

## Retraction

# Retracted: Precision Marketing and Brand Communication Model Using Particle Swarm Optimization Algorithm

### Mobile Information Systems

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This article has been retracted by Hindawi following an investigation undertaken by the publisher [1]. This investigation has uncovered evidence of one or more of the following indicators of systematic manipulation of the publication process:

- (1) Discrepancies in scope
- (2) Discrepancies in the description of the research reported
- (3) Discrepancies between the availability of data and the research described
- (4) Inappropriate citations
- (5) Incoherent, meaningless and/or irrelevant content included in the article
- (6) Peer-review manipulation

The presence of these indicators undermines our confidence in the integrity of the article's content and we cannot, therefore, vouch for its reliability. Please note that this notice is intended solely to alert readers that the content of this article is unreliable. We have not investigated whether authors were aware of or involved in the systematic manipulation of the publication process.

Wiley and Hindawi regrets that the usual quality checks did not identify these issues before publication and have since put additional measures in place to safeguard research integrity.

We wish to credit our own Research Integrity and Research Publishing teams and anonymous and named external researchers and research integrity experts for contributing to this investigation.

The corresponding author, as the representative of all authors, has been given the opportunity to register their agreement or disagreement to this retraction. We have kept a record of any response received.

### References

- [1] T. Xue and Q. Hu, "Precision Marketing and Brand Communication Model Using Particle Swarm Optimization Algorithm," *Mobile Information Systems*, vol. 2022, Article ID 6419665, 14 pages, 2022.

## Research Article

# Precision Marketing and Brand Communication Model Using Particle Swarm Optimization Algorithm

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In order to deeply study the macroenvironment, current situation, and the core elements affecting the operation of the product brand system, this paper further improves the product brand communication system from the perspective of precision marketing. Taking JR company's big cake products as the research object, this study proposes an accurate positioning optimization algorithm based on particle swarm optimization algorithm. Through the experiment of increasing the number of nodes of different algorithms, it is found that the average positioning error will decrease with the increase of the number of nodes under different algorithms. Compared with WSSPCO positioning algorithm, the average error of PSO positioning algorithm is reduced by about 30% due to the number of nodes, and the impact of node density on positioning accuracy is also reduced by about 40%. This algorithm can better achieve accurate positioning. Therefore, it is concluded that product brand communication based on precision marketing should pay attention to accurate positioning, further integrate brand communication channels, and build personalized communication channels.

## 1. Introduction

If any brand wants to realize precision marketing, a necessary prerequisite is to really clarify the target customer positioning corresponding to the enterprise's products or services. On this basis, it makes a comprehensive and general description of the products or services, fully displays the functions and values of the products in front of consumers, and enables the market customer group to understand the products or brands of the enterprise in an all-round way. The accurate brand strategy can provide consumers with more suitable and personalized demand services to the greatest extent. Accurate brand positioning can further improve brand recognition, stand out in the homogeneous market product group, and gradually form its own brand characteristics. Therefore, for enterprises, it is necessary to clarify the characteristics of their products or services and find the market target customer group from the product attributes, so as to more efficiently convey the buying points of products and further expand the market share, as shown in Figure 1.

## 2. Literature Review

In the 1980s, foreign scholars put forward the concept of competitive advantage. The two basic forms of competitive advantage are low cost and ambiguity, and the latter is the theoretical source of differentiated competition. Porter pointed out that the combination of the two basic forms of competitive advantage and the scope of activities for enterprises to seek to obtain this advantage can guide three basic strategies to create higher than average operating performance in the industry: total cost leadership strategy, standard differentiation and innovation strategy, and target agglomeration strategy. Many famous scholars believe that, in fact, the essence of the three competitive strategies is differentiation strategy, but the basis of differentiation is different. Total cost leadership strategy is a differentiation strategy based on low price, standard differentiation strategy is a differentiation strategy based on providing differentiated products or services, and target concentration strategy is a differentiation strategy based on market segmentation. Differentiation strategy requires enterprises to choose one or

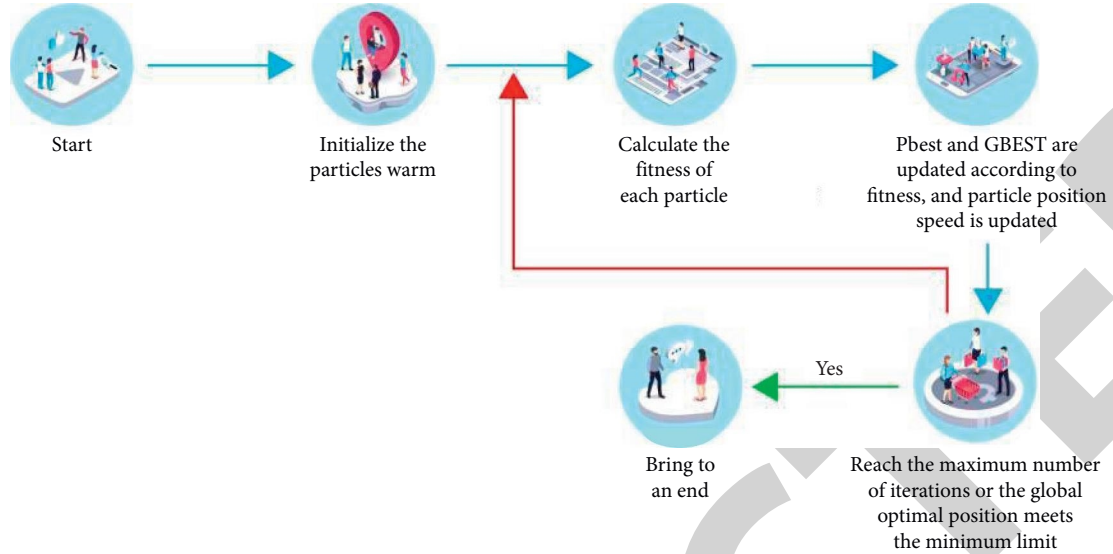


FIGURE 1: Particle swarm algorithm for accurate marketing.

more characteristics that are different from their competitors and make their business unique and choose a unique position for them to meet the requirements of consumers. Because of their unique position, they receive premium compensation.

Brand positioning research: In the research on brand positioning, some scholars put forward that brand is all the knowledge and association of consumers about the brand, which exists in the minds of consumers. Brand positioning is to determine a unique position in the minds of consumers, distinguish the brand from competitive brands, or connect the specific needs and goals of brand consumers. There are two main ways of brand positioning: competitive positioning and target positioning. No matter which way is adopted, enterprises can answer the questions of who the brand faces and what benefits it provides from a strategic height through the positioning statement, so as to coordinate the marketing activities inside and outside the enterprise and ensure the consistency of positioning [1].

The research on marketing channel management analyzes the basic characteristics of marketing channels of local enterprises and the evolution path of channel management mode of local enterprises. It is considered that the diversification and flattening of marketing channels have become the inevitable pattern of local enterprises, and the era of relying on a single channel to win has become the past. In the increasingly competitive and buyer driven market, enterprises should not only obtain cost advantages through channel flattening, but also strengthen the understanding and control of the target market and enhance the competitiveness of enterprises by realizing channel flattening. In terms of channel model innovation, it puts forward two directions: (1) Pay attention to customer experience and customer value; promote the transformation from “competition orientation” to “customer orientation” and from “transaction orientation” to “relationship orientation”. (2) Pay attention to strategic channel partnership, focus on cultivating

customer loyalty, and promote long-term cooperation and multiple transactions [2].

### 3. Modeling of Particle Swarm Optimization Algorithm

*3.1. Principle of Particle Swarm Optimization Algorithm.* PSO algorithm first initializes the random coordinates of a random particle in three-dimensional space. Each particle is regarded as a particle without volume and mass but has its own position and flies at a certain speed. The algorithm dynamically adjusts the parameters according to the flight experience of the particle itself and its companions and obtains the optimal solution through iteration [3].

Suppose the position and velocity of the  $i$ -th particle in the  $d$ -dimensional search space are (1) and (2), respectively:

$$X_i = (x_{i,1}, x_{i,2}, \dots, x_{i,D}), \quad (1)$$

$$V_i = (v_{i,1}, v_{i,2}, \dots, v_{i,D}). \quad (2)$$

Particles update themselves by tracking the individual optimal value and the global optimal value  $g_{best}$ . When finding the optimal position of the particles according to formulas (3) and (4), update the two values according to the new velocity. When the algorithm is executed to the preset maximum number of iterations or the position of the optimal solution currently searched by particle swarm optimization meets the predetermined minimum fitness threshold, the iterative calculation is stopped and the current global optimal solution is output [4].

$$v_{k+1} = wv_k + c_1(p_{best_k} - x_k) + c_2(g_{best_k} - x_k), \quad (3)$$

$$x_{k+1} = x_k + v_{k+1}, \quad (4)$$

where  $v_k$  is the velocity vector of the particle;  $x_k$  is the position of the current particle;  $x_k$  is the position of the optimal solution found by the particle itself;  $g_{best_k}$  is the position of the optimal solution currently found by the whole population;  $v_{k+1}$  is the vector sum of  $v_k$ ,  $P_{best_k} - x_k$ , and  $g_{best_k} - x_k$ . Inertia weight is generally a random number between (0,1), which is used to maintain the motion inertia of particles and make them have the ability to expand the search space. When it takes a larger value, it is conducive to jump out of the local minimum, and when it takes a smaller value, it is conducive to the convergence of the algorithm [5].

### 3.2. Algorithm Optimization of Particle Swarm Optimization Algorithm in Node Location

**3.2.1. Optimization of Inertia Weight.** In the later stage, due to the reduction of the search range, a smaller inertia weight is used to improve the local search ability to speed up the convergence speed. That is, the value of  $w$  decreases linearly with the time of iteration. In this paper, the inertia weight  $w$  is designed as a function of the number of iterations and decreases linearly with the number of iterations, that is, as shown in the following formula:

$$w = w_{\max} - k(w_{\max} - w_{\min})/k_{\max}, \quad (5)$$

where  $w_{\max}$  and  $w_{\min}$  are the initial and termination inertia weights and  $k_{\max}$  is the maximum iterative algebra.

By linearly reducing the inertia weight, the larger inertia weight in the early stage can improve the global search ability, and the smaller inertia weight in the later stage can speed up the convergence speed. By adjusting the step size, the optimal solution can be obtained faster and better. A large number of experiments show that the inertia weight  $w$  will decrease linearly with the increase of the number of iterations. When  $w$  gradually decreases from 0.9 to 0.4, the algorithm can achieve better optimization results. Therefore, the values of  $w_{\max}$  and  $w_{\min}$  in this paper are 0.9 and 0.4, respectively.

**3.2.2. Mixed Disturbance Optimization.** In the three-dimensional space, first establish a three-dimensional coordinate system with a specific point as the coordinate origin (0,0,0). The xoy plane is parallel to the horizontal plane, and the oz axis is perpendicular to the xoy plane. It is known that the coordinates of N beacon nodes in this coordinate system are as shown in the following formula:

$$Ai(xi, ti, zi), i = 1, 2, \dots, N. \quad (6)$$

Thus, a set of nonlinear equations can be established, as shown in the following formula:

$$\begin{cases} (x - x_1)^2 + (y - y_1)^2 + (z - z_1)^2 = r_1^2 \\ (x - x_2)^2 + (y - y_2)^2 + (z - z_2)^2 = r_2^2 \\ \dots\dots \\ (x - x_n)^2 + (y - y_n)^2 + (z - z_n)^2 = r_n^2 \end{cases} \quad (7)$$

According to the particle swarm optimization algorithm, the positioning equations of formula (8) are established:

$$\begin{cases} f_1(x, y, z) = \sqrt{(x - x_1)^2 + (y - y_1)^2 + (z - z_1)^2} = r_1, \\ f_2(x, y, z) = \sqrt{(x - x_2)^2 + (y - y_2)^2 + (z - z_2)^2} = r_2, \\ \dots\dots \\ f_n(x, y, z) = \sqrt{(x - x_n)^2 + (y - y_n)^2 + (z - z_n)^2} = r_n. \end{cases} \quad (8)$$

The key problem of particle swarm optimization algorithm is to select individual extremum and global extremum according to the fitness value of each particle. The fitness value in this paper is calculated by the following formula:

$$fit_i = \begin{cases} r_i, & r_i \leq R, \\ \infty, & r_i > R. \end{cases} \quad (9)$$

Previous studies usually used logistic mapping to generate mixed pure disturbance, but according to the conclusion of the literature, the ergodic hook of tent mapping is better than that of mapping, and higher search and optimization efficiency can be obtained. Therefore, this paper uses tent mapping as the mixed pure disturbance generator, and its expression is shown in the following formula:

$$x_{k+1} = \begin{cases} 2x_k, & 0 \leq x_k \leq 1/2, \\ 2(1 - x_k), & 1/2 \leq x_k \leq 1. \end{cases} \quad (10)$$

In WSN, in order to improve the node location accuracy of wireless sensor networks based on ranging, this chapter proposes to use WCSPOS algorithm for node location. POS algorithm is a method to search the global optimal solution through the interaction of the whole group. The algorithm is relatively simple, and the convergence speed is relatively fast. The biggest advantage is that particle swarm optimization algorithm has strong global optimization ability and less parameters to be controlled than other optimization algorithms. Therefore, the algorithm can effectively reduce the influence of error accumulation in the positioning iteration cycle. In addition, the particle swarm optimization is optimized and improved by using the three characteristics of randomness, ergodicity, and regularity of hybrid, so as to further approach the optimal solution [6].

**3.3. Simulation and Analysis.** In the simulation experiment, all sensor nodes are randomly distributed in the square area of 100m × 100 × 100 m. Set the total number of nodes in the network as 100, and the communication radius of nodes is the same. The main parameters used in algorithm simulation are shown in Table 1.

Number of nodes N: 100, proportion of beacon nodes: 5%–30%, node communication radius: 20 m, maximum number of iterations  $k_{\max}$ : 100, initial inertia weight: 0.9, termination inertia weight: 0.4, acceleration weight: 2, maximum speed: 0.4.

Setting of parameters used in simulation:

TABLE 1: Simulation environment parameters.

Main parameter	Parameter value
Number of nodes	100
Beacon node proportion	5%–30%
Node communication radius	20 m
Maximum iteration algebra $K_{\max}$	100
Initial inertia weight $W_{\max}$	0.9
Terminate inertia weights $W_{\min}$	0.4
Acceleration weight $c1, c2$	2
Maximum speed $V_{\max}$	0.4

The positioning error refers to the distance between the estimated position and the actual position of the node. The calculation formula is shown in the following formula:

$$P_{Error} = \sqrt{(x_i - \hat{x})^2 + (y_i - \hat{y})^2 + (z_i - \hat{z})^2}, \quad (11)$$

where  $P_{Error}$  is the positioning error of the node.

In order to evaluate the performance of the positioning algorithm as a whole, we can measure the average positioning error, which is shown in the following formula:

$$AVE = \frac{1}{N} \sum_{i=1}^N \sqrt{(x_i - \hat{x}_i)^2 + (y_i - \hat{y}_i)^2 + (z_i - \hat{z}_i)^2}, \quad (12)$$

where  $(\hat{x}_i, \hat{y}_i, \hat{z}_i)$  is the measurement position of the node to be measured,  $(x_i, y_i, z_i)$  is the actual position of the node to be measured, and  $N$  is the number of nodes to be measured.

Assuming that the coordinates of  $N$  anchor nodes are  $m_1(x_1, y_1, z_1)$ ,  $m_2(x_2, y_2, z_2)$  ...  $m_n(x_n, y_n, z_n)$ , respectively, we can regard the coordinate estimation problem of unknown nodes as an optimization problem. In this way, the coordinate error of unknown nodes can be reduced by iteratively calculating the minimum value of objective function. Suppose the coordinate of the unknown node is  $(x, y, z)$ , and the distance from the unknown node to the  $i$ -th wrong node is as shown in the following formula:

$$d_i = \sqrt{(x - x_i)^2 + (y - y_i)^2 + (z - z_i)^2}. \quad (13)$$

The objective function of the positioning optimization algorithm is as shown in the following formula:

$$f(x, y, z) = \sqrt{\frac{1}{n} \sum_{i=1}^n \left( \sqrt{(x - x_i)^2 + (y - y_i)^2 + (z - z_i)^2} - \hat{d}_i \right)^2}. \quad (14)$$

### 3.4. Performance Analysis

**3.4.1. Analysis of Ranging Error and Average Positioning Error.** The ranging error directly affects the positioning accuracy of nodes, so the least square method, PSO based positioning algorithm, and WCSPSO positioning algorithm can be compared and analyzed according to different ranging errors, as shown in Figure 2.

As shown in Figure 2, with the increase of ranging error, the average positioning error of the three algorithms

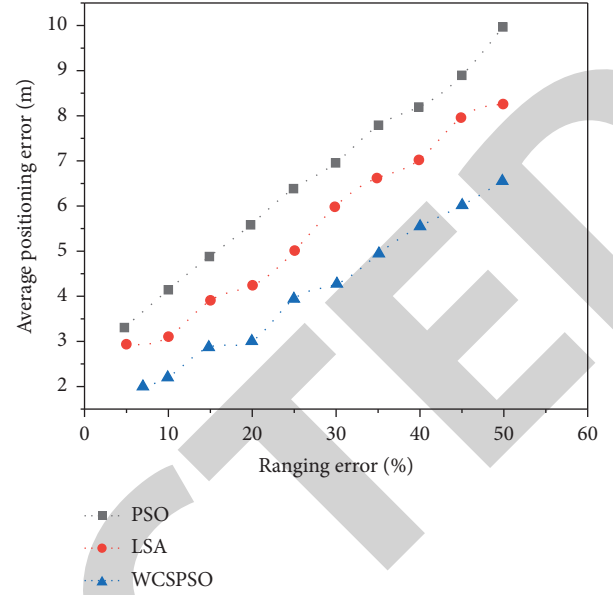


FIGURE 2: Relationship between ranging error and average positioning error.

increases. When the ranging error is 9, error of the algorithm is 50%, the average positioning error of WCSPSO algorithm is 6.6 m, and the average positioning error of PSO algorithm is 8.2 m. Generally speaking, the average positioning error based on WCSPSO algorithm is the smallest, which shows that it is necessary to optimize the positioning results, and the positioning performance has been improved compared with PSO positioning algorithm, which also shows that WCSPSO can converge to a better solution than PSO algorithm. Under the influence of different distance errors, the positioning results based on WCSPSO are obviously better than the other two algorithms [7].

**3.4.2. Analysis of Node Number and Average Positioning Error.** Different node numbers also have different effects on node location. The least square method, PSO algorithm, and WCSPSO algorithm are compared in different node densities, as shown in Figure 3.

As shown in Figure 3, for the three algorithms, the average positioning error decreases with the increase of the number of nodes. The error of the least square method ranges from 37 m to 17.6 m, which is greatly affected by the node density. The average positioning error of the POS positioning algorithm ranges from 25 m to 15 m, and the influence of the node density on the positioning accuracy is reduced by about 40% compared with the former. The average positioning error of the WCSPSO algorithm ranges from 18.1 m to 13.2 m, which is affected by the number of nodes [8]. The WCSPSO positioning algorithm is reduced by about 30%. But in general, WCSPSO location algorithm is less affected by the number of nodes; that is, when the number of nodes is small, this algorithm can also get better location accuracy, and its location result is relatively stable.

It can be seen from Figures 2 and 3 and processes that WCSPSO algorithm improves the positioning accuracy of



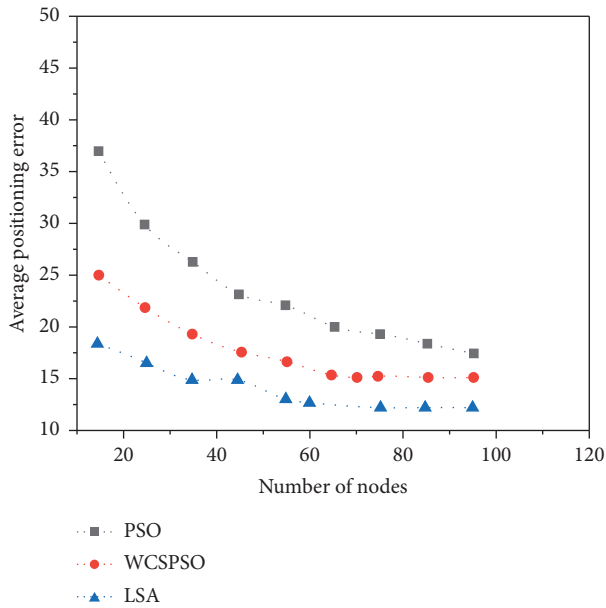


FIGURE 3: Relationship between the number of nodes and the average positioning error.

nodes through the fixed  $W$  value in PSO algorithm as dynamic coefficient and chaotic disturbance to the optimal solution of particles in the later stage [9].

#### 4. Marketing Environment and STP Analysis of Big Cake Products

**4.1. Macroenvironment.** According to the data of the National Bureau of Statistics, China's GDP reached 90.03 trillion in 2018, with a nominal year-on-year increase of 9.69% and a real increase of 6.6% in Figure 4(a). By industry, the added value of the primary industry was 6473.4 billion yuan, an increase of 3.5% over the previous year. The added value of the secondary industry was 36600.1 billion yuan, an increase of 5.8%. The added value of the tertiary industry was 46957.5 billion yuan, an increase of 7.6%. As shown in Figure 4(b), in 2018, China's per capita disposable income was 28228 yuan, an increase of 8.7% in nominal terms and 6.5% in real terms over the previous year, basically in line with economic growth. These economic bases determine that consumers are increasingly pursuing higher consumption quality and promote enterprises to promote supply side structural reform [10].

As shown in Figure 5, in 2018, the national per capita consumption expenditure was 19853 yuan, a nominal increase of 8.4% over the previous year and a real increase of 6.2% after deducting price factors. In the whole year, the per capita consumption expenditure of food, tobacco, and alcohol of residents in China was 5631 yuan, an increase of 4.8% over the previous year, accounting for 28.4% of the per capita consumption expenditure, ranking first among all consumption expenditures. From the perspective of comprehensive residents' income and consumption expenditure, China's residents' consumption ability is continuously improving, China's consumption environment is also

continuously improving, and the whole society maintains the trend of consumption upgrading [11].

**4.2. Industry Environment.** Young people have a strong ability to accept new things, and their ways of accepting new things are relatively more flexible, diverse, and discriminative. According to Figure 6, among the results of the survey on the most acceptable brand promotion methods for people under the age of 35, the first one is the promotion of relatives and friends, accounting for 33.8%. This method often passes the filtering and screening, which reduces the difficulty for shoppers to identify and screen information, and will effectively reduce their distrust of products. This also shows that young people attach great importance to product word-of-mouth and requires enterprises to attach great importance to word-of-mouth marketing. The second place is the promotion of shopping guide community websites, accounting for 20.1%. In the third place is the information released by We media, such as online celebrity and WeChat official account, accounting for 14%. In fact, such websites are also a kind of word-of-mouth marketing [12].

According to the survey, the two most commonly used leisure food shopping methods are food specialty store and market, as shown in Figure 7, the top three are food specialty stores, supermarkets, and online shopping, reaching 47.4%, 44.8%, and 42.9%, respectively. The proportion of these three is not much different. Although young people are very dependent on online consumption at present, the convenient experience of offline purchase can not be ignored [13].

**4.3. STP Analysis.** People under the age of 35, mainly students and young office workers, as shown in Figure 8, the top five factors they consider when buying leisure food are brand awareness, product taste, product packaging, product price, and health preservation function. This kind of group is characterized by low age and strong enthusiasm for trying and exploring new things. They eat snacks mainly to solve small hunger, fatigue, and boredom in their spare time, work, and leisure. They are more favored by the diversity of food tastes and personalized packaging [14]. They like to follow the fashion, full of feelings and imagination, and pay attention to the small happiness and beauty in life [15].

People aged 35 to 60, mainly working people: the group is characterized by stable income and relatively high purchasing power. As shown in Figure 9, the most important functional factors for health preservation when purchasing leisure food for this group of people are as follows: this group is relatively insensitive to price. They play a more important role in the workplace and family, and the interpersonal relationships they need to deal with are more complex. Due to the demand for gifts, these people pay more attention to the appearance and packaging of the brand [16]. They pay more attention to their own health and quality of life. Their demand for food also takes health and ecology as important standards.

People over 60 years old: with the advent of the aging era of China's society, the total number of people over 60 years

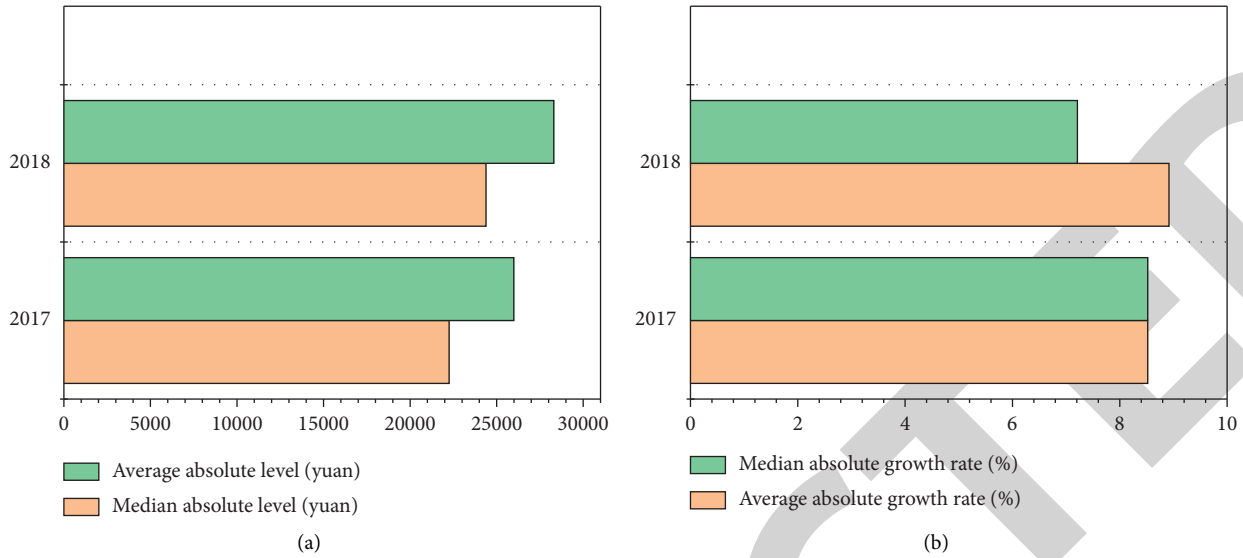


FIGURE 4: (a) Median absolute level. (b) Median growth rate.

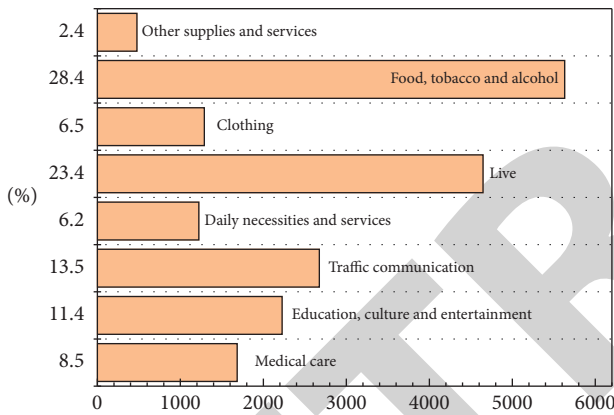


FIGURE 5: Household consumption expenditure in 2018.

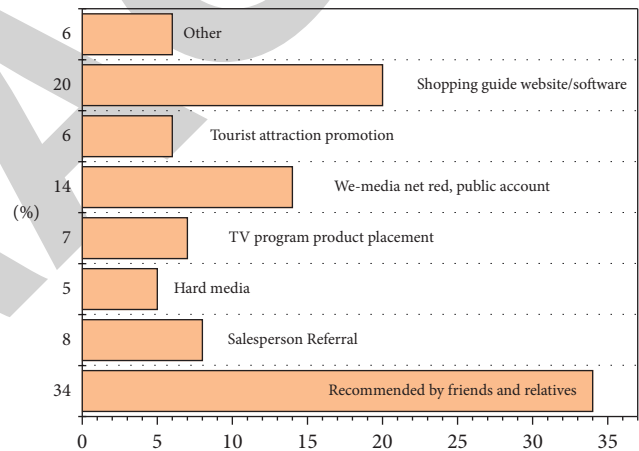


FIGURE 6: Analysis of shopping information acquisition channels for people under 35.

old will continue to grow in the next few decades. When purchasing food, such people not only consider the common brand awareness, but also attach great importance to the health function of food, accounting for 47.7% of the total population. At the same time, this kind of people also pay more attention to the price of products, and 40.9% of the total people choose price preference options, as shown in Figure 10.

From the perspective of product content, leisure snacks in Figure 11 refer to a kind of ready-to-eat food that complements the hunger demand outside the dinner. Leisure food emphasizes the extended value of consumption scenario, meeting more emotions and functions [17]. According to the statistical data analysis, as shown in Figure 12, the annual output value of China's leisure food industry increased from 401.4 billion yuan in 2010 to 919.1 billion yuan in 2017, with an average annual compound growth rate of 12.56%, and it is expected to maintain high growth from 2018 to 2020, from 1029.7 billion yuan in 2018 to 1298.4 billion yuan in 2020, with an average annual compound growth rate of 12.29%.

From the perspective of product categories, as shown in Figure 13, in the sales of leisure food in 2017, the first is candy, the second is pastry, and the third is nuts. The market share is 34.52%, 24.65%, and 19.36%, respectively. The market share of pastry in leisure food has maintained a stable growth trend in recent years [18]. Snack food has great development potential. Although the competition is fierce, it has a large market capacity. At the same time, it can help JR company get rid of the existing seasonal market restrictions and obtain more stable and lasting vitality.

#### 4.4. Brand Precision Marketing Improvement Strategy

4.4.1. Precise Brand Positioning. For the snack food market, a new brand of "ruxiaogao" has been opened up. For young consumers, if the JR brand name is continued to be used, it is not easy to give consumers the impression of modern leisure snacks, which will not be conducive to the interpretation of

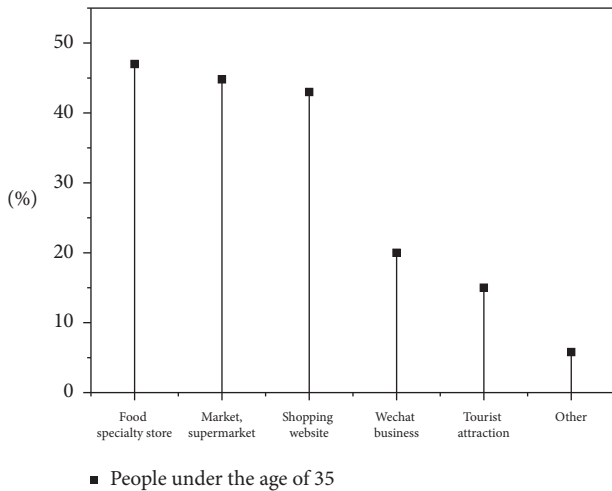


FIGURE 7: Analysis of shopping routes of people under 35.

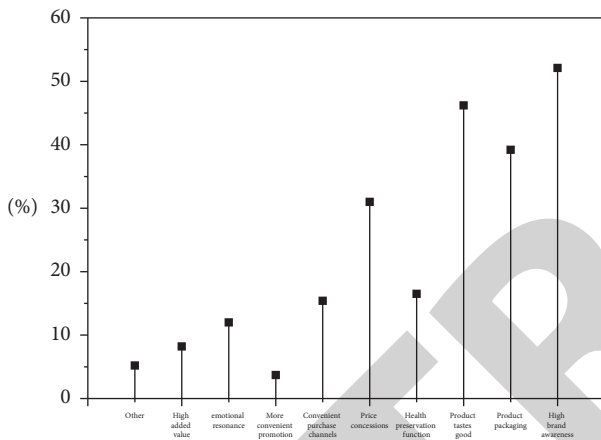


FIGURE 8: Analysis of reference factors for customers under 35 years old to buy food.

brand image and culture. Therefore, a brand trademark of “ruxiaogao” will be re-registered as a subbrand of JR company’s large cake products into leisure food. According to the brand positioning theory, “focus rule” is one of the effective rules for competition in the era of homogenization. The essence of positioning is to make the brand occupy the most favorable position in the customer’s mental ladder and make the brand a representative brand of a certain category or characteristic [19]. The biggest difference between the newly established “ruxiaogao” and other existing snack food brands lies in the brand background of Funing big cake. In order to highlight the younger market goal of the brand and the category of snack food, it is suggested to adopt the method of category positioning in advance, locate ruxiaogao as “young snack,” and publicize it with the advertising slogan of “not snack, but small cake” [20], as shown in Figure 14.

In order to more accurately define the brand positioning of “ruxiaogao,” a brand positioning map as shown in Figure 14 is established. At the center of the picture is the brand truth. Through the vocabulary elaboration of “relaxed and healthy,” it can further focus on the brand positioning of “such as small cake” and highlight the differences between

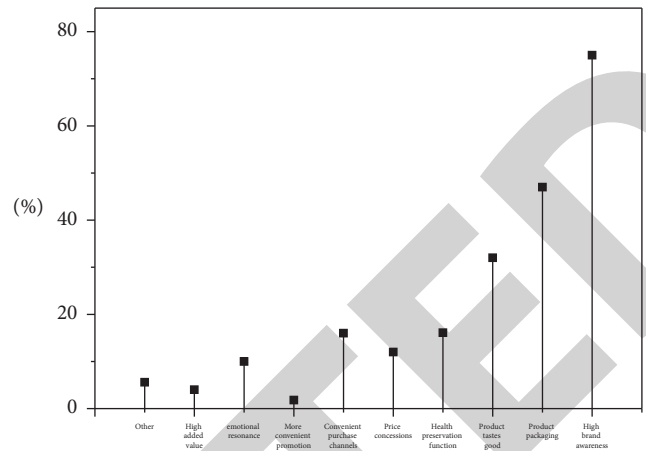


FIGURE 9: Analysis chart of reference factors for customers aged 35-60 to buy food.

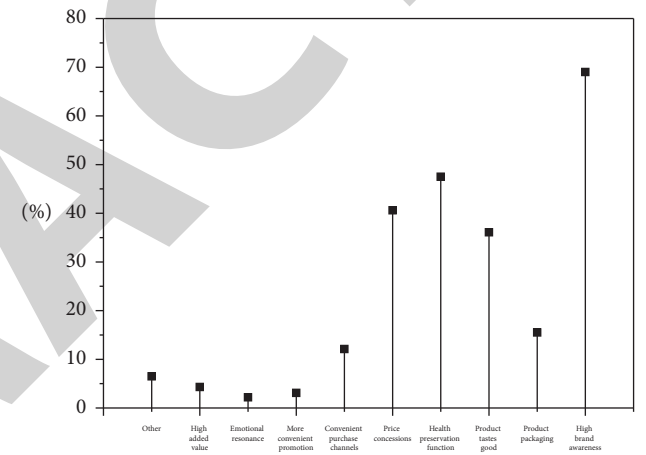


FIGURE 10: Analysis of reference factors for customers over 60 years old to buy food.

the brand and other leisure foods; that is, it can bring customers relaxed and comfortable time, high-quality and fresh cakes, and rich consumption experience. The next outer circle is used to support the differences of “ruxiaogao” brand and make customers believe. Experience marketing can be used to make customers feel the modern processing methods and product ideas of “ruxiaogao” production factory [21]. Finally, the outer ring includes two other brand concepts: (1) brand values: optimistic attitude towards life, lively personality, and delicate mood that can fully understand young troubles. (2) Executive elements and visual recognition: enhance the attention of consumers by constructing the image of cartoon characters and personalized packaging. Use interesting copywriting to impress customers [22].

4.4.2. *Brand Image and Brand Culture.* As shown in Figure 15, according to Maslow’s hierarchy of needs theory, people’s needs gradually develop with the gradual satisfaction of food, clothing, and materials and the development of higher-level psychological and value needs. Over the past



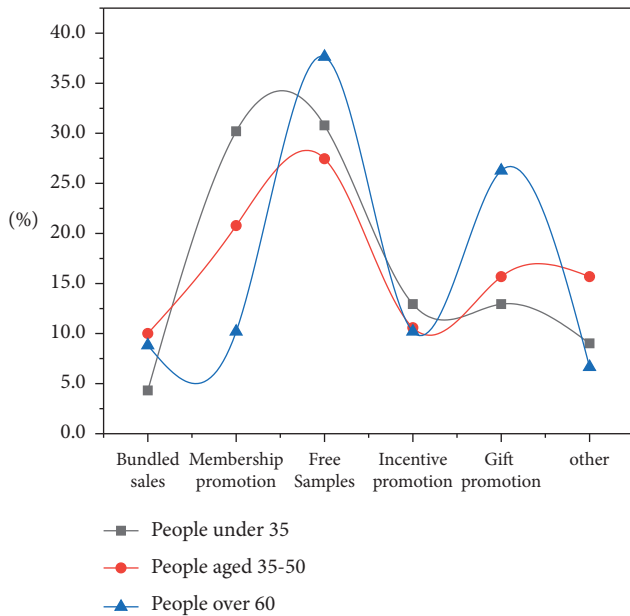


FIGURE 11: Analysis of customers' acceptance of product promotion methods.

half century, Chinese people's pursuit of products has also experienced a gradual transformation from simple basic living consumption to developmental and enjoyable consumption. The consumption structure has also undergone great changes, the proportion of service consumption has been expanding, and psychological consumption and cultural consumption have become the main stream. People pay more attention to emotional experience and interpersonal communication when shopping, and personal preferences occupy a more important position in purchase decision-making. Therefore, we must fully tap the brand story and cultural connotation of JR company, narrow the distance with consumers, and let consumers have a sense of brand dependence, so as to obtain market influence [23].

**4.4.3. Brand Communication.** In today's society, due to the influence of communication technology and other related factors, it has changed the way people communicate and deal with communication and also brought the diversified development of marketing communication environment. Due to the limited financial resources and budget behind JR company, we must combine our own characteristics and adopt reasonable communication methods in the marketing process, which can not only save the communication cost, but also achieve the effect of publicity and promotion. According to the common marketing communication platforms (Table 2), combined with the brand positioning of JR and Xiaogao, and fully considering the budget cost, it is suggested to mainly adopt the strategies of word-of-mouth marketing, event and experience marketing, and public relations marketing [24].

According to the different needs of customers, provide hand gift box and gift bag packaging services and provide supporting other peripheral products. Through the

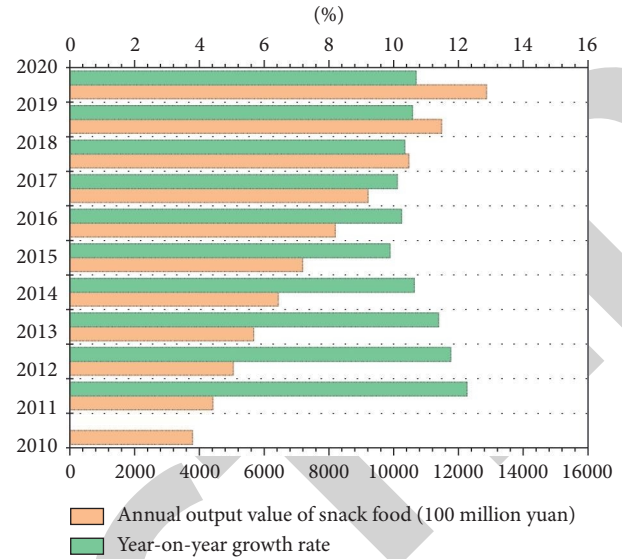


FIGURE 12: Analysis of output value scale and growth rate of leisure food in China.

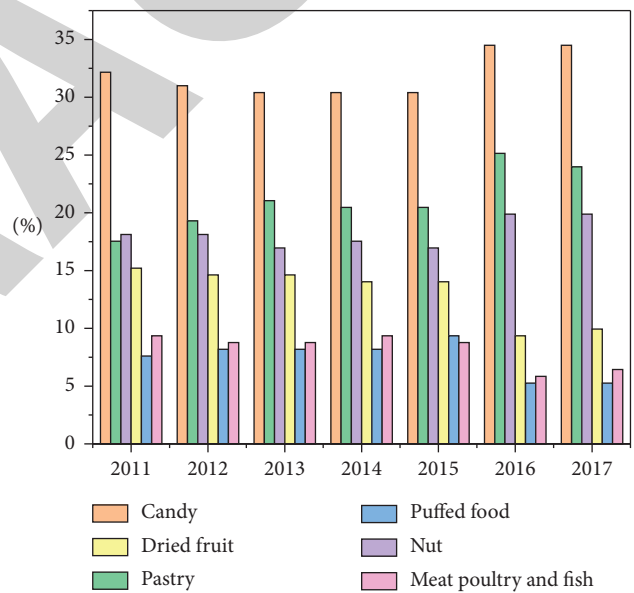


FIGURE 13: Category analysis of national leisure food sales in 2017.

establishment of membership system, combine brand marketing with tourism, regularly invite consumers to carry out brand experience activities, visit Funing big cake raw material production base, production line, big cake museum and other places, participate in the production, promote the interaction between consumers and brands, and deepen consumers' brand awareness [25], as shown in Table 3.

According to the different needs of customers, provide hand gift box and gift bag packaging services and provide supporting other peripheral products. Through the establishment of membership system, combine brand marketing with tourism, regularly invite consumers to carry out brand experience activities, visit Funing big cake raw material production base, production line, big cake museum, and

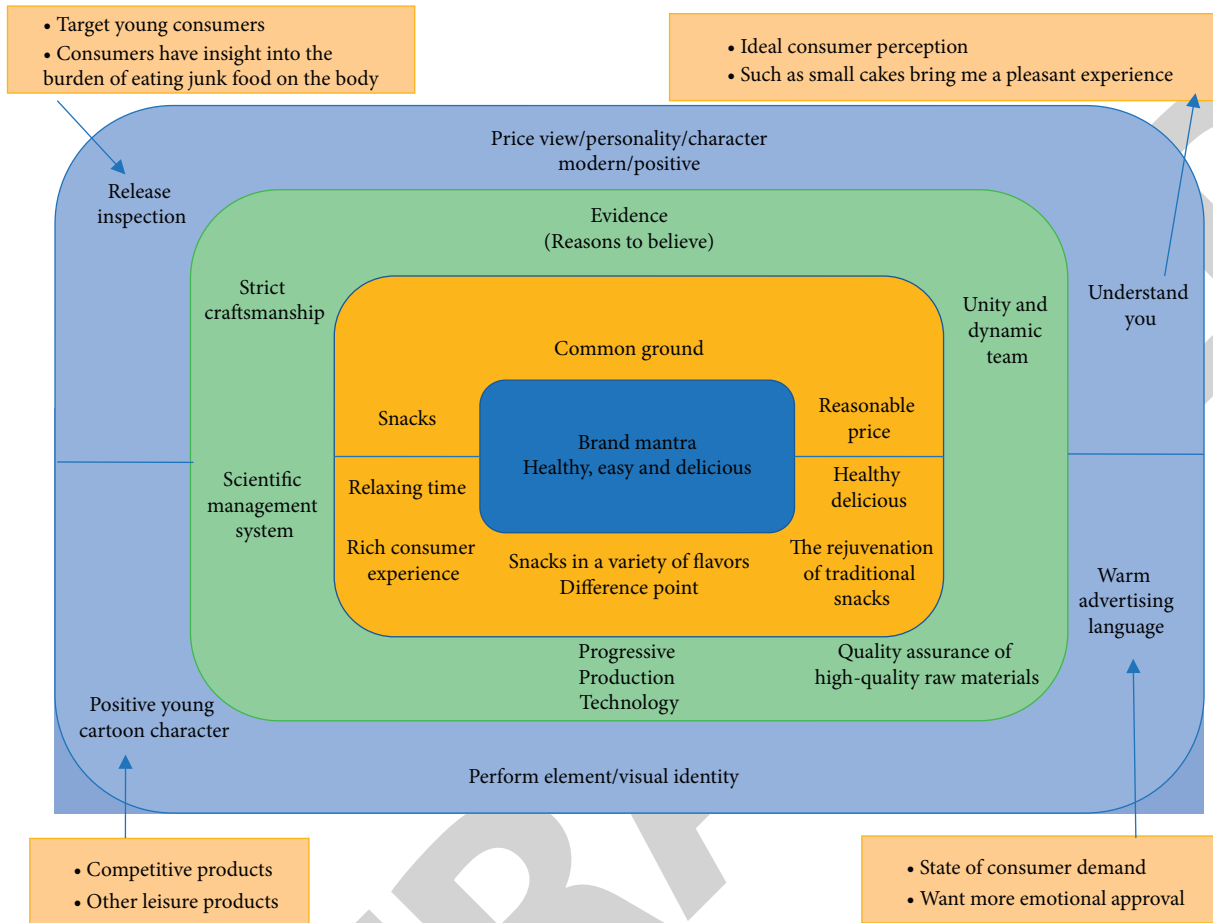


FIGURE 14: Brand positioning of ruxiaogao.

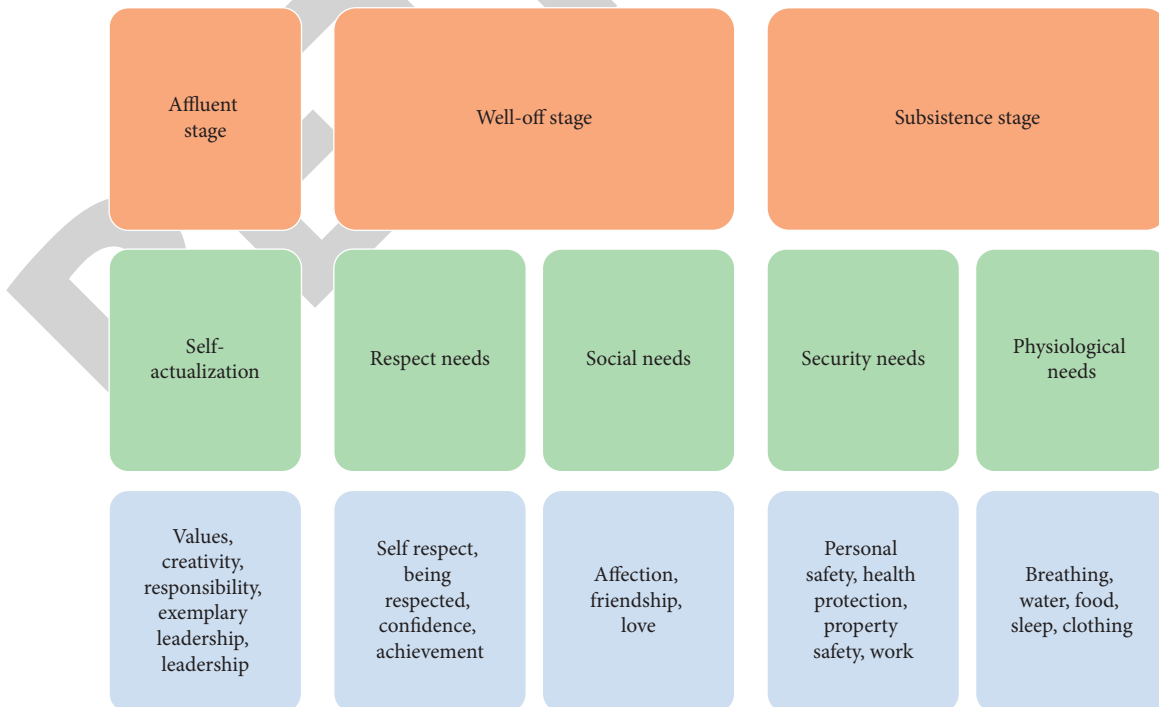


FIGURE 15: Maslow's hierarchy of needs theory.

TABLE 2: Common communication platforms.

Advertisement	Promotion	Events and experiences	Public relations and public outreach	Online and social media marketing	Mobile marketing	Direct marketing and database marketing	Personnel sales
Print and radio advertising	Contests, games, sweepstakes, lotteries	Physical education	Press conference	Website	Sms	Product catalog	Sales statements
Outer packaging	Offers and giveaways	Entertainment	Speech	E-mail	Online marketing	Mail	Sales meetings
Manual	Sample	Festival	Lecture	Search ads	Social media marketing	Telemarketing	Incentive programs
Cinema	Fair and trade show art	Art	Annual report	Display advertising		E-shopping	Sample
Brochure	Exhibition	Workmanship	Charitable donation	Company blog		TV shopping	Trade fairs and trade shows
Posters and flyers	Demo	Visit the factory	Publication	Third-party chat room forums and blogs		Fax	
Content	Coupon	Company museum	Community relations	Facebook and Twitter updates, Youtube channels and videos			
Advertising soft text reprint	Rebate	Street activity	Iobby				
Billboard	Low interest financing		Identity medium				
Display logo	Exchange discount		Company magazine				
Focus display	Term order agreement						
DVD	Tying						

TABLE 3: Specific measures of experience marketing strategy.

Tactics	Project	Specific measures
Convenient consumption environment	Optimize the sales link	Establish WeChat official account, official microblog, and other platforms to regularly release new news, so as to facilitate consumers' choice and booking in advance Encourage consumers to pay online, optimize the distribution process, and provide products with the freshest quality
Conduct sensory marketing	Host a variety of events	Hold supermarket audition activities, such as small cake weekend best friend tea party and small cake youth reading sharing meeting, so as to provide customers with scene based experience
Extended brand service function	Provide different peripheral services Factory tourism	Provide hand gift box and gift bag packaging services, supporting other peripheral products Regularly invite consumers to carry out brand experience activities, visit places such as small cake raw material base, production line, and big cake museum, participate in the production, promote the interaction between customers and brands, and deepen consumers' brand awareness

other places, participate in the production, promote the interaction between consumers and brands, and deepen consumers' brand awareness.

*4.4.4. Sponsor Public Welfare Activities.* At the present stage, JR company's enterprise scale and strength do not allow it to carry out advertising with large capital investment. Because

the minimum packaging unit of Funing cake of JR company is 5 pieces, the cost is relatively low. By sponsoring important activities in kind, it will effectively attract customers to try, so as to enhance the popularity and influence of the brand. Actively participate in the activities and hot events advocated by the local government and concerned by the people, such as the China Marathon held in Jiangsu Province, various campus activities, and sponsored food, establish a

TABLE 4: Specific measures for public relations marketing of “ruxiaogao” brand.

Tactics	Collaborators	Specific measures
Regional public brand creation	Government	Participate in the formulation of national standards for agricultural products with geographical indications of Funing big cake Coordinate the promotion of the overall image of the Funing big cake brand Establish a regional brand threshold access system Hold big cake brand seminars and tasting sessions and carry out scientific and technological research and development Make a promotional video for the overall image of Funing big cake:
Participate in the operation of industry associations	Trade associations	Jointly formulate a series of policies and regulations such as the practical measures and rules for the use and management of brand trademarks in Funing big cake $\mu$ , the protection and management methods of products in the origin of Funing big cake, and the regulations on the use of special marks for products in the origin Assist the market supervision department to strengthen the construction of the anti-counterfeiting quality supervision service inquiry system, form a rights protection network and an anti-counterfeiting rights protection team, and maintain the reputation and image of the Funing big cake regional brand in the market Sponsor activities and hot events advocated by the local government and concerned by the people, such as sponsoring the food supply for the 2019 Yancheng Ocean Bay Marathon, the 2019 Yancheng Cross-Strait Agricultural Products Fair, the 2019 Yancheng Economic and Trade Fair, and various campus sports held in and outside the province wait
Carry out sponsorship of public welfare activities	Public events	

TABLE 5: Implementation plan for safety management of big cake products of JR company.

Strategy	Measure	Specific implementation plan
Strengthen product quality management	Create a green and high-quality raw material supply base	Signed a raw material supply agreement with Luoqiao town, the famous “flavored rice town” in the province, to create a pollution-free, green, organic large cake base and to achieve quality control at the source
	Upgrading the big cake making technology	Carry out scientific and technological research and development cooperation with Jiangsu Academy of Agricultural Sciences, Jiangnan University, and other colleges and scientific research institutions, and formulate technical regulations for Funing big cake
	Optimize industry structure	Combining the production of large cakes with the development of organic green food, developing low-fat cakes, health cakes, women’s cakes, etc., to promote the transformation of enterprises to enterprises that produce a variety of cakes
Strengthen product preservation management	Carry out research and development of preservation technology	We can use the advanced conditions of our own R&D team to carry out technical research, and we can also carry out industry-university-research cooperation to continuously improve product shelf life and shelf life
	Establish regular inspection mechanism	Strengthen cooperation with channel dealers, conduct regular fresh-keeping inspections on distributed products, and implement monthly food safety inspections to prevent expired products from entering the market

good corporate image to the public, and expand the influence of the enterprise. At the same time, you can also actively participate in various major food exhibitions and fairs at home and abroad and comprehensively display and introduce JR’s Funing cake products and brands through the exhibition, so that more potential consumers can understand JR’s Funing cake products and expand the brand’s popularity. See Table 4 for details.

4.4.5. *Product Strategy.* By building a safe and stable food processing industry chain, selecting green and high-quality raw material supply base, optimizing product formula, and winning customers’ trust and dependence on JR’s products

with excellent product quality, for example, by signing a raw material supply agreement with Luoqiao town, a famous “Weidao town” in the province, and taking advantage of the existing advantages of Luoqiao town’s organic rice base, we can create a pollution-free, green, and organic large cake base, strengthen ecological protection, and start to pay attention to quality at the source. Improve the scientific and technological content of big cake, strengthen the scientific and technological research and development cooperation with well-known universities, scientific research institutions, and other big cake enterprises at home and abroad, promote the technological upgrading of big cake production, and combine the development and marketing of big cake products of JR company with the production of green food

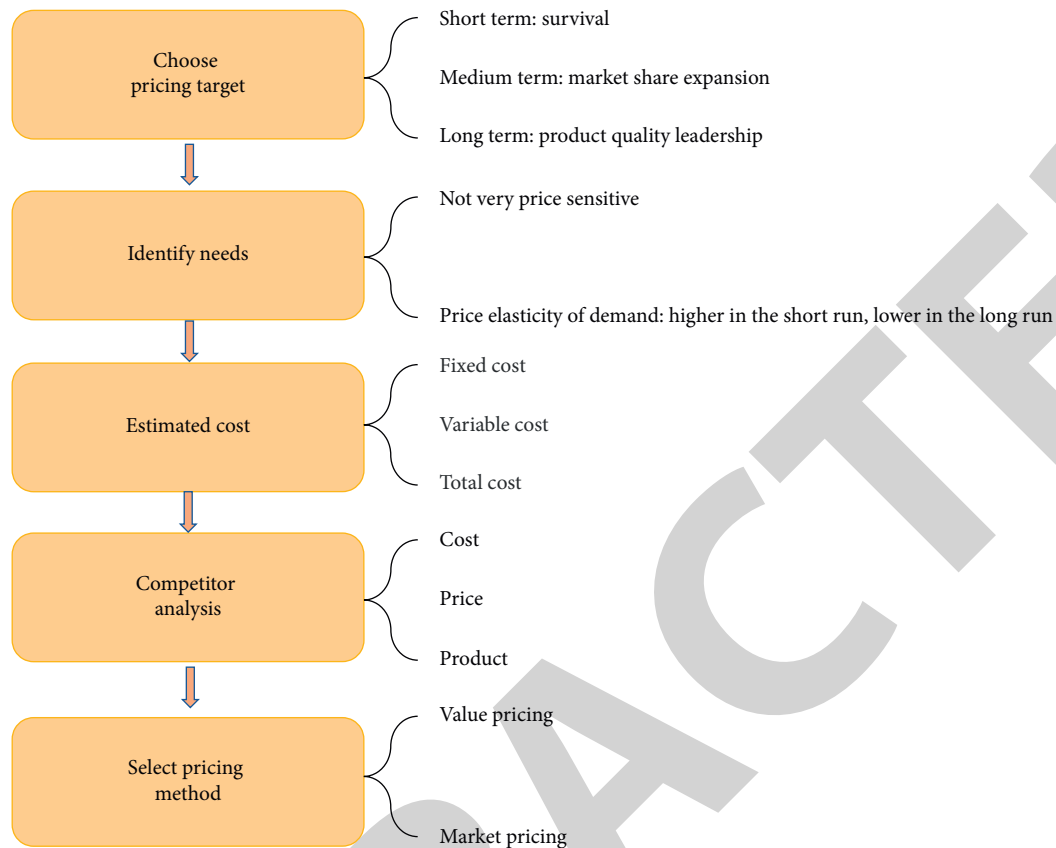


FIGURE 16: Steps of JR company's product pricing strategy.

such as organic big cake. Continuously optimize the industrial structure, and gradually transform from the production of a single variety of large cakes to the mixed production of a variety of large cakes, so as to transform the products from primary low-grade large cakes to famous, special, excellent, and high-grade large cakes and functional large cakes and from quantitative output value type to quality benefit type. Strengthen the quality management and supervision of big cake, establish a product platform with traceable quality, form a visual and traceable monitoring system for the whole production process of big cake products of JR company, and improve the sense of trust of consumers. The specific scheme is shown in Table 5.

**4.4.6. Price Strategy.** Price strategy is an important element of marketing mix strategy, because it can directly convey the value orientation of products or brands and bring income to enterprises. The product pricing of JR company is jointly agreed by the general manager and the deputy general manager and mainly adopts the cost plus pricing method. It can be said that JR's product pricing method is not organically combined with product positioning, communication strategy, and other marketing strategies, which makes the pricing of JR's big cake products basically consistent with local similar products and fails to reflect the brand value of JR's big cake. The future goal of JR company is not limited to survival, but the expansion of market share. The pricing of JR

company's products should adopt appropriate pricing strategy on the basis of determining product demand and competitor analysis, combined with brand positioning and the company's development direction. See Figure 16.

As the commodity price directly conveys the product quality and brand price, the total output value of JR company does not allow it to provide too low product discount. At the same time, "JR" and "ruxiaogao" brands do not aim at short-term sales but hope to pursue long-term market by establishing a stable brand image. Therefore, JR company should carefully choose the price adjustment strategy for the pricing of its two brand products and should strictly adopt a unified pricing standard. At the same time, strengthen the price control of different channels, different places, and different time periods and maintain the unity and stability of prices by giving subsidies to some long-distance or special channel dealers, so as to establish a good brand image with clear positioning, stable quality, and strict management for JR company's brand; on the other hand, it can effectively avoid fleeing goods among dealers in different regions, so as to win a stable, loyal, and trusted consumer group.

## 5. Conclusion

Fast and accurate node location is one of the key points of wireless sensor network node location research, and it is also a long-term research hotspot in this field. In view of the low positioning accuracy and weak stability of the current LSA



algorithm affected by the ranging error, and the slow convergence speed of PSO algorithm, which is easy to fall into local extremum and can not get the optimal solution, which affects the positioning accuracy, WCSPSO algorithm is proposed in this paper. The results show that, for the three algorithms, the average positioning error decreases with the increase of the number of nodes. The error of the least square method ranges from 37 m to 17.6 m, which is greatly affected by the node density. The average positioning error of POS positioning algorithm ranges from 25 m to 15 m, and the influence of the node density on the positioning accuracy is reduced by about 40% compared with the former. The average positioning error of WCSPSO algorithm ranges from 18.1 m to 13.2 m, and the influence of the number of nodes is reduced by about 30% compared with WCSPSO positioning algorithm. But in general, WCSPSO location algorithm is less affected by the number of nodes, that is, when the number of nodes is small, this algorithm can also get better location accuracy, and its location result is relatively stable.

The brand strategy rising to the enterprise precision marketing should start from the aspects of brand positioning, brand image, brand communication, product strategy, and channel strategy, make full use of the production process and brand foundation, put forward the idea of implementing the dual brand marketing strategy and re-registering the brand, and provide operational countermeasures and suggestions for the subversion of the traditional brand cognition and the path to enter the leisure food market.

## Data Availability

The labeled data set used to support the findings of this study is available from the corresponding author upon request.

## Conflicts of Interest

The authors declare that there are no conflicts of interest.

## Acknowledgments

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