

Comparison of different sales models and investment value analysis of the fresh produce market under the COVID-19 epidemic

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Abstract. Now in China, more and more capital and giants are starting to join the fresh food market, and new consuming models are being tapped to further expand the \$100 billion market size. The fresh market e-commerce sales model has also seen growth, especially against the backdrop of the COVID-19 epidemic. In this paper, several leading companies in the Chinese fresh produce market will be analyzed, using different fresh produce e-commerce sales models in China as comparative indicators to explore the profitability of different sales models. Overall, the profitability of fresh produce companies depends on the strength of their supply chain and the quality of their upstream supplies. The results show that traditional fresh produce supermarkets have obvious supply chain advantages, relatively strong profitability and long-term investment value. The O2O model has some profitability, but it requires a lot of financial support and are prone to losses. The market size of the community group buying model is huge, but it is still in the market consolidation stage, and there may be huge profit margins when it matures.

Keywords: fresh produce market; O2O, Distributed Mini Warehouse; Community Group Buying Model.

1. Introduction

1.1 Background

With a variety of nutritional values required by the human body, fresh produce has become a daily necessity for most residents, and China's huge population base has created a vast space for the fresh food industry to grow. With the development of e-commerce, a large number of traditional fresh produce enterprises have gradually upgraded and transformed into e-commerce enterprises, relying on the Internet for online sales, which has expanded consumer coverage and prompted rising sales of fresh products. Especially under the catalyst of the COVID-19 epidemic, fresh food e-commerce ushered in rapid growth, while competition in the fresh food e-commerce industry will continue to escalate. The strongest supermarkets and fresh produce e-commerce companies with supply chain advantages will continue to be strong. The epidemic is a short-term event, and although some consumers may still return to offline in the future, the epidemic has popularised fresh-to-home and cultivated some users' habit of consuming fresh food online. The penetration rate of Fresh-to-Home has increased significantly compared to the level before epidemic.

1.2 Related research

Hu's research reveals the current state of the fresh market industry: this sector is becoming increasingly competitive, with the fresh e-commerce segment in particular attracting a number of companies due to its high demand, consumption and repurchase rates. Through data comparisons, he explains the fact that in 2019 the new crown virus prompted a boom in online consumption of fresh food, and points out the bottleneck in the industry's current growth, namely logistics preservation [1].

Xiao et al. analyzed the dual-channel pricing strategy of large fresh produce chain stores and concluded through experimental data and social surveys that the optimal pricing of the online channel is lower than that of the retail channel, and the optimal pricing of the online channel is negatively related to the sensitivity of online sales. Finally, a comparative analysis of the business capacity of

companies concluded that the dual-channel fresh food sales model is conducive to the expansion of market scale [2].

Dai et al. studied the fresh food quality input and preservation effort decisions and commodity presale mechanism and community group buying model of some companies in today's Chinese fresh food market, and constructed a two-stage pricing, ordering, and preservation effort decision model based on consumers' strategic behavior for fresh food community platform presale and fresh food retailer on-sale. The study found that the cooperation between the community group buying platform and the fresh food retailer will be reached when the expected attraction effect brought by the group buying platform reaches a certain level. This indicates that the attraction effect of the platform on the pick-up points is important for the offline fresh food retailers' on-sale business[3].

Wan's study concluded that with the prosperity of China's e-commerce market, the development of O2O model and the maturity of QR code payment technology, fresh food e-commerce has promoted the transformation and upgrading of the traditional fresh food industry by using the business advantages of the deep integration of online and offline, and analyzed the problems on the online marketing of fresh food e-commerce based on the results of SICAS theory and questionnaire survey with Jingdong 7fresh as an example, such as not enough emphasis on interaction with consumers, asymmetry between marketing information and reality, no good community word-of-mouth and brand influence, etc[4].

A study by Masayoshi Maruyama et al. prior to the COVID-19 epidemic, based on survey data from three large cities in China, explains several reasons that influence consumers to switch from traditional to modern retail models for purchasing fresh products. They found regional differences in consumer preferences from a consumer demand-side perspective and that purchase preferences were related to product freshness and safety[5].

Yu's study analyzed the issue of fresh food sales firms' choice of sales model. By comparing data collection and analysis based on two elemental dimensions of goodwill and product freshness, they found that resale is the dominant sales model for fresh food products with low wholesale prices regardless of the type of traditional retailers. However, as wholesale prices rise, in addition to wholesale prices, platforms need to consider the impact of channel competition and rates to choose the optimal sales model[6].

Yan, et al. investigated the influence of consumer behavior on fresh produce supply chain decision making, quantified the consumer behavior factors that influence the strategic decision making of firms as risk aversion coefficients, and finally designed two coordinated decision making approaches based on revenue and wholesale price for fresh produce supply chain decision making[7].

Yu et al. studied the impact of fresh produce pricing and service level decisions and channel leadership on price and service level and profitability. By building a Stackelberg game model based on a participant analysis of suppliers, retailers, and third-party logistics providers, they found that suppliers were instead able to achieve higher profits with channel leadership than the other two participants[8].

Yang analyzed the best pricing and product insurance strategies for each of the three models of fresh produce distribution - retail, dual-channel, and O2O (online-to-offline) - and the choice of the best model for different supply chain participants. The choice of the best model differs for different supply chain players: suppliers choose the best dual-channel model, while retailers choose the best O2O model[9].

Mohammadi et al. point out that consumer market demand is very sensitive to the selling price of fresh products and product freshness, and based on this fact proposes a coordination mechanism based on preservation technology that can both reduce product waste and increase profitability generated in the supply chain system. A real case study of the new coordination mechanism through this so-called revenue and preservation technology investment analysis confirms that the solution does have a significant effect on product preservation and on increasing profits in the fresh produce supply chain[10].

1.3 Objective

This paper will use industry data, dig into the logic behind the quantitative data, analyse the ideas behind the qualitative content, objectively and honestly explain the current state of the fresh produce industry and predict the future trends of the industry. The following section compares the three main business models used by fresh produce e-commerce: O2O, the front-end warehouse model, and the community group buying model, with one company from each model selected as a case study to compare their strengths, weaknesses and profitability. Finally, the investment risks in the fresh produce market, especially in fresh produce e-commerce companies, are analysed and investment recommendations are given.

2. Three of the existing sales models in the Chinese fresh produce market

This paper will focus on three of the more classic business models: the O2O model, the DMW model and the community group buying model that is rapidly developing under the epidemic.

O2O model: Online to Offline, means that offline business opportunities are combined with the Internet, allowing the Internet to become the front desk for offline transactions. In this way offline services can be used to solicit customers, consumers can use online to filter services, and there are transactions that can be settled online and quickly reach scale. The most important feature of the model is that the promotion is traceable and each transaction can be tracked.

DMW model: Distributed Mini Warehouse model, means that fresh goods are transferred in advance from large warehouses into smaller warehouses located near communities in the city, with the aim of being able to deliver goods to homes in the fastest possible time.

3. Overview of the competitive landscape

China's fresh produce industry is less concentrated, with many players in the market, mostly small and medium-sized traditional retailers that do not yet have the brand effect and scale. Well-known e-commerce companies in the fresh produce industry in China include Missfresh, Dingdong (Cayman) Limited, Freshhema, Jingdong Fresh, etc.

Along with the development of the Internet and e-commerce, the traditional retail industry is facing reform, and a large number of fresh food companies are actively exploring online sales and home delivery to optimize the consumer shopping experience and expand the coverage of consumer groups.

At this stage, the core of competition for Chinese fresh food companies is the operational model, as there is homogeneity in fresh food products and product quality itself is hardly an advantage. In order to improve the competitiveness of enterprises, an in-depth study of the operational model is needed. The table below gives the three main operating models that will be analysed in this paper.

Table 1. Characteristics of the three types of sales

Model	O2O	DMW	Community group buying model
Company	Freshhema	Missfresh	Xingsheng Selected
Business Model	Online + offline, offline chain of physical shops to meet the offline shopping and experience needs; online to provide the order portal, to provide sorting and delivery services	Rapid delivery using DMW and shops located around the customer	Marketing and order management by community leaders via WeChat, offline delivery
Delivery Method	Merchant delivery/ customers pick up in shop	Third party logistics distribution	Customer pickup
Distribution Efficiency	Depend on delivery distance	30min-2h	Next day
Profit Model	Difference between purchase and sale	Difference between purchase and sale	Difference between cost and sale

3.1 A typical example of O2O model: Freshhema

As a pioneer of the new retail business model, it provides integrated online services through a combination of offline shops and online APPs, focusing on fresh products and instant meals, with shops mostly around 5,000 square metres in size. As of August 2022, Freshhema has 329 self-operated shops in first- and second-tier cities across China. The integration of online and offline development is complementary, with mature shops accounting for around 60% of the online business and 40% of the offline business. The strong offline user experience serves as an endorsement for the online services and attracts traffic. At the same time, the offline shops take on the function of front and back warehouses to ensure timely delivery and reduce costs. The offline catering experience increases the time users spend in the shop on the one hand, and facilitates the handling of expired fresh products and reduces losses on the other.

The profitability and drivers of this model are examined here, using the example of Freshhema and its business model is broken down as follows.

Table 2. Freshhema

Shop & Warehouse Information	Target customers	Middle and upper income groups in first and second tier cities
	Customer acquisition methods	Offline + Alipay and other channels to promote
Single bin model	Customer unit price (estimated value)	80
	Corruption cost rate	8%
	Warehouse & shop cost rate	20%
	Community leader commissions, in-group running costs	
	Distribution costs	5%
	Operating profit	-3%

Freshhema's new retail model has a high percentage of online orders, with a good combination of online and offline. However, due to the distribution costs subsidised by the shops in the current competitive environment, and the high cost of increased sorting and packing staff in the shops, the in-store model of Boxmaster Fresh has yet to achieve large-scale profitability. If it can increase its customer unit price and achieve a high gross margin and a stable high repeat rate, it will help to dilute back office expenses and distribution costs.

3.2 A typical example of DMW model: Missfresh

In order to gain a deeper understanding of the profitability and drivers of the distribution mini warehouse model, Missfresh is taken as an example and unpacked its model as follows.

Table 3. Missfresh

Shop & Warehouse Information	Target customers	White collar workers in first and second tier cities
	Customer acquisition methods	Ad Placement + Fission Marketing
Single bin model	Customer unit price (estimated value)	80
	Corruption cost rate	2%
	Warehouse & shop cost rate	15%
	Community leader commissions, in-group running costs	
	Distribution costs	5%
	Operating profit	-2%

Because of its ability to solve the "last mile" of fresh produce and bring consumers a better user experience, the DMW model was once admired and attracted many followers. However, this asset-

and operation-heavy model has brought about difficult profitability issues that cannot be ignored. It can be seen from the table that the warehouse shop costs are high. The total operating costs of the central and front-end distribution mini warehouses are around 15%, including in-cabin staff costs, rent, utilities, depreciation and amortisation.

Also the distribution costs are lower, but difficult to pass on to consumers. Due to the establishment of front-end warehouses, the delivery service distance is relatively short. The cost of delivery for Missfresh is only about 5%, and the cost per order is only about RMB3-4, which is much lower than the cost of takeaway delivery of about RMB7 per order. This is much lower than the cost of about RMB7 per single delivery. However, due to the fierce competition in the industry and oversupply at this stage, it is difficult to pass on the delivery costs to consumers.

As Missfresh was not profitable and only relied on constant financing to maintain its existing customer base, investors eventually lost patience and withdrew or stopped injecting capital, and at the end of July 2022, Missfresh shut down its core front-end distribution mini warehouse operations.

The withdrawal of Missfresh has exposed some of the drawbacks of the front-end warehouse model, but there is no need to question this model and ignore its advantages. Now in the market still exist Dingdong (Cayman) using this model. The distribution mini warehouse model can meet users' immediate consumption needs in the fresh food category at a lower cost, and will co-exist with the community group buying model and offline supermarkets in the long term to serve consumers' differentiated needs.

3.3 A typical example of Community Group Buying model: Xingsheng Selected

Based on a brick-and-mortar community convenience supermarket, Xingsheng Selected sells a full range of selected products such as vegetables and fruits, meat, poultry and aquatic products, rice, flour and oil, and daily necessities to consumers in the vicinity of its shops in the form of limited-time special sales.

Table 4. Xingsheng Selected

Shop & Warehouse Information	Target customers	Low-tier cities, price-sensitive consumers
	Customer acquisition methods	Referrals from acquaintances, group leaders
Single bin model	Customer unit price (estimated value)	25
	Corruption cost rate	2%
	Warehouse & shop cost rate	
	Community leader commissions, in-group running costs	18%
	Distribution costs	
	Operating profit	5%

As can be seen from the table, the rate of product wastage is at a low level, while consumers picking up their own goods also reduces logistics costs. In addition, the commission cost of the group leader is in the range of 10-20% of the unit price, while undertaking important functions such as traffic generation, consumer maintenance and property costs. The cost of last-mile delivery alone is about 12%, and if you add in about 10 per cent of the cost of recruiting and marketing, the cost is higher than that of community groups.

For community group buying model, which emerged from the epidemic, buying was the most immediate need. When the platform wanted to reclaim its price advantage and productive life returned to its normal pace, the group-buying platform lost its appeal to consumers. So as regulation increased and price wars were called off, the group buying platforms began to gradually shrink the scale of their business.

Overall the community group buying model emerged from the background of the epidemic and still has its place in the context of the normalisation of the epidemic, it still needs to exist. At present, companies with this business model are in a period of integration, competing for the strength

of subsidy funds. When companies with insufficient funds are squeezed out of the market, leaving a winner, which may bring considerable benefits in the future.

4. Investment analysis of the fresh fruit industry in China

4.1 Investment risk

Due to China's huge population base, China's fresh produce market is in high demand and the industry has a wide scope for development, attracting a large number of businesses to enter the market, but there are still the following investment risks.

On the one hand, fresh produce as a non-standard product itself supply chain pressure, gross profit level is low, generally in about 20%, while subject to labor costs, rent, terminal distribution, commodity loss and attraction to obtain customers and many other costs, in the unit price and order volume instability, the overall profit model is more fragile. Take the common front-end warehouse model as an example, when the gross profit margin level reaches a more excellent 25% level, the overall operation is still in a loss-making state under the high cost of compliance + diversion + labour rent and other costs.

On the other hand, the quality of supply from upstream suppliers is difficult to guarantee, and the scale of development of China's fruit growing industry is still in its infancy.

Moreover, although the epidemic is largely under control in China, there are still sporadic confirmed local cases of new infections in a number of places. If the epidemic were to recur, it would have an impact on upstream product production and cross-regional logistics and transportation, causing supply shortages.

4.2 Investment recommendations

At present, although community group buying is still highly competitive, it is still escalating, so the possibility of a breakout in community group buying is high. The online pre-sale + next-day pick-up business model of community group buying offers the possibility of profitability for fresh produce e-commerce companies:

(1) from the upstream procurement point of view, community group buying adopts a pre-sale model to determine production by sales, while cash flow is theoretically more abundant than traditional retail, with a shorter settlement cycle to reduce procurement costs upstream;

(2) from the inventory and loss point of view, the pre-sale model is conducive to reducing inventory pressure, in the case of residents' strong autonomy in picking up goods, can effectively improve inventory turnover and reduce the cost of loss;

(3) from the delivery cost point of view, unlike the delivery to home model, consumer pick-up significantly reduces the delivery cost of the terminal.

Therefore, after a painful period of transition and calmness, community group buying will enter a stable development phase, and it is probable that 2-3 oligopolies will be formed to share the market share, and these winners will have investment value.

On the other side, compared to these e-commerce models, traditional fresh produce supermarkets have certain advantages in their supply chain system. At present, the Internet The giant has flooded into the community group purchase, giving large subsidies to the consumer side. When the industry returns to rationality and the subsidies stop, the test will be the platform's ability to perform. When the industry returns to a rational subsidy, the test of the platform is still its ability to perform. When the industry returns to rationality, the test will be the ability of the platform to deliver. The supply chain of the operators is ultimately reflected in the quality of their products. Traditional fresh produce supermarkets will continue to be the mainstream business in the fresh produce distribution sector due to their excellent supply chain capabilities.

5. Conclusion

This paper analyses the advantages and disadvantages of the three different business models based on the financial data of the three major companies. The study shows that the outbreak of the COVID-19 epidemic at the end of 2019 cultivated residents' consumption habits and preferences on fresh food e-commerce platforms within a short period of time, reducing market costs and bringing a spurt of consumer demand, which is expected to reduce the pressure on platforms to acquire customers. However, in the long run, only platforms with a well-developed supply system and distribution capabilities will be able to bring consumers a good consumption experience during this period, thereby reaping a more mature and stable customer base and further increasing market share in the future, while small and medium-sized platforms without a mature supply chain system will struggle to withstand the long-term cost and operational pressure. In the long run, traditional fresh food supermarkets will remain the mainstream business in the fresh food distribution sector with their excellent supply chain capabilities.

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