-40 **=2** ⁭41-50 **=3** ⁭ 51-60 **=4** ⁭ 61-70 **=5** ⁭ 71 and over **=6**  41. What level of education have you attained?  ⁭ High School or less **=1** ⁭ College Degree **=3**  ⁭ Some College **=2** ⁭ Graduate Training or Degree **=4** |