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Short Research Paper

Research on Influencing Factors of O2O Consumption Behavior in Community Group Purchase Based on Interpretative Structural Model

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Abstract: With the continuous improvement of mobile network service quality and the continuous popularization of intelligent terminal products, the connection between the Internet world and the real world has become increasingly close. The purpose of this paper is to clarify the influence factors of consumption behavior and the relationship between them under the O2O business model of community group purchase. Influencing factors are extracted through literature review, expert interviews and other methods, and a hierarchical model of influencing factors is constructed by using interpretative structural model method to obtain the hierarchical relationship of influencing factors, and further analyze the consumption behavior of community group purchase O2O. By establishing a scientific evaluation system to evaluate the influencing factors of consumption behavior under the O2O business model of fresh agricultural products, improve consumers' shopping intention. This paper has some enlightenment for enterprises to cultivate core competence and competitive advantage.

Keywords: community group purchase, online to offline, consumption behavior, interpretative structural model

1. INTRODUCTION

At present, especially since the outbreak of COVID-19 in December 2019, people's living habits and behaviors have changed greatly, and the traditional shopping mode has been greatly impacted. A business model of community group purchase combining online and offline shopping has gradually entered people's lives.

This paper aims at exploring the influencing factors of O2O consumption behavior in community group purchase. Based on the analysis of the influencing factors of O2O consumption behavior at home and abroad, combined with the characteristics of community e-commerce, 15 alternative influencing factors are sorted out for related research, and then 12 alternative influencing factors are determined by collecting expert opinions. The corresponding interpretative structural model (ISM) is established to analyze the interdependence and constraint between the various components of the system, which provides theoretical basis for enterprises to seize the market under the online to offline model of community group purchase and promotes the rapid and effective development of enterprises.

2. METHODOLOGY

2.1 Literature Review

The model of community group purchase is based on the real offline community, and the consumer side drives the e-commerce channel of the supply chain side^[1]. O2O business model of community group purchase is a mode of "online booking + offline self-pickup" initiated by the head of the group, relying on offline physical communities and using online social tools. Through the research on the current O2O mode of community group buying platforms (such as Mei tuan, Xing sheng, Cheng xin), its main feature is that it takes fresh products as the entry point, based on the acquaintance characteristics of offline physical communities, and through online social networks, Attract consumers with low prices and convenient services. The research focus of O2O business model of community group purchase mainly focuses on the introduction of superficial concepts such as

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model, problems and operation strategies, while the literature related to the influencing factors of consumption behavior under this model is rare.

Gensler et al. investigated the factors that affect consumers' online purchases when visiting offline retail stores but competing retailers, and found that the perceived dispersion of price and the perceived return of product quality when entering stores play a key role in consumers' decision to enter stores^[2]. Hall et al. studied the decision-making and purchase intention activities of millennial online shoppers when deciding what kind of fashion to buy in the digital retail environment, and found that shoppers use various interactions to reach the purchase moment for a longer period of time^[3]. Shankar et al. evaluated the intention to use mobile payment in India by building a technical model, and found that perceived ease of use, perceived usefulness, trust and self-efficacy had a significant positive impact on the intention to use mobile payment^[4]. Chen et al. studied managers' responses to online customer reviews, and found that management responses did have a significant and positive impact on the subsequent customer reviews, which provided management enlightenment for service providers to improve customer participation in the Internet environment^[5]. In short, there are few researches on the influencing factors of consumer behavior under the O2O business model of community group purchase, and the perspectives are online and offline consumer evaluation, word-of-mouth communication in online social networks, service systems, etc., but there is no detailed research to pay attention to consumer behavior.

2.2 Overview of interpretative structural model

Interpretive structural modeling is a method developed in 1973 by Professor John N. Warfield. It is a method to model structural^[6]. It is mainly used to analyze various problems in complex social and economic systems, so as to reveal the complex relationship structural of the system^[7]. The characteristic of interpretative structural model method^[8] is to decompose a complex system into several subsystems with different elements. Using people's practical life experience and related professional knowledge, combined with the help of computers, it is best to build a multi-level ladder structural model. Its limitation lies in that when constructing the relationship between the elements of the system, it depends on people's actual experience to some extent^[9].

ISM has a wide range of applications, it is suitable for analyzing systems with many factors, interlaced relationships, and unclear structures, as well as for the sequencing of schemes from international issues, such as energy issues, bus network issues^[10], environmental sanitation issues, medical system^[11] and so on. Problems within the scope of regional economic development, enterprises, institutions and even individuals^[12] can be systematically analyzed accordingly.

2.3 Interpretive structural model analysis

In this paper, the technology acceptance model and expectation confirmation theory, which are widely used in the research on the influence of online shopping consumption behavior in the field of e-commerce, are used as theoretical basis, and the related research is carried out in combination with the particularity of community group purchase. Davis proposed a technology acceptance model^[13], which shows that consumers' online shopping behavior is determined by consumer behavior intention, and consumers' perceived usefulness and perceived ease of use determine consumers' consumer behavior intention. Expectation confirmation theory was put forward by Oliver in 1980^[14], which is mainly used to evaluate social behaviors such as consumer satisfaction and post-purchase. This paper further analyzes by establishing ISM, and the specific steps are as follows:

- (1) Set up an implementation team.

The subjects participating in community group purchase online to offline can be decomposed into three important parts: customers, core enterprises and offline entities, and network systems provide software support. After comprehensive consideration, it is determined that ISM team members are composed of ten experts, including professors from School of Management, product managers of IT enterprises, product managers of

three major operators, product managers of domestic mobile payment platforms, product managers of companies under community group purchase in online to offline and senior online and offline consumers^[15].

(2) Identify the key problems and the main influencing factors.

On the basis of literature research and the results of circular investigation and analysis of ten experts, the key issues of this study are determined as follows: the influencing factors of consumption behavior under the O2O business model of community group purchase. Based on the literature method and related theories, 15 alternative influencing factors are determined, and the corresponding sets are: $f = (f_1, \dots, f_i)^T, i = 15$. According to the principle of system engineering, determine the relevant comment set of each alternative influencing factor and the consumption behavior under the O2O business model of community group purchase, and summarize the number of relevant comment sets. The relevant comment set is: $X = \{X_1, X_2, X_3, X_4, X_5\} = \{\text{Very important, Important, General, Less important, Irrelevant}\} = \{1.0, 0.8, 0.6, 0.4, 0.2\}$.

From Table 1, an importance evaluation matrix R can be obtained, in which $r_{ij} = d_{ij}/d_a$, d_{ij} is the number of people who choose the No.j evaluation value for the No.i factor, d_a is the total number of people participating in the evaluation. The evaluation value of each alternative influencing factor can be obtained by weighted average, and the evaluation set y_i can be obtained by solving the following formula[16]: $Y = RX^T = (y_1, \dots, y_i, \dots, y_n)^T$.

$$R = \begin{bmatrix} R_1 \\ \vdots \\ R_j \\ \vdots \\ R_n \end{bmatrix} = \begin{bmatrix} r_{11} & \dots & r_{1j} & \dots & r_{1n} \\ \dots & \dots & \dots & \dots & \dots \\ r_{i1} & \dots & r_{ij} & \dots & r_{in} \\ \dots & \dots & \dots & \dots & \dots \\ r_{n1} & \dots & r_{nj} & \dots & r_{nn} \end{bmatrix}, n = 15$$

Table 1. Alternative influencing factors of consumption behavior under the O2O business model of community group purchase

Serial number	Type	Alternative influencing factors
1	Personal behavior attitude	Consumer purchase habits
2		Consumer purchase intention
3	Perceived usefulness	Types and quality of products
4		Price and promotion of products
5		Save time and improve work and study efficiency
6	Perceived ease of use	Simple and easy-to-operate design of platform shopping environment
7		Transparency and convenience of transactions
8		Network service facilities
9	Reputation and trust	Consumer Sharing and Commenting
10		Information quality of online platform
11		The platform fully considers the interests of consumption including after-sales interests
12	Logistics distribution	Logistics distribution service quality
13		Offline delivery time and delivery time arrangement
14		Convenience of picking up goods at offline self-lifting points
15	After-sales service	Merchant after-sales service

Table 2. Evaluation value of alternative influencing factors

Serial number	Importance					Evaluation value y_i
	Very important	Important	General	Less important	Irrelevant	
1	3	6	1	0	0	0.84
2	5	1	0	4	0	0.74
3	7	3	0	0	0	0.94
4	9	1	0	0	0	0.98
5	1	9	0	0	0	0.82
6	0	9	1	0	0	0.78
7	0	3	6	1	0	0.64
8	6	3	1	0	0	0.90
9	3	3	4	0	0	0.78
10	2	7	1	0	0	0.82
11	10	0	0	0	0	1.00
12	6	2	2	0	0	0.88
13	7	0	2	1	0	0.86
14	0	3	5	2	0	0.62
15	4	6	0	0	0	0.88

Combined with the law of 2-8, each factor is sorted from high to low according to the evaluation value, the top 80% is selected, and the alternative influencing factors are screened out. The remaining twelve factors are the influencing factors of consumption behavior under the O2O business model of community group purchase.

Table 3. Causing factors of consumption behavior under O2O business model of community group purchase

Number	Influencing factors	S_i
1	Consumer purchase habits	S_1
2	Types and quality of products	S_2
3	Price and promotion of products	S_3
4	Save time and improve work and study efficiency	S_4
5	Simple and easy-to-operate design of platform shopping environment	S_5
6	Network service facilities	S_6
7	Consumer Sharing and Commenting	S_7
8	Information quality of online platform	S_8
9	The platform fully considers the interests of consumption including after-sales interests	S_9
10	Logistics distribution service quality	S_{10}
11	Offline delivery time and delivery time arrangement	S_{11}
12	Merchant after-sales service	S_{12}

(3) Enumerate the correlations of the main factors and establish the accessibility matrix.

Considering the opinions of the team members comprehensively, determine the correlation of each influencing factor according to the following two principles: If S_i has an effect on S_j , fill in 1, and if S_i has no effect on S_j , fill in 0; If the two influence each other, take the party with greater influence as having influence.

The resulting factor relationship is a table with 13 rows and 13 columns, each of which represents the 12 main causes. For each row element, if the corresponding column-level element cell value is 1, it means that the row element has an impact on the column element. If the cell value is 0, it means that the elements of the row have no effect on the elements of the corresponding column. Through the above-mentioned influencing factors, the corresponding reachability matrix is established as follows (Table 4), which is a 13×13 matrix, and each value in the matrix has a one-to-one correspondence with the above-mentioned relational table.

Table 4. Reachable matrix R

M13*13	S ₁	S ₂	S ₃	S ₄	S ₅	S ₆	S ₇	S ₈	S ₉	S ₁₀	S ₁₁	S ₁₂
S ₁	1	0	0	0	0	0	0	0	0	0	0	0
S ₂	0	1	1	0	1	0	1	0	0	0	0	0
S ₃	0	0	1	0	0	0	1	0	0	0	0	0
S ₄	1	0	0	1	0	0	1	0	0	0	0	0
S ₅	0	0	0	1	1	0	0	0	0	0	0	0
S ₆	0	0	0	0	0	1	1	0	0	0	0	0
S ₇	0	0	0	0	0	0	1	0	0	0	0	0
S ₈	0	0	0	0	0	1	0	1	0	0	0	0
S ₉	0	0	0	0	0	1	1	0	1	0	0	0
S ₁₀	0	1	0	0	0	0	0	0	0	1	0	1
S ₁₁	1	1	0	1	0	0	1	0	0	0	1	0
S ₁₂	0	0	0	0	0	1	1	0	1	0	0	1

(4) Decompose the reachable matrix and establish the interpretative structure model.

According to the construction principle of interpretative structure model, the reachable matrix is decomposed to get the highest-level element set of each level. When the next level is decomposed, the columns and columns of the highest-level element set of the previous level are excluded until the decomposition is finished or the decomposition cannot be carried out, so as to get the elements of each level. As shown in Table 5, we get the reachable set and antecedent set of the first level, and there are $R(S_1) \cap A(S_1) = R(S_1)$ and $R(S_7) \cap A(S_7) = R(S_7)$ in the first level. Therefore, the highest-level elements in the first level can be obtained as 1 and 7, and the element set of the first level can be obtained as $\{S_1, S_7\}$, the reachable set and antecedent set of the second level can be obtained by striking out the corresponding rows and columns in the reachable matrix, eliminating the elements corresponding to the first level in Table 5 or performing operations in the matrix of eliminating the first-level element set.

Table 5. Reachable set and antecedent set of the first level

S _i	Reachable set R(S _i)	Antecedent set A(S _i)	R(S _i) ∩ A(S _i)
S ₁	1	1,4,11	1
S ₂	2,3,5,7	2,10,11	2
S ₃	3,7	2,3	3
S ₄	1,4,7	4,5,11	4
S ₅	4,5	2,5	5
S ₆	6,7	6,8,9,12	6
S ₇	7	2,3,4,6,7,9,11,12	7
S ₈	6,8	8	8
S ₉	6,7,9	9,12	9
S ₁₀	2,10,12	10	10
S ₁₁	1,2,4,7,11	11	11
S ₁₂	6,7,9,12	10,12	12

By decomposing the reachable matrix, The five-layer element set is obtained, and the established explanatory structure model is shown in Figure 1. The model is a multi-level hierarchical structure with five

levels. The influencing factors of each level are closely related, and each influencing factor has different influences and functions on the consumption behavior under the O2O business model of community group purchase through different ways and paths. The five-layer multi-dimensional structure can be divided into three different levels, namely, the decision level, the middle level and the representation level. Different levels have different influences, and the decision layer is related to enterprise logistics distribution, which is related to the particularity of community group purchase. Enterprise logistics distribution must be planned and designed, and delivered on time with good quality and quantity. The middle layer is mainly the design of the platform and the reputation of enterprises. Reasonable design of the platform can provide consumers with a good shopping environment and increase their perceived ease of use. The surface layer is the operation and related marketing strategy. Enterprises can combine different user group characteristics to carry out targeted business expansion and marketing promotion, and do a good job in these two aspects to maximize drainage and improve marketing efficiency. The connection between different levels is different, and the closer the connection is to the representation layer, the closer the connection between levels is also different. Relatively speaking, the connection between the decision layer and the middle layer is weak, while the connection between the middle layer and the representation layer is strong.

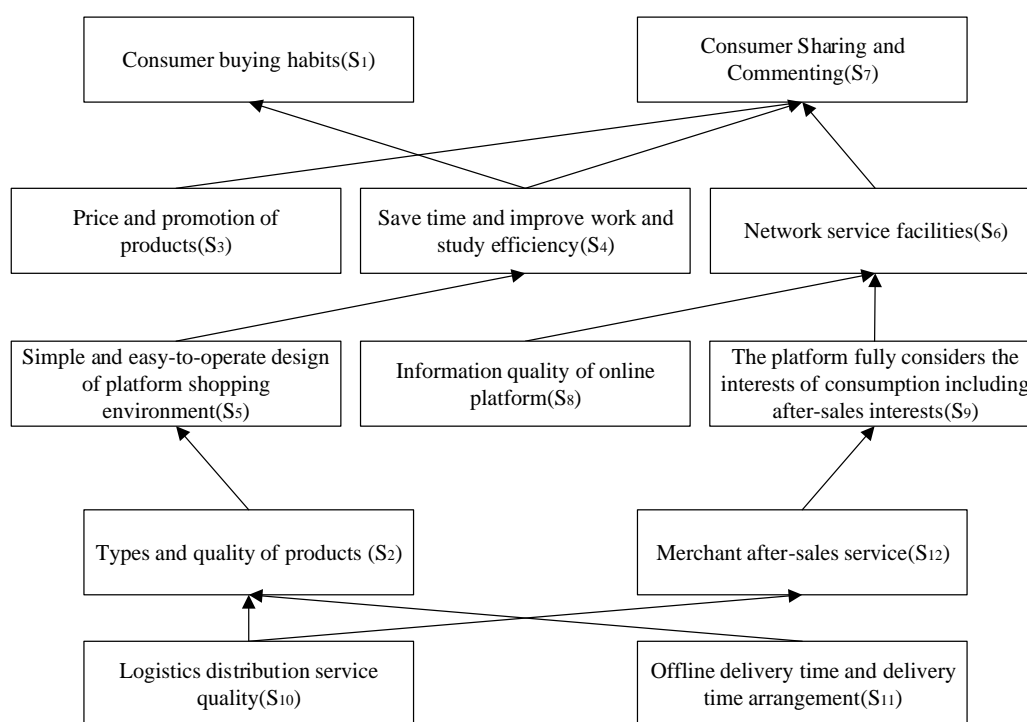


Figure 1. Results of ISM

3. RESEARCH CONCLUSION AND PROSPECT

In view of the difficulty in opening the market when the O2O business model of community group purchase landed, this paper identifies 15 alternative influencing factors qualitatively and quantitatively by means of dynamic capture of consumer behavior and bibliometrics combined with corresponding theoretical knowledge, and on this basis, determines 12 influencing factors according to the 28-rule. By adopting the ISM, a more intuitive and systematic hierarchical distribution diagram is formed. We discussed the hierarchical structure relationship between the influencing factors, and specifically analyzed the influence and role of each leading factor on consumer behavior in different ways and paths. This paper provides a theoretical basis for enterprises to cultivate core competitiveness and realize the implementation of business models.

Because of the limitations in various aspects, the research of this paper can be improved from the following aspects: ISM method is based on subjective qualitative analysis, and the granularity of influencing factors in this study is large, and 12 key influencing factors are found out, but each influencing factor cannot be quantitatively analyzed; The follow-up research can track the relevant dynamic information and literature extensively and continuously, and further consider the expert degree of experts in this study, so as to ensure the evidence-based identification and determination of links and achieve traceability; The research did not point out the problems existing in the "influencing factors of consumption behavior under the O2O business model of community group purchase", which can be discussed in depth in the follow-up and put forward some reasonable suggestions.

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