



## Artículo

## Customer segmentation model based on value generation for marketing strategies formulation

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## ABSTRACT

When deciding in which segment to invest or how to distribute the marketing budget, managers generally take risks in making decisions without considering the real impact every client or segment has over organizational profits. In this paper, a segmentation framework is proposed that considers, firstly, the calculation of customer lifetime value, the current value, and client loyalty, and then the building of client segments by self-organized maps. The effectiveness of the proposed method is demonstrated with an empirical study in a cane sugar mill where a total of 9 segments of interest were identified for decision making.

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## Modelo de segmentación de clientes basado en la generación de valor para la formulación de estrategias de mercadeo

## RESUMEN

Cuando se está decidiendo en qué segmento invertir o cómo distribuir el presupuesto de marketing, los Gerentes corren el riesgo de terminar tomando decisiones de manera general sin considerar el verdadero impacto que tiene cada cliente o segmento de clientes en las utilidades de la organización. En este artículo, se propone un modelo de segmentación de clientes que considera en primera instancia el cálculo de tres dimensiones: el valor de cliente en su ciclo de vida, el valor actual y la lealtad; para posteriormente construir los segmentos mediante mapas auto-organizados. La efectividad del modelo se probó en un Ingenio Azucarero donde se identificaron 9 segmentos de interés para la toma de decisiones de marketing.

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## Modelo de segmentação do cliente baseado na criação de valor para a formulação de estratégias de marketing

## RESUMO

Quando se está a decidir em que segmento investir ou como distribuir o orçamento de marketing, os Gestores arriscam ao tomar decisões de uma maneira geral, sem considerar o impacto real que cada cliente ou segmento tem sobre os lucros da organização. Neste artigo, propõe-se uma estrutura de segmentação que considera, em primeiro lugar, o cálculo do valor do cliente ao longo da vida, o valor actual e a fidelidade do cliente, e depois a construção de segmentos de clientes através de mapas auto-organizados. A eficácia do método proposto é demonstrada através de um estudo empírico sobre uma fábrica de cana-de-açúcar, em que um total de 9 segmentos de interesse foram identificados para a tomada de decisões.

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## 1. Introduction

From the modern management perspective, maximizing customer value is the key to surviving fierce competition in the business world. Differentiating more profitable customers from less profitable customers and focusing on lifelong, rather than short-term, customer relationships are key business strategies for survival in today's competitive marketplace (Chan & Ip, 2011). As result, building long-term customer loyalty is crucial to business sustainability (Keh & Lee, 2006; Kumar & Reinartz, 2006; Lars, 2007).

Mulhern (1999) proposed that customer value based on profit is an important base for behavior segmentation, due to central importance of benefits. Looking forward to keeping customers, who generates most benefits as well as maximize their profit, enterprises start managing their customer portfolio as a fundamental asset for achieving a sustainable competitive advantage along time, which has required modifying from transactional marketing philosophy to relation marketing. Therefore, business and marketing approach must fundamentally focus on customer or customer value (Rust, Zeithaml, & Lemon, 2000). What it means, a new vision looked at customer select and manage for optimizing their value in a long term. The customer diverse segments have a potential different benefit for companies and benefit pattern could vary depending on the period where customer life cycle is and other considerations. Looking after the customer group which represents the most valuable customers during the time, it could significantly increase the company benefit (Payne & Holt, 2001). By this way, resources and an appropriate business strategy can then be allocated and formulated respectively for business sustainability (Kumar & Reinartz, 2006). In addition, Bayón, Gutsche, and Bauer (2002) recognized that possible investors need to be convinced of the amount and sustainability of a calculated customer value.

A way to identify the most valuable customers is through benefit criteria which could be applicable in whatever kind of business. Customer value has been studied under the name of lifetime value (LTV), customer lifetime value (CLV), customer equity (CE), and customer profitability (Hwang, Jung, & Suh, 2004). Researchers have tried different methods to calculate the value of individual customer to make rankings of individual clients or segments or even predictions of the value, as can be found in Verhoef and Donkers (2001), Jain and Singh (2002), Bayón et al. (2002), Stahl, Matzler, and Hinterhuber (2003), Hwang et al. (2004), Venkatesan and Kumar (2004), Gupta and Lehmann (2006), Kim, Jung, Suh, and Hwang (2006), Khajvand, Zolfaghar, Ashoori, and Alizadeh (2011), Han, Lu, and Leung (2012) and Verbeke, Dejaeger, Martens, Hur, and Baesens (2012).

In addition to that, there are different ways to describe customer behavior; one of these is using Kohonen self-organizing maps (SOM) that recently have been important. Self-organizing maps are a particular type of neural network used for clustering and data visualization (Criado, Arroyo, & López, 2005).

Researches about segmentation using SOM could be found out in Lee, Suh, Kim, and Lee (2004), Jonathan (2005), Kuo, Wang, Hu, and Chou (2005), Kiang, Hu, and Fisher (2006), Kim et al. (2006), Kuo, An, Wang, and Chung (2006), Ghaseminezhad and Karami (2011), Hanafizadeh and Mirzazadeh (2011), Ordóñez, Dafonte, Arcay, and Manteiga (2012), Sahoo, Zuo, and Tiwari (2012), Seret, Verbraken, Versailles, and Baesens (2012), Wei, Lin, Weng, and Wu (2012), Chattopadhyay, Dan, and Mazumdar (2012), Chien-Wen (2012), Hong and Kim (2012). As can be seen, the trend of using SOM in segmentation has increased last year.

In this paper, a segmentation model with a customer value base, integrating different approaches from marketing and quantitative analysis is proposed. First, three criteria were selected

from different alternatives proposed by researchers. As a result, customer lifetime value (CLV), the current value and the client loyalty were decided as segmentation criteria. After considering the details for the calculation of every criterion in the company, the neural network for the analysis was developed. The segmentation of the database was performed by the Neural Network Clustering Tool (nctool), the way as Matlab solves clustering problems. As part of the simulation process, running the training with different number of segments is considered in order to find out the best way of clustering. Last step of this method is the calculation of the real value of every segment identified by SOM in order to know how important every one for financial results in the company is.

This paper is built in two sections: first, the detail about the segmentation model is presented, and second, the effectiveness of the proposed method is demonstrated with an empirical study of one of the largest producers of sugar cane in Colombia. In this company, one of its commercial lines which spend about USD 2 million per year in generic marketing campaigns segmented its national and international client database. The experimental results demonstrate that the proposed method can more effectively target valuable customers than actual method. This supports the idea that investing big amount of money in marketing campaigns with no reference about the weight or importance of the clients is not sustainable in these days.

## 2. Customer segmentation model

The proposed segmentation method is based on LTV calculation proposed by Kim et al. (2006) and Hwang et al. (2004) that considered three factors: current value, potential value, and customer loyalty. In addition, self-organizing maps are used as a tool for clustering the customer database and identifying the most valuable customers. The model considers the following steps.

### 2.1. Step 1: customer specification

First, it is necessary to define the scope of the analysis that will be done by defining business unit, geographical coverage, kind of product, customer aggregation level, the active or inactive status client, as well as the time that will be covered by the analysis. Making clear these parameters, the organization could perform better analysis and even plan the analysis in different levels.

### 2.2. Step 2: sales identification and payments done by customers

To continue with the process, some information about financial transactions has to be calculated for every customer. For revenues, the following has to be calculated:

- Compilation of customers' historical purchase: information about transactions done by customer in the period of analysis should be recollected.
- Compilation of customer arrears in payment: information about payment date of customer obligation in the period of analysis should be recollected, with the goal of identifying payments which was done after payment date. This information will be used in the next chapter for doing the calculation of customer earned value.
- Assignment cost: variable costs and customer acquisition costs should be identified.

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