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Module Name	Marketing Analytics
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Hierarchical Clustering Data Preparation for Study Case:

Dataset has three kinds of variables, which are continuous, binary, and categorical variables. To apply hierarchical clustering method, binary and categorical variables must be converted to dummy variables. This step is essential for measuring distance between data points by Euclidean method, in order to, create healthy clusters. Thus, I converted amazon prime, gender, degree, and income variables to dummy variables. Finally, dataset is ready for hierarchical clustering.

Findings:

Number of Segments:

Answer 1: There are two perspectives for answering this question. We can observe from data, there are in general two different segments according to product preferences. However, this segmentation does not answer the question of which kind of people in which segment. In my opinion, describing customer profile of segments also important as much as their product preferences due to marketing purposes such as promotion.

Cluster Dendrogram

dist_final_6
hclust (*, "ward.D2")
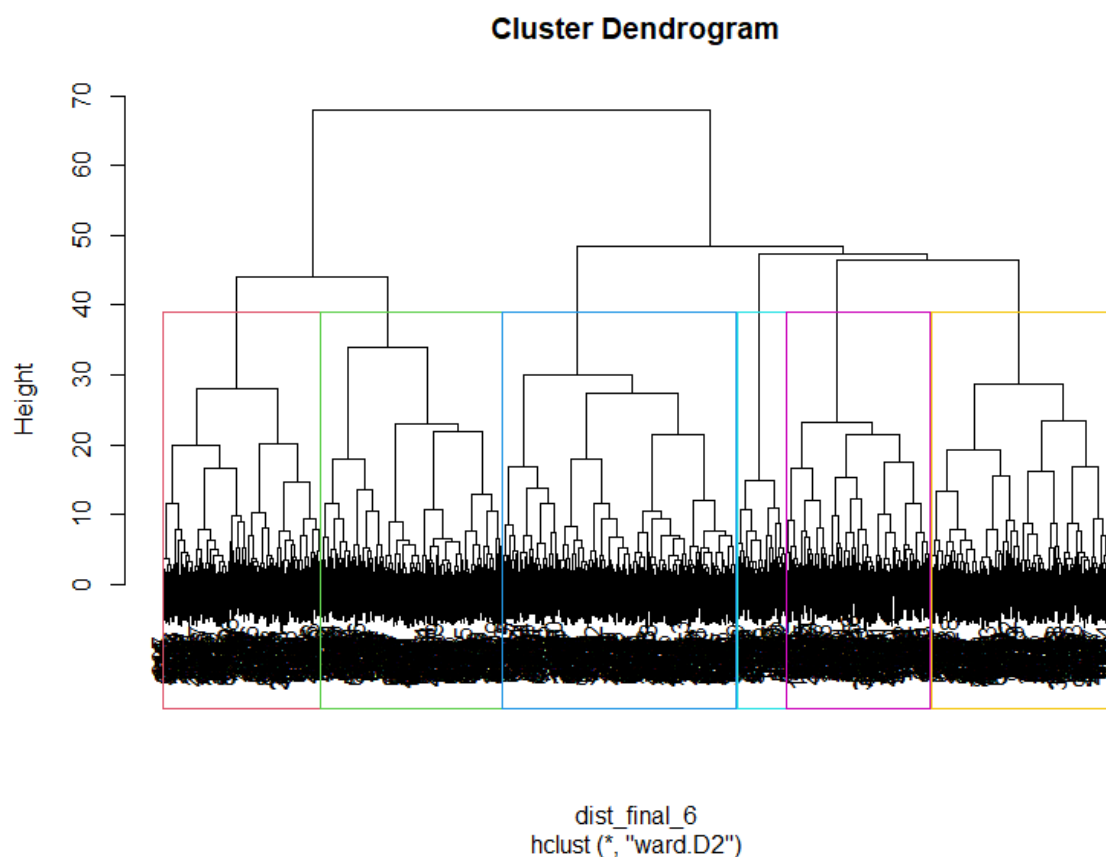
From dendrogram shown above, we can see that 6 cluster is optimal number of clusters for identifying each customer profile effectively. In addition, silhouette plot that shown below also tell us, there is no significant differences in average silhouette width between 6 number of clusters and 7.
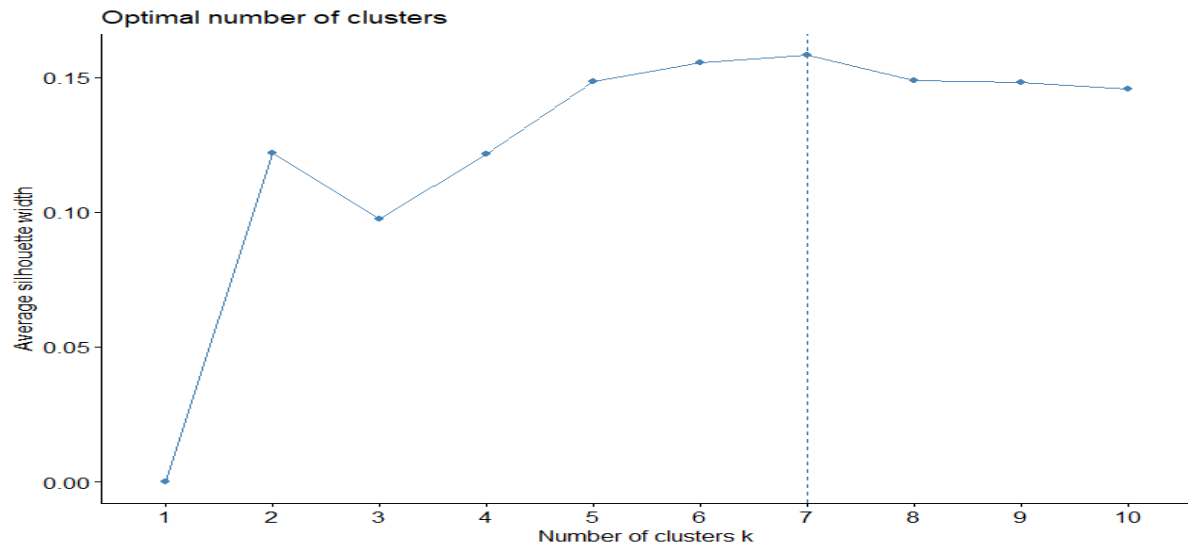
Elbow plot that shown below, suggested 2 clusters rather then 6, Although, second curve in the plot happens in number 6.
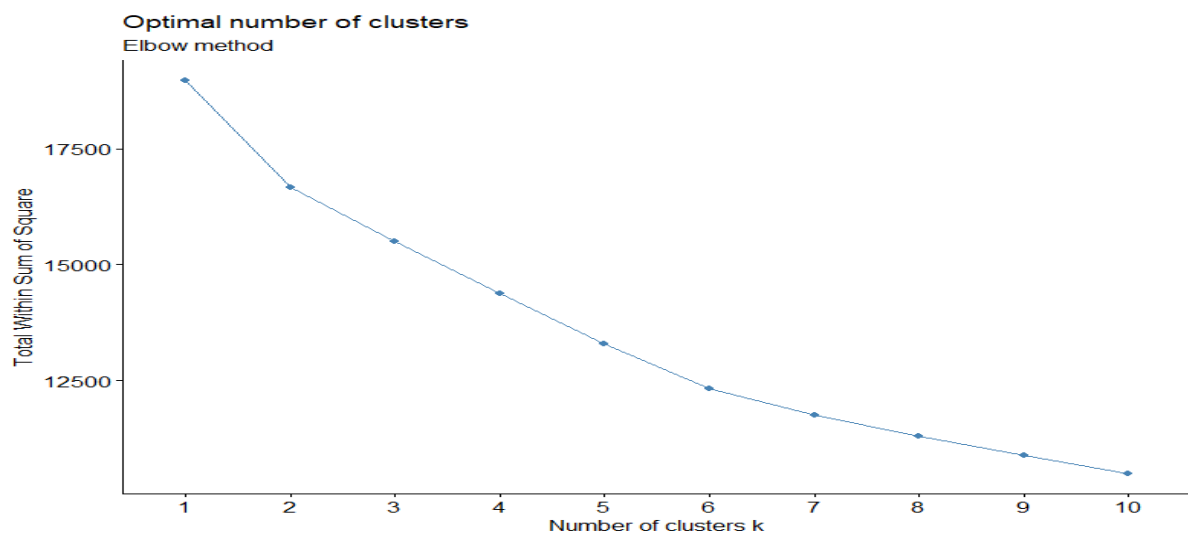
Clustering method has intuitive processes (Bock, 2020). Thus, I tried many iterations and decided number of segments mainly from final tables. In this case, also considering silhouette average width and dendrogram.

cluster	ConstCom_M	TimelyInf_M	TaskMgm_M	DeviceSt_M	Wellness_M	Athlete_M	Style_M	AmznP_0_M	AmznP_1_M	Female_0_M
1	4.174603175	3.936507937	4.100529101	3.17989418	4.116402116	4.037037037	4.08994709	0.650793651	0.349206349	0.37037037
2	5.209580838	4.664670659	5.053892216	4.54491018	5.934131737	4.730538922	5.461077844	0.101796407	0.898203593	0.413173653
3	4.44534413	4.137651822	3.562753036	3.340080972	3.384615385	2.862348178	3.627530364	0.562753036	0.437246964	0.562753036
4	5.317708333	4.770833333	4.65625	4.963541667	5	4.276041667	4.713541667	0.239583333	0.760416667	0.375
5	4.153846154	3.615384615	3.384615385	2.884615385	3.480769231	3.480769231	3.788461538	0.615384615	0.384615385	0.173076923
6	4.549019608	4.189542484	4.058823529	3.607843137	4.058823529	3.607843137	4.026143791	0.516339869	0.483660131	0.490196078

cluster	Female_1_M	Degree_1_M	Degree_2_M	Age_M	Income_1_M	Income_2_M	Income_3_M	Income_4_M	Income_5_M	Percentages
1	0.62962963	0.894179894	0.105820106	34.44444444	0	0.91005291	0.08994709	0	0	18.9
2	0.586826347	0.269461078	0.730538922	32.32934132	0	0.041916168	0.724550898	0.233532934	0	16.7
3	0.437246964	0.75708502	0.24291498	38.82995951	0	0.004048583	0.995951417	0	0	24.7
4	0.625	0.546875	0.453125	33.55729167	0	0	0	0	1	19.2
5	0.826923077	0.807692308	0.192307692	38.98076923	1	0	0	0	0	5.2
6	0.509803922	0.784313725	0.215686275	36.24183007	0	0	0	1	0	15.3

Purpose of marketing segmentation for companies to find possible least number of clusters and distinctive clusters for simplifying operational process. However, If I would choose 5 cluster, algorithm is merging cluster 2 and cluster 4. To create health environment for clear observations between clusters, there are significant differences between these two clusters in further steps of the report.

Describing Segments

Answer 2:

cluster	ConstCom_M	TimelyInf_M	TaskMgm_M	DeviceSt_M	Wellness_M	Athlete_M	Style_M	AmznP_0_M	AmznP_1_M	Female_0_M
1	4.174603175	3.936507937	4.100529101	3.17989418	4.116402116	4.037037037	4.08994709	0.650793651	0.349206349	0.37037037
2	5.209580838	4.664670659	5.053892216	4.54491018	5.934131737	4.730538922	5.461077844	0.101796407	0.898203593	0.413173653
3	4.44534413	4.137651822	3.562753036	3.340080972	3.384615385	2.862348178	3.627530364	0.562753036	0.437246964	0.562753036
4	5.317708333	4.770833333	4.65625	4.963541667	5	4.276041667	4.713541667	0.239583333	0.760416667	0.375
5	4.153846154	3.615384615	3.384615385	2.884615385	3.480769231	3.480769231	3.788461538	0.615384615	0.384615385	0.173076923
6	4.549019608	4.189542484	4.058823529	3.607843137	4.058823529	3.607843137	4.026143791	0.516339869	0.483660131	0.490196078

cluster	Female_1_M	Degree_1_M	Degree_2_M	Age_M	Income_1_M	Income_2_M	Income_3_M	Income_4_M	Income_5_M	Percentages
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4	0.625	0.546875	0.453125	33.55729167	0	0	0	0	1	19.2
5	0.826923077	0.807692308	0.192307692	38.98076923	1	0	0	0	0	5.2
6	0.509803922	0.784313725	0.215686275	36.24183007	0	0	0	1	0	15.3

		Income_1_M	Income_2_M	Income_3_M	Income_4_M	Income_5_M
		Below $40K	$40-70K	71-100K	101-175K	UP$175K

cluster	name of the cluster
1	lower-middle singles
2	plaza runners
3	steady incomers.
4	early winners
5	housewives
6	upper-middle householders

Lower-Middle Singles: This segment occupies 18.9% of the scoped market. First noticeable factor of this segment is that they have higher demand of functionality from a smartwatch rather than upper-middle householder. However, they have relatively less income. This comparison indicates that people who belongs to this segment have less people who dependent to them than upper-middle householders. Customers in this segment are looking for average smartwatch. Only, importance level of durability relatively less than other segments except housewives. 65% of the people do not have Amazon prime. The mean age of this segment increases the chance of people largely single because their preferences superior then people who earns almost twice as themselves. The logic is here they have less expenditure. Although the quality they are looking for not high-end product. Any company who targets middle class, can choose this segment.

Plaza Runners: This segment equal to 16.7% of the market. Plaza runners choose very high-quality smartwatch of the market in every segment. Average age of the segment is 32 and it has highest percentage of people who has finished master program with 73%. This segment has relatively high standards for their income distribution, which it can mean that they have high expectations in their career such as promotions. To maintain this life standard, they must increase their income in the future. Average score of style is highest which is 5.4 out of 7. Thus, appearance valuable for this segment in their social and working environment. This segment has other highest attributes too, which is task management, wellness, and sport tracking features. The reasons of high demands

about these attributes could be that they have long life-expectancy, and they have busy working life. This segment looking for best smartwatch in the market. Any company who has aimed to produce best smartwatch can simply choose this segment. However, 90% members of this cluster have Amazon prime. Thus, companies who have partnership with Amazon prime would be gain big advantage against their/its competitors. Finally, enormous scores of general attributes might be indicated that plaza runners also very close tech-trends followers.

Steady Incomers: The ratio of this segment is 24% of the market. Most noticeable element is that 99% of this segment's members annually earns $71-100K, which is considered middle class. Average age of this segment is 39. If we recall from dataset that min value of age 24 and max value of age 47 this group oldest group with housewives in the scope of the survey. Housewives' percentage on market is %5.2, so steady incomers cluster has majority of old employees of the scoped market. Once we analyse the attributes, rather than other clusters this segment knows what they want from smartwatch, such as constant communication and timely information attributes. Rest of the attributes are in the minimum level for a proper smartwatch. Members of this segment looks like shopping more realistic, which it means they are looking for a product that would not hurt their wallets. One of the main reasons for it could be, on the contrary of plaza runners, steady incomers do not have any expectation for promotion from their managers or employers or they could be small business owner such as neighbourhood grocery store. Any company who targets middle class with mid-quality product can target this segment. This segment is very crucial for companies that target middle class due to its percentages in market.

Early Winners: This segment is consisted by the people who achieved successful career in their early ages. Average age is 32 and all of them belong income 5 level, which it means they earn annually more than $175K. Despite plaza runners, they put less value for some attributes such as task management, wellness, and sport (athlete column) and style features. However, there are not big differences. One of the reasons these preferences could be, member of early winners already have maintained their life standards, thus it is easier to meet their will. To illustrate, plaza runners much more care about well-designed smartwatch, but both segments have same average age. Early winners still want high quality product, however, the difference about customer behaviour with plaza runners, can indicate that well-rounded middle-class product could be purchased by early winners, even though percentages would be quite low. Constant communication, timely information, wellness, style, durability and long lasting of smartwatch attributes are indispensable for early winners.

Housewives: This is very niche segment. It is only 5.2% of the scoped market and it has very strong characteristic features. All the people who earn annually below $40K are in this segment. The reason why I am named this segment as housewives is that 83% of the people in this segment are female and earn very little. This people probably working in part-time jobs, some of the freelance jobs or gig economy and their average age is 38. They probably look after their children and in their free time doing some extra work due to help family budget. Members of this segment looking for average profile smartwatch and durability does not matter for them. It can be good segment for companies who just has entered the market and companies who produces mid-quality products with low cost. Low significance score for durability of product and battery can encourage to focus this segment for new entrants of the market.

Upper-Middle Householders: This segment occupies 15.3% of the scoped market. It watches the trend of lower-middle singles segment, even though upper-middle householders belong 4th income group. The reason could cause this scenario, a lot of people such as family members or relatives could be dependent on these people and this people could have expenditures for themselves far

way less then what they are earning annually. However, indispensable attribute for this segment is ability to display messages and e-mails on smartwatch. This segment is must-gain segment for companies who aims to produce medium and upper-medium quality products.

Market Targeting and Taking Position
Answer 3:

Some features of the Basis Peak version 2016 still have competitive such as battery life. Duffy (2016) emphasises that, Basis Peak version 2016 has from 2 days to 5 days battery life, changing based on usage styles. In addition to durability, Basis Peak has waterproof feature, so customers can swim with it. Prospero (2016) said that Basis Peak analysing the very detailed data from application on a great chart a distinctive factor from its competitors. Moreover, he continuous, sensors of Basis Peak could work and record measures continuously and could detect his activity such as sleeping, walking, sitting, and jogging by tracking hearth rate. He also mentioned that Samsun Gear Fit's sensor only had been working in that time when users were standing still. On the contrary, Prospero (2016) says that one of the biggest drawbacks of the Basis Peak getting notifications from smartphone. In addition, he argued that the application of it is not much user-friendly. Magid (2015) said that Basis Peak is not the most well styled watch like Apply watch, although, with $199 price tag it is strong competitor to Apple watch with the price tag $349 with other strong features. Stein (2014) said that smartwatch sets challenges throughout the day and tells its user to achieve variety of challenges to keep user healthy. As a result of short recall, Basis Peak needs to find a partner that improves its connectivity, adding map, and lastly should add voice assistant.

If intel looking for partners to re-enter smartwatch market, it must consider this lack of features. In study case, it is being written that Intel looking for one partners for effective return. Candidate partners are Google, Aetna, and Amazon. First, Intel can directly eliminate Aetna. Intel does not need health or fitness related partner, because Intel already acquired Basis Science and basically their attributes are overlapping. Let's discuss other two options, which are Amazon and Google. Amazon has 3 main attributes to Intel for new smartwatch product. Firstly, Alexa the voice assistant. Secondly, it is largely using for shopping purposes, so Amazon as a company very well bridge for purchasing the product. Lastly, this attribute can be count as sub-element of purchasing, but it is very important for convincing online shopping, which is delivery speed. Amazon is very fast with the deliveries, and it creates habit to shopping from Amazon continuously. However, Google is the best option here and not in just study case, also in general. Google have the services in many fields such as maps, traffic routes, google store etc. Google also have voice assistant too, which is Google assistant. Greenwald (2021) argued that Amazon Alexa and Google Assistant are two premium voice assistants. Thus, Alexa does not have any significant advantages against Google Assistant. With the power of Intel processors, Basis Science sensors and Google environment product can be more functional and have more potential in the future rather than being partner with Amazon.

SWOT	
Strengths	**Weaknesses**
Fitness Attributes Health	Bad Image Style
Opportunities	**Threats**
Utilizing Google's services and products	One chance to save Image New partnership with Google

Company	Customer	Competitors
Intel with Basis Peak known for advanced fitness and health measurements.	**All customer segments give value to displaying notifications from smartphones.**	**Apple has the leader company with followed by Samsung. These 2 companies have high-cost products. So, their target customers are high-end customers such as Plaza runners and Early Winners. Except apple distribution of the market is close.**
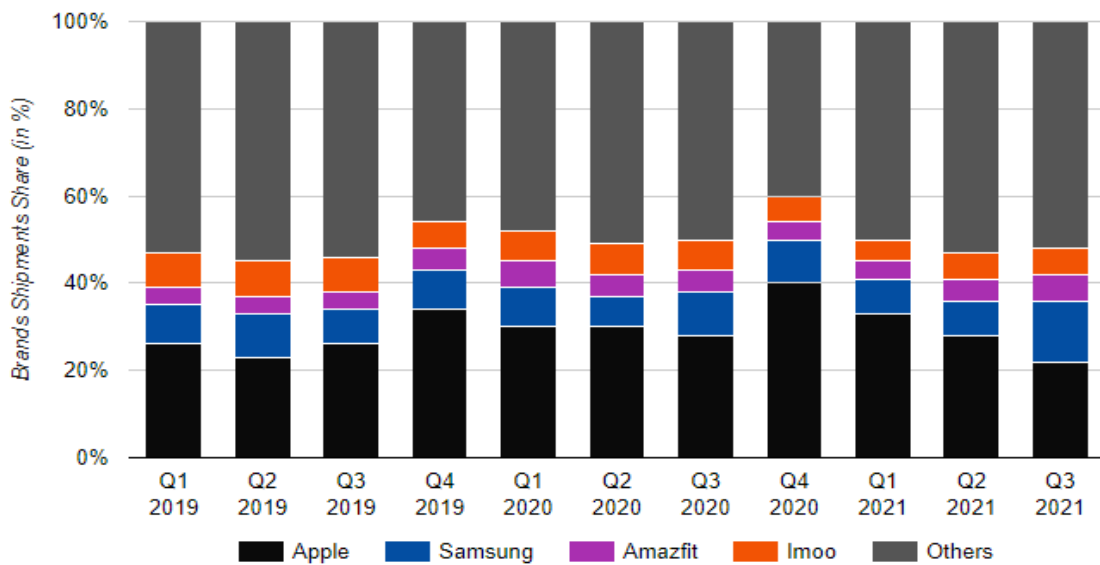
Source: Global Smartwatch Shipments by Model Quarterly Tracker

To conclude, Intel can produce medium range product and focused its segments, which are **lower-middle singles, steady incomers, and upper-middle householders.** With these segments Intel can reach 58.9% of the scoped market. Google can help Intel in displaying messages, e-mails, map, and Voice Assistant. Intel has strong chips for robust smartwatch. Because of the bad reputation, Intel must be successful to fix its image. Basis Peak was already good at health and fitness functionalities, in the long term if Intel can improve the partnership with Google, they will be able to target **plaza runners and early winners,** which total market ratio of them is 35.9.

References:

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