Analytics for Marketing Decisions - MKTG 464

Individual Assignment 1 (Total 12 Points)

Note:

- Each student is expected to work on this problem set **independently** and without any help from other students.

- You need to show the relevant R output and also **briefly explain your results in plain English**. You must also **clearly explain the managerial and/or marketing implications of the results**. Don't just report the final numbers / output as your answers.

- If after giving some thought, you have problems doing this assignment, do not hesitate to contact me (sumond@uw.edu). You can also ask clarifying questions on the Canvas Discussion board for assignments.

Questions

6. Courtyard by Marriott – Product Positioning (3 Points)

Arne M. Regreson, President and CEO of *Marriott International*, would like to know whether the positioning strategy for *Courtyard* has been effective.[1] So he gives you some survey data that was collected recently from 20 random customers. Among other things, the survey collected information on customers' ratings for *Courtyard*, **Rating** (on a 1-100 scale), and their age, **Age** (in Years), annual income, **Income** (in $1000s), and **Occupation** (a nominal variable that is coded as 1 = High-level Managers, 2 = Mid-level Managers, and 3 = Low-level Managers). The data is available in the file, **Courtyard.csv.**

a. Run a multiple regression of **Rating** as a function of **Age** and **Income** (ignore **Occupation** for now). Does the regression equation have any explanatory power? Show the scatter plots for **Rating** against each input variable. Also show the scatter plots for the residuals against each

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[1] The Marriott Chain has positioned *Marriott Hotels & Resorts* as its flagship premium brand. *Courtyard by Marriott* is positioned as a hotel chain to mid-level corporate managers and *Fairfield Inn by Marriott* to lower-level managers such as sales executives.

input variable. Based on a visual inspection of these plots, what variable transformation(s) would you propose? Can you recommend a better regression model (**Hint:** A regression model with fewer independent variables and good explanatory power is preferred)?

Do the following before proceeding to question 1(b):

- Create three income dummy variables: **Linc** = 1 for low Income (Income strictly less than $70K), and 0 otherwise; **Minc** = 1 for middle Income (Income greater than or equal to $70k and strictly less than $100k), and 0 otherwise; **Hinc** = 1 for high Income (Income greater than or equal to $100K), and 0 otherwise.

- Also create three occupation dummy variables, **Llvl** = 1 for Low-level managers, and 0 otherwise; **Mlvl** = 1 for Mid-level managers, and 0 otherwise; **Hlvl** = 1 for High-level managers, and 0 otherwise.

b. Run a regression by <u>using the Middle Income and High Income category dummies </u>as the only input variables (i.e., ignore **Age** and the Occupation category dummies). Is the regression result consistent with the scatterplot of **Rating** against **Income** that you had obtained in 1(a)? Is the coefficient of **the** High Income category dummy significantly different from zero? If not then what is its implication? Explain in plain English

c. Run a regression by <u>using the High-level Manager and Mid-level Manager category dummies </u>as the only input variables (i.e., ignore **Age** and the Income category dummies). Which slope coefficient(s) is/are significant? Compare the R-Sq value to that obtained in 1(b). What is the implication of this difference in the R-Sq value? Explain in plain English.

d. Now run a regression that has the two occupation category dummies from 1(c), as well as the two income category dummies from 1(b) as inputs (ignore **Age**). Which slope coefficient(s) is/are significant now? Explain the implication(s) of your results.

2. Conjoint Study for All-in-one Printers (7 Points)

All-in-one printers perform four functions: printing, faxing, scanning and copying. Fairly affordable models exist in the market, and a recent study in *PC magazine* revealed that the printers differ mostly on the following four attributes: Wireless, Speed (measured in pages per minute - ppm), Price (in dollars), and Brand. To understand consumers' preferences for All-in-one printers, the following attribute levels were chosen in a conjoint study.

Wireless: Most printer models come in two varieties: Wireless enabled or Wireless not enabled

Speed: The average number of pages printed per minute: 15ppm; 21ppm; 27ppm; 33ppm

Price: Price after rebate: $149; $199; $249; $349

Brand: Four large manufacturers were used for the study: Xerox; HP; Canon; Epson

A fractional factorial design suggested the following set of profiles for this study:

Profile ID	Wireless Enabled	Speed (in ppm)	Price (in $)	Brand
1	No	15ppm	$149	Xerox
2	Yes	15ppm	$249	Canon
3	No	27ppm	$149	Canon
4	Yes	27ppm	$249	Xerox
5	Yes	15ppm	$349	Epson
6	No	15ppm	$199	HP
7	Yes	27ppm	$349	HP
8	No	27ppm	$199	Epson
9	Yes	33ppm	$149	Epson
10	No	33ppm	$249	HP
11	Yes	21ppm	$149	HP
12	No	21ppm	$249	Epson
13	No	33ppm	$349	Xerox
14	Yes	33ppm	$199	Canon
15	No	21ppm	$349	Canon
16	Yes	21ppm	$199	Xerox

Ratings data (on a scale of 0 - 100) for the 16 profiles were collected from 35 respondents in an initial pilot study. The resulting utility functions of respondents are provided

to you in the dataset, Printers.csv (15 ppm, Wireless not enabled, $149 and Xerox are used as the base cases). Use this data to answer the following questions.

2a. Compute and plot the Part Worths for Price and Brand for the <u>twenty-fifth respondent</u>. Also, compute and plot the aggregate Part Worths for Price and Brand.

2b. Compute the relative importance of attributes for all individuals. Which attribute can have the most impact on the <u>twenty-fifth respondent</u>? Find the relative importance of the attributes in the <u>aggregate</u> and interpret the result in plain English.

2c. Suppose only the following three products exist in the market: What are the expected market-shares for the three products based on the Share of Preference approach?

Product 1	Product 2	Product 3
Wireless not enabled	Wireless not enabled	Wireless enabled
33ppm	21ppm	21ppm
$249	$149	$349
HP	Cannon	Epson

3. Product Decision for Forte Executive Innes (<mark>2 Points</mark>)

Forte Hotels, a large European hotel chain, is developing a new hotel chain in the United States. The chain, named Forte Executive Innes, will combine the ambiance of a European hotel with American functionality and convenience.

Forte now faces the challenge of fine-tuning the specific characteristics of the hotel. As a first step, the company decided to explore consumer preferences for five key attributes on which Forte Executive Innes could be differentiated: room type, business amenities, leisure facilities, conveniences and extras, and restaurants and dining(**Exhibit 1**). Forte's challenge was to decide which combination of the attribute options would most appeal to its target consumers – Business Travelers.

The management team has authorized you to use the information about individual level preference functions which were obtained from a Conjoint study of 40 (randomly selected) respondents who were Business Travelers. The data is available in the Excel file, **Forte.xlsx**.

Forte is exploring three specific hotel concepts (product profiles). **Forte will introduce any one of these three hotel concepts**. Assume that currently there are five hotel chains in the United States that target business travelers. The hotel concepts of these competitors are also provided in the Excel file. Report the expected market share for each hotel concept that Forte is exploring.

Exhibit 1: Attributes and Attribute Levels

Attribute [Abbreviation]	Possible Options [Abbreviation]
Room Type (All same size)	• Small suite [sm_suite] A small suite with a small bedroom area and a separate sitting area with a couch, TV, and coffee table.
[Room]	• Large standard room [lg_room] A room about three feet longer than a standard room with two queen-sized beds. • Room with large desk and swivel chair [rm_office] A room of the same dimensions as the large standard room with only one queen-sized bed and a well-lit work area with a large desk and swivel chair in place of the other bed.
Business Amenities projector	• Workspace [work_spc] A small-scale meeting space in the hotel that can be booked in advance. Includes an all-in-one printer and a
[Bus. Amen.]	• Reliable and free Wi-Fi throughout the hotel [wi_fi] • Digital Services [digital] Mobile check-in/out, digital key, and mobile concierge services
Leisure Facilities	• Exercise room [exerc_room] A room, open 24 hours a day, equipped with Nautilus machines free weights, stationary bikes, treadmills, stairclimbing machines, and a sauna.
[Leisure]	• Pool [pool] A standard rectangular indoor lap pool with shallow & deep ends. • Small exercise room and small pool [exerc + pool] A round pool for recreational swimming, not a lap pool, and an exercise room that lacks some features described above (e.g., no sauna and fewer machines).

Exhibit 1 (contd.): Attributes and Attribute Levels

Attribute [Abbreviation]	Possible Options [Abbreviation]
Conveniences & Extras	• Complimentary shoe shine [shoe_shine] Shoes left at the front desk or outside the room at night are shined and returned by a specified time in the morning.

[Extras]	• Movie streaming [movie]
	  A large selection of movies will be listed in a catalog in the room and available for streaming on the TV.
	
	• Complimentary fruit and cheese bowl [ft + cheese]
	  A complimentary fruit and gourmet cheese bowl in the room.
	
	• Free newspaper [newspaper]
	A complimentary copy of *USA Today* outside the door.

Restaurant
 	
[Restrn. Del.]
	• Yes [yes]
	  Delivery From a book of menus from nearby restaurants, patrons can order food through room service, and a hotel employee will pick up and deliver the food.
	
	• No [no]
	  No restaurant delivery service available.