Consumer Buying Behaviour – An Empirical Study on Laptop Purchase

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Abstract—This paper aims to study consumer behaviour while purchasing a laptop and analyze the role played by utility on people's choices. In our experiment we ask participants to rate certain laptop features on a scale of 1 to 4 to analyze which features are considered important by different participants. We try to find relationships such as relationship between the age of the participants and a particular feature and also check if the participants make irrational choices. In our experiment we also give some nudges to the participants based on which their decision to buy a particular laptop can change. We analyze here the effect of factors like influence of friends and families, brand consciousness, importance of price and offers.

Index Terms—consumer behaviour, dual process theory, decision making, utility, attribute non-attendance

I. Introduction

Consumer refers to an individual or a group of individuals who select, purchase, use and dispose of goods and services for personal consumption. The study of these individuals or group of individuals is called Consumer Behaviour. It is the study of how people make decisions about what they buy, want, need, or act in regards to a product, service, or company. It attempts to understand the buyer decision making process both individually and in groups and it also involves studying how external factors, for example the influence of friends, family, celebrities and the media, affect the consumer's decision making process. It is crucial for any successful business to understand the consumer behaviour and develop effective marketing strategies in order to be able to market their products and services effectively.

Over the years, researchers have tried to understand how the brain is involved in decision making process and considers various sources of information before making a particular decision. Our brain is wired in a very complicated way internally and is connected to every part of our body. Studies have shown that the brain can recognize objects such as a person or a tree in a fraction of a second, however, acting on this information often takes a longer time. Similarly even though there are a large number of neurons working parallely in our brain, it is incapable of performing parallel calculations or even a single arithmetic calculation that requires multiple steps unlike a computer. While the exact reason for why brain acts so slowly considering its potential computation power is not known to researchers, what is known is that the brain is constantly receiving signals from different parts of the body and different parts of the brain are involved in making decisions constantly based on these signals.

The process of decision making inside our brains can be thought of as a court trial where different types of stimuli such as sight, sound, taste, smell and touch are stored as sensory evidence in the sensory circuits of the brain. The rest of the brain cells act like the jury and compile and weigh every piece of sensory evidence. When the accumulated evidence crosses a certain threshold value a decision is made.

A. Dual Process Theory

In dual process theory, there are two type of cognitive processes : Type-1 which is more intuitive and Type-2 which is more deliberate or analytical. In Type-1 processes, the processing is faster and spontaneous in nature where people make decisions based on their 'gut feeling' with some level of confidence. On the contrary processing in Type-2 processes is slow and time consuming and requires what researchers call "hypothetical thinking". Here, people put more thoughts while making the decision and consider how the decision will affect them in the future [5]. Type-1 processes are more likely to be used when the decision is simple and the consequences are not severe. When the consequences are severe, people tend to use the Type-2 decision making process more. Type-1 processes are also more likely to be used when the decision is made under time pressure or when the decision is made in a group whereas Type-2 processes are more likely to be used when the decision is made under low time pressure or when the decision is made individually [3].

Some researchers also describe the Type-1 and Type-2 processes as "Emotional" and "Rational" respectively. However, it is important to note that the Type-1 and Type-2 processes are not mutually exclusive and both processes are used simultaneously in the decision making process. For example, when a person is deciding whether to buy a new car, the Type-1 process will be used to decide whether the person likes the car or not and the Type-2 process will be used to decide whether the person can afford the car or not.

B. Do people always think rationally?

Research has found that our brain processes about 70,000 thoughts in a day and most of these thoughts are not even conscious because our brain thinks even while we sleep. This

means that most of the time, we are not even aware of the thoughts that are going through our mind. As a result people end up making most of their decisions in a day based on their emotions or when they are not even conscious which may not be rational as they are driven by emotions and by deep, analytical thinking. For example the decision to buy a pack of pop-corns in the intermission of a movie in a cinema hall may not make sense rationally as they are way more costly than the ones available outside. Yet people get driven by their emotions and instinctively buy them even if they are not hungry. Research has also shown that in a given day people use the Type-1 process more than Type-2 process to make decisions and consequently make many decisions that are not rational [4].

II. METHODOLOGY

For our experiment we created an anonymous Google Form in which we collected responses from people regarding their choices while purchasing a laptop.

A. Participants

We collected responses from 58 participants from college and high school students in the age group 14-21 years.
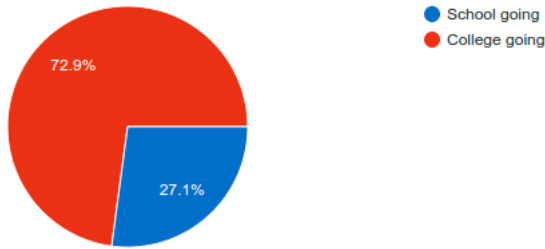

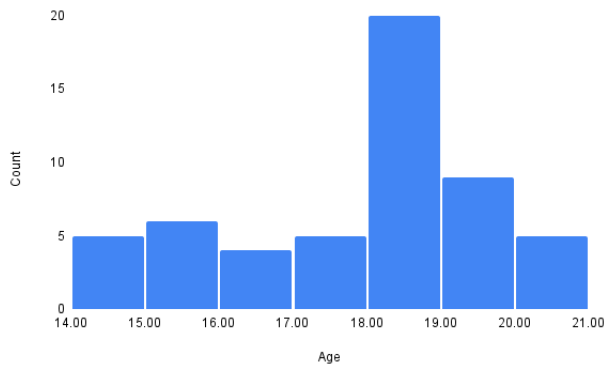Fig. 1. Educational Status of participants

Fig. 2. Age of participants

B. Design of the experiment and Questionnaire

In our experiment we study consumer behaviour of the participants for purchasing laptops. In section-A we ask participants to rate different features of a laptop on a scale from 1-4 based on how much importance they give to a particular feature with a rating of 1 meaning that the feature is not at all important, and a rating of 4 meaning that the feature is of utmost importance while purchasing a laptop.

In section-B of the experiment we give a scenario to the participants where they have liked a particular laptop that has the best combination of all the features according to them. Then they are given a few extra pieces of information and based on each piece of information their decision of whether to buy the current laptop can swing between three states : willing to buy the laptop, unwilling to buy the laptop and neutral/unsure. The link to our form can be found here

From the data collected above we analyse how different participants give different weight-ages to different features, how the extra pieces of information given in section-B change their decisions and whether people make choices that are contradictory.

C. Data Analysis Method

The raw data was first cleaned by removing the outliers. Upon manually checking the responses, we observed that there were 2 responses where an absurd age was entered. Besides that we also used the analyze tool of Microsoft Excel in removing the outliers. For the analysis of the data recorded in the part A we used the following methods:

- We used the Chi-Square test to test the whether we have a relationship between a particular feature and the age of the participant. To perform the test we calculated the expected value for each cell and then applied the 'CHISQ.TEST()' function in Excel
- The other major analysis tool was factor analysis. for which we used the 'XLSTAT' extension. Factor analysis helps in dimensionality reductions and helps to capture the latent and observable variables.

For the analysis of the data recorded in the part B we used the mathematical functions in excel to calculate frequency and mean of various states. The graphs and pie chart provided by google forms were used to figure out how the expected utility of the participants changed with the change in the information provided to them.

III. RESULTS

A. Chi Square Test

The results of chi square test show that there is no relationship between the age of the participants and the importance they give to a feature. The age groups were (14-16, 17-18, 19-21) and the screenshot shows the **p value** for Chi Square Test applied on age group and their importance towards the color of laptop. The p value greater than 0.05 represent that the decision making is independent of the age group. Chi square test was applied on all features and a similar result was observed.

B. Factor Analysis and Attribute non attendance

Through factor analysis we could identify the features that the people pay more attention to before buying a laptop. Due to cognitive load people ignore certain features.

The correlation matrix is useful to visualize how different factors can be combined together. For example the value in table for variable 1(RAM) and 7 (Processor) have value 0.69 show that they are highly correlated whereas value for variable 3 (screen size) and 7 (Processor) have value -0.143 show that there is minimum correlations.

Variables	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1	1	0.294	-0.078	0.009	0.373	0.047	0.690	0.183	-0.035	-0.073	0.405	0.339	-0.034	0.007
2	0.294	1	0.175	0.096	0.264	0.240	0.306	0.153	-0.029	0.087	0.384	0.352	0.345	-0.007
3	-0.078	0.175	1	0.331	0.033	-0.068	-0.143	0.346	0.245	0.126	0.188	0.313	0.310	0.181
4	0.009	0.096	0.331	1	-0.020	0.270	0.076	0.215	0.241	0.086	0.492	0.146	0.446	0.494
5	0.373	0.264	0.033	-0.020	1	-0.027	0.423	-0.008	0.008	0.105	0.107	0.163	0.081	0.005
6	0.047	0.240	-0.068	0.270	-0.027	1	0.136	0.020	-0.058	0.113	0.150	0.062	0.125	-0.030
7	0.690	0.306	-0.143	0.076	0.423	0.136	1	0.168	0.017	-0.113	0.306	0.303	-0.099	-0.096
8	0.183	0.153	0.346	0.215	-0.008	0.020	0.168	1	0.286	0.035	0.295	0.210	0.323	0.367
9	-0.035	-0.029	0.245	0.241	0.008	-0.058	0.017	0.286	1	0.208	-0.055	0.089	0.233	0.372
10	-0.073	0.087	0.126	0.086	0.105	0.113	-0.113	0.035	0.208	1	0.285	0.244	0.164	0.105
11	0.405	0.384	0.188	0.492	0.107	0.150	0.306	0.295	-0.055	0.285	1	0.327	0.277	0.280
12	0.339	0.352	0.313	0.146	0.163	0.062	0.303	0.210	0.089	0.244	0.327	1	0.185	-0.038
13	-0.034	0.345	0.310	0.446	0.081	0.125	-0.099	0.323	0.233	0.164	0.277	0.185	1	0.515
14	0.007	-0.007	0.181	0.494	0.005	-0.030	-0.096	0.367	0.372	0.105	0.280	-0.038	0.515	1

Fig. 5. Correlation Matrix where feature 1 is RAM, feature 2 is secondary storage, and similarly other features are in the same order as in fig 4

Through factor analysis and PCA we could reduce the dimensionality, it was observed that first 2 factor loadings capture 35% of the variance.

Column1	F1	F2	F3	F4	F5	F6	F7	F8	F9
Eigenvalue	2.922	2.004	1.058	0.693	0.643	0.331	0.271	0.146	0.023
Variability (%)	20.874	14.317	7.560	4.947	4.589	2.362	1.936	1.040	0.163
Cumulative %	20.874	35.191	42.750	47.698	52.287	54.649	56.585	57.625	57.788

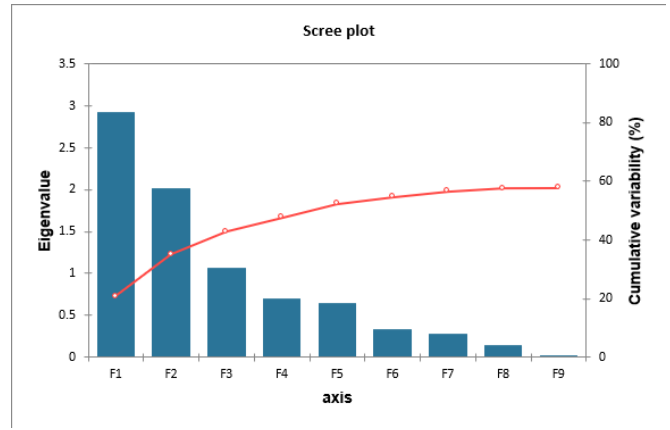Fig. 6. Table showing the variance captured by factors

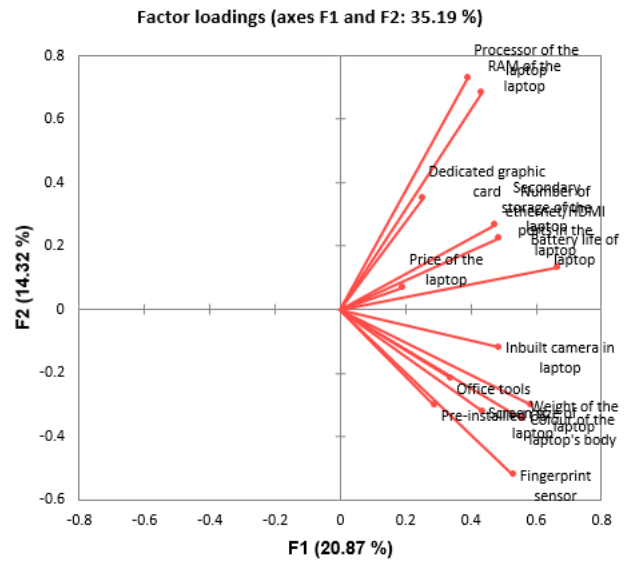Fig. 7. Graph depicting the variance captured by factors

Fig. 8. Graph depicting how the factors will be distributed if the data is reduced to 2 dimension

C. Dual Process Theory

Through the analysis we got to know that there are 15 participants (25.6%) that have never decided to buy the laptop. i.e. they are either in neutral or in not buying stage. Whereas there are only 2 participants (3.4%) that have never gone to not buying stage. 41 participants (71%) are constantly changing their states. These are the ones who are constantly thinking about their choice whereas the others have made up their mind and are taking impulsive decisions.

There are participants who are unaware about the features they must look into. 55.9% participants like to play video games but still 15% of those participants have given a rating of 2 or less to the dedicated graphic card feature. Moreover 46.8% of the same participants want a good battery life which is highly difficult to get in a gaming laptop.

D. Influence of Friends and family

Participants are more influenced by the information provided to them by their friends than their family members, in this case their uncle. In the friend's case, he advises not to buy the laptop because his laptop got hanged within a few months. This is very subjective and varies from person to person and could be because they accidentally got a defective piece. However, we still observe that close to 56% of the participants answered "No" when asked if they would still buy the laptop. This could be attributed to the fact that since the information is coming from a person who they trust and is from the same age group as them, it is more likely to influence them. Thus framing is a very important factor in decision making.
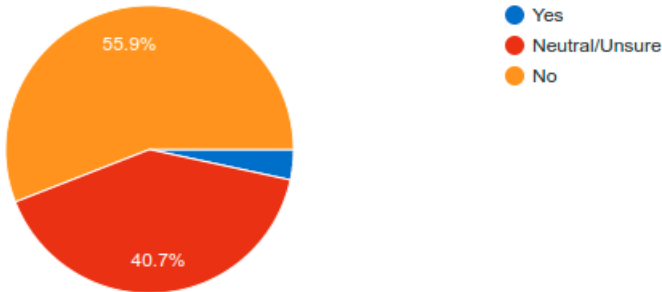

Fig. 11. 49.2% participants are ready to wait for a bigger brand to launch the laptop

Fig. 9. Influence of friend's advice

Fig. 12. 42.4% participants are ready to buy a lesser known brand to get a cheaper laptop even though they have to travel 15km

only 20.3% participants are ready to buy the laptop right now. Thus people have different utility functions. Some people are more concerned about the price and some are more concerned about the waiting period. Overall we see that people are more price conscious as they are willing to wait for the sale to buy the laptop.
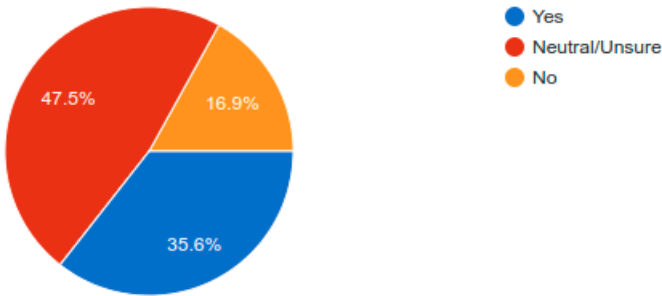

Fig. 10. Influence of uncle's advice

E. Brand Consciousness

There are 49.2% participants that are brand conscious. After being provided a more famous brand they are ready to wait for a longer period of time even though the price hasn't been specified. 42.4% participants were ready to buy a lesser known brand even though they would have to travel 15Km to get a cheaper Laptop. Thus people have different priorities and utilities, some people are more brand conscious while others are less conscious about brand and more concerned about the price even if they have to travel a significant distance.

F. Waiting Period V/s Price

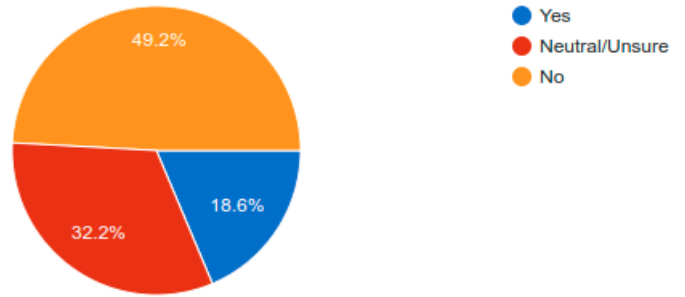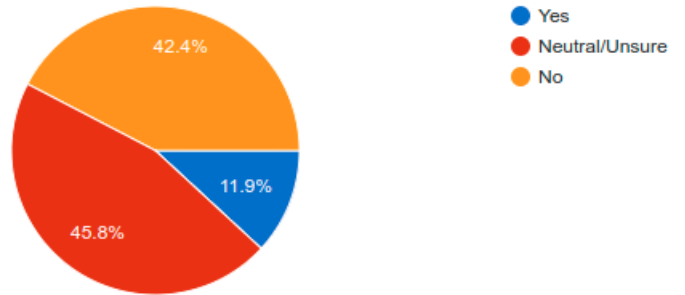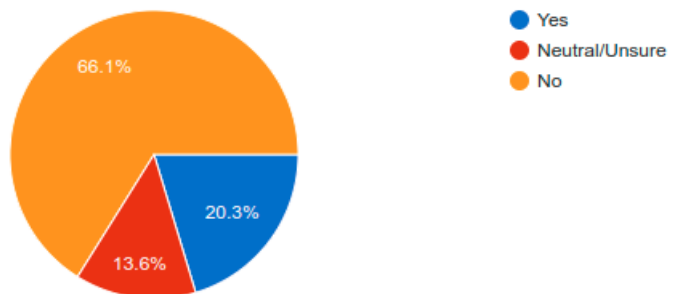There are 66.6% participants that are ready to wait for a longer period of time to avail the festival discount whereas

Fig. 13. one-third of the participants are ready to wait for the festival sale

G. Non Decisive factors

Many nudge questions were not able to change participants' previous decision. This is because the participants were already in a state of mind and the nudge questions were not able to change their state. These questions were

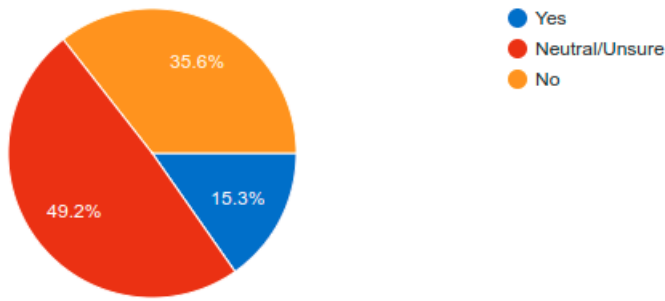- Related to online rating where 49.2% people were neutral

Fig. 14. Influence of rating participants were shown a screenshot from a trustworthy website where number of 5 stars were 40, 4 stars were 20, 3 stars were 8, 2 stars were 12 and 1 star was 20
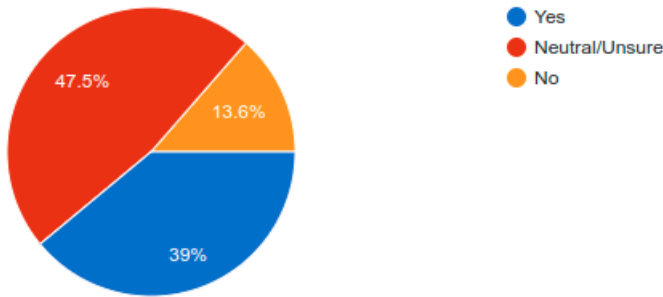

Fig. 15. Graph showing the response of participants when they were told that service center is near their place
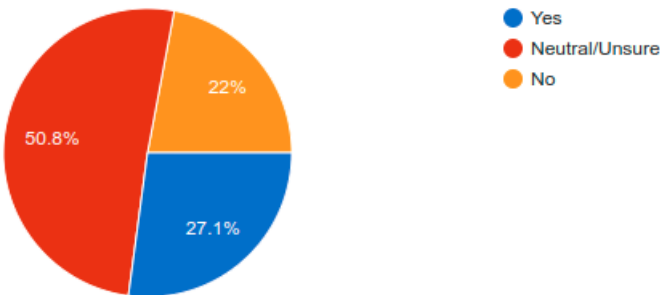

Fig. 16. Graph showing the response of participants when they were told that the warranty of the device is 6 months (usually these devices come with 1 year warranty).

- Proximity of service center where 47.5% people were neutral
- Opinion of uncle where 47.5% people were neutral
- Warranty of the laptop where 50.8% people were neutral

H. Difference over time

We compared our findings with the other work [1] [2] published online. Few differences were observed :-
- The importance of secondary storage have increased
- The influence of festive offers have increased

IV. CONCLUSION

In section-A we find that there is no relationship between age and laptop features. We find that RAM, secondary storage and price are the top 3 factors that have highest utility for people while features like Office tools, inbuilt camera and fingerprint sensor have the least amount of utility for the participants. The data was reduced by applying PCA and the top two factors captured 35% of the variance in the data.

In section-B we see that the influence of friends is slightly greater than that of a family member while purchasing a laptop. As expected, most of the people are willing to delay their purchase of laptop until the festival sale. Surprisingly, vicinity of the service center did not turn out to be very decisive factor in influencing people's choices. When participants were asked if they were willing to buy the current laptop if a well-known brand will release its laptop after two months, about half the people responded with a "No" which is expected as for an item as important as a laptop, people are generally brand conscious. However, surprisingly, it turned out that a large number of people were ready to choose a less famous brand for buying a cheaper laptop even if they had to travel a significant distance to reach the company's showroom indicating that people may not always be brand conscious particularly if they want something cheaper and don't want to wait for long.

V. LIMITATIONS

The sample space is not skew, age group taken for the purpose of data collection lie between 14-21 (most people are from the college itself) and as a result a major portion of people who buy laptops are not included. The number of questions also were reduced because no monetary compensation could be made thus reducing number of pivot points. Choices taken in the experiment may be different from the choices taken in reality, because in the experiment it is a virtual world where we are creating situations for participants and they just have to think not buy instantaneously. The experiment is incapable of handling the situation where there is an urgency.

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