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EXPLORING THE CHARISMATIC IMAGERY OF BAMBOO CHARCOAL-DERIVED PRODUCTS IN DESIGN AND DEVELOPMENT: A CASE STUDY OF LONGQI DISTRICT

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Abstract

In order to develop local innovation in Taiwan's traditional industries and products with local characteristics, and with market mechanisms in which society demands diversified consumer choices, there is now a trend among local industries to gradually broaden their product features and thus increase market demand. However, most traditional products with local characteristics are different from the well-known domestic products in terms of innovative identity and optimization of quality. The purpose of this study is to apply a Miryoku (attractiveness) Engineering evaluation construct and a Kano two-dimensional quality model to investigate the quality of bamboo charcoal-derived products with traditional local characteristics as well as their product planning and improvement strategies. This study used a theoretical approach, in-depth interviews, and statistical analysis of questionnaires. The study aims to gain a deeper understanding of current consumer perceptions of traditional local industries and products, the quality elements of product plan-

ning and design, and indicators that denote areas for improvement, so that practical suggestions can be made.

Key words: Local characteristics; Product design; Miryoku Engineering; Kano model

Introduction

The meanings implicit in globalization change constantly with incessant march of time. This affects the core of local cultural development, making it increasingly difficult to keep the spirit of local culture rooted in local areas. By exploring the characteristics of local industries through the lens of the development of cultural commodities, we are able to bring together the special characteristics of local industries and cultural resources to extend the spirit of local cultures and new industry economies.

Longci (龍崎, Lóngqí) District is located in the southeastern part of Tainan City, Taiwan. It has the lowest youths population per capita of any township in the country; it has the third highest percentage of senior citizens and the second highest rate of population loss in the country. The area's unique mudstone geology of the area makes it difficult to retain healthy soil and water; large outcrops of mudstone make areas of the district resemble a barren wasteland. Naturally, environmental protection and sustainable development have become a major area of focus for the residents of Longci.

In order to increase consumer satisfaction with bamboo charcoal-derived products, designers must understand consumers' demand for sentimental properties, and clarify the correlation between the quality of sentimental properties and consumer satisfaction. In this study, Miryoku ("attractiveness") Engineering is used to determine the factors of sentimental properties and appeal that influence consumers' preferences. The Kano quality model, a two-dimensional scale concept, was further applied to investigate the influence of charm elements on the evaluation of consumer satisfaction for bamboo charcoal-derived products, and to determine different quality categories. The key attributes of bamboo charcoal-derived product design quality were examined to identify the attributes that urgently need to be improved to help the industry and effectively enhance consumer satisfaction.

Local Characteristics

The term "locality" refers to a specific space or a narrative of a specific region. Localities are not only physical spaces, but also carry the history, experiences, emotions, meanings, and symbols of regional people's living spaces, from which values and meanings are derived [1,2,3]. The localized products and industries that are developed through local characteristics will, through the accumulation and continuity of time, reveal their historical context and the spirit of their specificity, local culture, and human traditions. These locally-developed products have their own uniqueness and diversity, as well as the richness of regional culture, thus turning local resi-

dents into a collective body of life and unifying the cohesive strength of the local community.

The management of local specialty industries is key in the development of new economic trends. We must take those local specialty industries, which are being gradually forgotten, and inject them with creative design ideas to develop new economic patterns. With the unique human background or natural resource imagery of the local area, we can develop a symbolic image with unique, historical, and cultural significance to establish a regional economic base and revitalize the local economy. By strengthening the technological development of local industries and building close interpersonal relationships, we can attract new industries and create a new economic model [3]. Many studies have shown that the realization of creative industries through creative expression and marketing based on the special lifestyle or resources of each region will enable each locality to develop its own unique natural and human resources to develop the characteristics of its regional industry. By turning lifestyles or resources into distinctive products, we can promote the development of local industries and economic value [5,6]. How to revitalize regional industries is closely related to local economic development. The Taiwanese economy has shifted from the more traditional industries of agriculture, manufacturing, and processing to more modern, service-oriented industries. If the industrial base of culture, leisure, and design can be integrated into a circular economy with local Miryoku (“attractiveness”) and vitality, it will be possible to develop mainstream industries with local characteristics and humanistic creativity.

Miryoku Engineering and the Evaluation Grid Method

Miryoku (“attractiveness”) represents the subjective preferences of consumers, which mainly comes from their value judgment systems. These judgment systems come from consumers’ sensory reception, psychological decision-making, and sociological and artistic evaluation[7]. Sanui (1996) divided the research method of Miryoku Engineering into two steps. The first step is that evaluation of the object needs to answer with like or dislike of the object; the second step is to clarify the meaning of the answer through additional questions and to integrate respondents' answers[8]. The product’s Miryoku elements for consumers are then analyzed, and a structure grid diagram is worked out. This research method is called the evaluation grid method (EGM). Chen, et al. (2012) argued that in terms of EGM, interviews must be conducted mainly with highly involved groups, and true and credible evaluations and opinions must be collated through paired comparison of features from the users’ actual behavior. Even relationships of abstract feelings (which have been difficult to capture in the past) and specific conditions can be integrated using this method[9].

The Kano Model

To improve the shortcomings of the linear hypothesis, Kano (1984) proposed

the Kano model, which uses Psychological Qualities as its central concept. The Kano model emphasizes a two-dimensional perspective to interpret correlations between product quality and satisfaction. The linear (one-dimensional) model means that for a certain quality element, satisfaction will increase or decrease in proportion to the adequacy of quality. However, in fact, this rule does not apply to all quality factors. Two-dimensional quality challenges this view. Some argue that satisfaction may not necessarily occur when all quality factors are in place. Sometimes dissatisfaction may occur, or satisfaction may not necessarily be related to quality.

The Kano model classifies product criteria into three distinct categories. These are illustrated in Fig. 1. Each quality category affects customers in different ways; the three different types of qualities are:

1. The must-be or basic quality: Here, customers become dissatisfied when the performance of the product criterion is low or the product attribute is absent. However, customer satisfaction does not rise above neutral with a high-performance product criterion.

2. One-dimensional or performance quality: Here, customer satisfaction is a linear function of a product criterion performance. High attribute performance leads to high customer satisfaction and vice versa.

3. The attractive or exciting quality: Here, customer satisfaction increases super-linearly with increasing attribute performance. There is not, however, a corresponding decrease in customer satisfaction with a decrease in criterion performance.

In addition to these three, two more quality types can be identified: Indifference, and reversal qualities. (Though, to be precise, these two should be called “characteristics”, because they are not really a customer need.) With indifference, customer satisfaction will not be affected by the performance of a product criterion. For reversal, customers will be more dissatisfied with the increase of a criterion performance.

A simple way of identifying the different Kano categories – one-dimensional, attractive and must-be – is to use a Kano questionnaire (Kano et al.,1984). In this questionnaire, customers indicate if they feel satisfied or dissatisfied with a given situation. First, a situation supposes the quality (criterion) is present or sufficient[10]. The customer must then choose one of the following answers to express their feelings:

a. Satisfied
b. t needs to be that way
c. I am indifferent
d. I can live with it
e. Dissatisfied

A second situation assumes the quality is absent or insufficient. Again, the customer must choose one of the above-mentioned feeling responses. By

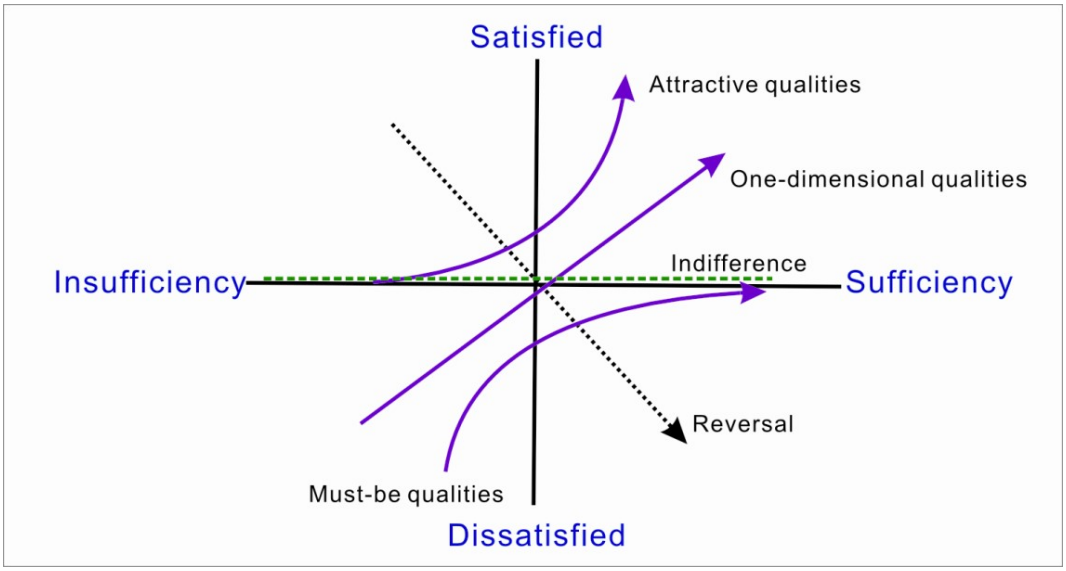


Figure 1. Kano model of customer satisfaction

Table 1: Kano Evaluation Table

Product Criteria/attributes		Insufficiency				
		Satisfied	It needs to be that way	I am in-different	I can live with it	Dissatisfied
Sufficiency	Satisfied	Q	A	A	A	O
	It needs to be that way	R	I	I	I	M
	I am indifferent	R	I	I	I	M
	I can live with it	R	I	I	I	M
	Dissatisfied	R	R	R	R	Q

(A: attractive; O: one-dimensional; M: must-be; I: indifference; R: reversal; Q: questionable)

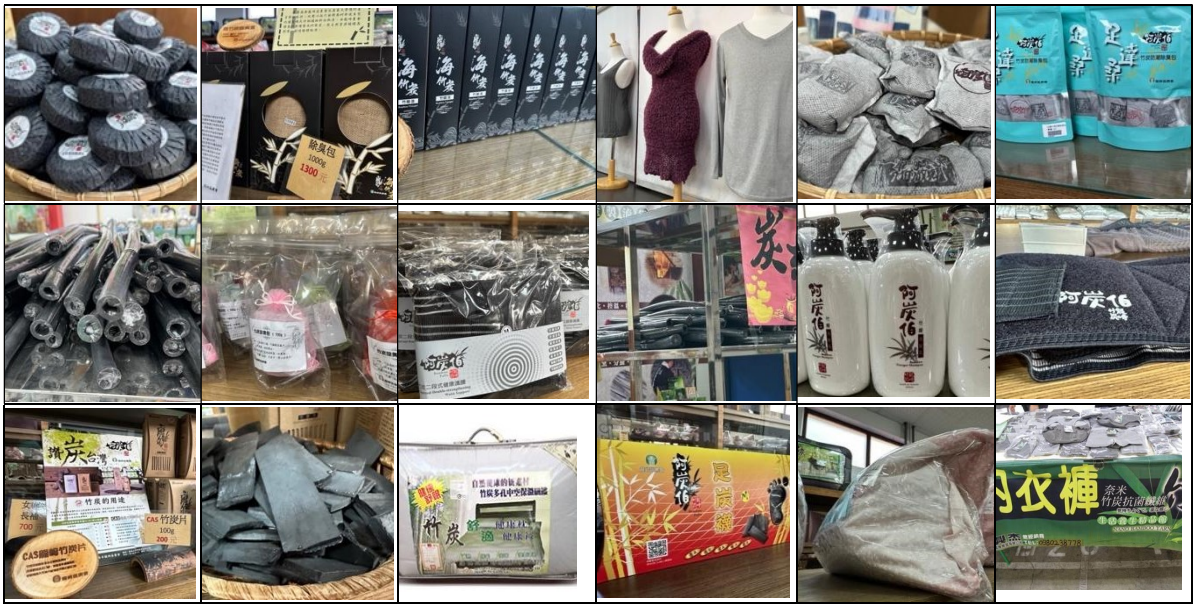
combining the two answers in the Kano evaluation table (Table 1), the product criterion can be identified as attractive, must-be, one-dimensional, indifference, or reversal.

Study Design

In the first stage, Miryoku Engineering's EGM (evaluation grid matrix) was implemented. Using the test sample in Table 2 and each person's subjective perception of bamboo charcoal-derived products, 10 experts (4 with academic backgrounds in product design, 3 manufacturers, and 3 frequent consumers) were interviewed to explore the Miryoku and emo-

tional attributes of bamboo charcoal-derived products. The EGM interview method consists of three parts: Original factors, concrete factors, and abstract factors. After understanding the original factors, we asked follow up questions to respondents on the abstract factoring, and then linked them to concrete factors [11]. The interviews were organized and mapped into a structured diagram. Finally, the structure diagram for evaluating the Miryoku element of bamboo charcoal derivative product design was summarized.

During the second stage, defined by quantitative research, the Kano model was applied to investigate the attributes of consumers' preferences for the types of local imagery contained in shopping sign boards, based on the results of the EGM survey. The purpose of this study is to understand whether there is a non-linear relationship between the factors that influence consumers' preference regarding the presentation of local images in signboards in shopping areas.



EGM Interview Results

Based on the results of the 10 interviews, a network diagram for the EGM was compiled. From the survey results, it was found that the visual elements that attract consumers' preference for bamboo charcoal-derived products are “product function” (16 times), “wording and graphic messages” (13 times),” “local industry” (10 times), “earth-friendly” (6 times), and “packaging design” (5 times). As shown in Figure 2, the most important visual elements of bamboo charcoal-derived products that attract consumers' preferences are product features, word and graphic messages, and local industries. These factors are most effective in attracting consumers' attention and generating favorable consumer impressions.

The abstract sensory elements of bamboo charcoal-derived products that

attract consumers are: “eco-friendly” (12 times), “healthy” (10 times), “expert” (8 times), “dry” (8 times), “natural” (7 times), and “comfortable” (6 times). These results indicate that the most important elements in terms of attracting consumers' abstract senses are environmental friendliness and healthiness; these are the elements that cause bamboo charcoal-derived products to be recognized by consumers in the local characteristics industry. In addition, the expertise and special functions of bamboo charcoal derivative products can also lead to a sense of demand from consumers, while product creativity and local heritage awareness are very important. The most sought-after feature among consumers of bamboo charcoal derivatives is the deodorizing function, which is the most important reason why bamboo charcoal derivatives attract consumers' preference. Secondary reasons include environmental protection, anti-mildew effects, and natural ingredients, which shows that sustainable development of the environment can induce feelings of approval among consumers. Additionally, the decontamination function, moisture-absorbing effect, and use of local materials demonstrate the importance consumers attach to environmental quality.

Statistical Results of the Kano Model

This study began distribution of the Kano questionnaire via Google Forms in December 2022. The target population was mainly master's and doctoral students with professional backgrounds in art, design, and cultural and creative fields; 90 valid questionnaires were collected. This study examined the reliability of the collected questionnaires with the statistical software SPSS 17. The Cronbach's alpha value of Kano's overall questionnaire is 0.908, indicating a high level of reliability.

According to the study, among the 15 quality factors of bamboo charcoal-derived products, 13 of them are One-Dimensional Qualities: Internal Environmental Protection Effect; Recyclability; Deodorization Effect; Natural Ingredients; Decontamination Effect; Health Benefits; Warming Properties; Mold Removal Effect; Moisture Absorption Effect; Local Material Use; Cleansing Effect; Environmental Friendliness; and Infrared Capabilities. These results indicate that for consumers, bamboo charcoal-derived products are general items for use in daily life.

Therefore, consumers' expectations of these products are based on the functionality of the products and the effectiveness of bamboo charcoal itself. In addition, “health benefits”, “elasticity and flexibility”, and “appealing features” are the qualities that should be emphasized in the design of bamboo charcoal derivative products in the future. These qualities should be used as niches for product differentiation in the future, and as a reference for product design guidelines and promotion.

Conclusion

This study was conducted on bamboo charcoal derivative products in Longci District, Tainan, in hopes that the special characteristics and functions of the bamboo charcoal industry and products could serve as an expression of local distinctive cultural and creative product qualities.

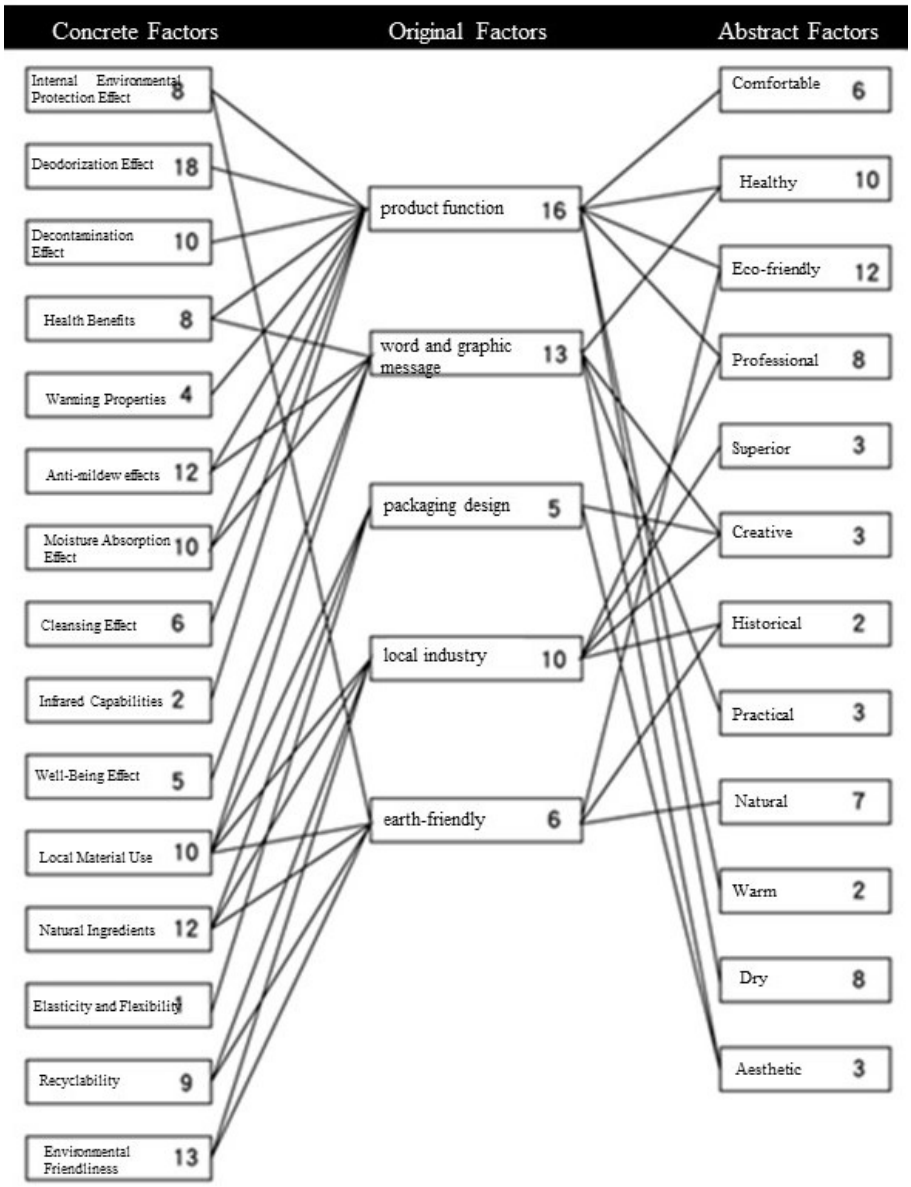


Figure 2: EGM Diagram

This study intended to help clarify how the Miryoku elements of bamboo charcoal derivative products can help promote local industries and the development and marketing of diversified products in the future. Based on the research results mentioned above, we extracted five original Miryoku elements (product function; wording and graphic message; packaging design; local industry; and earth-friendliness), 15 concrete Miryoku elements, and 12 abstract Miryoku elements. The abstract factors, concrete factors, and original factors

were analyzed to obtain consumers' needs and preferences for Miryoku factors and emotional attributes of bamboo charcoal-derived products. Finally, based on the research process and analysis, the following conclusions and recommendations are made.

Table 3: Kano quality element proportions

Quality elements	M	O	I	A	Q	R	Kano quality category
1.Internal Environmental Protection Effect	6.7	42.2	12.2	34.4	4.4	0.0	O
2.Recyclability	5.6	52.2	10.0	27.8	3.3	1.1	O
3.Deodorization Effect	14.4	52.2	6.7	22.2	4.4	0.0	O
4.Natural Ingredients	13.3	36.7	18.9	25.6	5.6	0.0	O
5.Decontamination Effects	3.3	41.1	7.8	41.1	6.7	0.0	O
6.Health Benefits	8.9	44.4	15.6	25.6	5.6	0.0	O
7.Well-Being Benefits	7.8	31.1	23.3	32.2	5.6	0.0	A
8.Warming Properties	6.7	36.7	17.8	33.3	5.6	0.0	O
9.Anti-mildew Effects	8.9	47.8	8.9	27.8	6.7	0.0	O
10.Moisture Absorption Effects	20.0	41.1	7.8	25.6	5.6	0.0	O
11.Local Material Use	6.7	38.9	15.6	33.3	5.6	0.0	O
12.Cleansing Effects	1.1	41.1	17.8	33.3	5.6	1.1	O
13.Elasticity and Flexibility	1.1	36.7	20.0	38.9	3.3	0.0	A
14.Environmental Friendliness	7.8	54.4	14.4	20.0	3.3	0.0	O
15.Infrared Capabilities	4.4	33.3	24.4	32.2	4.4	1.1	O

The Miryoku elements of bamboo charcoal derivative products are explored by interviews with cultural and creative designers and highly knowledgeable consumers, and the importance of decontamination of daily necessities and the concept of personal health care can open up a larger consumer market for this product. As can be seen from Figure 2, most of the Miryoku elements can be included in these five categories of original factors. These five categories of original factors are the elements that respondents interpreted throughout their responses to the questionnaire regarding bamboo charcoal derived products. In the future, we should make good use of the above Miryoku elements to transform the Miryoku elements into various designs of bamboo charcoal derived products. By incorporating Miryoku elements into the design of bamboo charcoal derivative products, we will be able to convey to consumers the favorability of bamboo charcoal derivative products and help to develop a more diversified market for bamboo charcoal derivative products.

In order to meet consumers' needs for bamboo charcoal derivatives, understand consumers' preferences for Miryoku elements, and draw more in-depth research

conclusions, this study applied a two-dimensional Kano Model. This study will clarify consumers' demand for the quality of bamboo charcoal derivative products and explain the correlation between consumer satisfaction and the performance of bamboo charcoal derivative products in social design applications. It provides decision makers and designers of bamboo charcoal derivative products with a variety of quality design decisions for continuous improvement.

In the future, we hope to increase the number of EGM interviewers and expand the age group of EGM interviewers, and to use the evaluation structure of Miryoku elements for open-run products to provide a reference basis for subsequent questionnaire design. In the future, the validity of the questionnaire and the weight of each Miryoku element can be examined by using AHP hierarchical analysis to determine the quantitative value of the Miryoku elements for reference in the design and improvement of the subsequent products

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