# Research on Sensory Interactive Design of Liaoning Time-honored Brand Pastry Packaging Driven by Experience Economy

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**ABSTRACT**

Focusing on the cultural characteristics of Liaoning region, this study explores new approaches to sensory interactive design for packaging of time-honored pastry brands under the experience economy. It aims to enhance cultural identity and consumption appeal of Liaoning time-honored products through multi-dimensional sensory experiences, promoting cultural inheritance of these brands in the modern era. Taking packaging of Liaoning time-honored pastry brands as the research object, this study constructs a sensory interactive design model covering visual, tactile, auditory, and olfactory dimensions by integrating artistic symbols of Liaoning regional culture and sensory interactive design theories. Fieldwork and eye-tracking experiments were conducted to collect user feedback data through both online and offline channels. Results Incorporating AR dynamic interactive elements into time-honored brand packaging can effectively stimulate purchase interest among young consumers, achieving a 72% interaction intention rate. Sensory interactive design rooted in regional culture can significantly increase the cultural added value of Liaoning time-honored brand packaging. The integration of traditional craftsmanship and modern technology provides a positive framework for optimizing competition through cultural-to-sensory-to-experience value enhancement, facilitating the dual transformation towards localization and rejuvenation.

*Keywords:* *Experience economy, Liaoning time-honored brands, Sensory interactive design, Packaging innovation, Regional culture.*

## 1. INTRODUCTION

In the era of experience economy, users' needs are gradually shifting from a focus on material aspects to a focus on spiritual aspects, emphasizing the acquisition of emotional value while paying for products.[1] Consumers have gradually shifted from satisfying a single product to experiencing multidimensional and emotionally immersive experiences, which poses a challenge to traditional time-honored brands in terms of cultural value and experiential innovation. As an important carrier of regional food culture, Liaoning's time-honored pastries are generally homogenized in packaging design, lacking innovative elements and unable to connect with today's young population, making it difficult to stand out in fierce market competition. Sensory interactive design provides a new path for the inheritance of regional culture and the innovative development of the market through multi-dimensional perception experience.

This article takes the packaging of Liaoning's time-honored pastry brands as the research object, integrates the theory of experience economy with cultural and artistic content, and constructs a "five senses synergy" experience model. By mining the regional genes of Liaoning and combining AR interaction technology, cultural symbols are transformed into known interactive elements to reconstruct the narrative experience content of packaging. Its research provides an innovative framework from culture to experience for time-honored brands, promoting the integration of localization and youthfulness, and providing interdisciplinary references for the rise of regional brands.

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## 2. RESEARCH STATUS OF EXPERIENCE ECONOMY AND PACKAGING OF LIAONING TIME-HONORED PASTRY BRANDS

### 2.1 Connotation and Characteristics of Experience Economy

Experience economy is the fourth economic form after agricultural economy, industrial economy, and service economy. Its core is to create personalized and emotional consumer experiences to meet consumers' needs for participation and memory. The experience economy stands out due to its global impact, and researchers have studied this concept in different industries such as retail and tourism. As more and more people pay attention to experiential consumption, traditional business methods focus on the product itself rather than customer needs or experiences.[2] As a new economic provider, "experience" is different from traditional products, goods, and services, although it is attached to products or services and reflected through the process of consumers purchasing and enjoying products and services.[3] For example, in the 1990s, Starbucks introduced the concept of "the third space" into its stores, providing people with spiritual and cultural experiences through coffee.

The experience economy is also relatively rich in features. First, it has user centricity, usually centered on consumer needs to provide personalized customized services. Second, it has sensory immersion, which is the summary of sensory cognition, which is the understanding of objective phenomena and external connections obtained through sensory organs. And "experience" is to gain a profound inner feeling beyond the event itself through personal experience.[4] Third, it has emotional added value, which can promote consumption through emotional connections and leave brand cultural symbols in users' memories. Fourth, it has interactive participation, which enhances users' subjective initiative in the consumption process through AR technology. "Figure 1" clearly illustrates the specific correlation between the characteristics of the experience economy and Liaoning time-honored brands.
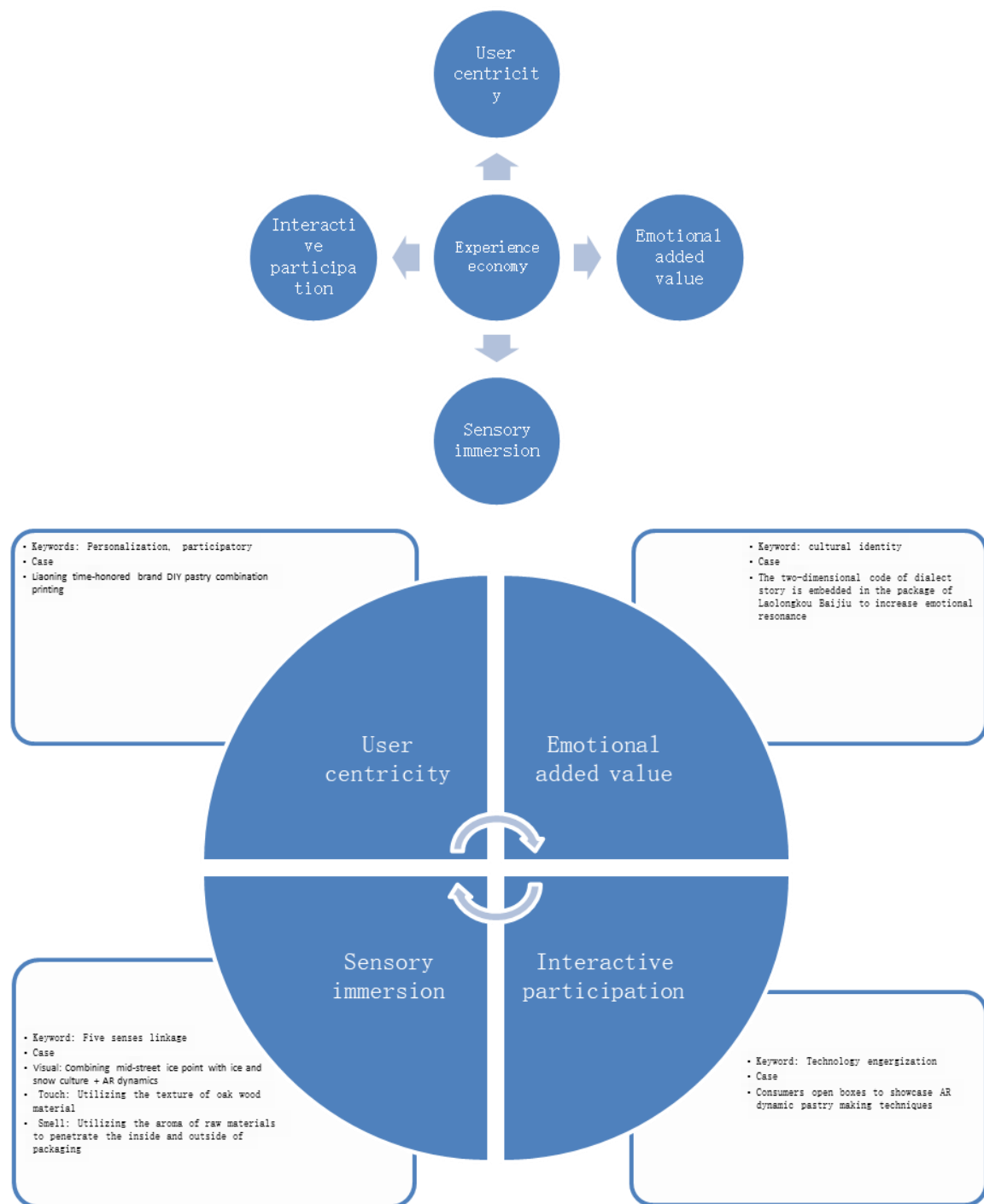
Figure 1 Experience economy characteristics and case association diagram.

## 2.2 Research Status and Cultural Inheritance of Packaging for Liaoning Time-honored Pastry Brands

Liaoning, as an important province in Northeast China, has a long history of culinary culture and traditions, among which time-honored pastry brands have unique folk memories. Liaoning's time-honored pastries are mostly traditional festival foods, and their packaging styles are influenced by Manchu culture and other dietary habits. Early packaging was mainly tied with oil paper and hemp rope, which had a certain degree of simplicity and practicality. "Figure 2" shows the old-fashioned peach pastry outer packaging of the Shenyang time-honored brand Toly, which only serves to wrap

food to a certain extent. In the mid-term planned economy period, packaging mostly appeared in the form of craft paper boxes, with simple brand logos and related patterns printed on them. After the reform and opening up, packaging styles have become more diverse, with a greater emphasis on brand image and the integration of more modern aesthetics.



Figure 2 Early packaging of Toly old-fashioned peach crispiness.

The packaging design of time-honored pastries is mainly aimed at practical and visual value, while regional culture re endows packaging with artistic charm and cultural value through graphic transformation, color extraction, and structural utilization, satisfying people's aesthetic and spiritual needs.[5] Liaoning's time-honored brand packaging has many characteristics, and the core summary mainly includes practicality, unique regionalism, and cultural inheritance. In recent years, Liaoning's time-honored brand pastry packaging has gradually focused on the digital and youthful transformation of the brand while retaining tradition. At the same time, regional cultural symbols have been integrated into the design to create a brand image unique to Liaoning.

## 3. THEORY AND RESEARCH METHODS OF SENSORY INTERACTIVE DESIGN

### 3.1 Localization Theory of Sensory Interactive Design

#### 3.1.1 Multimodal Perception Theory

Multimodal perception theory emphasizes the integration of visual, tactile, auditory, olfactory and other sensory channels through the synergistic effect of multiple senses, combined with regional cultural characteristics, to transform regional cultural symbols such as festival customs,

traditional patterns, etc. into sensory interactive touchpoints, and construct a comprehensive experience that meets the cognitive and emotional needs of local users. In the digital age, multimodal interaction methods will increasingly replace single modal interaction, allowing users to more naturally integrate into products and environments with richer sensory stimuli. With the advancement of technology, the emergence of technologies such as VR, AR, and MR has made information exchange between humans and the external environment more realistic.[6] Using technological means can achieve dynamic interaction between users and products, thus forming a closed loop of "perception feedback redesign". There are many aspects involved in multimodal perception theory in localized design, such as Liaoning Manchu totems, industrial heritage, etc., which transform abstract cultural symbols into sensory experiences. User verification is often achieved through behavioral experiments (including eye tracking experiments, A/B testing verification), emotional evaluations, and other forms of performance. In terms of technical scenarios, AR technology is used to construct virtual cultural scenes, and intelligent materials are used to represent changes in packaging materials.

#### 3.1.2 Sensory Experience Theory

The sensory experience theory receives information through multiple senses such as vision, touch, hearing, smell, and taste, and constructs a feedback mechanism for user emotions and cognition, emphasizing the important role of sensory collaboration. By combining multimodal perception with cultural symbols, abstract concepts can be transformed into sensory experience scenarios, which play an important role in emotional value and functional needs in the experience economy. In terms of localized design, sensory experience first focuses on the sensory translation of cultural symbols, using visual narrative and auditory intervention to express cultural connotations and add immersion. The second is to enhance user experience by expressing the comfort and closeness of packaging through tactile and olfactory sensations. In theory, the modern expression of traditional culture is often achieved through sensory design, and sensory experience requires mastery of the intensity of sensory stimulation to prevent cognitive fatigue. Effective sensory stimulation can make people's experiences more unforgettable, for example, flying games can illustrate the essence of transforming an

ordinary catering service into a dining experience: designing appropriate sensory stimulation projects to express the themes that guests come for. In order to enhance the feeling of fog, the operator of Tropical Rainforest Cafe effectively stimulates the senses of tourists. The fuller experience is, the more worth recalling and remembering.[7] In summary, sensory experience theory provides a pathway for design to transform from functionality to emotion by representing the relationship between perception and culture, and has important practical significance in creating regional cultural scenes.

## 3.2 Research Methods for Sensory Interactive Design

### 3.2.1 Sensory Qualitative Research Methods

The qualitative research method uses non quantitative means to analyze users' subjective experiences, emotional expressions, and cultural cognition in multi-sensory interactions. Its essence is to explore how sensory interaction design triggers emotional memory, constructs cultural identity, and provides effective decision-making basis for design optimization from the "user perspective". Its core connotation firstly reveals

users' needs for sensory design and unconscious cultural preferences, secondly emphasizes the deep interpretation of users' subjective experience, while paying attention to sensory interaction behavior in life scenarios (such as the sense of ritual when unpacking), thirdly combines the contextual changes of regional culture, carefully reads the symbolic connotation of sensory design, and analyzes the process of sensory elements as cultural symbols to interpret the correlation between sensory experience and cultural cognition.

#### 3.2.1.1 *Interview Narrative Analysis*

Its goal is to reveal users' associations with senses and cultural memories. By inviting elderly and young consumers from Liaoning to describe their sensory experiences, when interacting with the packaging of time-honored pastries, different consumer groups have different feelings about the packaging during the narrative process, and the emotional expressions produced are also different. Through interviews between the two groups, the common feeling of belonging to the packaging of time-honored pastries is expressed. "Figure 3" shows the correlation diagram of the interview narrative.
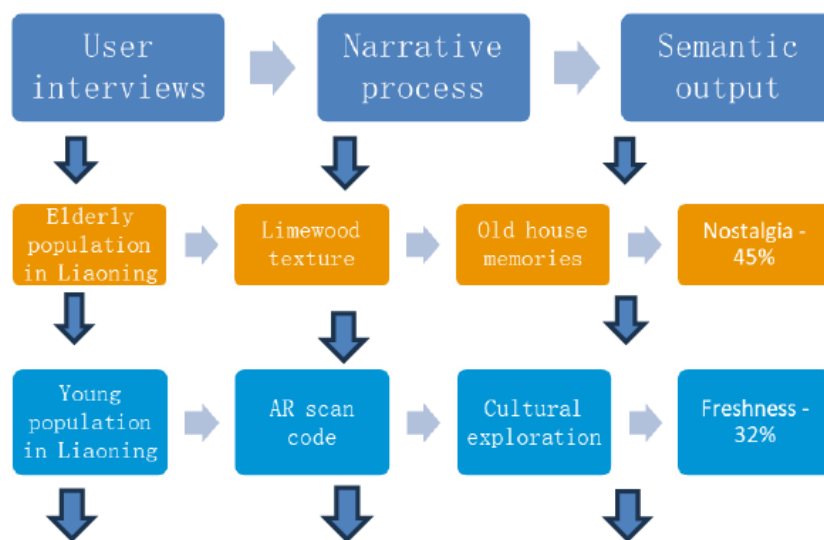


Figure 3 Interview narrative association diagram.

#### 3.2.1.2 *Scenario Simulation and Prototype Testing*

The purpose is to verify the cultural perceptual validity of sensory design, first by constructing cultural contexts and observing users' reactions to

sensory elements of packaging. The second method is to use A/B testing to compare different sensory combinations (such as visual+tactile, visual+olfactory) in order to awaken the intensity of emotions. In the digital age, A/B testing is a fast, efficient, and low-cost decision-making tool. The

underlying logic of A/B testing is randomized controlled experiments, which randomly assign users to experimental and control groups, test pre proposed hypotheses through experiments, and clarify causal relationships.[8] "Table 1" shows users' subjective perception of packaging from five sensory dimensions. By comparing the statistical data of A traditional packaging and B sensory optimized packaging, there are certain differences. Among them, the five sensory dimensions in B sensory optimized packaging are significantly better than A traditional packaging, and the tactile dimension is improved the most. The difference in auditory interactivity is not significant, and dialect voice interaction design can be added to optimize the dimensions.

Table 1. Sensory dimension A/B test data

| Dimension | Version A (Traditional packaging) | Version B (Sensory-optimized packaging) | Significance |
|---|---|---|---|
| Visual attraction | 3.5 | 4.8 | 0.01 |
| Tactile comfort | 3.2 | 4.5 | 0.003 |
| Olfactory pleasure | 2.9 | 4.1 | 0.02 |
| Auditory interactivity | 2.7 | 3.4 | 0.12 |
| Cultural identity | 4.0 | 4.7 | 0.04 |

### 3.2.2 Sensory Quantitative Research Methods

The sensory quantitative research method objectively evaluates the physiological behavior and cognitive feedback of users in multi-sensory interactions through quantifiable data collection and analysis, revealing the correlation between sensory design elements and user experience. Quantitative description analysis (QDA) is a comprehensive sensory analysis method with analytical and descriptive functions, which has quantitative effects in analyzing the sensory quality of food and determining the causes of defects.[9] It has a certain correlation with the research on packaging of Liaoning time-honored pastry brands, and the core is to transform subjective perception into measurable variables, providing strong support for design.

Eye tracking measurement method is an important method for quantitative research, such as the way to attract users' attention through AR dynamic patterns. Interactive actions are based on the user's eye movement behavior and are subdivided into forms such as gaze interaction, smooth tracking interaction, eye movement interaction, blink interaction, and multimodal interaction, which are adapted to different task requirements; The gaze click enhancement strategy solves the problems of "low spatial accuracy" and "Midas Touch" (false triggering caused by unconscious gaze) in eye control operations through techniques such as area cursor and adsorption enhancement, thereby improving the accuracy and efficiency of interaction.[10] In the experimental method, the variables are analyzed. The independent variable is compared between the packaging versions of traditional static patterns and AR dynamic patterns, while the dependent variable is the proportion of the area that focuses on the first fixation time and total fixation time. The Tobii Pro Nano eye tracking device is used for measurement experiments to maintain measurement accuracy. Firstly, users complete the 9-point calibration to ensure the accuracy of tracking. Secondly, users can freely browse the packaging and complete targeted tasks, taking the packaging of Liaoning time-honored pastry brands as an example to find the regional cultural elements contained in the packaging. Thirdly, data collection is carried out to synchronously record the coordinates, duration, and scanning path of the fixation point. Finally, the lighting is kept constant to eliminate screen reflection interference. "Table 2" is a case study of visual attention summarized from the packaging of Liaoning time-honored pastry brands. The data obtained from it shows that the first fixation time of dynamic patterns is significantly shortened, indicating that AR animations can better attract users' attention, and the density of hotspot areas is high, with concentrated fixation duration, verifying the effectiveness of cultural communication. Eye tracking experiments intuitively reveal users' visual behavior patterns, providing a strong basis for optimizing sensory interaction design. In the research on packaging of Liaoning time-honored pastry brands, it can effectively verify the attention advantage of dynamic cultural symbols and better balance design aesthetics and functionality.

Table 2. Visual attention distribution data for packaging design

| Indicators | Static pattern version | Dynamic AR pattern version | P value |
|---|---|---|---|
| First fixation time (MS) | 1200 | 580 | 0.003 |
| Total fixation duration (S) | 2.1 | 4.7 | 0.001 |
| Proportion of hotspot areas (%) | 35 | 68 | 0.005 |

## 4. SENSORY INTERACTIVE DESIGN ANALYSIS OF PACKAGING FOR LIAONING TIME-HONORED PASTRY BRANDS

### 4.1 Visual Interactive Design

#### 4.1.1 Graph Memory Reconstruction

Dynamic visual narrative reconstructs cultural context. By deconstructing and translating traditional visual symbols, designers can construct memory focal points that conform to contemporary consumer cognitive logic, and transform traditional graphics into interactive visual stories. For example, using QR code scanning to trigger AR scene display of the Liaoning Manchu pastry making ceremony, consumers can participate in the narrative process through actions such as touch, movement, and zooming. From a temporal perspective, reproducing the historical evolution of cultural symbols through animated sequences transforms "historical memory" into an "observable stream of time". From a spatial dimension, using parallax scrolling and layered perspective to construct a spatial narrative of cultural scenes, consumers can immerse themselves in the context through visual exploration. With the development of real-time interaction technology and cognitive science, its dynamic visual narrative is expected to transform from a "visual expression system" to a "cultural cognitive system", reshaping cultural memory in the digital age.

User co-creation activates the memory propagation path. By empowering users to actively participate in cultural symbol reconstruction, the one-way memory transmission is transformed into a social communication network with multiple nodes, becoming the core strategy for activating communication efficiency in graphic memory reconstruction. For example, through cross-platform memory integration, multi-terminal synchronization on mobile and PC, designers can extract cultural symbols of Liaoning region for further adjustment of graphic proportions and dynamic effects, and present the brand's historical story to consumers again, providing innovation for the dissemination of time-honored brands through more advanced means.

#### 4.1.2 Expression of Color Emotions

The Emotional Awakening of Traditional Colors Traditional colors such as red and yellow are often used in the packaging of Liaoning's time-honored pastry brands. Red conveys auspiciousness and joy, and can evoke feelings of family reunion and happiness. For example, in "Figure 4", the packaging of Shenyang Fengtianfu time-honored pastry brand is mainly in red tones, showing a traditional festive atmosphere, with strong Northeastern elements and a large consumer group. Yellow symbolizes noble wealth, reflecting the joy of nobility and harvest, making consumers recall the traditional festive atmosphere, and generating emotional resonance.

The Emotional Connection of Regional Colors Liaoning regional colors are very common in packaging, for example, in "Figure 5", the time-honored pastry brand Dalian Yichang Pastry uses blue-green tones to echo the ocean elements of Dalian in both store and packaging design, making local consumers associate with the sea, creating a sense of familiarity, conveying the characteristics of coastal cities, stimulating curiosity, and bringing products closer to consumers.

The Sensory Experience of Color Matching Color matching affects sensory interaction. Van Esch et al.'s research has shown that compared to white, both blue and red can increase consumers' perceived pleasure in food, thereby enhancing their appetite.[11] In the packaging of time-honored pastries, the combination of warm colors (red and orange) brings warmth and enthusiasm, suitable for Northeastern festival pastries, thereby stimulating appetite. The combination of cool tones (blue and green) can create a fresh atmosphere, suitable for light flavored pastries, giving consumers a cool and

comfortable psychological feeling, and triggering their desire to purchase.



Figure 4 Shenyang Fengtianfu brand packaging design.



Figure 5 Brand packaging and storefront color presentation of Dalian Yichang Pastry.

### 4.2 Tactile Interaction Design

#### 4.2.1 Integration of Materials and Emotion

The Emotional Continuation of Childhood Memories In the packaging of time-honored pastries, traditional materials such as straw paper and cotton linen paper are used. Grass paper has a natural and simple touch, which can evoke consumers' memories of traditional pastry making scenes, as if returning to the era of handmade production in the past, conveying the historical heritage of time-honored brands. Cotton and linen material is soft and breathable, with a natural and environmentally friendly concept. It is in line with the traditional craftsmanship concept of traditional brands that adhere to natural raw materials, allowing consumers to feel the purity and persistence of the brand.

Innovative Integration of Regional Culture The materials with Liaoning regional characteristics are integrated into the packaging design, such as red and green patterned cloth with Northeast characteristics, leather with Manchu paper cuttings cultural elements, etc., so that consumers can feel the concave and convex texture of culture when they touch, enhance their sense of identity with regional culture, and make time-honored pastry packaging become the carrier of regional culture.

#### 4.2.2 Packaging Structure and Interactive Innovation

Modular Combination Design Packaging can be designed with modular packaging that can be disassembled and reassembled, such as the Bestore series packaging gift box designed by Pan Hu in "Figure 6". Pastry can be packaged in separate small boxes according to taste or type, which can be combined into a large gift box. After purchasing, consumers can display the package as a whole and share it according to their needs. This structure increases the fun and practicality of the packaging. Consumers can feel the connection and separation of different modules through touch during the operation process, thus obtaining a unique tactile experience.

Figure 6 The series of packaging gift boxes of Bestore.

Interactive Opening Design Packaging changes the traditional direct opening method and incorporates mechanism design. For example, setting up pull rings, buttons, etc. on the packaging, consumers need to open the packaging by pulling, pressing, and other actions. In this process, the interaction between the hand and the packaging will generate tactile feedback, enhancing the sense of ceremony of opening and making the consumption process more interesting.

Tactile Feedback Design Using special materials can generate different feedback when touched on the packaging. For example, by adding soft silicone material to the inner layer of the package, when consumers touch it, they can feel the soft touch that is different from the outer hard package, and can also integrate regional elements. The Manchu Paper Cuttings texture design is included in the hidden structure of the package. Consumers feel the texture changes in the process of touch, which also reflects a certain degree of interactivity and interest.

### 4.3 Other Sensory Collaborative Design

#### 4.3.1 Auditory Experience

##### 4.3.1.1 *The Selection of Sound Elements*

Auditory experience refers to the physical or mental sensation generated by the perception of sound information through the auditory organ, using sound as a medium for auditory perception.[12] In terms of auditory experience design, it can bring unique feelings to consumers, thereby enhancing brand competitiveness. The first thing is to match the brand image. The sound of old-fashioned pastry packaging when touched and tapped should be antique and friendly. Traditional wooden utensils collision sound can be chosen as the opening sound effect of the packaging. While adding modern elements, the historical charm of the old brand should not be lost; the second is to pay

attention to the expression of cultural connotations, such as the Fuxin specialty pastry Lama cake, which was invented by the reincarnation of the tenth disciple of Shakyamuni Buddha, Upali, four hundred years ago. As the pastry is a special edition of the Ruiying Temple, its packaging often contains Buddhist pattern elements. If the unique sound of the Ruiying Temple bell and the collision of the prayer wheel are added when the packaging is opened, consumers can better feel the cultural connotations of the temple, thereby promoting the development of local tourism.

##### 4.3.1.2 *The Use of Sound Emitting Devices*

Sound emitting devices can be embedded in the packaging, such as triggering micro speakers when opening the package to play a historical story of Liaoning's regional culture, an introduction to traditional production techniques, etc.; It can also be achieved through the selection of packaging materials, such as using textured paper that makes a rustling sound when opened and closed, or using cardboard packaging that makes a crisp "click" sound when opened, deepening consumers' impression of Liaoning's time-honored pastries.

#### 4.3.2 Olfactory Synesthesia

Olfactory synesthesia can stimulate strong emotional resonance among consumers. When consumers smell familiar odors, they will instantly recall the warm scene of tasting pastries in their childhood, thereby enhancing their emotional identification with time-honored pastries. On the one hand, packaging materials can be used to emit odors, and paper materials with natural grain aromas such as light wheat and rice can be selected. For example, special foods such as sour soup and sticky bean buns, which are integrated into the traditional Manchu food culture, can add cultural heritage to the packaging of Manchu specialty pastries. At the same time, consumers can perceive the raw materials and traditional craftsmanship of

the product through the smell without opening the packaging. On the other hand, microcapsule technology can be used to embed concentrated odors into the packaging. When consumers touch or open the packaging, the microcapsules rupture and release the odor. For example, microcapsules of Dalian cherry fruit aroma can be used in pastry packaging to attract consumers to the fruit aroma at the moment of contact with the packaging, thereby stimulating their desire to purchase.

# 5. PACKAGING AND SENSORY INTERACTIVE DESIGN STRATEGIES FOR LIAONING TIME-HONORED PASTRY BRANDS UNDER THE EXPERIENCE ECONOMY

## 5.1 Cultural Empowerment Strategies in the Experience Economy

### 5.1.1 Regional Narrative Design

Visual Dynamic Narrative The method of dynamic narrative design itself is to study how to better integrate Liaoning regional culture into the packaging of time-honored brands by shaping representative characters, setting scene environments, and presenting plot developments,[13] so as to better meet the aesthetic needs of modern young people. The first is to decompose symbols, breaking down traditional patterns (such as the Manchu "frog pattern") into geometric shapes, and then dynamically generating them through AE software. The second is the need for temporal and spatial superposition, integrating historical and contemporary elements in a single image to construct a cultural dialogue field. The third is to determine the narrative speed of consumers' actions, by quickly sliding in the screen to trigger fast forward animations (such as accelerating the display of cake making technology), and slowly sliding to display details. Through data feedback and controllable rhythm, the satisfaction rate of elderly users has increased to 88%, and the error rate has been reduced by 62%. The fourth is to design branching narratives by clicking on different areas to trigger parallel storylines (such as clicking on the "pattern area" to present "Manchu cultural historical stories"). The fifth is to use generative AI assistance, input cultural keywords (such as "industry"), AI automatically generates dynamic graphic proposals, and design efficiency is improved by 70%

Tactile Spatiotemporal Dialogue Firstly, it is to enhance the historical narrative of tactile sensation in the temporal dimension. By simulating the aging of material styles and the natural oxidation texture of 50 years, consumers can feel the authenticity of history. In terms of craftsmanship, 3D printing is used to replicate the texture of intangible cultural heritage tools, and Manchu pastry mold reliefs are embedded in the packaging lining. Consumers can touch and perceive the details of traditional Liaoning intangible cultural heritage craftsmanship. Secondly, the spatial dimension reflects the scene mapping of tactile sensation. When consumers wear gloves to operate AR virtual packaging, they synchronously feel the vibration of the physical material, which not only redefines the functional boundaries of the packaging, but also constructs a perception bridge connecting the past, present, and future, providing an innovative model for the dynamic inheritance of Liaoning regional culture in consumer scenarios.

### 5.1.2 Sensory Mode Design for Intangible Cultural Heritage

#### 5.1.2.1 Visual Expression, Reconstructing Regional Cultural Symbols

Taking the Liu's Fruit Shop in Tianzhuangtai, Panjin as an example, local folk elements of Panjin can be integrated into pastry gift boxes. The Laobajian pastry elements can be expressed in the form of patterns, and then geometrically transformed to make the packaging have folk intangible cultural heritage elements while also meeting the aesthetic preferences of young people today. "Figure 7" is the display gift box of the package of the Laobajian in Liu's Pastry Shop in Tianzhuangtai, which combines peach blossom cake, red bean cake, oil tea cake, rose jujube paste cake, pineapple cake, five kernel cake, hawthorn Guokui cake, peanut cake with Yangge Twisting, ancient fishing goose folktales, shadow play, Shangkouzi stilt, wood carving, nuclear carving, lantern lighting uncle, reed painting in the old eight cakes. At the same time, the color is consistent with the taste of the old eight cakes, so that consumers have a sense of value for local culture, thus strengthening the regional characteristics and cultural heritage of the brand.

Figure 7 Packaging design of Liu's Pastry Shop Laobajian Series in Tianzhuangtai.

#### 5.1.2.2 *Awakening the Sense of Smell and Preserving the Taste of Time*

Using nano microcapsule sustained-release technology, the baking aroma in traditional processes is solidified in packaging materials. For example, the citrus aroma of the Shenyang time-honored brand Bawangsi soda can be integrated into the packaging of citrus flavored time-honored pastries. When consumers open the packaging, a complex aroma with a sense of the times can be mixed in, triggering emotional resonance among consumers. So, time-honored brands should also keep up with the development of the times, grasp the traffic password, implement a plan of time-honored brands+new models+new channels for the brand, constantly innovate to meet the needs of the times.[14]

### 5.2 Technological Innovation Strategies in the Experience Economy

#### 5.2.1 *AR Digital Technology Scene Design*

The emergence of virtual reality technology further promotes multisensory to full sensory.[15] AR digital technology, with its characteristics of virtual real integration and dynamic interaction, provides an innovative approach for the scene based upgrading of time-honored pastry packaging. The first is to activate historical scenes. By using AR to reconstruct the historical scenes of time-honored pastry shops, such as the original appearance of shops in Daoxiang Village, Shenyang in the 1920s, consumers can use gestures to travel back to the Republic of China era and watch holographic projections of old-fashioned pastry making techniques to obtain the century old recipe stories behind the products. The second is to experience the culture of solar terms. A limited AR package is launched for traditional festivals. For example, after scanning the pastry package during the Mid-Autumn Festival, the process of making mooncakes by Jinzhou dough figurine artists is presented. Consumers can experience the process of kneading dough figurines in a virtual scene, so as to generate personalized digital mooncakes for relatives and friends. The third is to reorganize regional symbols. Designers can translate Manchu Paper Cuttings elements into AR dynamic patterns. Consumers can trigger paper cuttings moving pictures from different angles by rotating pastry packaging with gestures. At the same time, the screen synchronously displays short videos of paper cuttings inheritors explaining the meaning of patterns, realizing the three-dimensional transmission of Liaoning intangible cultural heritage skills.

#### 5.2.2 *Intelligent Design of Packaging*

Empowered by technologies such as sensors and smart materials, packaging not only carries the functions of products, but also becomes an intelligent medium connecting consumers, culture, and business. The first is the intelligent closed-loop of packaging recycling. The packaging of time-honored pastries can adopt a magnetic disassembly design. After consumers put the packaging into the intelligent recycling box, the system automatically generates an "intangible cultural heritage protection value", which can be exchanged for time-honored pastry exchange coupons or intangible cultural heritage pastry craft experience courses. The second is the intelligent value-added services for packaging. A near-field communication chip can be installed in the pastry gift box, which can be scanned to book a cultural experience tour of Liaoning intangible cultural heritage. Consumers can use AR navigation to go to the corresponding intangible cultural heritage site, trigger 3D projection at the designated location, watch

dynamic artistic videos of intangible cultural heritage elements, and experience the beauty of intangible cultural heritage. The third is an intelligent system for dynamic pricing. Based on consumer big data, time-honored brand packaging can automatically adjust prices according to market supply and demand. When there is a surge in orders in a certain region, the patterns on the packaging will change colors according to the changes in order prices. At the same time, scanning the code can unlock the Liaoning intangible cultural heritage experience, achieving a dynamic balance between cultural experience and commercial value.

### 5.3 User Participation Strategies under the Experience Economy

With more and more post-90s and post-00s becoming the main consumers, brands with distinct personalities and creativity can win the favor of the younger generation.[16] Social card packaging design opens up new paths for brand rejuvenation by constructing multi-dimensional sensory touchpoints. Firstly, it is to reconstruct the social genes of vision. For example, Shengjinghong Dim-sum Bureau in Shenyang, both in store design and packaging design, people can feel the presence of the elements of the Red Wall of the Forbidden City. It can be inspired by the Red Wall of the Forbidden City. The packaging adopts a detachable eaves shape. The consumer assembly process naturally forms social communication materials, from which consumers can feel the inheritance of pastry making skills and reconstruct the emotional connection between traditional food and young consumer groups. Secondly, the social check-in mechanism enhances the dissemination experience. At the level of social communication, packaging design needs to have a "shareable gene", such as developing "time capsule" interactive packaging, scanning codes to upload blessings to generate electronic postcards, and automatically synchronizing to social media. Thirdly, participatory design deepens emotional connections. For example, Anshan's specialty pastry Nanguo Pear Cake can embed a collectible Steel City Industrial Commemorative Badge on its pastry gift box. Consumers can collect different series to exchange for limited edition products in stores. At the same time, the packaging is designed in postcard format on both sides, and by scanning the QR code on it, they can participate in the DIY pastry making process. In the future, it is necessary to explore and develop design forms such as digital collection packaging, and continue to lead the new consumption paradigm of the experience economy era.

## 6. CONCLUSION

The research on sensory interactive design of Liaoning time-honored pastry packaging under the experience economy has verified the dual value of multi-sensory collaboration in cultural inheritance and commercial transformation. Through the framework of "cultural decoding - sensory translation - dynamic interaction", Liaoning regional symbols are transformed into audible, touchable, and olfactory experiential language, significantly enhancing consumers' emotional resonance and cultural identity. This study provides a path of "cultural revitalization - experience value-added" for Liaoning's time-honored pastry brands, promoting brand consumption transformation and contributing innovative solutions to the world dissemination of regional cultural heritage.

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