Investigating the Weights of Service Design Indicators: An Education Case Study Regarding Creative Lifestyle Industry Service Innovation

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The rapid development of Taiwan's creative lifestyle industries (CLIs) in recent years has made service innovation a core competitive strength for the industry. Consequently, service design (SD) teams consistently encounter new challenges in the industry and successful SD decisions are crucial. The main objective of this study was to examine participants' perceptions regarding the relative importance of design decisions during the CLI SD decision-making process for SD teams. In the first stage of this study, we conducted a literature analysis and expert interviews to identify and integrate the elements that influence SD, and then employed the modified Delphi method to conduct expert questionnaires and investigations, select indicators that achieved consensus, and construct a hierarchy framework for the SD indicators. For the second stage, we adopted the analytic hierarchy process (AHP) for evaluation, and conducted questionnaire collection and data analysis, to obtain the relative weights of each indicator. For this study, we divided the SD indicator framework into four major dimensions, 13 criteria, and 41 influential factors. The relative weights of the four SD indicator dimensions from highest to lowest were creation (0.366), deliverable (0.307), exploration (0.177), and prototype (0.149).

Key words: service design (SD), modified Delphi method, analytic hierarchy process (AHP), creative lifestyle industries (CLIs), weights

1. Introduction

In response to the recent shift in the global economic paradigm, the Taiwanese government proposed the concept of creative lifestyle industries (CLIs) to encourage corporations to adopt and introduce SD methods and conduct service innovation research and development [1]. The Taiwanese government has described and listed CLIs as crucial industries requiring cultivation within the creative industry. Consequently, considering research on service innovation in Taiwan's CLIs, studies regarding how SD teams develop and implement design strategies are insufficient and limited. Therefore, based on the importance of SD to Taiwan's CLIs and corporate service innovation, as well as the background and motivation for this study, we adopted the SD framework proposed by Stickdorn and Schneider [2]. After conducting a literature review and expert interviews, we summarized the factors that influence SD and constructed CLI SD evaluation indicators based on empirical research. The objectives of this study were to (1) construct a hierarchy framework for SD indicators, and (2) explore the relative weights and rankings among the CLI SD evaluation indicators.

2. Literature Review

This study explores SD procedures and influential factors, as well as the definition of CLIs. Relevant literature is explained below.

2.1 Innovation Through SD

Since the 1990s, the global economic model, social structure, and community culture have rapidly shifted. To cope with future development trends, service organizations have employed design thinking to generate new service creativity and innovation and promoted the gradual development of SD theories, practices, and applications [3,4]. The earliest example of systematic and standardized SD is the SD procedures proposed by the British Standards Institute [5] (i.e., develop the business, design and develop the service, deliver and support the service, and operate and optimize potential). Moritz [6] integrated industry, government, and academic service innovation practices, and contended that new design procedures developed with a design thinking-orientation should include understanding, thinking, generating, screening, explaining, and realization. Furthermore, Stickdorn and Schneider [2] emphasized that a balance or trade-off between design details and overall integrity should be established within SD procedures, and that the purpose of the implementation methods proposed by various professional teams was to develop optimal solutions. Stickdorn and Schneider [2] employed the Design council [7] double diamond design process model (discover, define, develop, and deliver) as the basis for innovation methods, and combined the service innovation design procedures established by Engine [8], Live|work [9], and Designthinkers [10]. They then redefined SD development procedures as exploration, creation, reflection, and implementation.

2.2 Factors that influence SD

In the context of the mental cognition aspects of customer satisfaction, Press and Cooper [11] contended, based on observations of and insights into customer needs, that a significant or meaningful customer experience design is, on a macro scale, influenced by environmental factors, such as social change, political issues, market impact, and technology; conversely, on a micro scale, design is influenced by demographics, family structures, consumer or consumption values, work patterns, creative economics, democratic systems, copyright, product differentiation and innovation, usability, customized services, environmental protection, lifestyles, communication, and smart systems. Regarding research on customer service, museologists Falk and Dierking [12] explained in their book *The Museum Experience* that the experiences of visitors or users must be considered in their personal, social, and environmental contexts. In addition, on the basis of customer experience values, Schmitt [13] asserted the importance of the customers' experience world, and divided consumers' experience world into social culture, commercial environments, application and consumption environments, product experiences, and brand experience contexts for observation. Guan and Chen [14] examined Taiwan's CLI service models and identified the following factors that influence SD: unique management philosophy or concepts, consumer or consumption environment, product design, market reputation or word-of-mouth, social recognition and identification, personnel services, community, cultural promotion, aesthetics, brand value, pricing, security, customization, customer type, live performances, digital media, and relatives.

Holmlid [15] suggested indicators that may influence SD based on the depictive, symbolic, enactive, physical, virtual, ongoing, tangible, spatial, temporal, social, visual, experiential, active, product, use, performance, final, customizable, dynamic, mass market, organizational support, and customer's customer (corporate customers)

aspects. Moreover, Meroni and Sangiorgi proposed the following design guidelines for services: (1) Empathic design (2) Distributed and interconnected service solutions–maintain the quality of the original service model or generate new solutions and new methods to provide enabling platforms to satisfy demands for increased or altered services . (3) Co-creation–unlike traditional methods, SD projects incorporate various stakeholders and use co-creation value concepts to regard users as the largest undeveloped resource, not the source of problems. This co-design approach allows users, frontline staff, and professionals to cooperatively formulate effective solutions or plans, and increases the possibility of identifying deeper user needs when planning services and advanced preparations.

2.3 CLIs

In response to the development trends of global creative industries, which are gradually shifting toward an experience economy, CLIs have been included in Taiwan's 2003 "cultural and creative industries development plan" as a national industry development priority. Referencing the concept of experience industries first adopted in Sweden [17], the Taiwanese government has supported the transformation of Taiwan's creative industries into service-oriented experience industries. According to the attribute classification for CLIs established by the Industrial Development Bureau of Taiwan's Ministry of Economic Affairs, CLIs cover the various aspects of life. Additionally, innovative or creative applications of core industrial knowledge can be divided into the six main categories of cultural crafts, décor and fashion, food culture, lifestyle education, natural ecology, and specific cultural relics [1], as shown in Table 1.

Table 1. Attribute classification of CLIs [1]

Category	Description
Cultural Crafts	Businesses that base the development of their business operations on craft creations and provide lifestyle-related products or services.
Décor and Fashion	Businesses that base their decoration development on model designs that enhance furnishings or apparel and accessory theme styles to establish diverse experiences and provide lifestyle-related products or process services.
Food Culture	Businesses that implement or enhance the cultural elements of existing industry facilities, factory areas, or operations to provide diverse experiences and lifestyle-related products or services.
Lifestyle Education	Businesses that provide lifestyle learning and aesthetically rich lifestyle-related products or services.
Natural Ecology	Businesses that use diverse flora and fauna ecology or natural health life experiences to provide lifestyle-related products or services.
Specific Cultural Relics	Businesses that use specific humanistic cultures, regions, groups, or heritages and relics to provide lifestyle-related products or services.

3. Methodology

This study was divided into two phases. In the first phase, we constructed an SD indicator hierarchy framework. In the second phase, we applied the analytic hierarchy process (AHP) to CLI SD teams to determine the relative weights and importance rankings of SD indicators. The research was conducted from February 2012 to February 2013. The research process and procedures are discussed below.

3.1 Constructing a Hierarchy Framework for SD Indicators

The first phase of this study involved the preliminary collection, screening, and selection of SD indicators and the construction of a hierarchy framework for SD indicators. These processes are explained below.

3.1.1 Stage 1: Preliminary Collection of SD Indicators

This study adopted the modified Delphi method proposed by Murry and Hommons [18] to achieve effective interactions within expert groups. The implementation and calculation techniques of the modified Delphi method are similar to those of the traditional Delphi method. While retaining the essence and advantages of the original Delphi method, by allowing experts to exchange and express opinions anonymously, the modified Delphi method simplifies the complex questionnaire process by substituting the first-round open-ended questionnaire survey with findings from related literature, researcher plans, or expert interviews to directly develop a structured questionnaire. Therefore, this study first conducted a literature review or analysis to identify and summarize the influential factors for SD. To compensate for the lack of a practical perspective in relevant research, we selected experts to undergo in-depth interviews. The results were used to construct a conceptual SD evaluation framework and develop the first round of structured questionnaires.

3.1.2 Stage 2: SD indicator screening and selection

In this stage, we adopted the modified Delphi method to conduct selection and screening concerning the SD indicators that achieved expert consensus. Regarding the expert selection criteria, Murry and Hammons [18] highlighted that the Delphi method should be conducted with at least 10 experts to attain optimal results. However, obtaining effective results from a group of more than 30 experts in terms of research contributions can be difficult. Regarding design of the expert questionnaire, Babakus and Mangold [19] stated that a five-point Likert scale can enhance the questionnaire response ratio or percentage of completed questionnaires and quality; therefore, we employed a five-point Likert scale as the measurement tool and conducted multiple rounds of expert opinion collection until a consensus of opinion was reached.

To assess the level of importance, we employed mean or average values to analyze variations in the expert group's perceptions concerning the importance of individual items to further understand the overall level of expert consensus. Hence, to summarize the overall consensus or agreement level of the experts, we limited the scale or level results to a score of 3.5 (between neutral and important) or above, which was regarded as the overall experts and scholars having reached a consensus. To assess and distinguish consistency, this study followed the recommendations of Fahety [20] and Holden and Wedman [21]. When the interquartile range or quartile deviation of the questionnaire statistics was 0.6 or below, the item was considered to have achieved a high and consistent degree of consensus between experts. If the quartile deviation was between 0.6 and 1.00, the item was considered to have achieved a moderate level of consensus. If the quartile deviation exceeded 1.00, the item was considered to have not achieved expert consistent consensus. When more than 85% of the items achieved a high or moderate level of consensus, the questionnaire was considered complete.

To assess the reliability and validity of the questionnaire, internal consistency was used to determine the degree of reliability. The Cronbach's αvalue was applied to the Likert scale to examine the internal consistency reliability. A Cronbach's α coefficient of 0.5 or 0.6 or above was set as the acceptable standard, and Cronbach's α coefficients that ranged between 0.7 and 0.9 indicated high reliability. Therefore, the standard for acceptance or rejection adopted in this study was Cronbach's $\alpha > 0.5$. In addition, because under the Delphi method, the questionnaire

content must be reviewed and revised by experts of related fields, “valid” expert judgments can be converged or collected, and questionnaires produced using this method are considered to possess expert validity [22,23].

3.1.3 Stage 3: Construct a Hierarchy Framework for SD Indicators

In this stage, SPSS statistical software was adopted as the primary tool for data analysis. Factor analysis was conducted on variables with higher correlations, and common factors were identified and extracted using principal component analysis. Furthermore, varimax was employed to perform orthogonal rotations and extract the major or primary factors in each dimension. Subsequently, classifications were conducted and dimensions were renamed to establish a hierarchy framework of SD indicators [24].

3.2 Establishing Relative Weights for the SD Indicators

The verification of the SD indicators weights employed in this study is described below.

3.2.1 Stage 1: Introduction of SD Methods in an Education Case Study

For this study, we conducted empirical education-based case study research (the research period extended from September 2012 to February 2013) of the service innovation course taught by the study author (as a part of the Bachelor degree program of Art and Cultural Creation at Fu Jen Catholic University, Taiwan). To obtain practical SD application results, the purposive sampling method was employed to select the research subjects. A total of 45 junior undergraduate students were selected to receive the SD teaching method. Taiwanese CLI vendors who had implemented SD projects were also recruited.

3.2.2 Stage 2: Establishing the Relative Weights of SD Indicators

After the student completed the vendor’s SD project, a questionnaire regarding the relative weights of the SD indicators was conducted with the 45 participants to analyze and rank each level and indicator. We developed our operational methods based on the AHP technique developed by Saaty [25]. Generally, AHP involves dividing a complex and non-structured situation into several formative variables, arranging these variables in a level ranking, allocating each variable’s relative importance a numerical value using subjective judgments, and combining these judgments to determine which of these variables is the most important or exhibits the highest priority. Each variable must be allocated a value to assist decision-makers in making judgments and deriving conclusions. Regarding statistical analysis tools, this study employed Expert Choice software for data analysis to produce a hierarchy framework diagram, clarify problems through level expansion, and determine the levels of mutual relationships or influence by deconstructing complex problems, comparing judgments, and performing integration and ranking. The software can also be used to establish the correlated weighting matrices among various level factors. When constructing a paired comparison matrix, a positive reciprocal matrix was used to divide each input item in the matrix by the total value of the input items in the corresponding field to obtain a new standardized matrix. The average value of each column in the standardized matrix was calculated to determine the weight. Subsequently, the consistency ratio (CR) was employed to confirm whether the participants’ questionnaire responses were consistent. A CR value of 0.1 was set as the standard, with values smaller than 0.1 considered acceptable. The results were organized and ranked according to weight to identify the content with the highest importance [26].

4. Implementation and Result Analysis

This study conducted expert questionnaires, and, after two stages of expert screening and selection regarding indicators, an SD indicator hierarchy framework was constructed. Next, analysis of the indicator weights was conducted using AHP. The results and relevant analysis are discussed below.

4.1 The Formulation and Screening of SD Indicators

This study referenced related literature and expert interviews to construct the conceptual SD evaluation framework. The framework included four major dimensions, 12 design criteria, and 46 influential factors, which were employed to develop the modified Delphi method expert questionnaire. The questionnaire respondents comprised industry, government, and academic experts, who were divided into CLI personnel (containing company owners and managers, service planners, designers, and service management personnel, for a total of 11 participants), educators with practical experience (i.e., professors of SD, CLI planning and evaluation, customer experience, and related courses, for a total of five participants), research unit or agency consultants who had participated in SD (i.e., product design, visual design, interactive design, strategy management, operational management, and observational research or trend experts, for a total of nine participants), and experts of other fields, for a total of 25 participants. The service questionnaires were primarily distributed via e-mail. Each completed questionnaire received underwent statistical analysis and opinion integration.

4.1.1 Stage 1: SD Indicator Screening Results

The first round of questionnaire implementation and data analysis lasted for three weeks. For this round, 25 questionnaires were distributed and 22 were returned, for an effective recovery rate of 88%. The preliminary results of the first round of expert evaluation and selection were statistically analyzed, and two inappropriate indicators were eliminated. Three indicators recommended by the experts were added, for a total of four dimensions, 12 primary criteria, and 48 influential factors. To satisfy the quality standards for questionnaire items, we constructed a second version or round of the questionnaire after compiling indicators that did not achieve a high level of expert consensus in the first round and incorporating the new or revised indicators recommended by the experts. The second round of questionnaire implementation and data analysis also lasted for three weeks. A total of 22 questionnaires were distributed, and 21 were returned, for an effective recovery rate of 95%. Regarding the overall stability or robustness of the questionnaire, the number of experts who demonstrated varying opinions was 5% [(22 - 21)/22 × 100%], which was less than the statistical standard of 20%, indicating overall questionnaire stability or robustness. After analysis and compilation of the second-round expert selection results and deletion or revision of inappropriate indicators, four dimensions, 12 primary criteria, and 45 influential factors were selected. The overall consistency for the second-round questionnaire showed expert consensus for more than 95% of the items. Thus, a third round of evaluation was not necessary. After using SPSS software to analyze the internal consistency of the evaluation indicator items, the reliability coefficient for the overall scale was 0.890. Each subscale (reliability for the dimensions of exploration, creation, prototype, and deliverable was 0.672, 0.602, 0.731, and 0.700, respectively), the overall scale, and the coefficients of each subscale all achieved the standards for high reliability. This indicates that the study questionnaire possessed good reliability, and the questionnaire items used to evaluate the same dimensions possessed consistency. The content of the study questionnaire was based on “logical reasoning and deduction,” “knowledge bases,” “empirical experience,” and “expert consensus,” and underwent pretests; consequently the questionnaire was considered to have considerable content validity (Yang & He, 2005). The results of both rounds of SD indicator screening and selection are shown in Table 2.

Table 2. Results of SD indicator screening and selection (Source: organized by this study)

Consistency results for the expert questionnaires						
	First-Phase Questionnaire Survey Results			Second-Phase Questionnaire Survey Results		
Evaluation Indicators	Importance (average)	Consistency (quartile range)	Level of Consensus	Importance (average)	Consistency (quartile range)	Level of Consensus
Exploration	4.6818	0.50	High	—	—	—
Environment analysis	4.0000	1.00	Moderate	4.0000	1.00	Moderate
Political and economic	3.6364	0.50	High	—	—	—
Society and culture	4.5909	0.50	High	—	—	—
Technology development	4.0455	0.75	Moderate	4.1429	0.50	High
Market sensing	4.7727	0.00	High	—	—	—
Commercial	4.1364	1.00	Moderate	4.6667	0.50	High
Consumption	4.4545	0.50	High	—	—	—
Brand	4.5000	0.50	High	—	—	—
Product type	4.2273	0.50	High	—	—	—
Usage scenario	4.7727	0.00	High	—	—	—
Business strategy development	4.5000	0.50	High	—	—	—
Uniqueness	4.0455	1.00	Moderate	4.4762	0.50	High
Cost	4.1818	0.50	High	—	—	—
Possible	4.5455	0.50	High	—	—	—
Organization ability	4.4545	0.50	High	—	—	—
Profit	4.3182	0.50	High	—	—	—
Sustainable	4.1818	0.50	High	—	—	—
Enabling platforms	4.0455	0.75	Moderate	4.0952	0.25	High
Creation	4.6818	0.50	High	—	—	—
Value creation process	4.3636	0.50	High	—	—	—
Meaning (revised by experts)	4.4545	0.50	High	4.2381	0.50	High
Empowerment (added by experts)	—	—	—	4.1429	0.50	High
System (revised by experts)	4.0455	0.75	Moderate	4.1905	0.50	High
Empathic	4.2727	0.50	High	—	—	—
Collaborative	4.0909	0.75	Moderate	4.2857	0.50	High
Visible	4.5000	0.50	High	—	—	—
Situated	4.5455	0.50	High	—	—	—
Concept design representation	4.5909	0.50	High	—	—	—
Depictive	4.2727	0.50	High	—	—	—
Symbolic	3.9091	1.00	Moderate	4.2381	0.50	High
Enactive	4.7273	0.00	High	—	—	—
Production process	3.8636	1.00	Moderate	4.2381	0.50	High
Physical	3.7273	0.50	High	—	—	—
Virtual	3.7273	0.50	High	—	—	—
Ongoing	4.0455	0.50	High	—	—	—
Prototype	4.1818	0.50	High	—	—	—
Material	3.7727	0.75	Moderate	3.9048	0.50	High
Software	3.8182	0.50	High	—	—	—
Manuscripts	4.1818	0.50	High	—	—	—
Virtual material	3.4091(<3.5)	0.50	Deleted	—	—	—
Card (added by experts)	—	—	—	3.3000(<3.5)	0.50	Deleted
Small model (added by experts)	—	—	—	3.4000(<3.5)	0.50	Deleted
Design evidence dimensionality	4.5455	0.50	High	—	—	—
Spatial	4.3182	0.50	High	—	—	—
Temporal	4.1818	0.50	High	—	—	—
Social (revised by experts)	3.7727	1.00	Moderate	4.1905	0.50	High
Aesthetic focus	4.0000	0.75	Moderate	4.2857	0.50	High
Visual	4.1364	0.50	High	—	—	—
Experiential	4.5909	0.50	High	—	—	—
Active	4.6364	0.50	High	—	—	—
Deliverable	4.4091	0.50	High	—	—	—
Scope of deliverable	4.3182	0.50	High	—	—	—
Product	3.9545	0.25	High	—	—	—
Use	4.0909	0.50	High	—	—	—
Performance	4.0000	0.75	Moderate	4.0476	0.25	High
Sale	4.4091	0.50	High	—	—	—
Flexibility of deliverable	4.1364	0.50	High	—	—	—
Final	3.0455(<3.5)	1.00	Deleted	—	—	—
Customizable	4.3182	0.50	High	—	—	—
Dynamic	4.0000	0.75	Moderate	4.2857	0.50	High
Customer for deliverable	4.0000	0.25	High	—	—	—
Mass market	4.2727	0.50	High	—	—	—
Organizational support	4.4545	0.50	High	—	—	—
Corporate customers	4.0455	0.75	Moderate	4.2381	0.50	High

4.1.2 Stage 2: Constructing a Service Indicator Hierarchy Framework

Following factor extraction, a total of 13 primary criteria and 41 influential factors were extracted from the four main dimensions (Table 3).

Table 3. Results of factor extraction, merging, and renaming (Source: organized by this study)

Dimensions	Renamed Indicators	Eigenvalue	Accumulated Explained Variance (%)	Principle Factor Extraction and Developed Indicators	Factor Loading
Exploration	Development Feasibility	3.897	27.837	Factor 1	
				Commercial	0.897
				Profit	0.876
				Possible	0.838
				Society and Culture	0.616
	Technology Application Trends	2.165	43.298	Factor 2	
				Enabling Platforms	0.709
				Political and Economic	0.692
				Technology Development	0.657
	Brand Sustainability	1.862	56.601	Factor 3	
				Usage Scenario	0.806
				Cost	0.793
		1.424	66.770	Factor 4	
				Brand	0.859
				Sustainable	0.784
		1.193	75.290	Factor 5	
				Consumption	0.804
				Uniqueness	0.668
Creation	System Form Development	2.933	24.444	Factor 1	
				Symbolic	0.971
				System	0.785
	Empathic Design Thinking	2.318	43.757	Factor 2	
				Empathic	0.879
				Situated	0.858
				Depictive	0.660
	Value Co-creation	1.747	58.316	Factor 3	
				Collaborative	0.880
				Meaning	0.812
	Production Method	1.398	69.965	Factor 4	
				Virtual	0.868
				Physical	0.758
				Enactive	0.569
		1.083	78.993	Factor 5	
				Visible	0.875
				Ongoing	0.687
Prototype	Scenario Simulation	2.849	40.696	Factor 1	
				Temporal	0.847
				Spatial	0.736
	Goods Interface Aesthetics	1.347	59.932	Factor 2	
				Visual	0.864
				Software	0.819
				Manuscripts	0.672
	Experience Orientation	1.024	74.562	Factor 3	
				Experiential	0.951
				Active	0.581
Deliverable	Customization Services	2.830	31.439	Factor 1	
				Customizable	0.867
				Organizational Support	0.791
				Product	0.707
				Use	0.559
	Service Flexibility and Performance	1.579	48.981	Factor 2	
				Dynamic	0.897
				Performance	0.797
	Commercial Commissioning	1.359	64.080	Factor 3	
				Corporate Customers	0.819
				Mass market	0.739
				Sales	0.527

After conducting factor analysis of the 14 original indicators in the exploration dimension, excluding organization ability, which did not achieve an absolute factor loading of 0.5 and was, therefore, eliminated, the remaining 13 indicators underwent factor extraction, merging, and renaming. The results were subsequently used as the three primary evaluation indicators, that is, development feasibility, technology application trends, and brand sustainability. After factor analysis, all of the original 12 indicators of the creation dimension possessed absolute factor loadings that exceeded 0.5. The four primary evaluation indicators of system form development, empathic design thinking, value co-creation, and production method were developed following factor extraction, merging, and renaming. All seven original indicators of the prototype dimension possessed absolute factor loadings that exceeded 0.5 after factor analysis. Consequently, scenario simulation, goods interface aesthetics, and experience orientation were set as the primary evaluation indicators following factor extraction, merging, and renaming. Finally, all nine original indicators for the deliverable dimension also possessed absolute factor loadings that exceeded 0.5 after factor analysis. These factors were extracted, merged, and renamed customization services, service flexibility and performance, and commercial commissioning. The reliability coefficient for the overall scale was 0.890, satisfying the reliability standard. This indicated that that the study questionnaire possessed good reliability.

4.2 Results and Analysis of the Relative Weights of SD Indicators

For this stage, we employed the SD hierarchy framework established in this study to investigate relative weight values. Pairwise comparisons of each measurement item were performed to obtain evaluations of the relative weights among each dimension and conduct a paired comparison questionnaire . After critically reviewing the questionnaires completed by the 45 student participants, 24 valid questionnaires were determined as being recovered. The statistical results obtained using Expert Choice software are provided in Table 4. The CR values were all less than 0.1, which indicates that the questionnaire showed consistency for measuring items in the same dimension. The results also indicated that the questionnaire reliability was satisfactory.

Table 4. CLI SD indicator weights (Source: organized by this study)

Dimensions	Dimension Weight	Weight Ranging	CR	Criteria	Within-group Weight	Relative Weight	Weight Ranking	CR
Exploration	0.177	3	0.029	Development Feasibility	0.336	0.089	4	0.043
				Technology Application Trends	0.185	0.049	11	
				Brand Sustainability	0.479	0.127	1	
Creation	0.366	1		System Form Development	0.148	0.039	13	0.002
				Empathic Design Thinking	0.290	0.076	7	
				Value Co-creation	0.311	0.081	6	
				Production Method	0.251	0.065	8	
Prototype	0.149	4		Scenario Simulation	0.236	0.055	10	0.012
				Goods Interface Aesthetics	0.247	0.058	9	
				Experience Orientation	0.517	0.121	2	
Deliverable	0.307	2		Customization Services	0.342	0.083	5	0
				Service Flexibility and Performance	0.459	0.111	3	
				Commercial Commissioning	0.198	0.048	12	

4.3 Comparison and Analysis of the Relative Weights of the Overall Dimension Indicators

4.3.1 Analysis of weighting for various dimensions

The CR of the four SD indicator dimensions was 0.029 ($CR \leq 0.1$), satisfying the consistency standards established by Saaty (1994). Comparing the relative weights of the four dimension, the highest weighting was allocated to creation (0.366), followed by deliverable (0.307), exploration (0.177), and prototype (0.149). Based on the ranking of relative dimension weights, SD project teams perceive that during the SD process, the development of service creation is a repeated procedure that involves consistently assessing and testing creativity and conceptualization using design thinking. The earlier a service concept design is tested before execution, the greater extent to which lost costs can be reduced. This also indicates that SD teams consider the creation dimension to be extremely important. Additionally, SD team concepts regarding service project results or achievement delivery, including the service delivery range, delivery flexibility, and customer type, as well as the flexibility plan drafted concerning the completion of service implementation and activation are essential to whether service innovation introduction is successfully implemented and evaluated.

4.3.2 Analysis of the Relative Weights of the Evaluation Indicators (Criteria)

(1) Comparison of the relative weights for indicators in the first dimension (exploration)

According to the statistical results for the exploration dimension, the brand sustainability indicator achieved the highest weight (0.479) in the dimension; the development feasibility indicator achieved the second highest weight (0.336), and that for technology application trends was third (0.185). These results indicate that the core mission of CLI SD remains to construct or enhance the competitiveness of sustainable management for corporate brands. .

(2) Comparison of the relative weights for indicators in the second dimension (creation)

In the creation dimension, value co-creation achieved the highest weight (0.311) in the dimension, empathic design thinking achieved the second highest value (0.290), and production method achieved the third (0.251), with system form development achieving the lowest weight (0.148). In value co-creation, different user perspectives are employed to propose real problems during the service creativity, concept development, modeling, and testing stages.

(3) Comparison of the relative weights for the indicators in the third dimension (prototype)

Regarding the prototype dimension indicators, experience orientation achieved the highest weight (0.517) in the dimension, followed by goods interface aesthetics (0.247) and scenario simulation (0.236). The most appropriate or optimal method involves the SD team creating tangibility for SD using other methods (e.g., building a simulated service field or venue, communicating customers' experience or service process through the dramatic method of storytelling, constructing a service flowchart to structure service procedures, or using animations to depict the overall service procedure or flow).

(4) Comparison of the relative weights for the indicators in the fourth dimension (deliverable)

The service flexibility and performance indicator achieved the highest relative weight (0.459) of the deliverable dimension, and the customization services indicator achieved the second highest weight with a value of 0.342. The commercial commissioning indicator received the lowest weighting, with a value of 0.198. The results show that CLI SD emphasizes the service flexibility and performance of SD result delivery, and the provision of various service models for differing future and potential customers. Furthermore, the development of customization services for SD must consider the needs of not only general users or customers but also specific customized customer groups or other indirect customers. Finally, regarding commercial commissioning, the result objective that is delivered by the SD team to the commissioning proprietor can be a sample, a completely standardized

service recommendation document or evaluation criteria, or a commercial or business operation model or testing tool.

5. Conclusion and Recommendations

This study conducted a review of domestic and international literature and compiled the practical opinions of industry experts to construct a CLI SD indicator hierarchy framework. We hope that this framework can provide a reference for the implementation of SD projects in the design industry or practical design fields. This study employed two stages of expert questionnaires, factor analysis, and factor extraction to construct the SD indicators, which comprised the dimensions of exploration, creation, prototype, and deliverable, 13 evaluation criteria, and 41 influential factors. These dimensions and evaluation criteria are crucial to the success or failure of SD decisions. A more objective and complete evaluation of CLI SD can be achieved using these detailed indicators.

In addition, this study also applied AHP to obtain the relative weights of the four SD dimensions and 13 evaluation criteria. Moreover, the consistency of the CLI SD project teams' opinions was tested to develop a complete CLI SD indicator weight system.

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