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Smartwatch in Digital Times

Analysis of Smartwatch's market trend

Group 1

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Executive Summary

This research is based on the survey conducted on 211 students of Syracuse University. Our research group created a survey based on the attributes which a customer calculates when purchasing a product. The survey was designed to collect data based on aesthetics, demographic, technological and economic opinions.

Our research group circulated the survey via e-mail with the help of Syracuse University's administration. The survey was distributed to students having different socioeconomic background and discipline to obtain a more wide-ranging dataset. The survey was designed on Qualtrics and distributed electronically enabling us to collect data from students living on and off campus.

The data from the survey was assembled in Excel for further analysis. We studied the general structural properties for our dataset and with the help of pivot table and plots, observed some nominal data. We used Principal Component Analysis and Clustering to get trends and linear combinations. Based on the data analysis, we provide inferences and recommendations.

Introduction

With a few clicks and rotation of a button, we can now access our e-mails, track our activities, listen to music and even check heart rate. A smartwatch is as functional as our smartphone with the added advantage of being a fitness tracker. According to market research, 1 in 10 American will have a smartwatch in 2019 thanks to their LTE connectivity and new health features.

The following research study was conducted to analyze the factors leading to the growing popularity of smartwatches. Our research with the help from Syracuse Administration circulated the survey built on Qualtrics. Through sending out an electronic survey, we were able to collect data from 211 students from different courses and socioeconomic backgrounds. The survey was carefully designed by dividing it into sections focusing on demographics, technological features, physical features and socio-economic status of the individuals.

Based on the data collected, we divided it based on gender, ownership of the products and its utilities to name a few. The descriptive analysis helped us to visualize customer's expectations and demands from the product. Principal Component Analysis enabled us to choose the number of factors we further used for dividing the data into clusters. PCA tabulated factors which play a crucial role in a customer's decision. Clustering followed by PCA enabled us to understand expectations from a product better while also providing an insight into factors which could be worked upon to meet the demands.

Sampling Technique

Dataset Characteristics:

The data that we examined was limited to Syracuse University's students. Syracuse University's total enrollment for fall 2017 was 22,484, including both full- and part-time students in undergraduate, graduate, and law programs. The current gender distribution is 47.5% Male and 52.5% Females.
*Enrollment and Demographic data obtained from the Syracuse website at 'About SU.'

Technique: Surveys were distributed electronically via e-mails. The aim was to collect an extensive, varied data ranging from multiple age groups and course works.

Weaknesses: The survey consists of data from individuals who filled out the survey. It has no data about the individuals who could be using our product but didn't fill the survey.

For obtaining better results, the research team would modify its approach in collecting data from Syracuse students. We would make the survey more appealing to our audience to collect more extensive data. The strategy should also consider the proportion who may not be using the product and how can we accommodate their opinions in the survey as well.

Measurement

The survey questionnaire consisted of a homogeneous mix of open-ended, multiple choice, dichotomous and Likert-type scale questions. The questions were designed taking into consideration demographic variables such as age, socioeconomic status, interest, product usage information, product expectation. The different section of the survey consisted of:

- The demographic section was designed to gather necessary information such as gender, age, Media interaction, smartphone, and laptop ownership. This section consisted of multiple choice or short answers to understand how customers learn about new products.
- The second determines the interest of people in and their opinions. All questions in this section are itemized rating scale. There are five scales for each question. One being the lowest rating which refers to "not interested at all" and "5" the highest rating suggesting customers are "very interested."
- The third section is about product usage, product and brand loyalty — questions designed to calculate the frequency of wristwatch usage, ownership, the brand name and the activities where the product gets utilized. Multiple choices and are nominal and ordinal measurements.
- The fourth part presents a set of multiple choice questions to determine product expectation. These questions were built to understand better how the product is relevant and its shortcoming. It also takes into consideration a customer's price sensitivity.
- The last section included a set of 16 hypothetical smartwatches which differed from each other in brand names, battery life, casing, and price. It is a rating scale question (1(most likes) -16(least like)) to determine which combinations are chosen by the majority.

The results were assimilated in Excel. Our team used Excel to analyze the data using pivot tables and chart. The results are found in the Data Analysis section below.

Data Analysis

Aggregate Results: This section observes the means, standard deviations and counts of the various responses received through the survey. The means provide an overview of the variable's values while standard deviations give us an estimate of how spread is a variable. A complete list of these results for each variable is available in the excel sheet. Listing some of the variables below:

| Variables	Mean	Standard Deviation	Comments
Duration (in seconds)	267.36	159.6370577	
Latitude	37.46465851	4.522414603	
Longitude	-92.66832977	15.32735697	
Age Groups	4.02	1.285555546	26-35

Data Visualization: The results below analyze the data collected through the survey. The plots help determines the demographic characteristics of the students, product characteristics and their ratings.
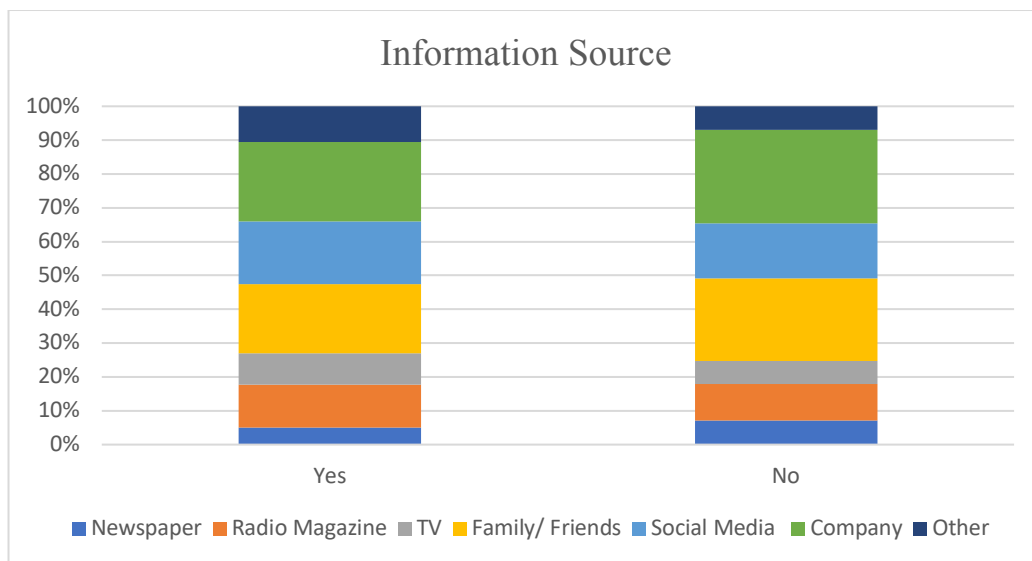
1. Smart Phone Ownership

Smart Phone Ownership

■ Yes ■ No

50, 24%

161, 76%
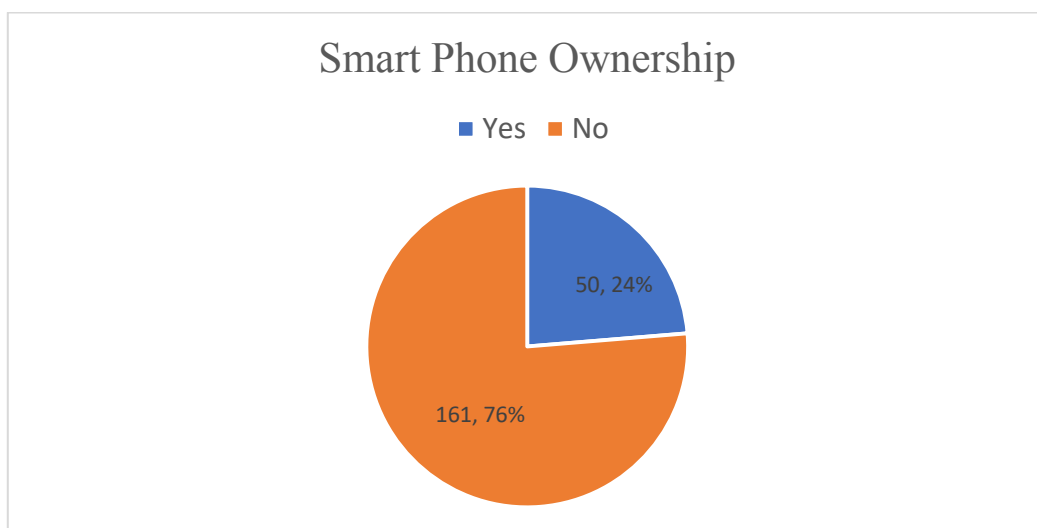
Ownership	Count
Yes	50
No	161

2. Smart Phone Ownership based on gender

Smart Phone Ownership by Gender
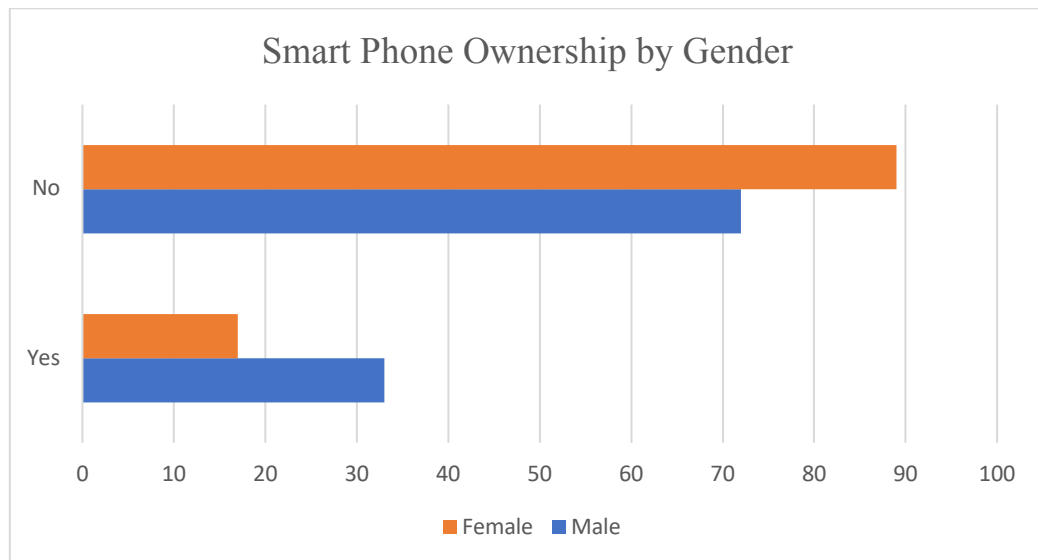
Gender	Yes	No
Male	33	72
Female	17	89

3. Different information sources for marketing new products

Information Source

Information Source	Yes	No
Newspaper	7	27
Radio Magazine	18	40
TV	13	26
Family/ Friends	29	91
Social Media	26	61
Company	33	104
Other	15	26

4. Distribution of customers based on the smartphone and previous smartwatch ownership

Phone Brand	Previous Watch brand								
	Apple	Casio	Fitbit	Garmin	Huawei	Nike	Other	Samsung	Grand Total
Apple	16		2				1	1	20
Good					1				1
HTC								1	1
Huawei	1								1
LG			1			2	1	1	5
Mi	1								1
Samsung		1	2	2		1	1	4	11
Unkown	2	1	1	2				1	7
ZTE		1	1					1	3

5. Distribution of customers based on the smartphone and present smart watch ownership

Present Phone Brand	Present Watch Band						
	Apple	Fitbit	Huawei	LG	Other	Samsung	Grand Total
Apple	12	1			6	1	20
Good	1						1
HTC						1	1
Huawei			1				1
LG		1		1	2	1	5
Mi	1						1
Samsung	1	1		1	7	1	11
Unknown	1	2			2	2	7
ZTE		1		1		1	3
Grand Total	16	6	1	3	17	7	50

6. Distribution of customers based on the present and previous smartwatch ownership

Previous Watch Brand	Present Watch Brand						
	Apple	Fitbit	Huawei	LG	Other	Samsung	Grand Total
Apple	13	1	1		5		20
Casio	1	1		1			3
Fitbit	1	3			3		7
Garmin					3	1	4
Huawei	1						1
Nike		1		1	1		3
Other					3		3
Samsung				1	2	6	9

7. Activities individuals prefer to perform in spare time
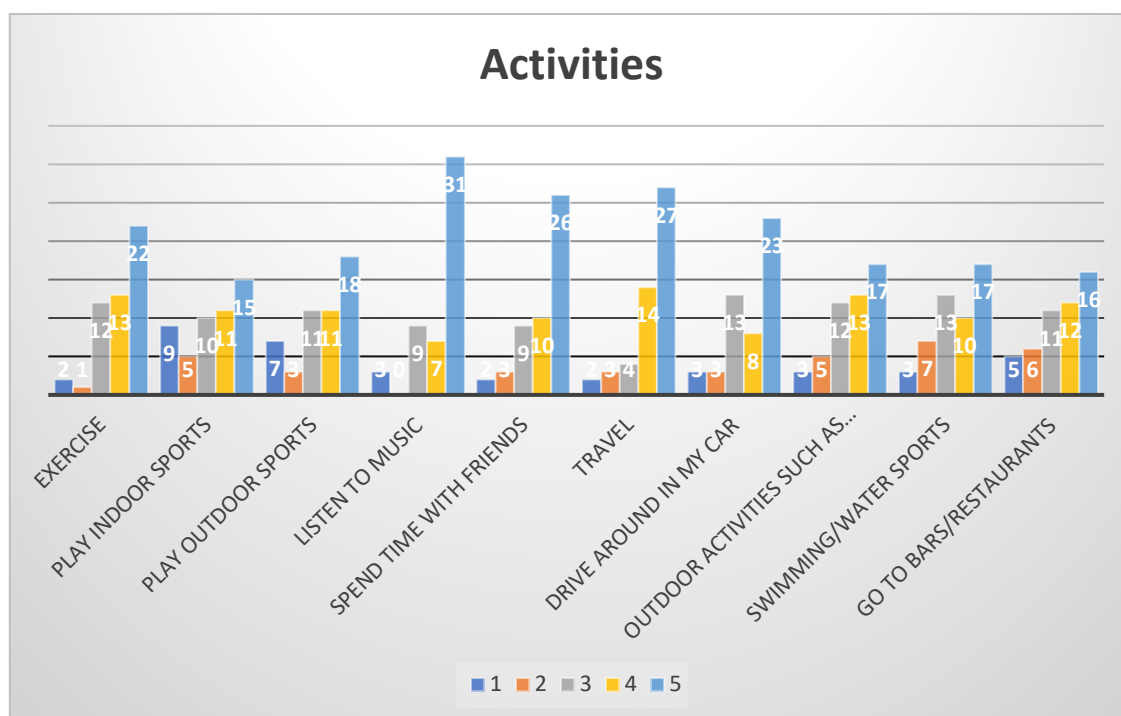
Activities in Spare time	1	2	3	4	5
Exercise	2	1	12	13	22
Play indoor sports	9	5	10	11	15
Play outdoor sports	7	3	11	11	18
Listen to music	3	0	9	7	31
Spend time with friends	2	3	9	10	26
Travel	2	3	4	14	27
Drive around in my car	3	3	13	8	23
Outdoor activities such as hiking or rock climbing	3	5	12	13	17
Swimming/water sports	3	7	13	10	17
Go to bars/restaurants	5	6	11	12	16

8. Advertising and Sale patterns through likert-questions

Opinions about product advertising and sale
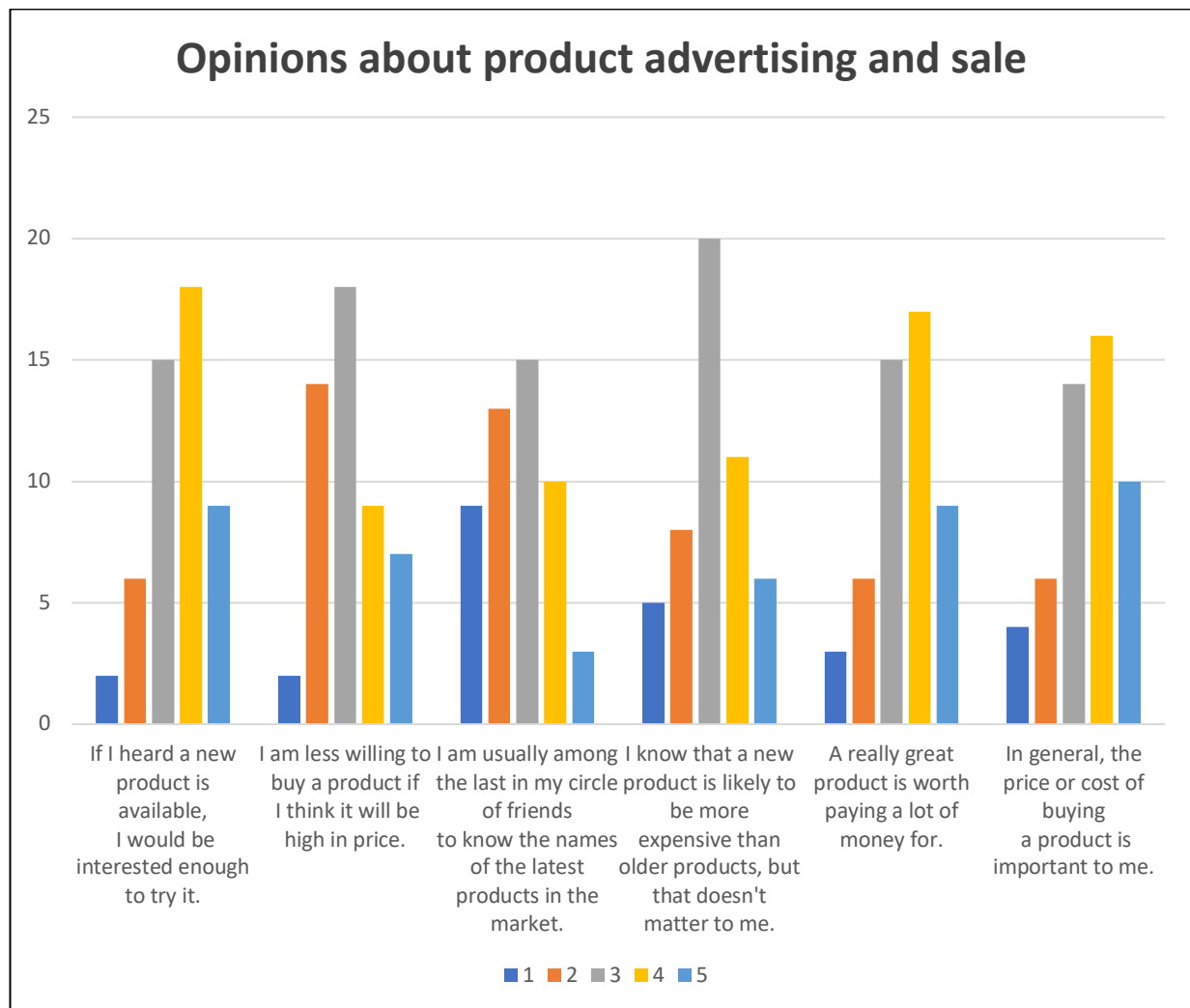
Questions	1	2	3	4	5
If I heard a new product is available, I would be interested enough to try it.	2	6	15	18	9
I am less willing to buy a product if I think it will be high in price.	2	14	18	9	7
I am usually among the last in my circle of friends to know the names of the latest products in the market.	9	13	15	10	3
I know that a new product is likely to be more expensive than older products, but that doesn't matter to me.	5	8	20	11	6
A really great product is worth paying a lot of money for.	3	6	15	17	9
In general, the price or cost of buying a product is important to me.	4	6	14	16	10

9. Budget Range for the customers
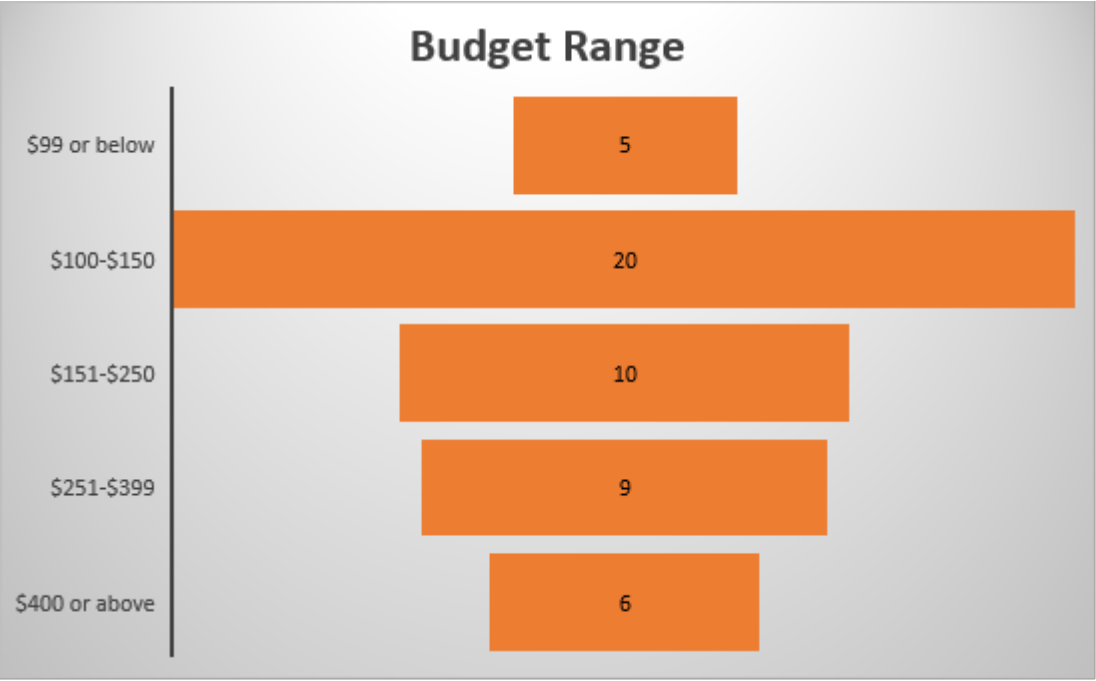
| Amount Range	Count
$99 or below	5
$100-$150	20
$151-$250	10
$251-$399	9
$400 or above	6

<u>Research Questions</u>: Through our survey and descriptive analysis, we propose these research questions. These questions revolve around awareness of customer towards our product of interest, factors taken into account before buying the product, utility of the product and the value for its price. The questions are as follows:

1. Customer Loyalty towards a brand.
2. Physical features of the product that appeal the most to customers
3. Activities performed on/with the product.
4. Product sale based on Age and Gender.
5. Applications offered by the product.
6. The choice of purchasing smartwatch based on gender and age

Analysis

Principal Component Analysis (PCA) is a statistical dimension-reduction tool used on several correlated variables. It reduces the dataset while retaining most of the information. An orthogonal transformation is used to convert the observations into a set of linearly uncorrelated variables called **principal components**.

We used XLSTAT in extension to Microsoft Excel to run PCA on our survey dataset.
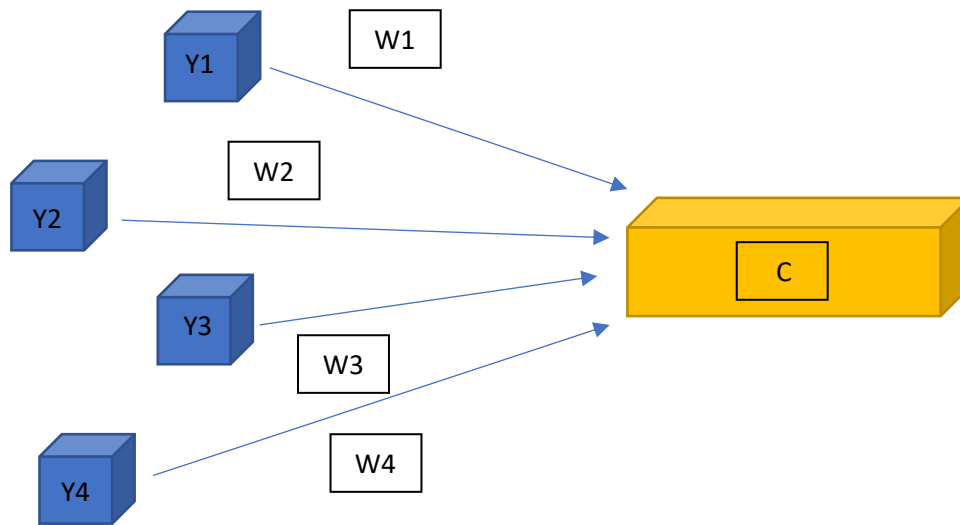
The PCA selects and constructs characteristics that will summarize our product characteristics. It takes into consideration the properties that display variations to produce a better summary. These properties will allow us to reconstruct the original characteristics.

Before executing PCA, we transformed a few columns of our dataset to get a structured dataset. The open-ended questions such as brand names for smartphones, laptops and previously owned laptop were converted into a standard format using the original brand names to simplify our analysis. For example, Apple air mac book, mac book pro was renamed as Apple.

After executing PCA, we narrowed down our observation into five factors and observed which factors influence an individual's decision before and after the purchase. A detailed summary of factors and different variables for them is listed below:

Factor 1:

- Important factors that affect a person's purchasing decision:
    - Positive:
        - Brand name
        - Price
        - Battery life
        - Quality of display
        - Operating system
        - Heart rate monitor
        - Water resistance
        - Wi-Fi connectivity
        - Map/GPS
        - Touchscreen

Factor 2:

- Important factors that affect a person's purchasing decision:
    - Positive:
        - Color
        - App for Payment
- Applications of Smartwatch
    - Positive:
        - Send or receive a message
        - Travel planning
        - Navigation and map
        - Make payments
        - Listen to music
- The Hypothetical smartwatches preferred by most individuals
    - Positive:
        - Fitbit, aluminum, six days of battery life, $200
        - Fitbit, steel, nine days of battery life, $250

Factor 3:

- Information source
    - Positive:
        - Newspapers
        - Radio
        - Magazines
        - TV
        - Social Media
        - Company websites
        - Other's sources – search engines, workplace

- The Hypothetical smartwatches preferred by most individuals
    - Positive:
        - Apple, aluminum, three days of battery life, $300
    - Negative:
        - Samsung, aluminum, 12 days of battery life, $250

Factor 4:

- The Hypothetical smartwatches preferred by most individuals
    - Positive:
        - Garmin, aluminum, nine days battery life, $400
        - Fitbit, plastic, 12 days of battery life, $400
    - Negatives:
        - Apple, ceramic, nine days of battery life, $200
        - Apple, plastic, six days of battery life, $250

Factor 5:

- The Hypothetical smartwatches preferred by most individuals
    - Positive:
        - Samsung, aluminum, 12-day battery life, $250
        - Garmin, plastic, three days battery life, $200
    - Negative:
        - Apple, steel, three days of battery life, $4

K-Means interpretation:

The k-means clustering utilizes an algorithm which splits the dataset into a fixed specified number of clusters where every variable is clustered is divided based on their distance from the nearest mean. It is widely used in market segmentation, geostatistics, and agriculture. Based on the five factors, we created 5 clusters to obtain the following trends in each of them:

Cluster 1:

- The people in Cluster 1 are likely to buy premium smartwatches ($400) with a high battery life lasting for 9 to 12 days while they are more averse to low priced watches in general. This trend suggests that Premium pricing strategies are useful for consumers in this cluster, as a higher price will give the impression that this product is of higher quality.
- These people are moderately interested in the operational capabilities of the smartwatches.
- It is likely that these people gain information about smartwatches from word of mouth rather than conventional media sources.

Cluster 2:

- The people have a strong preference for the features of the product, such as color, sensors, battery, water resistance, etc.
- These consumers value the utility aspects that a smartwatch can provide to their lives such as messaging, payment, navigation/travel, and music, etc.
- As pragmatists, they prefer products that have value for the price they pay. Maximum amounts of features for the lowest price.
- They are most likely to be influenced by word of mouth and their research.
- They also show aversion to premium pricing.

Cluster 3:

- These consumers are merely apathetic towards a smartwatch's physical features.
- They are only slightly interested in the utility values a smartwatch can bring.

Cluster 4:

- These consumers would purchase smartwatches due to influences of advertisements from conventional media, such as magazines, television, and social media.

- The functionality of these smartwatches is the least of their concerns.
- It is possible that these folks wear smartwatches for aesthetic or fashion purposes.
- They are attracted to cheap smartwatches.

Cluster 5:

- These customers are likely to be trapped in what is called "Manipulative Advertising." The chances of these people purchasing an item are higher and are based on the frequency and attractiveness of the advertisement.
- They only purchase premium products of the high price, suggesting a strong financial background.
- Surprisingly, they also value greatly the functionalities a smartwatch can provide.
- The physical features of the watch play a less significant role.

Conclusion and Recommendations

Based on the results of our cluster analysis, we observed that customers weigh functionality and appearance almost equally. The customers are evidently divided based on financial background and purchase or are likely to purchase products which are a projection of the same. Broadly speaking, the smartwatch brands need to have a more diverse selection of products based on not just age or gender but financial status of the customers. Improving the nexus between different complementary products of a brand can increase the customer loyalty.

Through our analysis and discussion, we would like to provide the following recommendations:

- From the distribution of the individuals we see in the "Results by class" table (in the excel file), a significant number of people are allocated to cluster 1, 2 and three while a smaller but yet significant number of individuals are allocated in cluster 4 and 5.

- A smartwatch manufacturer could observe the trends in cluster 1,2,3 and design a premium and a budget line of smartwatches. Similar to the product strategies employed by Apple for their iPhones. The premium line will target cluster 1 and five while the budget line targets cluster 2, 3 and 4.

- To be more specific, the premium line would feature a higher price while including the essential functionalities that a top of the line smartwatch in the market would typically have. Not only they would have to be made out of high-quality materials and design to give off the impression of luxury and high social status, but they will also need to be popular enough that word of mouth alone would be enough for financially strong class.

- On the other hand, the budget line can opt for cooperation campaign with other companies. An example of such cooperation would be to include exclusive applications/software as a bundle. Keeping in mind that the target customers in the budget lines value functionality more than appearances, the smartwatch makers could consider partnering with companies that are related to fitness, sport, and health.

- Another idea would be to establish B2B relationships with other corporation or government agencies, as these organization would value functionality with minimal costs. With B2B cooperation one can assume that the client organization would buy the smartwatches in bulk for their employees. Therefore the manufacturer could employ a lower price per unit as a special offer or incentive for purchase.

- For the premium line, an idea for bundles would be for manufacturers to partner up with luxury car brands such as Bugatti and Ferrari. An example on how the premium watch would fit into the picture would be to include an application or function within the watch that can tie the smartwatches to the luxury cars and serve as car keys or remote control.

- Another possibility for the premium segments would be to manufacture smartwatches that are specifically tailored to the client's profession; these watched would include as software packages that are full of application relevant to the job. For example, a medical professional or surgeon can use a smartwatch to connect to the camera of an endoscope. Alternatively, it can be used to visualize the conditions of a body connected a network of nanites injected into a patient. These highly specialized watches would undoubtedly cost more to manufacture than the budget line. Therefore it would make sense to categorize them as a premium product for niche consumers.