Optimisation study of female suit product design based on the Kano-HOQ model

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ABSTRACT – REZUMAT

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This study adopts the Kano-HOQ method to address the gap between the consumption demands of female suit consumers and the market supply, improving the satisfaction of female suit consumers and the precision of market response. Firstly, 20 product demand factors influencing the consumption decisions of female suit consumers are extracted, classified and analysed according to Kano attributes. Then, based on the importance of each demand factor to the users, the comprehensive satisfaction of each consumption demand is calculated. The consumption demands of female suit consumers are transformed into 4 primary design requirements and 16 secondary design requirements. These are then input into the House of Quality (HOQ) model to determine the correlation between user demand factors and design requirements. Finally, by calculating the matrix, the weight values of each design requirement were determined, and they were ranked accordingly. The study summarised the consumer demand items and product design technical elements that should be prioritised for improvement in the female suit product design process. The research indicates that priority should be given to aesthetic appeal on the visual level in the design process of female suits, such as style, structure, colour, and patterns. At the same time, attention should also be paid to the personalised characteristics of the product, ensuring that it matches the individual demands of users. This approach aims to enhance user satisfaction and better fulfil consumer demands.

Keywords: *female suit, user demands, Kano model, House of Quality, design requirement*

Studiu de optimizare a proiectării costumelor de damă pe baza modelului Kano-HOQ

Prezentul studiu adoptă metoda Kano-HOQ pentru a aborda discrepanța dintre cerințele de consum ale femeilor care achiziționează costume și oferta de pe piață, îmbunătățind astfel satisfacția acestor consumatoare și precizia răspunsului pieței. În primul rând, sunt identificați, clasificați și analizați 20 de factori de cerere ai produsului care influențează deciziile de consum ale femeilor care achiziționează costume, în conformitate cu atributele Kano. Apoi, pe baza importanței fiecărui factor de cerere pentru utilizatoare, se calculează nivelul de satisfacție globală asociat fiecărei cerințe de consum. Aceste cerințe sunt transformate în 4 cerințe de proiectare primare și 16 cerințe de proiectare secundare. Acestea sunt apoi integrate în modelul „House of Quality" (HOQ) pentru a determina corelația dintre cerințele utilizatorilor și cerințele de proiectare. În final, prin calcularea matricei, au fost determinate valorile ponderale ale fiecărei cerințe de proiectare, iar acestea au fost clasificate în consecință. Studiul a sintetizat aspectele legate de cerințele consumatoarelor și elementele tehnice de proiectare a produsului, care ar trebui să fie prioritizate în vederea îmbunătățirii procesului de proiectare a costumelor de damă. Studiul indică faptul că în procesul de proiectare a costumelor de damă ar trebui să se acorde prioritate aspectelor estetice la nivel vizual, precum stilul, structura, culoarea și modelele. În același timp, ar trebui să se acorde atenție și caracteristicilor personalizate ale produsului, asigurându-se că acesta corespunde cerințelor individuale ale utilizatorilor. Această abordare are ca scop sporirea satisfacției și o îndeplinire mai bună a cerințelor utilizatorilor.

Cuvinte-cheie*: costum de damă, cerințele utilizatorilor, modelul Kano, modelul House of Quality, cerințe de proiectare*

INTRODUCTION

As China's apparel industry soft power grows [1], market competition intensifies [2]. Consumers demand greater personalisation in garment designs [3]. Market drivers now blend fashion, individuality, and varied aesthetics [4], replacing utility-focused priorities. Designers must analyse consumer needs meticulously, innovate concepts to create styles that align with market demands, bridging supply-demand gaps through optimal design [5].

Existing research on market supply and demand has perspective-driven limitations in China. From enterprise/designer viewpoints, studies emphasise apparel structure, styling, patterns, colours, and fabric functions, but over-reliance on individual philosophies creates design-consumer disconnects. Song et al. [6]. Taking geometric patterns of different forms and basic cheongsam styles as the research objects, this paper analyses the perceptual evaluations generated by the combination of different geometric patterns and cheongsam styles. Zhang [7], taking the dress as an example, realised the digital construction of the clothing style database through the quantification of clothing styles. Shen [8] analysed the four

major relationships between clothing styling design and fabric, and put forward effective suggestions for guiding clothing styling design and promoting fabric research and development. User-centric research focuses on perceptual needs while insufficiently addressing market-demand alignment [9–11]. This duality creates supply-demand gaps impacting satisfaction and competitiveness.

In the highly competitive women's clothing sector, female suits have a large market share, and it continues to grow. However, traditional female suit products suffer from severe homogenization, making it difficult to meet the diverse demands of contemporary women for female suits. Based on this, this article focuses on the Chinese clothing market and takes female suits as the research object, identifying market-consumer imbalance points and satisfaction-impacting design elements. Using Kano-HOQ [12–14], it prioritises design requirements to enhance supply-demand alignment, providing apparel enterprises with theoretical and practical guidance for improving user satisfaction.

METHODOLOGY

Research on the consumer demands of female suit users

This article selects the styles of women's suits with lapel structures as the research objects based on the morphological classification of women's suits, and does not impose restrictions on the silhouettes and lapel classifications of women's suits. The basic style of women's suits is shown in figure 1. Based on the existing research results on women's suit product design and user needs [2, 15–16], the consumer demand elements of women's suit users are refined,



Fig. 1. Basic women's suit styles

and on this basis, the questionnaire is designed and investigated. To ensure the representativeness of the research sample, this study employs a combination of stratified sampling and quota sampling to select respondents. First, stratification is conducted based on the tier levels of Chinese cities (first-tier, second-tier, third-tier, and below). Within each tier, quotas are set according to two key demographic variables: age and monthly income, to ensure that the sample structure aligns with the basic characteristics of the core consumer group for women's suits (referencing data from the National Bureau of Statistics and industry consumption reports). Ultimately, 150 respondents were selected for semi-structured interviews, including sales personnel from women's suit brands (30%) and consumers with over five years of experience in purchasing and wearing women's suits (70%). All respondents provided informed consent and voluntarily participated in this study. This approach aims to

Table 1

CONSUMER DEMAND ELEMENTS OF FEMALE SUIT USERS

Primary demand elements	Secondary demand elements	Primary demand elements	Secondary demand elements
Aesthetic elements (A)	Aesthetic design (A_1)	Personality elements (C)	Professional image (C_1)
	Proper structure & cut (A_2)		Flexible pairing (C_2)
	Concealing figure flaws (A_3)		*Print/embroidery craft* (C_3)
	Beautiful patterns (A_4)		Fashionable flair (C_4)
	Coordinated colors (A_5)		Personality accent (C_5)
	Aesthetic variety I (A_6)		Unique accessories (C_6)
Quality elements (B)	Excellent workmanship (B_1)		Gender-specific traits (C_7)
	Exquisite detail design (B_2)		Identity recognition (C_8)
	Soft, fine texture (B_3)	Cultural elements (D)	Reflect ethnic styles (D_1)
	Durable and thick fabric (B_4)		Chinese elements (D_2)
	Extra parts included (B_5)		Brand narrative and cultural embodiment (D_3)
	Easy to wash and maintain (B_6)	Functional elements (E)	Suitable for multiple occasions (E_1)
	Reflect brand value (B_7)		Comfortable and convenient to wear (E_2)
	Eco-friendly fabric (B_8)		Multifunctional design (E_3)
	Durable fabric (B_9)		Adjustable size (E_4)

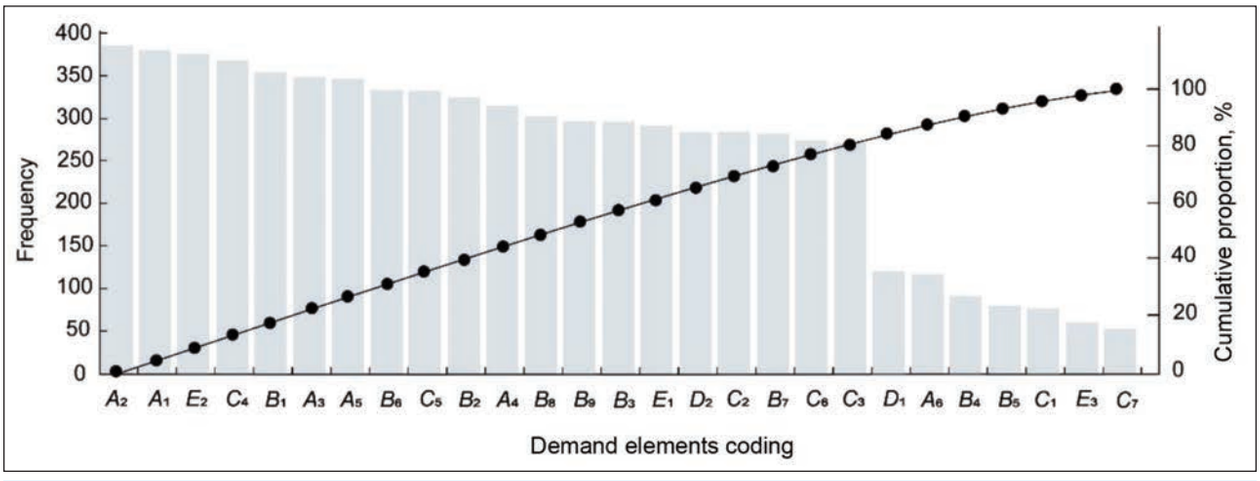


Fig. 2. Female suit products consumer demand key elements of the Pareto figure

comprehensively capture user needs from both supply (sales) and demand (consumption) perspectives, enhancing the representativeness of the sample and the external validity of the research findings. Moreover, the number of participants meets the common scale for market research and can be compared with past results. It complies with the basic requirements of statistical validity and principles of statistical analysis, fulfilling the capacity requirements for samples in such surveys [17]. Semi-structured interviews explored background, preferences, usage, purchasing, and market feedback. Data analysis categorised results into 5 primary demand elements and 30 secondary elements (table 1).

Based on a preliminary survey of 150 respondents, participants selected prioritised attributes from table 1. Three least-selected primary attributes (<10 selections) were excluded, leaving 27 demand elements. A questionnaire assessed user expectations for these elements, with optional non-essential attributes. Applying the Pareto principle (2:8 rule) [18], critical factors were identified by 80% cumulative selection frequency, visualised in figure 2.

Figure 2 shows 20 key attributes, including proper structure & cut (A_2), aesthetic design (A_1), comfortable and convenient to wear (E_2), and fashionable flair (C_4), covering 79.88% of responses. These were redefined as primary demand attributes (table 2), while seven lower-priority attributes were excluded.

Analysis of the gap between market supply and user demands

Users form varied expectations based on consumption needs, influencing purchase decisions. Gap values correlate with satisfaction: negative gaps indicate excess demand fulfilment, positive gaps reflect unmet needs, and zero gaps signify alignment.

This study applies Expectation Confirmation Theory (ECT) [19] to link consumer demands and satisfaction for female suits. A 5-point Likert Scale [20] assessed discrepancies between expectations and perceived satisfaction for each attribute. Participants were female, with demographics detailed in table 3.

Table 2

FEMALE SUIT CONSUMER DEMAND SYSTEM TABLE

Primary demand elements	Secondary demand elements	Primary demand elements	Secondary demand elements
Aesthetic elements (A)	Aesthetic design (A_1)	Personality elements (C)	Flexible pairing (C_1)
	Proper structure & cut (A_2)		*Print/embroidery craft* (C_2)
	Concealing figure flaws (A_3)		Fashionable flair (C_3)
	Beautiful patterns (A_4))		Personality accen (C_4)
	Coordinated colors (A_5)		Unique accessories (C_5)
Quality elements (B)	Excellent workmanship (B_1)	Cultural elements (D)	Chinese elements (D_1)
	Exquisite detail design (B_2)	Functional elements (E)	Suitable for multiple occasions (E_1)
	Soft, fine texture (B_3)		Comfortable and convenient to wear (E_2)
	Easy to wash and maintain (B_4)		
	Reflect brand value (B_5)		
	Eco-friendly fabric (B_6)		
	Durable fabric (B_7)		

SPSS analysis of questionnaire data (table 4) revealed that all demand elements exhibited P<0.05 [21], highlighting intergroup discrepancies.
Expectations consistently exceeded market satisfaction, with current offerings falling short of user needs. This gap underscores significant market optimisation potential.

Principles of the Kano model

The Kano model is a demand analysis model that can conduct qualitative analysis and attribute classification of demands, and is often used to study users' personalised demands. This model is frequently applied in fields such as product design, interaction design, and service design [22]. Its advantage lies in

Table 3

TARGET AUDIENCE FOR THE QUESTIONNAIRE					
Dimension	**Category**	**Percentage**	**Dimension**	**Category**	**Percentage**
Age	20–29 years old	20%	Region	First-tier cities	30%
	30–39 years old	25%		Second-tier cities	40%
	40–49 years old	25%		Third-tier and below cities	30%
	50–59 years old	20%	Purchasing frequency	High frequency (at least once per quarter)	60%
	60+ years old	10%		Low frequency (half a year or less)	40%
Occupation	White-collar/public staff	50%	Monthly income	Below 5,000 RMB	30%
	Freelancers	30%		5,001–10,000 RMB	40%
	Students	10%		Above 10,000 RMB	30%
	Others	10%			

Table 4

RESULTS OF THE SIGNIFICANT DIFFERENCE ANALYSIS							
Primary demand elements	**Secondary demand elements**	**Expectation**		**Satisfaction**		***T*-value**	***P*-value**
		Mean value	**Rank**	**Mean value**	**Rank**		
Aesthetic elements (*A*)	Aesthetic design (A_1)	4.82	1	3.72	6	4.75	0.000*
	Proper structure & cut (A_2)	4.76	2	4.41	2	4.69	0.000*
	Concealing figure flaws (A_3)	4.68	3	3.85	10	4.15	0.000*
	Beautiful patterns (A_4)	4.65	4	4.19	4	3.72	0.000*
	Coordinated colors (A_5)	4.57	5	4.00	8	4.28	0.025*
Quality elements (*B*)	Excellent workmanship (B_1)	4.55	6	3.82	11	3.79	0.000*
	Exquisite detail design (B_2)	4.48	7	4.52	1	4.70	0.032*
	Soft, fine texture (B_3)	4.43	8	4.38	3	4.28	0.000*
	Easy to wash and maintain (B_4)	4.39	9	4.02	7	3.66	0.000*
	Reflect brand value (B_5)	4.26	10	3.78	12	3.38	0.000*
	Eco-friendly fabric (B_6)	4.18	11	4.06	5	3.81	0.000*
	Durable fabric (B_7)	4.12	12	3.96	9	4.39	0.000*
Personality eements (*C*)	Flexible pairing (C_1)	4.08	13	3.38	19	2.87	0.000*
	Print/embroidery craft (C_2)	4.05	14	3.57	15	3.19	0.018*
	Fashionable flair (C_3)	3.96	15	3.41	18	2.58	0.000*
	Personality accent (C_4)	3.92	16	3.5	16	2.13	0.000*
	Unique accessories (C_5)	3.88	17	3.62	14	3.02	0.000*
Cultural elements (*D*)	Chinese elements (D_1)	3.81	18	3.46	17	1.99	0.000*
Functional elements (*E*)	Suitable for multiple occasions (E_1)	3.72	19	3.66	13	2.26	0.000*
	Comfortable and convenient to wear (E_2)	3.75	20	3.36	20	2.31	0.006*

Note: * indicates a p-value less than 0.05, indicating significant differences.

its ability to effectively and clearly illustrate the relationship between product demand elements and user satisfaction, precisely dissect users' demand levels, and provide a clear basis for product decision-making [23]. Based on the links, it classifies elements into five attributes: Must-be (M), One-dimensional (O), Attractive (A), Indifferent (I), and Reverse (R) [3, 24]. To design the Kano questionnaire, target users were invited to assign importance scores to the secondary demand factors listed in table 2. The scoring criteria were as follows: Satisfied (5 points), Should be (4 points), Neutral (3 points), Barely Acceptable (2 points), and Disliked (1 point). To ensure the reliability and validity of the results from the Kano questionnaire, reliability and validity tests were conducted. Cronbach's α coefficient was used to assess the internal consistency of the survey. The overall α coefficient of the questionnaire was calculated to be 0.892, and the α coefficients for each primary demand element were all greater than 0.7, indicating a high level of reliability. In terms of validity, exploratory factor analysis (EFA) was performed on the 20 secondary demand factors using principal component analysis, with the maximum variance method applied for rotation. Ultimately, 3 common factors were extracted, with a cumulative variance contribution rate of 88.45%. Additionally, this indicates that the questionnaire possesses good structural validity and can effectively measure the consumption demand structure of women's suit users [3].

To prevent misclassification, Better-Worse coefficients (equations 1–2) refined prioritisation and weighting.

$$Better = (A + O) / (A + O + M + I) \quad (1)$$

$$Worse = -1 \times (O + M) / (A + O + M + I) \quad (2)$$

Kano attribute classification

Following the Kano model, 20 female suit demand elements were categorised using Better-Worse coefficients (table 5) [22]. Must-be attributes centred on aesthetics, highlighting users' priority for fashionable design to drive purchase intent. One-dimensional attributes were quality-focused, indicating users' dual expectations for aesthetics and durability. Attractive and indifferent attributes showed scattered distribution, reflecting diverse yet consistent needs.

Attractive attributes enhance satisfaction but are non-essential, while indifferent attributes garner minimal attention. Notably, no reverse attributes were identified, avoiding potential user aversion.

Comprehensive user demand satisfaction calculation

User satisfaction for each demand element was determined via Kano model analysis. The satisfaction index T_i was calculated using equation 3.

$$T_i = \max(|Better|, |Worse|) \quad (3)$$

Table 5

THE KANO ATTRIBUTE CLASSIFICATION OF THE CONSUMER DEMAND ELEMENTS OF FEMALE SUIT USERS

Primary demand elements	Secondary demand elements	Percentage/%					Kano attribute	Better coefficient	Worse coefficient
		M	O	A	I	R			
Aesthetic elements (*A*)	A_1	68.22	22.10	8.03	1.33	0.32	M	0.302	–0.906
	A_2	55.97	31.82	7.14	3.88	1.28	M	0.394	–0.888
	A_3	25.16	45.82	13.16	12.86	3.00	O	0.608	–0.732
	A_4	32.68	25.27	20.97	13.61	7.47	M	0.500	–0.626
	A_5	49.72	34.65	8.63	6.96	0.04	M	0.433	–0.844
Quality elements (*B*)	B_1	52.04	31.04	12.27	3.08	1.07	M	0.443	–0.845
	B_2	25.58	31.72	22.39	17.92	2.39	O	0.554	–0.587
	B_3	25.80	36.52	16.98	19.68	1.02	O	0.541	–0.630
	B_4	30.01	47.28	16.05	4.02	2.64	O	0.650	–0.794
	B_5	19.08	43.28	21.02	13.05	3.57	O	0.667	–0.647
	B_6	5.63	23.64	52.93	14.69	3.11	A	0.790	–0.302
	B_7	21.85	22.32	10.09	44.68	1.06	I	0.328	–0.446
Personality elements (*C*)	C_1	27.28	29.57	18.63	20.04	4.48	O	0.505	–0.595
	C_2	13.86	12.46	10.39	56.31	6.98	I	0.246	–0.283
	C_3	59.18	23.91	10.22	3.28	3.41	M	0.353	–0.860
	C_4	28.48	39.82	10.65	18.32	2.73	O	0.519	–0.702
	C_5	15.29	28.66	39.72	10.87	5.46	A	0.723	–0.465
Cultural elements (*D*)	D_1	4.56	4.51	3.34	27.53	60.06	I	0.197	–0.227
Functional elements (*E*)	E_1	7.56	28.06	43.27	20.11	1.00	A	0.721	–0.360
	E_2	55.68	33.64	3.37	4.27	3.04	M	0.382	–0.921

Table 6

SCORE OF EACH INDEX OF CONSUMER DEMAND FACTORS OF FEMALE SUIT USERS											
Demand elements	H_i	T_i	V_i	k	Z_i	**Demand elements**	H_i	T_i	V_i	k	Z_i
A_1	4.49	0.91	0.30	0.5	1.84	B_6	3.66	0.79	0.03	1.5	0.26
A_2	4.53	0.89	0.05	0.5	0.33	B_7	3.19	0.45	0.04	0	0.13
A_3	4.28	0.73	0.22	1	1.59	C_1	3.35	0.60	0.21	1	1.11
A_4	3.89	0.63	0.11	0.5	0.72	C_2	2.98	0.28	0.13	0	0.40
A_5	4.27	0.84	0.14	0.5	0.82	C_3	4.26	0.86	0.16	0.5	0.94
B_1	4.39	0.84	0.19	0.5	1.14	C_4	4.02	0.70	0.12	1	0.82
B_2	3.45	0.59	0.02	1	0.09	C_5	3.95	0.72	0.07	1.5	0.64
B_3	3.64	0.63	0.01	1	0.07	D_1	2.76	0.23	0.10	0	0.28
B_4	4.51	0.69	0.09	1	0.70	E_1	3.38	0.72	0.02	1.5	0.13
B_5	4.10	0.67	0.13	1	0.87	E_2	4.65	0.92	0.12	0.5	0.75

An adjustment coefficient k (I=0, M=0.5, O=1, A=1.5) [25] was integrated to quantify the relationship between satisfaction and attributes. Let S_1 = "satisfaction", S_0 = "expectation", and V_i = "improvement rate", derived from equation 4.

$$V_i = \frac{S_0 - S_1}{S_1} \quad (4)$$

Target users from the preliminary survey were invited to rate the importance (H_i) of each demand element on a 5-point scale: Extremely Important (5 points), Moderately Important (4 points), Neutral (3 points), Moderately Unimportant (2 points), and Extremely Unimportant (1 point). The ratings are summarised in table 6. A comprehensive importance score (Z_i) was established, as presented in equation 5.

$$Z_i = H_i \times (1 + T_i)^k \times V_i \quad (5)$$

All values of H_i, T_i, S_0, S_1, V_i, and Z_i are presented in table 6.

RESULTS AND DISCUSSION

Establishment of the design requirement framework

The House of Quality (HOQ), as the core analytical tool of Quality Function Deployment, can create a systematic mapping of 'customer needs – technical characteristics – process parameters – quality control' through a visual matrix structure, effectively transforming vague requirements into quantifiable technical indicators. By quantifying customer importance and analysing the correlation of technical characteristics, it supports product development decisions, thereby reducing production costs, shortening the research and development cycle, and enhancing the market adaptability of the final output [26]. This article combines the application of the Kano model and the HOQ model. It can not only precisely classify the core demands of female suit users through the Kano model, but also quantitatively map user demands to design requirements with the help of the HOQ model, scientifically determining the priority order for improvement of each design requirement. Thus, through the combined application of these two technical models, it can not only avoid the waste of resources by the supply side of female suits in undifferentiated demands, but also precisely match the differentiated demands of users for female suits, efficiently narrowing the gap between supply and demand.

Design requirements must align with consumer demands through human-centred approaches [27]. Thirty female suit designers refined requirements via expertise and market analysis, retaining features with over 80% consensus. Four primary requirements emerged: D_1 (Visual Design), D_2 (Quality Design), D_3 (Emotional Design), D_4 (Functional Design), with 16 secondary ones (table 7).

Construction of the HOQ matrix model

Consumer demand requirements were input into the HOQ model to determine relevance (γ_{ij}) between user demands and design requirements. The HOQ ceiling represents product design requirements, while the left wall lists user demands. Substituting Z_i and γ_{ij} into equation 6 calculated weight values for design requirements, ranked by importance. To ensure the objectivity and accuracy of the correlation scores (γ_{ij}) between user demands and design requirements in the Quality House, this study formed an evaluation panel consisting of 15 experienced women's suit product designers and 15 experts in the field of garment engineering. Before the evaluation, all experts were given a detailed explanation of the correlation scoring criteria (strong correlation 9 points; moderate correlation 5 points; weak correlation 1 point). Subsequently, the experts independently scored the correlation between 20 user demands and 16 design requirements. The Kendall's W coefficient was calculated for each group's scores to assess the consistency of expert opinions, resulting in a W value of 0.813 ($p < 0.001$), indicating a high level of consistency among the expert ratings. The quality house model is constructed accordingly, as shown in figure 3. Figure 3 illustrates the female suit HOQ model,

Table 7

DESIGN REQUIREMENTS FOR FEMALE SUIT PRODUCTS			
Primary design requirements		**Secondary design requirements**	
No.	**Name**	**No.**	**Design requirement description**
D_1	Visual Design	D_{11}	Monitor fashion trends and maintain sensitivity to trend changes
		D_{12}	Consider characteristics of different figure types
		D_{13}	Develop colour schemes based on popular colours
		D_{14}	Design attractive and fashionable patterns
		D_{15}	Create unique accessories that complement the apparel
D_2	Quality Design	D_{21}	Use eco-friendly materials and prioritise sustainability
		D_{22}	Refine design for craft precision
		D_{23}	Prioritise washability & durability to cut maintenance
D_3	Emotional Design	D_{31}	Consider appropriate occasions for the apparel
		D_{32}	Feature logos/elements for brand recognition
		D_{33}	Fuse brand narratives to convey values
		D_{34}	Personalised design options with distinct styles
		D_{35}	Employ traditional Chinese elements for cultural depth
D_4	Functional Design	D_{41}	Optimise patterns for ergonomic comfort
		D_{42}	Prioritise performance fabrics for comfort/function
		D_{43}	Design versatile styles for easy mixing

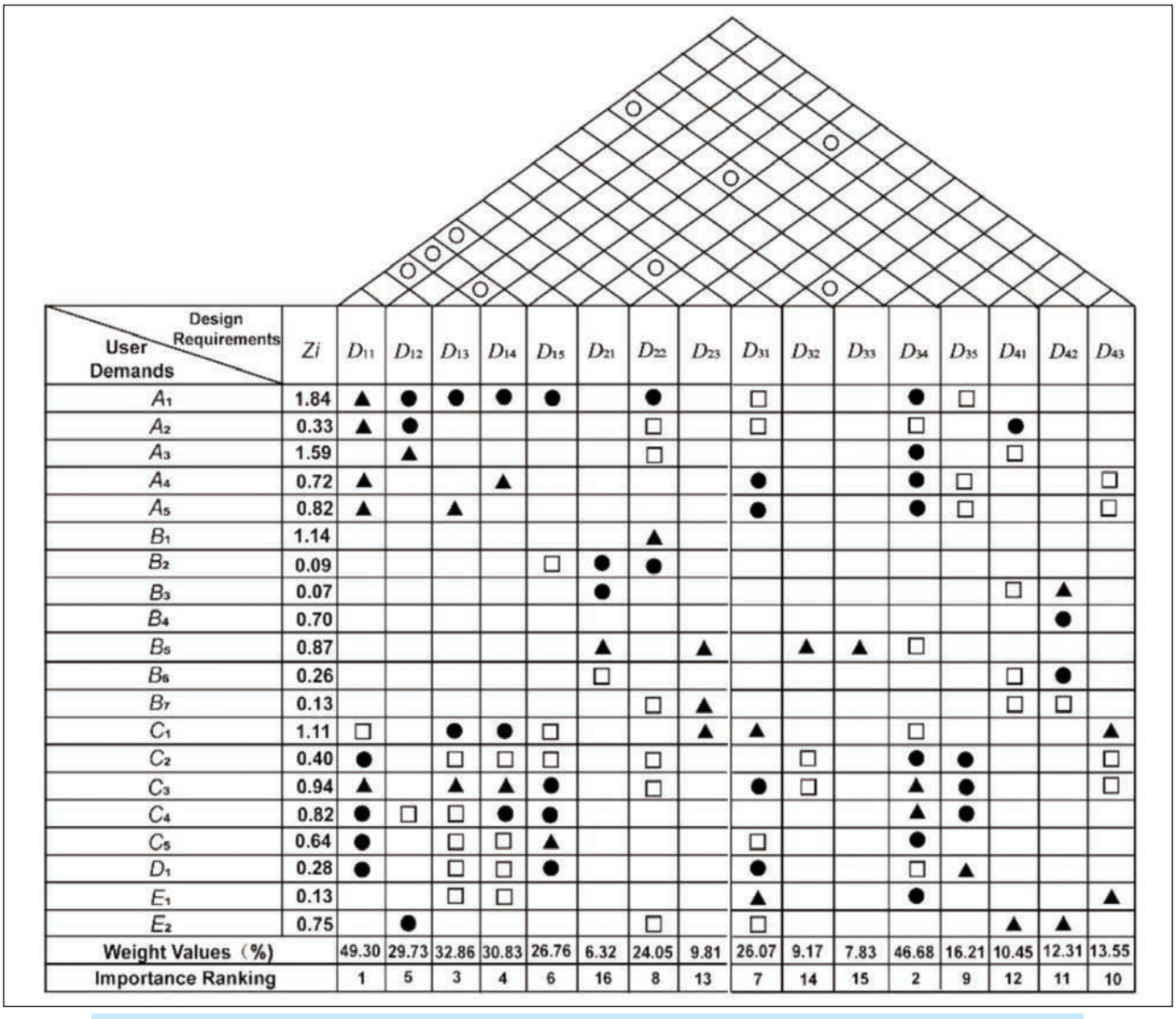


Fig. 3. Female suit product quality house model

with symbols ▲, ●, and □ indicating strong, medium, and weak correlations scored as 9, 5, and 1 points.

$$W_j = \sum_{i=1}^{m} Z_i \times \gamma_{ij} \quad (j = 1, 2, ..., n) \qquad (6)$$

Equation 6 defines γ_{ij} as the relevance between *No.* $_i$ user demand and *No.* $_j$ design requirement.

Correlations among technical requirements were assessed: "○" denotes positive mutual enhancement, while "×" indicates negative trade-offs. Figure 3 shows that no negative correlations exist among design requirements.

The HOQ analysis reveals the importance ranking of female suit design requirements: $D_{11} > D_{34} > D_{13} > D_{14} > D_{12} > D_{15} > D_{31} > D_{22} > D_{35} > D_{24} > D_{43} > D_{42} > D_{41} > D_{23} > D_{32} > D_{33} > D_{21}$. Implementation should prioritise these levels. The top ranks cluster under visual design, indicating consumer priorities have shifted from functionality to aesthetics, reflecting a "visual appeal-driven" market. Among secondary requirements, personalised customisation holds extreme weight, signalling a demand for self-expression. The HOQ ceiling correlations show no negative impacts between design requirements, ensuring holistic improvement.

This study, via HOQ model analysis, concludes that female suit design should focus on fashion trends (D_{11}) and personalised customisation (D_{34}). Digital systems and modular platforms integrate colours (D_{13}), patterns (D_{14}), and fit (D_{12}) into dynamic units. Traditional elements (D_{35}) are redesigned via parametric methods while improving precision (D_{22}), forming a "trend-driven, function-fit, cultural-added" path. This ensures comfort (D_{41}, D_{42}) and enhances product competitiveness and cultural value, bridging consumer-market gaps effectively.

CONCLUSIONS

To address the supply-demand gap and imbalance between user consumption demands and market supply in female suit products, this study integrates user demands, comprehensive evaluation, and design requirements. By integrating the Kano-HOQ methodology, a user-oriented optimisation model for female suit design is proposed, achieving precise alignment between demand elements and design requirements. The conclusions are as follows:

Research shows that there is a comprehensive supply-demand gap in the Chinese women's suit market; user expectations for all demand factors are significantly higher than their satisfaction levels, and the gap exhibits 'layered characteristics'. The supply-demand difference is greatest for Aesthetic elements (A_1 Aesthetic design, A_2 Appropriate structure and version) and Personality elements (C_3 Fashionable flair, C_4 Highlight personal temperament), with average expectation levels above 4.5 and average satisfaction levels below 3.7. This finding challenges the common perception that 'users only care about appearance' and reveals that the dual demand gap of 'aesthetic necessity + individuality enhancement' is the core contradiction limiting market satisfaction, thus pinpointing a precise direction for design optimisation.

Based on the model analysis results, we broke through the traditional design logic of female suits and created a three-dimensional collaborative path of "trend-driven – personalised adaptation – cultural value-added":

Trend-driven layer: With the core of responding to D_{11} fashion trends, a conversion mechanism of "fashion data – design parameters" is constructed to address the gap in aesthetic demands.

Personalised adaptation layer: Based on the high weight of D_{34} personalised customisation, a modular design platform is developed to meet the value-added demands of C_1 Flexible matching capabilities and C_4 Highlight personal temperament.

Cultural value-added layer: Integrate the traditional cultural elements of D_{35} into visual design to avoid waste caused by attribute generalisation. Its feasibility has been verified through the positive correlation of design requirements, which can directly guide enterprises to carry out precision development and reduce trial-and-error costs.

This study shows the Kano-HOQ correlation effectively converts user demands into design requirements, aligning products with consumer expectations. Among 16 secondary requirements, top criteria emphasised visual/emotional design and personalisation. Thus, female suits should prioritise aesthetics (style, colour, pattern) and individualised features.

However, there are still some limitations. Approaches to the acquisition of user consumption demands can be further explored. For example, semantic analysis of user comments, feedback on online platforms(e.g., Taobao, Douyin, livestreams) and fan messages on official brand websites could be employed to capture deeper consumer insights. These limitations will be tackled in future research.

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