



Determinants of Shopping Style in Dual-channel Supply Chain: Grounded Theory from the Consumer Perspective

Yuhan Hou^{1†}, Jinyuan Song^{2†}, Yongjun Xu^{3†} and Xuan Ye^{4**}

¹School of Economics and Management, Yanshan University, Qinhuangdao, 066004, China

²School of Pittsburgh, Sichuan University, Sichuan, 610065, China

³School of Economics and Management, Guangdong University of Petrochemical Technology, Maoming, 525000, China

⁴School of Finance, Zhongnan University of Economics and Law, Wuhan, 430073, China

*Corresponding email. †These authors contributed equally.

¹hyh515400@163.com, ²2020141520047@stu.scu.edu.cn,

³xyj123jun@163.com, ^{4,*}201921030101@stu.zuel.edu.cn

Abstract. Supply chain management is one of the key research topics today, and it is also a bridge connecting the world. At present, most of the relevant research focuses on the pricing and decision-making of suppliers, and there are few articles on the supply chain from the perspective of consumers. Therefore, this paper studies the determinants of shopping patterns under the dual-channel supply chain. According to the grounded theory, interview the respondents, analyze, code and classify the original data, extract the main and sub-categories, and build a theoretical system. Using the grounded theory method, the extracted main categories are taken as important influencing factors. Then, through a questionnaire survey and analytic hierarchy process, the weight of each influencing factor is obtained. Finally, it is concluded that shopping experience, price factors, logistics factors, customer service, product quality and information access have a significant impact on consumers' choice of shopping methods, among which product quality and price factors are the most considered by consumers, and retailers should put forward corresponding suggestions and improvements for the above factors.

Keywords: Grounded theory, Dual-channel supply chain, Analytic hierarchy process, Impact factors.

1 Introduction

With the high integration of internet technology and online shopping, E-commerce platforms have greatly influenced people's lifestyles. During the epidemic, E-commerce platforms contributed to the main development of our online economy and the expression of the housing economy. As a result of a dual-channel (online+ offline) supply chain, more and more consumers are shuttling in between different shopping styles. Consumer preference and channel preference will definitely influence the

overall development of the dual-channel supply chain. Therefore, it is relevant to study the factors influencing consumers' shopping style decisions under a dual-channel supply chain.

The existing research on dual-channel supply chain mainly focuses on the analysis of how the product's price is confirmed from suppliers' and retailers' points of view, or their decision and coordination based on a certain situation to maximize the benefit of the participant in the supply chain. Although it has made significant progress in the study of this field during recent decades, there are still some gaps in the research on the consumer's internal factors which influence their choice of shopping channel under the background of the dual-channel supply chain. Even if some articles mention the inner factor of consumers, most of them are too subjective on the acquisition of the factor. They do not conduct further studies on their relationships and influence weights.

In this study, our team not only tended to figure out what factors significantly affect consumers' shopping channel choices, but also tried to analyze the weight of each factor by qualitative and quantitative research methods. The result would be instructive in guiding the supplier and the retailer on how to promote the supply chain system from the consumers' perspective. Our team is convinced that this study is of practice to increase benefit in the supply and demand market.

This paper combines qualitative and quantitative methods to analyze the influencing factors of consumers' shopping choices. First of all, through interviews with 40 consumers, researchers have used the grounded theoretical analysis to objectively analyze the factors that affect the choice of shopping methods, and extracted six main influencing factors. Then, to know how much influence can be made by the corresponding six main influencing factors, our team calculates the weights of the six main influencing factors by the analytic hierarchy process. Finally, based on the calculated weights, the paper clarifies the main factors that affect consumers' choice of shopping methods. It puts forward optimization and improvement suggestions for the supply mode of suppliers and retailers under the dual-channel supply chain, to improve efficiency.

2 Literature Review

Research on Dual Channel Supply Chains has focused on channel pricing, decision, and coordination under different dual-channel supply chain structures. Keen et al. (2004) analyzed the impact of three sales models on the overall supply chain profit by comparing the traditional retail model, the online only direct sales model and the dual-channel sales model. They found that the dual-channel model can maximize the supply chain profit. Hsiao (2013) asserts that spurring in internet channels has given rise to manufacturers' opening of dual channels and that the expansion of demand has also led to increased competition. Chen et al. (2017) studied and comparatively analyzed product prices and product quality in three scenarios: single retail channel, single direct sales channel, and dual channel, and they also demonstrated that introducing new channels can effectively improve product quality. Yang et al. (2019) ana-

lyzed and compared the pricing strategies in the fresh food cold chain supply chain in the context of single-channel, dual-channel, and omnichannel modes of operation. The results of the study showed that consumers were able to obtain the highest consumer surplus under the O2O mode of operation. Still, suppliers and retailers diverged in their preferences for the mode of operation due to profit. Heydari et al. (2019) explored the optimal decision making and coordination of a two-channel green supply chain with three tiers. The vast majority of scholars' studies on the factors influencing consumer preferences are based on model building, with more research on perceptions, and choosing different aspects of multiple factors to hypothesize for empirical analysis. Gupta et al. (2008) studied the relationship between consumers' final purchase decisions and channel shifting behavior. They concluded that consumers make different choices when purchasing different products based on factors such as channel price, risk, and evaluation. Bernstein(2009) pointed out that because online sales channels allow consumers to search for products with lower prices at lower costs, more and more Consumers are increasingly experiencing products in physical stores and enjoying product information services, while making product purchases through online channels. Herhausen et al. (2015) proposed a theoretical model in which perceived service quality and perceived risk play a mediating role, while consumers' online shopping experience its moderating role. The researchers then studied the influence of online and offline channel convergence on several intentions, such as search intention, purchase intention, and payment intention. The study found that channel convergence had a positive impact on online services. Fang (2018) developed two mean-variance models in centralized and decentralized supply chains to study the price decision problem in a risk-averse retailer-led dual-channel supply chain, and also compared and analyzed the optimal solutions under the two decisions models. Yao Wei(2020) proposed that according to the theory of customer perceived value and the characteristics of branded agricultural products, there are five dimensions of customer perceived value: economic value, social value, emotional value, functional value and image value, which increase the purchase intention of branded agricultural products. Zhao Haichuan (2020)et al. studied how sellers' responses to negative online reviews affect consumers' purchase intentions and found that apologizing and remedying negative reviews when they are generated can better regain consumers' purchase intentions. Yu et al. (2020) studied manufacturers' dual-channel decisions in shopping centers, considering consumers' preferences between direct and indirect channels.

In summary, researches on dual-channel supply chains are mostly based on the supplier's perspective, in which researchers concentrate on the issue about how to conduct the corresponding pricing strategy in order to maximum the profit, etc, but rarely from the consumers' perspective. This paper argues that the study of dual channels from the perspective of consumers has certain practical significance and can help dual-channel merchants, such as membership stores and social e-commerce, better grasp consumer preferences and promote their development. Most of the current studies on the influencing factors of consumer shopping style choice are based on models or software tools to analyze the influencing factors, which are based on previous scholars, social background or subjective ideas to analyze influencing factors, and

the obtained influencing factors are not universal. Based on the root theory approach, this paper investigates the factors influencing consumers' shopping choices through interviews with consumers and further analyzes the weights of the influencing factors using hierarchical analysis to be more convincing.

3 Methodology

3.1 Methodology applied

Grounded theory (GT), an established qualitative research method, is widely used in academic research. GT enables researchers to identify the essence of the social phenomenon and then generate a new hypothesis. The material GT uses derives from the interview. It analyzes the words and sentences people say during the interview to figure out how and why people behave in certain ways. In this study, our team tries to discover which shopping ways people tend to choose and what factors make an impact on their preferences. As far as our team is concerned, GT is an ideal approach to apply in this subject.

The essential steps of GT are a series of coding: open coding, axial coding and selective coding. GT begin with an interview with a particular target group. After being collected from the interview, the data would be step-by-step coded and abstracted to several concepts, including core concepts and secondary concepts. Then they would be compared with each other to set up a theoretical model which explains their relationship and interaction. from which we can understand the logical relationship between the Determinant of Shopping Style and the shopping decision Figure 1 demonstrates the main procedure of GT.

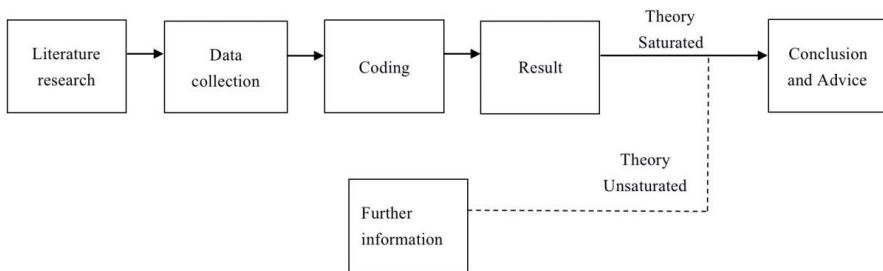


Fig. 1. Grounded theory process steps

After extracting the core concept by selective coding, our team continues to adapt the hierarchical analysis method to confirm the weights of the factors. From that we can know how important an element is in influencing how customers decide to shop. Hierarchical analysis, or AHP for short, is a decision-making method. It classifies the aspect related to decision-making into three categories: objective, criteria and options. Firstly, our team constructs a hierarchical structure model by dividing the objectives (shopping method decision), the criterion (factors considered by customers) and the

option (traditional offline shopping, membership store, e-commerce platform, etc.) into the top, middle, and bottom levels respectively. Then, our team designs a questionnaire in which we ask people to compare the weights of each two factors concerning the influence on their shopping decisions. After that, samples will be collected and then inputted into the mathematical tool software Matlab. By Matlab, Comparison matrices and results of the consistency test will be obtained on the basis of the data from collected questionnaires. The comparison matrices which pass the consistency test will get into the next step. Our team will calculate their maximum eigenvalue ω_{max} and united eigenvector W . A series of values in the united eigenvector of the comparison matrix correspond to the weight of the factors affecting shopping decisions.

3.2 Sample Selection

Grounded theory attaches great importance to the representativeness of the sample. In addition, it is obvious that shopping concepts vary with different age groups, which leads to inevitable errors in the results. To decline this error, the interview has to cover a large range of customers of different ages. As a result of the above consideration, the age of the sample subjects in this study is mainly between 18 and 50 years old.

The age range(18-50 years old) can be divided into two age groups: young people (18-30 years old) and middle-aged people (30-50 years old).

The consumption spending of these two groups of people are most considerable. Young people, the potential largest consumer group in the future, are keen on novel and trendy shopping methods. What's more, they show great enthusiasm for purchasing various electronic products, cosmetics, snacks, etc. Middle-aged people are currently the largest consumer group. With a stable income and the responsibility to support a family, middle-ager purchase goods frequently. The goods they buy mainly consist of necessities, such as fruits and vegetables, tissues, clothes, etc. The selection of interviewees makes the sample more representative so that the research results could be more convincing. Finally, our team interviewed 40 people in the mentioned age range(30 samples for initial coding and 10 for saturation test).

In the hierarchical analysis method, comparisons of the importance of every two factors are the data needed. Our team investigates through questionnaires. Eventually, 101 questionnaires were collected in total. The range of the sample for this part of the study coincides with that in the GT part, and the sample size is much larger.

4 Category extraction and model building

4.1 Category extraction based on opening coding

Open coding is the first link in a grounded theoretical data analysis. It compares the original data word by word and sentence by sentence, encodes the original data, conceptualizes the original data, and classifies the original data. In this study, 40 subjects of different ages and occupations were interviewed, and the questionnaire and the original sentences of the interviewees were used to analyze the influencing factors of

shopping style decisions under the dual-channel supply chain. After further analysis and refinement of many original sentences, some sentences with original data are selected and divided into 20 categories. The obtained categories of conceptual sentences are given in Table 1.

Table 1. Open Coding.

Initial concept	Category
1. You can buy a large number of products they trust	Time consuming shopping
2. You can buy it anywhere, anytime, no need to go to a specific place.	Ease of operation
3.Once the community unsealed, community e-commerce on the choice of goods is less.	Choice diversity
4.Generally do not worry about the words will be online shopping, because can be sent home more convenient.	Delivery service
5.There are a lot of people offline, this kind of shopping is very fire-works, is a kind of relaxation for me.	Leisure and entertainment attributes
6.Double 11 and 618 when there is a big sale, just to store some things.	Discount
7. Very expensive things, usually bought offline.	Commodity value
8. Buy what you need at a lower price.	Cost performance
9. You can buy and take offline.	Immediate delivery
10.Buy things is very look forward to, want to get the goods immediately, delivery time is too long to accept.	Delivery speed
11.Urgent things are bought offline.	Logistics speed
12.Unexplained delays or staying at a site can be difficult to accept.	Arrive on time
13.The guide of offline shopping will introduce activities, it has clear service.	Consumer service attitude
14.Goods do not meet expectations when the return trouble.	Post-sales service
15.Feel the price is cheap to place an order, but when the goods arrive, the quality is unsatisfactory.	Product quality
16.Because of the high daily demand, the online transport process may be damaged.	Integrity of goods
17.More expensive clothes are afraid of fake goods on the internet.	Product brand
18.The scope of choice is too large, in the online search order is more convenient.	Convenient search
19.The book bought offline is packaged, can only see the cover, but online can see the catalogue.	Integrity of commodity information
20.The food does not match the picture .	Accuracy of commodity information

4.2 Principal category extraction based on principal axial coding

Axial coding is finding or establishing links among the many data units found in the previous step to show the intrinsic links between the meaningful content scattered throughout the data, such as cause and effect, time, similarity and inequality. RepeatAccording to the similarities and differences between categories to classify and name the main category, repeated comparisons e scattered data become more coherent and logical. In this study, 20 subcategories were classified and analyzed, and 6 main

categories were induced. The axial coding can clearly show the internal relationship and concrete connotation of subcategories, as shown in Table 2.

Table 2. The principal category formed by axial coding.

Specific connotation of category	Subcategory	Main category
1.Time required for shopping.	Time consuming shopping	
2.The number of operational steps required for procurement.	Ease of operation	
3.The number of types of goods selected.	Choice diversity	Shopping experience
4.What form of distribution of goods to the hands of customers.	Delivery service	
5.The leisure and entertainment that shopping methods bring to consumers.	Leisure and entertainment attributes	
6.The strength of discounts.	Discount	
7.The choice of the shopping method corresponds to the value of the goods.	Commodity value	Price factors
8.The price-oerformance ratio of the goods.	Cost performance	
9.You can buy it on the spot if you have it in stock.	Immediate delivery	
10.The time interval between placing an order and delivery.	Delivery speed	Logistics factors
11.Be able to arrive at the scheduled time.	Arrive on time	
12.Good or bad attitude of customer service.	Consumer service attitude	Custom service
13.Quality of after-sales service.	Post-sales service	
14.The quality of the goods themselves.	Product quality	
15.Is there any damage to the goods during transportation.	Integrity of goods	Product quality
16.A situation in which the purchase of branded goods is similar to that of counterfeit goods.	Product brand	
17.Is it convenient to search for what you need.	Convenient search	
18.Integrity of imformation relating to goods.	Integrity of commodity information	Information access
19.Whether the goods and the goods information correspond accurately.	Accuracy of commodity information	

4.3 Selective coding

Selective coding to extract the core category from the main category, analyze and compare the relations between the classes, find the relationship between the core categories and other categories, and build a specific theoretical model (as shown in Figure 2).In this study, six main categories and twenty subcategories are formed by opening code and axial coding among many concepts. Other categories affect shopping patterns in ways that affect core categories. Because the choice of shopping methods in the dual-channel supply chain ultimately depends on the consumer's own shopping experience, and other categories of links indirectly affect the choice of shopping methods by acting on the category of the shopping experience, the study chooses the shopping experience as the core category.

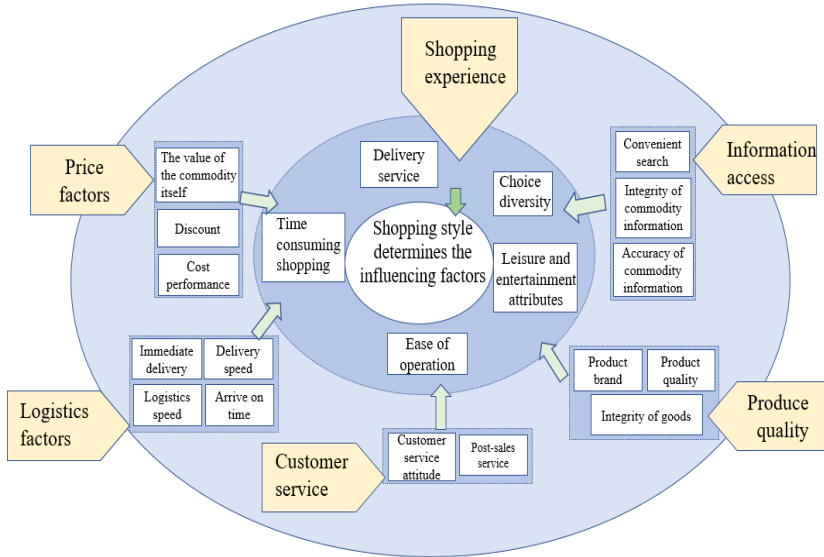


Fig. 2. Elective coding of influencing factors of shopping channel.

4.4 Category extraction based on opening coding

The original interview data were used to test the saturation of the theory. According to the results, there are no new concepts and categories, and no new connections between categories, it shows that the coding obtained from the above research reaches the theoretical saturation. In the study, one fourth of the original data for forty different interview subjects reserved and recoded the data to analyze and supplement. The obtained result still conforms to the above relationship. There is no new categories and concepts are generated, so it passes the saturation test.

Test sample: Clothing is the main commodity purchased offline. Offline shopping is a way to release pressure, and it is fun to go shopping with friends (Shopping experience). The offline purchase will be sales of goods false evaluation, and there will be queuing phenomenon, and the attitude of the salesperson bad situation (Customer service). Online e-commerce platform to buy the use goods in no hurry, goods with a longer shelf life, toilet paper, and so on. Not out of the house, easy to choose, a full range (Information access), and lower prices relative to offline (Price factor). But there will be no guarantee of product quality problems (Product quality), as well as damaged goods for replacement trouble, after-sales and logistics in the holiday very slow (Logistics factor).

5 Copyright Form

5.1 Establish a hierarchical structure model

After the main category is extracted by classification and coding through grounded theoretical analysis, a quantitative method is carried out. The research continues to carry out the Analytic Hierarchy Process of the main category to calculate the weight of the factors corresponding to the main category, on shopping methods.

According to the decision-making goal, the choice of shopping methods, the six main categories extracted from the above-grounded theory are taken as the influencing factors of shopping methods. The shopping experience, customer service, product quality, price factors, logistics factors and information acquisition are represented by A1, A2, A3, A4, A5 and A6 respectively, and the weight level of each factor affecting the choice of shopping methods is analyzed by analytic hierarchy process. First, the decision-making objectives, influencing factors and alternatives are arranged from high to low to build a hierarchical structure model. As shown in Figure 3.

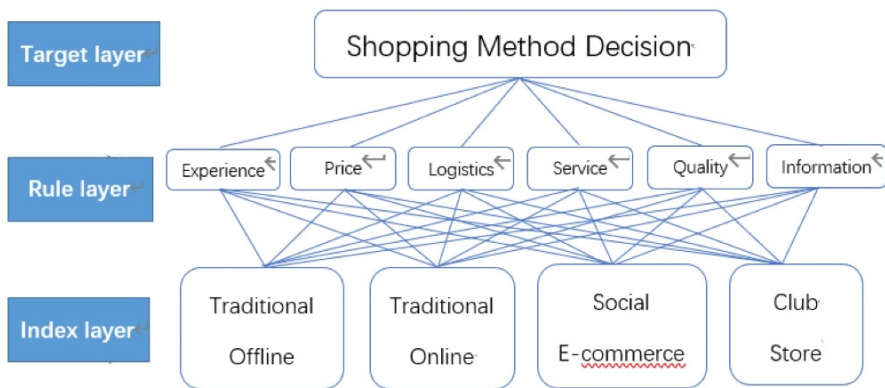


Fig. 3. Establishment of hierarchical structure model.

5.2 Construct a pairwise comparison matrix at the same level

This study conducted a questionnaire survey on 160 random consumers and obtained the relative importance data between the two elements according to the questionnaire results. A pairwise comparison matrix is constructed between different parts at the same level to get the relative importance data between two elements at the same level. A_{ij} ($i, j = 1, 2, 3, \dots, 6$) represents the importance of element i relative to element j , and A_{ji} represents the importance of element j relative to element i . Among them, the relative importance value is assigned on the basis of the scale from 1 to 9, which was proposed by Thomas Seti. The comparison table of relative importance and scale is shown in Table 3.

Table 3. Relative importance and scale.

Scale	Meaning
1	Denotes that the two elements are equally important;
3	Denotes that compared with two elements, the former is slightly more important than the latter;
5	Denotes that compared with two elements, the former is obviously more important than latter;
7	Denotes that compared with two elements, the former is much more important than the latter;
9	Denotes that compared with two elements, the former is extremely more important than latter;
Intermediate value	An intermediate value of the above judgment;
Value less than 1	If the importance of elements i and j is a_{ij} , the importance ratio of elements j and i is $a_{ji}=1/a_{ij}$;

5.3 Consistency check

The original interview data were used to test the saturation of the theory. The test results show no new concepts and categories, and no new connections between categories. It shows that the coding obtained from the above research reaches theoretical saturation. In the study, one-fourth of the original data for forty different interview subjects are reserved and recoded the data to analyze and supplement. The obtained result still conforms to the above relationship. No new categories and concepts are generated, so it passes the saturation test.

Human thinking is subjective, and many factors often affect the analysis. Especially in the case of a large number of complex characteristics of objective objects, the judgment will be affected by subjective consciousness and personal preferences, which will affect judgment accuracy. Therefore, it is necessary to check the consistency of the pairwise comparison matrix obtained from 100 questionnaires and remove the matrix that fails the consistency test.

First, calculate the maximum eigenvalue of the n -order Matrix, and then calculate the consistency index of the matrix according to.

$$CI = \frac{\lambda_{max}-n}{n-1} \tag{1}$$

Second, find the corresponding average random consistency index RI according to the order of the matrix.

Table 4. Average random consistency index.

Order	1	2	3	4	5	6	7	8
RI	0	0	0.52	0.89	1.12	1.26	1.36	1.41
Order	9	10	11	12	13	14	15	
RI	1.46	1.49	1.52	1.54	1.56	1.58	1.59	

Third, calculate the consistency check coefficient CR of the matrix. The consistency check coefficient of the matrix is $CR = CI/RI$. When $CR < 0.1$, the consistency of

the matrix is considered to be within the allowable range. When $CR \geq 0.1$, the consistency of the matrix is poor, and the matrix needs to be removed. As shown in Table 4.

5.4 Arrangement of levels

After the consistency test, the consistency of 75 pairwise comparison matrices is acceptable. Calculate the maximum eigenvalue of pairwise comparison matrix A and its corresponding normalized eigenvector W , then

$$AW = \lambda W \tag{2}$$

$$W = \{\omega_1, \omega_2, \omega_3, \omega_4, \omega_5, \omega_6\} \tag{3}$$

In equation (3), $\sum_1^6 \omega_i = 1$. The ω_i represents the weight value of the influence degree of AI on the target layer. In this paper, refers to the weight value of influence on the shopping choice caused by the i th factor. Therefore, the author obtains 75 groups of normalized eigenvectors, which represent the evaluation of 75 representative samples on the weight of each influencing factor. The author averages the corresponding numbers in all normalized eigenvectors to obtain the average horizontal weight value of AI. Therefore, 75 groups of normalized eigenvectors are obtained, representing the evaluation of 17 representative samples on the weight value of each influencing factor. The author averages the corresponding numbers in all normalized eigenvectors to obtain the average horizontal weight value of A_i . As shown in Table 5.

Table 5. The weight value of the influencing factor.

	A1	A2	A3	A4	A5	A6
$E(\omega_i)$	0.11180	0.17834	0.13346	0.12848	0.34221	0.10571

The result shows that the weights value of the influence caused by shopping experience, price factors, logistics factors, customer service, product quality, and information acquisition on the choice of shopping methods are 0.11180, 0.17834, 0.13346, 0.12848, 0.34221, and 0.10571 respectively. The product quality factor has the most significant weight on consumers' shopping methods. Secondly, the importance of price, logistics, customer service, consumers' shopping experience, and information acquisition is low. These two factors have little impact on consumers' shopping methods, and the weight of information acquisition is the lowest.

6 Conclusions

Based on the grounded theory, this paper explores the influencing factors of consumers' shopping style decisions in a dual-channel supply chain context. The research shows that shopping experience, price, logistics, customer service, product quality, and information access significantly impact consumers' choice of shopping style. The weight of each influencing factor is obtained through the analytic hierarchy process,

among which the more critical influencing factors are product quality and price. According to the research results, retailers can take corresponding improvement measures in these two aspects and then get good development. In terms of product quality, brand, quality, and integrity of products ought to be paid more attention to. Retailers should ensure the artistry and fabric quality of clothing goods. For fruit and vegetable goods, they should try to achieve the same quality of goods at the same price. It is strictly forbidden to have uneven quality, stale, or out of stock. Regarding the price factors, retailers should improve the cost performance of consumers' purchases and give appropriate discounts to promote the improvement of consumption level and attract more consumers to buy to achieve reasonable goals. Consumers buy cost-effective goods at affordable prices, and retailers sell more goods and make more profits.

Although the research process strictly follows the step specification, the research conclusion is based on a small sample of certain interviewees, which may also influence the subjectivity of interviewees, and the research conclusion still has certain limitations. With the development of various platforms, new influencing factors will continue to appear, and we should continue to pay attention to real-time updates.

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