

# Optimizing Supply Chain Resilience: The Guangzhou Mengniu Case

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## Abstract:

This paper explores the operations and supply chain with Mengniu Dairy, one of the most famous dairy companies in China, based on a subsidiary called Guangzhou M.N Milk Industry Sales Co., Ltd. The research, which looks at Mengniu's operational strategies and integrates the cooperation with supply chains in its business side of shelf-stable milk as well as fresh milk products, revealed a situation brought about by external factors including the COVID-19 pandemic, Russia-Ukraine war challenges, and currency exchange rate movements. Priority issues have been identified, such as uncertainty in the prices of raw materials, deflation effects, and bullwhip effect towards Cold Chain Logistics Being Others. Addressing these challenges, the paper proposes solutions such as-with regards to procurement-diversifying sources of material and services; enhancing cold chain logistics using state-of-the-art technology; adopting Just-In-Time (JIT) production methodologies for greater resilience in supply chains while optimizing operational and cost efficiency. The report closes with key points of advice on how to overcome these hurdles post-pandemic, featuring directions from improving risk management, building stronger partnerships in the supply chain, and providing educating consumers.

**Keywords:** Mengniu, Dairy Industry, Supply Chain Management, Cold Chain Transportation, COVID-19 Impact, Exchange Rate, Raw Material Prices, Bullwhip Effect, Just-In-Time Production, Guangzhou Mengniu, Risk Management, Operational Strategy, Fresh Milk Market, China Dairy Market

## 1. Introduction

Mengniu is a famous milk brand in China. Their main products are dairy products, with dozens of different brands and types. Mengniu mainly deals in room temperature milk (17 brands in total), fresh milk (2 brands) and other dairy products such as cheese, ice cream, yogurt and milk powder (Mengniu, 2023a). Due to the huge scale of this company, the main target of this paper is Guangzhou Mengniu Milk Industry Sales Co. Ltd., a subsidiary of Mengniu. The paper will focus on normal temperature milk and fresh milk (Cryogenic liquid milk) operated by Mengniu.

According to Mengniu (2023b) and Macrotrend (2023), the global revenue and profit of Mengniu in 2018-2022 are as follows:

Except for the COVID-19 influence in 2020, Mengniu's global revenue showed a steady upward trend. Since Mengniu's international business accounts for only 10%, this statement can represent the operating status of Mengniu in China (Mengniu, 2023a).

For the dairy milk market in China, Mengniu and Yili have established an oligopoly over 10 years. They together account for nearly half of China's dairy market. Other brands such as Guangming, Junlebao, New Dairy, Sanyuan and other products have a market share of less than 5%

each (The Value Pendulum, 2020).

However, due to the particularity of China's milk market and the immature characteristics of cold chain transportation, the market of fresh milk will have a large space for development (Wang, Zhang and Gao, 2023a), and this trend may endanger the currently popular market of normal temperature milk in China. At the same time, due to the various impacts of COVID-19 and the Russia-Ukraine war, Mengniu's future supply chain will face challenges.

This paper will analyze the operation and Supply Chain management of Mengniu from the aspects of Location, Process Design and Supply Chain Partnerships. China's exchange rate changes during the war, as well as the challenges that supply chains and the post-COVID-19 era will encounter. After that, the report provides solutions to these challenges and how operations and supply chain managers should implement them.

## 2. Mengniu's Current Operations and Supply Chain

### 2.1 Theory Based Analyzing Mengniu's Operations

#### 2.1.1 Location

Locational factors influence the business operation's

choice, both Quantitative and Qualitative (Slack, Brandon-Jones and Burgess, 2022).

Qualitative factors include cultural, social factors, and so on.

In terms of cultural and social factors, the most popular milk in China is room temperature milk. Unlike most other countries in the world, global consumption of low-temperature liquid milk should account for more than 80% of liquid milk, while China's current consumption is only about 15%, so high-end pasteurized milk (low-temperature liquid milk/fresh milk) offers significant growth opportunities (Sun, 2021).

In this case, Mengniu's main sales product is room temperature milk.

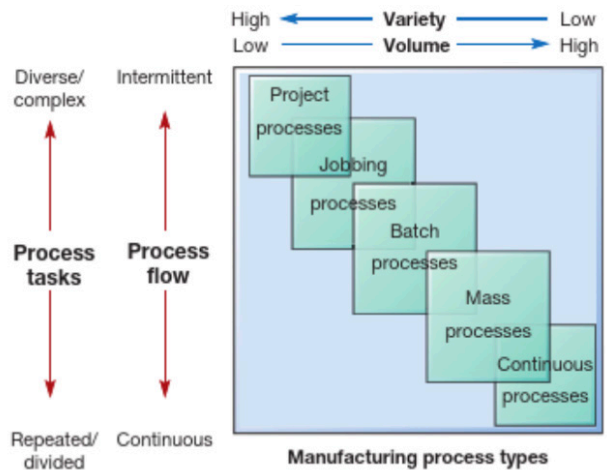
For quantitative dimension, according to Wang, Zhang and Gao (2023a), the survey statistics from July 2021 to June 2022, from the online sales of normal temperature milk, Mengniu ranked first occupied 52% of the market share, and Yili ranked second occupied 45%. Mengniu and Yili together account for 45% of offline sales.

In the case of fresh milk. In China, the sales of low-temperature liquid milk are mainly distributed in cities with relatively perfect cold chain transportation and chain supermarket infrastructure, and Guangzhou, as one of the cities with good development, is also listed in it (Cai and Zhang, 2022). Therefore Guangzhou Mengniu Milk Industry Sales Co.,Ltd. It has a relatively good geographical environment, which promotes the sales of low-temperature liquid milk and has a high development space.

However, Online sales of Mengniu's low-temperature liquid milk account for only 8%-9% of the market. Its offline market share is 36%. However, it should be noted that China's milk online market sales are eight times that of offline (Wang, Zhang and Gao, 2023a). As a result, Mengniu lags in sales of pasteurized milk.

### 2.1.2 Mengniu's Process Design

According to Slack, Brandon-Jones and Burgess (2022), process design can facilitate organizations to achieve their performance of process. Manufacturing Process can be roughly defined as the following five types: Project, Job, Batch, Mass, Continuous Flow. This is highly relevant to the Variety and volume of products produced.



Mengniu production involves multiple stages, such as collecting raw milk, handling, processing, packaging, etc., which require specific handling and waiting times. Its Production process has the characteristics of Batch Type and Mass Type, that is, it maintains a certain degree of production flexibility and adaptability, but also pursues scale and automation to improve efficiency. For example, Mengniu's flagship brand Telunsu (room temperature milk) has a very high growth trend every year (Mengniu, 2022), so the production of Telunsu has reached economies of scale, and through standardized production processes, Mengniu can significantly reduce production costs.

However, due to the low popularity of fresh milk in China and the short shelf life, the production quantity and scale of Mengniu's fresh milk products cannot fully reach the level of scale economy, and Mengniu, like its competitors, does not have high investment in low-temperature pasteurized milk, so it has relatively high production, transportation and inventory cost (Hou, 2023). Therefore, even though fresh milk and normal temperature milk have the same process type, the quantity and frequency of production need to be more flexible.

### 2.1.3 Supply Chain Partnerships

The quality of supplier relationship is closely related to the type of inter-firm contact and resource Scope (Slack and Lewis, 2019).

As one of the largest dairy brands in China, Mengniu has a close cooperation relationship with Upstream and Downstream of the supply chain. This provides a very solid foundation for Mengniu's oligopoly in the dairy industry.

Upstream refers to the process stage involving raw materials and the initial stages of production (Chopra, 2019). For example, the cooperation between Mengniu and China Agricultural University has optimized the milk production efficiency of Mengniu dairy farms, reducing the cost

price of milk per kilogram by 0.1-0.2 yuan. On the basis of previous cooperation, it is proposed to carry out in-depth cooperation around precision management and lean production (China Agricultural University, 2021).

The Downstream of the supply chain means the process stage that is closer to the user or customer (Chopra, 2019), such as delivery and retail. Jingdong is one of the largest logistics companies in China, with nearly 300,000 distribution staff and 30 million warehouse area (Jingdong, 2023). In 2019, Mengniu established cooperation with JD Home, which was upgraded to a strategic partnership in 2020 (China.com, 2022). This means that Mengniu and Jingdong will have a long-term cooperation and a high degree of resource sharing.

The firm and partnership have enabled Mengniu to have good sustainable development and consolidated its position in the Chinese dairy market.

## 2.2 Mengniu's Potential Challenges

### 2.2.1 Raw Materials Price Affected by Russia-Ukraine War

The war in Ukraine could have a direct impact on Mengniu's upstream supply chain costs. Russia and Ukraine together account for nearly a third of the world's wheat and barley exports. Due to the port closure caused by the war, the price of dairy feed based on wheat will increase (ABC News, 2022), which will increase the cost of the supply chain. However, as China is the largest wheat grower and Russia, the largest wheat exporter with which China has good relations, has exported much more wheat than expected, so feed prices influenced by war are not a threat to Mengniu in the long run (Braun & Braun, 2023).

In the short term, however, global markets and social unrest still pose a high degree of uncertainty for Mengniu, especially in China, which is very close to Russia. For example, in early 2022, wheat rose by 60.14% and coal rose by 69.31% in a short period of time (Statista, 2022). Rapid price fluctuations may interfere with upstream supply chain purchasing decisions and lead to fluctuations in customer demand for various goods.

### 2.2.2 Deflation Cause by Exchange Rate

In recent years, China has controlled their own exchange rate, which has led to deflation, especially the decline in food prices (Reuters, 2023). If Mengniu can take advantage of falling production costs and raw material costs due to deflation, this could be an opportunity to increase profits. However, deflation may increase consumers' desire to buy in the short term (Reza, 2017), while in the long term it may lead to a significant decrease in consumers' desire to spend (Investopedia, 2023).

In addition, half of China's feed is imported (Dairy Head-

lines, 2023), and a fall in the Chinese exchange rate will make imports more expensive. As mentioned before, feed prices affected by the Russia-Ukraine war have limited impact on China. However, under the dual effects of exchange rates and war, food prices will experience volatile fluctuations.

### 2.2.3 Bullwhip Effect Posed by COVID-19 and Cold Chain Transportation

After the COVID-19 outbreak in 2020, consumers' awareness of dairy products to enhance immunity has increased, and residents' demand for dairy products such as milk has increased. Milk prices, for example, saw a sharp increase in the second half of 2020 (Wang, Zhang and Gao, 2023b). This is both an opportunity and a challenge for Mengniu. This could lead to Mengniu having a very uncertain estimate of market demand, leading to bullwhip effect. The emergence of bullwhip effect may bring a series of chain reactions, such as the increase of inventory cost and the disorder of production plan (Lee, Padmanabhan and Whang, 1997).

Meanwhile, cold chain transport has encountered greater challenges during COVID-19. In the first quarter of 2022, due to road closures, declining resident income and other reasons, the purchase frequency of low-temperature liquid milk, which was originally low in sales, declined. At the same time, the road closures caused by the epidemic made it more difficult to deliver fresh milk products, which were difficult to preserve, to consumers (Cai and Zhang, 2022). When the bullwhip effect and the problem of cold chain transportation appear at the same time, it will be more difficult for Mengniu to predict consumer demand, so the production and sales of fresh milk will encounter greater challenges.

## 3 Solutions of the Challenges

### 3.1 Operations and Supply Chains Improvement

#### 3.1.1 Diversified Purchasing for Wild Fluctuations in Raw Material Prices

The challenge of raw material price changes brought about by the Russian-Ukrainian war and exchange rate changes comes from the upstream of the supply chain, that is, the feeding materials of dairy cows (ABC News, 2022). Downstream cost increases are added upstream in the supply chain, for example, raw milk prices are also rising because of the rising price of cow feed.

Therefore, Mengniu should consider diversified procurement issues. For example, reducing dependence on wheat from other countries, turning to domestic sources for feed materials for cows, and signing long-term cooperative

agreements with more suppliers to lock in prices to avoid wild fluctuations in raw material prices.

### 3.1.2 Investment for Cold Chain Transport Problems and Bullwhip Effect

In recent years, Mengniu and its competitor Yili have been considering improving the capacity of cold chain transportation in order to gain the market of low-temperature liquid milk (Cai and Zhang, 2022).

Food cold chain transportation is not perfect in China, so the cost of cold chain transportation is high, especially in Guangzhou, where the average climate is relatively hot. The milk market has relatively low differentiation, and the taste and nutrition of different brands of milk have relatively little difference (Dong et al., 2023). Therefore, the main competition of fresh milk between the duopoly Yili and Mengniu lies in cost. Who can get better cold chain transportation in advance, who can get the initiative and competitive advantage in the fresh milk market. Therefore, Mengniu should develop and invest in cold chain transportation, or look for cooperation enterprises in cold chain transportation.

Furthermore, for the prevention of bullwhip effect, Mengniu should consider strengthening the database, targeted monitoring of each stage of the supply chain, to avoid milk expiration and waste due to uncertain demand.

## 3.2 The Suggestion Implemented by Operations & Supply Chain Managers

For the implementation of the solutions, Operations and supply chain managers can consider the following points.

### 3.2.1 Risk Management

The Russia-Ukraine war led to exogenous shock, which means that these shocks came from the outside, and the drastic changes in the global raw material and fuels market are not something that the organization can directly intervene in.

This has an impact on the stability and efficiency of Mengniu's supply chain. As a result, operations and supply chain managers should be aware that operational and supply chain resilience is critical for organizations to ensure that they continue to run and adapt to change even when they encounter these external shocks.

Therefore, Risk management is crucial. Risk management is about being able to accurately measure the emergence of risks and prevent them from becoming worse or having the ability to reduce and prevent consequences when risks have already emerged (Slack, Brandon-Jones and Burgess, 2022).

The ability to avoid risks is related to Supply Chain Resilience. There are five Pillars of Supply Chain Resilience, namely supply chain reengineering, collaboration, agility,

SCRM culture Crisis Management (Christopher and Peck, 2004). Faced with the problem of volatile raw material prices, Managers should focus on Collaboration and Agility.

In terms of Collaboration, Mengniu should choose to build good community relationships with suppliers and partners, such as long-term knowledge sharing and cooperation with China Agricultural University and Jingdong Home (China Agricultural University, 2021; China.com, 2022). At the same time, long-term cooperation contracts should be signed with various raw material organizations, including the provision of stable prices and unified quality of raw materials.

In terms of Agility, since most of the milk products of Mengniu are room temperature milk (Mengniu, 2023a), they have a relatively long shelf life. Consider increasing inventory levels and inventories to meet market demand and avoid the cost of producing new products due to sudden price increases. Flexible production facilities are also essential, for example during periods of rising raw material prices, the production of higher-margin products (such as Telunsu) can be considered, in order to avoid a sharp reduction in the margins of inexpensive products.

### 3.2.2 Possible Supply Chain Partnerships

For the improvement of Cold Chain supply, Mengniu can consider increasing supply chain partnerships.

Its own investment will bring relatively high risks, and to gain competitive advantages in a short period of time, Mengniu can consider developing more partnerships, such as cooperating with Hema's cold chain transportation and supermarkets.

China's food cold chain transportation is at a relatively initial stage, while Freshbox (Hema Fresh) has a relatively excellent cold chain infrastructure construction, and Hema has 15 direct stores in Guangzhou (Hema, 2023). Hema's cold chain transportation may help Mengniu's fresh milk transportation problems and support the offline sales of Mengniu's fresh milk products.

In addition, Guangzhou has a lot of partners to choose from, such as Wal-Mart, a large supermarket, and 7-Eleven, a small chain. Strengthening the cooperation relationship can also enhance the Supply Chain Resilience and enhance the sustainable development of Mengniu.

### 3.2.3 JIT on Bullwhip Effect

In order to reduce the impact of bullwhip effect, Mengniu can consider using production methods Just in time. Just in time (JIT) means determining the amount of production based on the amount of demand (Slack, Brandon-Jones and Burgess, 2022). JIT production methods are designed to reduce inventory, which means that demand signals need to be clearer, reducing the problem of too much vol-



atility in demand.

Especially for fresh milk products that need cold chain transportation, too much production will lead to a large amount of milk expiration. In the era of uncertain demand and the Chinese market, JIT can greatly avoid the problem of overstocking and excessive costs.

However, there are also some potential barriers to the implementation.

### 3.2.4 Potential Barriers in Implementation

From the issue of signing long-term cooperation contracts for raw materials, entrepreneurs in the world are aware that the Russia-Ukraine war may bring drastic fluctuations in food and fuel, so it is inevitable that there will be a game when you want to sign long-term price agreements with raw material supply companies. Both the companies and suppliers will try to maximize their own interests.

For Possible Partnerships, Mengniu already has a strategic partnership with Jingdong Home, and Hema is one of Jingdong Home's potential competitors, so the cooperation may lead to dissatisfaction of the partners. Managers should consider whether working with multiple cold-chain organizations will bring conflicts.

Investment and cooperation in cold chain transportation will consume a lot of costs. It still needs to be taken into account here, since the Chinese people are basically drinking milk at room temperature for a long time (Sun, 2021). And the use of JIT to provide fresh milk supply may result in insufficient supply of fresh milk. Such instability will still drive customers toward familiar, room-temperature milk products. Therefore, the challenge of selling cold liquid milk is not only in the supply chain, but also in customer acceptance.

### 3.3 Overcome The Potential Barriers During Post COVID-19

As the impact of the epidemic gradually recovers, production levels in various industries are gradually returning to normal levels. However, according to UN News (2023), the global economic growth in 2023 will decrease from 3.1% to 2.5% compared with the previous two decades. At the same time, tighter financial conditions and rising interest rates have led to increased pressure on businesses around the world. As a result, factories may increasingly need to work together compared to before the pandemic.

In the context of such conditions and the fluctuating market prices of raw materials, Mengniu may have relatively higher bargaining power from the perspective of cooperation with raw material enterprises. At the same time, it is also possible to consider signing flexible pricing terms, so that raw materials in line with market fluctuations while obtaining the highest interest. From the perspective of possible competition issues between partners, managers

should fully consider the benefits and risks of cooperation with different companies and establish more transparent communication mechanisms, such as ensuring that Jingdong understands the intentions and goals of Mengniu's cooperation with other organizations.

In addition, after the epidemic comes, people are more aware of the importance of health and immunity, so milk products will be more popular. Meanwhile, fresh milk has better flavor and taste. After the cold chain transportation in Guangzhou is gradually improved, Fresh milk is expected to gain dominance (Wang, Zhang and Gao, 2023b). Therefore, for the Chinese people are not familiar with the cold chain transport of fresh milk, Mengniu need consider publicizing the nutritional power and taste of fresh milk.

Finally, JIT production methods may only work in some cases. Mengniu should also consider increasing the cultivation of lean manufacturing, sharing information with partners (such as with China Agricultural University), increasing supply chain Visibility, or using other inventory management methods such as Buffer to flexibly adjust supply chain strategies.

## 4. Conclusion

Mengniu is a famous dairy product brand in China. Guangzhou has a high development space under the relatively developed infrastructure and cold chain transport construction, so Guangzhou Mengniu Milk Industry Sales Co. Ltd. has a very good development prospect. However, under the influence of the Russia-Ukraine war and COVID-19, the economy, finance, crop and fuel markets of China and the world have been impacted to varying degrees (UN News, 2023).

These external influences have exposed Mengniu to risks both upstream and downstream in the supply chain. Upstream, more expensive and volatile raw materials and fuel markets have increased product costs. Downstream, customer spending habits change, and unpredictable demand can lead to overstocking or supply problems (bull-whip effect).

To address these challenges, Mengniu should consider enhancing risk management capabilities, Supply Chain Resilience, and sign agreements with different suppliers to increase the transparency of the supply chain and seek more partnerships. At the same time, consider flexible use and development of inventory management methods, such as JIT, Buffer, Lean manufacturing, etc.

With the gradual improvement of Chinese cold chain transportation system, fresh milk products may gradually replace normal temperature milk in Chinese major city (Cai and Zhang, 2022). Therefore, in order to maintain Mengniu's position in the future, investment and cooperation in cold chain transportation will be one of Mengniu's

important strategic directions.

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