Critical Criteria for Customer Satisfaction of Interior Design

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Abstract. Because of the wide scope of interior design work, the satisfaction of interior design service customers is easily affected by perception differences. This study developed a set of indicators that can be used to evaluate interior-design-related customer satisfaction. Potential factors were first identified by conducting a literature review and in-depth interviews. The modified Delphi method was then employed to establish the analytic hierarchy process (AHP) framework. Lastly, the AHP method was used to identify the key indicators. The study results revealed 4 dimensions and 15 factors. The results of this study can serve as a reference for the interior design industry.

1. Introduction
Because of the increasing emphasis people place on their living environment, the interior design industry has become an important economic domain. This trend can be observed through the increased rate of housing improvement activities compared with overall economic activities [4]. Despite this change, customer perception problems caused by the diversity of interior design have not received the attention they deserve. In interior design, customer satisfaction is affected by various factors, including economic advantage, reputation, and environmental protection awareness (e.g., energy conservation and carbon emissions reduction). The level of customer satisfaction thus depends on not only whether customers are happy with the quality of design output but also subjective factors such as perception of the overall service process and experience. Therefore, identifying the factors affecting customer satisfaction in the diverse sector of interior design has become a critical issue. This study aimed to use both qualitative and quantitative research methods to develop a set of indicators that can be used to evaluate interior-design-related customer satisfaction. First, potential factors were identified by conducting a literature review and in-depth interviews. The modified Delphi method was then used to establish the analytic hierarchy process (AHP) framework. Lastly, the AHP method was used to identify the key indicators affecting interior-design-related customer satisfaction.

The research objectives of this study were thus as follows:
1. To assemble a set of interior design satisfaction indicators by considering the practical experiences, diversity, and culture and folk beliefs of interior design.
2. To combine the modified Delphi method and AHP and subsequently examine the appropriateness of this combination.
3. To obtain the importance rankings of interior design satisfaction indicators from practical and academic experts, the results of which will provide a reference for operations and management in the interior design industry.
2. Literature review

2.1 Scope of interior design services
The work of an interior designer involves using the budget effectively and schedule control (economic advantages dimension), as well as ensuring regulation compliance and giving impressive presentations (designer characteristics dimension) [1]. With reference to Maslow’s hierarchy of needs theory, in addition to fulfilling customers’ basic needs such as physiological and safety requirements, interior designers must consider how they can fulfill high-level needs such as social, esteem, and self-actualization needs. Many customers consider these high-level aspects to be crucial and adding high value, because interior design can express their identity and confer a status symbol.

Additionally, awareness of energy conservation and carbon emissions reduction and ensuring construction materials are environmentally have become social responsibilities of concern to modern residents [5]. Being environmentally conscious is thus now a crucial part of the modern interior designers’ job and means using green materials in indoor spaces and designing or adopting energy-saving, water-saving, and electricity-saving facilities in interior design.

2.2 Customer satisfaction
Holbrook [2] divided Customer Satisfaction into four components, namely interactivity, relativity, preference, and experience. From the perspective of interior design, the factors related to customers’ satisfaction include Customer participating experience, low operation cost, easy maintenance, optimal solution for current housing conditions, service accessibility, good customer–designer communication, and Designer Reputation & word of mouth. On the basis of the scope of work for interior design services and the literature related to customer satisfaction, 4 dimensions and 17 factors related to customer satisfaction with interior design were identified:

1. Value Creation: Social Status Symbol, Customer participating experience, Identity representation, optimal solution for current housing conditions.
2. Economic Advantages: Budget Effectiveness, Schedule Control, easy maintenance, Low Operation Cost.
3. Designer Characteristics: Designer Reputation & Word of Mouth, Service Accessibility, Impressive Presentation, Regulation Compliance, good customer–designer communication.
4. Environmental Conscious: Green Material, Energy Saving, Water Saving, Electricity Saving.

3. Methodology
By using both qualitative and quantitative research methods, this study developed a set of indicators for evaluating interior-design-related customer satisfaction. First, the potential factors were identified by conducting a literature review and in-depth interviews. The modified Delphi method was then employed to establish the AHP framework. Lastly, the AHP method was used to identify the key indicators affecting interior-design-related customer satisfaction.

3.1 Examining the dimensions and factors of customer satisfaction using in-depth interviews
Interviews were conducted with (1) two interior design company owners who had more than 10 years of operating experience (2) two legal professionals who had more than 5 years of experience in providing expert opinion in interior design dispute resolution; and (3) two customers who had previously received interior design services. To ensure that the interview content was realistic, the interviews were guided by the 4 dimensions and 17 factors identified through the literature review. During the interviews, three interviewees mentioned that depending on the culture and folk beliefs of where they live, most people consider certain types of living arrangement taboo. Interior design must thus have some connection with the service values of this domain. In response, culture and folk beliefs was included as a factor. Additionally, the interviewees mentioned that the good customer–designer communication factor and service accessibility factor are excessively homogeneous. Therefore, the good customer–designer communication factor was deleted.
3.2 Establishing the AHP framework through the Modified Delphi Method

The following 5-point Likert scale was employed to score the expert questionnaire: 5=very important, 4=important, 3=moderately important, 2=unimportant, and 1=very unimportant. The target respondents of the questionnaire were interior designers, building material merchants, construction workers, professors, and customers. A total of 45 questionnaires were distributed, and 35 were successfully retrieved, a return rate of 78%. Among the returned questionnaires, 8 were invalid, whereas 27 were valid.

The evaluation criteria in the present study were mean > 3 and coefficient of variation ≤ 0.5 [3]. Additionally, the criterion was used that the standard deviation and absolute values should be ≤1. According to analysis of the returned expert questionnaires, all dimensions fulfilled the evaluation criteria; their standard deviation and absolute values were <1, mean values were >3, and coefficients of variation were <0.5. Such results indicated that the experts were relatively consistent in their identification of the indicators in the 4 dimensions (Table 1).

| Dimension                      | Standard deviation | Mean | Coefficient of variation | Absolute value | Evaluation results |
|--------------------------------|--------------------|------|--------------------------|----------------|--------------------|
| Value creation                 | 0.565              | 4.2  | 0.136                    | 0.833          | ○                  |
| Economic advantages            | 0.506              | 4.1  | 0.124                    | 0.9            | ○                  |
| Designer characteristics       | 0.620              | 3.9  | 0.159                    | 0.1            | ○                  |
| Environmental consciousness    | 0.679              | 3.6  | 0.189                    | 0.4            | ○                  |

However, in the sub-dimensional factor layer, the mean values of optimal solution for current housing conditions and electricity saving were < 3. These two factors thus did not meet the evaluation criteria and were eliminated (Table 2).

| Factor                                | Standard deviation | Mean | Coefficient of variation | Absolute value | Evaluation result |
|---------------------------------------|--------------------|------|--------------------------|----------------|--------------------|
| Social status symbol                  | 0.643              | 4.1  | 0.158                    | 0.933          | ○                  |
| Customer participating experience     | 0.8                | 3.7  | 0.216                    | 0.3            | ○                  |
| Identity representation               | 0.718              | 3.7  | 0.192                    | 0.267          | ○                  |
| culture and folk beliefs              | 0.877              | 3.6  | 0.244                    | 0.4            | ○                  |
| optimal solution for current housing conditions | 0.859 | 2    | 0.422                    | 0.033          | ×                  |
| Budget effectiveness                 | 0.447              | 4.3  | 0.105                    | 0.733          | ○                  |
| Schedule control                     | 0.577              | 4.1  | 0.141                    | 0.9            | ○                  |
| Easy maintenance                     | 0.58               | 4.1  | 0.143                    | 0.933          | ○                  |
| Low operation cost                   | 0.675              | 3.5  | 0.191                    | 0.467          | ○                  |
| Designer Reputation & Word of mouth  | 0.465              | 4.2  | 0.11                     | 0.767          | ○                  |
| Service accessibility                | 0.518              | 3.6  | 0.145                    | 0.433          | ○                  |
| Impressive presentation              | 0.506              | 3.4  | 0.149                    | 0.6            | ○                  |
| Regulation compliance                | 0.62               | 3.3  | 0.188                    | 0.7            | ○                  |
| Green materials                      | 0.641              | 3.8  | 0.169                    | 0.2            | ○                  |
| Energy saving                        | 0.48               | 4.2  | 0.114                    | 0.8            | ○                  |
| Water saving                         | 0.58               | 4    | 0.144                    | 0.967          | ○                  |
| Electricity Saving                   | 0.77               | 2.6  | 0.3                      | 0.433          | ×                  |
3.3 Using the AHP to identify evaluation indicators

Next, the AHP questionnaire was used to survey experts. The target respondents of the questionnaire were interior designers and customers. A total of 80 questionnaires were distributed, and 61 of them were returned, a return rate of 76%. Among the returned questionnaires, 9 were invalid, whereas 52 were valid.

The local weight of each indicator was obtained using the AHP matrix calculation process. As indicated in Table 3, the rankings of the indicators according to their importance (weight) are Economic Advantages 0.397, Designer Characteristics 0.223, Value Creation 0.192, Environmental Consciousness 0.188. This ranking indicated that in the dimension layer, the most influential item is economic advantages.

| Dimension                | Local weight | Ranking | \( \lambda_{\text{max}} \) | C.I.   | R.I.  | C.R.  |
|--------------------------|--------------|---------|-----------------------------|-------|------|------|
| Value creation           | 0.192        | 3       |                             |       |      |      |
| Economic advantages      | 0.397        | 1       |                             |       |      |      |
| Designer characteristics | 0.223        | 2       | 4.0513                      | 0.0171| 0.58 | 0.0295|
| Environmental consciousness | 0.188      | 4       |                             |       |      |      |

Based on the local weight analysis of the value creation dimension, the rankings of the factors are Social Status Symbol 0.391, Customer participating experience 0.229, culture and folk beliefs 0.21, Identity representation 0.17 (Table 4). Among the factors in this dimension, social status symbol appears to be the most influential.

| Factor                          | Local weight | Ranking | \( \lambda_{\text{max}} \) | C.I.   | R.I.  | C.R.  |
|---------------------------------|--------------|---------|-----------------------------|-------|------|------|
| Social status symbol            | 0.391        | 1       |                             |       |      |      |
| Customer participating experience| 0.229        | 2       |                             |       |      |      |
| Identity representation         | 0.17         | 4       | 4.1022                      | 0.0341| 0.58 | 0.0587|
| culture and folk beliefs        | 0.21         | 3       |                             |       |      |      |

Based on the local weight analysis of the economic advantages dimension, the rankings of the factors are Budget Effectiveness 0.391, Schedule Control 0.229, Low Operation Cost 0.21, Easy maintenance 0.17 (Table 5). Budget effectiveness thus appears to be the most influential factor.

| Factor                    | Local weight | Ranking | \( \lambda_{\text{max}} \) | C.I.   | R.I.  | C.R.  |
|---------------------------|--------------|---------|-----------------------------|-------|------|------|
| Budget effectiveness      | 0.391        | 1       |                             |       |      |      |
| Schedule control          | 0.229        | 2       |                             |       |      |      |
| Easy maintenance          | 0.17         | 4       | 4.1116                      | 0.0372| 0.58 | 0.0641|
| Low Operation Cost        | 0.21         | 3       |                             |       |      |      |

The local weight analysis of the designer characteristics dimension reveals that the rankings of the factors are Reputation & Designer Reputation & Word of mouth 0.411, Service Accessibility 0.238, Impressive Presentation 0.184, Regulation Compliance 0.167 (Table 6).

In the designer characteristics dimension, Designer Reputation & word of mouth thus appears to be the most influential factor.
Table 6. Weight analysis of the factors in the designer characteristics dimension.

| Factor                        | Local weight | Ranking | $\lambda_{\text{max}}$ | C.I. | R.I. | C.R. |
|-------------------------------|--------------|---------|------------------------|------|------|------|
| Designer Reputation & Word of mouth | 0.411        | 1       | 4.1203                 | 0.0401 | 0.58 | 0.0692 |
| Service accessibility         | 0.238        | 2       |                        |      |      |      |
| Impressive presentation       | 0.184        | 3       | 4.1203                 | 0.0401 | 0.58 | 0.0692 |
| Regulation compliance         | 0.167        | 4       |                        |      |      |      |

Based on the local weight analysis of the environmentally conscious dimension, the rankings of the factors are Green Material 0.445, Energy Saving 0.3, Water Saving 0.255 (Table 7). Among the factors in this dimension, green materials appear to be the most influential factor.

Table 7. Weight analysis of the factors in the environmentally conscious dimension.

| Factor          | Local weight | Ranking | $\lambda_{\text{max}}$ | C.I. | R.I. | C.R. |
|-----------------|--------------|---------|------------------------|------|------|------|
| Green materials | 0.445        | 1       | 3.0326                 | 0.0163 | 0.58 | 0.0281 |
| Energy saving   | 0.3          | 2       |                        |      |      |      |
| Water saving    | 0.255        | 3       | 3.0326                 | 0.0163 | 0.58 | 0.0281 |

Regarding the consistency of the expert questionnaire, the results of reliability analysis revealed that the consistency index and ratio were both <0.1. Thus, consistency exists between same-level questions in the expert questionnaire. This also indicates that the questionnaire has favourable reliability [6].

4. Results and analysis

The results obtained from the weight analyses for each level are summarized in Table 8. Using these results, the overall weight of each factor was calculated for further analysis.

Table 8. Summary of the factors affecting interior-design-related customer satisfaction.

| Layered framework | Dimension layer | Local weight | Factor layer | Local weight | Overall weight | Ranking |
|-------------------|-----------------|--------------|--------------|--------------|----------------|--------|
| Critical Criteria for Customer Satisfaction of Interior Design | Value creation | 0.192 | Social status symbol | 0.391 | 0.075 | 6 |
|                   |                 |             | Customer participating experience | 0.229 | 0.044 | 11 |
|                   |                 |             | Identity representation culture and folk beliefs | 0.17 | 0.033 | 15 |
|                   | Economic advantages | 0.397 | Budget effectiveness | 0.426 | 0.169 | 1 |
|                   |                 |             | Schedule control | 0.195 | 0.078 | 5 |
|                   |                 |             | Easy maintenance | 0.246 | 0.098 | 2 |
|                   |                 |             | Low Operation Cost | 0.133 | 0.0527 | 9 |
|                   |                 |             | Designer Reputation & Word of mouth | 0.411 | 0.092 | 3 |
The data in Table 8 indicate that in the experts’ opinion, four factors most crucially affect interior-design-related customer satisfaction: budget effectiveness, easy maintenance, Designer Reputation & word of mouth, and green materials. These results reveal that the element that customers are most concerned with when using an interior design service is budget. Effectively, customers wish to get more than they pay for. In addition, customers also wish that their interiors will be easy to maintain. As such, the easy maintenance factor is the second most crucial factor affecting customer satisfaction. If a designer were to focus solely on budget effectiveness, concerns might arise regarding the quality of the design. Customers thus consider Designer Reputation & Word of mouth (which is related to quality assurance) after considering budget effectiveness. That Designer Reputation & word of mouth is the third most crucial factor affecting customer satisfaction indicates that customers wish to employ designers with favorable business reputation. Lastly, the rise in environmental consciousness has caused green materials in interior design to be ranked the fourth most crucial factor affecting interior-design-related customer satisfaction.

5. Conclusion

To assemble a set of interior-design-related satisfaction indicators that reflect practical experiences, diversity, and culture and folk beliefs, this study first identified 4 potential dimensions and 17 potential factors by conducting a literature review and in-depth interviews with experts. The Modified Delphi method was then employed to establish the AHP framework. Lastly, AHP was used to identify 4 dimensions and 15 factors that affect interior-design-related customer satisfaction. The study results indicate such combined application of the Modified Delphi method and AHP was practical, and the evaluation of the factors was highly relevant and objective. Therefore, this approach was deemed adequate. Of the dimensions identified, the economic advantages dimension has the highest weight of 0.397. Regarding the indicator factors, budget effectiveness (from the economic advantages dimension) ranks first among all factors, with an overall weight of 0.169. These results indicate that the element customers are most concerned with when using an interior design service is budget, followed by ease of maintaining the design (also related to economic advantages). After considering the economic advantages, customers next consider Designer Reputation & Word of mouth (related to quality assurance), followed by the greenness of materials (related to environmental protection compliance consideration).

This study discovered four dimensions as follows, in order of their importance: Economic Advantages, Designer Characteristics, Value Creation, Environmental Consciousness. Additionally, the 15 relevant factors identified were as follows, in order of importance: Budget Effectiveness, Easy maintenance, Designer Reputation & Word of mouth, Green Materials, Schedule Control, Social Status Symbol, Energy Saving, Service Accessibility, Low Operation Cost, Water Saving, Customer participating experience, Impressive Presentation, culture and folk beliefs, Regulation Compliance, Identity representation. The results of this study can help interior designers understand the needs of customers and demands of the market. Furthermore, the results can serve as a reference when developing strategies for increasing the satisfaction of interior design customers.
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