

Analysis of Customer Satisfaction for FMCG Products Applying Clustering Analysis

¹Sunita Jadhav & ²Dr.Ramchandra G.Pawar

¹Research Scholar, Savitribai Phule Pune University (India)

²Principal SVPM's College of Commerce, Science & Computer Education, Malegaon, Tal –Baramati, Dist – Pune (India)

ARTICLE DETAILS

Article History

Published Online: 13 March2019

Keywords

Business-To-Customer (B2C) Markets, Enhancing Customer Retention and Profit Enhancement, Segment the Clients and Assess the Satisfaction Levels

Corresponding Author

Email: sunitajadhav01@gmail.com

ABSTRACT

The growth of the business-to-customer (B2C) markets has led to numerous studies on creating and enhancing customer retention and profit enhancement. This's primarily due to the retail business increasingly becoming competitive with prices getting pushed down by innovative and existing competitors. Generally, consumer markets have a few qualities including repeat buying over the pertinent time interval, a lot of clients, in addition to insightful information detailing previous customer purchases. Mining on this information is able to assist to obtain useful insights about customer satisfaction and design advertising methods, to enhance the consumer satisfaction and also stay away from churn rate. In this particular work, job of data mining to improve the consumer satisfaction is investigated and also device is developed using clustering analysis to segment the clients and assess the satisfaction levels of theirs.

1. Introduction

Just about the most critical areas of surviving in a powerful industry knows and adjust to changes occurring in consumer behavior. Additionally, in the recent past, there continues to be the explosive development in the quantity of info. Generally, Fast moving consumer goods (FMCG) distribution companies collected substantial volume of information from the customers of theirs and their purchasing transactions. In this particular gathered data, we are able to see as relevant hidden info about the buyers and the behaviors of theirs.

The standard method for marketing decision making for marketing promotions, strategies and also market analysis in FMCG distribution businesses is focusing much more on the inner expert opinions of theirs. These professionals include the advertising supervisors and also sales managers that are in constant contact with their merchandisers and sales agents that bring them industry info.

Nevertheless, this particular type of decision making process ignores the consumer information and the actions of theirs. Moreover, these days in which the industry is extremely competitive and solutions are overwhelming, customers encounter with various providers and various products with various marketing methods. In such a circumstance, customer behavior changes all of the time on account of such a dynamic market. When the marketing supervisor started to be alert to several changes within the marketplace by sales team; he/she doesn't have some thought about where and how to begin realizing these changes and the motives of theirs. It results to develop a wide time consuming and costly market analysis which its result maybe didn't reach on time on the advertising department to respond to these changes. Also in such a market, you will find several marketing campaigns by business itself and also rivals that it's tough to evaluate the usefulness of them in the marketplace. Therefore, in the competitive atmosphere, there's a need to mine consumer data and the transactions of theirs to find changes in client purchasing behavior which is an efficient and effective method to respond

to their desires timely and effectively.

Data mining methods would be the procedures created to determine and understand details for the goal of understanding and deducing actionable trends and developing techniques dependant on those trends. Data mining techniques extract the raw information, after which change them to obtain the converted information, after which get meaningful patterns among the transformed data. As businesses evaluate the investments of theirs on marketing activities, they have a tendency to concentrate on their data mining capability and techniques. How you can discover about clients and their tendency towards certain items, use that info making proper choices to clients, and also understand what marketing techniques are able to be successful in long-term customer satisfaction and retention. Managers are able to know the customer of theirs by analyzing consumer behavior, customer profiles, customer segregation, loyalty (how long have they been related to the company) and profitability (which applications could be aimed at the specific buyer to acquire maximum profits). Data Mining will help managers to determine valuable patterns found in raw data and their associations to assist the major choices.

In this particular job, use of data mining techniques to improve the consumer satisfaction is checked out with precise program to Clustering analysis. The case study considered is a regarding FMCG company for evaluation of customer satisfaction on its products and services. Questionnaire are handed out by organizations with the consumer and collected after filled. This procedure is done before and also after specific advertising tactic is completed on the result and also the market of the advertising and marketing program on improvement of customer satisfaction is examined by performing the data mining process on the filled questionnaire data.

2. Related Work

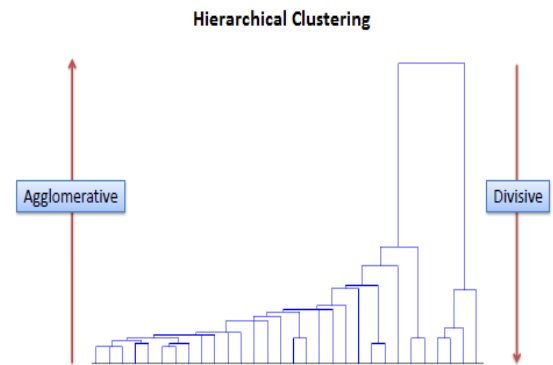
The current works on application of data mining for

enhancement of customer satisfaction is detailed in this work.

In [1] author applied clustering to segment the insurance customer and identify policies which could satisfy their need. The most prospective customer for a policy is found using clustering analysis and it improved the customer satisfaction by helping the banks identify the targeted customer. In [2] authors applied data mining for the problem of churn prediction for banking customers. From past data of customers who have churned a C5 decision tree classifier is constructed for predicting the churn of new customers based on their transaction and banking history. This tool helps banks to predict the customers who have high probability to churn and device mechanism to avoid the churn thereby customer retention is improved. In [3] authors applied multiple data mining algorithms for task like view the item sets customer purchase most, forecast sales so as to plan for manufacturing, suggest packs to market uninterested items and predicting seasonal promotional items. They used Naïve Baiyes, Linear Regression, Decision Tree, and Frequent Pattern Growth and ARIMA algorithms for accomplishing this task. In [4] authors applied data mining for maximizing "incremental" revenues in online interaction with customers. Through data mining, author was able to target right visitors to chat, Predicting customer needs, Routing customer to the right customer service agent, analyzing customer sentiment etc. In [5] authors identified the areas where data mining can be applied to improve the insurance sector. The identified area like detecting risk factors that predict profits, claims and losses, marketing and sales analysis and developing new product lines where data mining could contribute a lot in improving the current way of operation. In [6] authors detailed the different capabilities in data mining like Classification, Clustering, Association mining, Prediction and Correlation and how these capabilities can be used to enhance the customer relationship management. In [7] authors applied data mining to recommend the products based on history of purchases so as to maximize the business at the same time without disturbing the customers by recommending only the product which customer will buy. In [8] author applied association rules and cluster analysis to analyze consumer adumbration, lifestyle habits and purchasing behavior. Based on the analysis authors created models for consumer purchase preference and demand in order to generate different marketing alternatives for decisions. In [9] authors put together internet shopping and home delivery, and try to make use of association guidelines to establish unknown bundling of new goods and also non fresh goods in a hypermarket. Customers are then split up in clusters by clustering studies, and also the catalog was created based on every one of the cluster's consumption preferences. By this particular technique, to boost the catalogue's appeal to clients, hypermarkets are offered an internet shopping and home delivery company model for product sales services and propositions. With such a model, writer expects to draw in a lot more clients opened up more large marketplaces, and also get the higher profits for hypermarkets. In [ten] authors applied Fuzzy C Means (FCM) technique to bunch the consumers in online shopping and determine the unique facilities in the proper marketing techniques according to the consumer wants. Through this particular customer satisfaction is improved.

3. Clustering

Clustering is the procedure of grouping equivalent entities together. The objective of the unsupervised machine learning strategy is finding parallels in the information point and group related data points together. Grouping similar entities together help profile the characteristics of organizations that are different. Put simply, which can give us insight into underlying patterns of organizations that are different? There are lots of uses of grouping unlabeled details, for instance, to determine various groups/segments of clients and market every number in an alternative method to optimize the earnings. In this particular work, hierarchical clustering is applied. Hierarchical clustering entails creating clusters which have a predetermined ordering from the best to bottom. You will find 2 kinds of hierarchical clustering, Divisive and Agglomerative.



In divisive or top-down clustering method all of the observations are assigned to a single cluster and then cluster is partitioned into two least similar clusters. Proceeding like this, recursively on each cluster until there is one cluster for each observation. There is evidence that divisive algorithms produce more accurate hierarchies than agglomerative algorithms in some circumstances but is conceptually more complex. In agglomerative or bottom-up clustering method each observation is assigned to its own cluster. Then, the similarity (e.g., distance) is computed between each of the clusters and two most similar clusters are joined. Finally, repeat steps 2 and 3 until there is only a single cluster left. The related algorithm is shown below.

Given:

A set X of objects $\{x_1, \dots, x_n\}$

A distance function $dist(c_1, c_2)$

for $i = 1$ to n

$c_i = \{x_i\}$

end for

$C = \{c_1, \dots, c_n\}$

$l = n + 1$

while $C.size > 1$ **do**

- $(c_{min1}, c_{min2}) = \text{minimum } dist(c_i, c_j) \text{ for all } c_i, c_j \text{ in } C$

- remove c_{min1} and c_{min2} from C

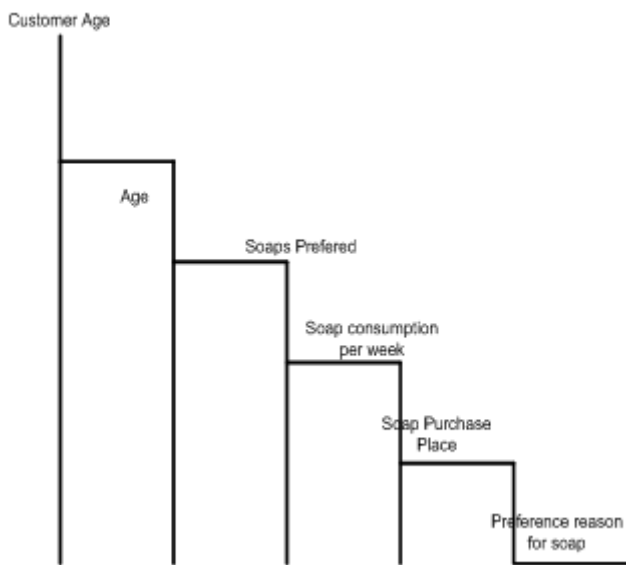
- add $\{c_{min1}, c_{min2}\}$ to C

- $l = l + 1$

end while

4. Case Study

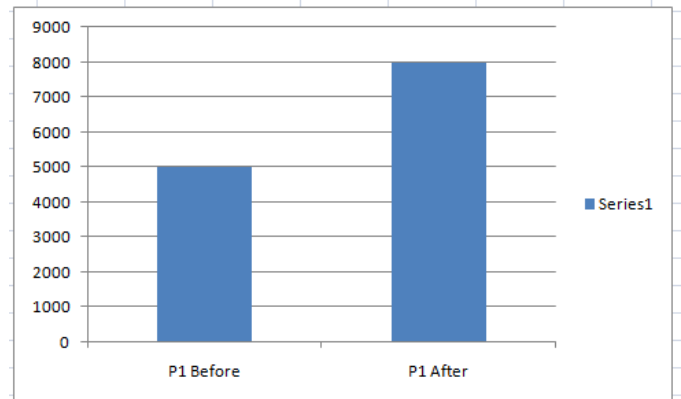
Data mining analysis using hierarchical Agglomerative clustering was applied for the case of improving customer satisfaction of the company located in Pune (India) which deals with bath soaps. Bath soap segment is a heavily competitive segment in INDIA with more than 20 brands competing in this segment. The companies in this segment have to innovate every frequently in terms of marketing mix to gain customer base and retain existing customer support, which could be done using traditional methods. To analyze the effect of marketing strategy on customer satisfaction, this study placed questionnaires at all major shopping malls and centres across Pune. Customers were asked to fill the questionnaire before and after marketing strategy launch. The questionnaire covered various details about customer preference for soaps, their purchasing behavior and the marketing influence of customer in product selection. The questionnaire also had various other attributes like age, salary etc. The questionnaire answers before a marketing strategy launch are dumped to data set file (prevdataset) and the answers before a marketing strategy launch are dumped to data set file (post dataset). Hierarchical Agglomerative clustering is done on both prevdataset and post dataset. Following are the cluster hierarchy created by the clustering algorithm.



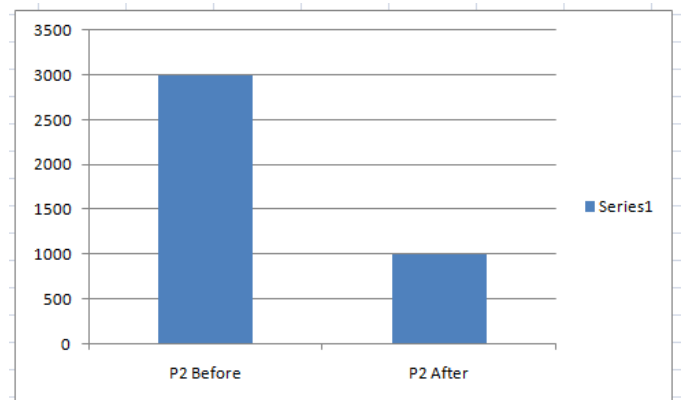
From the cluster created from the prevdataset and post dataset following parameters are collected for different age groups based on the marketing strategy designed for that age group.

1. Number of customer moved from other Soap cluster to Soap Cluster of the company(P1)
2. Number of customer moved from Company soap cluster to other soap cluster.(P2)
3. Number of customer soap purchase place changed (P3)
4. Number of customer preference reason for soap changed (P4)
5. Change in consumption of soaps consumption per week for company's soap (P5)
6. Change in consumption of soaps consumption per week for other company's soap (P6)

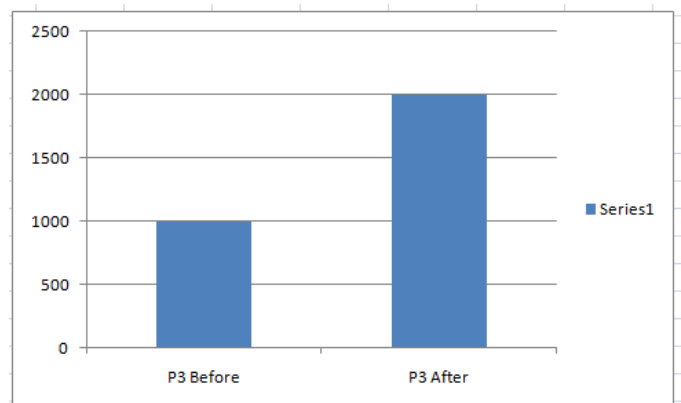
Advertisement strategy and product position strategy are devised based on the answers to the advertisement category questions in the questionnaire. Following results were collected for 3 month marketing strategy implementation. Each of the parameter P1 to P6 are collected before launching the marketing strategy and after 3 months of launch of marketing strategy.



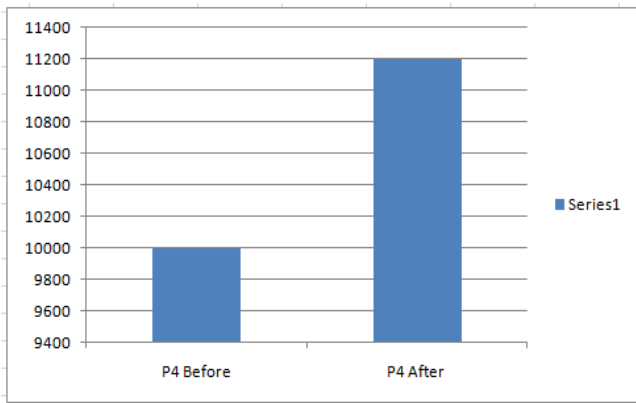
The result shows that the marketing strategy is effective to increase the sale of the soap for the company.



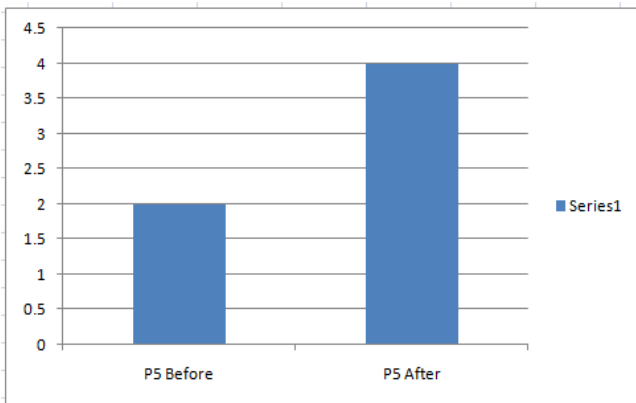
The result shows that the marketing strategy is effective to reduce the churn rate.



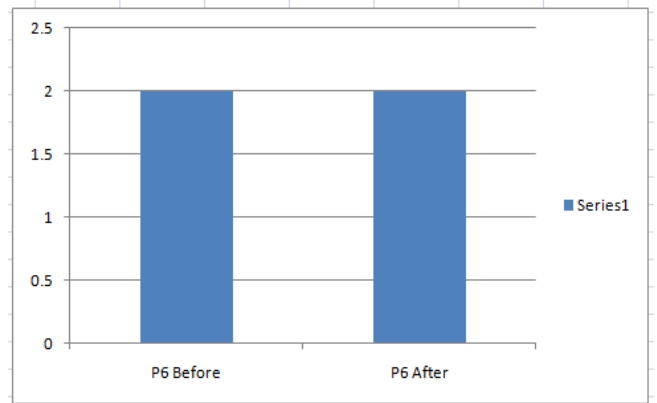
The result shows that the marketing position strategy ensuring the availability of soap at the place where customer prefers.



The result shows that the marketing strategy is effective to change the preference reasons.



The result shows that the marketing strategy is effective to increase the number of soaps consumed per week for the companies soap.



The result shows that the marketing strategy needs to be improved as it has not reduced the soap consumption of other companies and a competitive strategy must be improvised.

5. Conclusion

Hierarchical Agglomerative clustering analysis is done on the dataset collected from customer to analyze the impact of the marketing strategy in this work. Use of this clustering helped to gain valuable insights into the efficiency of marketing strategy. The solution thus developed in this work can be applied to any products in any business category.

References

1. Pratik Biswas, ParthaSarathiBishnu. "Application of data mining and CRM in banking sector medical insurance" International Journal of Innovative Research in computer and communication engineering.vol 3, Issue 11 Jan, 2015.
2. Prasad. U. D and Madhavi. S, "prediction of churn behavior of bank customers using data mining tools", Business Intelligence Journal, Vol.5, pp.96-101, 2012.
3. Aponso, K. Karunaratne "Analysis and Prediction Framework: Case Study in Fast Moving Consumer Goods",IJITKM , 2015
4. Ravi Vijayaraghavan , P V Kannan, Applications of data mining and machine learning in online customer care, Proceedings of the 17th ACM SIGKDD international conference on Knowledge discovery and data mining, August 21-24, 2011, San Diego, California, USA
5. Umamaheswari.K and Janakiraman.S, "Role of Data mining in Insurance Industry", an international journal of advanced computer technology, Vol 3, Issue-6, pp.2014.
6. Sunil Yadav "Knowledge Management in CRM using Data mining Technique", International Journal of Scientific & Engineering Research, Volume 4, Issue 7, July-2013
7. SiddheshChavan, AdityaJadhav "Data Mining Techniques to Improve Customer Relationships Management", International Research Journal of Engineering and Technology Feb 2018
8. Shu-hsien Liao, Yin-ju Chen, Hsin-huaHsieh,"Mining customer knowledge for direct selling and marketing ", Expert Systems with Applications, 2011, 38, 6059– 6069.
9. Shu-hsienLiao,Yin-ju Chen "Mining customer knowledge to implement online shopping and home delivery for supermarkets" ,Expert Systems with Applications: An International Journal,2011
10. LisnaZahrotun "Implementation of data mining technique for customer relationship management (CRM) on online shop tokodiapers.com with fuzzy c-means clustering",2017 2nd International conferences on Information Technology, Information Systems and Electrical Engineering (ICITISEE)