

The Evaluation Research on the Importance of User Requirements of Chinese Middle-Aged Lady Dresses

Jun Yao, Jianhui Chen*

College of Fashion and Design, Donghua University, Shanghai, 200051, China

**Corresponding author*

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Abstract: In order to improve user satisfaction and improve the accuracy of clothing product design, this study takes the dress of Chinese middle-aged women as an example, classify the needs of Chinese middle-aged women, and then divides the important degree of their needs by means of the application of the four-quadrant model and finally obtains the important and urgently needed needs. Then, it tries to compare Chinese females of different ages, income, purchase route and purchase frequency so as to obtain the demand classification of different users' attributes and relevant importance evaluation. After all these calculation and analysis, the research results present that the craft, color, style and fabric are the important user needs of Chinese middle-aged women's dresses, among which the craft and color are the important and urgently required user needs. Meanwhile, we can find that Chinese women in this age group with different user characteristics have varied urgent needs for dresses.

1. Introduction

As a personalized consumer product, the economic benefits of clothing industry depends on whether the product can meet the needs of users [1]. In recent years, how to analyze and deal with the user needs of clothing brands, and transform such needs into product attributes has become one of the main problems faced by brands [2]. Therefore, accurate processing and evaluation of user demand information is an important development direction of clothing product design research.

Entering the middle age, women usually have diversified, differentiated and personalized needs for clothing [3]. Due to the particularity of age, figure, social status and so on, their clothing products have higher performance and appearance requirements than those of young women [4-5]. At present, the research on their wear in China mainly focuses on body shape and functional design [6-9], and the analysis of user needs of this group and the evaluation of the attributes of clothing products are not in-depth enough.

Based on the research method of literature [10], this paper categorize the user needs of Chinese middle-aged women through the Kano model, and uses the four-quadrant model to divide the importance of user needs. Then, the Kano model was analyzed for users of different ages, income, purchase channels and purchase frequency respectively to obtain the important user needs and urgent user needs so as to improve the accuracy of product design and thus improve user satisfaction.

2. Concepts

2.1. The Kano Model Classification Method

Noriaki Kano [11] proposes Kano model and two-dimensional diagram to analyze the impact of user needs on user satisfaction, as is shown in Figure 1. The Kano model provides an efficient way to qualitatively analyze the user needs, while Literature [12] demonstrates the effective use of the Kano user satisfaction model in Quality Function Deployment, explore the forward and reverse needs of users and further divide it into five different categories: Must be Requirements, One dimensional Requirements, Attractive Requirements, Indifferent Requirements, and Reverse Requirements. The Kano survey outcome evaluation form was obtained, as is shown in Table 1.

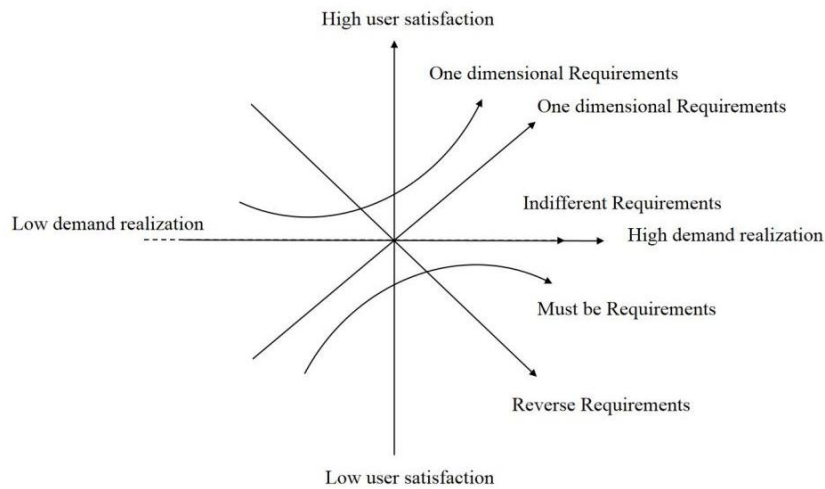


Figure 1: The Kamo model [11].

Table 1: Results of the Kano questionnaire survey evaluation form [12].

User needs		Reverse requirement				
		Very important	Important	Generally important	Unimportant	Very unimportant
Forward requirement	Very important	Q	A	A	A	O
	Important	R	I	I	I	M
	Generally important	R	I	I	I	M
	Unimportant	R	I	I	I	M
	Very unimportant	R	R	R	R	Q

Then, the user satisfaction coefficient S_i is calculated, and the index values between 0 and 1, the higher the sensitivity, the higher the priority of this index. And as for the dissatisfaction coefficient D_i , its value ranges between -1 and 0, the smaller the value, the greater the sensitivity. The calculation formula is as follows:

$$\text{Better(satisfaction coefficient } S_i) = (A_i + O_i) / (A_i + O_i + M_i + I_i) \quad (1)$$

$$\text{Worse(dissatisfaction coefficient } D_i) = (M_i + O_i) / (A_i + O_i + M_i + I_i) \quad (2)$$

In the formula, i represents the number of user requirements, $i=1, 2, 3, \dots, n$. A_i , O_i , M_i , and I_i is

the demand rate.

2.2. Division of the Four-Quadrant Model

American management scientist Stephen R. Covey has proposed a four-quadrant model for time management [13], distinguishing between important and urgently demanded work according to two different degrees. According to the Kano classification results, the user satisfaction coefficient S_i and dissatisfaction coefficient D_i of each attribute are calculated, which can establish the coordinate position of the user demand in the four-quadrant model. In the four-quadrant model, the first quadrant represents one dimensional requirements, the second quadrant the attractive requirements, the third quadrant the indifferent requirements, and the fourth quadrant the must be requirements. Among them, the needs in the first and second quadrant belong to important user needs, and the needs in the first and fourth quadrant belong to urgent user needs, as is shown in Figure 2.

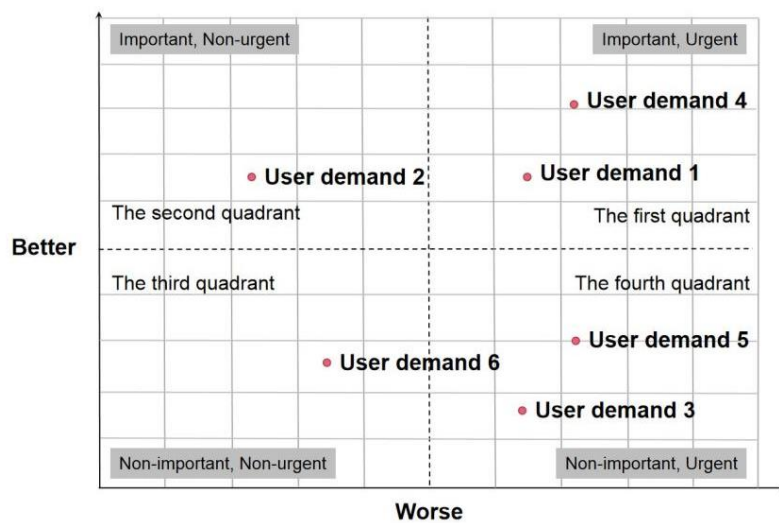


Figure 2: Four-quadrant transmit model.

3. Calculation of the Importance of User Needs

3.1. Acquisition of User Demand Information

Table 2: User needs of middle-aged lady dresses.

Pattern	Color	Fabric	Craft	Style	Function
Loose	Bright	Pure cotton	Smooth needle	Elegant	Warmth
Not showing fat	Not dark	Light	Embroidery	Leisure	Sunscreen
Modify figure	Comfortable	Elastic	Hot drill hot picture	Simple	Multi-purpose
Fit for all kinds of figure	Red	Soft	Narrow goods weaving	Lady-like	Easy to wear and take off
Simple	Light	Cozy	Goo-looking patterns	Chinese	Easy to match
Waist-high		Wear-resistant	Washing effect	Business	
Not exposed			Printing		
Beautiful silhouette			Nail bead nail drill		
Not easy to be outdated					

This paper will apply the Kano model classification method to classify and locate the

characteristics of each factor according to the survey results through the form of questionnaire survey. This study takes the Chinese middle-aged lady summer dress as an example. By means of expert interviews, brand research, user survey method, it will obtain original requirements of the summer dress of this age group, and summarize the original data [14] of the 6 types of middle-aged lady dress product evaluation index properties concluding pattern, color, fabric, craft, function, style, see table 2.

3.2. Calculation of the Importance of User Needs

Based on the above six types of user needs, set the importance questionnaire, the product features of the summer dress of middle-aged women were surveyed. Positive and negative questions were asked for each attribute [15]: Do you think it is important if this item is met? Do you think it is important if this item is not satisfied? The answers are shown on a 1 to 5 scale in Table 3.

Table 3: The scale of importance in products which meets or does not meet attributes.

		Very important	Important	Generally important	Unimportant	Very unimportant
Product attributes	Meet	5	4	3	2	1
	Not meet	1	2	3	4	5

In this study, 535 Chinese middle-aged women aged from 40 to 59 years were investigated, and 529 valid questionnaire answers were obtained in electronic questionnaire and face-to-face form. The results of 529 surveys were imported into the Kano model user demand factor classification table, and then the results were summarized in Table 4. Among them, a total of 154 people in the style survey chose Attractive Requirements (A), which accounted for the largest proportion, so the pattern is Attractive Requirements (A). In addition, a total of 154 people considered color as One dimensional Requirements (O), so color is the One dimensional Requirements (O). By this way, fabric is Attractive Requirements (A), craft is One dimensional Requirements (O), function is Indifferent Requirements (I), and style is Must be Requirements (M). Finally, the statistical results are calculated according to the percentage, and the final pair with the highest proportion should be classified by attributes, as is shown in Table 5.

Table 4: Summary of Kano Model product attribute survey results.

	A	O	M	I	Better	Worse
Patterns	154	137	102	136	0.536	-0.464
Color	117	154	128	130	0.501	-0.523
Fabric	154	128	110	137	0.522	-0.460
Craft	121	163	128	117	0.527	-0.541
Function	88	15	59	367	0.198	-0.142
Style	65	77	199	188	0.272	-0.514

Table 5: Summary of Kano attribute results (n=529).

	A	O	M	I	Kano attributes
Pattern	29.11%	25.9%	19.28%	25.71%	Attractive Requirements
Color	22.12%	29.11%	24.2%	24.57%	One dimensional Requirements
Fabric	29.11%	24.2%	20.79%	25.9%	Attractive Requirements
Craft	22.87%	30.81%	24.2%	22.12%	One dimensional Requirements
Function	16.64%	2.84%	11.15%	69.38%	Indifferent Requirements
Style	12.29%	14.56%	37.62%	35.54%	Must be Requirements

According to the summary results of the user needs of middle-aged lady dresses, the formula (1) and (2) are applied in calculating the satisfaction coefficient of the data in the table, as is shown in

Table 6. Then, which requirement attributes are more sensitive can be determined, making it easier to improve user satisfaction by improving these attributes in the product design process. In the results, when the dissatisfaction coefficient is eliminated, the statistics become smaller and the user satisfaction decreases more quickly, while when the dissatisfaction coefficient increases, the statistics get bigger and user satisfaction increases faster.

Table 6: Results of satisfaction S_i and dissatisfaction D_i calculation.

Items	Satisfaction coefficient S_i	Dissatisfaction coefficient D_i
Pattern	0.55	0.45
Color	0.51	0.53
Fabric	0.53	0.45
Craft	0.54	0.55
Function	0.19	0.14
Style	0.27	0.52

According to the calculation results of the satisfaction coefficient and dissatisfaction coefficient in Table 6, the four-quadrant model diagram divided by the scatter plot is drawn, see Figure 3. The first quadrant contains two attributes, color and craft. For the one dimensional requirements, the quadrant is an important and urgent demand, indicating high satisfaction coefficient and high dissatisfaction coefficient. Therefore, promoting the attribute of the product can greatly improve the user satisfaction. When this attribute is not satisfied, the user satisfaction will decrease. The second quadrant is an important rather than urgent attractive requirements, including pattern and fabric, which indicates high satisfaction, while dissatisfaction is low. When this attribute cannot be satisfied, the user satisfaction will not decrease, whilst when this attribute is satisfied, the user satisfaction will be greatly enhanced. The third quadrant is an indifferent requirements containing functional attributes. The satisfaction coefficient and dissatisfaction coefficient are relatively low, which are non-important and non-urgent needs. This means that whether this attribute is provided or not, it will not affect the user satisfaction, and users do not care about this attribute. The fourth quadrant is a must be requirements, including style attributes, which is a non-important but urgently needed requirement. This quadrant displays that the satisfaction value is low, while the dissatisfaction value is high. Therefore, so when the product meets the attribute, the user satisfaction will not increase, and when the attribute is not satisfied, the user satisfaction will decrease. To sum up, the middle-year lady's dress can meet the four attributes, including the craft, color, style and fabric, to greatly improve user satisfaction. Therefore, craft, color, pattern and fabric are the important user needs of middle-aged ladies' dresses; craft, color and style are the urgently needed user needs.

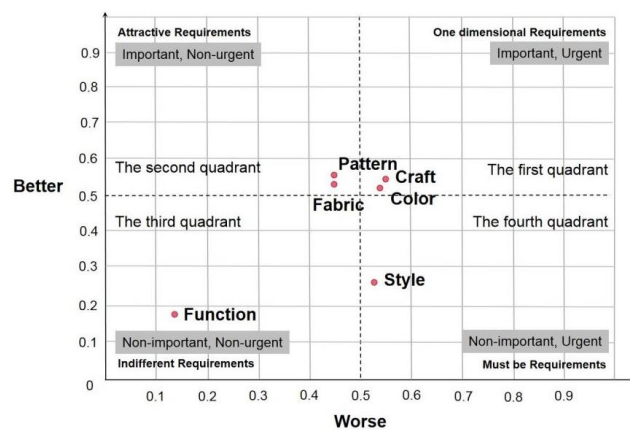


Figure 3: Four quadrant model of middle-aged lady dress.

4. Comparison of the Demand Importance of Different User Characteristics

The above method was used to analyze the women of different ages, income, purchase route and purchase frequency respectively, excluding the option with small data in the survey results, and Kano model analysis results is shown as follow.

4.1. Results of Kano Attribute Analysis for Users of Different Ages

Among these 529 people surveyed, 136 of them are in the age group of 40 to 44, 126 in 45 - 49, 112 in 50 to 54, and 155 in 55- 59. Then the above age intervals were imported into the Kano model user requirements classification table, and the statistical results are shown in Table 7.

Table 7: Summary of Kano property results for users of different ages.

Age	Pattern	Color	Fabric	Craft	Function	Style
40-44	O	I	O	O	I	M
45-49	A	I	A	I	I	I
50-54	I	O	A	O	I	I
55-59	I	M	O	M	I	M

Then, the satisfaction coefficient and the dissatisfaction coefficient are drawn, respectively, as is shown in Tables 8 and 9.

Table 8: Results of the satisfaction S_i calculation of users of different ages.

Age	Pattern	Color	Fabric	Craft	Function	Style
40-44	0.56	0.49	0.59	0.59	0.27	0.36
45-49	0.57	0.50	0.51	0.48	0.14	0.22
50-54	0.52	0.55	0.49	0.53	0.19	0.22
55-59	0.50	0.48	0.49	0.51	0.19	0.28

Table 9: Results of dissatisfaction D_i calculation for users of different ages.

Age	Pattern	Color	Fabric	Craft	Function	Style
40-44	0.47	0.50	0.51	0.51	0.17	0.52
45-49	0.45	0.48	0.35	0.47	0.11	0.46
50-54	0.45	0.55	0.45	0.60	0.12	0.48
55-59	0.48	0.56	0.51	0.58	0.16	0.58

The calculation results of satisfaction coefficient and dissatisfaction coefficient are presented in the four-quadrant model map to show the important and urgently needed needs of different age ranges. Among these age groups, females aged 40 to 44, 50 to 54 and 55 to 59 all consider that pattern, colors, fabrics and crafts are important user needs, while patterns, fabrics, crafts colors and styles are urgent user needs. Those in 45 - 49 age group believe that pattern, colors, fabrics and crafts are important user needs, while the urgent user needs are pattern, crafts, colors and styles and women in this age range do not regard fabrics as urgent user needs.

4.2. Kano Attribute Analysis Results for Different Disposable Income Users

Table 10: Summary of Kano attribute results for users with different disposable income.

Disposable income	Pattern	Color	Fabric	Craft	Function	Style
RMB1001-3000	A	M	A	A	I	I
RMB3001-5000	I	O	I	O	I	M
RMB5001-10000	A	O	A	O	I	I

The disposable income included 144 users of 1001 yuan -3000 yuan, 210 users of 3001 yuan -

5000 yuan, and 112 users of 5001 yuan - 10000 yuan respectively. And the data put into the Kano model user requirements classification table are shown in Table 10.

The satisfaction coefficient and the dissatisfaction coefficient, respectively, are displayed in Tables 11 and Table 12.

Table 11: Results of satisfaction S_i calculation of users with different disposable income.

Disposable income	Pattern	Color	Fabric	Craft	Function	Style
RMB1001-3000	0.49	0.50	0.51	0.52	0.21	0.27
RMB3001-5000	0.52	0.47	0.48	0.51	0.16	0.28
RMB5001-10000	0.54	0.53	0.54	0.54	0.21	0.23

Table 12: Results of dissatisfaction D_i calculation for users with different disposable income.

Disposable income	Pattern	Color	Fabric	Craft	Function	Style
RMB1001-3000	0.46	0.52	0.49	0.52	0.14	0.48
RMB3001-5000	0.45	0.53	0.45	0.59	0.18	0.53
RMB5001-10000	0.43	0.54	0.42	0.51	0.10	0.48

In the light of the above calculation results, the four-quadrant model diagram is drawn, and the important and urgent needs of different disposable income users are obtained. In the table, we can find that users in the three income ranges all believe that pattern, colors, fabrics and craft are important user needs. Women in China with income of 1001 yuan - 3000 yuan and 5001 yuan-10000 yuan think that pattern, fabric, craft, color and style are the urgently needed user needs, while users with 3001 yuan - 5000 yuan think that color, craft and style are the urgently needed user needs, and users in this income range do not think that pattern and fabric are the urgently needed user needs.

4.3. Analysis Results of Kano Attributes of Users of Different Purchase Routes

Table 13: Summary of Kano attribute results for users of different purchase routes.

Purchase route	Pattern	Color	Fabric	Craft	Function	Style
Online stores	O	I	A	A	I	M
Large shopping malls	O	O	A	A	I	M
Brand stores	A	O	A	A	I	M
Other channels	A	I	A	A	I	I

There were a total of 224 users surveyed who often bought clothes in online stores, 256 users who bought clothes in large shopping malls, 216 users in brand stores and 110 users who bought clothes through other channels. The above purchase route data were put into the Kano model and the results are shown in Tables 13 to 15.

Table 14: Results of satisfaction S_i calculation of users with different purchase routes.

Purchase route	Pattern	Color	Fabric	Craft	Function	Style
Online store	0.54	0.47	0.50	0.49	0.22	0.30
Large shopping mall	0.57	0.54	0.56	0.55	0.22	0.26
Brand store	0.60	0.53	0.57	0.57	0.21	0.29
Other channels	0.51	0.45	0.48	0.53	0.16	0.26

Through the above calculation results, we can attain the important and urgent needs of users of different purchasing ways. Users of the four purchasing ways all consider that pattern, color, fabric and craft are the significant user needs, and those buying clothing through online stores, brand stores and other ways think that pattern, fabric, process, color and style are the urgent user needs. Those who often purchase clothing in large shopping malls think that pattern, craft, color and style

are urgent needs, while fabrics are non-urgent needs.

Table 15: Results of dissatisfaction D_i calculation for users with different purchase routes.

Purchase route	Pattern	Color	Fabric	Craft	Function	Style
Online store	0.48	0.51	0.50	0.55	0.16	0.54
Large shopping mall	0.47	0.53	0.43	0.53	0.13	0.53
Brand store	0.47	0.53	0.47	0.56	0.13	0.52
Other channels	0.41	0.49	0.39	0.48	0.12	0.46

4.4. Analysis Results of Kano Attributes of Users with Different Purchase Frequencies

According to the survey, a total of 83 women buying clothes once a month, 110 women buying clothes once every three months, 59 women buying clothes once every six months, and 241 women buying clothes irregularly were investigated. The statistics of different purchase frequencies were loaded into the Kano model and the results are exhibited in Tables 16 to 18.

Table 16: Summary of Kano attribute results for users with different purchase frequencies.

Purchase frequency	Pattern	Color	Fabric	Craft	Function	Style
Once a month	A	M	I	O	I	I
Once every three months	O	O	A	A	I	M
Once every six months	I	M	O	O	I	I
Irregularly	O	O	A	O	I	I

Table 17: Results of satisfaction S_i calculation of users with different purchase frequencies.

Purchase frequency	Pattern	Color	Fabric	Craft	Function	Style
Once a month	0.48	0.45	0.45	0.44	0.11	0.27
Once every three months	0.54	0.51	0.54	0.57	0.20	0.27
Once every six months	0.48	0.44	0.51	0.59	0.20	0.29
Irregularly	0.58	0.52	0.55	0.52	0.19	0.26

Table 18: Results of dissatisfaction D_i calculation for users with different purchase frequencies.

Purchase frequency	Pattern	Color	Fabric	Craft	Function	Style
Every month	0.44	0.54	0.39	0.62	0.15	0.50
Once every three months	0.48	0.50	0.49	0.56	0.15	0.56
Once every six months	0.36	0.54	0.54	0.55	0.12	0.47
Irregularly	0.49	0.51	0.46	0.52	0.14	0.50

In the light of the calculation results, users of the four purchase frequencies all think that pattern, color, fabric and craft are important user needs. Among them, those who buy clothing every three months and irregularly consider that pattern, fabric, craft, color and style are urgent user needs. However, those who purchase once a month believe that color, craft and style are urgently needed user needs, and that styles and fabrics are non-urgent needs. Those who buy every six months think that fabric, craft, color and style are urgently needed, while pattern is non-needed.

5. Conclusion

This paper applies the Kano model to classify the user needs of Chinese middle-aged lady dresses, and divides the specific needs in combination with the four-quadrant model. By comparing the Kano attributes of users of different ages, income, purchase route and purchase frequency, this study is able to obtain the important and urgent needs of different user characteristics. After calculation and comparison, the research results show that: on the whole, the pattern, color, style

and fabric are the important user needs of Chinese middle-aged women's dresses, among which the craft and color are the important and urgently needed user needs. From different age ranges, females between 45 and 49 differ from other age users in terms of urgently needed needs. From the perspective of different disposable income, women with the income range of 3001 yuan - 5000 yuan are different from other income groups. Regarding different purchasing ways, those who often buy clothes in large shopping malls are different from other users in terms of urgent needs. In terms of purchase frequency, there are differences between users who buy clothes every month and every six months.

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