MARKET SEGMENTATION ANALYSIS

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1. Deciding (not to segment)

1.1 Implications of Committing to Market Segmentation

Even though market segmentation has been in huge demand in majority of the organizations, it is not always the right course of action to take, even if it has become a popular marketing tactic in many firms. Before investing time and resources in a market segmentation inquiry, it is imperative to understand the implications of putting a market segmentation plan into practice.

The main conclusion is that the segmentation technique requires a sustained commitment from the organization. There's a correlation between an organization's dedication to market segmentation and its capacity and willingness to undertake major investments and modifications. Researching, doing focus groups and polls, making several packages, and crafting various marketing and communication messages all come with costs. One of the tenets of segmentation strategy is that using the scheme has to be more profitable than marketing without it, net of the expense of developing and implementing the scheme itself. Cahill advises against segmenting unless the expected increase in sales is sufficient to justify implementing a segmentation strategy.

The creation of new items, the alteration of already-existing products, adjustments to the product's price and distribution methods, and all market communications are examples of potentially necessary modifications. These alterations will therefore probably have an impact on the organization's internal structure, which might need to be modified in light of, say, focusing on a small number of distinct market niches. According to Croft (1994), organizations should organize around market segments rather than around goods in order to maximize the benefits of market segmentation. Segment-specific strategic business units provide an appropriate organizational structure to guarantee continued attention to the (evolving) requirements of market segments.

The decision to look into the possibility of a market segmentation strategy must be made at the highest executive level and must be systematically and continuously communicated and reinforced at all organizational levels and across all organizational units due to the significant implications of such a long-term organizational commitment.

1.2 Implementation barriers

The first group of barriers has to do with upper management. The effectiveness of market segmentation is weakened by senior leadership's lack of commitment, proactive advocating, leadership, and involvement in the process. Insufficient resources for the initial market segmentation analysis or the long-term execution of a market segmentation plan can be a major contributing factor to senior management's inability to properly implement market segmentation.

The organizational culture is the subject of the second group of barriers. The following factors have been identified as impeding the successful implementation of market segmentation: short-term thinking, unwillingness to make changes, office politics, resistance to change and new ideas, lack of creative thinking, poor communication and lack of sharing of information and insights across organisational units, lack of market or consumer orientation.

A potential issue that may arise is inadequate training. The introduction of market segmentation is likely to be unsuccessful if senior management and the team assigned to the task are ignorant of the fundamentals of the approach or the repercussions of following it. A business with little resources must choose which chances to pursue. Process-related obstacles include unclear objectives, poor or nonexistent planning, a lack of structured procedures to lead the team through every stage of the market segmentation process, an inequitable distribution of responsibilities, and time constraints that impede efforts to arrive at the optimal segmentation result.

2. Specifying the Ideal Target Segment

2.1 Implementation barriers

It is crucial to realize that user input cannot be restricted to the creation of a marketing mix at the conclusion of the process or a briefing at the beginning of the process in order for a market segmentation analysis to yield results that are beneficial to an organization. Instead, the user must actually wrap around the technical parts of market segmentation study during the majority of the process.

The organization must significantly contribute to market segmentation study after committing to look into the benefits of a segmentation plan. Even though this contribution is purely conceptual, it serves as a guide for many subsequent actions, such as gathering data and choosing one or more target segments. Two sets of segment assessment criteria need to be decided upon by the organization. Knock-out criteria are a subset of the evaluation criteria. These are the fundamental, non-negotiable characteristics of the target segments that the organization would think about pursuing. We might refer to the second set of evaluation criteria as the attractiveness criteria. The relative attractiveness of the

remaining market segments—those that meet the knock-out criterion—is assessed using these criteria.

2.2 Knock-out criteria

Knock-out criteria are employed to ascertain if market segments derived from the market segmentation study are eligible to be evaluated using segment attractiveness criteria. The following points must be taken into consideration to satisfy the criteria:

• Homogeneity: Members of the segment must share similarities with one another in order for the segment to be homogenous.

• Distinction: Members of the segment must differ noticeably from those of other segments; the segment must be distinct.

• Market size: The market must be big enough and comprise enough customers for it to be profitable to spend more money tailoring the marketing mix to them.

• Position: The segment should align with the organization's strengths; the latter should be able to meet the demands of the segment's members.

• Recognition: Members of the sector need to be recognizable; they need to be able to be found in the marketplace.

• Accessibility: In order to make the customized marketing mix available to the segment's members, there has to be a means of reaching out to them.

2.3 Attractiveness criteria

The segmentation team determines the values of segment attractiveness and organizational competitiveness. Whether a market segment is chosen as a target segment in Step 8 of the market segmentation analysis depends on its attractiveness relative to all other criteria. There are no absolutes when it comes to attractiveness standards. The attractiveness criteria are not evaluated in terms of segment compliance or noncompliance. Instead, based on a given set of criteria, each market segment is assigned a score that indicates its level of attractiveness.

2.4 Implementing a structured process

The segmentation literature is generally in agreement that it is advantageous to evaluate market segments using an organized process. The most widely used structured method for assessing market segments with the goal of choosing them as target markets is the segment evaluation plot, which displays organizational competitiveness on one axis and segment attractiveness along the other. The market segmentation team should have a list of about six segment attractiveness criteria at the end of this step. There should be a

weight assigned to each of these criteria, indicating its relative importance to the organization in relation to the other criteria.

3. Collecting data

3.1 Segmentation variables

Market segmentation relies heavily on empirical data. Both commonsense and data-driven market segmentation are based on empirical data.

The commonsense market segmentation is based on one single characteristic or one segmentation of the consumers in the sample. For instance, a smartphone selling company might consider the mobile operating system as a segment further divided into Android and IOS operating systems.

The data-driven market segmentation is based on multiple segmentation variables rather than just one. These segmentation variables are used to identify naturally existing or artificially created market segments that are useful to the organization.

3.2 Segmentation criteria

An important decision needs to be made by the organization regarding which segmentation criterion to use before segments are extracted, and even before data is collected for segment extraction. In this context, the terms "segmentation variable" and "segmentation criterion" are used more broadly. Regarding the type of data utilized for market segmentation, the term "segmentation criterion" is used. Additionally, it may pertain to a single concept, like the advantages pursued.

Due to the need for prior market knowledge, the choice of which segmentation criterion to use cannot be simply delegated to a data analyst or consultant. The most often used segmentation criteria are geographic, sociodemographic, psychographic, and behavioral.

- Geographic segmentation: It divides a target market based on geographic location, such as country, region, city, or postal code. This approach is often used by businesses that sell products or services that are sensitive to location, such as restaurants, retailers, and travel companies.

- Sociodemographic segmentation: It divides a target market based on social and demographic factors, such as age, gender, income level, education level, occupation, and family status. This approach is often used by businesses that want to target their marketing efforts to specific groups of people, such as parents of young children, college students, or retirees.

- Psychographic segmentation: It divides a target market based on psychological factors, such as personality, values, interests, lifestyle, and attitudes. This approach is often used by businesses that want to target their marketing efforts to people who share similar values, interests, or lifestyles.

- Behavioral segmentation: It divides a target market based on past behavior, such as purchase history, website browsing behavior, social media engagement, and product usage patterns. This approach is often used by businesses that want to target their marketing efforts to customers who have demonstrated a specific interest in their products or services.

3.3 Data from survey studies

The majority of market segmentation studies rely on survey data. Any organization can find success with a survey approach because it is affordable and simple to gather data. However, a variety of biases can taint survey data, as opposed to data gathered from seeing real behavior. The quality of solutions obtained from market segmentation analysis may be adversely affected by such biases. Below is a discussion of some important factors to take into account when using survey data.

- Choice of Variables: Selection of segmentation variable(s) must be done carefully for both commonsense and data-driven segmentation. All the necessary variables must be chosen through either exploratory data analysis or as per business sense. Similarly, unnecessary variables must be discarded.
- Response options: The specific choices or answers that respondents provide when responding to survey questions or other data collection methods used to gather information about their characteristics, preferences, and behaviors are referred to as response options. These response options serve as the foundation for categorizing the target market into distinct groups based on shared characteristics or responses.
- Response styles: Response style refers to respondents' proclivity to select specific response options regardless of the content of the question. This can result in biased responses that do not accurately reflect the respondents' true opinions or behaviors.
- Sample size: A specific number of observations pertaining to the data must be selected in order to make predictions. A large sample size indicates the statistical power to make more sensible predictions meanwhile reducing the error.

3.4 Data from internal sources

Organizations are getting access to large volumes of internal data that can be collected and used for market segmentation analysis. Typical examples include booking data from airline loyalty programs, grocery store scanner data, and online purchase data. Because these data show actual consumer behavior rather than statements about the behavior or intentions of the consumers, they are strong. These data are typically generated automatically, meaning

that no additional work is needed to collect them—provided that organizations can store the data in a format that facilitates easy access.

3.5 Data from experimental studies

Experiments may also provide data that can serve as the foundation for a market segmentation analysis. Field or lab experiments can produce experimental data. They might, for instance, be the outcome of experiments to see how people react to particular ads. A segmentation criterion could then be based on the advertisement's response. These studies seek to provide consumers with stimuli that have been carefully designed and comprise particular product attributes at particular levels. Customers then indicate which product(s) they prefer, which are distinguished by various combinations of attribute levels.

4. Exploring data

4.1 A glimpse into the data

The initial step while performing exploratory data analysis is exploring the data. itinvolves visualizing and exploring the data in order to find patterns, identifying statistical measures such as mean, variance, standard deviation and assess the dependency structure between variables. The results obtained from this analysis helps us to provide insights regarding the various segmentation methods to be used in the market segmentation analysis. In addition to the exploratory data analysis, data preprocessing can also be performed in order to transform certain variables and extract useful features from the data.

4.2 Data cleaning

There is a chance that while gathering data from multiple sources, there will be certain observations which are repeating or maybe corrupted or will contain data which needs to be transformed. Data cleaning is a step perfomed to remove unnecessary observations and variables, fix certain observations and perform feature engineering to extract meaningful data to form a new variable. This step would futher help us in preprocessing the data.

4.3 Data preprocessing

4.3.1 Categorical variables

Segmentation algorithms require data which is numeric. In case there are categorical variables, we need to transform them to numeric variables by using various encoding techniques in Python such as OneHotEncoding which would n-1 variables for a variable which is to be encoded where ‘n’ is the different types of observations in the variable. For

example, if Male and Female are the only types of observations in the variable, then only one variable will be created which would contain binary values for either male or female and one of those variables along with the original variable will be deleted. Similarly LabelEncoding is another technique which can create numeric values in the categorical variable itself. There are multiple techniques used for transformation of such variables for different programming tech stacks.

4.3.2 Numeric Variables

Numeric variables are often on different scales and cover different ranges, so they can't be easily compared. What's more, variables with large values can dominate those with smaller values when using certain modelling techniques. centring and scaling is a common pre-processing task that puts numeric variables on a common scale so no single variable will dominate the others. The simplest way to centre data is to subtract the mean value from each data point. Subtracting the mean centres, the data around zero and sets the new mean to zero.

4.4 Descriptive Analysis

Descriptive analysis involves analysing the data using statistical measures. that helps describe or summarize data points in such a way such that patterns might emerge that fulfills every condition of the data. The three main types of descriptive statistics are frequency distribution, central tendency, and variability of a data set. The frequency distribution records how often data occurs, central tendency records the data's centre point of distribution, and variability of a data set records its degree of dispersion. These statistics can also be analysed using graphical methods for numeric data such histograms, box-plots, and scatter plots. For categorical variables a bar graph or box plot can be used to plot the count or occurrence of the data points.

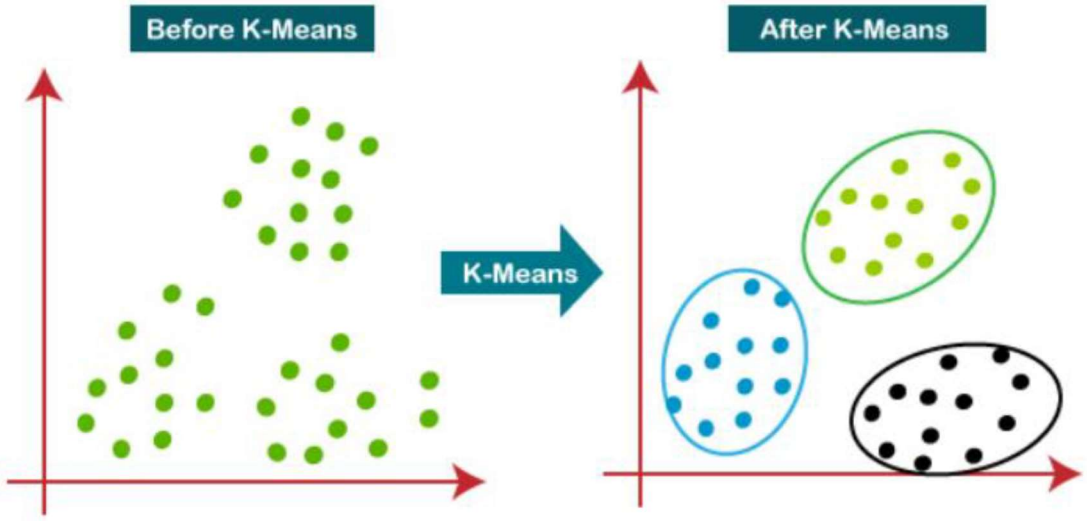
4.5 Principal Component Analysis

Principal Component Analysis abbreivated as PCA is an unsupervised machine learning algorithm that helps reduce the dimensionality of large datasets by identifying the most important underlying patterns and extracting them as new, uncorrelated variables called principal components. These principal components capture the majority of the variance in the original data, allowing for efficient analysis and interpretation. In market segmentation analysis, PCA can be used to identify groups of customers with similar characteristics based on their responses to various marketing stimuli. By analyzing the principal components, researchers can understand the key factors that differentiate different customer segments and develop targeted marketing strategies to reach each segment effectively.

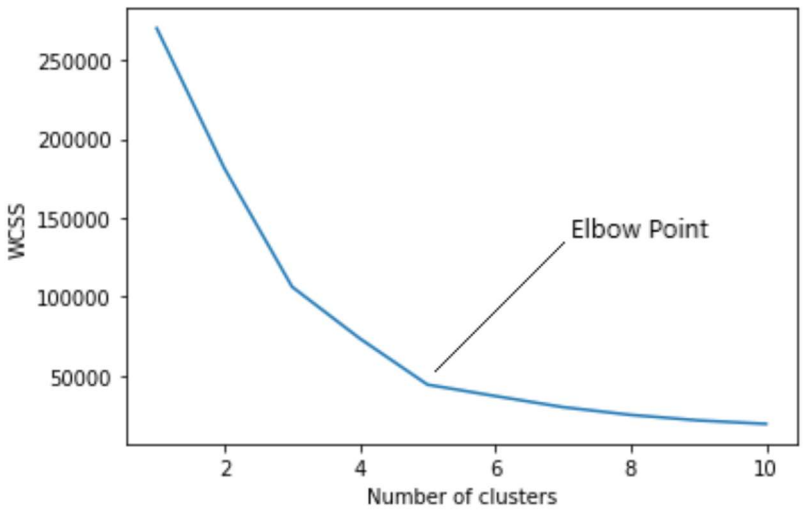
5. Extracting segments

5.1 K-Means Clustering

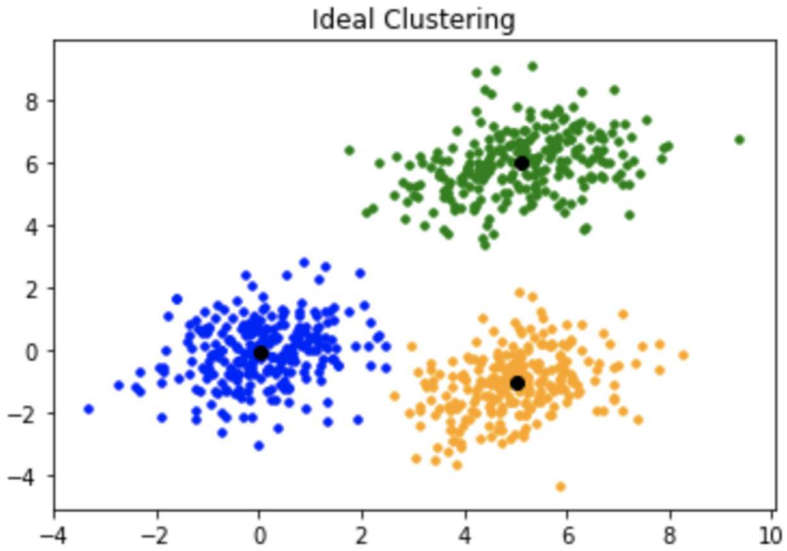
K-Means Clustering is another unsupervised machine learning algorithm that creates clusters based on similarity between data points. Each cluster represents a unique and distinct feature that helps us to identify which segments need to be focused on for our analysis. It is usually performed on an unlabelled dataset and it studies the remaining features to identify patterns in the data. K-Means Clustering aims to partition n observations into K clusters that need to be created in the process, so if K=2, there will be two clusters, and for K=3, there will be three clusters, and so on.
The figure below shows what K Means Clustering does for three clusters.



To find the optimum number of clusters (k), the Within Sum of Squares (WSS) plot is used. It is probably the most well-known approach which involves calculating the sum of squares for each cluster size, graphing the results, and identifying the ideal cluster size by looking for an elbow where the slope changes from steep to shallow.



After finding out the optimum number of clusters, we use the K-Means algorithm for creating clusters. The observations are partitioned into K clusters which each cluster having its centroid.



Every data feature has the potential to have a range of values, which raises the feature's overall variance. Segmenting our data according to like-values features is the primary objective. Values from a similar range are assigned to the same cluster by clustering algorithms, which divide the data into groups according to their values.

5.2 “Improved” K-Means Clustering

K-Means is sensitive to initialization of points of centroid. If a centroid is far-off, no point will be associated with it and a centroid may be aligned to more than one cluster. Similarly, a cluster may have more than one centroid which results in poor clustering. To overcome these drawbacks, we use the “improved” K-Means Clustering to improve the initialization of centroids and the quality of clustering.

6. Profiling Segments

6.1 Identifying key characteristics of market segments

In commonsense segmentation, where predefined profiles exist, Step 6 of profiling may be deemed unnecessary. Conversely, data-driven segmentation relies on extracting segments based on variables like consumer benefits, and profiling becomes crucial for understanding the resulting market segments. Profiling involves characterizing segments individually and comparing them to discern defining features. For instance, in the context of winter tourism in Austria, while alpine skiing may characterize a segment, it might not effectively

differentiate it from others. The exploration of alternative segmentation solutions is particularly important in cases where natural segments are absent in the data. Profiling serves as the foundation for correctly interpreting segmentation results, a crucial aspect for making informed strategic marketing decisions.

6.2 Traditional Approaches to Profiling Market Segments

Data-driven segmentation solutions are typically presented to users in two formats: simplified high-level summaries that may mislead by oversimplifying segment characteristics, or complex tables detailing exact percentages for each segmentation variable within each segment. As travel motives are binary, these means correspond to the percentage of segment members engaged in each activity. The challenge lies in the difficulty of obtaining a quick overview of key insights from such intricate tables, posing a potential barrier to effective interpretation for users and managers.

6.3 Segment Profiling with Visualizations

Visualizations are integral in the data-driven market segmentation process, allowing a close examination of individual segments within each proposed segmentation solution. Statistical graphs play a key role in understanding segment profiles and contribute to the evaluation of the efficacy of a given market segmentation approach. With the segmentation process generating numerous alternative solutions, the selection of one becomes a pivotal decision. Visual representations of these solutions serve as essential aids for both data analysts and users, streamlining the task of choosing the most appropriate segmentation solution.

6.3.1 Identifying Defining Characteristics of Market Segments

Segment profile plots visually represent the differences between each segment and the overall sample across all segmentation variables. The order in which segmentation variables are displayed in figures and tables is highlighted, suggesting that maintaining a meaningful order from the data set is beneficial. However, rearranging variables can enhance visualizations if the order is independent of content. An alternative method of ordering variables by similarity of answer patterns is through hierarchical clustering. Hierarchical clustering is employed to order segmentation variables based on the similarity of answer patterns. This method organizes the variables by grouping together those with similar patterns of responses. The resulting order is then utilized in the creation of a segment profile plot (barchart) where the variables are arranged according to the hierarchical clustering order. This approach aims to enhance the visual representation of segment characteristics and highlight patterns in the data that might not be evident in the original order of variables.

6.3.2 Assessing Segment Seperation

For employing segment serperation, a segment separation plot is utilized, aiming to illustrate the distinctiveness and separation among identified market segments. This graphical representation is instrumental in showcasing the boundaries and potential overlap between different segments based on selected segmentation variables. Typically, the plot incorporates segment profiles, offering a visual display of variable values for each segment and facilitating a comprehensive understanding of the unique characteristics that define each group. This, in turn, facilitates well-informed decisions regarding targeted marketing strategies by identifying segments with specific needs or behaviors that may necessitate tailored approaches. Beyond its analytical utility, the segment separation plot serves as an effective communication tool, simplifying complex information and fostering discussions among stakeholders regarding the outcomes of market segmentation analyses.

7. Market Segmentation Case Study on McDonald's dataset

The code implementation is done in Jupyter Notebook with the above algorithms being used.
Link to the GitHub repository: https://github.com/Sharath1036/feynn-labs-projects/tree/main/Task%202.0:%20Market%20Segmentation%20Analysis