Market Segmentation

Introduction

Market segmentation is a strategic approach used by businesses to divide a target market into smaller groups that share similar characteristics. These characteristics can include factors such as age, income, personality traits, behaviour, interests, needs, or geography. By segmenting the market, companies can tailor their product design, marketing, promotion, and sales strategies to better meet the needs and preferences of each segment. This allows for more personalized messaging and enhances the chances of effectively reaching and engaging with the intended audience.

Types of Market Segmentation:

1. Geographic Segmentation: This involves categorizing customers based on their geographic location. Factors such as climate, area, and cultural differences influence the needs and interests of potential customers in different regions. Geographic segmentation helps businesses determine where to sell and advertise their products or services, as well as where to establish a presence.

2. Demographic Segmentation: Demographic segmentation divides the market based on factors such as age, gender, nationality, education level, family size, occupation, and income. This type of segmentation is commonly used as it provides insights into how consumers use products and services and how much they are willing to pay for them.

3. Psychographic Segmentation: Psychographic segmentation categorizes the target audience based on their behaviour, lifestyle, attitudes, and interests. Market research methods such as focus groups, surveys, interviews, and case studies are employed to construct this type of segmentation. Psychographic segmentation helps businesses understand the motivations, values, and preferences of different customer groups.

4. Behavioural Segmentation: Behavioural segmentation focuses on specific consumer behaviours, buying patterns, decision-making processes, and attitudes towards brands. It includes understanding how customers interact with a brand, their level of brand loyalty, and their awareness of the brand. Similar to psychographic segmentation, behavioural segmentation is also based on data collected through research methods such as surveys and interviews.

Objectives of Market Segmentation:

1. Product: One of the primary objectives of market segmentation is to create successful products. By understanding the needs and preferences of different

customer segments, businesses can develop products that meet their expectations while optimizing costs.

2. Pricing: Market segmentation helps in determining the appropriate pricing strategy for products. By identifying which segments of the market are willing to pay higher prices for certain features or benefits, businesses can effectively price their offerings.

3. Promotion: Segmentation enables businesses to target specific segments and tailor their promotional efforts accordingly. By understanding the characteristics and preferences of each segment, companies can create targeted marketing campaigns that resonate with the intended audience.

4. Place: The ultimate goal of market segmentation is to identify the most effective distribution channels and methods for reaching each segment of customers. By studying the preferences and behaviors of different segments, businesses can ensure that their products are available and accessible to the right customers in a compelling manner.

Steps of Market Segmentation Analysis

Step 1: Decision on Segmentation

The initial step involves the organization's commitment to the segmentation strategy and its readiness to implement significant changes. It requires a clear sense of purpose, determination, patience, and the ability to overcome challenges that may arise during the implementation of the segmentation plan.

Step 2: Identification of the Target Segment

Once the commitment to segmentation is established, the organization must dedicate efforts to conduct a thorough market segmentation analysis. This step includes the development of two sets of segment evaluation criteria. The first set consists of non-negotiable qualities that the organization seeks in the target segments. The second set, known as attractiveness criteria, helps assess the relative appeal of the remaining market segments.

Step 3: Data Collection

Both intuitive and data-driven segmentation rely on empirical data. This step involves gathering relevant data to identify or create market segments. The data collected will serve as the foundation for the detailed description of the segments in later stages of the analysis.

Step 4: Data Exploration

Data exploration entails analysing and summarizing the dataset to gain insights into its characteristics and patterns. Statistical methods, visualizations, and other analytical tools are employed to identify relationships, patterns, and anomalies in the data. This exploration process helps guide further research and decision-making. It also involves data cleaning techniques to handle outliers, inconsistencies, duplicates, and erroneous data. PCA is a technique used for data analysis and dimensionality reduction. It transforms high-dimensional data into a lower-dimensional representation while preserving as much information as possible. The PCA process consists of several steps:

1. Data Standardization: The data is standardized to have a mean of zero and a standard deviation of one for each variable.

2. Computation of Covariance Matrix: The covariance matrix, which represents the relationship between each pair of variables, is calculated using the standardized data.

3. Eigenvalue Decomposition: The covariance matrix is decomposed into scalar eigenvalues and eigenvectors. These eigenvalues and eigenvectors capture the underlying structure of the data.

It's important to note that the pre-processing procedures and techniques employed in data exploration and PCA may vary depending on the data type, analysis methods, and objectives of the analysis.

Step 5: Segment Extraction

5.1 Grouping Customers:

Market segmentation involves dividing customers into groups based on their preferences and interests. To achieve this, various methods are employed to analyse customer data. One common approach is cluster analysis, which helps identify these groups. However, it is crucial to select the appropriate method as different methods can yield different results. For example, one method may create round-shaped groups, while another may generate groups with a different shape. Understanding the interaction between the data and the chosen method is essential for obtaining the most accurate and meaningful results. The selection of methods depends on the size and type of data available, as well as the desired characteristics of the groups. This step also addresses the identification and categorization of customers based on their attributes. While some characteristics, such as product preferences, are easily identifiable, others, like price sensitivity, may require more in-depth analysis. The article also discusses approaches for

handling binary variables (yes or no responses) in the analysis, based on the specific objectives.

5.2 Distance-Based Methods

5.2.1 Measures of Distance

Calculating the distance between two vectors in a data matrix involves quantifying the dissimilarity between two observations (customers) based on their vacation activities (variables). Different distance measures are utilized, including Euclidean, Manhattan, and Asymmetric Binary distance. Euclidean distance, the most commonly used method, measures the direct straight-line distance between two points. Manhattan distance calculates the distance as if one were traveling on a grid of streets between two points. Asymmetric Binary distance considers only dimensions where one vector has a value of 1 and treats 0s and 1s differently.

5.2.2 Hierarchical Methods

Hierarchical clustering is a process of grouping data into segments based on their similarities. Two methods are commonly employed: divisive and agglomerative. In the divisive method, the data starts as one large segment and is divided into smaller segments. In the agglomerative method, individual segments are formed initially and then merged into larger segments. The distance between segments is determined using a distance measure and linkage method. The linkage method specifies how the distance between groups of observations is computed. Different combinations of distance and linkage methods can reveal distinct features of the data. The popular Ward method, based on squared Euclidean distances, joins sets of observations with the minimum weighted squared Euclidean distance.

5.2.3 Partitioning Methods

For large consumer datasets, hierarchical clustering methods may not be practical, and partitioning methods are more suitable. Partitioning methods compute distances only between consumers and the center of the segments, rather than calculating all pairwise distances between consumers. This makes the process more efficient, especially when extracting only a few segments.

5.2.3.1 k-Means and k-Centroid Clustering

k-Means Clustering is a widely used method for partitioning a dataset into subsets. It aims to group observations into market segments, ensuring that consumers within the same segment are similar while those in different segments are dissimilar. The algorithm involves five steps: specifying the desired number of segments, randomly selecting initial cluster centroids, assigning each

observation to the closest cluster centroid, recomputing the cluster centroids, and repeating the process until convergence or a maximum number of iterations is reached. The k-means algorithm relies on squared Euclidean distance, with the optimal centroids being the means of the clusters.

5.2.3.2 "Improved" k-Means

The k-means clustering algorithm has been enhanced by using better starting points instead of random initial selections. By evenly spreading starting points across the entire data space, the algorithm reduces the likelihood of getting stuck in a local optimum, which may be a good solution but not the best. Researchers Steinley and Brusco compared 12 strategies and found that the best approach involves randomly selecting numerous starting points and choosing the set that best represents the data, with good representatives being close to their segment members and having a small total distance.

5.2.3.3 Self-Organizing Maps

Self-organizing maps are algorithms used in market segmentation to identify different consumer groups (market segments). These algorithms position segment representatives on a grid, such as a rectangle or a hexagon. The process involves randomly selecting a consumer from the data and adjusting the representatives' locations on the grid to become closer to the selected consumer. This process is repeated until a final solution is achieved. The advantage of self-organizing maps is that they provide a clear numbering of market segments and indicate their similarities to each other. The R package "kohonen" is commonly used to run this algorithm and generate a visual representation of the final solution, demonstrating the relationship between market segments based on their risk-taking tendencies.

5.2.3.4 Neural Networks

Neural networks for cluster analysis operate differently than other methods. The most popular method involves using a three-layer system known as a single hidden layer perceptron, which includes input, output, and hidden layers. The hidden layer has no external connections and its values are a combination of the inputs. During network training, the parameters are adjusted to minimize the distance between inputs and outputs. Once trained, the parameters connecting the hidden layer to the output layer can be viewed as segment representatives. Neural network clustering is a fuzzy type of segmentation, assigning membership values ranging from 0 to 1, whereas other methods provide distinct segmentation with each consumer belonging to a single segment. Various implementations of auto-encoding neural networks are available in R, such as the "autoencoder" package.

5.2.4 Hybrid Approaches

Hybrid approaches combine two different methods to identify market segments in data. These approaches typically involve a combination of hierarchical clustering and partitioning clustering. The aim is to leverage the strengths of both methods and compensate for their weaknesses. Hierarchical clustering is effective at revealing similarities but requires substantial memory, while partitioning clustering performs well with large datasets but requires advance knowledge of the number of segments. In a hybrid approach, a partitioning algorithm is used initially to generate multiple segments, and then information about the centres and sizes of these segments is utilized in hierarchical clustering. This approach improves the final result and facilitates determining the optimal number of segments to utilize.

5.2.4.1 Two-Step Clustering

The two-step clustering process is a method employed to identify and characterize distinct groups within a dataset. The first step involves reducing the data size by selecting a representative member from each extracted cluster using the k-means method. In the second step, the original data is linked to the segmentation solution derived from hierarchical analysis. This linkage is achieved using a function from the MSA package that takes the hierarchical clustering solution, cluster memberships of the original data, and the desired number of segments. The final result presents the extracted segments, which can be verified by examining the generated plot.

5.2.4.2 Bagged Clustering

Bagged Clustering combines hierarchical clustering and partitioning clustering. It begins by randomly sampling the dataset multiple times and clustering these samples using a partitioning algorithm. The resulting cluster centroids are saved for the subsequent step, which involves hierarchical clustering. The final segmentation solution is obtained by selecting a cut point in the dendrogram from the hierarchical clustering. Bagged Clustering is particularly useful when there is a suspicion of niche markets, when standard algorithms may not perform well, or when the dataset is too large for hierarchical clustering.

5.3 Model-Based Methods

Model-based methods in market segmentation differ from distance-based methods as they assume that each market segment has specific characteristics and sizes for consumers. These methods use real data to estimate the values of these characteristics and sizes, typically through maximum likelihood estimation or

Bayesian frameworks. Consumers are then assigned to segments based on their likelihood of belonging to each segment.

5.4 Algorithms with Integrated Variable Selection

While algorithms used in market segmentation may focus on certain variables, these variables may not always be crucial in determining the segmentation solution. Variable selection methods such as filtering approaches can help assess the usefulness of variables, particularly for metric data. However, for binary variables, biclustering, VSBD (variable selection procedure for clustering binary data), or factor-cluster analysis can be employed to extract segments and select appropriate variables.

5.4.1 Biclustering Algorithms

Biclustering is a technique that groups both consumers and variables to identify similar market segments, mainly used for binary data. It rearranges the data matrix, searching for consumers who share a value of 1 for a specific group of variables. Biclustering is useful when there are numerous variables and enables the identification of niche markets. The Kaiser biclustering algorithm is efficient, although it may not group all consumers.

5.4.2 Variable Selection Procedure for Clustering Binary Data (VSBD)

The VSBD method is designed to select variables when clustering binary datasets. It utilizes the k-means algorithm to identify the best small group of variables that can effectively extract segments. The performance is evaluated based on the within-cluster sum of squares, and the algorithm progressively adds variables until reaching a specified limit for the increase in within-cluster sum of squares. The recommended number of random initializations is typically high, but it can be reduced with the Hartigan-Wong algorithm.

5.4.3 Variable Reduction: Factor-Cluster Analysis

Factor-Cluster Analysis is employed in market segmentation when the number of segmentation variables is excessively high. This approach involves compressing the segmentation variables into factors using factor analysis. However, it is important to note that this method may result in a loss of information and difficulties in interpreting the factor-cluster results, limiting their practical application in providing concrete recommendations for the marketing mix.

5.5 Data Structure Analysis

Data structure analysis helps assess the reliability and stability of market segmentation solutions by providing insights into the properties of the data. It

aids in determining the presence of natural, distinct, and well-separated market segments. Cluster indices, gorge plots, global stability analysis, and segment level stability analysis are common techniques used in data structure analysis.

5.5.1 Cluster Indices

Cluster indices are useful tools for evaluating market segmentation solutions and making important decisions, such as determining the optimal number of market segments. They can be categorized as internal or external indices. Internal cluster indices assess the quality of segmentation solutions based on the compactness and separation of segments. Examples include the sum of within-cluster distances, Ball-Hall index, and Ratkowsky and Lance index. External cluster indices compare two solutions to measure their similarity using indices such as the Jaccard index, Rand index, and adjusted Rand index.

5.5.2 Gorge Plots

Gorge plots are graphical representations used to evaluate the separation of market segments. They depict the similarity or dissimilarity of each customer to segment representatives through histograms. The x-axis represents similarity values, while the y-axis represents the frequency of these values. A well-separated market segmentation solution exhibits a deep valley shape with peaks on both sides, indicating significant differences in similarity values among segments.

5.5.3 Global Stability Analysis

Global stability analysis examines whether a market segmentation solution remains consistent when the data is repeated multiple times. It helps determine the presence of natural and well-separated market segments. This analysis involves generating multiple data sets, extracting market segments from each set, and comparing the results for similarity. The level of similarity among solutions aids in determining the optimal number of segments to extract from the data.

5.5.4 Segment Level Stability Analysis

Segment level stability analysis assesses the stability of market segments within and across multiple solutions.

5.5.4.1 Segment Level Stability Within Solutions (SLSW)

SLSW measures the stability of market segments within a solution by repeatedly sampling the data and finding segments in each sample. The segments that consistently appear across all samples are considered the most stable and reliable. SLSW results can be displayed using boxplots, where higher values indicate greater stability and attractiveness of segments.

5.5.4.2 Segment Level Stability Across Solutions (SLSA)

SLSA determines the stability of market segments across different market segmentation solutions. It assesses whether a segment consistently appears in multiple solutions, indicating its natural occurrence in the data. SLSA can be visualized using plots or measured using entropy, where thick lines between segments indicate stability, while many branching lines indicate instability.

Step 6: Profiling Segments

Profiling segments involves dividing a target audience into smaller groups based on specific characteristics or behaviors. These segments can then be used to create specialized product offers, marketing campaigns, and other business strategies. By targeting specific consumer categories with tailored messages and offerings, businesses can increase the effectiveness of their marketing campaigns and potentially boost revenue and sales. Profiling segmentation is a crucial aspect of market segmentation as it helps organizations gain a better understanding of and target specific customer segments. By segmenting the target market based on variables such as demographics, purchasing trends, and psychographics, businesses can create more targeted and effective marketing campaigns. This, in turn, can lead to improved financial performance and customer satisfaction.

Step 7: Describing Segments

Describing segments involves developing a comprehensive picture of market segments by understanding variations in segmentation factors across different segments. Segment profiling is similar to the profiling procedure but focuses on variables that have not been used to extract market segments. Descriptive statistics, visualizations, and inferential analysis can be used to investigate variations across market groups based on descriptor variables. Traditionally, statistical testing and tabular depictions of variations in descriptor variables have been used in marketing literature. However, visualizations can enhance the usability of segment descriptions. Mosaic plots, for example, are a type of stacked bar chart that can show the distribution of variables across segments, providing a graphical representation of a contingency table. Visualizations can help interpret the data and identify where observed frequencies depart from predicted frequencies.

Metric descriptor variables, which provide precise measurement, can be used to describe consumer behavior. Testing for segment differences in descriptor variables can be done through statistical tests. The chi-square test is commonly used to determine column and row independence in a table, while analysis of variance (ANOVA) can compare the variation between segment means with the

variance within segments. Mean values of metric descriptor variables per segment can be summarized in a table, and the inclusion of p-values from ANOVA can determine the statistical significance of differences.

Predicting segments from descriptor variables can be accomplished through regression models, such as binary logistic regression and multinomial logistic regression. These models can help predict segment membership based on independent variables (descriptor variables). Additionally, tree-based methods like decision trees can be used for classification and regression tasks to predict segment membership or forecast values.

Step 8: Selecting (the) Target Segment(s)

Selecting target segments is a critical decision that significantly impacts the future performance of an organization. Evaluating different market segments helps identify the most suitable segments for targeting. Factors to consider when evaluating market segments include market potential (number of potential customers, their income, and needs), sales potential (expected share of the potential market), competition (existing suppliers' sales relative to market potential), and cost (costs associated with servicing the segment). By assessing these factors, organizations can determine the value and attractiveness of each segment and select one or more target segments that align with their sales performance objectives.

Step 9: Customizing the Marketing Mix

9.1 Implications for Marketing Mix Decisions

The marketing mix is made up of four important parts: Product, Price, Promotion, and Place. Market segmentation helps in determining which target audience to sell the product to, and the marketing mix is then adjusted to fit the needs of that target audience. This includes deciding on the product features, price, promotion strategies, and distribution channels that would appeal to the target segment. Market segmentation should be integrated with other areas of marketing strategy to effectively reach the target audience.

9.2 Product

The product aspect of the marketing mix involves deciding what product to offer and how to cater it to the customers' needs. This includes changes to an existing product or creating a new one, taking into account factors such as branding, packaging, guarantees, and post purchase services. Using market segments from data analysis can help in product development by identifying specific customer needs. For instance, if a destination has a rich cultural heritage and the target

market segment is interested in visiting museums, monuments, and gardens, the destination can create a product to help them find these attractions or focus on making the gardens a more popular attraction.

9.3 Price

The article talks about how to tailor the marketing mix for a tourist destination that targets a specific group of consumers (segment 3) based on data analysis. The data shows that this group of tourists spends more money on their vacations compared to other tourists, meaning the destination doesn't have to offer a lower price for their product and may even be able to charge a higher price.

9.4 Place

The place aspect of marketing refers to how a product is made available to customers, like through online or in-person sales, directly from the manufacturer, or through a middleman. In a market segmentation analysis, researchers looked at the booking habits of a certain group of customers during their last domestic trip. The findings showed that they frequently booked their hotel online, making them different from other tourists. This information is

significant for marketing as it shows the need for online booking options for the hotel and could suggest that this group primarily books online for other things too.

9.5 Promotion

The study analyzed the promotion aspect of marketing for segment 3, which is a group of tourists. The goal was to find out the best way to reach them through advertising and communication. The research found that segment 3 tourists rely mostly on information from tourist centers when deciding on a vacation destination and they also prefer watching Channel 7 on TV. This information can help in creating an effective media plan to promote the product "MUSEUMS, MONUMENTS & MUCH, MORE" to this segment.

Step 10: Evaluation and Monitoring

After implementing the market segmentation strategy and customizing the marketing mix, it is essential to evaluate and monitor the effectiveness of the approach. This involves ongoing assessment and tracking of the segmentation strategy's impact and making necessary adjustments based on changing market conditions. There are two key actions to be performed in this step:

1. Assessing the Segmentation Strategy's Efficacy: The primary goal of market segmentation is to achieve increased profit or organizational objectives.

Therefore, it is crucial to evaluate whether the segmentation strategy and customized marketing mix have delivered the anticipated benefits. This assessment can be done by analyzing financial data, sales figures, customer feedback, and other performance indicators. By comparing the actual outcomes with the projected targets, organizations can determine the success of their market segmentation approach. If the results fall short, adjustments may be necessary in terms of segment selection, targeting strategies, or the marketing mix itself.

2. Continuous Monitoring: The market is dynamic, and various factors such as consumer preferences, market conditions, and competitor behavior can change over time. Therefore, it is important to establish a mechanism for continuous monitoring of the market segmentation plan. This monitoring process can range from regular reviews conducted by the segmentation team to implementing automated data mining systems that provide real-time insights. By monitoring the market, organizations can identify any shifts in the size or composition of the target segments and proactively adjust their marketing strategies accordingly. This ensures that the market segmentation approach remains relevant and effective in a constantly evolving business environment.

The evaluation and monitoring process should align with the organization's specific goals and objectives. For-profit organizations typically focus on increased profitability, while non-profit organizations may assess metrics such as fundraising success or volunteer recruitment. By regularly evaluating the market segmentation strategy and monitoring market dynamics, organizations can make data-driven decisions and adapt their marketing efforts to maximize the benefits derived from segment customization.

McDonalds Market Segmentation Case Study

Github Link :

https://github.com/keerthi-63/Mcdonalds-Market-segmentation-Case-study.git