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REVEALING FITNESS-BANDS ATTRIBUTES DIMENSIONS WITH MULTIVARIATE TOOLS :A CBCA APPROACH

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Introduction

Any organization wishing to rule the market should respect consumer preferences and to understand preferences of consumers. fitness bands has nowadays become our day to day partner. Consumers are looking for various innovative and transformed features. The fitness bands markets depict a lot of variations worldwide. In India major players are Samsung, Apple, Google Fitbit, Lenovo, Intex , Mi etc. All of them offer wide range of options and thus maintain long product lines. Almost every household who are health conscious is among the users of such Fitness bands in urban areas. The objective of this paper is to determine the attributes affecting the preferences of potential customers for various brands of Fitness bands and to provide insights on how Fitness bands companies can tap a number of potential customers. The results of this research are expected to inform Fitness bands companies about a health conscious customer's perceptions regarding various attribute of Fitness bands and to aid them design business models and execute successful marketing strategy based on the their needs. Here we are using conjoint analysis to measure preferences. Conjoint analysis is a multivariate technique which is to be utilised to comprehend individual customer's preferences and find out how these are developed. Explicitly, this method is utilised to gain discernments into how consumers are giving value to various product attributes on the basis of their evaluation of the complete product. Conjoint analysis is widely accepted in marketing research literature to assess consumer favourites for prospective products and services. It is well accepted for pricing research also. Choice-based conjoint analysis has proved its mettle. There are various benefits of Choice-based conjoint analysis. In CBCA collection of data is in the form of choices (simulated purchase decisions), which is actually relatively simple job for respondents than rankings or ratings. The derived part-worth utilities given in the output shows influence on the selection of product. Thus estimation of share is direct. Another advantage is that product related attributes and levels can be easily housed and thus we can estimate brand-specific utilities. This tool of research has been applied to comprehend the preferences in various industries including retail industry, academics, ecommerce and logistics Industry and even in health care services. But only a few studies have been conducted for Fitness bands users using conjoint analysis for finding out their preferences. In this study, we are striving to find out the preferences of Consumers of Maharashtra about various attributes of the smart bands like Brand, Operating System Compatibility, and Activity tracking features, Price, Weight, and Battery Backup.

Review of Literature

The Roots of conjoint analysis are back to the second decade of nineteenth century, but its real use has been started in 1964 when mathematical psychologists utilised it to solve sophisticated problems (Luce and Tukey, 1964). The broad idea behind its use was that people evaluate the overall utility of a multifarious product or service on the basis of the value of its discrete fragments (Orme, 1996). Conjoint analysis is de-compositional tool & in a de-compositional approach, preferences scores of consumers produced from their responses in an indirect way. Conjoint analysis is one such multivariate technique which used to comprehend how the customers are developing preferences for purchasing goods (Hair et al., 1998). Kamakura (1988) suggested that conjoint analysis is specifically useful in the classification and comprehension of benefit segments. Also, this method is strong and effective for spotting out benefits segmentation (Green and Krieger, 1993; Green and Srinivasan, 1978).

Conjoint Analysis Methodology: As per Carroll and Green (1995); Haaijer, Kamakura, and Wedel (2000) basic conjoint analysis model may be represented as :

$$U(X) = \sum_{i=1} \sum_{j=1} \alpha_{ij} x_{ij}$$

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where,
U (X) = Overall utility (importance) of an attribute
αij = part-worth utility of the j_{th} level of the i_{th} attribute
i= 1, 2........, m   j= 1, 2…......, k_i
x_{ij} = 1, if the j_{th} level of the i_{th} attribute is present
Otherwise equals to 0.

Initially conjoint analysis model used Ordinary least squares and utilized dummy variable regression for estimation (Fox 1997). Green and Krieger (1993) opined that the preference ratings were used for the predicted (dependent) variable and predictor variables and consisted of dummy variables for the attribute levels thereby algorithm calculates partial values by homogenizing the rate fluctuations on the basis of the normal distribution and the total mean values for the perception would be calculated using partial values. Also Hardle (2009) suggested that conjoint measurement analysis plays very vital role in marketing. Conjoint analysis is such a frequently executed market research analysis tools can design and price a product or a service in a simultaneous manner (Orme, 2005).

According to Wedel and Kamakura (2001), following are the essential stages to perform a conjoint analysis procedure

1. Determination of the attributes and levels: The selection of attributes and attribute levels which together make up alternative product concepts is the first step in conjoint analysis procedure. These attributes reflect key product features which consumers can used to evaluate the product. Also, attributes' levels should cover the whole range of representative levels. Therefore, successful conjoint analysis needs an appropriate selection of attributes and levels. For the purpose of this paper, attributes and levels selected based on available literature survey and interviews with Fitness bands selling dealers.
2. Stimulus set construction: For the purpose of this paper, a full-profile approach is selected. Full-profile conjoint has been a mainstay of the conjoint analysis community for decades (Orme, 2005). By academics suggestion, the full-profile approach is useful for measuring up to six attributes (Green and Srinivasan, 1978). Besides, this analysis could be used for paper-and-pencil studies (Orme, 2005). Also traditional full-profile approach can measure interactions between attributes. Creating the profiles is another part of this step. Usually, a factorial or fractional factorial design is used (Naes et al., 2001). In this study, this tool is used to design the product profiles. In this approach, the number of hypothetical profiles of Fitnessbandss is obtained by multiplying the number of levels associated to each attribute. This method can generate a large number of product profiles (here in this paper- $4 \times 6 \times 3 \times 3 \times 2 \times 2 = 864$ hypothetical profiles). It is difficult, from a consumer's point of view, to evaluate a large number of product concepts. Therefore, it is necessary to select a sample of product profiles, but maintain the effectiveness of sorting and evaluating the relative importance of a product's multi-dimensional attributes. A fractional factorial design has been chosen to reduce the number of profiles to 36. A special class of fractional design, called orthogonal arrays was used for this reduction. Here, two sets of data were obtained. One, estimation set, consisting of 32 stimuli, was used to calculate part-worth functions for the attribute levels. The other, holdout set, consisting of four stimuli, was used to assess reliability and validity. The orthogonal arrays (orthoplan) were generated by SPSS-20.0 software. So, total 36 design cards resulted and therefore respondents have to evaluate questionnaires consisting of 36 cards. For the survey purpose, we have used Metric Conjoint Analysis. Here, respondents were required to provide preference ratings for the Fitnessbands package described by 32 profiles in the estimation set and 4 profiles in the holdout set. The ratings were obtained using five-point scale (1= Strongly disagree, 5 = Strongly Agree). An example of profile card was depicted in Table 2. Table 3 shows a few numbers of profiles and an example of a profile card, respectively.
3. Stimulus presentation: Choosing the method of data collection: questionnaire was used as a stimulus in this study.
4. Calculating part-worth utility for each level of attributes.
5. Calculating the relative importance of each attributes.

6. Evaluating and interpreting the results.

Various other authors like Churchill et al. (2002) and Hair et al. (1998) have suggested almost similar steps for conjoint analysis as shown in the following figures.

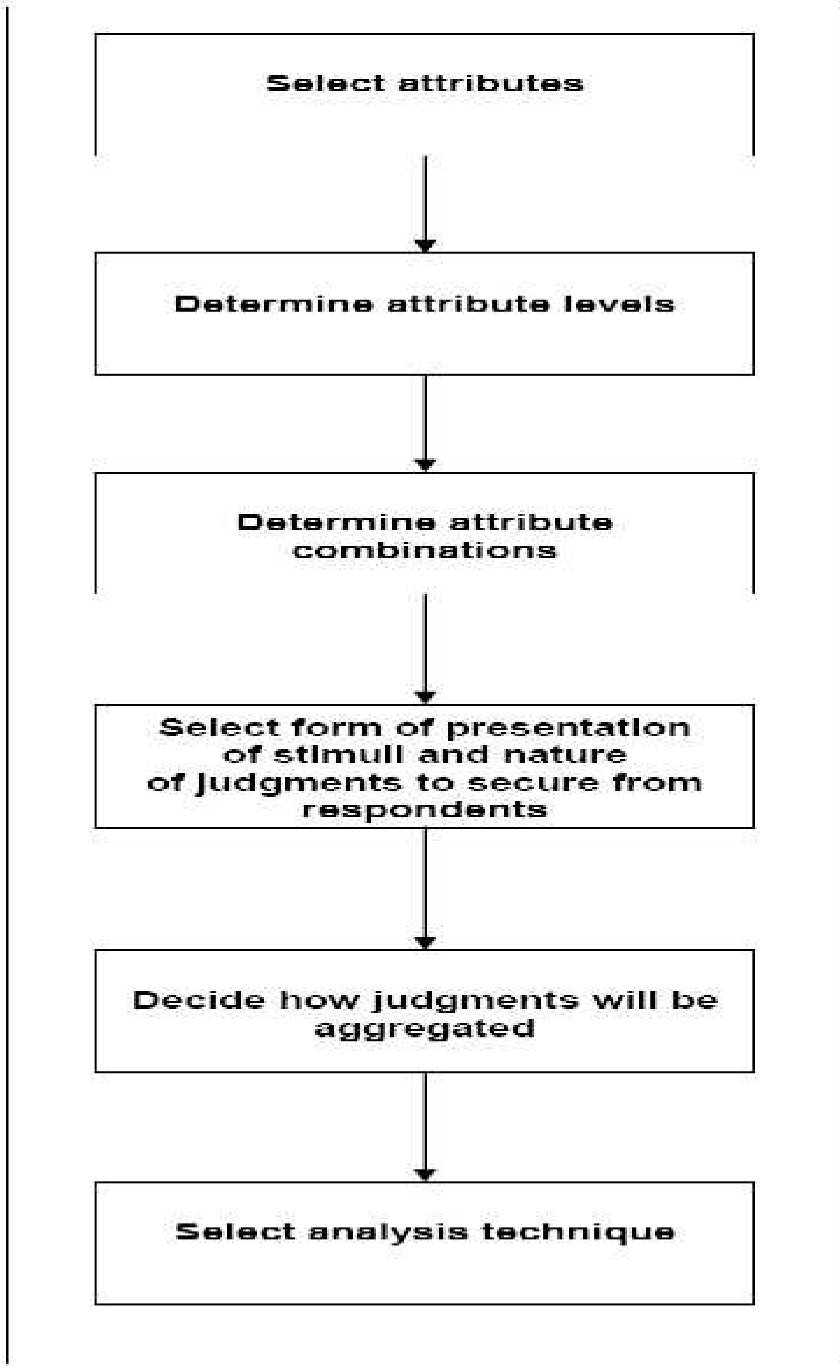

Figure 1: Designing a conjoint analysis experiment: Stages of the conjoint analysis decision diagram (Adapted from Churchill & Iacobucci, 2002 753)

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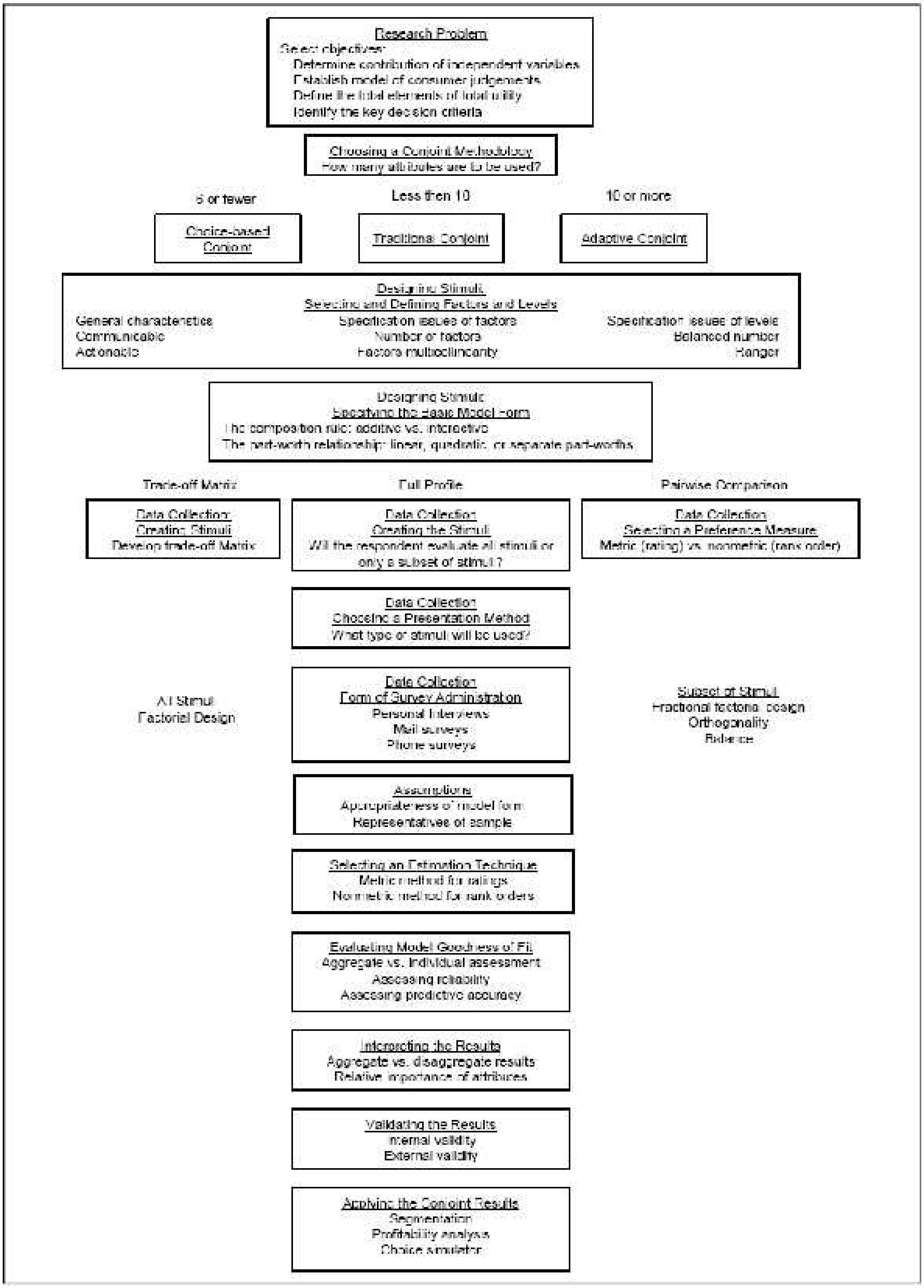

Figure 2: Key decisions when conducting a conjoint analysis (Hair *et al*. 1998:401-419)

Objective of the study

The objective of the study is as follows:

1. To find out the preferences of the smart band attributes amongst the Smart band users of Maharashtra.

Research Methodology

We collected generalizable data that represents the population using survey method. In this study we collected primary data targeting at individual existing Fitness bands Consumers. Subsequently, Conjoint analysis method was used to analyse the data so collected and presented in an intuitive and insightful presentation format. Here, the data was collected using both online and offline self-administrated survey. The data was collected from the residents of Nashik ,Nagpur, Mumbai, Pune, Amravati. Residents in these cities are selected as the respondents because they constitute the major propositions of fitness bands user in Maharshtra. The questionnaire items are designed in such way that technical jargons are minimized in order to enhance the understanding for the users from different knowledge backgrounds. At the end of data collection process, we were successful in procuring correct questionnaires from 305 respondents. So we have used sample size of 305. By securing this high sample size, the data collected is ventured to have low level of random errors, and the responses should follow normal distribution. Hence, the quality of data collected is to be considered fairly good, and appropriate for data analysis. Moreover Kendall's tau value has been found out as 0.750 which is sufficiently showing the validity of the data.

Analysis and Discussion

Total utility of the consumer can be found by adding utilities of Brand, Activity tracking, Weight, Operating System compatibility, Battery backup and Price.

Total utility = Utility (Activity tracker) + Utility (Brand Name) + Utility (Operating System compatibility) + Utility (Price) + Utility (Weight) + Utility (Battery backup) + Constant

The value of the constant was determined as 16.119. Following table show the Utility tables for different parameters.

Utilities			
		Utility Estimate	Std. Error
BRAND	FITBIT	1.564	.456
	APPLE	.872	.456
	SAMSUNG	.318	.456
	MI	.374	.456
ACTIVITY TRACKER	HEART RATE MONITORING	.719	.512
	STEPS COUNTER	.409	.512
	SLEEP TRACKING	.011	.669
	CALORIE TRACKING	.277	.669
	OTHERS	.146	.669
WEIGHT	> 25GRAMS	-.056	.263
	<25 GRAMS	.056	.263
OPERATING SYSTEM COMPATIBILITY	I OS	-.242	.263
	ANDROID	.242	.263
PRICE	<=5000	.525	.318
	5000-10000	1.050	.635
	>10000	-1.575	.953

BATTERY BACKUP	LESS THAN 5 DAYS	.662	.318
	5 DAYS	1.324	.635
	MORE THAN 5 DAYS	1.986	.953
(Constant)		16.119	.834

The table shows the utility (part-worth) scores and their standard errors for each factor level. Higher utility values indicate greater preference. Fitbit as the Brand and Android as the operating system have higher utilities as compared to any other Brand or operating system. As expected, there is an inverse relationship between prices and utility, with higher prices corresponding to lower utility (larger negative values mean lower utility).Utility values for the OS Compatibilty is higher for Android as compared to IOS .Also 'Battery Backup of more than 5 days has depicted maximum utility. Since the utilities are all expressed in a common unit, they can be added together to give the total utility of any combination.

ACTIVITY TRACKING	25.950
BRAND	35.873
BATTERYBACKUP	5.776
WEIGHT	8.582
PRICE	12.093
OS COMPATIBILITY	11.725
Averaged Importance Score	

The results show that Brand has the most influence on overall preference. Average importance score for the Brand is 35.873. This means that there is a large difference in preference between product profiles containing the most desired Brand name and those containing the least brand name. The second most important factor for the subjects of this study is Activity tracking (Averaged Importance Score 25.950) followed by Price (Averaged Importance Score 12.093). The results also show that a Battery back plays the least important role in determining overall preference. Activity Tracking and Price plays a significant role but not as significant as Brand. Customers are ready to shell out extra money for purchasing and getting the Brand of their own choice. The values are represented in percentages and they sum to 100.

Coefficients	
	B Coefficient
	Estimate
PRICE	-.525
WEIGHT	-.662

The above table shows the linear regression coefficients for the factors "Price" as -0.525 and for "weight" as -0.662 . These factors have been specified as LINEAR.

Correlations[a]		
	Value	Sig.
Pearson's R	.851	.000
Kendall's tau	.750	.000
Kendall's tau for Holdouts	.000	.500
a. Correlations between observed and estimated preferences		

Above table is showing significant correlation between various rankings and utilities undertaken for the study as Pearson's R value is 0.851 and Kendall's tau 0.750 which is sufficiently showing the validity of the data.

Model Description		
	N of Levels	Relation to Ranks or Scores
ACTIVITY TRACKING	4	Discrete
BRAND	6	Discrete
PRICE	3	Linear (less)
WEIGHT	3	Linear (less)
OS COMPATIBILITY	2	Discrete
BATTERY-BACKUP	2	Discrete
All factors are orthogonal.		

The Conjoint procedure keeps track of the number of subjects whose preference showed the opposite of the expected relationship—for example, a greater preference for higher 'Prices' is given by 45 respondents and a lower preference for a 'OS Compatibility' was given by 35 respondents .

Conclusion

For Smart-band Sellers who are operating in a highly competitive environment, it is extremely imperative to explore the preferences of the segment of health conscious customers, who make up a significant base of future users. Meeting the demands of this category of customers can have a very positive consequence in long-term profitability, loyalty and Brand Equity. As per the findings of this study, it is evident that the Brand has the most significant influence on overall preference of the consumers of Maharashtra for the smart-band market battle. Being 35.873 as the average importance score for the brand we can conclude that there is a large difference in preference between product profiles containing the most desired Brand name and those containing the least brand name. So the companies should first of all capitalise their established Brand Name. Most of the consumers prefer Fitbit followed by Mi as per the results of this study. Fitbit and Mi should capitalise on their established Brand Names. Moreover the companies, for example, Fitbit and Mi may think to offer a new smart-band with Activity Tracking (Averaged Importance Score 25.950) with a Price of Rs10000 or above (Averaged Importance Score 12.093).Consumers are even ready to pay more than Rs10000 if their smart bands are equipped with all activity trackers and has more than 5 days battery backup and weighs less than 25grams. Activity tracking and Price plays a significant role but not as significant as Brand. That's why these customers are ready to shell out extra money even for purchasing the Brand of their own choice having all the activity tracking attributes, Android Operating System compatibility, less than 25 grams of weight and more than 5days of battery back-up .

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Code used for Conjoint Analysis in the Study

```
CONJOINT PLAN= 'C:\Users\Prashant\Desktop\SP CONJ FITNESSBANDS\PRASHANT
FITNESSBANDS.sav'
/DATA = 'C:\Users\Prashant\Desktop\SP CONJ FITNESSBANDS \RESPONSESPG
FITNESSBANDS.sav'
/SEQUENCE =PREF1 TO PREF36
/SUBJECT= ID
/FACTORS =ACTIVITY TRACKING (DISCRETE)
BRAND (DISCRETE)
PRICE (LINEAR LESS)
WEIGHT (LINEAR LESS)
BATTERY BACKUP (DISCRETE)
OS COMPATIBILITY (DISCRETE)
/PRINT =SUMMARYONLY
```