

Article

An Investigation of Atmospheric Design Attributes in Light Food and Beverage Space Amidst Loneliness Economy Trend

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Abstract: In the loneliness economy era, the atmospheric design of light food and beverage spaces is particularly significant in meeting the multifaceted demands of urban consumers. Thus, we investigated how the atmospheric design of such spaces responds to and fulfills consumers' multidimensional evaluations, encompassing their psychological, emotional, and social needs. The findings underscored the significant appeal of "emotional healing" and "emotional companionship" to consumers. The factor analysis result delineated two major dimensions, "emotion and space" and "environmental aesthetics", reflecting that consumers, besides seeking emotional satisfaction, placed a high value on the cultural and aesthetic experience of the space. Through the Kano model and regression analysis, "emotional healing" and "independent space" were confirmed as pivotal factors in the atmospheric design of light food and beverage spaces. To cater to the innermost needs of urban consumers, in the atmospheric design of such spaces, dimensions including psychological, emotional, and environmental aesthetics must be strategically integrated.

Keywords: Loneliness economy, Atmospheric design, EGM, Kano two-dimensional quality model

1. Introduction

As global urbanization accelerates and society enters the post-pandemic era, changes in consumer behavior and lifestyles have shown a prevalent phenomenon - loneliness. This has led to the emergence of a distinct economic form known as the "loneliness economy." The loneliness economy not only manifests as an economic phenomenon but also reflects contemporary lifestyles, cultural consciousness, and societal changes. With an increasing trend of consumers dining alone, an individual pursuit of freedom and independence becomes an important trend emphasizing quality of life. Consequently, the food and beverage industry has begun to introduce various dining models targeting solo diners to meet their demands in the loneliness economy. The spatial design of light food and beverage establishments must adapt accordingly. The rise of light food and beverage establishments can be seen as an expression of individualism and autonomous values in modern society. These establishments have transcended basic dietary fulfillment and nutritional requirements for psychological and emotional needs. Thus, the environmental ambiance created by light food and beverage establishments is closely related to comfort and tranquil personal space, allowing the dining space to be connected with consumers emotionally and attract them to these establishments.

Food and beverage establishments play a significant role in the loneliness economy, as they meet the unique needs of individual consumers and provide profound emotional and perceptual values. Therefore, it is crucial to understand consumer needs and consider how to create spaces that align with the characteristics of the loneliness economy. We explored the concept of the loneliness economy and its interaction with the ambiance design of light food and beverage spaces that meet the needs of contemporary consumers. The role of restaurants extends beyond basic consumer needs; it must merge emotional and perceptual values. To cater to this trend, the design of food and beverage spaces must be continuously innovated and transformed into social venues to satisfy consumers' deeper emotions and needs. By understanding consumer demands and combining strategic spatial design, the food and beverage industry needs to create new business opportunities. By investigating the concept of the loneliness economy and its interaction with the atmospheric design of creative dining spaces, we proposed how creative dining spaces, through the provision of unique dining environments, cultural experiences, and multifunctionality, offer consumers a novel dining experience in the loneliness economy and how to create more appealing dining spaces and generating new opportunities in the business landscape.

2. Literature Review

2.1. Loneliness Economy and Restaurant Atmosphere

There is an increasing trend in research related to the loneliness economy including Peng (2017), Yen (2023a), Yao (2015), and Jiang (2020), as well as research focusing on loneliness and emotions (Lin, 2023) and workplace-related aspects (Chen, 2023; Yen, 2023b; Huang, 2022). However, there is a notable dearth of research that analyzed the creation of spatial ambiance design catering to consumer needs. In this study, therefore, a correlation between the concept of the loneliness economy and the design of atmospheric ambiance in light food and beverage spaces was investigated.

Yao (2015) researched the design of accommodation spaces for solo travelers, starting from a user-centered perspective and incorporating service design theory to plan and design, integrating various relevant aspects such as spatial design, product design, indicator design, and workflow design. Peng (2017) explored the dining behavior of single individuals in restaurants, highlighting the influence of demographic factors on choices and consumption willingness. He emphasized that factors such as restaurant products, pricing, marketing, and service impacted consumers and provided recommendations for improving operational strategies to align with the trend of the solo economy. Jiang (2020) pointed out that due to the COVID-19 pandemic, people's consumption habits have changed, leading to the rise of the home-based economy, with developments in industries such as distance education, remote work, and online shopping. In this research, the outstanding performance of the home-based economy industry was examined during the pandemic, and the importance of corporate social responsibility for sustainable development was underscored. Yan (2023) explored the potential of friendship apps from the perspective of the loneliness economy, particularly targeting young female markets. In the study, member filtering and consultation services were proposed by combining business models with potential consumer demands.

Research related to restaurant ambiance included the following studies. Pang (2023) focused on Mongolian seafood restaurants and identified that customer loyalty in seafood restaurants stems from evaluations of chef image, service quality, food quality, and restaurant ambiance. The study result provided crucial insights into the interaction between these factors and customer loyalty. Chen (2021) systematically investigated the spatial distribution of landscape restaurants in Ba Gua Terrace and analyzed in-depth the multiple considerations that influenced visitors' restaurant choices. He showed the close interactive relationship between landscape restaurant clustering and local tourism development. Chen and Yang (2015) employed the fuzzy Delphi method to investigate the aesthetic characteristics and design of aesthetic domains in international tourist hotel restaurant spaces. The research result offered a profound understanding of the marketing and operational models of aesthetic domains in hotel restaurants. Chen and Chen (2015) applied research methods such as the fuzzy Delphi method and analytic hierarchy process to investigate the interaction between the atmospheric design of Chinese-style restaurants in international tourist hotels and consumer experiences. They presented the core role of restaurant ambiance in enhancing consumer aesthetic experiences and provided strategic designs and marketing recommendations for the restaurant industry.

With the acceleration of globalization and fast-paced lifestyles, the loneliness economy has become a prominent contemporary trend. The loneliness economy, in conjunction with consumers' increased demand for aesthetic experiences, particularly in dining, has propelled restaurant ambiance design beyond mere decoration. How to integrate consumers' emotions to enhance their consumption experiences is now focused on. Consumers' pursuit of personal space and self-worth has elevated the importance of aesthetic experiences in the consumption process, particularly for dining. Consumers no longer seek merely the taste of food; they place greater emphasis on the overall ambiance and emotional experience at a restaurant. Elements such as restaurant decor, music, and service influence consumers' emotions and experiences. Based on the relevant study results, we posited a close correlation between restaurant ambiance and customer repurchase intentions. Therefore, we explored, from the perspective of the loneliness economy, how restaurant ambiance affects consumers' emotions and purchasing decisions to provide the restaurant industry with precise and strategic recommendations for long-term sustainability and development.

2.2. Aesthetic Engineering

In the era of emotional consumption, consumers are no longer purchasing products or services only; they are seeking a connection between emotions and experiences. Aesthetic engineering, as a subfield of psychology, is used to precisely address the need for this emotional dimension as an important tool for understanding and responding to consumers' profound sentiments. Rooted in psychology, aesthetic engineering acquires individual cognitive concepts and organizes them into usable information. The Elementary Geometric Method (EGM) is a common research approach in aesthetic engineering to analyze individual preferences for objects. EGM is conducted through individual interviews to compare the perceptions of Respondents A and B and discuss the similarities or differences in their evaluations of the assessed objects. In-depth interviews are the most commonly used data collection method in EGM, guiding interviewees to articulate their concepts and preferences for various entities. Subsequently, the

interview content is analyzed to discover aesthetic factors. We used EGM in this research to understand consumers' emotions and needs for design and innovation. In the context of emotional consumption, a singular functional value is no longer sufficient to attract consumers; what matters more are emotions, experiences, and narratives. The EGM approach enables a profound exploration of consumers' inner emotions and experiences, providing valuable insights for the design of products or services.

We conducted EGM interviews to explore the aesthetic factors in the design of the ambiance of food and beverage spaces by dissecting and constructing user preferences for services or goods. Based on respondents' preferences or quality assessments of services or goods, we categorized them into three tiers, including concrete reasons, original evaluation items, and abstract reasons. We discussed the differences and similarities between the services or goods offered by different vendors and then organized the aesthetic factors into characteristics of the target service or product (Kelly, 1955). The EGM method was used to concretize consumers' feelings, understand the perspectives and thoughts of the interviewees through in-depth interviews, and obtain reliable and genuine evaluations and opinions through pairwise comparisons. Based on interview data, a structural diagram was constructed to identify the attractiveness factors for the target audience and provide valuable insights for the design of products or services. These aesthetic factors can serve as a distinct differentiating foundation from competitors and offer concrete and valuable recommendations for designers or business owners.

2.3. Kano Regression Analysis

The determination of Kano quality attributes is most commonly and conveniently used with the outcomes of Kano quality "bipolar questionnaires" (Matzler and Hinterhuber, 1998). Concurrently, "regression analysis" is used for ascertaining "quality attributes" with a certain degree of reliability in the "Kano Quality Model" (Anderson and Sullivan, 1993; Mittal et al., 1998). Ting and Chen (2002) employed "consumer satisfaction with hypermarkets" as an illustrative example to validate the "asymmetry" in the influence of "adequacy of quality" on "satisfaction" and the "non-linear" relationship between these factors, as postulated by Anderson and Sullivan (1993) and Mittal et al. (1998). The aforementioned "asymmetry" signifies the varying proportions by which "adequate quality" and "inadequate quality" affect "satisfaction." Specifically, when "quality is adequate," "satisfaction" shows a marginal increase, whereas "satisfaction" shows a substantial decrease when "quality is inadequate." "Non-linearity" indicates that the rate of ascent or descent in "satisfaction" concerning differing levels of "quality" does not conform to a straightforward linear relationship. The "regression model" introduced by them has been widely adopted in various research (Chen and Li, 2008). In line with the categorization of attributes of the Kano model, Ting and Chen have proposed a regression model to assess the impact of quality attributes on customer satisfaction. They conducted regression analyses for each attribute with customer satisfaction as the dependent variable and positive/negative attribute performance as an independent variable. Positive performance means the presence or sufficiency of an attribute, while negative performance presents its absence or insufficiency. A linear regression model is employed to estimate the effect of positive and negative attribute performance on customer satisfaction.

$$US = C + \beta_1 \times (-Kn) + \beta_2 \times Kp \quad (1)$$

where US denotes the level of customer satisfaction, Kn and Kp stand for negative attribute performance and positive attribute performance, respectively, and β_1 and β_2 represent the corresponding regression coefficients.

When attribute performance is negative, the negative attribute performance values ($-Kn$) are considered with Kp set to 0. Conversely, when attribute performance is positive, the positive attribute performance values (Kp) are taken into account, while Kn is set to 0. By comparing the two regression coefficients (β_1 and β_2), the relationship between attributes and customer satisfaction is determined based on the significance and direction of the coefficients. For traditional attributes, β_1 needs to be significantly negative, while β_2 needs to be significantly positive. The magnitude of the coefficients represents their impact on customer satisfaction. According to the Kano model, quality attributes can be categorized into different groups based on the significance of the regression coefficients. The classification criteria are as follows.

- (1) If β_1 in the regression equation is not statistically significant, but β_2 is significantly positive, it implies "Attractive Quality."
- (2) When β_1 in the regression equation is statistically negative, and β_2 is statistically positive, it suggests "One-Dimensional Quality."
- (3) In cases where β_1 in the regression equation is statistically negative, but β_2 is not statistically significant, it signifies "Must-Be Quality."
- (4) When neither β_1 nor β_2 in the regression equation is statistically significant, it indicates "Indifferent Quality."
- (5) If β_1 in the regression equation is statistically positive, and β_2 is statistically negative, it denotes "Reverse Quality".

Table 1 presents the significance of regression coefficients and the relationship between quality attributes that are classified based on the significance of β_1 and β_2 with corresponding annotations indicating the attribute type.

Table 1. The relationship between “significance of regression coefficients” and “quality attributes”.

Quality Attributes	β_1 (Backward) Sig.	β_2 (Forward) Sig.	Table Remark
Attractive	n.s.	*	$\beta_1 = 0; \beta_2 > 0$
One-Dimensional	*	*	$\beta_1 < 0; \beta_2 > 0$
Must-Have	*	n.s.	$\beta_1 < 0; \beta_2 = 0$
Indifferent	n.s.	n.s.	$\beta_1 = 0; \beta_2 = 0$
Reverse	*	*	$\beta_1 > 0; \beta_2 < 0$

Sig. < 0.05 represents significance; n.s. represents non-significance; * represents significance. Data source: Chen & Li (2008).

3. Research Methodology

We explored the potential existence of non-linear relationships among quality attributes in restaurant ambient space design. We suggested in-depth insights from high-involved stakeholders (expert scholars) in relevant fields to elucidate consumer core expectations, key driving factors, and their relative impacts. The findings provide valuable references for industry practitioners and culminate. The study’s design process is outlined as follows (Fig. 1).

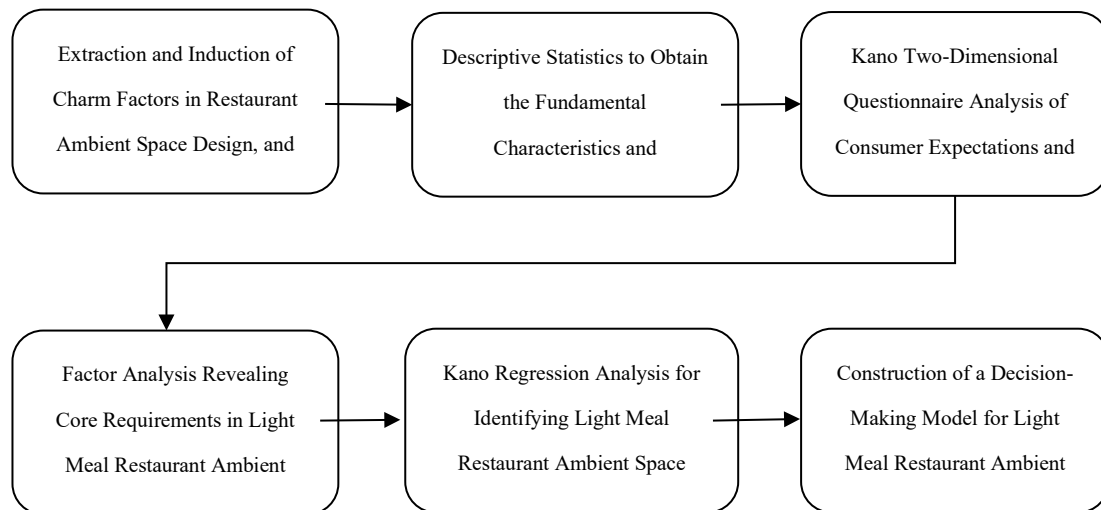


Fig. 1. Research framework.

3.1. Application of Charm Engineering via EGM Deep Interviews

Charm factors in light meal restaurant ambient space design were determined through the application of Charm Engineering, specifically, the EGM interviews. In Charm Engineering, representative design samples are created to ensure research robustness when conducting in-depth interviews. However, given the extensive scope of restaurant ambient space ambience, we conducted a pivotal initial exploration considering the limited body of existing relevant research. Due to the broad scope inherent in restaurant ambient space ambience, relevant research is still relatively sparse. Several test samples introduced biased or distorted research objectivity, we focused on how to reflect correlations between the elements of light meal restaurants. Individual subjective perceptions were determined for EGM interviews. With this approach, we concentrated on light meal restaurant ambience and mitigated the risk of sample bias or interference. Nine participants with a decade of work experience were invited for interviews.

3.2. Extraction of Charm Factors in Restaurant Ambient Space Design through EGM Interviews

The charm factors in restaurant space design are extracted based on EGM interviews. Subsequently, a focus group discussion was conducted to select suitable Kano two-way questionnaires. This focus group comprised seven participants, including three interior space designers, two restaurant operators, and two marketing planners with an average of over 12 years of professional experience. Kano two-way questionnaires were used to ascertain which factors were genuinely demanded by consumers and added supplemental value. The method was relevant in the context of the loneliness economy to have insights into consumer expectations and demands. Through Kano two-way questionnaires, fundamental consumer expectations were distinctly identified with design

elements for the expectations of customers. The result helps designers craft environments that fulfill basic needs and offer unique experiences effectively responding to the yearnings of consumers in the era of the loneliness economy.

3.3. Factor Analysis for Discerning Key Elements and Trends

In the loneliness economy, consumer needs and preferences are manifested with diversity and variability. Factor analysis was used to identify key elements and major trends of light meal restaurant design. Beyond understanding consumer real needs, the factor analysis result provided designers and industry practitioners with better ideas for contemporary trends and consumer preferences.

3.4. Kano Regression Analysis

Kano regression analysis, an amalgamation of the Kano model and traditional regression analysis was used to explore and assess consumer needs and satisfaction with precision. In the loneliness economy, consumer expectations and evaluations concerning light meal restaurant ambient space exhibit novel characteristics and hierarchical levels. Through Kano regression analysis, design elements that are fundamental, expected, or delightful were systematically identified and evaluated, providing tailored design directions for light meal restaurant spaces.

4. Research Findings

4.1. Aggregation of EGM Attractiveness Factors

In the Charm Engineering method, in-depth interviews were conducted with 9 highly involved individuals to construct a network diagram for EGM of the loneliness economy. Following the simplification and integration of interview content, the attractiveness factors were determined as presented in Fig. 2.

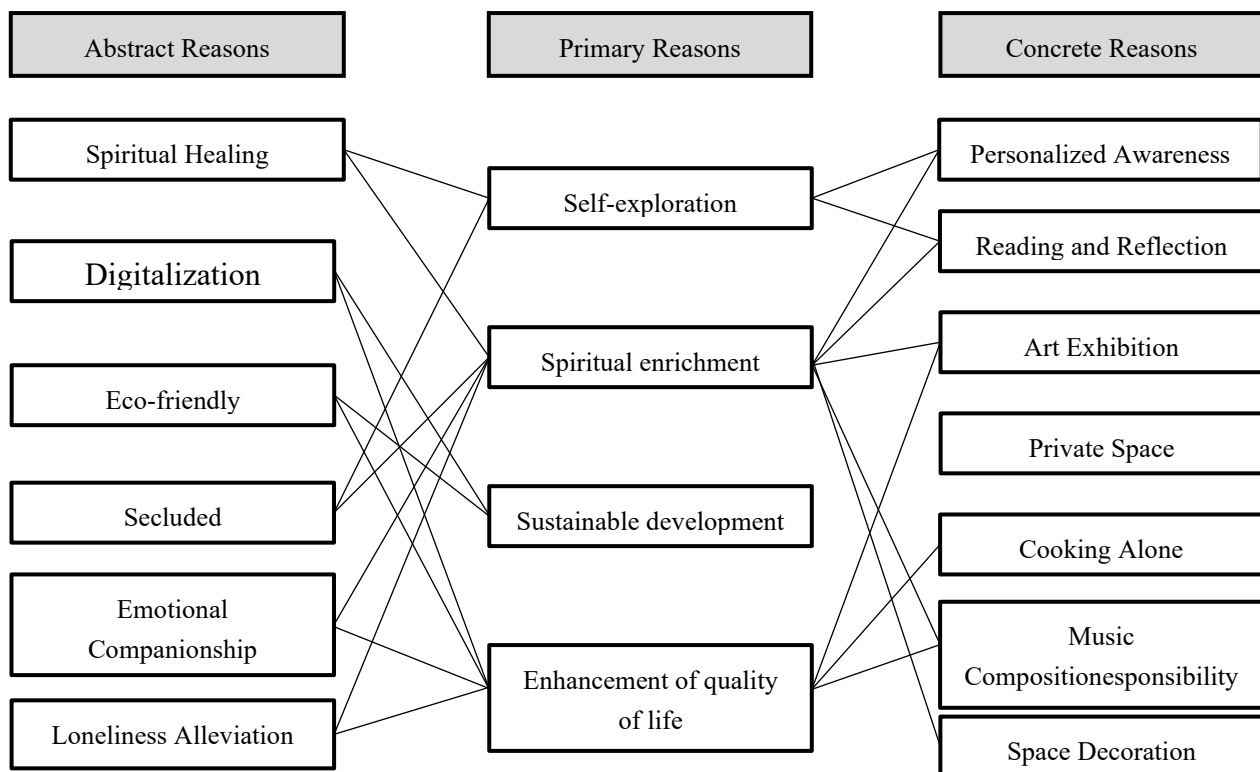


Fig. 2. EGM interview results.

These factors exhibited close interrelations of a multi-tiered dining experience in emotional comfort, emotional companionship, and sensory enjoyment. The EGM method result revealed multiple attractiveness factors in restaurant design and consumers' innermost needs and preferences for dining services. The aforementioned attractiveness factors reflected consumers' desire for emotional comfort, self-exploration, and a sense of happiness. "Emotional companionship" and "savoring delicacies" showed

consumers' pursuit of finding connection through food and a specific atmosphere to mitigate loneliness and isolation. The high scores for "private space" and "happiness" indicated that consumers had a strong desire for self-worth, self-identity, spiritual fulfillment, and individual autonomy. This result suggested that contemporary consumers sought material satisfaction, recognition, and affirmation. "Personalized customization", "reading and contemplation", "space decoration", and "spiritual healing" emphasized the need for individualization and exclusivity. In an information-saturated era, consumers are looking for dining spaces where they can immerse themselves, engage in deep contemplation, and relax to gain emotional balance through personalization and solace psychology. The result of this study presented consumers' extensive and in-depth expectations for restaurant space. These attractiveness factors highlighted the significance of the physical environment and reflected consumers' desires for emotional nourishment, emotional reliance, environmental responsibility, and personal expression. In dining spaces, dietary needs to be fulfilled with emotions, contemplation, and cultural exchange. Therefore, restaurant operators need to understand such comprehensive demands and design spaces carefully for consumers to feel deep emotional and psychological connections.

4.2. Descriptive Statistics

The descriptive statistics of the results provided insights to explore the restaurant design in the lonely economy.

"Private Space" scored the highest (4.53), indicating that consumers considered having a private and independent area in dining spaces to be important. This need stems from self-realization and self-expression in the lonely economy. Interviewees suggested that consumers in the lonely economy valued the privacy and individuality of dining spaces. This reflected modern consumers' desire for a space of their own in public places to relax, contemplate, or have good times with friends and family. In contrast, "Cooking Alone" scored lower (3.81), possibly indicating that although consumers enjoyed food, it was not the primary consideration for most when choosing a dining space.

Table 2 presents the reliability of the KANO questionnaire survey, including a range of attributes such as "Spiritual Healing," "Digitalization," "Eco-friendly," and more, with their respective minimum and maximum values, mean, standard deviation, and mean ranking. This table further substantiates the observed trends and preferences among consumers. Consumers prioritized ambiance, environment, and service when selecting a dining space. "Private Space," "Spiritual Healing," and "Emotional Companionship" scored higher than 4.25, demonstrating that consumers emphasized emotional and spiritual needs when choosing a dining space. This is particularly pronounced in the lonely economy, as consumers seek not only material satisfaction but also emotional fulfillment and connection. The result suggested that dining space designers need to understand consumers' needs and emotions to create a comfortable and attractive dining environment.

Table 2. Reliability of KANO questionnaire survey.

Item	Minimum Value	Maximum Value	Mean	Standard Deviation	Mean Ranking
01. Spiritual Healing	1.00	5.00	4.26	0.99	7
02. Digitalization	1.00	5.00	4.14	0.92	9
03. Eco-friendly	1.00	5.00	4.25	0.98	8
04. Secluded	1.00	5.00	4.42	0.86	2
05. Loneliness Alleviation	1.00	5.00	4.17	1.02	10
06. Personalized	2.00	5.00	4.42	0.80	3
07. Reading and Reflection	1.00	5.00	4.39	0.79	4
08. Art Exhibition	1.00	5.00	4.33	0.90	5
09. Private Space	1.00	5.00	4.53	0.75	1
10. Cooking Alone	1.00	5.00	3.81	1.18	12
11. Music Composition	1.00	5.00	4.13	0.98	11
12. Space Decoration	1.00	5.00	4.32	0.95	6

The maximum value for each attribute was 5. For each aspect of dining spaces, specific target customers existed. The differences in minimum values suggested that several attributes were underestimated or overlooked. Standard deviation reflects the degree of consensus among consumers regarding that attribute. A low standard deviation for "Private Space" (0.75) implied that consumers experienced a sense of spatial oppression and had a strong desire for personal space. They sought a space of their own in dining to relax without disturbances. Therefore, in restaurant design, a comfortable and private environment needs to be provided. In contrast, "Cooking Alone" showed a high standard deviation (1.18), indicating variation in consumers' attitudes." As cooking is

common in leisure and creative activity, consumers believed that a cooking experience offered by a restaurant enhanced interaction and enjoyment. Those who lack cooking skills prefer to enjoy ready-made meals. The variance was caused by consumers' lifestyles, cooking skills, or expectations for the dining experience.

The statistical data revealed consumers' evaluations of different attributes and their underlying psychology and lifestyles. Understanding needs and expectations is crucial for restaurant operators. Consumers' expectations and demands for dining space ambiance were diverse. They sought independence and privacy and hoped to find emotional fulfillment and opportunities for self-realization in these spaces. These results provide direction and inspiration for dining space designers in planning and innovation.

4.3. Factor Analysis

Before conducting factor analysis, the suitability of the data was assessed using the Kaiser-Meyer-Olkin (KMO) test and Bartlett's test of sphericity. The KMO measure evaluates the appropriateness of the data for factor analysis, with higher KMO values indicating a greater degree of common variance among variables, making it more suitable for factor analysis. Table 3 presents the results of the KMO and Bartlett's test, providing a detailed breakdown of the Kaiser-Meyer-Olkin Measure of Sampling Adequacy, which was found to be 0.859, and the Bartlett's Test of Sphericity, including an Approximate Chi-Square value of 830.797, Degrees of Freedom of 66, and a Significance level of 0.000. The questionnaire was distributed and collected via Google Forms in September 2023 for individuals with backgrounds in dining and interior design. A total of 132 valid questionnaires were collected. The Bartlett's sphericity test yielded a significant p-value of 0.000 ($p < 0.001$), and the KMO value was 0.859, indicating validity for the questionnaire scale and the presence of common factors among variables.

Table 3. KMO and Bartlett's Test.

Kaiser-Meyer-Olkin Measure of Sampling Adequacy:		0.859
Bartlett's Test of Sphericity:	Approx. Chi-Square:	830.797
	Degrees of Freedom:	66
	Significance:	0.000

In the exploration of restaurant design in the loneliness economy, the factor analysis result provided an understanding of consumer needs and expectations. Factor 1, "Emotion and Space," underscored consumers' innermost needs in urban areas. In the hectic urban life, consumers encounter sustained social and environmental pressures. Consequently, the demands for "extreme privacy" and "independent space" were more pronounced. In addition to physical space requirements, individual privacy and self-worth were required. These were connected to "mental healing" and "loneliness alleviation," implying that contemporary consumers looked for material consumption and psychological and emotional fulfillment in restaurants. Factor 2, "Environmental Aesthetics," reflected cultural and societal issues in restaurant spaces. "Environmental concepts" indicated the high degree of concern of contemporary consumers for environmental conservation and sustainability. This requires more than basic spatial design for the core values of the restaurant. "Art exhibitions" and "musical composition" indicated that customers required specific functions for cultural exchange and creative expression.

Table 4 provides a summary of the factor analysis, showing the loadings of each item on Factor 1 and Factor 2. For instance, 'Secluded' and 'Private Space' had high loadings on Factor 1, indicating their relevance to emotional and space aspects, whereas 'Space Decoration', 'Art Exhibition', and 'Music Composition' scored higher on Factor 2, emphasizing their importance in environmental aesthetics. The table also includes the explained variance for each factor, illustrating their contribution to understanding consumer preferences in restaurant design.

In the loneliness economy, light dining restaurants must reevaluate their roles and strategic positioning in space ambiance design. Therefore, restaurant spaces not only provide food places but reflect and respond to consumers' complex psychological, cultural, and social needs. Thus, restaurant spaces become more strategic to align with market trends by establishing a distinctive brand image in a compatible and inclusive complex context. This necessitates that designers and operators view spaces as dynamic platforms for social connections, cultural exchange, emotional interplay, and contemporary societal values.

Table 4. Summary of factor analysis.

Item	Factor 1	Factor 2
04. Secluded	0.819	0.036
09. Private Space	0.768	0.291
05. Loneliness Alleviation	0.698	0.262
01. Spiritual Healing	0.696	0.274
10. Cooking Alone	0.661	0.191
06. Personalized	0.659	0.404
02. Digitalization	0.536	0.290
12. Space Decoration	0.193	0.865
08. Art Exhibition	0.209	0.840
11. Music Composition	0.222	0.817
03. Eco-friendly	0.356	0.630
07. Reading and Reflection	0.554	0.558
Explained Variance (%)	49.18	11.64
Cumulative Explained Variance (%)	49.18	60.82

4.4. Kano Regression Analysis

To understand consumers’ latent needs, we performed a Kano regression analysis. “Must-be” attributes such as “mental healing,” “extreme privacy,” and “independent space” were the foundational expectations of urban consumers for light dining restaurant spaces. In the dense urban environment and the prevalence of loneliness, consumers seek more than just nourishment from food; they long for the emotional solace that the space and ambiance can provide. Dining spaces need to offer a sanctuary for consumers to escape the external hustle and find inner serenity. The “must-be” of “environmental concepts” highlighted consumers’ growing environmental consciousness. In information proliferation, consumers have higher expectations regarding food and anticipate that restaurants embody environmental protection and sustainability. Simultaneously, “reading and contemplation” as a “one-dimensional” attribute revealed consumers’ deeper spiritual pursuits in dining spaces. However, these attributes did not exhibit a linear relationship with consumer satisfaction. While several attributes were considered “must-be,” their excessive presence or absence were not linearly increased or decreased for consumer satisfaction. This non-linear relationship suggested that restaurant operators needed to trade off in space design strategies. The ambiance design of a light dining restaurant needs to meet consumers’ basic physiological demands and satisfy their emotional, spiritual, and values-based dimensions to achieve strategic innovation and differentiation.

Regression analysis is a predictive model to explore the relationship between one or more independent variables and a dependent variable. R^2 (coefficient of determination) represents the percentage of variance that the model can explain, with values closer to 1 indicating a better explanatory capability of the model. As presented in Table 5, the R^2 value for “mental healing” was 0.301, suggesting that this model explained 30.1% of the variance occupied by mental healing in the ambiance design of light dining restaurant spaces, significantly higher than other factors. The results indicated that modern consumers when choosing light dining, prioritized mental healing as their primary psychological need rather than the experience of food. “Loneliness alleviation” (0.243) and “independent space” (0.205) showed higher R^2 , indicating that consumers required a place to alleviate loneliness and provide independent space for tranquility amid their busy lives. The lower R^2 values for “reading and contemplation” (0.078) and “artistic displays” (0.099) suggested that, although these elements were considered important, their influence was relatively weak in the overall scope of the light dining restaurant. This implied that in a broader market, these elements were not fully recognized or appropriately utilized. The results showed the strategic direction of ambiance design for light dining restaurants in the loneliness economy, emphasizing emotional and psychological satisfaction over material fulfillment to meet the needs of consumers.

Table 5. Kano regression analysis results.

Item	$\beta 1$	Sig.	$\beta 2$	Sig.	R2	Quality Classification
01. Spiritual Healing	-0.203	0.028	0.411	<0.001	0.301	Must-be
02. Digitalization	0.000	0.996	0.420	<0.001	0.164	Must-be
03. Eco-friendly	-0.009	0.926	0.361	<0.001	0.121	Must-be
04. Secluded	-0.206	0.062	0.227	0.039	0.144	Must-be
05. Loneliness Alleviation	-0.068	0.458	0.463	<0.001	0.243	Must-be
06. Personalized	-0.099	0.377	0.371	0.001	0.187	Must-be
07. Reading and Reflection	-0.051	0.636	-0.270	0.013	0.078	One-dimensional
08. Art Exhibition	-0.210	0.048	0.163	0.123	0.099	Must-be
09. Private Space	-0.284	0.016	0.214	0.069	0.205	Must-be
10. Cooking Alone	-0.200	0.042	0.294	0.003	0.184	Must-be
11. Music Composition	-0.152	0.110	0.287	0.003	0.137	Must-be
12. Space Decoration	-0.033	0.747	0.3691	<0.001	0.139	Must-be

5. Conclusion and Recommendations

In the loneliness economy, the significance of ambiance design in light dining restaurant spaces for urban consumers is emphasized. We assessed consumers' latent needs for light dining restaurant spaces by extracting multidimensional evaluations concerning their mental, emotional, and socio-cultural dimensions. The results from EGM highlighted "mental healing" and "emotional companionship," while factor analysis delineated "Emotion and Space" and "Environmental Aesthetics". The results demonstrated that consumers when choosing dining spaces, pursued emotional satisfaction and cultural and aesthetic experiences within the space. The Kano model result revealed that "mental healing" and the "eco-friendly concept" were necessary attributes for light dining restaurant spaces for "mental healing" and "independent space". In the loneliness economy, ambiance design strategies for light dining restaurants must be provided to integrate multidimensional aspects, including mental, emotional, and environmental aesthetics to satisfy the needs of urban consumers. The research result provides robust strategic guidance for restaurateurs and ambiance design. It was found that more dining spaces need to be prioritized for the needs of consumers to enhance their performance and competitiveness in the market. There were limitations in this study that need to be addressed in subsequent research. For instance, the study's respondents were from specific regions or cultural backgrounds. In future research, cross-cultural or cross-regional comparisons need to be included to explore whether differences exist in consumers' attitudes and demands regarding ambiance design for light dining restaurants in different cultural or geographical contexts. Although "digitalization" was included as an attribute, the application and impact of emerging technologies such as augmented reality (AR), virtual reality (VR), or AI in restaurant space design were not thoroughly explored though the technologies can change ambiance design in dining spaces.

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