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Factors affecting choice of mobile phone among university students: A conjoint analysis approach

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Abstract

The use of mobile phones has been expanded among the university students during the COVID-19 pandemic for easy access to virtual classes conducted by the different faculties, for communication with fellow friends and for keeping touch with the virtual library in addition to storage facility for soft copies of their academic work. Moreover, students prefer mobile phone for their own recreation purposes and online businesses. This study reported on students' preferences for different mobile phones based on conjoint analysis. The study was conducted based on RBCA (Ranking-based conjoint analysis). In this analysis the respondents were asked to rank the combination of attributes according to their preferences. In the study an orthogonal design with six attributes at different levels is constructed and 16 different combinations are generated. The attributes are brand, RAM, battery, price, display and camera. The relative importance of attributes was calculated using part-worth utility on a sample of 420 students under a fractional factorial design. In the study the most preferential attribute is observed to be RAM with relative importance score 31.51 and the least important attribute is found to be price having the relative importance score 4.87 among the university students.

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INTRODUCTION

Communication is mainstay of the current technologically developed modern world. Now a days mobile phone has become an efficient way of communication to get access to the people living in home and abroad. This device is useful enough to get our work done. This medium of communication makes life more comfortable and easier which could not be considered a few years back. It gives privileges to communicate with people through email, text message, MMS etc. Besides, smart phone is being used for more general and complex computation. Our new generation takes help of smart phone for the purpose of studying and finding relevant and necessary reading materials. The purchase choice of mobile phone depends on some salient features provided by the producers. The attributes that are being considered in purchasing mobile phones by the university students could be Brand, RAM, Battery, Price, Display and Camera. All attributes are not equally preferred by each student. The choice depends on affordability by the students and working capacity of the device. The producer offers mobile phones with a combination of available features that could be affordable and preferable by the buyers of different sections. Conjoint analysis helps in finding the leading attributes in consideration of the relative importance of many attributes available in the mobile phone. Saxena et al. (2021) applied conjoint analysis to estimate customers preferences towards different channel attributes namely: internet banking, mobile banking, and payment portals at a composite level that reflect the relative importance of using attributes. Ogbo et al. (2021) used conjoint analysis to present insight into the impact of access to Over- the-Top (OTT) services on users' demand interrelationships and willingness to pay for mobile services.

Basically, the study intends to reveal the relative importance of each of the attributes of mobile phone and find the most and least preferential attributes among the students studying at the university.

Literature review

Mahanova and Tkachenko (2021) studied with the women of reproductive age in Ukraine to identify the preferences of contraceptive methods using the tool of conjoint analysis. The study took some socio- economic characteristics such as age, income level and level of education to stratify the choice differentials among women. The results showed that women of 16 to 19 years give preference to skin patch while the women in the age category of 20-24 and 25-29 prefer tablet and injectables. Ayyavoo et al. (2021) attempted to study the development of consumers' preferences for products and services using conjoint analysis and found that carrot is most preferential attribute and sea weed is the least preferential attribute. In a study conducted by Jinadasa et al. (2021) found that type of contract is the most important attribute in taking decision regarding job while the least preferential attribute is observed to job location. The study took sample from the management undergraduates of some selected university in Sri Lanka. In the mobile phone industry, Kmlolu et al. (2010) revealed customer categories with diverse behavioral patterns. They want to do this by analyzing the decision-making criteria of 302 Turkish mobile phone users and clustering the sample into four behaviorally distinct groups. Moschis (1976) showed that Consumer behavior is affected by various factors ranging from personal motivations, needs, attitudes and values, personality characteristics, socio-economic and cultural background, age, sex, professional status to social influences of various kinds exerted by family, friends, colleagues and society as a whole. Liu (2002) analyzed factors that affect the decision regarding brand in the mobile phone industry in Asia. It was found from the analysis that the most preferential attribute is the battery capacity which is followed by larger screen. When it comes to mobile phone brands, according to Requelme (2001), contract features are the most important trait, followed by switching cost. Swait and Adamowicz (2001) discovered that a lot of shopper decision behavior might change

from one person to the next because buyers may utilize varied techniques to make their decisions rather than only utilizing mathematical modeling. The relative importance of each mobile phone feature, as well as the most and least liked features among university students, are yet unknown. As a result, the study's goal is to determine the relative relevance of each of the mobile phone's qualities, as well as the most and least preferred attributes among university students.

Methodology

'Conjoint analysis' is a statistical tool mostly used in market research to identify the attributes as per the choice of the respondents. The basic conjoint analysis model may be represented as (Carroll & Green,1995; Haaijer, Kamakura & Wedel 2000):

$$U(X) = \beta_0 + \sum_{i=1}^{m} \sum_{j=1}^{ki} a_{ij} x_{ij} + e_i$$

where, $U(X)$= Total utility of an attribute.

a_{ij}= part-worth utility of the j^{th} level of the ithattribute; i= 1, 2,...,m and j= 1, 2, ..., k

x_{ij}= 1, if the j^{th} level of the ith attribute is present and

x_{ij}= 0, otherwise.

β_0= constant and e_i= stochastic error.

The study attributes along with their different levels are displayed in the following table:

Table 1: Conjoint Attributes and Levels of Mobile Phones

	Attributes Brand	RAM	Battery	Price	Display	Camera
Levels	Samsung	2 gb	3000 mAH	Less than TK. 15000	4.5inches	16 MP
	MI	3 gb	3300 mAH	TK15000 and above TK. 15000	5 inches	24 MP
	Huawei Symphony	4 gb	4000 mAH		6 inches	

Generating the orthogonal design

After completing the attribute specification, the orthogonal design should be generated. In my study 100000 is the random number seed value. The orthogonal design is given in the following table.

Table 2: Orthogonal Design for Conjoint Analysis of Mobile Phone

Brand	RAM	Battery	Price	Display	Camera	Status	CARD
MI	2 gb	3300 mAH	TK15000 and above	6 inches	16 MP	Design	1
Samsung	3 gb	3300 mAH	Less than TK15000	4.5 inches	24 MP	Design	2
Samsung	2 gb	3000 mAH	Less than TK15000	4.5 inches	16 Mp	Design	3
Symphony	4 gb	3300 mAH	TK15000 and above	4.5 inches	24 MP	Design	4
Huawei	3 gb	3000 mAH	TK15000 and above	4.5 inches	16 MP	Design	5
MI	2 gb	4000 mAH	Less than TK15000	4.5 inches	24 MP	Design	6
Samsung	2 gb	3000 mAH	TK15000 and above	6 inches	24 MP	Design	7
MI	4 gb	3000 mAH	Less than TK15000	4.5 inches	16 MP	Design	8
Samsung	4 gb	4000 mAH	TK15000 and above	5 inches	16 MP	Design	9
Symphony	3 gb	4000 mAH	Less than TK15000	6 inches	16 MP	Design	10
MI	3 gb	3000 mAH	TK15000 and above	5 inches	24 Mp	Design	11
Huawei	2 gb	3300 mAH	Less than TK15000	5 inches	16 MP	Design	12
Symphony	2 gb	3000 mAH	Less than TK15000	5 inches	24 MP	Design	13
Huawei	4 gb	3000 mAH	Less than TK15000	6 inches	24 MP	Design	14
Symphony	2 gb	3000 mAH	TK15000 and above	4.5 inches	16 MP	Design	15
Huawei	2 gb	4000 mAH	TK15000 and above	4.5 inches	24 MP	Design	16

Formation of factorial design

Respondents were asked to assign ranks for the given set of combinations marked in terms of 16 cards. The following table displays the attributes and levels of those 16 cards.

Table 3 : Factorial Design for Generating Cards

Cards	Attributes and levels for the 16 cards					
	Brand	RAM	Battery	Price	Display	Camera
1	2	1	2	2	3	1
2	1	2	2	1	1	2
3	1	1	1	1	1	1
4	4	3	2	2	1	2
5	3	2	1	2	1	1
6	2	1	3	1	1	2
7	1	1	1	2	3	2
8	2	3	1	1	1	1
9	1	3	3	2	2	1
10	4	2	3	1	3	1
11	2	2	1	2	2	2
12	3	1	2	1	2	1
13	4	1	1	1	2	2
14	3	3	1	1	3	2
15	4	1	1	2	1	1
16	3	1	3	2	1	2

Data were collected from the students of Chittagong University. A total of 420 respondents are taken purposively to conduct our study. The survey was conducted from May 2019 to December 2019. Analysis was done in February 2020. At first a questionnaire is drafted on the light of objective of the study and verified responses by pre-testing of questionnaire. Then the questionnaire is finalized and printed. Consequently, each respondent was asked to rank 16 alternatives. The data analysis was performed using SPSS version 25.

Results and discussion

Table 4 : Utilities and Standard Errors of Attributes and Levels

Utilities			
		Utility Estimate	Std. Error
Brand	Samsung	-.674	.113
	MI	-1.349	.226
	Huawei	-2.023	.340
	Symphony	-2.698	.453
RAM	2 gb	1.171	.153
	3 gb	2.343	.305
	4 gb	3.514	.458
Battery	3000 mAH	.299	.153
	3300 mAH	.598	.305
	4000 mAH	.897	.458
Price	Less than TK15000	-.361	.253
	TK15000 and above	-.723	.506
Display	4.5 inches	.321	.153
	5 inches	.642	.305
	6 inches	.963	.458
Camera	16 MP	1.466	.253
	24 MP	2.932	.506
(Constant)		5.394	.774

The above table demonstrates the utility scores along with the standard errors for each factor level. As expected, preference is greater when the utility is observed to be higher.

Table 5 : Calculation of Total Utility for Each Combination

Combination	Calculation	Total Utility
1	(-1.349)+1.171+0.598+(-0.723)+ (0.963)+1.466+5.394	7.520
2	(-0.674)+2.343+0.598+(-0.361)+ (0.321)+2.932+5.394	10.553
3	(-0.674) +1.171+0.299+(-0.361) + (0.321) +1.466+5.394	7.616
4	(-2.698)+3.514+0.598+(-0.723) + (0.321) +2.932+5.394	9.338
5	(-2.023) +2.343+0.299+(-0.723) + (0.321) +1.466+5.394	7.077
6	(-1.349)+ 1.171+0.897+(-0.361) + (0.321) +2.932+5.394	9.005
7	(-0.674) +1.171+0.299+(-0.723) + (0.963) +2.932+5.394	9.362
8	(-1.349)+ 3.514+0.299+(-0.361) + (0.321) +1.466+5.394	9.284
9	(-0.674) +3.514+0.897+(-0.723)+ (0.642) +1.466+5.394	10.516
10	(-2.698) +2.343+0.897+(-0.361) + (0.963) +1.466+5.394	8.004
11	(-1.349)+ 2.343+0.299+(-0.723) + (0.642) +2.932+5.394	9.538
12	(-2.023) +1.171+0.598+(-0.361) + (0.642) +1.466+5.394	6.887
13	(-2.698) +1.171+0.299+(-0.361) + (0.642) +2.932+5.394	7.379
14	(-2.023) +3.514+0.299+(-0.361) + (0.963) +2.932+5.394	10.718
15	(-2.698) +1.171+0.299+(-0.723) + (0.321) +1.466+5.394	5.230
16	(-2.023) +1.171+0.897+(-0.723) + (0.321) +2.932+5.394	7.969

The above table shows that combination no. 14 gives the most utility which is followed by combination no. 2. If we go in same way we find that the least utility is observed for the combination no. 15.

Table 6: Relative Importance of Attributes

Attribute	Level	Utility Estimate	Standard Error	Relative Importance(%)	Ranking
Brand	Samsung	-.674	.113	27.22	2
	MI	-1.349	.226		
	Huawei	-2.023	.340		
	Symphony	-2.698	.453		
RAM	2 gb	1.171	.153	31.51	1
	3 gb	2.343	.305		
	4 gb	3.514	.458		
Battery	3000 mAH	.299	.153	8.04	5
	3300 mAH	.598	.305		
	4000 mAH	.897	.458		
Price	Less than TK15000	-.361	.253	4.87	6
	TK15000 and above	-.723	.506		
Display	4.5 inches	.321	.153	8.64	4
	5 inches	.642	.305		

Camera	6 inches	.963	.458	19.72	3
	16 MP	1.466	.253		
	24 MP	2.932	.506		
(Constant)		5.394	.774		

The ranges of the utility values (highest to lowest) for each factor provides a measure of how important the factor was to overall preference. Factor with the greater utility ranges play a more significant role than those with smaller ranges. In the study, with a relative importance score 31.51 RAM is the most important factor in the choice of mobile phone. Brand which has a relative importance value of 27.22 is the second most important factor. Camera is the third most important factor with a relative importance score 19.72. The fourth most important factor is display with relative importance score 8.64. Battery and price are the fifth and sixth important factor with relative importance score 8.04 and 4.87 respectively in the choice of mobile phone. That is, RAM plays the most significant role and price plays the least significant role in the choice of a mobile phone.

Conclusion

The study aims to explore the underlying relative importance of the different attributes while purchasing mobile phone by the students of the university. Some of the factors contribute high and some depict low impact on the purchase choice of the customers. Three features of mobile phone stand out as motivator of preference/choice behavior among the students of Chittagong University: RAM, brand and camera. Among the attributes, RAM is observed to be the most preferential which is followed by brand and then camera. The least preferential attribute is found to be price in purchasing decision of mobile phone among the students of university. This study possesses superiority over other similar studies in the sense that a student at the public university with limited money at hand can get maximum satisfaction through the choice of attributes as per his/her desire. This study of conjoint analysis opens the avenues of identifying leading attributes in purchasing mobile devices for the daily usages.

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