

Analysis of the Resilience of China's Fresh Food E-Commerce Supply Chains after COVID-19: Evidence from Hema Fresh

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Abstract. The COVID-19 pandemic has caused severe disruptions to global supply chains, and the fresh food e-commerce sector has been particularly affected due to the perishable nature of its products and the strict time requirements in distribution. Understanding how fresh food e-commerce platforms cope with such extreme shocks and rebuild their supply chains afterwards is therefore of both practical and research significance. This study takes Hema Fresh as a case to examine the disruption risks it encountered during the pandemic, the emergency measures it adopted, and the strategic transformation it pursued in the post-pandemic period. Using a single-case-study approach and drawing on multiple data sources including corporate financial reports, media coverage, academic papers, and industry research reports, the study applies thematic analysis to identify key patterns in Hema's resilience-building process. The findings show that Hema effectively addressed immediate crises through measures such as the "shared employee" program and multi-source procurement, and later achieved a turnaround from loss to profit through discount reforms and vertical supply chain integration. However, the study also identifies a persistent tension between cost efficiency and resilience redundancy, which remains a key challenge for Hema and the broader fresh e-commerce industry.

Keywords: Hema Fresh, Supply chain resilience, Fresh food e-commerce, COVID-19 disruption, Post-pandemic recovery

1. Introduction

The fresh food e-commerce industry experienced an unprecedented demand shock and supply chain disruption during COVID-19. Among various industries, the fresh retail industry was among the most severely affected by the pandemic due to its perishable products, strict time requirements in distribution, and continuous end-consumer demand. As a benchmark for new retail under Alibaba, Hema Fresh faced multiple challenges during the pandemic, including supply chain disruptions, labor shortages, and food safety concerns, with daily order volumes peaking at 10,000 in some stores. To cope with the crisis, Hema took the lead in launching the "shared employee" policy, organizing aid teams from more than 20 cities across the country to support material distribution in Shanghai and other places [1]. Afterwards, Hema continued to deepen its direct supply model from

production areas, relying on the national "Hema Village" and the two major supply chain operation centers in Wuhan and Chengdu to control the fresh food loss rate at a relatively low level.

Therefore, this study takes Hema Fresh as a case study to systematically analyze the disruption risks faced by its supply chain under the impact of the epidemic, the response strategies adopted, and the long-term resilience construction path. Based on these findings, it explores the impact of supply chain reform on enterprises' sustainable development in the post-epidemic era. This study summarizes Hema's emergency measures and subsequent adjustments during the epidemic, and also reveals the logic of fresh food e-commerce shifting from short-term response to long-term structural reform in the face of sudden shocks. These findings can provide a reference for similar enterprises when formulating supply chain strategies, helping them balance cost control and risk prevention.

2. Literature review

Supply chain resilience is a research hotspot in the fields of operations management and emergency management in recent years. Pettit et al. defined supply chain resilience as the ability of a supply chain to recover to its original state or evolve to a more ideal state after being disturbed. Its core dimensions include vulnerability and capability [2]. Christopher and Peck argue from the perspective of risk management that supply chain resilience stems from the identification, assessment, and proactive management of supply chain disruption risks [3]. In the specific context of the fresh food supply chain, due to the characteristics of product perishability, cold chain dependence, and demand volatility, building resilience faces more complex challenges than that of general manufacturing supply chains.

Ivanov points out that global supply chains prioritizing efficiency exhibit structural vulnerabilities, and resilience should be a key objective in supply chain design [4]. Graves et al. categorize the impacts of the pandemic into two types (surge in demand and supply constraints) providing an analytical framework for examining the crisis performance of fresh food e-commerce platforms [5]. Wu et al. conducted a systematic review based on 194 studies, confirming that the pandemic spurred growth in online consumption while simultaneously causing labor shortages and disruptions to production capacity and logistics [6]. They identified resilience strategies such as multi-channel procurement, alternative suppliers, and supply chain collaboration, providing theoretical support for this study's analysis of Hema's response measures.

In research on Hema Fresh, existing literature mainly focuses on the following dimensions: firstly, supply chain management models, such as studies analyzing Hema's "warehouse-store integration" operation model and its impact on fresh food distribution efficiency; secondly, logistics service quality and performance evaluation, some studies have evaluated Hema from the perspectives of logistics service quality and supply chain performance management; thirdly, in the context of new retail, strategic choices have been made. Research has constructed a three-dimensional supply chain strategy optimization framework based on a dynamic capability perspective, which includes "data-driven partner collaboration and green response". In addition, some scholars have conducted a dual case comparative study on the distribution models of Hema and JD Fresh.

International literature has further enriched research on the resilience of fresh food supply chains. Singh et al. found that digital platforms can enhance food supply chain resilience by incorporating partners and leveraging local resources; Singh, using a sample of UK online fresh food retailers, quantitatively verified the impact of multiple overlapping shocks and assessed the roles of alternative suppliers and increased distribution center capacity [7]. Su et al. identified 17 emergency logistics elements for fresh food e-commerce in Wuhan, emphasizing the critical value of rerouting

transportation, contingency plans, and real-time information sharing [8]. The FAO and EBRD, as well as Wang and Fu, examined the impact of the pandemic on fresh food supply systems and their resilience potential at the urban level [9, 10].

However, existing research has significant shortcomings in the following areas: firstly, most studies focus on normal supply chain operations and lack systematic analysis of the response mechanism of Hema's supply chain under extreme shock scenarios; secondly, although some scholars have paid attention to the driving effect of the epidemic on fresh food e-commerce, they have not deeply revealed the specific paths and mechanisms of building supply chain resilience at the enterprise level; thirdly, there is still a lack of systematic empirical analysis on the strategic logic and economic consequences of Hema's supply chain reform in the post-pandemic era. This study is based on the above-mentioned research gaps, taking Hema Fresh as a single case and comprehensively using multi-source data for in-depth analysis, aiming to provide theoretical insights and practical inspirations for understanding the construction path of resilience in fresh e-commerce supply chains.

3. Methodology

This study adopts a single case study method and selects Hema Fresh as the analysis object. The data sources include the following four categories: (1) financial reports officially released by Hema, public information from supplier conferences, and corporate announcements; (2) authoritative media reports on Hema's response strategies during the pandemic, including in-depth coverage by mainstream media such as China National Radio, 21st Century Business Herald, and National Business Daily; (3) research papers on Hema Fresh's supply chain management published in academic journals and retrieved from the China National Knowledge Infrastructure (CNKI) database; and (4) research reports on the fresh e-commerce and retail industry released by industry research institutions.

In terms of data analysis, this study uses thematic analysis to systematically code the collected textual data, extract core themes related to supply chain interruption risks, response strategies, and resilience building, and ensure the reliability and validity of the research conclusions through triangulation. Referring to the analysis method adopted by Su et al. in identifying the emergency logistics capability elements of fresh e-commerce, this study classifies and analyzes Hema's supply chain response measures according to the framework of "emergency-response-infrastructure investment model innovation" [8].

4. Analysis and discussion

4.1. The disruption risks and emergency response faced by Hema's supply chain during the epidemic period

The COVID-19 pandemic has dealt Hema a systemic, multi-faceted blow across the dimensions of supply, fulfillment, and demand, creating a classic disruption on both the supply and demand sides; the simultaneous eruption of multiple risks has amplified the inherent fragility of the fresh food supply chain.

On the supply side, origin lockdowns and logistics disruptions posed the primary threat. In extreme situations, a single local supply system has inherent fragility, and cross regional allocation capability becomes a key support for supply chain resilience. On the transportation side, the extreme shortage of human resources has become the most prominent bottleneck. Hou Yi, President of

Hema, listed "personnel shortage" as one of the core challenges when reviewing the impact posed by the epidemic. During COVID-19 outbreak in Shanghai in 2022, many staff and delivery personnel at Hema stores were unable to work due to lockdown measures, resulting in a significant increase in demand. Some stores had to shut down their online delivery channels. The shortage of transportation capacity has directly led to the extension of delivery time. In core areas such as Lujiazui and Changning Road in Shanghai, consumers basically had to book delivery one day in advance. This conclusion is consistent with the view expressed by Su et al., who argue that, during emergency situations, the ability to restructure transportation routes and optimize logistics scheduling determines the resilience of fresh food e-commerce platforms [8].

On the demand side, the panic hoarding and surge in order volume caused by the epidemic have further amplified the supply-demand contradiction. Wang and Fu found significant differences in the supply capacity of fresh food during the lockdown period in Shanghai in 2022, which further highlighted the importance of emergency logistics planning [6]. Multiple risks have compounded and interacted, creating a synchronized disruption effect that poses a severe challenge to Hema's regular supply chain system.

Faced with the multidimensional impact mentioned above, Hema's emergency response reflects a high degree of organizational agility and innovative mode. The most iconic measure is the pioneering introduction of the "shared employee" policy. On February 3, 2020, Hema officially announced a "shared employee" cooperation with catering brands such as Yunhaiyao, Xibei, Tanyu, and Youth Restaurant. This mode skillfully connects the idle labor force in the catering industry due to the closure with the surging employment demand of fresh food e-commerce, and realizes the optimal allocation of resources across industries. Singh et al. found that mature e-commerce food operators can effectively enhance supply chain resilience by introducing partners to cope with external shocks. Hema's "shared employee" model illustrates this logic in practice [11].

At the same time, Hema adopted a dual track supply strategy of "local first, supplemented by other provinces" on the supply side. In Wuhan, Hema relied on local fresh food processing centers for the first level of quality control and packaging decomposition, while also transferring and supplementing from large warehouses in Shanghai, Changsha, and other places. At the product level, Hema also adopted a flexible product strategy by breaking down and repackaging large fruit gift boxes originally intended for the Spring Festival to serve more family customers during lockdowns. The report by FAO and EBRD pointed out that the urban food distribution pattern underwent profound changes during the epidemic, and the acceleration of connecting supermarkets and digital platforms for delivery services has become a global trend [10]. Hema's practice is a typical manifestation of this global trend in China. These measures together constitute Hema's emergency response system in the early stages of the crisis, which helped maintain the basic operation of the supply chain under extreme conditions.

4.2. Hema's supply chain strategic transformation and economic effects in the post-pandemic era

After the demand dividend generated by the epidemic recedes, Hema faced more severe market competition and profit pressure. In this context, Hema launched a strategic adjustment centered on "discounting" transformation and vertical supply chain construction.

In terms of discount transformation, Hema launched significant price and category reforms. The company announced a reduction in product categories from 8,000 to 5,000, while implementing a maximum price reduction of 20% for the remaining products. Hema has set "offline exclusive prices" for over 5,000 products such as dairy products, water drinks, and frozen foods, with prices

generally reduced by 20%. At the business level, after taking office, Hema CEO Yan Xiaolei significantly reduced more than ten Hema business models to two: Hema Fresh and hard discount store Hema NB (later renamed "Super Box NB"). Hema NB plans to grow to 300 stores by fiscal year 2025. The essence of this strategic adjustment is to support price competition through improving the efficiency of the supply chain, by cutting intermediate links, compressing channel costs, and diluting costs through economies of scale. Graves et al. pointed out that one of the core challenges facing supply chains in the post-pandemic era is how to find a new balance between efficiency and resilience. The discount transformation of Hema not only improves efficiency, but also carries the risk of weakening resilience redundancy [5].

The pandemic exposed structural contradictions in the efficiency and resilience of the fresh food supply chain, and it also prompted Hema to shift from short-term, emergency-based resilience measures to long-term, structural supply chain reforms.

In terms of vertical supply chain integration, Hema continued to extend upstream along the industrial chain. By 2025, Hema has built 8 supply chain centers, over 300 direct procurement bases, 8 logistics transit warehouses, and hundreds of "Hema villages". In the field of fruits, Hema has established a "Fruit Alliance" with 22 leading domestic fruit companies to connect the entire "production supply sales" chain. In the bakery industry, Hema has established a complete supply chain of "fresh fruits + cream + production factories". The effectiveness of a vertical supply chain lies in reducing intermediate costs, ultimately reflected in a decrease in product prices and an improvement in quality. The report by FAO and EBRD emphasized that building resilience in urban food logistics systems after the pandemic requires strengthening food system linkages between rural and urban areas [9]. The vertical supply chain construction of Hema reflects this idea, which improves the efficiency and controllability of the entire system by reducing intermediate links.

Structural reforms in the supply chain ultimately translated into significant positive economic outcomes. Alibaba's annual report for fiscal year 2025 shows that Hema's overall GMV exceeded 75 billion yuan, and it achieved positive adjusted EBITA for the first time. By 2025, the overall revenue growth rate of Hema exceeded 40% year-on-year, and the dual formats of Hema Fresh and Super Box Computing NB served over 100 million consumers [12]. This turning point from loss to profit can largely be attributed to the continuous improvement of supply chain efficiency. Wu et al. point out that the recovery strategy of the food supply chain after the epidemic needs to balance short-term emergency response and long-term structural reform [6].

However, it is worth reflecting on the subtle tension between discount transformation and supply chain resilience. Excessive pursuit of cost compression may weaken the redundancy capability of the supply chain in extreme situations, and it is precisely this redundancy that constitutes an important source of resilience. As warned by Graves et al., supply chain management in the post-pandemic era cannot simply return to the old path of "efficiency first", but needs to find a sustainable balance between efficiency and resilience [5]. Finding a sustainable balance between efficiency and resilience will be a long-term challenge for Hema and the entire fresh e-commerce industry.

5. Conclusion

This study takes Hema Fresh as a case study to systematically analyze the disruption risk, emergency response, resilience building path, and strategic transformation of its supply chain under the impact of the COVID-19 pandemic. Hema's discount reform and vertical supply chain construction have achieved significant results. According to the previous analysis, both the annual revenue and consumer reach demonstrate the reliability and outstanding leadership of its supply

chain strategy in the supermarket retail industry. On the other hand, although discount strategies lower prices, they also compress cost margins, which may weaken redundancy in staffing and inventory in emergency situations. How to find a sustainable balance between price competition and sudden supply guarantee is the practical challenge that Hema needs to face in the next step. This study makes theoretical contributions by applying supply chain resilience theory to the unique setting of fresh food e-commerce. It identifies a three stage pathway to resilience development, covering emergency response, infrastructure investment, and model innovation. The research also finds that the conflict between efficiency orientation and resilience orientation constitutes the central paradox of supply chain management in the post epidemic era. The limitation of the study lies in the limited universality of single case studies. Future research can further validate the findings of this article through multi-case comparisons or quantitative methods.

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