Conjoint Analysis Hotel Business Analysis

Question 1:

Summarize the advantages and limitations of describing products as bundles of attribute options.

We have developed a study design template which is attached in the zip folder. We found the following advantages and disadvantages

Advantages:

- The main advantage is Maximum Utility. It helps to find out which feature of the product highly attracts the customers and which is not. This analysis is not just based on ratings given by the respondents. It is estimated by the utility points. It is calculated by a formula which analyses various combinations of attributes and bundles.

$$U(P) = \sum_{j=1}^{k_j} \sum_{i=1}^{m} a_{ij} x_{ij}$$

P: A particular product/concept of interest U(P):

The utility associated with product P

aij: Utility associated with the jth level (j = 1, 2, 3...kj) on the ith attribute

kj: Number of levels of attribute i m: Number of attributes

xij: 1 if the jth level of the ith attribute is present in product P, 0 otherwise

- Utility points helps to analyze how much unit a feature of the product is worth to a respondent.
- This analysis is possible only by describing the products as bundles so that it covers all the attributes and levels in simple format. This helps the MEXL to analyze all cases effectively.
- Splitting customer preference by attributes and different levels helps the respondents to rate for their favorite option easily.
- Bundling helps to easily interpret the utility points gained by each bundle

Disadvantages:

- There can be numerous combinations of bundles when classifying preferences as attributes and levels. But, we don't consider all those combinations. In Forte case, we are considering only 16 bundles. So, many combinations are left out.
- When we consider specific number of attributes and options within attributes choices become very limited.
- While designing the study plan, it is necessary to study the attributes competitors are offerings. This would give them accurate future prediction of market share.
- Preference maps and perceptual maps can be used in analyzing lots of characteristics based on demographic, psychological and economic factors. using whereas conjoint analysis does not provide such option.

- This study gives very good insights into the customer preferences the choice which they have been asked for, it does not offer for customers to choose.

Question 2:

Utility assessment: Interpret your own preferences on the resulting Part Worth's Sheet.

For rating each bundle, we assigned weight each hotel attributes.

Following is the total weight assigned to each attribute.

Hotel Attributes	Weight
Room Type	30%
Business Amenities	30%
Leisure Facilities	10%
Conveniences & Extras	10%
Restaurant Delivery	20%

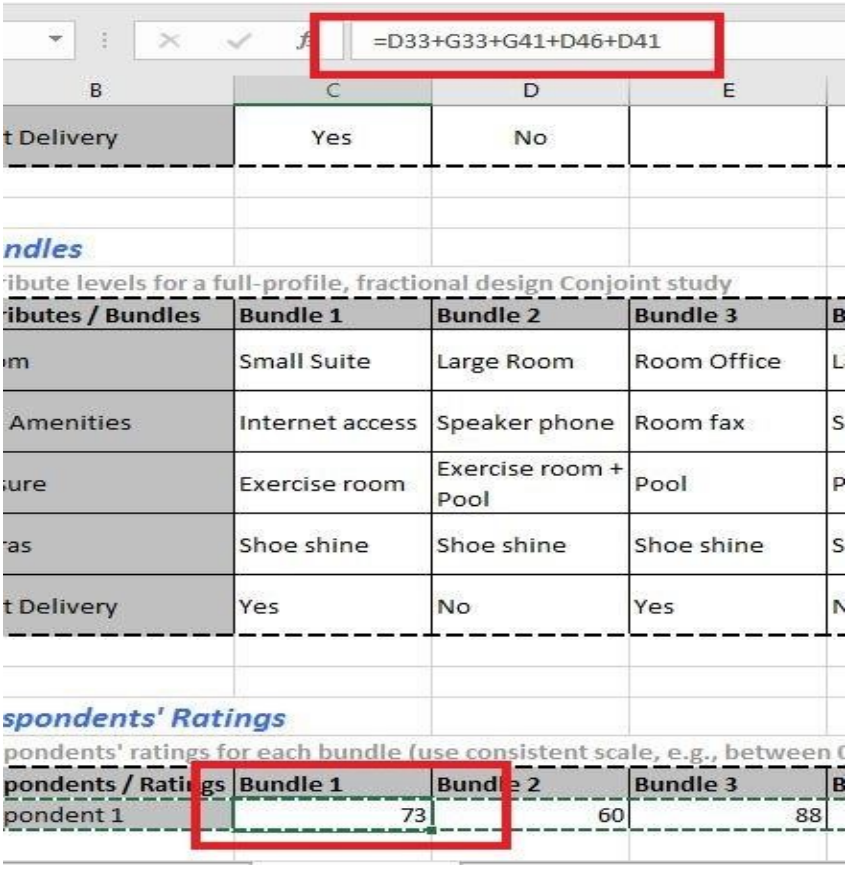
In these attributes, there are options for choose the best-suited hotel room for business travelers. Referring to exhibit 2 and team's interpretations, following are scores given by us to each option

Room Type	Score
Small Suite	20
Room Office	30
Large Room	10

Business Amenities	Score
Internet	15
Speaker Phone	30
Fax	25

Business people give more importance to on-site conference facilities with well-lit work area, large desks etc. These facilities are available in Room Office; hence it is given more score. Small suite with a small bedroom and sitting area and the Large room are a big room with 2 queen size beds. Business people are also

Speaker Phone and Fax is given high value as these amenities are more helpful in conducting conference or conference with offshore teams. Description of the internet says it is a computer with the internet and at an hourly rate. Business people would prefer working on their own laptops as they would have many confidential documents, office software etc.



=D33+G33+G41+D46+D41

B	C	D	E
t Delivery	Yes	No	

ndles

ibute levels for a full-profile, fractional design Conjoint study

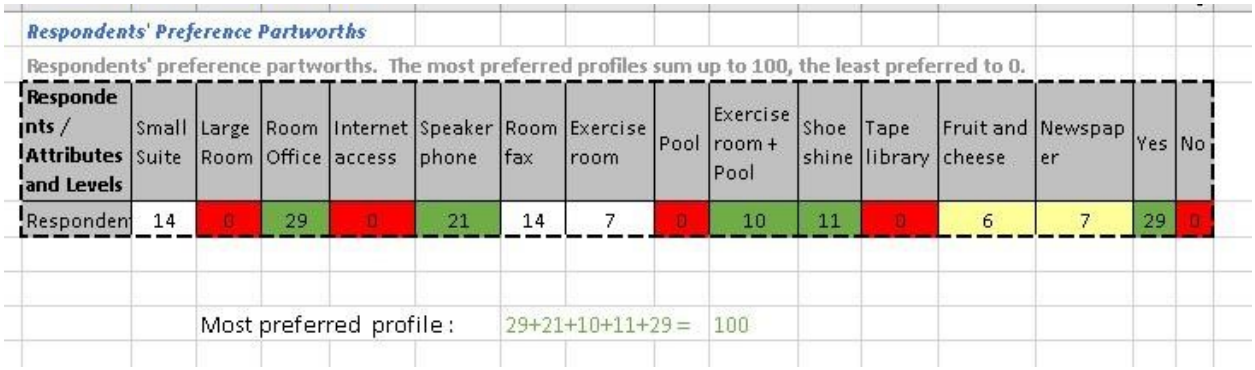
ibutes / Bundles	Bundle 1	Bundle 2	Bundle 3	B
m	Small Suite	Large Room	Room Office	L
Amenities	Internet access	Speaker phone	Room fax	S
ure	Exercise room	Exercise room + Pool	Pool	P
as	Shoe shine	Shoe shine	Shoe shine	S
t Delivery	Yes	No	Yes	N

spondents' Ratings

pondents' ratings for each bundle (use consistent scale, e.g., between

pondents / Rati gs	Bundle 1	Bund e 2	Bundle 3	B
pondent 1	73	60	88	

After running the analysis, following is the respondents' preference partsworths



Respondents' Preference Partworths

Respondents' preference partworths. The most preferred profiles sum up to 100, the least preferred to 0.

Responde nts / Attributes and Levels	Small Suite	Large Room	Room Office	Internet access	Speaker phone	Room fax	Exercise room	Pool	Exercise room + Pool	Shoe shine	Tape library	Fruit and cheese	Newspap er	Yes	No
Responden	14	0	29	0	21	14	7	0	10	11	0	6	7	29	0

Most preferred profile : 29+21+10+11+29 = 100

Analyzing the scores for each attributes on respondent's preference partworths, most preferred profile suiting business travelers would be

Room office with speaker phone having an exercise room and small pool with complimentary shoe shine and availability of restaurant delivery.

Question 3:

Summarize the advantages and limitations of conjoint analysis for obtaining preference data from customers.

Advantages of Conjoint Analysis

- Conjoint Analysis is best suited as it considers the trade-offs allowing to compare the attribute on the same metrics during the survey so the results are more accurate. The customers are not only given one option to choose but the combination of things so they could trade-off their preferences to give most relevant result.
- It is purely based on customer preference and each attribute preference is measured which helps in a good and most appropriate product development.
- Conjoint analysis helps in assessing the market share by designing the market simulation which is an important factor for the product to grow and establish in the market.

Limitations of Conjoint Analysis

- The survey does not give any information about the respondent except their name, which leads difficulty to interpret the preference variations. Like the business traveler from US and Europe may have different preference, the person who is not a frequent traveler may consider the travel as vacation and gives high preference to luxury like large rooms, Pool etc.
- The orthogonal design helps in reducing the combinations, by which the preferences can be easily interpreted. By this, some of the effective combination will be eliminated thereby reflecting difference in the utilities.
- Practically, in real time survey includes a lot of respondents which makes it difficult to choose the attribute level. By taking average of all the respondents results in a low utility also there are no large variation between the levels making it difficult to decide.

Respondents' Preference Partworths

Respondents' preference partworths. The most preferred profiles sum up to 100, the least preferred to 0.

Respondents / Attributes and Levels	Small Suite	Large Room	Room Office	Internet access	Speaker phone	Room fax	Exercise room	Pool	Exercise room + Pool	Shoe shine	Tape library	Fruit and cheese	Newspaper	Yes	No
Amanda	0	9	11	52	13	0	0	8	10	17	6	13	0	0	10
Ann	10	37	0	0	9	3	0	39	21	3	0	3	0	12	0
Bruce	26	0	10	21	0	14	9	16	0	0	14	7	19	18	0
Byron	8	0	22	13	25	0	0	12	6	22	12	0	15	0	19
Byung	34	0	30	0	16	11	0	16	11	21	0	14	8	13	0
Colleen	45	0	16	0	2	0	0	15	32	2	0	0	1	0	19
Courtney	17	7	0	7	24	0	5	0	32	2	15	8	0	0	12
Daniel	15	0	12	0	14	38	4	0	9	5	7	0	21	0	17
Dierdre	13	0	24	10	23	0	14	0	4	8	0	24	12	15	0
Ello	11	20	0	9	0	19	14	0	32	5	0	18	12	11	0
Eugene	0	27	7	4	0	2	56	19	0	4	10	0	6	3	0
Frank	8	0	31	8	0	10	10	4	0	0	7	15	18	31	0
Gabriel	20	0	14	0	7	21	9	0	5	41	13	10	0	0	9
George	0	19	5	10	22	0	32	16	0	9	11	0	3	16	0
Gina	14	31	0	14	0	13	7	25	0	13	0	18	8	12	0
Hans	6	16	0	0	16	9	7	0	33	5	0	9	13	0	22
Hector	0	7	47	0	8	25	9	6	0	4	12	8	0	0	7
Jin Hyuk	34	0	16	6	27	0	8	0	14	4	0	10	8	0	15
Jose	12	0	28	5	0	37	0	20	11	8	12	0	6	4	0
Kevin	0	12	34	9	22	0	0	5	6	15	0	22	8	16	0
Lawrence	72	43	0	7	6	0	7	0	10	0	0	5	5	0	6
Marina	21	10	0	12	26	0	0	21	3	21	9	13	0	0	11
Martina	0	16	8	16	29	0	0	29	20	0	13	6	9	14	0
Michael	47	0	20	21	0	10	12	16	0	10	0	8	11	5	0
Nicholas	28	0	33	11	29	0	0	1	3	6	0	26	4	0	9
Nissa	0	16	22	5	0	22	12	6	0	24	8	0	12	0	20
Oliver	50	27	0	0	19	4	11	0	7	0	8	5	4	12	0
Peony	10	0	29	7	11	0	0	31	17	1	9	16	0	13	0
Robert	34	0	11	23	13	0	4	12	0	5	0	8	14	17	0
Sally	23	0	7	0	15	29	7	0	5	9	5	18	0	0	23
Saulo	20	0	16	10	0	27	7	10	0	0	12	20	16	23	0
Scott	13	43	0	11	0	12	10	25	0	0	8	6	4	0	12
Shawn	0	7	18	0	27	18	12	0	27	4	8	0	14	0	14
Stacy	27	0	23	0	13	42	0	4	7	8	6	0	3	0	16
Sukhdeep	36	18	0	18	8	0	0	11	24	0	6	8	8	14	0
Thomas	16	0	33	0	16	10	13	0	10	0	11	33	18	0	5
Tiffany	14	0	30	6	0	19	20	10	0	4	6	0	13	0	18
Traci	25	0	17	13	0	8	0	20	38	0	10	4	12	0	12
Trevor	17	32	0	0	15	15	31	0	28	12	7	0	5	10	0
Vladimir	0	14	19	10	0	22	10	16	0	24	5	0	7	17	0
	18.15	10.275	14.825	8.6666667	11.375	11	8.5	10.375	10.625	7.9	6.25	8.875	7.925	6.9	6.9

Question 4:

Viability of New Hotel Concepts

Attributes / New Product Profiles	Professional 1	Professional 2	Tourist	Deluxe
Room	Room Office	Small Suite	Large Room	Large Room
Bus Amenities	Internet access	Room fax	Speaker phone	Internet access
Leisure	Exercise room	Exercise room	Exercise room + Pool	Exercise room + Pool
Extras	Fruit and cheese	Tape library	Tape library	Tape library
Rest Delivery	No	Yes	No	Yes

1. **Professional 1**

   Market share = 15.7%

   Revenue per unit = 101 (Base 100)

   Incremental fixed cost = 4100

   Incremental contribution per day/room = **(Internet + Exercise + Fruit, Cheese) = -4**

2. **Professional 2**
   Market share = 16.39%
   Revenue per unit = 101 (Base 100)
   Incremental fixed cost = 2500
   Incremental contribution per day/room = **(Fax + Exercise + Video Tape) = 0**

3. **Tourist**
   Market share = 14.25%
   Revenue per unit = 101 (Base 100)
   Incremental fixed cost = 4000
   Incremental contribution per day/room = **(Speaker + Exercise, Pool + Video) = -3**

4. **Deluxe**
   Market share = 13.36%
   Revenue per unit = 101 (Base 100)
   Incremental fixed cost = 6400
   Incremental contribution per day/room = **(Internet + Exercise, Pool + Video) = -5**
   Contributing factors

- **Deluxe has lowest incremental contribution of - $5** per day per room. For 200 rooms, it will contribute to a loss of **$1000 per day.**
- **Professional 2 has per day contribution of $0.** For 200 rooms, it will not contribute any profit or loss**.**
- Tourist has per day contribution of - $3. For 200 rooms, it will contribute a loss of $600 per day.
- Professional 1 has per day contribution of - $4. For 200 rooms, it will contribute a loss of $800 per day.

Market Share factor

- **"Professional 2" has the highest Market Share of 16.39%**
- Deluxe has lowest Market Share of 13.36%

"Professional 2" concept has lowest fixed cost of $2500. It also satisfies the customer by providing Fax Service, Exercise room and Videotape. This helps Professional 2 to achieve maximum market share.

The characteristics of Tourism concept is similar to Professional 2. It offers low variable cost products such as Speaker, Video Tape. The fixed cost is $4000 which is similar to Professional 1 but the variable per day contribution is very low because of offering highly expensive complementary products such as Fruit & Cheese bowl.

Deluxe concept's high fixed cost and low per day contribution because it offers all high expense products such as Exercise room, Pool, Internet. The cost of installing such systems is very high and it also requires maintenance, hence low per day contribution.

Question 5:

Optimal product out of four concept

We analyzed using two decision rules:

Logit Rule and

- **First Choice (Maximum Utility) Rule**

Scenario / Product profiles	Courtyard by Marriott	Nittany Lion Inn	Atherton Hilton	Toftrees	Scanticon	New Product Profile	Revenue per Unit of New Product	Revenue Weighted by Market Share
Predicted market shares	22%	17%	16%	23%	23%	n/a	n/a	n/a
...with Professional 1	19%	14%	13%	19%	19%	15.70 %	100	15.622
...with Professional 2	18%	14%	13%	19%	18%	16.39 %	101	16.472
...with Tourist	19%	15%	13%	19%	20%	14.25 %	101	14.321
...with Deluxe	19%	15%	14%	20%	20%	13.36 %	99	13.160

Logit Rule - Market Share and Revenue Simulations

Scenario / Product profiles	Courtyard by Marriott	Nittany Lion Inn	Atherton Hilton	Toftrees	Scanticon	New Product Profile	Revenue per Unit of New Product	Revenue Weighted by Market Share
Predicted market shares	18%	10%	8%	33%	33%	n/a	n/a	n/a
...with Professional 1	15%	10%	5%	28%	30%	13%	100	12
...with Professional 2	13%	10%	8%	33%	28%	10%	101	10
...with Tourist	15%	8%	5%	28%	33%	13%	101	13
...with Deluxe	15%	8%	5%	33%	30%	10%	99	10

Maximum Utility Rule - Market Share and Revenue Simulations

We **preferred Logit rule over First Choice** because

- Comfort and preference changes for each individual. It depends on their needs. Business personal may not look for a hotel room which gives them maximum utility, rather they like to stay in a place which just offers what they want for a cheaper price
- Logit Rule is best in producing weighted results based on customer preference. This helps in deciding what customers really wants and prefers instead of providing everything.
- This helps in targeting a segment of customers with a specific taste. This segment has high market share for Forte.
- Hotel rooms are not commodity products, rather it is a live-in space comfort and it should be provided according to an individual's choice. Hence we go with Logit Rule.

Result:

- **Professional 2 is the best concept to adopt.** High Market share, per day contribution and revenue per unit is 101 which is 1 unit above the base value of 100.
- **Professional 1 is the second best concept to adopt.** Second high market share, high per day contribution. Although, revenue per unit is same as base value, high market share can compensate for that.

Question 6:

Would you recommend product concepts other than the four Forte is considering for the State College market? Explain how you arrived at your recommendation(s).

The below screenshot shows the output based on optimized revenue using logit rule, First choice rule and Share of preference rule with optimal product profiles.

Existing Product Profiles

Labels and attribute levels for each existing product profile that already exists in the market.

Attributes / Existing Product Profiles	Courtyard by Marriott	Nittany Lion Inn	Atherton Hilton	Toftrees	Scanticon
Room	Small Suite	Large Room	Large Room	Small Suite	Room Office
Bus Amenities	Speaker phone	Speaker phone	Speaker phone	Speaker phone	Room fax
Leisure	Exercise room + Pool	Exercise room	Exercise room	Exercise room + Pool	Exercise room + Pool
Extras	Newspaper	Newspaper	Tape library	Newspaper	Shoe shine
Rest Delivery	Yes	Yes	No	No	Yes

Market Share and Revenue Simulations

Market share and revenue simulations for different scenarios, using the First-Choice Rule.

Scenario / Product profiles	Courtyard by Marriott	Nittany Lion Inn	Atherton Hilton	Toftrees	Scanticon	Market Share of Optimal Product Profile	Revenue per Unit of Optimal Product	Revenue Weighted by Market Share
Predicted market shares	18%	10%	8%	33%	33%	n/a	n/a	n/a
...with Optimal Product 1	5%	5%	8%	25%	25%	33%	94	30
...with Optimal Product 2	18%	10%	5%	28%	13%	28%	102	28
...with Optimal Product 3	8%	8%	5%	30%	23%	28%	95	26
...with Optimal Product 4	13%	8%	5%	28%	20%	28%	94	26
...with Optimal Product 5	10%	8%	5%	33%	20%	25%	99	25

arket Share and Revenue Simulations

irket share and revenue simulations for different scenarios, using the Share of Preference Rule.

enario / Product profiles	Courtyard by Marriott	Nittany Lion Inn	Atherton Hilton	Toftrees	Scanticon	Market Share of Optimal Product Profile	Revenue per Unit of Optimal Product	Revenue Weighted by Market Share
dicted market shares	21%	18%	17%	21%	22%	n/a	n/a	n/a
ith Optimal Product 1	18%	15%	14%	17%	17%	18%	102	18
ith Optimal Product 2	18%	15%	14%	17%	18%	18%	101	18
ith Optimal Product 3	18%	15%	14%	17%	18%	18%	101	18
ith Optimal Product 4	17%	15%	14%	17%	18%	18%	101	18
ith Optimal Product 5	18%	15%	14%	18%	18%	17%	104	18

Optimal Product Profiles

Labels and attribute levels for each optimal product profile that the software recommends you introduce in this market

Attributes / Optimal Product Profiles	Optimal Product 1	Optimal Product 2	Optimal Product 3	Optimal Product 4	Optimal Product 5
Room	Small Suite	Small Suite	Small Suite	Small Suite	Small Suite
Bus Amenities	Room fax	Room fax	Speaker phone	Speaker phone	Room fax
Leisure	Pool	Pool	Pool	Pool	Exercise room
Extras	Shoe shine	Newspaper	Shoe shine	Newspaper	Shoe shine
Rest Delivery	No	No	No	No	No

We used Logit Rule compared to first choice and share of preference rule because as per our previous analysis Logit gave the best results based on the customer preferences for hotel offerings.

Market Share and Revenue Simulations

Market share and revenue simulations for different scenarios, using the Logit Rule.

Scenario / Product profiles	Courtyard by Marriott	Nittany Lion Inn	Atherton Hilton	Toftrees	Scanticon	Market Share of Optimal Product Profile	Revenue per Unit of Optimal Product	Revenue Weighted by Market Share
Predicted market shares	22%	17%	16%	23%	23%	n/a	n/a	n/a
...with Optimal Product 1	19%	14%	13%	19%	17%	19%	102	19
...with Optimal Product 2	18%	14%	13%	18%	18%	18%	102	19
...with Optimal Product 3	18%	14%	13%	19%	17%	19%	99	18
...with Optimal Product 4	18%	14%	13%	19%	17%	19%	98	18
...with Optimal Product 5	18%	14%	13%	19%	17%	18%	101	18

Optimal Product Profiles

Labels and attribute levels for each optimal product profile that the software recommends you introduce in this market

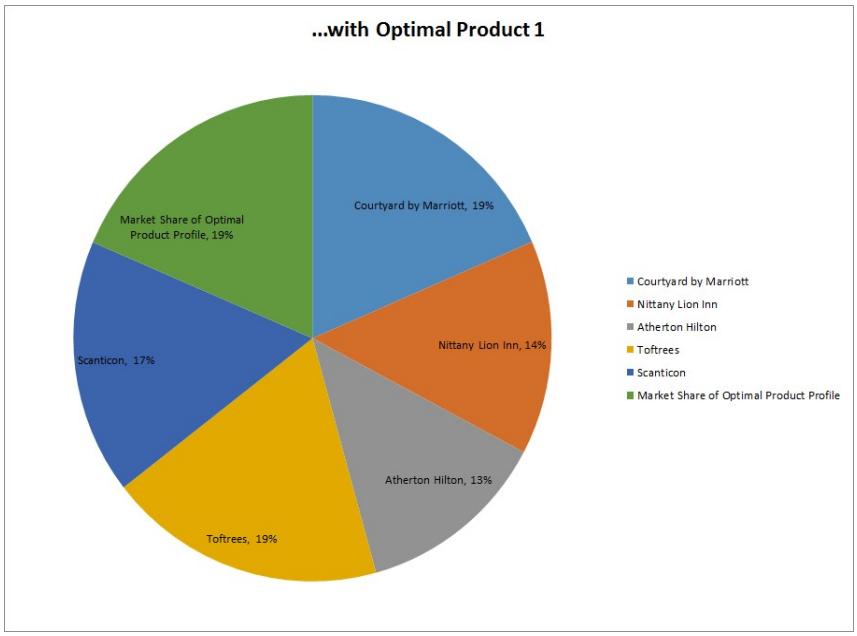
Attributes / Optimal Product Profiles	Optimal Product 1	Optimal Product 2	Optimal Product 3	Optimal Product 4	Optimal Product 5
Room	Room Office	Small Suite	Room Office	Room Office	Room Office
Bus Amenities	Room fax	Room fax	Room fax	Room fax	Room fax
Leisure	Pool	Pool	Pool	Pool	Pool
Extras	Shoe shine	Shoe shine	Shoe shine	Newspaper	Newspaper
Rest Delivery	No	No	Yes	Yes	No

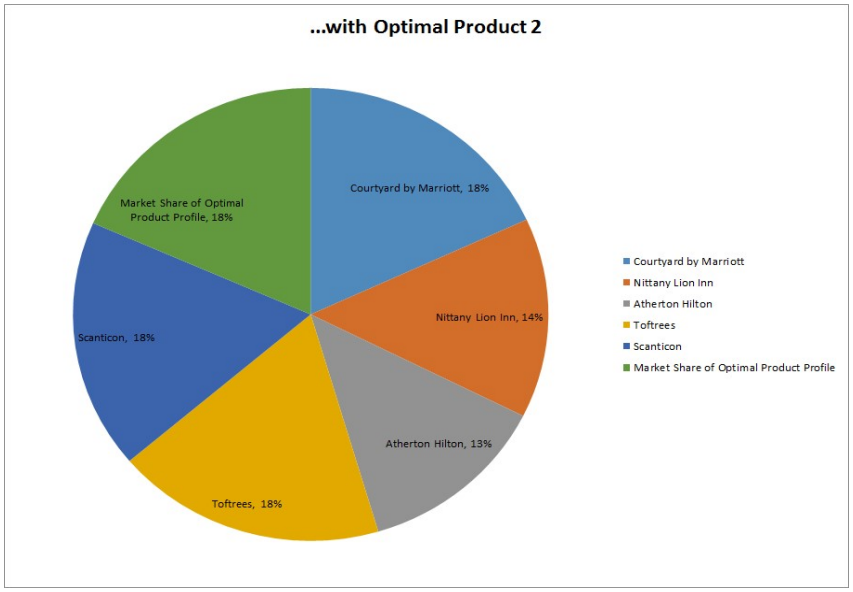
Based on the above results we compare Optimal Product 1 and 2 as they have highest Revenue per unit and market share compared to other products.

Optimal Product 1:
Market share = 19%.
Revenue per unit =102.
Revenue weighted by market share =19.
Incremental fixed cost = $3630
Incremental contribution per day/room = **(Room fax + Pool + Shoe shine) = -2**

Optimal Product 2:
Market share of Optimal Product 2 = 18%.

Revenue per unit = 102.
Revenue weighted by market share = 19.
Incremental fixed cost = $3630
Incremental contribution per day/room = **(Room fax + Pool + Shoe shine) = -2**





In this all the optimal products have pool which was not seen previously so we need to be careful what do the business people actual require either pool or exercise.

Optimal product 1 has highest market share of 19% compared to Optimal product 2 which is 18%. Revenue per unit for both are 102 while revenue weighted by market share is 19.

Optimal product 1 consist of individual who wants pool, room fax and shoe shine. This shows they are more interested in getting the service rather than completion of their business work.

Optimal product 1 has added incremental fixed cost of $3630 per room but an average incremental contribution per day per room is -2. Although the fixed cost is not very high still in we think in a long run it is not very profitable.

Similarly, Optimal product 2 has individuals who prefer pool, room fax and show shine. Even these people are more interested in service than their actual business work. Optimal product 2 has added incremental fixed cost of $3630 per room but an average incremental contribution per day per room is -2. Thus, same as Optimal product 1 in long run it is not very profitable as fixed cost is high while incremental contribution per day per room is negative.

Results

When we compare Optimal product 1 and Optimal product 2, both are very similar but market share is 19% for optimal product 1 compared to 18% for Optimal product 2, So we prefer Optimal product 1. Optimal product 1 is feasible but involve high risk as fixed cost is high but gives highest market share. Optimal product 1 is preferred when business traveler wants to enjoy the service and relax rather than actual business work.

The choice remains the same (Optimal product 1) when we used other rules like First choice rule and Share of Preference Rule due to highest market share.
Finally, we prefer **Optimal product 1** compared to Professional 2 because it gives highest market share of 19% and revenue per unit of 101. Although it has a higher fixed cost of $3630 compared to $2500 of professional 2, it is like a onetime investment as market share in Optimal product 1 is greater by 2.53% so the total revenue will also increase.

Also, incremental contribution per day per room is -2 for Optimal product 1 while it is 0 for Professional 2. This negative value can be reduced by increasing the cost of service as they have special amenities like pool and shoe shine. Thus it will have positive contribution per day per room and thus Optimal product 1 will be the best solution.

Question 7:
Summarize the major advantages and limitations of a conjoint study for new product design.

What conditions favor the use of this approach in the hotel industry?

Considering the current conjoint analysis has the many strengths that provide us with valuable insights and effective decision support.

- The analysis gives financial analysis for each bundle. This allows us to make choice and decide on priority based on financial support.
- The data about customer preference was included in the analysis. Evaluation of attributes was done based on preferences as well. This increases the effectivity of valuating each bundle.
- The analysis allows us to compare our bundles against our competitors. Better understanding of competitors gives us an opportunity to improvise on our offerings.

The conjoint analysis had some limitations which cannot be overlooked before acting based on the result of the analysis.

- The case mentions that at least 30% of business travelers are interested in the amenities, thus we need to consider finding ways to reach out to other 70% of the business travelers. Missing out on preferences by the other 70% is a huge setback.
- One of the important factor while choosing a hotel room is price which should be considered in the overall analysis.
- Considering a hotel with 200 rooms, we need to consider on how much variety we can provide in our services. As price is not the part of analysis, it's difficult to settle down on limited number of bundles on fixed price.

Question 8:

We totally disagree with the statement that conjoint study is a deterrent to excellence. With conjoint analysis, we are benefited immensely. With this study, we can measure preference of the consumer. This builds up our understanding on the consumer perspective towards our services. The study also quantifies the attributes. Using these quantities, we can decide on charging our consumers based on preferences. If we charge more to the customers more for a highly preferred value, then we will surely have an opportunity to make profit. We can achieve a lot using this study but we would like to make certain recommendations through which we can improve our analysis.

Firstly, the study isn't focused particularly for American or European customer's while collecting preference data. Preferences can highly differ based on the target segment. If they decide to target European customers, then the preference data should be collected from that segment only. The study is not considering the price and location of the offering. Affordability and ease of access are one of the highly-considered attributes while booking a hotel. Responses of 40 out of 300 people were used, we may get different results from the analysis if all the 300 responses are considered in the analysis. Considering these recommendations and improving over the analysis will give us greater understanding of the customer and make our analysis stronger. A stronger analysis will act as a stepping stone towards building the Hotel and designing the services.