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Brand Relationship Types Identity and Approximate Reasoning Based on Online Reviews

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Abstract: From the brand relationship's connotation and combining interpersonal communication theories, this study divides Brand Relationship into two dimensions: Cognition and identification. According to the established structure model, the brand relationship is classified into four types: disconnected, functional, affective and loyal. In the internet marketing environment, the study extracts consumer online reviews and computes the cognition, emotion and behavior by using the fuzzy property of natural language. The type of consumer-brand relationships is therefore identified by fuzzy inference computing. A case study is conducted on online reviews of 7-brand mobile phones and the validity of the proposed method is also verified.

Key words: Brand relationship, relationship types, online reviews, affective computing

INTRODUCTION

In recent years, researching on brand becomes a hot issue in the field of marketing. Brand relationship theory is a new research field formed by applying the concept of relationship marketing in the level of brand and product.

Brand relationship, the relationship of consumer and brand, is a two-way interactive concept, including consumer's attitudes toward the brand and the brand's attitude toward the consumer. Blackston (1992) based on the theories of interpersonal relationship, puts forward the concept of brand relationship and believes that through the interaction between brands and consumers can form a close, lasting and stable relationship. Harvard business school's Fournier (1998) proposed the concept of brand relationship quality (brand relationship quality, BRQ), further development of the theory of brand relationship and discussed the effectiveness of the relationship theory in the field of brand marketing. Later, Aggarwal, (2004) studied the effects of brand relationship norms on consumer attitudes and behavior, etc.

In the heyday of relationship marketing and brand equity, understanding the types of brand relationship is very necessary. Want to divide the brand relationship form, understand and manage brand relationships, first it must be described and measurement the brand relationship and understand the structure of the brand relationship.

From the existing literature, most of the studies are taken based on the statistics and the questionnaire method and most studies are qualitative analysis, less able to carry out quantitative study. With the rapid

development of the network and the rise of forums and microblogs, consumers on the network published a large number of brand opinion. How to effective use of this information is the important topic of concern for scholars.

From the combining the former researches, this article divided brand relationship into two dimensions: Cognition and identification. By established the two-dimensions structural model, we divide brand relationship into four kinds: Disconnected, Functional, Affective and Loyal. In the internet marketing environment, the study extracted online reviews which consumer expressed to the brand and computed the brand relationship information by using fuzzy sentiment corpus. Then, the type of consumer-brand relationships can be identified by fuzzy inference computing.

STRUCTURE ANALYSIS

Chinese scholar Zhou (2004) based on the interpersonal structure theory indicated that the structure of the brand relationship may exist three elements: cognition, emotion and behavior. Through the empirical study, he concludes that brand relationship is made up of three parts include cognition, emotion and behavior. Cognition, emotion and behavior are brand relationship's rational level, emotional level and external performance. These three parts are interlinked and united in the core of brand relationship.

The two elements emotion and behavior in Zhou (2004) three-dimensional structure of brand relationship reflect the level of consumer's brand identification.

Lastovica and Gardner (1979) considered that brand identification is consumer's psychological or emotional connection to the brand and it could compare the size of the brand identification by the degree of willingness that consumer choose the brand. Aaker and Keller (1990) thought that the more consistent between the brand's personality and the consumer's personal, the more intense of consumer purchase intention. So, brand identification can be characterized by two dimensions of emotion and behavior.

Therefore, the three parts of the brand relationship cognition, emotion and behavior could be portrayed by two dimensions: cognition and identification.

Cognition is the understanding of the consumer to the brand after using brand products. The higher cognition, the better consumers think the brand, that is to say, the better attitude and behavior the brand toward the consumer. Identification includes two parts. One is emotional identification, which is consumer's emotion to the brand including like, praise, etc. The other is behavioral identification, which is consumer's behavior to the brand including repeat purchase, trust, etc.

FORM DIVISION

The study of the relationship form is a hot topic in the field of brand relationship. Different relationship types corresponding to different behavior norms, studying on the brand relationship form can effectively predict consumer behavior; can also be effective guidance enterprise's brand relationship management activities.

Hess and Story (2005) considered the relationship between the brand and the customer is a promise which is composed of personal connection and function connection. And personal connection determined by the trust. Functional connection determined by the satisfaction. The satisfaction would affect the trust. Then, he puts forward the measuring method of brand relationship and divided brand relationship into four types: Disconnected, Functional, Personal and committed.

In this study, the brand relationship type is divided by a new way. Based on the level of cognition and recognition of the brand relationship, the brand relationship type is divided into four kinds: Disconnected, Functional, Affective and Loyal, as shown in the Fig. 1.

When cognition and identification are in low, the brand relationship is in disconnected. Many small brands are in the form of this relationship.

When cognition is in high and identification is in low, the brand relationship is in functional. It is means that consumers believe the brand products are good but they have low emotion and identification to the brand. Many

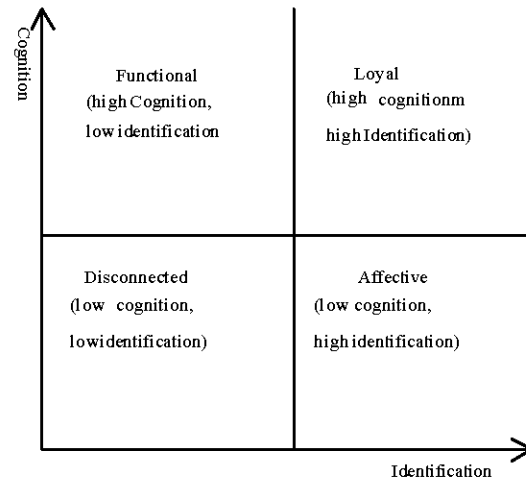


Fig. 1: Two-dimensions structural model of consumer experience types

potential good brands are in the form of this relationship. When cognition is in low and identification is in high, the brand relationship is in affective. Many old brands who at disadvantage in the competition of the market are in the form of this relationship.

When cognition and identification are in high, the brand relationship is in loyal. Consumers produce a strong sense of dependence and a sense of belonging to brands in terms of material and spiritual.

CALCULATION METHOD

In online reviews, consumers' attitudes and behavior will be expressed in the form of natural language. Natural language have fuzzy attribute. Therefore, we can extract consumer reviews, the words express consumer awareness, consumer emotional and consumer behavioral, to quantify the brand relationship.

Fuzzy calculation method: Valuation words, emotional words and behavior words express cognition, emotion and behavior in brand relationship. In order to excavate consumer brand relationship, this article made fuzzy processing to three kinds of words. The measurement of the meaning of valuation words, emotional words and behavior words can be divided into five ranking separately on positive and negative category continuum, micro (A), small (B), neutral (C), large (D) and extreme (E). Each rank corresponds to a fuzzy membership function, namely, -E, -D, -C, -B, -A, +A, +B, +C, +D, +E. The Gaussian function is chosen as a template to define fuzzy membership functions for 10 sentimental ranks in domain [-4, 4]:

Table 1: Example of corpus

Valuation words	Valuation degree	Emotional words	Emotional degree	Behavioral words	Behavioral degree
Perfect	4(E)	Be enchanted	4(E)	Recommend	4(E)
Power	3(D)	Love	3(D)	Trust	3(D)
Good	2(C)	Satisfied	2(C)	Good reputation	2(C)
Ok	1(B)	Like	1(B)	Consider	1(B)
Slowly	-1(-B)	Depressed	-1(-B)	Decline	-1(-B)
Damageable	-2(-C)	Regret	-2(-C)	Abjection	-2(-C)
Bad	-3(-D)	Sick	-3(-D)	Never buy	-3(-D)
Rubbish	-4(-E)	Insupportableness	-4(-E)	Boycott	-4(-E)

$$\mu_w(x) = \text{gaussmf}_w(x, \sigma_w, a_w) = \exp\left[\frac{-(x - a_w)^2}{2\sigma_w^2}\right]$$

Here:

$$w \in \{-E, -D, -C, -B, -A, +A, +B, +C, +D, +E\}$$

σ_w is the expectation and standard deviation of Gaussian membership function when the emotion level is w , respectively. Refer Zhao *et al.* (2011) to see detailed description of calculation method of semantic value.

In order to mine information of online reviews, we built fuzzy libraries group, which conclude evaluation corpus, emotional corpus and behavior corpus, based on consumer psychological and behavioral theory. For cellphone brands the fuzzy corpus example are shown in Table 1.

We can obtain valuation words, emotional words and behavioral words related to cognition, emotion and behavior in the way of semantic annotation and parsing by extracting online reviews. At last, we can obtain cognition, emotion and behavior by calculating three kinds of words.

CONSTRUCTION OF THE INFERENCE RULE

Brand relationship model is constructed by two dimensions: Cognition and identification. Besides, the dimension of identification is obtained by fuzzy inference. This article built the inference rules in the form of nature language. The format of the expression is described as below.

IF emotion and behavior then identification: In order to establish the brand relationship identification inference rule base, we propose hypothesis as following:

- **H1:** The higher consumer emotion, the higher identification degree
- **H2:** The higher consumer behavior degree, the higher identification degree

Among all the possible rules, there have been 121 rules that are valid, which cover all the possible cases of the two antecedents. The fuzzy inference system is set as follows: “And operation” using Minimal operations; defuzzification using the centroid method.

CASE STUDY AND ANALYSIS

In this study, corpus and data is extracted on The Speaker Mesh Website (<http://www.holaba.com.cn>), a website that brand recommendation is the core topic. We downloaded over 1300 comments of phones with the help of web collection tools. After removing duplicate publication comments and irrelevant comments, the experiment screened out 1187 comments.

For these 1187 comments, to use the method of semantic fuzziness and the fuzzy calculations which described above, then obtain cognition, emotion and behavior. Then we set fuzzy inference rules with emotion and behavior as the antecedent and identification as the consequent. The calculation results are shown in Table 2. From the calculation results, each type of brand relationship is shown in Fig. 2.

From Fig. 2, we can see that EASTCOM and Bird is in disconnected status, Sony Ericsson is in functional status, Samsung is in affective status, Motorola, Nokia and iPhone is in loyal status. EASTCOM as a small cellphone brand, consumers believe that the EASTCOM product is not good enough and they have less emotion and identification to EASTCOM. Bird is an old cellphone brand in China. It can be seen from the results that compared to EASTCOM, consumer improved their cognition and identification to Bird, but still did not reach in a high level. Sony Ericsson as the world-renowned brand, its high product satisfaction made it in functional relationship status. As can be seen from the specific comments, Sony Ericsson is in functional status not because it is a new brand, but because it is a Japanese brand, which greatly reduces the Sony Ericsson support recognition in China.

We can see from the results that Samsung as an old cellphone brand in Korea, whose recent products did not meet the expected state. Consumers still have higher identification to this brand based on previously generated

Table 2: Calculation results of mobile phone brand

Mobile phone brand	Available comment	Cognition	Emotion	Behavior	Identification
iPhone	196	8.27	7.46	9.09	8.92
Nokia	182	7.02	7.23	8.18	8.19
Motorola	185	5.71	5.70	6.60	6.62
Samsung	175	4.51	5.10	5.99	5.99
Sony ericsson	178	5.31	5.06	4.72	4.74
Bird	167	3.39	3.73	4.81	4.58
EASTCOM	104	1.16	1.12	1.12	0.52

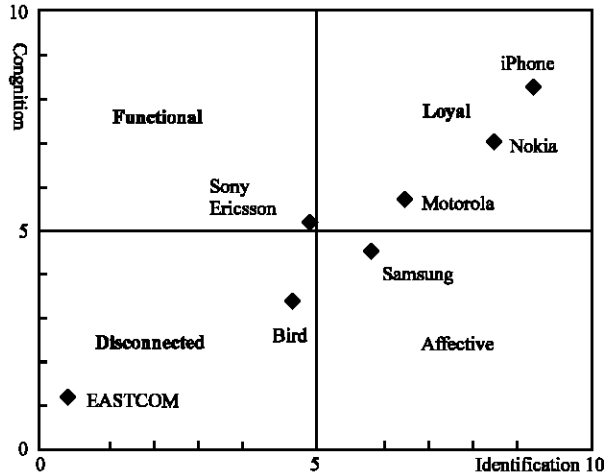


Fig. 2: Results of identifying brand relationship type

emotion. If Samsung do not improve its products in future, the crisis, the brand reduced its level, would be appeared.

Motorola, Nokia and iPhone, as the world-renowned brand, is in loyal status. Consumers have high cognition and identification to iPhone because its performance is far beyond people’s expectations. Thus the mobile phone market continued to hit in the past two years.

As can be seen through the examples that the structural model of the brand relationship, which includes cognition and identification two dimensions, could help companies recognize their brand relationship status. For company, the marketing strategy should be different under different brand relationship status.

CONCLUSION

A new two-dimensional model of the brand relationship is built and the brand relationship is categorized in this paper. The fuzzy inference and calculation about the brand relationship is conducted based on the online reviews. The theories about the brand relationship are hence enriched and the relevant quantitative research is implemented. The quantitative research on the brand relationship can help companies monitor the development of the brand relationship and

detect the potential crisis. The coordination relationships can also guide practice and makes it possible to predict the relationship develop tendency. The research helps enterprises precisely understand their own brand relationship status and take targeted marketing strategies to strengthen the construction of the brand relationship.

However, there are some limitations in this study. For example, the Inference rules are of some subjectivity and the extraction of the affection words online can’t be conducted. Moreover, further calculation and verification need to be done among other products, which is also the direction of the future study.

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