

How to Equip Students with Methodologies and Tools for Capturing Rapidly Changing Environments through Computer Supported Education

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Abstract: In the midst of the global mega-competition, the most competitive battle fields of economy, often referred to as the tripod consisting of the United States, EU and Japan, has entered the matured market economy where consumers are interested in acquiring goods and services to fit their particular needs, demanding a variety of products and services in small quantities. Accordingly, corporations now have to deal with segmented submarkets which change quite rapidly. For achieving the leading competitiveness in this new environment, it is no longer sufficient to capture the entire market as a whole. Instead, it is necessary to trace and analyze the segmented submarkets separately. In order to overcome this difficulty, methodologies and tools are needed for extracting effective managerial implications from the massive data collected through the Internet with speed and accuracy. The purpose of this paper is to demonstrate how to equip students with such methodologies and tools through computer supported education.

1 INTRODUCTION

The growing market economy may be characterized by the fact that consumers share the sense of lacking goods and services for consumption and are eager to possess what others have. In contrast, in the matured market economy, consumers tend to pursue individual tastes in consumption so as to maximize their own sense of satisfaction. In other words, consumers are interested in acquiring goods and services that others may not have but fit their particular needs. Naturally, this trend results in a variety of products and services in small quantities and the market segmentation becomes extremely important. A typical successful R&D strategy in this stage would be the market-in strategy, where a variety of products are introduced into the market in small quantities in response to particular needs in particular market segments. Such products in the matured market economy would have much shorter life cycles than those in the growing market economy, causing rapid changes in the segmented submarkets.

As long as the real economy is concerned, the economies of scale is always present. Since the

matured market economy requires more detailed marketing strategies for individual segmented submarkets, the efficiency resulting from the economies of scale tends to diminish. In other words, if corporations have to deal with separate segmented submarkets in a one-on-one manner, the profit margins would inevitably decrease. In order to overcome this difficulty, methodologies and tools are needed for extracting effective managerial implications from the massive data collected through the Internet.

The central approach for achieving this goal would be to apply the 70-30 principle, proposed by the authors in (Sumita and Yoshii, 2012), to the information processing procedures, where such procedures for separate segmented submarkets are designed 70% in common with remaining 30% for customization so as to cater for peculiarities of individual submarkets. This observation would be valid across many different industrial sectors. Accordingly, from a pedagogical point of view, it is very important to familiarize students with the 70-30 principle applied to information processing, no matter what industrial segment they plan to enter after graduation.

The purpose of this paper is to demonstrate how to equip students with methodologies and tools for implementing the 70-30 principle in information processing through computer supported education. In this paper, we focus on dynamic customer segmentation in e-marketing for enhancing CRM (Customer Relationship Management). A pedagogical training scheme is illustrated explicitly through computer supported education. Furthermore, we clearly outline the procedures for extracting managerial implications from the massive data collected through the Internet.

2 DYNAMIC CUSTOMER SEGMENTATION IN E-MARKETING FOR ENHANCING CRM

More than a decade has passed since the Internet gained its significant presence in the world. It has penetrated into many aspects of business practices and has been drastically changing the traditional business models in almost every industry. In the

retail chain business, for example, it is now possible to collect and accumulate massive data from the market via a POS (Point of Sales) system and utilize them so as to develop effective marketing strategies for enhancing sales of products. An extensive literature exists for analyzing consumer purchasing behaviors based on POS data, represented by (Taguchi, 2010; Eugene, 1997; Ishigaki et al., 2011; Yada et al., 2006) to name only a few.

The problem we face here is the excessive computational burden, where the tremendous amount of POS data collected from the market has to be analyzed repeatedly in a timely manner. In order to overcome this difficulty, we introduce the concept of profile vectors as an intermediary information base between various analytical engines and the DB of POS data.

Figure 1 depicts the basic framework for implementing dynamic customer segmentation. Here, a variety of profile vectors, such as CPV (Customer Profile Vector), PPV (Product Profile Vector) and SPV (Store Profile Vector), are automatically constructed and updated periodically from the DB. These profile vectors are then used by different analytical engines, producing the standard reports

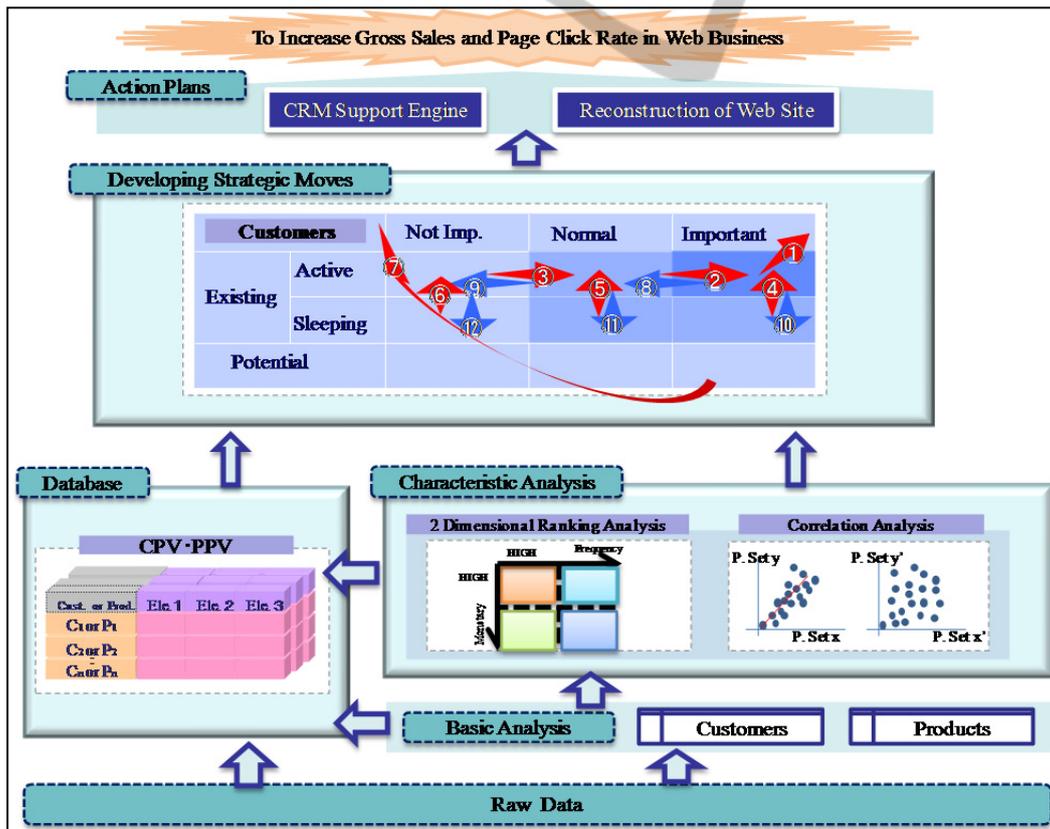


Figure 1: Dynamic customer segmentation for enhancing CRM.

from the basic analysis as well as some ad hoc reports derived from characteristic analyses specified by a manager through the graphic interface. Furthermore, these results are used to update customer segments dynamically so as to yield different marketing strategies applied to different customer segments.

CRM typically means that the lifetime value of a customer is to be maximized by maintaining two way communications between the customer and the company through the Internet. This concept is limited in that the potential customers are not addressed explicitly. By combining POS data with transaction data on the Internet, not necessarily linked to purchasing, it is now possible to capture the entire market as depicted in Figure 1, where the market is decomposed into 9 segments: (Existing-Active, Existing-Sleeping, Potential) \times (Not Important, Normal, Important). The arrows (1) through (7) indicate the desirable changes of the market for the company, whereas the arrows (8) through (12) represent the changes of the market to be avoided. The new marketing approach for enhancing CRM would then be to devise strategic moves so as to promote the moves along favorable arrows and prevent the moves along unfavorable arrows. Since such customer segments have to be updated dynamically, the profile vector approach becomes crucial for containing the underlying computational burden. This example demonstrates the importance of the 70-30 principle in e-Marketing.

For establishing a base for computer supported education through this example, where students can learn how to develop and maintain the dynamic customer segmentation system illustrated in Figure 1 based on the 70-30 principle, a computer simulator for the dynamic customer segmentation system is installed in a server at Sumita Research Laboratory in parallel with the system developed at the collaborating e-business company through the joint research project. Real data collected from the Internet are fed into the simulator once a week. This simulator enables students to actively get involved in the decision process for development and analysis of e-marketing strategies.

3 CONCLUSIONS

In the matured market economy, consumers are interested in acquiring goods and services that others may not have but fit their particular needs so as to maximize their own sense of satisfaction. Naturally, this trend results in a variety of products and

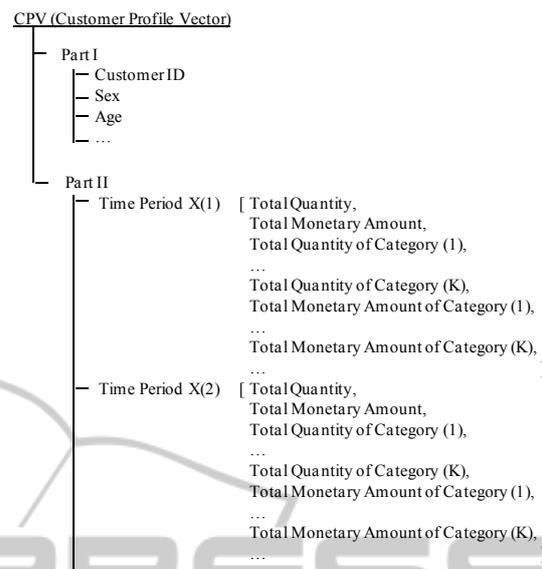


Figure 2: Customer profile vector.

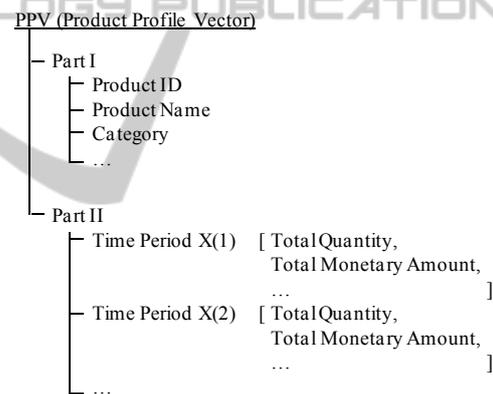


Figure 3: Product profile vector.

services in small quantities and the market segmentation becomes extremely important. Such products introduced in response to segmented submarkets would have much shorter life cycles, causing rapid changes in the segmented submarkets. In this paper, we propose a general scheme involving methodologies and tools for capturing such rapidly changing environments.

The proposed general scheme is based on the 70-30 principle, proposed by the authors in (Sumita and Yoshii, 2012), applied to the information processing procedures, where such procedures for separate segmented submarkets are designed 70% in common with remaining 30% for customization so as to cater for peculiarities of individual submarkets. The key success factor for development of the general scheme is to introduce profile vectors as an

intermediary DB, where the majority of necessary information for running analytical engines can be extracted from such profile vectors without going back to the DB, achieving the necessary speed.

In order to describe the general scheme clearly, one concrete application area is discussed: dynamic customer segmentation in e-marketing for enhancing CRM (Customer Relationship Management). A pedagogical training scheme is illustrated explicitly through computer supported education. Furthermore, we clearly outline the procedures for extracting managerial implications from the massive data collected through the Internet. It is expected that the 70-30 principle applied to massive information processing for capturing rapidly changing environments provides a general guidance to enhance the strategic flexibility and the business agility in other areas to be competitive in the midst of the global mega-competition in the 21st century.

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