A CLUSTERED-BASED SEGMENTATION OF CHINESE WINE CONSUMERS BY MEANS OF KERNAL FUZZY C-MEANS

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ABSTRACT

The aim of this study is to segment Chinese wine consumers based on their preferences, motivations and purchasing behaviors. Data from representative 3420 responses were profiled through Kernel fuzzy c-means (KFCM), and one-way ANOVA analysis was used to define socio-demographic characteristics of each cluster. This study identified four consumer segments: Balanced Consumers, Credulous Consumers, Experiential Consumers and Health Sippers. Each group showed different demographics, eating and purchase habits. These findings reveal a typology of Chinese wine consumers when making the purchase decisions and verify the applicability of KFCM in consumer segmentation. Identification of Chinese consumer segments provides winemakers a better understanding of the various characteristics of wine consumers and their different purchasing behaviors. This study also provides new contributions to research on the segmentation of the Chinese wine market.

1. INTRODUCTION

With the increased household income and the growing middle class consumers, the level of wine consumption among Chinese consumers has significantly increased in recent years. During the past twenty years, China's wine consumption has risen from 10.7 million hl in 1999 to 17.9 million hl in 2017, with an annual growth rate of about 10.9% (OIV, 2018). With a population of 1.39 billion and a GDP of 82.7 trillion CNY in 2017 (NATIONAL BUREAU of STATISTICS, 2018), China provides a huge market for food and alcohol sales. The rapid growth of wine demand has not only promoted the development of local wine production, but also enabled a large number of foreign wine products enter to the Chinese market. For winemakers, China has become a very important target market. As reported by International Organization of Vine and Wine, wine consumption in China shows a positive growth trend. In 2017, wine consumption was 1.79 million kiloliters, accounting for about 7% of global consumption (OIV, 2018). In addition, according to a report by Vinexpo, China has become the fifth largest static wine market in the world (VINEXPO, 2018). In other words, wine has become one of the most popular products for Chinese consumers and is increasingly favored by the younger generation. For Chinese wine drinkers, although the per capita alcohol consumption will rise from 1.34 liters/year to 1.53 liters/year, there is still a big gap compared with traditional wine consuming countries – 28 times different from France (IWSR, 2018).

Despite the increase in the production of domestic wine and the growing demand for imported wines, the market potential of Chinese wine consumers is huge. However, the needs and preferences of consumers are heterogeneous which means simple types of wine can't meet the needs of differentiated markets. Because of the competitions in the Chinese wine businesses, it is important to segment the market to attract more potential consumers (ZENG, 2014). There are very few studies on the segmentation of Chinese wine market from the perspective of marketing (CAPITELLO *et al.*, 2015; CAPITELLO *et al.*, 2014; LEE *et al.*, 2015) although market segmentation is an important component and platform for corporate strategic marketing. Market segmentation can help companies accurately distinguish valuable targets and select target markets more effectively, find their own position in market competition, and design unique products to meet the needs of consumers in the market.

Hence, understanding the main drivers and potential motivations for different types of consumers is very important for winemakers. Market segmentation also provides a better framework to customize and distribute products to meet different needs of consumers. In addition, it can provide corresponding marketing strategies for marketers.

2. LITERATURE REVIEW

2.1. Understanding customers in the wine industry

The different attributes and functions of a product are key factors in determining whether a consumer will purchases it (GREEN *et al.*, 2004). Consumers purchase decision can be influenced by intrinsic cues and extrinsic cues as a criterion for judging quality in the process of purchasing products (GRUNERT *et al.*, 2004). Intrinsic cues are properties which are inherent to the products, such as ingredients and sensory attributes. Extrinsic cues mainly refer to physical attributes such as price, brand, packaging, and origin that are not part of the physical attributes AKDENIZ *et al.* (2013). In addition, the marketing

strategies of wine shops and the motivation of consumers to purchase are also important factors (ATKIN *et al., 2007;* BRUWER *et al.,* 2012; BRUWER *et al.,* 2011).

Wine consumption is the specific behavior generated by consumers based on complex psychological activities, including psychological cognition and behavioral awareness (PETTIGREW and CHARTERS, 2010). The cognition includes a variety of psychological activities such as stimulation, impression, thinking and imagination. In general, it is the evaluation of the quality, function and image of a certain wine by the consumers. On the basis of cognition, consumers will have needs of wine, which will form the motivation for wine purchase. When the products meet requirements of consumers, the motivation for wine purchase will gradually be translated into specific wine purchase behavior.

Many researchers have carried out studies on wine consumption psychology (cognition, motivation, etc.) and behavior, providing an important theoretical reference for people to understand the behavior characteristics and behavior of wine consumers. Health benefits, auxiliary dining and interpersonal communication are the main motivations of Chinese wine consumers (SOMOGYI *et al.,* 2011). The positive health benefit of wine is that people drink wine in moderation can prevent disease and has anti-aging effect because wine is rich in vitamins and antioxidants (LEE, 2009). Due to the special color, aroma and taste of wine, it helps to improve the taste of the food when eating with wine (WANG, 2016). As a social tool, wine is widely used by Chinese consumers to express emotions or enhance friendship (HALL *et al.,* 2013).

In terms of Chinese wine consumer behavior, previous studies have shown that the attribute of product, individual characteristics of consumers and psychological factors of consumers will affect the behavior of Chinese wine consumers (PICKERING and HAYES, 2017). Various attributes, such as sensory attributes and extrinsic cues including price, brand, and origin are found to be important aspects that influence wine choice (LOCKSHIN *et al.,* 2016).

When consumers make purchase decisions, the sensory attributes of wine are arguably the most important factor in determining whether people drink or not (CHARTERS and PETTIGREW, 2007; KEOWN and CASEY, 1995; SARAR *et al.,* 2010; THOMPSON and VOURVACHIS, 1995). LIU and MURPHY (2007) have shown that the main reason why Chinese wine consumers drink red wines is color, because red symbolizes prosperity and good luck in Chinese culture. CAMILLO (2012) also confirmed that sensory attributes such as taste are the main factors affecting wine purchase and consumption.

Regarding the extrinsic cues of wine, a number of researchers have determined the attributes that have significant effect on wine consumption (XU *et al.,* 2014). They found that the most important factors influencing consumers' choice of wine are previous experiences, quality, brands and recommendations. ARETA *et al.* (2018) believe that the quality ratings provided by experts, the vintage and scale of the winery are important in the process of wine consumers' decision-making. In addition, JOVANOVIĆ *et al.* (2017) empirically demonstrate socio-demographic factors such as region, place of residence (urban and rural areas), family size, age, income and education; and behavioral-cognitive factors such as the importance of market price, place of purchase and product characteristics play a leading role in wine consumers' decision-making process.

Finally, the health function of wine is also an important factor affecting consumer purchases. Nowadays, people pay more attention to their health. The healthy function of wine has been gradually recognized and received more attention by Chinese consumers. SOMOGYI *et al.* (2011) found that the perceived health benefits of wine could influence the behavior of wine consumers. PETTIGREW and CHARTERS (2010) also verified that the health benefit is an important reason for wine consumption.

2.2. Market segmentation theory

Market segmentation is the process of differentiating consumer groups who have different needs in the market according to certain criteria. Market segmentation helps companies meet the needs of each segment more effectively, explore market opportunities, open up new markets, select the target market, and develop effective marketing strategies (MARSHALL and JOHNSTON, 2010). RAAIJ and VERHALLEN (1994) showed that the needs of different segments of consumers could offer new opportunity for enterprises. Nowadays, researchers mainly segment the wine market from the aspects of personal profile (gender, age, etc.), geographical factors, psychological factors (preference, attitude, etc.) and behavioral factors, like purchase frequency, purchase time, etc. (JAIN, 2012). SPAWTON (1991) classified consumers into four categories: the wine connoisseur, the aspirational wine drinker, the beverage wine drinker and the new wine drinker based on the consumers' location, consumers' attitude towards the brands, and their knowledge and involvement of the wine. A study of Chinese wine consumers from a gender perspective was conducted by BRETHERTON and CARSWELL (2013) and the results showed that wine was considered more masculine rather than feminine. It had also verified the results of LIU and MURPHY (2007) and RITCHIE (2007) at the same time. OGBEIDE and BRUWER (2013) found that older consumers in western countries were more involved in wine related activities from the perspective of age, because they had more time and money to participate in the wine tasting and wine clubs. Regarding the places of purchase, HU *et al.*(2008) showed that 65% of Chinese consumers are accustomed to buying wines in supermarkets or restaurants, and the main motivation for drinking is celebration and accompanying meals. More specifically, SZOLNOKI (2018) used two-step clustering to classify tourists in Rheingau into four classes: Wine and Rheingau lovers, Wine-oriented tourists, First-time tourists and International tourists based on objective variables. MASSON *et al.* (2017) classified wine consumers into six groups from the perspective of drinking occasions. These six groups of consumers were: indifferent occasionals, wine lovers, relaxed amateurs, social networkers, stay-at-home connoisseurs and infrequent money- minded. MALONE and LUSK (2018) segmented consumers into five clusters: Traditional, Mavens, Uninformed, Locavores and Premium by k-means cluster analysis, which was based on consumers' taste perceptions of various brands.

Most business models are based on PCA, factor analysis and K-means method to segment consumers into several groups (DÍAZ *et al.*, 2018; MASSON *et al.*, 2017; YANG *et al.*, 2017). However, the initial point of K-means method is unstable and random, which causes the instability of clustering results and limits the quality of clustering (AKBULUT *et al.*, 2016; LU and YAN, 2015). With the continuous improvement of machine learning methods, cluster analysis based on K-means method are insufficient to meet the requirement of academics and practitioners when segmenting massive data.

With introducing fuzzy set theory, RUSPINI (1969) first adopted the idea of fuzzy in data clustering. Data clustering based on fuzzy set theory has become an important step in data mining and machine learning (AKBULUT *et al.*, 2016). In order to overcome several drawbacks of K-means, Kernel fuzzy c-means (KFCM) was proposed. Compared with the classical clustering algorithm (k-means and factor analysis), KFCM can better distinguish, extract and amplify useful features, so as to achieve more accurate clustering. At the same time, the convergence speed of the algorithm is faster. When the classical clustering algorithm fails, the kernel clustering algorithm can still get the correct clustering (YANG and TSAI, 2008; ZHANG and CHEN, 2003). The KFCM has been widely used in image

segmentation, fault diagnosis and customer segmentation (BASU and SRINIVAS, 2014; CAI *et al.*, 2009; YANG *et al.*, 2011).

The purpose of this paper is to use KFCM to segment Chinese wine consumers by considering the attitudes, purchase motives and purchasing behavior of Chinese wine consumers. The findings will make wine dealers and winemakers better understand the needs of consumers.

3. MATERIALS AND METHODS

3.1. Questionnaire

To achieve the aims of this study, a semi-structured questionnaire was developed and used to classify Chinese wine consumers. The questionnaire was based on geographic, demographic, socioeconomic, psychological and behavioral variables (MASSON and AURIER, 2017). It also includes perception of packaging and labeling, consumer motivation, knowledge and involvement and sensory attributes (BRUWER *et al.*, 2011) which impact on wine purchase (BARBER, 2012). The questionnaire is divided into three parts: consumer' knowledge and his consumption of wine; consumer preferences and motivations for purchasing wine and sociodemographic characteristics. A total of 21 items are divided into six variables: sensory attributes, business marketing, motivation of purchase, consumers' familiarity, product attributes, and where to buy. In this study, the Likert five-point scale method was used to measure the consumers' attitude. The measurement structure was "very disagree=1, very agree=5", which were all ordinal measurement, indicating the attitude of consumers to a certain point of view.

3.2. The sample

In order to improve the representativeness of the sample and the practical application value of the research conclusions, this study conducted a comprehensive sample survey in 24 provinces, municipalities and autonomous regions in the eastern, central and western regions of China from July to August 2018. The samples covers a wide range of regions, thus could represent the purchasing behavior of wine consumers in different regions of China. Before the official investigation, the researchers conducted a centralized and unified training for the investigators and explained the purpose of the survey, the content of the survey, the survey methods and process. The survey was conducted by using convenient sampling because surveys were conducted in shopping malls, streets, residential quarters, parks, farmer's markets, and village markets. The respondents independently filled out the questionnaire according to their actual situation, which would take 20-30 minutes. A total of 4000 questionnaires were collected, of which 2180 were online questionnaires the rest were face-to-face questionnaires. The questionnaires, which had too many missed items and incorrect key information, were removed and finally 3,420 valid questionnaires were actually collected.

The sample distribution of the survey was showed in Table 1 and the sample coverage is considered comprehensive and representative.

Table 1. Samples distribution of the survey.

Location	Number of respondents	Location	Number of respondents
Coastal area		**Inland area**	
Beijing	240	Anhui province	36
Hebei province	307	Gansu province	100
Shandong province	184	Liaoning province	147
Shanghai	173	Ningxia hui autonomous region	94
Jiangsu province	316	Shanxi province	267
Zhejiang province	198	Guangxi Zhuang Autonomous Region	41
Fujian province	44	Henan province	85
Guangdong province	253	Heilongjiang province	64
Tianjin	90	Hubei province	70
		Hunan province	144
		Jilin province	51
		Shaanxi province	66
		Sichuan province	195
		Yunnan province	147
		Chongqing	108
Total	1805	Total	1615

3.3. Method

3.3.1 Confirmatory factor analysis

Confirmatory factor analysis was used to determine whether items related to wine consumption in literatures could be profiled as general characteristics (HAIR *et al.*, 2011). For this purpose, confirmatory factor analysis was carried out for 21 selected items, and factors were extracted by maximum rotation of variables. Items, which factor loads, were less than 0.5 or items with two or more factor loads greater than 0.5 were excluded from the sampling scale. The results showed that the correlation matrix of the 17 item scales is appropriate (Bartlett's test of sphericity : $\chi^2 = 14653.65$; $df = 435$; $p < 0.000$; the KMO index was 0.861).

Then, the cronbach's α value was tested to measure the reliability of each factor indicating that the cronbach's α values of these factors were higher than 0.7, indicating that the internal consistency between the items was better (HAIR *et al.*, 2011). Finally, a six factor solution using varimax rotation procedure was proposed through SPSS. Confirmatory factor analysis showed that 17 variables accounted for 85.65% of the variance and the KMO index was 0.861 (Table 2).

3.3.2 Cluster analysis

Kernel fuzzy C-means (KFCM) was used to segment Chinese wine consumers based on their purchasing behavior and motivations. The reason for choosing KFCM is that the clustering result of KFCM is more accurate than the general cluster analysis (LU and YAN, 2015). We used Matlab 2014a software for the analysis.

Table 2. Factor loadings and reliability values.

Name	Items	Factor loading	Cronbach's α
Intrinsic cues (MADEIRA *et al.*, 2009)	IC1: I usually buy wines with famous brand.	0.792	
	IC2: The higher the price, the better the quality of the wine.	0.824	0.929
	IC3: The quality of wines in well-known regions is more reliable.	0.611	
	IC4: The better the packaging, the higher the grade of the wine.	0.792	
	IC5: Good vintage can produce good wines.	0.755	
Extrinsic cues (CHREA *et al.*, 2011; HALL, 2013)	EC1: The better the color, the better the wine quality.	0.699	0.845
	EC2: The richer the fragrance, the better the quality of the wine.	0.825	
	EC3: The better the taste, the better the quality of the wine.	0.853	
Marketing (MADEIRA *et al,.* 2009)	M1: Wine advertisement has a big impact on my purchase decision.	0.784	0.932
	M2: Promotion has a big impact on my purchase decision.	0.744	
	M3: The location of the store and its interior style impact my choices.	0.607	
	M4: I trust the recommendation of the sellers.	0.661	
Reference group (FERNANDES *et al.*, 2018)	RG1: I trust the recommendations of my friends and relatives.	0.755	0.895
	RG2: The more rewards offered by the seller, the better the quality of the wine.	0.899	
Motive (CHREA *et al.*, 2011; HALL, 2013)	MO1: The health benefits of wine affects my choice.	0.678	0.850
Knowledge and involvement (BRUCKS, 1985)	KI1: The knowledge of wine will influence my choice.	0.711	0.769
	KI2: I have very good knowledge about wine.	0.697	

The principle of KFCM algorithm is to map the points of the original space to the feature space by using the kernel function, then directly or indirectly perform algorithm design, analysis and calculation in the feature space, so as to obtain the clustering of the original space. By mapping the kernel function, it can better distinguish, extract and amplify the features that did not appear before, which makes the clustering results more accurate, and also makes the convergence speed of the algorithm improved.

For traditional fuzzy clustering analysis, fuzzy C-means clustering is the most widely used method. However, the number of clusters in this type of algorithm is unknown in advance and requires artificially determined determination. In order to better determine the number of clusters in the real structure of the data set and improve the accuracy of cluster analysis, this paper based on the cluster validity function proposed by BEZDEK *et al.* (1984) to determine the optimal number of clusters in the data sample set. Among them,

the number of clusters that maximize the value of Cluster Validity Index is the optimal number of clusters.

3.3.3 One-way ANOVA analysis

Descriptive statistical analysis was used to compare the socioeconomic characteristics of each group and wine purchasing and eating habits. In addition, one-way ANOVA was used to compare the mean differences based on age, education and monthly income among the identified groups (LÓPEZ-ROSAS and ESPINOZA-ORTEGA, 2018; SKURAS and VAKROU, 2002). Before testing demographic variables and consumption patterns among groups of consumers, homogeneity test of the variance of the population was conducted. The study found that the variances of sociodemographic backgrounds, purchasing and eating habits are the same among different groups of consumers, then one-way ANOVA can be used to analyze these data. The overall One-way ANOVA analysis using F-test were conducted, and when the Sig is less than 0.05, it can be considered that there are differences among groups. The results were shown in Table 4.

4. RESULTS AND DISCUSSION

4.1. Cluster analysis

BLANCHARD *et al.* (2009) argued that the desires and willingness of the consumer can explain consumer's behavior well and can be used to predict consumers' actual consumption behavior of products. Therefore, it is especially important to understand the factors related to consumer behavior.

In order to better determine the number of clusters that can reflect the real structure of the data set, it is necessary to calculate the clustering validity function and determine the optimal number of clusters by comparing the index values. The calculation results are shown in Figure 1. According to the definition of clustering validity function, the clustering number corresponding to the maximum value is the optimal clustering number of data sets. Fig. 1 shows that when the fuzzy weighted index is 1.5, 2, 2.5 and 3, the clustering validity index is the largest when class is 4, so the optimal clustering number is 4.

The results of the KFCM revealed four distinct consumer groups that can be named according to the segmenting variables of the consumers (Table 3). The scores of the attributes are shown in Fig. 2: Balanced Consumers, Credulous Consumers, Experiential Consumers and Health Sippers.

Health Sippers: This is the largest group of the four consumer groups, with 39.4% of respondents belonging to this group. What makes it different from other groups is that the main motivation for this group to drink wine is for health. They think that drinking wine is good for health and they are more likely to have a high level of health awareness than other groups. It is worth noting that this group scores the highest on knowledge and involvement, which indicates that that they are confident in their knowledge of wine and were care about their health.

Table 3. Categories of wine consumers according to the segmenting variables

Factor	Balanced Consumers (n=1324)	Credulous Consumers (n=237)	Experiential Consumers (n=515)	Health Sippers (n=1347)
Reference group	3.7	3.8	1.9	3.1
Marketing	3.2	4.2	2.1	2.9
Intrinsic cues	3.8	2.9	4.0	3.3
Knowledge and involvement	3.3	3.1	2.8	3.4
Extrinsic cues	3.5	3.2	3.1	2.8
Purchase motive	3.4	3.3	2.1	3.9
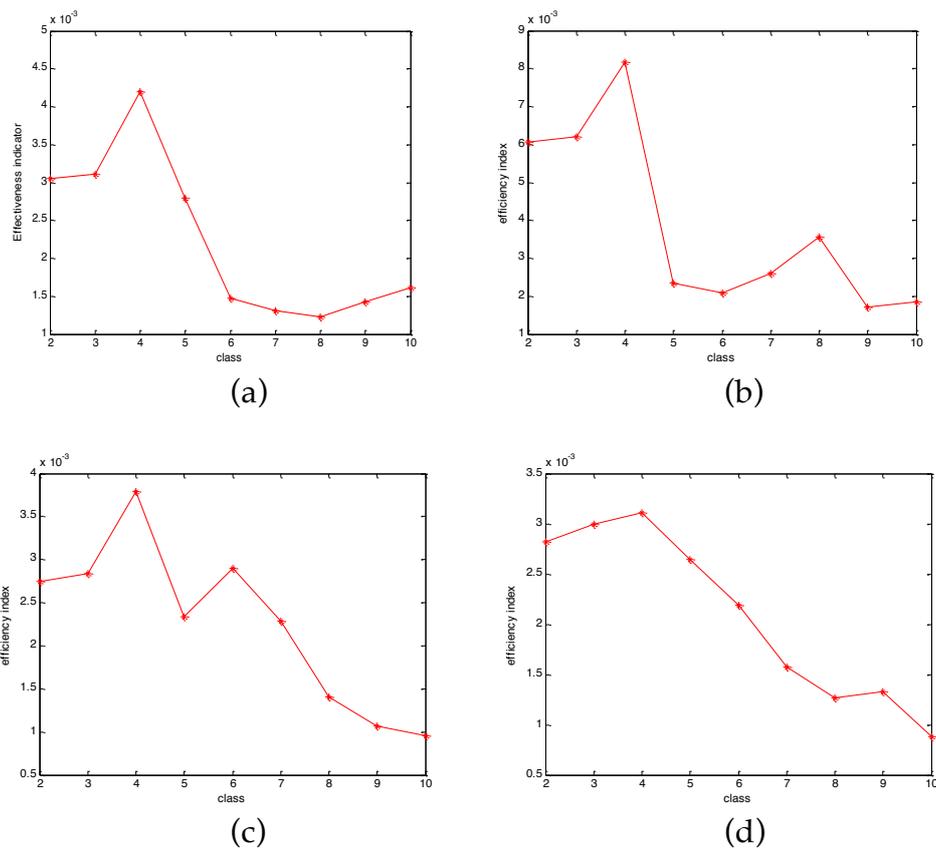
Figure 1. Diagram of KFCM Validity Function's Change to Data: (a) fuzzy weighted index is 1.5, (b) fuzzy weighted index is 2, (c) fuzzy weighted index is 2.5, (d) fuzzy weighted index is 3.

Balanced Consumers: This group consists of 38.7% of the total respondents. They are "balanced" because consumers in this group consider all aspects of the product in the purchase process, such as the intrinsic and extrinsic cues of wine, the recommendation of family and friends, and the health benefits. The preference scores for marketing strategies such as advertising and shopping guide recommendation are lower compared to the other three groups suggesting that they are more rational. In other words, this group of consumers will evaluate wines by considering the balance of multiple factors during the

purchase process. They don't need to have the highest level of quality for all segmenting variables.

Experiential Consumers: This group of consumers consists of 15.1% of the samples. They show significantly preference for the sensory attributes of wine such as color, taste and aroma. These attributes are usually not confirmed until the product is purchased or used, so consumers can only determine these attributes through "experience." Hence, these consumers may not be influenced by their friends' recommendations and the marketing strategies. For this group, only the score of intrinsic cues are high because they just trust their own experiences. They don't drink wines for its health benefit and they don't know much about the knowledge of wine.

Credulous Consumers: These consumers accounts of 6.9% of the respondents. They are more susceptible to extrinsic cues than other groups of consumers, such as corporate promotions, friends' recommendations, etc. They are more likely to be influenced by others during the purchase process and have less knowledge about the wine. They don't care about the quality and health benefits of the wine itself, but the shopping environment and experience can affect their trust and their purchase decision.

These results are similar to other researchers on wine consumers. For example, MASSON *et al.* (2017) identified six groups of wine consumers using the k-means method. Among them, wine lovers have high product involvement in wine. Similar to Balanced Consumers in this study, when choosing wine, they will mainly consider the recommendation of the independent wine experts. Like Experiential Consumers in this study, relaxed amateurs rely on the taste of wines rather than other variables. They don't have much knowledge of wine and only buy what they like. Finally, consumers belong to the social network cluster have limited knowledge of wine. They buy wines based on recommendations from others like Credulous Consumers in this study and are not interested in the intrinsic and extrinsic cues of wines.

LÓPEZ-ROSAS and ESPINOZA-ORTEGA (2018) also found that there are four groups of wine consumers in Mexico: traditional consumers, consumers in transition, social consumers and consumers linked to the territory. The first group of consumers is similar to Balanced Consumers because they buy wine based on factors such as origin, brand, awards and quality of wines. They are more rational when make purchase decisions. The second group of consumers is similar to the Experiential Consumers; they pay more attention to the sensory attributes of wines. Then, the third group of consumers are not aware of the attributes of the wine and do not pay attention to the product itself. They often do impulse shopping, just like Credulous Consumers.

For Health Sippers, ANNUNZIATA *et al.* (2016) found that Italian consumers who focus on the health warning had a better understanding of the nutritional properties of wines and like wins with detailed nutritional information. These consumers valued wines with health warning followed by nutritional information, when they chose wines. SAMOGGIA (2016) studied the effects of wine consumption on health; they found that health-oriented consumers were willing to spend more money on wines, which could improve their health. They are more concerned about the health benefits of the wines. In addition, YOO *et al.* (2013) have shown that consumers who are more knowledgeable about the health benefit of wines would be willing to spend more money on health-oriented wines. Therefore, winemakers and wine marketers should consider health benefits of wines in order to increase the consumers' desire to buy, especially when developing new wine markets.
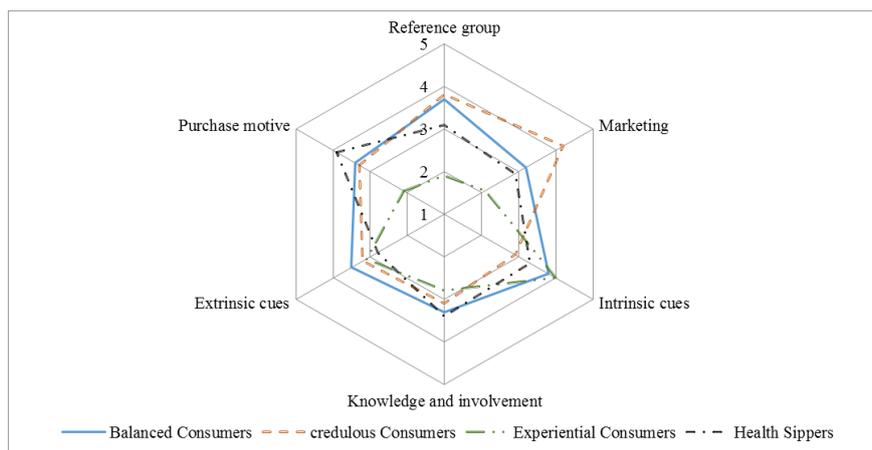
Figure 2. Scores of the groups according to the segmenting variables.

4.2. Socio-demographic backgrounds, purchasing and eating Habits of the groups

The analysis of Table 4 shows that the proportion of males and females of Chinese wine consumers is relatively balanced. The proportion of female consumers is slightly higher than that of men which is in line with MASSON's (2017) study of Chinese consumers.

OGBEIDE and BRUWER (2013) pointed out that the age of consumers is related to the level of wine drinking. The results of one-way ANOVA show the age differences among the four groups of consumers. More than half of all respondents are 26 to 45 years old, similar to the findings of China Wine Barometer – Wave 6 (2016). In addition, more than 24% of consumers belonged to Balanced Consumers. The Credulous Consumers are more than 45 years old. Thus it can be seen that effective marketing can influence purchase decisions of the middle-aged and older consumers.

MAGRI *et al.* (2007) indicated that the main factors affecting consumers' alcohol consumption are consumers' characteristics and the hedonic motivation. However, other motivations, such as health benefits and appropriate labeling content are also important. The results also show that the Health sippers have a higher degree of education. In this study, Health Sippers have the highest percentage of consumers with college and higher education qualification, which is directly related to their knowledge and involvement score.

SANTOS *et al.* (2006) argued that the difference between wine consumer groups is caused by their level of involvement and knowledge of the product. Therefore, the occupation of consumers is also a key factor influencing their purchase. Regarding the occupation of consumers, all four groups of consumers have steady occupations, although there is a considerable proportion of students and retired people. It is worth mentioning that the ratio of retired and independents in Experiential Consumers is higher than in other groups. In this group, wine consumption is related to intrinsic cues, which may be related to their social backgrounds and their belief that drinking wines can to help them to release stress and be more relaxed.

Table 4. Socio-demographic backgrounds, purchasing and eating habits by cluster.

Variable	Sample (%)	Experiential Consumers (15.1%)	Balanced Consumers (38.7%)	Credulous Consumers (6.9%)	Health Sippers (39.4%)	Homogeneity test	F-test	Sig.
Gender								
Male	48.5	49.5	46.9	47.0	49.5	0.61	0.983	0.400
Female	51.5	50.5	53.1	53.0	50.5			
Age								
Below25	13.6	18.6	14.8	15.0	16.2	0.79	27.309	0.000
26-35	32.8	44.5	25.4	32.0	36.5			
36-45	28.2	23.2	31.8	28.2	26.5			
46 or above	25.4	13.7	28.0	24.7	20.8			
Education level								
Secondary/high school or blow	28.7	35.0	18.0	49.0	34.9	0.52	31.297	0.000
College/university	60.4	49.9	70.8	40.4	55.9			
Graduate level or higher	10.9	15.1	11.2	10.6	9.1			
Occupation								
Student	13.1	9.7	16.1	14.4	11.2	0.73	1.192	.311
Independent	16.4	16.3	12.8	15.7	20.2			
Retired	18.9	23.5	18.5	17.4	17.8			
Employed	51.6	50.5	52.6	52.5	50.8			
Per capita monthly income								
below 3000 CNY	12.7	8.3	15.7	13.1	11.3	0.45	17.247	0.000
3001-5000 CNY	13.9	13.6	11.0	26.9	16.3			
5001-7000 CNY	30.1	29.3	23.2	24.7	36.3			
7001-10000 CNY	21.3	23.9	20.9	21.6	20.6			
Above 10000 CNY	22.1	24.9	29.3	13.6	15.5			
Consume bottles of wine in a year? (750ml)								
1-2 bottles	25.2	19.2	24.9	28.0	27.3	0.65	3.043	0.028
3-5 bottles	23.0	24.7	22.5	23.3	22.8			
6-8 bottles	20.8	24.1	20.3	15.3	21.0			
9-11 bottles	12.7	13.6	12.5	13.6	12.4			
12-15 bottles	7.9	5.4	9.6	7.6	7.1			
16-20 bottles	4.6	5.8	3.9	7.2	4.5			
Above 20 bottles	5.8	7.2	6.2	5.1	4.9			
Price of wine (750ml)								
Below 50 CNY	1.0	5.1	8.3	5.4	4.9	0.76	45.317	0.000
51-100 CNY	13.2	20.1	23.2	27.0	21.7			
101-150 CNY	29.1	25.7	33.1	33.2	30.0			
151-200 CNY	23.5	24.7	22.9	18.6	22.0			
201-300 CNY	16.7	14.7	5.1	9.2	12.2			
301-500 CNY	9.5	7.8	4.7	4.0	6.3			
Above 500 CNY	7.0	1.9	1.7	2.5	2.9			
Preferred origin of wine								
Domestic	51.9	39.6	50.6	52.1	57.9	0.82	17.357	0.000
Imported	48.1	60.4	49.4	47.9	42.1			
Dietary preference								
Meat lovers	26.2	23.1	27.6	28.4	25.6	0.25	3.386	.017
Vegetarian lovers	21.4	21.0	16.9	30.5	24.3			
Plasma balance	52.5	55.9	55.5	41.1	50.1			
Preferred type of wine								
Red wine	65.8	60.8	69.9	44.1	67.4	0.47	3.197	.023
White wine	23.9	24.7	20.3	41.5	24.1			
Rose Wine	10.4	14.6	9.8	14.4	8.5			

In terms of monthly income of consumers and the time and price of wine purchased, it can be seen that the proportion of consumers with monthly income of 5001-7000 CNY in all groups is quite large. Consumers with this range of income prefer to buy wines with prices between 101and 150 CNY per bottle. This finding is similar to that of MU *et al*. (2017). Balanced Consumers group has the largest proportion of high-income respondents. Credulous Consumers accounted for the majority of respondents with a monthly income of less than 5,000 CNY. This income group's purchase price was less than 100 CNY per bottle. The proportion of this group was much higher than the other three groups. The result analysis suggests that these consumers may be more inclined to promotional information when buying wine because they do not know much about wines and have no interest in the product itself.

As for eating habits and frequency of drinking, there is a significant difference in the frequency of consumption by consumers in different groups. Credulous Consumers drink more frequently than Balanced Consumers, Experiential Consumers and Health Sippers. A large percentage of Credulous Consumers consume one bottle of wine per month (750ml). The most frequent drinkers are Credulous Consumers, followed by Balanced Consumers, Experiential Consumers, and finally Health Sippers. In terms of eating habits, Most of sampled respondent are consumers with balanced diet. In particular, the proportion of consumers who prefer vegetarian food in Credulous Consumers is significantly higher than those in other three groups.

Finally, in terms of the types of wines, the findings show that more than 50% of the respondents prefer domestic red wines. Interestingly, more than 60% of Experiential Consumers prefer imported wines, which may be related to the variety and the richer taste of imported wines. In addition, Credulous Consumers believe that there is no big difference between drinking red wine and white wine. This, on the other hand, proves that such consumers are relatively ignorant, easy to be affected by extrinsic factors and unable to make their own judgments.

From the results of the one-way ANOVA, it can be seen that at the level of 0.05, the four groups of consumers have significant differences in terms of age, monthly income, education level, favorite origin of wines and price of wine purchased regularly.

5. CONCLUSION AND IMPLICATIONS

In the past few decades, the global alcohol market has undergone tremendous changes, and wine is no exception. As a result, winemakers have realized that they need to understand their consumers and markets better. In this research, KFCM was used to study the key factors affecting the purchase behavior of Chinese wine consumers. The results show that there are four different groups of wine consumers: Experiential Consumers, Balanced Consumers, Credulous Consumers and Health Sippers. This market-oriented study provides detailed and practical marketing suggestions for each of the four identified groups.

The outcome of this study shows that consumers between the ages of 26 and 45 are the main consumer groups of wine and red wine remains a popular choice of wines. Future researches can measure consumer health awareness trends. Similarly, future research should expolre how extrinsic attributes (such as nutrition labels, packaging styles) interact with other identified attributes that affect the consumer wine preferences.

It should be noted that although this study provides useful findings for consumer segmentation in the Chinese wine market, it has certain limitations. For example, the

study is based on the participant's self-description. Future research should supplement provide additional information by observing the actual purchase behavior of the consumers, such as measuring the real amount of purchased wine in the store, and the consumers who go out to eat together with wines. In addition, since China is a very large country, the regional dietetic culture is quite different. It is necessary to increase the number of consumers in different representative regions in order to improve the representativeness of research in the future.

First, for Health sippers, wine makers can add detailed nutrition and health information on the labels attached to bottles to improve the possibility of Chinese wine consumers' purchase. In addition, manufactures can increase the promotion of wine through social media and increase the awareness of wine and its health benefits. This will increase the popularity of wines.

Second, for Experiential Consumers, according to a study by CAPITELLO *et al.* (2015), Chinese consumers tend to try different flavors of wines, therefore the wine makers should conduct more effective market research to ensure the taste and quality of the products and to meet the current changing marketing needs. On the other hand, regular wine tastings and increased communication and understanding of consumers are also effective measures to expand the market and gain more market share. They can also develop and design wines with their own characteristics, create core products and customize different marketing combinations for different products. Moreover, through in-depth understanding of the characteristics and functions of wines, dealers can establish a multi-category bundle of product combinations. Wine stores must have wines of various countries and varieties. Only when consumers have more choices can they be more interested in wines and their consumption.

Third, Balanced Consumers are rational consumers who have certain knowledge of wine and are not affected by the external influence easily. They like wines and have a relatively high income. Therefore, wine makers should provide relevant events to attract these consumers and develop wine tourism projects to increase wine consumption experience to meet the experience needs of wine consumers. By means of drinking cultural propaganda, manufacturers can hold wine related exhibitions of the brand in large and medium-sized cities in China, and cooperate with other media channels such as TV, website, magazines, newspapers and so on to popularize wine drinking experience and culture. Through holding different kinds of wine festivals to establish the image of wine brand and promote the customers' loyalty to increase sales. In terms of publicity and marketing channels, wine producers should also make full use of online sales channels and publicity. Under the traditional mode, television, Newspapers and magazines are the core channels of advertising, but under the influence of the Internet, these traditional media are beginning to be marginalized. Social media has gradually become the main channel for people to communicate and communicate. Mobile media has begun to occupy people's lives and become the most influential media channel.

Finally, in order to cater for the taste of Credulous Consumers, wine makers should highlight the characteristics of the products, because these consumers have little knowledge of the products. Considering that their monthly income is relatively low, low-cost and occasional products discount can be effective for such consumers. In addition, salesmen can be trained to stimulate consumers' interest in products and desire to consume by using different promotion methods, such as free trial drinks, giving gifts and interacting with customers, according to the needs of different sales targets. Lastly, advertising through television, radio and social media to increase product awareness is also an effective way of publicity for wine makers and manufacturers (GENDALL, 2003).

APPENDIX - QUESTIONNAIRE ITEMS

Name	Items
Intrinsic cues (MADEIRA *et al.* ,2009)	IC1: I usually buy wines with famous brand.
	IC2: The higher the price, the better the quality of the wine.
	IC3: The quality of wines in well- known regions is more reliable.
	IC4: The better the packaging, the higher the grade of the wine.
	IC5: Good vintage can produce good wines.
Extrinsic cues (CHREA *et al.*, 2011; HALL, 2013)	EC1: The better the color, the better the wine quality.
	EC2: The richer the fragrance, the better the quality of the wine.
	EC3: The better the taste, the better the quality of the wine.
Marketing (MADEIRA *et al,.* 2009)	M1: Wine advertisement has a big impact on my purchase decision.
	M2: Promotion has a big impact on my purchase decision.
	M3: The location of the store and its interior style impact my choices.
	M4: I trust the recommendation of the sellers.
Reference group (FERNANDES *et al.*, 2018)	RG1: I trust the recommendations of my friends and relatives.
	RG2: The more rewards offered by the seller, the better the quality of the wine.
Motive (CHREA *et al.*, 2011; HALL, 2013)	MO1: The health benefits of wine affects my choice.
	MO2 The auxiliary purpose of wine affects my choice.
	MO3: The social purpose of wine affects my choice
Knowledge and involvement (BRUCKS, 1985)	KI1: My knowledge of wine influences my choice.
	KI2: I have very good knowledge about wine.
	KI3: I'm very interested in wine.
	KI4: I select the wines I purchase very carefully

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