STATISTICAL ANALYSIS OF MARKET SEGMENTATION AND MARKETING STRATEGY

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ABSTRACT: To ensure and establish a development strategy scientifically and reasonably, we need to carry out a more accurate prediction for the future. The paper has studied the beneficial segmentation status of market with the statistical methods of factor analysis and cluster analysis. With the purpose of profit-maximization, suppliers are constantly researching the bidding strategy when bidding into the auction of balancing market. There are two mainstreams of auction mechanisms in balancing markets: "uniform-price auction" based on marginal fuel cost and "payas-bid auction" with discriminatory pricing. Here uniform price is taken as market segmentation method and pay as bid is taken as marketing strategy. Market segmentation is the important basis and precondition of electronic commerce while electronic commerce is the key for services enterprise to success. So, nowadays pay much attention to online services market segmentation risk becomes the first important matter to electronic commerce service enterprise, by analysing the connotation, variety, feature and forms of online services.

KEY WORDS: Market Segmentation, Marketing strategy, Statistical Analysis, uniform-price auction method, payas-bid auction method.

I.INTRODUCTION

Market segmentation has become one of most important concepts of marketing discipline since fmt presented by Wendell Smith in 1956. Faced with an intensively competitive market place, a FM could greatly benefit from following the market segmentation strategy. Such benefits are appealing: a full understanding of a market: the ability of predicting consumers' behaviours accurately: and an increased likelihood of detecting and exploiting new market opportunities.

Therefore, it is not surprising that a huge number of market Segmentation methods have been proposed for decades. However, the advancement of Market segmentation research requires a narrowing of the gap between the academy-oriented research on market segmentation and its real-world application. One conventional approach is to categorize customers into uniform groups, using some known or suspected relevant measure, and assume these groups will respond differently to their marketing efforts. Examples include demographic measures, geographic regions, lifestyle, situation etc. Meanwhile, another approach is generally acknowledged better 131 such approach segments market through a more data-intensive, post-hoc procedure employing cluster analysis or similar algorithms based on data sets obtained from market survey. An official report presented to San Francisco Bay Area Water Transit Authority produced by Cambridge Systematics, Inc and Mark Bradley Research & Consulting outlined the general framework of the post-hoc market segmentation approach 1 .Collecting basic data via market survey: 2.Identifying Critical Attributes (by some special techniques such as Factor Analysis) - To identify the latent critical variables which can be used to segment the respondents: 3.Segmenting the Market (by Cluster Analysis): 4.Presenting and Interpreting the Segmenting Result.

Unfortunately the post-hoc segmentation approach above would encounter a tough problem of how to select the appropriate market variables to perform the market segmentation procedure. As most segmentation methods make the assumption that the selected market variables should have a strong comlabon with consumers' purchase behaviours, for example, one may partition a market by consumed occupation, income, age, sex and so, yet such variables may not be bully related to the fmal purchase-decision. In fact, the strategy of choosing the right partition variables is not easy in real business \world. Hence, there are lots of misleading or invalid segmentation results from the wrongly choosing of market variables, which leads to the doubt about the belief that segmentation leads inevitably to better decision making. To solve such problem, some researchers advised to segment marketplace based on consumers' preference data. However, the implementation details from the technical perspective are not given.

II. BACKGROUND

Smith and Wendell (1956) first put forward the concept of market segmentation, considering that customers' demand for products and services have heterogeneity. Market segmentation is to decompose the heterogeneous market into plenty of smaller homogeneous markets, in order to adapt to different customers' preferences and desire, meet consumers' different demands and realize consumers' satisfaction. Tony Lunn brought forward two schools of market segmentation research. One school is consumer-oriented segmentation, whose key point is to classify consumers' demand and behavioural characteristics. Consumers are grouped mainly taking their demographic, behavioural and psychological characteristics as segmentation standards, in which demographic characteristics contains external properties that consumers emerge, behavioural elements are shown as consumers' specific purchasing behaviour, while psychological characteristics reflect not only consumers' behaviour, but also include their interests and attitudes.

The other school is product-oriented market segmentation, which is to segment consumers around a certain consumption situation of a product or a brand according to different marketing decision targets. Segmentation variables include service condition (quantity, frequency) of the product (brand), consumption attitude, interest and etc., whose purpose is to understand consumers' psychological need and consuming behavioural diversities to a product, thus choose the appropriate target consumer group and the corresponding marketing strategy. Lazer (1963) first proposed to identify and segment consumers taking the way of life as the background, while the way of life is a systematic concept. In 1971, Wells and Tigert pointed out to express the way of life from three dimensions, which are Activity, Interests and Opinion. Hughes (1994) proposed to describe and distinguish consumers from three behavioural variables, which are regency, frequency and monetary, namely RFM analysis. Marcus (1998) amended RFM method using two-dimensional consumer value matrix model which is structured by frequency and average monetary. Haley (1963) first proposed interest segmentation, using causal elements rather than descriptive factors to carry through market recognition, whose main difference with traditional segmentation method is that it excavates the real interests behind through consumers representative behaviour, attitude and motivation.

Factor analysis, fitting analysis, cluster analysis, artificial neural network, multidimensional dimension analysis and etc. are commonly used methods of market segmentation. This paper adopts the mutual combination of factor analysis and cluster analysis. Kim and Mueller (1978) summarized the basic theories using factor analysis to segment customers, including the recognition of crytic structures or "factors" which can explain relevancies between a series of variables, the hypothesis test of related variables' structures, the generalization of initial mass variables with a few derivative variables and the confirmation of dimension amount that need to be expressed.

The idea of fitting analysis is to identify the consumer groups with the same or similar preference based on evaluating the preference of individuals or groups. Boone and Roehm (2002) studied Hopfield and Kagmar (HK) clustering method with Hopfield artificial neural network technology to segment customers. Through dimension reduction, factor analysis expresses the original variables with the sum of the linear combination of less common factors and the special factors. When the accumulative variance (contribution rate) of several common factors reached a certain percentage, it shows that these common factors intensively reflect most information of the original variables, while common factors are irrelevant and information are non-overlapping. Cluster analysis is a multivariate statistical analysis method to classify according to the similarities between variables (indexes), whose principle is that individuals in the same category have larger similarity while individuals in different categories have larger diversity. This paper adopts factor analysis to refine the common factors through observation variables and calculate the scores of all samples on each factor. Each common factor reflects a certain nature of the sample. Carrying on clustering regression analysis of the sample with the factor scores, taking the common factors as the dimensions of market segmentation and segmenting out several markets can provide basis for the companies to select target market.

III.PRINCIPLES OF MARKET SEGMENTATION ANDMARKETING STRATEGY ANALYSIS

Segmenting Online services market is based on different behaviours and preference in customers, the goal is to allocate customers into categories the minimize variance within groups and maximize variance between groups. Web services market can be divided into many segmented markets, each consisting of customers that have the same behaviours, preference and needs. In the same services market, customers nearly have the same needs; but there have obvious difference in different services market. Online services market segments can be identified on the basis of their lifestyles and behaviours. Three main categories are described as follows. The first are group to buy computers in their lives and at work, and they spend more than ten hours on the Internet each week. But most of the services they bought are computer related services, and they are more likely to buy from online expert marketers. The seconds are those for whom the Internet is a tool to do their job. Although they are heavy users, they are not necessarily online shopping enthusiasts. They can't live without it, but increasingly they are questioning whether they enjoy living with it, and sometimes they refuse to spend another minute looking at a computer screen in spare time. Of course, that doesn't mean they may not buy some items were clearly there is an advantage, but the advantage must be clear, they must have a reason to go to your site and spend their precious leisure time online. The third consumers are those who use the Internet sometimes during work and occasionally at home. If online retailers want to enhance sales, growth will have to come from this segment. And most businesses today don't expect a surge in the number of daily dependents, unless there are new technology applications that increase Internet dependence in more jobs. The increase in the number of e-trade is concentrated mainly among average consumers. This group represents the best segments and greatest growth areas for B2C e-business. So e-traders should understand the minds and information of these ordinary consumers, offer specialized services for them, in that they can perform business functions efficiently.

The concept of strategy has evolved from long-term planning. It involves the determination of long term objectives of an enterprise and the adoption of course of actions by considering the strengths and weaknesses in the internal environment, the opportunities and threats in the external environment. Successful implementation of services market segmentation strategies involves matching market opportunities with the firm's capability for developing marketing programs. Viable services market segments should be scrutinized according to the following criterion: The first is Measurability criterion. It's the degree of difficulty and easy for firms in obtaining the size, attribution and behaviour of the segment. The segment not only has the clear boundary, but also can be easily identified in its size and characteristics. It's also the degree of difficulty and ease for firms to go into the target market and services for them effectively. The seconds is Substantiality criterion. It means that the profitability of target segment is worthy to be developed by firms. Market size is large enough to generate enough volume to support the development, services costs needed to satisfy the segments. The third is Stability criterion. It means that the segment must keep a stable state during certain time in order to take a long-term services market strategy for firms, develop and take up the segment effectively, get the expected profit at last.

IV. STATISTICAL ALANYSIS

In the market segmentation and marketing strategy, "Uniform-Price" auction and "Pay-as-Bid" auction are widely adopted as a successful bidding method. Figure 1 shows the image of the bidding method of "Uniform-Price" auction in which the clearing price is determined by the highest bid price on the winning bid. In general, bidding strategies tend to be selected according to their marginal costs, but they can be empirically modelled to select high-value bids according to the situation of supply and demand. In the balancing power market, if the imbalance capacity is satisfied as demand, it is made a successful bid in order from the low bidding price as shown in the Figure 1. For example, in Figure 1, the biddings of G0 to G3 are awarded and the market clearing price is the bid price of the G3 generator.

"Pay-as-Bid" auction method is different from "Uniform Price" auction method, the clearing price is determined as bid price for each bidding company. When the bidding strategy shown in Figure 2 is taken, the balancing power supplier who made a successful bid in balancing power market are G1, G3, G2 and part of G4, and the clearing price of each successful bidder carries out market clearing at each bidding price. The area of the yellow portion in Figure 2 represents the profit of each supplier. Therefore, in order to maximize the profit of each bidding supplier, it is important to predict the market settlement price as accurately as possible and to bid accordingly. From figure (3) it can observe that the output of analysis of marketing strategy and marketing segmentation.

Fig. 1. "Uniform-Price" auction model

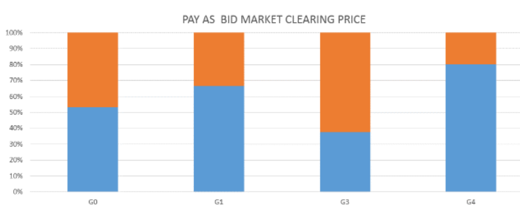

Fig. 2. "Pay-as-Bid" auction model

V. CONCLUSION

In this paper, we used Uniform-Price as market segmentation and "Pay-as-Bid" method for marketing strategy under the same bidding condition. The statistical analysis shows that market segmentation risk becomes the first important matter to electronic commerce service enterprise. The cluster analysis of the chosen sample of respondents explained a lot about the possible segments. The initial cluster centres were chosen and then final stable cluster centres were computed by continuing number of segmentations. The future work will involve more trials and automation of the market forecasting and planning

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