Under COVID-19 Research on the Impact of Supermarket Participation in Farming-Supermarket Docking Supply Chain[†]

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Abstract > -

Purpose: The sudden outbreak of COVID-19 became a challenge to the supply chain stability of fresh agricultural products in supermarkets. When dealing with major public emergencies, the supply chain is unstable or even broken. Insufficient upstream supplier production and operation ability causes lack of timely supply. The supermarket's own scheduling, inventory capacity, and so on are insufficient to meet the needs of downstream consumers, which leads to lesser customer satisfaction and the loss of many loyal customers. Therefore, improving the supply capacity of upstream suppliers, accelerating stock turnover, and meeting the needs of downstream consumers have become pressing problems for supermarkets.

Research design, data, methodology: Considering the supermarket as the research object and examining the actual situation of "Farmer-Supermarket Docking" under COVID-19, this paper summarizes the main factors influencing the willingness of supermarkets to participate in the "Farmer-Supermarket Docking" supply chain .Through a questionnaire survey to obtain data, We propose hypotheses and establish models.

Results: The factors influencing supermarkets participation in the "Farmer-Supermarkets Docking" supply chain are docking advantage, docking relationship, docking ability, docking environment, through supermarket expectation lead to significant and positive effect on supermarket participation. Docking advantage and docking ability through perceived quality have significant and positive influence on supermarket participation.

Conclusions: To help supermarkets in the face of major public emergencies, there is need to enhance docking advantage, consolidate docking relationship, strengthen docking ability, optimize docking environment, improve perceived quality, and meet supermarket expectations, which are all conducive to increasing the willingness of the supermarket to participate in "famer-supermarket Docking" and stabilize the supply chain.

Key words : Supermarkets Participation Willingness, Questionnaire, Farmer-Supermarket Docking, COVID-19, SPSS21.0&Amos21.0

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코로나 19에 따른 공급사슬관여가 농림 슈퍼마켓유통에 미치는 영향에 관한 연구^{*}

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- 〈국문초록〉 -

본 연구는 중국의 우한을 시작으로 지난 2020년 초부터 전 세계적으로 대유행한 코로나 19와 같은 갑작스러운 외부 환경 변화요인에 의하여 농산물 공급 체인의 혼란이 야기되었 을 때, 소비자들에게 신선한 농산물 공급의 안정과 품질을 담보하기 위하여 "생산자와 슈퍼 마켓 유통업자 간의 공급체인 상에서 영향을 미치는 요인"을 연구하고자 하였다.

연구방법으로는 생산자와 슈퍼마켓유통 체인 간의 공급망에서 각자의 역할에 대한 참여 의지에 영향을 미치는 주요 요인을 도출하여 설문하였으며, 이를 통해 공급자와의 관계, 공 급자의 능력, 공급사슬 내의 환경, 슈퍼마켓운영자의 기대치와 인식된 품질에 영향을 미친 다는 것을 확인할 수 있었다. 또한, 공공 비상환경에 대응하기 위하여 품질개선에 대한 공 급자의 인식 전환을 통하여 슈퍼마켓 체인의 유통환경을 개선할 수 있으며, 공급관계 강화 및 공급능력 강화, 공급환경의 최적화, 슈퍼마켓 체인의 참여 의지를 더욱 강화하는데 도움 이 된다는 것을 확인할 수 있었다.

주제어 : 슈퍼마켓 유통, 농업유통 공급시슬관여, 코로나 19, 슈퍼마켓유통, Spss21.0&Amos21.0

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I. Introduction

In 2020, the early outbreak of COVID-19 in Wuhan spread around the world, which had an unprecedented impact on the economy and society. The Chinese economy was also hit hard in the fight against the epidemic, with GDP growth in the first quarter falling 6.8% from a year earlier, and in Hubei, the worst-hit region, the GDP growth rate fell 39.2% from a year earlier. In February, the average wholesale price of 28 vegetables monitored by the Ministry of Agriculture and Rural Affairs was 5.71 yuan/kilogram, up to 17.2%, which is the highest level in 10 years. Because the transportation of feed and livestock and poultry products is blocked, the breeding production chain is greatly impacted: 77.8% of farmers have reduced the amount of livestock and poultry fed, and 31.9% of farmers have reduced the amount of livestock and poultry stock. Affected by the epidemic situation of South China seafood market and Beijing Xinfadi market, consumers' desire to buy aquatic products has been greatly reduced, and the price of aquatic products has fallen seriously.

As one of the main selling places of agricultural products, supermarket has been impacted and brought opportunities. During COVID-19, the supply of the freshest agricultural products to consumers in the shortest possible time became an urgent problem for supermarkets."Farmer-Supermarket Docking" is a new circulation mode that provides a new channel for agricultural products to enter the supermarkets; it creates an effective docking for different types of supermarkets, farmers and agricultural cooperatives. Direct links between production and marketing can not only help to reduce the various costs of circulation links, but also effectively expand the sales of agricultural products at the supermarkets. As a result, farmers, agricultural cooperatives, supermarkets, and consumers are able to gain more benefits. In order to give full play to the role of "Farmer-Supermarket Docking", it is very important to correctly handle the relationship between farmers, agricultural cooperatives and supermarkets. Supermarket as one of the main body is the key to the development of diversified "Farmer-Supermarket Docking".

In foreign countries, "Farmer-Supermarket Docking" has a long history and its circulation system is relatively perfect. Sandberg(2010) after comparing the circulation mode of supermarket agricultural products in many countries, it was concluded that the basic performance of "Farmer-Supermarket Docking" was the centralized purchasing and unified distribution of supermarket. Guritno et al.(2015) analyzed the important indicators that affected the supply chain performance of fresh agricultural products from the

perspective of supply chain, he also analyzed the behavior of suppliers in Indonesia, evaluated the performance by AHP and put forward the corresponding countermeasures. Madelon et al.(2016) found that the entry threshold of supermarkets is high, which required high purchasing quality and distribution speed, and limited many small and medium-sized farmers. Raymond et al.(2017) analyzed the consumption power of Argentine consumers on agricultural products. The following conclusions were drawn: with the increase of consumer income and the shortening of shopping time, more and more consumers chose to go to supermarkets to purchase agricultural products. Although the traditional fresh business model was greatly squeezed by supermarkets, supermarkets was not able to completely replace the agricultural market.

Since the expand of "Farmer-Supermarket Docking" in 2008 in China, the government has issued a series of policies on "Farmer-Supermarket Docking", which has laid a good foundation for its development from finance, taxation, talent and so on. Changzheng Zhu et al. (2011) said that most small and medium-sized supermarkets in China still relied on third parties to distribute agricultural products, while the third party's logistics distribution capacity was not enough and the service scale was insufficient, which led to higher prices of supermarket agricultural products. Many large chain supermarkets had their own distribution centers for fresh agricultural products, which could be convenient to purchase, process and distribute agricultural products. Wenbin Cao and Hui Zuo(2015) believed that the supermarket would pay more attention to the spillover effect of the new channel of fresh agricultural products on the traditional channel, so as to reduce the degree of market competition of agricultural products, and the supermarket would be more willing to participate in the "Farmer-Supermarket Docking". Linlin Sun(2020) studied the current operation mode of "Farmer-Supermarket Docking" in China. He thought that the small production mode of farmers could not meet the needs of supermarkets, and most cooperatives pursued short-term interests. So it was difficult to form a long-term stable supply chain. Zichu Xu(2019) thought that building a modern agricultural production base and vigorously developing an information exchange platform would be able to actively promote the sustainable development of "Farmer-Supermarket Docking" in China. Wang Zuoxin and Ye Xin (2020) believed that under certain conditions, compared with giving funds directly to cooperatives, the government's poverty alleviation behavior was effective, and there was the most brand building level.

Scholars at home and abroad have a lot of analysis and discussion on the main body of "Farmer-Supermarket Docking". The researchers are different and the thinking angle is different. From the existing research, the theoretical research on the participation behavior of "Farmer-Supermarket Docking" mainly focuses on the farmers, cooperatives and other agricultural products supply subject, and the research on the supermarket as the main body of agricultural product demand is relatively lacking. Based on the key subject of supermarket, this paper researches on the willing of supermarkets participation through docking advantage, docking relationship, docking ability, docking environment, supermarket expectation and perceived quality under COVID-19, which can make supermarkets quickly implement the corresponding measures to minimize the impact of the epidemic, and stabilize the "agricultural super docking" supply chain in the face of major public emergencies.

I. Theoretical Model and Research Hypothesis

1. The Influence of Docking Advantage, Relationship, Ability and Environment on Supermarket Participation Intention.

Lihua Zhang(2010) thought that "Farmer-Supermarket Docking" inhibited the abnormal fluctuation of agricultural product price to some extent by establishing the purchase and sale relationship between farmers and retailers. Ying Li(2011) believed that supermarkets could improve their production planning by transferring expected consumer demand to producers by order. Some scholars believed that in the process of docking, supermarkets will provide technical, capital, manpower and other support for farmers, which can improve their agricultural products quality. As the retail terminal of agricultural products, supermarket is the leader in the transaction of "Farmer-Supermarket Docking", which would inevitably chase excess profits and pay attention to short-term interests. Pritchard and Godwin(2010) had the qualitative analysis of the docking relationship of instability from the agricultural cooperative and supermarket. The lack of spirit of contract, the lack of ability to detect agricultural products and the lack of normative contract affected the stability of "Farmer-Supermarket Docking". Mingyue Zhang et al.(2017) believed that the stronger the ability of supermarket to purchase agricultural products, the more quality and cheap the agricultural products it sold, and the stronger its willingness to participate in "Farmer-Supermarket Docking" was. The stronger the overall dispatching ability of supermarket, the more it would be able to realize the effective connection between the supply side and the demand side of agricultural products, the more it could adapt to the purchasing mode of "Farmer-Supermarket Docking" and the higher its enthusiasm for participation was. The stronger the inventory management ability of supermarket, the more active the behavior of participating in "Farmer-Supermarket Docking", the more it could adjust the storage and shelf according to the fresh product freshness and sales situation in real time. Xingli Xue(2017) believed that the good docking opportunity in the docking environment was helpful to increase the connection between the cooperative and the supermarket, to develop the supply chain of "Farmer-Supermarket Docking", and to improve the enthusiasm of the supermarket to participate. The better training and education of supermarkets was beneficial to understand the "Farmer-Supermarket Docking" and improve the enthusiasm of supermarkets to participate. Thus, this paper proposes the following hypotheses:

- H1a: Docking advantage has a significant positive impact on supermarket participation intention.
- H1b: Docking relationship has a significant positive impact on supermarket participation intention.
- H1c: Docking ability has a significant positive impact on supermarket participation intention.
- H1d: Docking environment has a significant positive impact on supermarket participation intention.

2. The Influence of Perceived Quality and Supermarket Expectation on Supermarket Participation Intention

Fornell(1996) found that customer expectation to direct effect on perceived quality, perceived value and customer satisfaction by investigating the retail industry in the United States. Simonson(2007) pointed out that customer expectation was the decisive factor of customer satisfaction and loyalty. Xiaoxiao Wei(2017) thought that perceived quality and customer expectation affect customer satisfaction and perceived quality includes the quality of agricultural products and service quality. Thus, this paper proposes the following hypotheses:

H2a: Perceived quality has a significant positive impact on supermarket participation intention.

H2b: Supermarket Expectation has a significant positive impact on supermarket participation intention.

3. Intermediate Effect of Perceived Quality and Supermarket Expectation

Jiajia Zhao(2014)pointed out that the cooperation intention, degree and ability between supermarkets and cooperatives significantly affected the efficiency of "Farmer-Supermarket Docking" and affected the satisfaction of participants, while the efficiency of "Farmer-Supermarket Docking" was determined by customer expectation and perceived quality, Guo and Lei Xu(2017) believed that the demand for supermarkets agricultural products, agricultural cooperative ability and regional economic level were significant factors affecting the stability of the relationship between supermarkets and agricultural cooperatives. Suxia Wang and Dinghuan Hu(2007)believed that encouraging supermarkets to set up modern logistics distribution centers encouraging agricultural suppliers and supermarkets to set up production bases and direct procurement in the producing areas were conducive to improving the logistics efficiency of agricultural products. Bing Liu and Hu(2013)believed that the government to Dinghuan may take measures "Farmer-Supermarket Docking" in an all-round way, hold "Farmer-Supermarket Docking" training activities and continue to formulate preferential policies in logistics services, which was conducive to encouraging supermarkets to participate in "Farmer-Supermarket Docking". Thus, this paper proposes the following hypotheses:

- H3a: Docking advantage has a significant positive impact on supermarket participation intention through perceived quality.
- H3b: Docking relationship has a significant positive impact on supermarket participation intention through perceived quality.
- H3c: Docking ability has a significant positive impact on supermarket participation intention through perceived quality.
- H3d: Docking environment has a significant positive impact on supermarket participation intention through perceived quality.
- H4a: Docking advantage has a significant positive impact on supermarket participation intention through supermarket expectation.
- H4b: Docking relationship has a significant positive impact on supermarket participation intention through supermarket expectation.

- H4c: Docking ability has a significant positive impact on supermarket participation intention through supermarket expectation.
- H4d: Docking environment has a significant positive impact on supermarket participation intention through supermarket expectation.

Docking advantage refers to the benefits that supermarkets may obtain in participating in "Farmer-Supermarket Docking". Its docking advantage is mainly considered from three aspects: product quality, price fluctuation and product supply. The stable interest link is an important guarantee that the agricultural cooperative and the supermarket obtains the agricultural product resources and the farmer realizes the stable income. The trust between supermarket and agricultural cooperative and the attitude of facing risk are also the important guarantee of the stability of docking relationship. Therefore, the docking relationship mainly includes benefit sharing, trust degree and risk sharing. Although "Farmer-Supermarket Docking" realizes the production and marketing docking and reduces the intermediate link, but also puts forward the higher request to docking ability. Combined with the existing research and actual investigation, it is found that there are three abilities that affect the willingness of supermarket to participate:purchasing,dispatching and distribution. "Farmer-Supermarket Docking" will not only be affected by the participants, but also by the external environment. In theory, the better the external environment, the more convenient the supermarket to participate in "Farmer-Supermarket Docking", the smaller the docking friction, the higher the willingness of supermarket to participate. The external environment mainly includes docking opportunities, training and education, policy awareness.

American Customer Satisfaction Index(ACSI) is a comprehensive evaluation index of customer satisfaction level based on the process of product and service consumption. The index points out that customer expectation, perceived quality and perceived value affect customer satisfaction. For customers, the better the perceived quality, the greater the perceived value, the more consistent with expectations, the higher the customer satisfaction. Customer satisfaction is composed of customer complaint and customer loyalty, so the factors that affects the willingness of supermarket participation are whether the supermarket is dissatisfied with the agricultural cooperative behavior, whether the supermarket has the intention of long-term cooperation for agricultural cooperative, and whether the actual feelings and expectations of the cooperative bring to the supermarket are different. Supermarket expectation is the embodiment of psychological activities of supermarket to agricultural cooperative behavior and its benefits. In the process of cooperation between supermarket and agricultural cooperative under "Farmer-Supermarket Docking", the expectation of supermarket is mainly reflected in meeting customer demand, profit ability and service ability. Perceived quality refers to the overall perception and evaluation of agricultural products under the process of cooperation, namely the evaluation of the overall situation of "Farmer-Supermarket Docking" products, including the types of agricultural products, distribution costs. Perceived quality and supermarket expectations to affect supermarket participation intention.

Some scholars thought that the ACSI only constructs the relationship between customer expectation, perceived quality, customer satisfaction and so on, and does not refine the specific measurement index. Based on this, this article puts forward that the factors supermarket participation are docking advantage, relationship, ability affecting and environment. Docking advantage refers to the benefits of supermarket participation in "Farmer-Supermarket Docking", that is the attraction of the expected income after joining "Farmer-Supermarket Docking" to supermarket. The stability of the docking relationship depends on the trust between the supermarket and the agricultural cooperative and the attitude when facing the risk. The benefit is the important guarantee for the agricultural cooperative and the supermarket to obtain the supply of agricultural products resources and to realize the stable income increase for the farmers. Docking ability includes three kinds abilities:purchasing,dispatching distribution. of and In the process of "Farmer-Supermarket Docking", it reduces the intermediate links and puts forward higher requirements for the docking ability of supermarkets at the same time. In addition to the influence of participants on "Farmer-Supermarket Docking", the external environment will also affect its docking process. In theory, the better the external environment, the more convenient the supermarket is to participate in"Farmer-Supermarket Docking", the smaller the docking friction, the higher the willingness of supermarket to participate.

The model in this research inherits the frame structure of perceived quality, customer expectation, perceived value and customer satisfaction in ACSI model, which provides a theoretical basis for the construction of supermarket participation intention model and the hypothesis of the relationship between variables under the "Farmer-Supermarket Docking" model.



(Figure 1) Research Model in this Paper

■. Sample Description, Variable Selection and Reliability and Validity Test

1. Sample Description and Variable Selection

By studying researches at home and abroad on the factors affecting supermarket participation intention, the relevant information is summarized and the questionnaire is designed. There are 26 questions in the questionnaire. The first part mainly investigates the characteristics of the sample supermarket, including the operating life, business scale, annual turnover and service radius of the supermarket. As the main part, the second part is considered from six aspects: docking advantage, docking relationship, docking ability, docking environment, perceived quality, supermarket expectation, using the 5 Likert scale, 1 said "very not willing to", 5 said "very willing to". This survey mainly uses the questionnaire survey, the research data comes from Jiangsu Province, mainly carries on the questionnaire survey to the supermarket staff. A total of 400 questionnaires were distributed, 227 were recovered, 19 invalid and incomplete questionnaires were eliminated and 208 valid questionnaires were obtained, the effective rate was 52. Table 1 is the basic statistics of specific variables and survey data.

Index	Item	The Mean	The Standard Deviation
Docking Advantage	Proportion of high-quality agricultural products during the outbreak	3.19	1.271
	Volatility of agricultural during the outbreak	3.56	1.194
	Stable availability of agricultural products during the outbreak	3.56	1.110
Docking Relationship	Frequency of contact between supermarkets and rural cooperatives during the outbreak	3.32	1.227
	Number of cooperatives linked to supermarkets during the outbreak	3.57	1.206
	Degree of trust in supermarkets and cooperatives during the outbreak	3.51	1.239
Docking Ability	Purchasing capacity during the outbreak	3.48	1,183
	Inventory management capacity during the outbreak	3.58	1.283
	Cold chain logistics vehicle utilization during the outbreak	3.36	1.311
Docking Environment	Numbers of fairs for agricultural products during the outbreak	3.21	1.352
	Numbers of offline and online training sessions for supermarket staff during the outbreak	3.68	1.174
	Supermarket's Cognition of "Farming-Supermarket Docking" Policy during the outbreak	3.56	1.057
Supermarket Expectation	Meet customer needs under COVID-19	3.60	1.045
	Profitable capacity under COVID-19	3.34	0.970
	Level of service under COVID-19	3.51	1.026
Perceived Quality	Add variety of agricultural products under COVID-19	3.55	0.962
	Reduce logistics costs under COVID-19	3.52	1.002
	Enhance visibility under COVID-19	3.50	0.978
Supermarkets Participation Intention	The extent to which supermarkets complain about suppliers during the outbreak	3.56	1.029
	The extent to which supermarkets loyalty about suppliers during the outbreak	3.46	1.021
	The degree of difference between reality and expectation during the outbreak	3.50	1.007

$\langle Table \ 1 \rangle$ Scale Construction and Basic Statistics

2. The Reliability Test

Before testing the relationship between variables, it is necessary to test the reliability and validity of the data. This study uses SPSS to carry out exploratory factor analysis. Firstly, the reliability test is carried out by using the Cronbach's α coefficient. The test results are shown in Table 2, and α values are all greater than 0.7, which indicates that the reliability of the questionnaire is good.

Variables	Cronbach's Alpha
Docking Advantage	0.793
Docking Relationship	0.794
Docking Ability	0.823
Docking Environment	0.818
Perceived Quality	0.778
Supermarket Expectation	0.846
Supermarkets Participation Intention	0.791

(Table 2) Reliability Statistic

3. Validity of the Test

Using KMO and Bartlett spherical test values verify the structural validity of the data. Its KMO test value is 0.857, more than 0.8, which indicates that the questionnaire is reasonable. The sig. value of Bartlett spherical test value is 0.000, less than 0.05. Then the principal component analysis method was used to analyze the data in the sample and the main factor with the characteristic root greater than 1 was extracted.

The details are shown in Table 3. The first six common factors in the table can be explained to add up to 70.328, more than 60% of the standard, indicating that these six common factors can fully reflect all the information of the original total table. Table 4 shows the rotation component matrix. If the load value of 18 items to variables is greater than 0.5, the results are satisfactory, which indicates that the structure of the table is reasonable.

By comparing the AVE values of each variable with the correlation coefficient, the distinguishing validity is tested. As shown in Table 5, the correlation coefficients were significantly correlated at 0.05 or 0.01, indicating that the scale was significant.

		Initial Eige	envalue	F	Extract the S Squares and	Sum of Load	Rotate the Sum of Squares to Load		
No.	Total	Variance (%)	Cumulative (%)	Total	Variance (%)	Cumulative (%)	Total	Variance (%)	Cumulative (%)
1	6.570	31.285	31.285	6.570	31.285	31.285	2.718	12.944	12.944
2	2.203	10.489	41.774	2.203	10.489	41.774	2.503	11.918	24.862
3	1.869	8.898	50.672	1.869	8.898	50.672	2.500	11.903	36.766
4	1.642	7.819	58.491	1.642	7.819	58.491	2.388	11.371	48.136
5	1.438	6.849	65.340	1.438	6.849	65.340	2.364	11.258	59.395
6	1.047	4.988	70.328	1.047	4.988	70.328	2.296	10.933	70.328
7	0.723	3.442	73.770						
8	0.578	2.752	76.522						
9	0.530	2.524	79.046						
10	0.502	2.391	81.437						
11	0.471	2.242	83.679						
12	0.466	2.220	85.899						
13	0.432	2.057	87.956						
14	0.424	2.021	89.977						
15	0.366	1.742	91.719						
16	0.355	1.692	93.412						
17	0.349	1.660	95.071						
18	0.289	1.374	96.445						
19	0.273	1.301	97.746						
20	0.252	1.200	98.947						
21	0.221	1.053	100.000						

(Table 3) Explain the Total Variance

		Element						
		1	2	3	4	5	6	
	AD1	0.171	0.013	0.087	0.000	0.081	0.828	
Docking Advantage	AD2	0.150	0.072	0.170	0.017	0.066	0.825	
	AD3	0.067	0.069	0.158	0.026	0.148	0.766	
	RE1	0.063	0.146	0.192	0.042	0.797	0.124	
Docking Relationship	RE2	0.158	0.016	0.154	0.029	0.823	0.079	
	RE3	0.020	0.148	0.117	0.109	0.791	0.094	
	AB1	0.118	0.833	0.051	0.094	0.047	0.120	
Docking Ability	AB2	0.185	0.817	0.156	0.064	0.135	-0.065	
	AB3	0.098	0.807	0.202	0.076	0.113	0.072	
	EN1	0.028	0.142	0.048	0.837	0.108	-0.055	
Docking Environment	EN2	0.165	-0.010	0.227	0.815	0.005	0.021	
	EN3	-0.070	0.102	0.125	0.865	0.063	0.074	
	QU1	0.839	0.140	0.062	0.072	0.130	0.142	
Perceived Quality	QU2	0.844	0.175	0.042	-0.013	0.085	0.130	
	QU3	0.820	0.086	0.108	0.026	0.007	0.094	
	EX1	0.182	0.228	0.739	0.116	0.124	0.128	
Supermarket Expectation	EX2	0.155	0.047	0.730	0.184	0.260	0.062	
	EX3	-0.147	0.150	0.806	0.100	0.089	0.248	

(Table 4) Rotation Component Matrix

Notes: 1. Extraction Method: Principal Component.

2. Rotation Method: Orthogonal rotation method with Kaiser standardization.

3. a. The rotation converges after 6 iterations.

(Table 5) Comparison of AVE Value and Correlation Coefficient of Each Variable

(Namely Discriminant Validity Test)

Var	SPI	AD	RE	AB	EN	QU	EX
SPI	0.818						
AD	0.423**	0.807					
RE	0.489**	0.279**	0.804				
AB	0.486**	0.177*	0.290**	0.819			
EN	0.376**	0.078	0.189**	0.222**	0.839		
QU	0.492**	0.317**	0.237**	0.333**	0.124	0.834	
EX	0.576**	0.374**	0.420**	0.379**	0.339**	0.244**	0.759

Note: *. Significant correlation at 0.05 level(bilateral).

**. Significant correlation at 0.01 level(bilateral).

IV. Model Test and Result Analysis

1. Model Specification

It is used by AMOS 21.0 to construct structural equation model, including of docking advantage, docking relationship, docking ability, docking environment, perceived quality, supermarket expectation and supermarket participation intention. It can be seen from figure 2 that the load of the standardized factor is above 0.7, and the fitting index of the model can be obtained by calculation : CMIN/DF=1.095, IFI, NFI, TLI, CFI are all above 0.9, RMSEA=0.021 (0.08. It is represented that the graph has good fitting degree.

A list of standardized path coefficients, non-standardized path coefficients, composite reliability(C.R.) and significance of the measurement model is given in Table 7. All the C.R. values were greater than 1.96, indicating that the coefficients were significant at 0.01 level.

Table 8 shows that docking advantage has a positive and significant effect on the willingness to participate in the supermarket. The standardized path coefficient is 0.18, the P value is 0.014, and the P value is significant at the 0.05 level. Hypothesis H1a is supported. Docking relationship has a significant positive effect on the willingness of supermarket to participate. The standardized path coefficient is 0.2, the P value is 0.008, and the P value is significant at 0.01 level. Hypothesis H1b is supported. Docking ability has a significant positive effect on the willingness of supermarket to participate. The standardized path coefficient is 0.22, the P value is 0.003, and the P value is significant at 0.01 level. Hypothesis H1c is supported. Docking environment has a significant positive effect on the willingness to participate in the supermarket. The standardized path coefficient is 0.18 and the P value is 0.008, which is significant at the level of 0.01. Hypothesis H1d is supported. The perceived quality has a significant positive effect on the willingness to participate in the supermarket. The standardized path coefficient is 0.24, and the P value is significant at the level of 0.001. Hypothesis H2a is supported. The expectation of supermarket has a significant positive effect on the willingness of supermarket to participate. The standardized path coefficient is 0.27 and the P value is 0.006, which is significant at the level of 0.01, Hypothesis H2b is supported.



{Figure 2> AMOS Research Model

 $\langle Table \ 6 \rangle$ Fitting Index of the Model

Model	CMIN/DF	IFI	NFI	TLI	CFI	RMSEA
Default Model	1.095	0.992	0.912	0.989	0.991	0.021
Reference Value	⟨3	>0.9	>0.9	>0.9	>0.9	<0.08

	⟨Table 7	>	Estimation	and	Composite	Reliability	/ of	model
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			Standardized Estimate	Unstandardized Estimate	C.R.	Р
	AD					
AD	\rightarrow	X1	0.77	1		
AD	\rightarrow	X2	0.81	0.982	10.215	***
AD	\rightarrow	X3	0.69	0.792	9.122	***
	RE					
RE	\rightarrow	X4	0.80	1		
RE	\rightarrow	X5	0.76	0.937	10.005	***
RE	\rightarrow	X6	0.71	0.889	9.353	***

			Standardized Estimate	Unstandardized Estimate	C.R.	Р
AB						
AB	\rightarrow	X7	0.76	1		
AB	\rightarrow	X8	0.79	1.131	10.577	***
AB	\rightarrow	X9	0.79	1.15	10.596	***
	EN					
EN	\rightarrow	X10	0.75	1		
EN	\rightarrow	X11	0.77	0.903	10.025	***
EN	\rightarrow	X12	0.83	0.861	10.675	***
	QU					
QU	\rightarrow	X13	0.86	1		
QU	\rightarrow	X14	0.83	1	12.754	***
QU	\rightarrow	X15	0.73	0.851	11.389	***
	EX					
EX	\rightarrow	X16	0.74	1		
EX	\rightarrow	X17	0.74	0.927	9.191	***
EX	\rightarrow	X18	0.73	0.956	9.277	***
	Y					
Y	\rightarrow	Y1	0.71	1		
Y	\rightarrow	Y2	0.80	1.151	10.293	***
Y	\rightarrow	Y3	0.76	1.054	9.78	***

Note: ***. P<0.01

<table 8=""></table>	Test res	ults of	principal	effect	hypothesis	
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			Unstandardized Estimate	Standardized Estimate	Р
AD	\rightarrow	Y	0.112	0.18	0.014
RE	\rightarrow	Y	0.147	0.20	0.008
AB	\rightarrow	Y	0.190	0.22	0.003
EN	\rightarrow	Y	0.131	0.18	0.008
EX	\rightarrow	Y	0.206	0.27	0.006
QU	\rightarrow	Y	0.274	0.24	***
AD	\rightarrow	EX	0.235	0.27	***
AD	\rightarrow	QU	0.237	0.28	***
RE	\rightarrow	EX	0.298	0.30	***
RE	\rightarrow	QU	0.009	0.10	0.249
AB	\rightarrow	EX	0.210	0.25	0.004
AB	\rightarrow	QU	0.264	0.30	***
EN	\rightarrow	EX	0.214	0.25	***
EN	\rightarrow	QU	0.009	0.01	0.943

Note: ***.P(0.01

2. Model Specification

This article analyzes the direct, indirect and overall effects of the independent variables of the model. From the data in Table 9, the mediating role of perceived quality in the relationship between docking relationship and supermarket participation intention is not significant. Hypothesis H3b is not hold. Perceived quality does not play a significant intermediary role in the relationship between docking environment and the willingness to participate in the supermarket. Hypothesis H3d does not hold. The standardized path coefficient between docking advantage and perceived quality is 0.28, the P value is significant at the level of 0.001. Hypothesis H3a was established by test. The standardized path coefficient between docking ability and perceived quality is 0.3, and the P value is significant at the level of 0.001. Hypothesis H3c was established by test. Above all, docking advantage and capability have a significant positive effect on the willingness of supermarket participation indirectly through perceived quality. However, the relationship between docking environment and perceived quality is not significant. It can not indirectly have a significant positive effect on supermarket participation intention through perceived quality.

The standardized path coefficient between docking advantage and supermarket expectation is 0.27, the P value is significant at the level of 0.001. Hypothesis H4a was established by test. The standardized path coefficient between the docking relationship and supermarket expectations is 0.3, the P value is significant at the level of 0.001. Hypothesis H4b was established by test. The standardized path coefficient between docking capacity and supermarket expectations is 0.25,P is 0.004, Significant at 0.01. Hypothesis H4c was established by test. The standardized path coefficient between the docking environment and supermarket expectations is 0.25, the P value is significant at the level of 0.001. Hypothesis H4a was established by test. Combined with the above analysis, docking advantage, relationship, ability and environment have a significant positive effect on the willingness of the supermarket to participate indirectly through the expectation of the supermarket.

	Indirect Effects (EX)	Indirect Effects(QU)	Total Indirect Effects	Direct Effects	Total Effects
AD→	0.273	0.284	0.179	0.143	0.322
RE→	0.299	0.101	0.198	0.106	0.304
AB→	0.245	0.295	0.217	0.138	0.355
EN→	0.253	0.006	0.181	0.071	0.252

(Table 9) Test Results of Mediating Effects

V. Conclusions and Suggestions

1. Conclusions

Under COVID-19, taking large and medium-sized supermarkets as a sample, this article studies the influencing factors of supermarket participation in "Farmer-Supermarket Docking" from the perspective of middle and senior managers, and analyzes the intermediary effect of supermarket expectation and perceived quality. According to the existing research and theory, combined with ACSI, the theoretical model of supermarket participation intention under the mode of "Farmer-Supermarket Docking" is constructed and tested by exploratory factor analysis, significance test and path analysis. The key findings of this study are following :

Firstly, docking advantage, relationship, environment and ability have a positive and significant impact on the willingness of supermarket participation. It shows that under COVID-19, supermarkets are more willing to try to join into this supply chain and even become the leader after understanding the advantages of "Farmer-Supermarket Docking" in order to provide consumers with stable and high-quality agricultural products, improve the utilization rate of employees, turn over inventory in time, and share risks and so on. Secondly, docking advantage, relationship, ability and environment can have a significant positive effect on the willingness of supermarket to participate through perceived quality and supermarket expectation. But supermarket expectation is more obvious than that of the perceived quality, which plays an intermediary role in the docking advantage, relationship, ability and environment. Docking advantage and ability for perceived quality, supermarket expectations and supermarket participation will be more effective. In other words, when considering whether to join the "Farmer-Supermarket Docking", supermarket managers will pay more attention to whether they can achieve the expected goal of the

supermarket and relieve existing supermarket pressure. They believe that the achievement of this goal depends more on the stable supply of agricultural products by upstream suppliers and the advantages of supermarkets themselves.

2. Recommendations

In order to improve the willingness of supermarkets to participate into "Farmer-Supermarket Docking", this article puts forward the following suggestions.

1) Deepening Digital Transformation in an All-round Way and Enhancing the Elasticity of Supply Chain Development

Under the influence of COVID-19, the supermarket, as the leader of the supply chain of "Farmer-Supermarket Docking", can be transformed from "Digital Transformation" to upgrade. Taking technology as the core and data as the driving force, the digital transformation of participants in each link is deepened in an all-round way to form a traceable information network. While optimizing the efficiency of resource allocation, the supply chain can deal with the risks in the external market more quickly and flexibly. The digital supply chain based on block chain technology can obtain and link the real information of agricultural products inventory of rural cooperatives. In this case, supermarkets can grasp the inventory level of other participants in the supply chain in real time and accurately grasp the operation of rural cooperatives and farmers in the upper and middle reaches of the supply chain. At the same time, the relevant data and demand of the downstream distribution supermarket can also be fed back to the upstream rural cooperatives and farmers to produce on demand and make full use of land resources. The vertical integration of supply chain constitutes a visual and transparent supply chain network, which realizes the data sharing of upstream and downstream enterprises in supply chain, promotes the efficient operation of supply chain, optimizes supply chain management, controls supply chain risk, and realizes reducing cost and increasing efficiency.

2) Expand Sales Channels, Optimize Inventory Management, Reduce Product Wastage

Agricultural products as daily necessities have less elastic demand and shorter shelf life. Selling the freshest agricultural products to customers is difficult for supermarkets to sell agricultural products. According to the particularity of COVID-19, the supermarket can develop and perfect the online sales and distribution to realize the service of fresh home. It also can additional community supermarkets. Compared with the large complex supermarket in the core commercial circle, the service radius of the community supermarket is limited to 0.3 square kilometers, which can better meet the needs of the residents to shop nearby during the epidemic period.

Supermarkets also use the Internet of Things to optimize inventory management. Through the Internet of things to track the whole process, supermarkets can confirm the production date and shelf life of agricultural products, cold chain transportation time, agricultural products on the shelf sales time and other information. Combined with the analysis of the three-party data of inventory, logistics and shelf, the real consumption of fresh products can be fed back to the upstream of the supply chain, the purchasing rhythm and decision can be optimized, the inventory level and turnover rate can be adjusted in time, and the distribution at the distribution end can be effectively carried out wastage.

3) Optimize the docking environment and perfect the docking channel

The government can vigorously support agricultural cooperatives, encourage farmers to join agricultural cooperatives, but also give financial subsidies to mobilize the enthusiasm of farmers. It can also integrate small-scale agricultural cooperatives, make their advantages complementary, enhance the overall production, distribution and other capabilities, and reduce their resistance in the "Farmer-Supermarket Docking". On the other hand, the government can perfect the channel of "agricultural super docking" by holding more agricultural products fairs, increasing the contact opportunities between supermarkets and agricultural cooperatives, and making more supermarket managers understand "Farmer-Supermarket Docking" supply chain. Agricultural cooperatives can also set up websites, find marketing means such as promotion, display their agricultural products, highlight their own advantages, and attract more supermarket partners.

Supermarkets can also use the chance to train employees. The transformation and upgrading of supermarket supply chain requires a group of excellent employees, while the staff of traditional supermarket generally have low education and poor quality, so it is difficult to adapt to the transformation and upgrading of supply chain. The isolation of personnel caused by COVID-19 is a favorable time for retail enterprises to organize employees to "recharge". Supermarkets can take full advantage of this opportunity to conduct training for employees. On the one hand, it can help stabilize staff confidence. On the other hand, it can be ready for the transformation and upgrading after COVID-19

from the skills, ideas to fill the board.

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