The Connection between Data Mining and Segmentation in Marketing Area

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ABSTRACT: Marketing decisions are sometimes based on intuitive decision making and process is inclusive of marketing people's judgmental calls. By segmenting markets marketers can better understand their customers and target them in efficient and effective manner. Segmentation provides the foundation to address strategic decision making. Data mining converts data into knowledgeable and actionable information. Data mining can be used to forecast and model the future by making past data. Thus, data mining can be used to create data-driven behavioural segments. For marketers both segmentation and data mining is important and needed. It is necessary to understand the connection between data mining and segmentation in marketing. This study unfolds the inter linkages of data mining and segmentation terms in marketing.

KEYWORDS: Data mining, Market Segmentation, Clustering, Targeting, Positioning

I. INTRODUCTION

There are rapid changes happening in global marketplace. Increased competition made it essential to function in cost effective manner. Thus to design marketing strategies researchers and companies need to utilize tools to understand their customers attitudes and behaviour. The information is usually buried too deep to extract using a conventional analysis tool. The power of finding new information helps corporate decision makers to learn more about their customers by performing tasks such as market segmentation, customer profiling, trend forecasting, cross-selling and fraud detection. Data mining and segmentation can be used as informative apparatus for decision making. The purpose of data analysis is to discover previously unknown data characteristics, relationships, dependencies, or trends. Based on the patterns discovered market segmentation is possible. As reverse of this, one need to uncover based on market segmentation the hidden patterns for designing marketing strategies. Thus, data mining can create data-driven behavioural segments. Provided the data mining models are properly built, they can uncover groups with distinct profiles and characteristics and lead to rich segmentation schemes with business meaning and value [1]. Therefore, it suggests establishing the relationship between the data mining and market segmentation. This study unfolds the inter linkages of data mining and segmentation terms in marketing.

Data mining is the process of extracting previously unidentified and actionable information from large, complex databases. Segmentation is a key data mining technique. A segment is a group of consumers that react in a similar way to a particular marketing approach. So the key to segmentation is to decide how to split the database up.

A business can define the characteristics of the segments in advance and then allocate its customers to these groups (this is known as a priori segmentation), or it can use software to analyse the data and identify naturally occurring clusters of behaviour, which then form the basis of the segments. This is the process of data mining known, unsurprisingly, as clustering.

II. RELATED WORK

Wang W. and Fan S. [2] stated that, in a consumer society, marketers are interested in the behaviors of mainstream consumers, but also would want to focus on the most valuable customers. Mainstream consumers appreciate and value the product/service and convey these to different segments of customers. According to authors Consumers within these segments again carry different levels of appreciation of the product/service. Some of them are high value, corresponding to valuable customers. Some of them are low value, those that we could let go. Customers in such segments are further broken into smaller groups until appreciation and value harmonize. Interplay of recognizing proper segments for a given product/service and refining the product/service for the relevant segments is one important factor in successful businesses. Authors suggested that the Data mining tools predict future trends and behaviors, allowing businesses to make proactive, knowledge-driven decisions. The automated, prospective analyses offered by data mining move beyond the analyses of past events provided by retrospective tools typical of decision support systems. According to the author, TraMy Ngoc Do [3], market segmentation is becoming very familiar and essential to every marketer in the process of designing and implementing an effective target-marketing strategy. Therefore, the motivation for his thesis is to discover a segmentation based on this purchasing behavior among whole range of products, which is called purchasing pattern. The Purchasing pattern is interpreted by purchasing portfolios, which include list of categories that a certain customer purchases and also consumption behavior on these categories. In his study he acknowledged other related theories to design a theoretical model of market segmentation based on purchasing portfolios. Then, applied data mining techniques to process a practical database in order to test the theory's hypotheses, as well as illustrate for the model. Finally concluded the results using data mining has shown four segments from the analysis of purchasing portfolios. Authors McCarty & Hastak [4] explained in there paper that direct marketing has become more efficient in recent years because of the use of data-mining techniques that allow marketers to better segment their customer databases.

Robert Groth [5] in his book "Data Mining: A hand on approach for business professionals" summaries and explain the current field of data mining and talks about some popular tools on the market that could be of use to anyone who is considering data mining. He analyzed the data mining software called Knowledge Seeker, which uses the decision tree approach to data mining and concluded that data could be grouped in optimal ways and this can be very useful if you are looking at market segmentation studies. While summarizing the typical industries that make use of data mining as a tool, author stated that direct mail and mailing is another area where data mining is widely used, almost all types of retailers' use direct marketing, and their main concern is to have information about customer segmentation, which in data mining is a clustering problem.

Tsai & Chiu [6] in their study stated that traditionally, a marketer segments a market using general variables such as customer demographics and lifestyle. However, several problems have been identified and make the segmentation result unreliable. Thus, they developed a novel market segmentation methodology based on product specific variables such as items purchased and the associative monetary transactional history of customers. This identifies groups of customers with similar purchasing behaviors with a more homogeneous response to marketing programs. A genetic algorithm (GA) approach is developed in this methodology that increases the clustering quality. This ensures that customers in the same cluster have the closet similar purchase patterns.

III. DATA MINING

Data Mining (DM) as an interdisciplinary field draws statistical analysis, database system, machine learning, pattern recognition, neural networks, fuzzy systems and other soft computing techniques[7]. The purpose of data mining is to create decision making models for estimation of the behaviours in the future based on the analysis of the past activities [8]. Data mining is knowledge discovery using a sophisticated blend of techniques from traditional statistics, artificial intelligence, and computer graphics [9]. As compare to traditional DSS tools, data mining is proactive. Data mining tools analyse the data and uncover problems or opportunities hidden in the data relationships. Based on the findings one can design the computer models to predict business behaviour requiring minimal end-user intervention. End-user gains knowledge that may yield competitive advantage. Data Mining uses well-established statistical and machine learning techniques to help marketing professionals to improve their understanding of customer behaviour. In turn, this better

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understanding allows them to target marketing campaigns more accurately and to align campaigns more closely with the needs, wants and attitudes of customers and prospects. The technology enhances the procedure by automating the mining process, integrating it with commercial data warehouses, and presenting it in a relevant way for business users. Data mining tools use advanced techniques from knowledge discovery, artificial intelligence, and other fields to obtain "knowledge" and apply it to business need. Knowledge is then used to make predictions of events or forecasts of values.

IV. SEGMENTATION IN MARKETING

Market segmentation is the segmentation of markets into homogenous groups of customers, each of them reacting differently to promotion, communication, pricing and other variables of the marketing mix. Market segments are formed in a way to show the differences between customers within each segment. Thus, every segment can be addressed with an individually targeted marketing mix.

A market segment consists of a group of customers who share a similar set of needs and wants. It is the marketer's task to identify the segments and decide whom to target. Niche marketing is a more narrowly defined customer group seeking a distinctive mix of benefits. Marketers usually identify niches by dividing a segment into sub segments. The customers in the niche have a distinct set of need for which they are ready to pay a premium to the firm that best satisfied their needs. The niche is not likely to attract other competitors; it gains certain economies through specialization. Niche always has size, profit and growth potentials. Segments are fairly large and normally attract many competitors whereas niches are fairly small and normally attract only one or two competitors. Grassroots marketing or local marketing activities concentrate on getting as close and personally relevant to individual customers as possible. The ultimate level of segmentation leads to customized marketing or one-to-one marketing. However not every company will go for customization as it leads to raise the cost of product or service by more than the customer is willing to pay.

The major segmentation variables are geographic, demographic, psychographic and behavioural. It may be that the top priority of the business is prospecting for new customers or retaining existing customers or cross selling to existing customers. Different business priorities will tend to make some dimensions of segmentation more important than others.

V. USE OF DATA MINING AND SEGMENTATION IN MARKETING

Peacock (1998) identifies several potential uses that data mining has in the area of marketing, including customer acquisition, customer retention, customer abandonment and market basket analysis [10]. Thus comparison between data mining and segmentation is made in this study considering the above mentioned areas of marketing.

Customer acquisition: Marketers can use data mining methods to discover the attributes that can predict customers' responses to offers and promotion programs. Thus customer acquisition is possible by matching to those attributes for converting non-customer to respond to new offers and promotions. However, in segmentation normally the group of people is of similar needs, characteristics or behaviours. Thus for customer acquisition similar type of segment needs to be targeted with similar offers and promotion programs.

Customer retention: Using data mining one can identify the customers who contributes less in company sales and who may be likely to leave and go to a competitor. There might be various reasons for the same. Accordingly the company can design special offers and incentives to retain such customers sufficing there requirements. In market segmentation, as long as the offers are suitable to the specific segment no such problem of customer retention arises. However, in segmentation marketers have to come up with additional offers and incentives for a segment customers sufficing there additional requirements.

Customer abandonment: Data mining can be used to found out whether a customer has a negative impact on the company's bottom line [11]. It will be better for the company to reject such customer which cost adversely rather than contributing to the growth. In case of segmentation normally targeting is done. Targeting means the actual selection of

segment the company want to serve whose needs a product is specifically designed to satisfy. Thus, in segmentation company needs to manage the satisfaction level of customers rather than rejecting them.

Market basket analysis: Retailers and direct marketers can use market basket analysis technique of data mining to find product affinities. By identifying the associations between products purchase in point of sale transaction retailers can develop focused promotion strategies. Segmentation uses positioning technique. Positioning is selecting the marketing mix of products most appropriate for the target segment(s). Positioning is to enable customers to form a mental image of company's product in their minds with relation the other products available.

VI. CONCLUSIONS

This study would like to conclude segmentation sits at the beginning of value creation chain in marketing whereas data mining is at other end of value chain.

Fig. 1: Comparison of Segmentation and Data mining

Segmentation operates fair roughly whereas data mining techniques give predictions about each subject, allowing decisions to be made with great precision. Practical significance of segmentation in marketing is understood in the study. However, data mining technique can be used as a tool for proper segmentation in marketing. If the data mining models are built properly, such models/techniques can discover the segments with different profile and characteristics which will lead to rich analysis based segmentation scheme rather just behavioral based segmentation on business rules. This will increase the business meaning and value for segmentation.

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BIOGRAPHY

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