

EFFECTIVENESS OF MOBILE PHONE USERS BASED ON AGING ISSUE: IN THE CONTEXT OF URBAN PART OF CHINA

¹Kian Aun Law, ²Amiya Bhaumik³Hao Yin, ⁴Valliappan Raju

***ABSTRACT-**This paper can be on the basis of the description of the general statistics, using clustering and spatial statistics and grey model to deeply demonstrate the data owing to its particularity of data. It can provide new thoughts, new perspectives, new methods and new paths for related elderly research by analyzing generality and individual characters of the behavioral activities of the elder cell phone users. Based on the literature research on the aging of population and the research status of the elderly, the interaction between the elderly and TV media, the interaction between the elderly and mobile media and other aspects, this paper explains the problems related to the consumption behavior of the elder mobile phone users. Taking the mobile phone user database of telecom operators as the original data, this paper makes a descriptive statistical analysis of the elderly's mobile phone consumption behavior, utilizing the spatial statistical analysis method grey model, and reveals the influencing factors and development trend of the elderly's mobile phone consumption behavior. In addition, combining the above research results, this paper points out the existing problems and potential business opportunities in the elderly mobile phone consumption market by analyzing the interviews with experts and marketing strategies of operators. Through the above research, this paper fills in the gap in the research on the behavior of elderly consumer groups in China, and shows the changes and influences brought by the aging society from a new perspective, providing new perspectives, research methods and research ideas for future research on the elderly.*

***Keywords:** Aging issue, mobile phone user consumption behavior, spatial statistics, grey correlation*

I. INTRODUCTION

The main research domains are focused on curing the diseases of the elderly, exploring the body functions, improving current medical care situation and researching on psychological features of the elderly. In the meanwhile, scholars began to keep their eyes on the elderly-oriented economic market, a gold mine to be mined to research on consumer behavior of the elderly, to put forward segmented marketing strategy, and provide reference to help companies make marketing decisions (Valliappan Raju, Dr. Siew Poh Phung, 2019). In the recent years, specific marketing research related to the elderly mainly focused on the fields of tourism, pension consumption, healthy products, however, information consumption still lagged behind others mentioned above. This is mainly due to the mixed influence composing of traditional values and data accessibility and there is still research gap to be filled. This paper will give operators relevant advice on marketing aspects by extracting data from their operational data then analyzing relevant needs of the elderly, which is in line with my own studies.

¹Universiti Tunku Abdul Rahman

²Lincoln University College

³Lincoln University College

⁴Lincoln University College

From current literature research, the point of view is that university students as well specific groups are the main research objects of mobile users' consumption behaviors. This is because university students are active consumers and have more access to obtain data, which is easier to launch research. As for the research on specific groups, research itself mainly demonstrates users' using conducts under the certain circumstances. In the respect of its drawbacks:

One is the lack attention to the elder consumers. Furthermore, the reasons for a limited amount of research are due to the high cost of collecting data and the low efficiency of research (Hwang, K. K, 2000)

II. LITERATURE REVIEW

M Minkler (1989) suggested that the former fixed perspective commercial departments owned toward the elderly has shifted from an insignificant consumer cluster to a huge market with 500 billion dollars, he also noticed both positive and negative aspects of these newly emerged older consumer group. Guanke, Guo (1999) indicated that people over 50 have become the richest in France with 43% of French people's total income (Valliappan Raju, Dr. Siew Poh Phung, 2019). Thus it can be seen that with the development of Chinese social productivity, economy and urbanization, fulfillment and promotion of social security system, the income of old people, including the rural elderly, will gradually increase, the source of income will be guaranteed, and the purchasing power of the elderly consumers with the ability to pay will be greatly enhanced. The old generation in China will make a profound influence on future socio-economic development. Mary S. Furlong (2007) coined a marketing perspective of "shift of life stage". Furlong did meticulous study upon various aspects including health, housing, property, employment, daily life and future prospects respect to people between 30 and 40, he found out that the unstable factors and unprecedented changes were keen to succeed in the market of the old. Qingru Yang (2013) pointed out the existing of problems in developing market of the elderly: ambiguous target market, inaccurate market positioning, insufficient old-oriented product developing and so on. She thought the forthcoming market for the elderly would be orientated to a more precisely divided and proficiently enhanced market of producing products and brands for the old. In January 22, 2016, the press spokesperson Zhong Li from Ministry of Human Resources and Social Security (MOHRSS) pointed out that China has become an aging society. 15.5% of total population, in equivalent to 210 million people in China are at the age over 60, amongst which 40 million are disabled or half-disabled. Depend on the forecast of relevant departments, the old population will reach 4 billion by the year of 2035, and the ratio of disabled or half-disabled will increase more (Valliappan Raju, Dr. Siew Poh Phung, 2019). According to the Chinese National Population Census in 2002, 8.2% of the total population were at or above the age of 65, 1.2% higher than 7% of it in 2000. If divided by region, the highest was 13.4% in Shanghai, other districts over 8% were 11.2% in Zhejiang, 10.8% in Beijing, 10.7% in Tianjin, 9.9% in Jiangsu, 9.2% in Chongqing, 8.8% in Hubei, 8.6% in Hunan, Guangxi and Sichuan, 8.5% in Shandong, 8.2% in Anhui, 8.1% in Liaoning and 8% in Shaanxi, 690 million people in 14 provinces in total which was 54% of Chinese population. Other 17 provinces like Northwest and Yunnan-Guizhou-Tibet were under 8% which implied that developed regions had come into aging society earlier than the others.

According to the fifth and sixth Chinese National Population Census, China is not only the country which owns the largest aged population in the world, but also the highest in growth rate. It is predicted that by the year of 2020, Chinese people over 60 will make up to one fifth of its population, China will have completed the aging progress in mere 20 years compared to 60 years in developed countries and 100 years in European countries (Hwang, K. K, 2000). The aging of Chinese population appeared under the circumstances of birth control and one-child policy, therefore it has special complexity. The aging of Chinese society is accompanied by characteristics of aging with one child, aging and disabled, empty-nested aging and loneliness with empty nest. Current Chinese families are tend to kernelization and miniaturization which means the average family members are 3.1. Data from Chinese Ministry of Civil Affairs shows that more than half of the families in China are empty-nest ones, this number climbs up to 70% in some medium and large cities. The amount of left-behind elderly in rural areas are around 40 million, 37% of the rural elderly. Unlike developed western countries, China's aging progress is not synchronized with its urbanization, industrialization and economic development, the social material wealth accumulation, spiritual civilization, system of elderly care service and social security degree are unprepared, and this situation is called "getting old before getting rich", so to say that the aging of Chinese society has the traits of fast speed, empty-nested and getting old before getting rich, etc (Valliappan Raju, Dr. Siew Poh Phung, 2019). Prominent social problems caused by all sorts of aging will have high frequency in next ten years, and appeal from the old asking for socialized service for the elderly will be more and more urgent (Hwang, K. K, 2000).

III. RESEARCH METHODOLOGY

Our approach is validated on large-scale datasets. We simply think of every smartphone in the dataset as a mobile user. To validate our proposed method, we predefined 12 user properties. According to our observation, there are a few pre-installed apps on some mobile phones, which are not eligible in reflecting users' interests and preferences. We manually filtered out some pre-installed applications from the original dataset. We've seen a lot of pre-installed apps related to mobile brands, mobile-phone operators and mobile-phone operating systems. In the end, we filtered out 665 pre-installed applications, leaving 59,967 applications for the experiment (Hwang, K. K, 2000). For the purpose of verifying our method, we require the de facto information about the user's attributes. However, it is difficult to obtain real user information on a large scale. To solve this problem, we adopted two strategies to build the real information of users: The first strategy is predefining user attributes based on the mobile phone model. In addition to the list of apps on each phone, there is also its model information in our data set. For each phone, we grasped online for data related to smartphone models. Then, we designed two user attributes: smartphone price and smartphone size (Valliappan Raju, Dr. Siew Poh Phung, 2019). According to relevant researches, price is the first factor taken into consideration when users are about to buy mobile phones, accounting for 69.6% of all factors. The price of smart phones can reflect users' income and consumption level to some extent. Besides, the size of the mobile phone is another important factor which makes up to 20.2% among them all. The size of the phone reveals the user's preference for it to a certain context. Smart phone price and size: our dataset contains model information of each phone. Based on the frequency of the models, we ranked them in descending order and selected the 700 most frequently appeared models. The 700 models cover 12,275

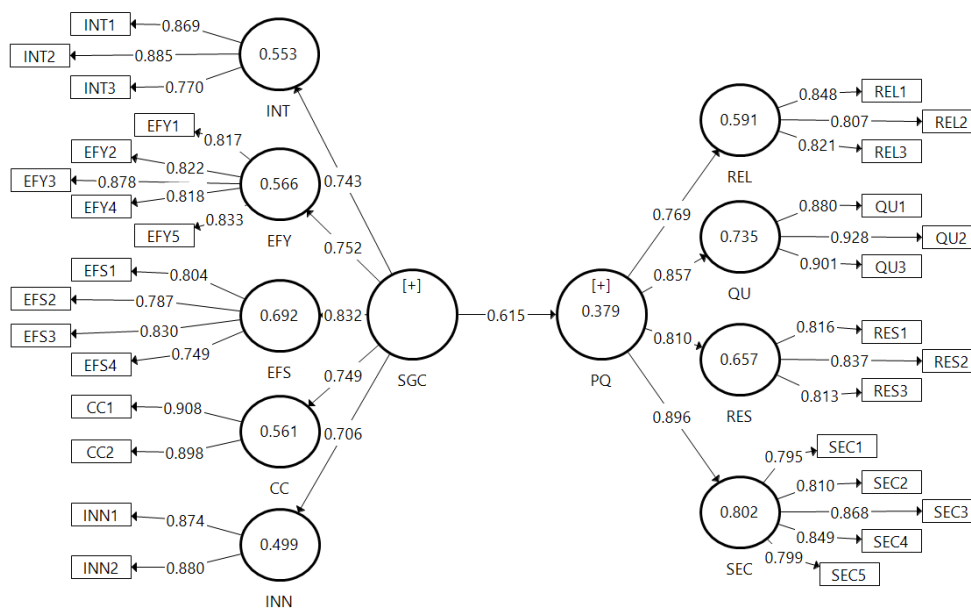
users (Hwang, K. K, 2000). We have crawled the price and size information of the models on two websites. We calculated the frequency of users in terms of price and size and figured out that 2000 CNY is an obvious cut-off point. Many users' mobile phones cost less than 2,000 CNY, and only 25% of users' mobile phones cost more than 2,000 CNY. We chose 2000 CNY as the cut-off point and divided users into two groups: the low price group (negative sample) and the high price group (positive sample).

IV. DATA ANALYSIS

The data in this thesis is from the mobile phone user data of an operator in Qingyang District, in the meanwhile, the thesis also uses the data of TV user as a comparison analysis (Valliappan Raju, Dr. Siew Poh Phung, 2019). In the early research stage, the required data types were determined through literature research, and matched with the actual data in the operation database of an operator.

Structural Model Assessment

The structural model can be tested by computing beta (β), R^2 , and the corresponding t -values via a bootstrapping procedure with a resample of 5,000 (Hair, Hult, Ringle, & Sarstedt, 2017).



Key: SGC: smart government characteristics, INT: integration, EFY: efficiency, EFS: effectiveness, CC: citizen centerity, INN: innovation, PQ: performance quality, REL: reliability, QU: quickness, RES: responsiveness, SEC: security

Figure 2: PLS algorithm results

Table 1: Structural path analysis result

Hypothesis	Relationship	Std Beta	Std Error	t-value	p-value	Decision	R ²
H1	SGC → PQ	0.61	0.04	14.52	0.00	Supported	0.38

Fornell-Larcker criterion

	<i>CC</i>	<i>EFS</i>	<i>EFY</i>	<i>INN</i>	<i>INT</i>	<i>QU</i>	<i>REL</i>	<i>RES</i>	<i>SEC</i>
CC	0.903								
EFS	0.631	0.793							
EFY	0.340	0.468	0.834						
INN	0.547	0.475	0.397	0.877					
INT	0.529	0.536	0.361	0.510	0.843				
QU	0.298	0.443	0.560	0.301	0.331	0.903			
REL	0.310	0.373	0.350	0.209	0.278	0.564	0.826		
RES	0.334	0.343	0.465	0.291	0.302	0.638	0.545	0.822	
SEC	0.360	0.442	0.643	0.294	0.306	0.661	0.580	0.614	0.825

Note: Diagonals represent the square root of the average variance extracted while the other entries represent the correlations.

Key: INT: integration, EFY: efficiency, EFS: effectiveness, CC: citizen centerity, INN: innovation, REL: reliability, QU: quickness, RES: responsiveness, SEC: security.

After matching, the relevant raw data was extracted from an operator database using SQL, the range of which were from October 2017 to December 2018 (Hwang, K. K, 2000). These five quarters of data are proved to meet the requirements of Grey System. Then Excel was utilized to filter and clean the data, then combining with SPSS 20.0 to analyze the data. Since the figure in this paper is extracted from the operator’s data system, it could discard systematic error brought by the questionnaire and guarantee the obtained data with a high credibility and objectivity

V. CONCLUSION

This article proceeded from the mobile phone use behavior and preferences of the aged, mining consumption data from the big data of users, showing the use behavior of elderly consumer groups, adopting statistical methods such as grey model, spatial statistics to analyze their consumption characteristics and preference of mobile phones and looking into the future development trend, proposing suggestions for database marketing strategy, the first one is to help to layout the future redirecting of operator’s the marketing strategy in advance, the second suggestion is for the purpose of contributing to matching market demand more effectively with prospectiveness, thirdly, it will help operators improve operation efficiency and economic benefits which is of great practical significance (Valliappan Raju, Dr. Siew Poh Phung, 2019). In addition, the phone App product developers and designers of operator’s package products can also be inspired through demonstrating the elderly consumer groups’ consumption preference which provides information reference for the relevant government departments, enterprises and institutions, manifesting the changing status quo and development trend of aging society, offering reference and the relevant suggestions for all aspects of society to alter strategically under the background of an aging society.

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