Model Development of Customized Marketing Strategy based on Credit Card Data and Social Big Data

Myungki Nam, Jangmook Kang, Sangwon Lee

Abstract: In the Big Data era where data analysis generates new value, there is an increasing demand from Credit Card companies to utilize both external social data as well as internal data to develop their marketing strategies. This new research has triggered new marketing model called SOMO(Social Trend Oriented Marketing Offer). SOMO combines internal data, which includes customer profile and transaction data, with external social data, which includes customer spending preferences and desire. Credit Card companies are able to offer a new customized marketing strategy based on specific consumer groups, each group having been analyzed through this model according to different consumption trends. Moreover, this research is currently testing this model's influence by providing actual card company customers with customized marketing offers. Card companies can analyze both card data and social data in tandem, with "the type of business" entered as a key factor. Then, the company initiates two rounds of marketing to BC Card holders to verify the effect of SOMO model. Based on the results of marketing, the company then further builds a more effective marketing strategy.

Index Terms: Big Data, Social Data, Credit Card Data, Marketing Science, Marketing Strategy

I. INTRODUCTION

The increasing use of smart phones, tablet PCs and various mobile devices, along with the advancing social medias [1], is creating data in such an enormous amount that has never been experienced before. IDC Research forecasts the amount of digital data produced throughout the world will reach 44 zeta bytes in 2020. In the age of Big Data, businesses are recognizing the importance of data analysis and are moving forward to enhance their market competitiveness and make the changing environment a new opportunity for them [2]. In particular, Credit Card companies are the most active industry in creating values through data analysis, as they have been long handling a vast amount of data. They are trying to use their internal data on customer profiles and Credit Card transactions for customized marketing [3, 4] and further maximize their profits from Credit Card fees. However, such customized marketing using internal business data may cause a lot of problems – unconformity caused by using old data for marketing, difficulty of marketing to satisfy diverse customer needs in the modern society, and difficulty of coping with changes in consumption trends which is easily affected by various social events. Therefore, in the age of Big Data, where structured and non-structured data are analyzed to create new values, Credit Card companies require marketing strategies [5, 6, 7, 8, 9, 10] developed from not only the data they own but also the ones outside, such as social data.

With the expansion of tablet and smart phone use, people are now able to access the Internet regardless of time and place, and consumers are sharing a wide variety of information, sometimes showing off what they purchased or evaluating what others purchased through the social media. The social media is a service where users actively engage in through networks, creating and sharing information. The data produced in the social media are useful external data for businesses, through which they can find out what consumers are actually interested in and what they demand. When a business combines the social data, naturally incorporating customer preferences and demands, with its internal business data and use for marketing, it would be able to make marketing more efficient with more detailed standards following the trends [11, 12], and further offer services based on prediction of what consumers want. However, despite such change in external environment, many studies on business marketing portray businesses using the social media as a marketing channel only or using their internal data only for developing marketing strategies. They are lacking efforts to actually utilize social data carrying consumers' preferences and diverse changes of the society for providing customized services.

Therefore, this study offers a new marketing model that combines customer profile and transaction data within the Credit Card companies (structured data) and the external social data portraying various consumer preferences and demands (non-structured data). The study also develops customized marketing strategies using the model and puts them into practice to actual Credit Card customers to verify the effect.

II. RELATED STUDIES

A. Concept and features of big data

The concept of Big Data [13, 14, 15] was first introduced by a global consulting group McKinsey.

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It defined Big Data as 'datasets whose size is beyond the ability of typical database software tools to capture, store, manage, and analyze' and Big Data technology as a new technology designed to effectively

extract values from such data. The global research firm Gartner emphasized the potential of Big Data by comparing it with the oil of the 21st century, and Jack Ma, the founder of Alibaba Group of China also stressed the importance of Big Data by mentioning that the next three decades will see the age of data technology coming. Unlike other data, Big Data can be characterized by 3V – massive 'volume' in terms of physical and conceptual scopes, 'velocity' that ensures real-time production and fast delivery, and 'variety' covering digital images and videos, web documents on social media, and GPS signals from mobile phones. Recently, three more keywords - 'veracity', 'visibility', and 'value' of data analytics – were added to the 3V, making Big Data represented by 6V.

Fig 1 Characteristics of Big Data (6V) (IBM, 2015)

As the amount of data collected and owned by businesses is gradually increasing along with their interest in Big Data, more and more businesses are willing to use Big Data in their business management to create values. In particular, the area where Big Data can be highly used is marketing, for which companies had already analyzed data web search or purchase and recommended products or services. A study found that the areas of business management with the highest Big Data usability were marketing (49%), production management (18%), financial management (15%), new project (14%), and HR (4%). The 2015 survey on Big Data market also showed that Big Data would be used the most in customer management and marketing areas, which are directly related to sales performances [16, 17, 18].

B. Existing studies using big data

Looking at the marketing strategies of Credit Card companies based on the studies carried out so far, they are largely divided into two types – either relying on the internal customer analysis only or using external data only; and using both internal business data and external data. Marketing which solely relies on the internal customer data analysis misses out on a study on potential customers outside the company, ruling out any attempts to convert potential customers to new customers. On the other hand, marketing which solely relies on external customer analysis finds implications after analyzing propensity of general customers outside the company or general market trends, which undoubtedly leads to lack of customer strategies tailored to

the company, and this will even further develop marketing strategies so unreal that they will cause a lot of difficulties in converting potential customers to new customers or bringing back defected customers.

Most of the current studies on marketing strategies of Credit Card companies introduce strategies developed through their internal data analysis. Even some studies that have gone more in-depth are only limited to the cases of marketing based on internal business data analysis. More recently, studies are emphasizing the need for using not only internal data but also external data, along with introductions of actual practices in financial companies; however, there is no study as of yet, which actually develops marketing strategies and finds out the impact of application of such strategies.

C. Need for a new study

In order for a Credit Card company to get marketing benefits from using Big Data, it is necessary that it attempts to fully utilize the features of Big Data. This, again, requires marketing strategies developed upon combination of customers' Credit Card transaction data and external social data which implies consumer characteristics, and empirical studies verifying the impact. This study is highly expected to contribute to the academia as well as in the industry, as it offers marketing strategies which use Credit Card transaction data and social data at the same time, reflecting both the operational data of Credit Card companies and social data portraying consumer characteristics, and verifies the impact through actual marketing tests in real life.

III. MODEL AND METHODOLOGY

A. Defining the study

For the study, a project was organized with BC Card and LG CNS on 'Finding consumption trends and developing a predictive platform based on structured and non-structured Big Data analyses'. The project developed a heterogeneous dataset combination model, obtained Credit Card transaction data of BC Card customers, and verified marketing offer strategies based on the study model as an attempt to find out the effects and limitations of marketing based on combination of social and card data.

Among many consumer trends, this study focused on the trend of 'six-pocket' consumption to measure the impact of the model [19]. 'Six-pocket' generation, the concept first introduced in Japan, originally means young people each receiving pocket money from six adults – parents, grandparents from mother's side, and grandparents from father's side. The concept has been renewed recently to cover mother, father, grandfather, grandmother, aunt, and uncle, as aunts and uncles are delaying their marriage and spending more for their nephews and nieces. This study uses the new concept of six-pocket generation.

Also to design a model to combine social and card data, BC Card's Credit Card sales data (1 million on a daily average) were used as

structured data, and social data from online communities, blogs, and SNS (80,000 on a daily average), crawled by LG CNS, were used as non-structured data. In particular, 500,000 BC Card users who spent KRW 300,000 or more on average for the last three months were extracted through random sampling. Among these customers in the sample group, 2% from each of the 26 customer segments in

BC Card were extracted to make a group of total 8,737 persons, whose Credit Card sales data for one year from 1 July 2014 to 30 June 2015 were used. As for the social data, posts with 50 'six-pocket' keywords such as 'son', 'daughter', 'niece' or 'nephew', 'grandchild', etc. and 10 buying keywords such as 'bought me' and 'bought for me' were extracted, among which 69,770 posts were used to design the model after getting rid of exceptions (purchase of used items – 155,112 posts before application of exception logic).

B. Developing the model

1. Model development

This study developed Social Trend Oriented Marketing Offer (SOMO) model, which combines social and card data to identify connected consumption groups who can be potential new customers and implements marketing that is targeted toward them. Specifically, the model extracts social data (S) and Credit Card transaction data (C) for each consumption trend, standardizes them, combines them using new industry codes, and identifies a new connected consumption group (G) found in the intersection of industries frequently mentioned or related to both social data and card transaction data, to advise on new customized marketing strategies.
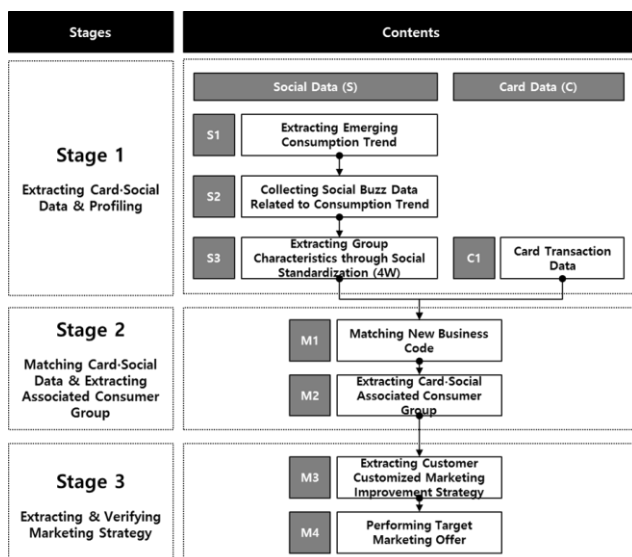

Fig 2 SOMO(Social trend Oriented Marketing Offer) model

The SOMO model development consists of three steps – i) extracting and profiling card and social data, ii) data matching and identifying connected consumption group; and iii) developing and verifying marketing strategies.

IV. RESULTS AND DISCUSSIONS

(Step 1) Extracting and profiling card and social data

Handling of the social data (S) consists of experts' extracting consumer trends (S1), collecting social buzz data related to such trends (S2), and inferring group properties through social data standardization (S3). During the S1 process, experts analyze Credit Card transaction data and various social trends and select emerging consumer trends. The experts, who have years of experience in trend analyses, use all types of global publications including newspapers, magazines, and reports, as well as Credit Card sales data and their empirical knowledge and, before the end of each year, announce 5 consumer trends of the next year.

Table 1 Font social data on consumption prospects

Type	Characteristics	Example
General Experience	Getting suggestions on what to buy	• I went to…. • It was delicious.
Perception/ Exploration	Getting suggestions on what to buy	• What should I buy him/her? • Where do you buy it?
Purchase Consideration	Asking or consulting others before deciding to make a final purchase	• I'm thinking of buying it. • Should I buy it? • I should buy it.
Purchase Completion / Usage Experience	Boasting after purchase or evaluating purchased goods mostly by sharing usage experiences	• I bought it. • I placed an order. • I got it as a gift.

During the S2 process, social trends selected in the S1 process are collected from Twitter, online communities, blogs, and online cafes through the method of web crawling, and documents or posts on consumption prospects are extracted, which can be utilized in actual marketing. While most of the social data generally consist of documents expressing 'daily experiences', documents on 'experiences of purchase and use' should be selected and analyzed for application in actual marketing.

In the S3 process, social data are standardized (5W1H) and group features on consumption trends are extracted. First, the social data in different forms of sentences are standardized under five w's and one h – who, when, where, what, why, and how. As 5W1H are the key elements in describing a case [20], extracting these elements from the collected social media documents would make an ideal set of structured data.

(Step 2) Data matching and identifying connected consumption groups

To interconnect the structured social data in Step 1 with the card transaction data and identify the connected consumption group for individually customized

marketing, there should be a medium connecting the two different forms and types of social data and card data. Connecting these two different datasets requires the 'key' value. In most cases, using the key value to find and match individual identifiers is simple but with privacy issues, it would be important to find a way bypassing the issue of personal information incidents. In such regard, the study focused on the 'industry type (what)' when connecting the two datasets in order to practice marketing that avoids privacy issues, yet increasing sales in the Credit Card company.

First, the Credit Card transaction data need to have new industry codes for better identification, as the columns are showing mixed industry types. For better and easier identification of industry types, the four columns of Credit Card transaction data – affiliate store's industry code, upper-level category, sub-level category, and industry information – are reorganized to create new industry codes. In the meanwhile, the 'what' values of the social data, standardized under 5W1H, are organized and classified into corresponding social trends, and the industry types which can be identified by Credit Card data are finally selected.
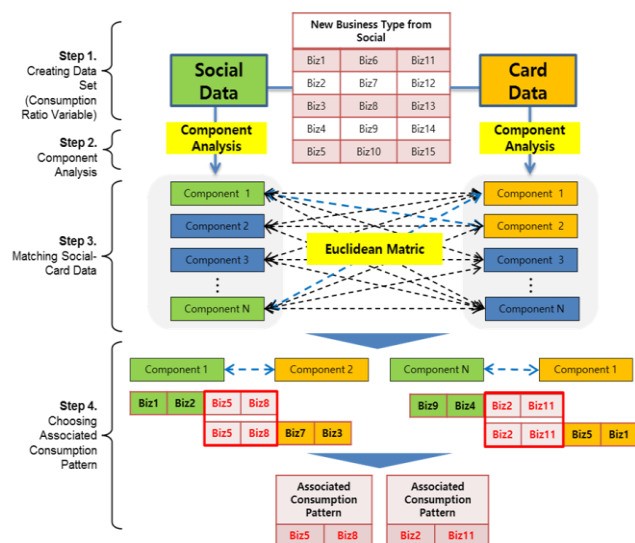

Fig 3 Extraction procedure of associated consumption group

Next, from the card and social data which are connected with new industry codes of consumption trends, a target dataset is again selected based upon the shares of Credit Card sales and mentions in social media. Methods of principal component analysis and Euclidean distance matrix are then applied to this dataset and groups that show connected consumption patterns are selected. The principal component analysis is a method for finding main components of data, which identifies a card dataset and social dataset that best explains each consumption trend. Euclidean distance matrix is applied to these datasets to identify connected consumption groups, whose shares of Credit Card sales and mentions in

the social media are on similar levels. Finally, among the connected consumption groups, identified through combination of the two datasets, more convincing card-social connected consumption groups are selected for marketing that is customized to card users.

(Step 3) Developing and verifying marketing strategies

The three connected consumption groups, which are found to be relatively more convincing through application of the SOMO model, are described. The table shows that industry types 5 and 8 are the types mentioned a lot in social data as well as sold a lot as shown in card data; the industry types 7 and 3 are the ones mentioned a lot in social data but not so much sold as shown in card data; and the industry types 1 and 2 are the ones mentioned little online but actually sold.

Table 2 Examples of associated consumption group

No	Card Data	Card Data ∩ Social Data	Social Data
1	Industry Type 1~ 2	Industry Type 5~8	Industry Type 7~3
2	Industry Type 9~4	Industry Type 2~5	Industry Type 11~15
3	Industry Type 6	Industry Type 3~10	Industry Type 11~13
	…	…	…

The actual marketing is implemented in ways to induce up-selling by providing marketing offers related to card-only industry groups or social-only industry groups as identified through SOMO model.

V. CONCLUSIONS

Most of the Credit Card companies often relied on their internal data only, such as data on the share of sales in each industry type, to analyze customers' consumption or provide marketing based on predictions using the past sales data of the industry, which caused low accuracy rate of the marketing offers. Even though the emergence of social media generated a lot of valuable data outside the company, they used them as a new means of marketing only, rather than combining them with their internal data and using them to classify their customer segments. This study holds its academic significance in that it enhanced data usability in the Big Data age by combining different datasets without any privacy issues, suggested a new methodology of customized marketing and verified the performances. In addition, this study gives significant implications in that it suggested on how to combine the card and social data to provide customized marketing and how to provide marketing offers for connected consumption, and verified the effect of marketing offers, specifically finding out the most effective gender or age groups. The marketing trend recently has changed from product-oriented marketing represented by 4P (product, price, place, and promotion)

to customer-oriented marketing represented by 4R (right customer, right product, right time, and right channel) which is based on understanding of the customers. While the product-oriented marketing strategies focused on the products to decide the price, place, and promotions, the new customer-oriented marketing should define the right customer first and then provide the right products at the right time through the right channels. This study is also meaningful in that it visualized the 4R [21], where it first defined the customer segments by combining the internal Credit Card transaction data with external social data and provided the most effective marketing offers, accurately linking the consumer tendency to sales and offering the right products to the right customers at the right time through the right channels.

The study was conducted for only one consumption trend - 'six-pocket', which is not enough to find out whether the SOMO model-based marketing offers are effective in general. Another limitation is that the marketing effect verification only compared the result of data collected within the test periods. Even though the marketing tests, conducted based upon the analyses on the connective consumption and sales tendency between groups with and without marketing offers, found the marketing offers had positive effect, collecting and using the sales data before the test periods would have enabled more diverse statistical analyses, such as regression analysis, and comparison of the effects. In such regard, future studies would need to expand the scope from the six-pocket consumption to more diverse trends and verify the effect of SOMO model-based marketing strategies customized to consumers. In addition, the sales data before the periods of marketing tests also need to be obtained for more diverse statistical analyses on the effect. Also, the method of combining different datasets without privacy issues should be further applied to finance and other industries so more values can be created in more diverse areas. Lastly, future studies would need to develop marketing strategies, which both businesses and customers are satisfied with, by enabling real-time analysis of consumption trends using the social data, which is combined with card data to offer real-time customized marketing.

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