

Research on Consumer Purchasing Demand for Household Humidifiers in China Market

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Abstract—Household humidifiers are gaining increasing popularity among consumers. In order to study the creative design strategy of household humidifiers for consumers, this paper analyzes the operating principles and environment, materials, functions, physical appearances and colors of household humidifiers. The purchasing demand of consumers was surveyed. Based on the online questionnaire survey of and site interview with household humidifier consumers in Beijing, this paper analyzes competitive brands in the market, defines the consumers' purchasing demand for household humidifiers and summarizes the elements for creative design of household humidifiers needed by consumers so as to provide a reference for creative design of household humidifiers.

Keywords—User research, humidifiers, market research, design strategies

I. OVERVIEW AND CURRENT RESEARCH OF HOUSEHOLD HUMIDIFIERS

A. Development of the Household Humidifier Industry

With the improvement of people's living standards and development of heavy industry, indoor air has become a common concern of the public [1]. Like air temperature, air humidity is an important factor of ambient temperature. It has a significant impact on people's living and working environment [2]. Some medical experts indicated that the most comfortable ambient temperature is about 25°C; that the most comfortable ambient temperature is 45 to 70RH; and that a proper value of relative humidity makes us comfortable, keeps us fit and improves our working efficiency [3]. However, for the northern region of China, its dry air makes it difficult to reach the reasonable air index. Thus, it can be seen that household humidifiers play an important role in keeping consumers health, either physically or mentally.

According to the survey conducted by chinabaogao.com, China has witnessed a slow growth in the sales amount of humidifiers in recent years. As of the end of 2017, the total sales amount of the humidifier industry has reached RMB 1.63 billion yuan, an increase of 20 million yuan. Throughout China, the northern regions remain the major market for humidifiers. Retailers account for 45.5% of the total sales in the market. The eastern, central and northern regions witnessed a rapid growth

on a year-on-year basis, typically eastern regions, accounting for 18.8% of the domestic market; and the southern and western regions showed a year-on-year decline. With the effective promotion of air quality measurement and products in northern and northeastern regions, the number of humidifier consumers is growing year by year in the north. So, there is still a huge space for humidifiers to develop in China.

From the perspective of innovative drivers (Table I), in order to facilitate the development of household humidifiers, in addition to environmental applicability and market promotion, we should further product quality and produce the products that are needed by consumers. Thus, the market survey on the household humidifiers of China can provide strategic guidance for further improving the design of household humidifiers on the one hand and promote the development of household humidifiers in the market, thus promoting social and economic growth.

TABLE I. DRIVERS FOR HUMIDIFIER INNOVATION

Factor	Indicator
Technical development	Monopoly issue and market characteristics
Market demand	User experience and development of intelligent era
Environmental applicability	Public awareness towards air quality and preference for quality products

B. Research Status and Literature Review

The household humidifier is a kind of household appliance that can increase the humidity of a room. The rapid development of science and technology provides a wide space for household humidifiers and causes the appearance of diversified humidifiers in the market. As the concept of intelligent household is proposed, the concept of intelligence penetrates into all aspects of household appliance, which improves both user experience and improves life quality. The humidifier industry has developed in China for nearly 20 years. During the period, Chinese scholars have made increasing research on humidifiers. Now the people living in rooms have more urgent requirements for air quality and household environment improvement. Qian Liang summarized humidifiers and their varieties [4].

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In terms of air quality, Zhu Yimeng and Guo Zhendong summarized the changes in mass concentration of indoor PM_{2.5} from different sources and explored the water resources more suitable for indoor environment [5]. Wang Guifang, Chen Liexian, Song Ruijin et al. collected the air conditions in the office upon decoration, tested the content of air pollutants and used indoor purification equipment to improve indoor air quality [6].

In terms of humidifier products, Ji Zhijian analyzed electric heating humidifiers in the interpretation of the Announcement on the Quality Supervision and Inspection of Humidifier Products of Shanghai in 2017. Currently, household humidifiers are divided into three types, namely ultrasonic humidifiers, direct heating humidifiers and thermal evaporating humidifiers. Ji analyzed the working principles of three humidifiers [7] and interpreted the environmental applicability. Yao Yanchun, Zhang Qingling et al. [8] studied the impact of humidifiers on the bacteria content in the air, interpreted the antibacterial effect of humidifiers through the changes in bacteria concentration in the air, and compare the amount of bacteria released by the three types of humidifiers, so as to provide a reference for consumers to select and use humidifiers.

In order to make consumers of northern region understand more the operation, applicability and purchasing desire of household humidifiers and factors to be considered in purchase, an survey was made on purchasing factors and product defects based on careful review.

II. OVERVIEW OF HOUSEHOLD HUMIDIFIERS AND CURRENT RESEARCH STATUS

A. Pre-survey Work

In order to make questionnaire design more detailed, accurate and understandable, the first 50 consumers of different genders, ages, educational backgrounds and regions were pre-surveyed before formal survey. Questionnaires were designed based on the pre-survey result; questionnaires were effectively analyzed and screened and reasonable survey was conducted on such basis.

In the survey, consumers proposed some new ideas and demands for questionnaire design, such as understanding humidifier types and brands. Among them, 20 correspondents believed that awareness should also cover the awareness towards the development of household humidifiers and 9 correspondents indicated the factors that dominate the development of household humidifiers in their opinions.

In terms of purchasing willingness, all correspondents believed that it is necessary to ask consumers if they need to purchase household humidifier. If yes, what are the main factors for consumers? 30 correspondents selected price, brand, environment-friendly and overall performance; 19 correspondents selected visual appearance, applicable scope and region; and 16 correspondents selected utilization means, multiple functions and comfort.

B. Variable Design for Research

The variables for formal survey were identified based on the above pre-survey result and by reference to relevant documents and reference materials.

With respect to the awareness factors of consumers for household humidifiers, it should be learned through pre-survey that the following items should be surveyed in the pre-survey: degree of awareness, channel of awareness, awareness of household humidifier types, awareness of brands, awareness of consumers on the development of humidifiers in China, and the current defect of humidifiers in design, and trend of future humidifier development.

In terms of awareness in the survey, consumers were surveyed in terms of the humidifier types, brands, performance, quality, market promotion, direction as well as the trend and direction of household humidifiers in the future design estimated by consumers were surveyed.

C. Questionnaire Design

The “potential household humidifier consumers”, as objects of research in this paper, were surveyed in the form of online questionnaire in terms of purchase awareness, willingness and mirror factors to make the questionnaire design easily understood. The questionnaire structure is shown as follows:

1) *Questionnaire title*: The questionnaire is based on the principle of clear and simple topic of survey, “questionnaire on the awareness and the willingness to purchase household humidifiers”.

2) *Main content*: The main parts of this part for this questionnaire include: survey on household humidifier application scope, survey on the factors affecting consumers' willingness to purchase, survey on the defects of products purchased by consumers and their future development. Questionnaires are numbered from No. 1 to 20. One or more choices are designed for questions in the survey so as to facilitate understanding and operation.

3) *Background data*: including gender, age, family structure, educational background, income and other basic information of each user. The questionnaire survey is omitted.

III. SURVEY AND ANALYSIS

A. Sample Data Acquisition and Data Descriptions

Online questionnaire survey and field random survey are combined in the questionnaire survey this time. 90 copies of questionnaires were distributed to the districts of Beijing, either big or small. Except the lost or damaged questionnaires, at total of 82 copies were recovered, with questionnaire rate of 91.1%, which made our conclusions more objective.

Among household humidifier consumers, male consumers and female consumers accounted for 35.42% and 64.58% respectively. Region is one of the important factors that affect people's consumption. For consumers of different regions, they differ in the way of obtaining effective goods information, demand for products, product applicability and purchasing method. Among the correspondents, 41.67% earns an annual

income of less than RMB 2,000 yuan; 14.5% between RMB 2,000 and 4,000 yuan; 18.75% between RMB 4,000 yuan and 6,000 yuan; 6.25% between RMB 6,000 yuan and RMB 8,000 yuan; 8.33% RMB 8,000 and 12,000 yuan; and 10.42% above RMB 12,000 yuan.

B. Survey and Analysis on the Application Scope of Household Humidifiers by Consumers

It can be seen from the survey that although household humidifiers are quite popular in the northern part of the China, consumers in the southern part of China demand less for the products. 72.92% northern consumers had demand for humidifiers while only 25% southern consumers had demand for humidifiers.

It is shown from the survey that 89.58% consumers believed that household humidifiers are used most at home and only 4.17% consumers used humidifiers in hospitals or public places. Consumers used humidifiers most in winter (62.5%), followed by autumn (14.58%), spring (12.5%) and summer (4.17%) (See Fig. 1). It can be seen that the major consumers of humidifier products are mainly concentrated in large- and medium-cities, especially cold regions in the northern part of China. Due to the necessity of heating and dry air indoors in winter, some users who have certain requirements for living quality regulate the indoor humidity via humidifiers to make the indoor environment more comfortable.

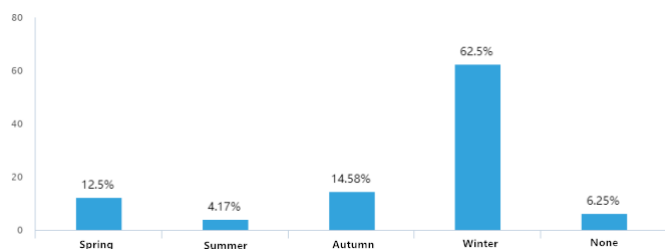


Fig. 1. Applicable reasons for consumers

C. Survey and Analysis on the Factors Affecting Consumers' Willingness to Purchase

In the 82 copies of survey questionnaires, a survey was made to consumers in terms of price, brand, region, season, function, material, physical appearance and color. When purchasing household humidifiers, 43.75% consumers selected the price range of RMB 100 to 300 yuan and 27.08% selected the price range of RMB 60 to 100 yuan. Other price ranges were paid little attention to, less than 10%. The two price ranges above occupy a large proportion. In terms of market occupation rate, Midea and Gree are undoubtedly two major players in the market, attracting 35.42% and 22.92% users. Consumers believed that in addition to the humidification function, anion generation and air purification had a share of 70.83% and disinfection had a share of 54.17% (See Fig. 2). Practical functions seem more attractive to consumers. In terms of materials, more consumers selected polymer plastics, with a share of 68.75%. 35.42%, 33.33% and 14.58% consumers selected organic glass, ceramics and glass. Fashion simple style and white color were preferred in terms of physical appearance, with a share of 72.92% and 72.90%. It can be seen that

consumers preferred to the humidifiers with simplified visual appearance, moderate price, and high degree of satisfaction, light color and high performance when making purchase.

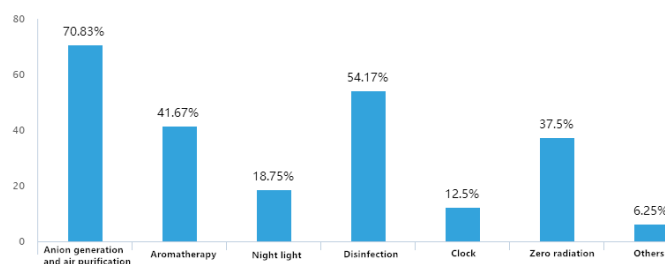


Fig. 2. Applicable reasons for consumers

D. Survey and Analysis on Product Defects Fed Back by Consumers

Through visit to consumer market and expert team evaluation, survey and screening were made in terms of the frequent problems of household humidifiers in daily life. Finally, five defects with high frequency were obtained, namely "high price", "low quality", "small water capacity", "inconvenience for dismantling and washing", and "easy forming of scale". In this survey, the last two had the largest share, namely 62.5% and 54.17%. Also, according to the survey on customers' satisfaction with household humidifiers, the percentages of the aspects to be improved are as follows: user-friendly design, 72.92%; mute design, 75%; multi-purpose design and visual appearance, 52.08% each (See Fig. 3). It can be seen that household humidifiers in the market have defects in design and need to be further improved.

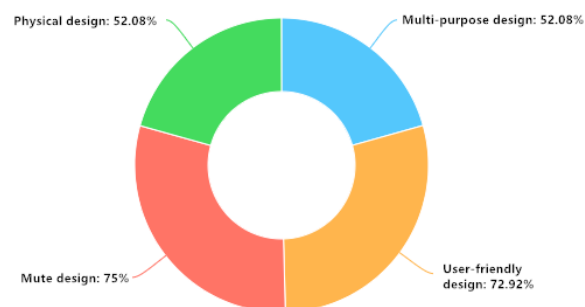


Fig. 3. Survey on the product defects fed back by consumers

IV. DESIGN STRATEGY

In recent years, the diversity and fashion of design has become the trend for the development of household humidifiers. The continuous upgrading and involvement of their performance and technical factors has become the key to the competition of the humidifier industry in China. Humidifiers tend to be designed as follows.

1) *More focus on multi-purpose design.* MP3, audio and light effect, music foundations are added to more and more humidifiers. The updated household humidifiers can eliminate formaldehyde, add odor and purify air, thus enriching user experience. Additional functions are improved. Users become

not satisfied with single forms of products along more. Among the consumption behaviors of new times, users pay more attention to the new experience and additional good functions presented by products and continuously have their functional demands satisfied.

2) *Emphasis on user-friendly design.* Humidifiers reflect multiple functions and emphasize user-friendly details. For example, the intelligent humidity regulator can keep humidifier evenly at the comfortable horizontal level and enable consumers to understand ambient temperature and humidity. Anyhow, the creative design of products is not only reflected in the functional demands for their products. With the evolution of times, segmentation of functions and appeal for emotions, user-friendly design has prevails in the current days and become the emotional demand for design of continuous products.

3) *Emphasis on mute design.* More and more developed mute settings are developed. Currently, humidifiers in the market are of mute effect, which would not disturb people's normal work and rest. Widely accepted by the market, mute design is applicable to kitchen and public space and makes consumers sleep comfortably.

4) *Lively physical design.* With free design, humidifiers do not only have basic attractive functions but also offer aesthetics for household living environment. With diversified functions of humidifiers in the market, their physical appearance is gradually satisfying people's aesthetic needs. Visual design does not only refer to the physical appearance of product but also a practical decoration placed in space. It combines both practicability and aesthetics and integrates with indoor environment.

V. CONCLUSION

In order to study users' needs, the household humidifier design status, psychological and physiological characteristics as well as purchasing demand of target users were studied. Online questionnaire survey and field interview was conducted

with consumers in Beijing. The functional layout and constituting parts as well as advantages and disadvantages of equivalent competitive brands in the market were analyzed in order to define consumers' demand for using humidifiers. The household humidifier design elements needed by consumers were extracted and the creative design strategy of household humidifiers was obtained so as to provide a reference for creative design of household humidifiers for consumers.

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