Forte Hotels Design Analysis

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Introduction

Forte Hotels is a European hotel chain that is planning to enter the United States market

They plan to create a new hotel chain, Forte Executive Innes, that appeals to business travelers

- European business travelers in the US who are familiar with their brand already
- US business travelers, who will expect American functionality and convenience, but could be converted to customers by unique characteristics and a European ambiance that is often lacking in mid-priced hotels

By surveying the target market and utilizing conjoint analysis, it's possible to determine which hotel characteristics will appeal most to business travelers in the US

Potential Hotel Attributes and Levels

Room Type

Small Suite: a small suite which contains a bedroom and separate sitting area with a couch, tv, and coffee table

Large Room: a large standard room containing two queen-sized beds

Room-Office: a room that contains a full-sized desk with swivel chair, and single queen-size bed

Business Amenities

Internet: an in-room computer with access to the internet at a low hourly rate

Speaker Phone: an in-room speaker phone for conference calls

Fax Machine: an in-room fax machine with a private temporary number

Leisure Amenities

Exercise Room: access to a large exercise room, equipped with a variety of cardio machines, free weights and a sauna

Pool: access to a standard indoor lap pool

Exercise Room and Pool: access to both a small exercise room and a small pool

Extras

Shoe Shine: a complimentary shoe shine every night

Tape Library: complimentary access to a large collection of videotapes

Fruit and Cheese Bowl: a complimentary fruit and gourmet cheese bowl

Newspaper: a complimentary newspaper delivered every morning

Restaurant Delivery

Yes: complimentary delivery service for nearby restaurants

No: no restaurant delivery service

Business Traveler Questionnaire

The questionnaire was developed using a selection of 16 bundles of attribute options, identified from fractional factorial design to efficiently sample the 216 possible hotel attribute combinations

The respondents rate each of the 16 bundles with their estimated satisfaction on a scale of 0 – 100

Please rate how satisfied you would be with each of the following hotel amenity bundles when you are travelling for business:	Rating (0 - 100)
Bundle 1: A small suite (includes a sitting area with a couch), including an in-room computer with internet access, access to a full-sized exercise room, a complimentary shoe shine, and with restaurant delivery service	
Bundle 2: A large room (includes 2 queen-sized beds), including an in-room speaker phone, access to a small exercise room + small pool, a complimentary shoe shine, and without restaurant delivery service	
Bundle 3: A room office (includes a desk), including an in-room fax machine, access to an indoor lap pool, a complimentary shoe shine, and with restaurant delivery service	
Bundle 4: A large room (includes 2 queen-sized beds), including an in-room speaker phone, access to an indoor lap pool, a complimentary shoe shine, and without restaurant delivery service	
Bundle 5: A small suite (includes a sitting area with a couch), including an in-room speaker phone, access to an indoor lap pool, videotape library access, and with restaurant delivery service	

Questionnaire, displaying the first five bundle options

Data Preparation & Conjoint Model

For conjoint analysis, the profile information for each attribute level was encoded to an integer representation
- For example, with the Room Type attribute, 1, 2, and 3 are used to represent Small Suite, Large Room, and Room Office respectively

The profile encodings were then utilized to encode each of the 16 questionnaire profile bundles

The conjoint model is created by fitting a linear model with the profile integer encodings as explanatory variables, and the survey rating as the response variable

Part Worth Utilities – All Respondents

The coefficients from the linear model represent the part worth utilities of each level within each attribute

The part worth utilities from conjoint analysis are shown here, where a larger coefficient value indicates a higher preference

These indicate that the overall preferred hotel room is:

◦ Room Type: a small suite which contains a bedroom and separate sitting area with a couch, tv, and coffee table

◦ Business Amenities: an in-room speaker phone for conference calls

◦ Leisure Amenities: access to both a small exercise room and a small pool

◦ Extras: a complimentary fruit and gourmet cheese bowl

◦ Restaurant Delivery: complimentary delivery service for nearby restaurants

And the most important attribute is Room Type, with an importance rating of 29.2%

```
## [1] "Part worths (utilities) of levels (model parameters
for whole sample):"
##                      levnms     utls
## 1               intercept 43,6885
## 2             Small Suite        3
## 3             Large Room  -3,2438
## 4            Room Office    0,2438
## 5        Internet access  -1,4687
## 6           Speaker phone   0,9063
## 7               Room fax    0,5625
## 8          Exercise room  -0,9979
## 9                   Pool    0,3896
## 10 Exercise room + Pool    0,6083
## 11             Shoe shine   0,1047
## 12           Tape library  -1,2641
## 13       Fruit and cheese   0,8859
## 14              Newspaper   0,2734
## 15                    Yes   0,0078
## 16                     No  -0,0078
## [1] "Average importance of factors (attributes):"
## [1] 29,20 21,32 19,74 15,94 13,80
## [1] Sum of average importance:   100
## [1] "Chart of average factors importance"
```

Segmentation Analysis

Using K-means clustering, I grouped the individual respondents into distinct segments, using their preference information to calculate similarity within groups

Using a scree plot, I determined that 2 is an appropriate number of segments for this analysis

◦ This is apparent because the scree plot shows that there is a significant reduction in the total within group sum of squares when changing from 1 to 2 segments, but adding further segments results in increasingly small reductions

◦ Too many segments would make it difficult to differentiate distinct features between segments
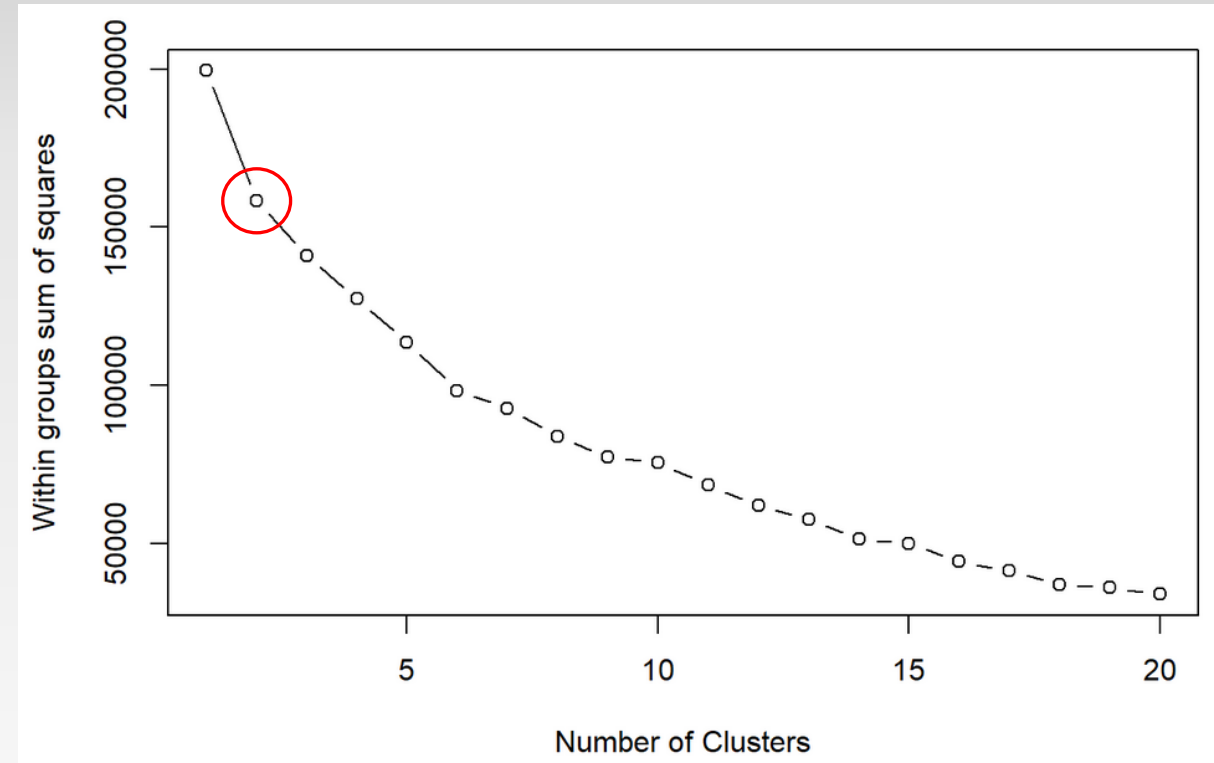
Segmentation Results

This plot shows the segmentation results, with each individual represented, with the color of the dot representing cluster assignment

There appears to be a good plane of separation between segments, so K-means worked well to form distinct segments based on individual preferences

Segment 1 is the largest at 70% of respondents, while Segment 2 only contains 30% of respondents

Using segmentation results, I re-visited conjoint analysis, calculating the part worth utilities for each segment

Part Worth Utilities – Segment 1

The part worth utilities for Segment 1 indicate that the preferred hotel room for these individuals is:

- Room Type: a room that contains a full-sized desk with swivel chair, and single queen-size bed

- Business Amenities: an in-room speaker phone for conference calls

- Leisure Amenities: access to both a small exercise room and a small pool

- Extras: a complimentary fruit and gourmet cheese bowl

- Restaurant Delivery: no restaurant delivery service

And the most important attribute is Room Type, with an importance rating of 28.07%

It seems that the individuals in Segment 1 prefer primarily to have a space where they can work efficiently.

```
## [1] "Part worths (utilities) of levels (model paramet
ers for whole sample):"
##                        levnms    utls
## 1               intercept 42,3527
## 2              Small Suite  3,9747
## 3              Large Room -8,7708
## 4             Room Office  4,7961
## 5         Internet access -1,5789
## 6            Speaker phone  0,8006
## 7                Room fax  0,7783
## 8           Exercise room -1,9494
## 9                    Pool  0,5685
## 10 Exercise room + Pool   1,381
## 11              Shoe shine  0,0513
## 12            Tape library -1,5201
## 13       Fruit and cheese  1,2746
## 14              Newspaper  0,1942
## 15                    Yes -0,9978
## 16                     No  0,9978
## [1] "Average importance of factors (attributes):"
## [1] 28,07 23,77 16,03 17,66 14,46
## [1] Sum of average importance:  99,99
## [1] "Chart of average factors importance"
```

Part Worth Utilities – Segment 2

The part worth utilities for Segment 2 indicate that the preferred hotel room for these individuals is:

- Room Type: a large standard room containing two queen-sized beds
- Business Amenity: an in-room speaker phone for conference calls
- Leisure Amenity: access to a large exercise room, equipped with a variety of cardio machines, free weights and a sauna
- Extras: a complimentary newspaper delivered every morning
- Restaurant Delivery: complimentary delivery service for nearby restaurants

And the most important attribute is Room Type, with an importance rating of 31.85%

It seems that business travelers in Segment 2 are primarily looking for a place to relax

```
## [1] "Part worths (utilities) of levels (model paramet
ers for whole sample):"
##                     levnms     utls
## 1           intercept   46,8056
## 2          Small Suite    0,7257
## 3           Large Room    9,6528
## 4          Room Office  -10,3785
## 5      Internet access   -1,2118
## 6        Speaker phone    1,1528
## 7             Room fax    0,059
## 8        Exercise room    1,2222
## 9                 Pool   -0,0278
## 10 Exercise room + Pool   -1,1944
## 11          Shoe shine    0,2292
## 12         Tape library   -0,6667
## 13     Fruit and cheese   -0,0208
## 14            Newspaper    0,4583
## 15                  Yes    2,3542
## 16                   No   -2,3542
## [1] "Average importance of factors (attributes):"
## [1] 31,85 15,61 28,38 11,92 12,25
## [1] Sum of average importance:  100,01
## [1] "Chart of average factors importance"
```

Market Analysis

Attribute / Competitor Hotel Profiles	Courtyard by Mariott	Nittany Lion Inn	Atherton Hilton	Tofftrees	Scanticon
Room Type	Small Suite	Large Room	Large Room	Small Suite	Room Office
Business Amenities	Speaker phone	Speaker phone	Speaker phone	Speaker phone	Room fax
Leisure Amenities	Exercise room + Pool	Exercise room	Exercise room	Exercise room + Pool	Exercise room + Pool
Extras	Newspaper	Newspaper	Tape library	Newspaper	Shoe shine
Restaurant Delivery	Yes	Yes	No	No	Yes

Shown here are the nearest competitors for the business traveler target market, with their accompanying profiles in the five attribute categories used for this analysis

New Hotel Analysis

Attribute / New Hotel Profiles	Professional 1	Professional 2	Tourist	Deluxe
Room Type	Room Office	Small Suite	Large Room	Large Room
Business Amenities	Internet access	Room fax	Speaker phone	Internet access
Leisure Amenities	Exercise room	Exercise room	Exercise room + Pool	Exercise room + Pool
Extras	Fruit and cheese	Tape library	Tape library	Tape library
Restaurant Delivery	No	Yes	No	Yes

Shown here are the profiles of new hotel room options for the Forte Executive Innes

Results

	Segment 1	Segment 2
Strongest Competitor	Scanticon	Nittany Lion Inn
Preferred New Profile	Professional 1	Tourist

Using the results of conjoint analysis, I determined the strongest competitor, and the preferred new profile, for each segment

These results were determined by evaluating hotel profiles first at the most important attribute for each segment, then continuing with further attributes until only one profile was identified

(Unfortunately the R 'Conjoint' package's simulation functions were not working for this data set, because a more complex evaluation would have been possible)

Recommendation

I suggest that the new hotel design account for the preference of both identified segments proportionally

◦ 70% of rooms in the new hotel design should fit the preferences of Segment 1

◦ 30% of the new hotel rooms should accommodate the preferences of Segment 2

Using the preferred new room profiles identified on the previous slide, this means that the new hotel design should include

◦ 70% of its rooms with the Professional I profile, and

◦ 30% of its rooms with the Tourist profile.

◦ For the Leisure amenity, because it would make sense to have only one option for the entire hotel, I would suggest accommodating the preferences of Segment 1 and having an exercise room + pool.

Future Work

Now that we have identified the preferences of the different segments of target customers for Forte Hotels, further analysis could be done to identify what the drivers are of consumer choice of the new Forte Executive Innes versus the closest competitors identified from conjoint analysis

- Scanticon for Segment 1 and
- Nittany Lion Inn for Segment 2

This future analysis could be completed by developing a binary logit model